SUPPLEMENTARY FIGURES

DATE: 15 SEPTEMBER 2022

Data and variables

The graphical outputs presented in this supplementary document include only papers with two or more citations. Two different diversity measures are used to represent the level of diversity in citing groups, i.e., the Gini-Simpson index and the Shannon index. Data from 2010 to 2019 (both inclusive) as publication years are presented. Diversity measures are calculated based on grouping all possible links between the cited paper and institutional affiliations of citing papers into bins as defined by the type of citing groups, i.e., institutions, countries, subregions, and regions, and also the citing papers by fields of research. We present various findings in terms of both means and medians, as both have their advantages and disadvantages in dealing with outliers, high number of repeat observations, etc., together along with other distributional analyses, to compare the performance of OA papers and closed papers in citation diversity.

Section A: Summary statistics for the overall data

The following figures present various summary statistics for our overall data. The top-left figure shows the overall number of paper (with DOIs) that are included in our study. These are grouped into their respective publication year as per Crossref metadata records. The top-right figure shows the yearly comparison between the amount of OA versus non-OA papers. There is a clear increase in the proportion of OA papers over the ten-year period. The bottom two figures depict the comparisons of mean and median, respectively, number of citations received by papers across different OA categories. There is a clear and consistent signal of OA papers receiving more citations when looking at the whole data set overall.

Figure: Annual DOI counts

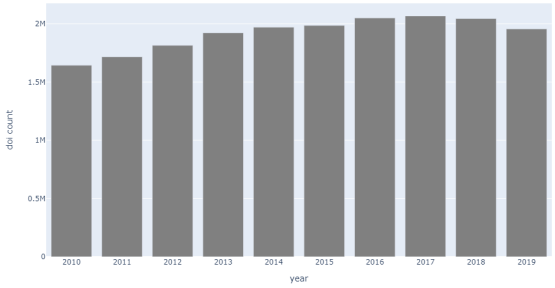


Figure: Annual OA versus non-OA DOI counts

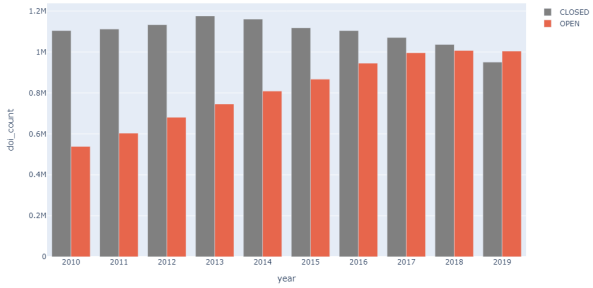


Figure: The mean citation count per OA category

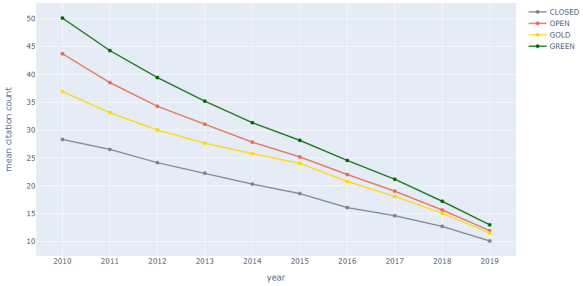
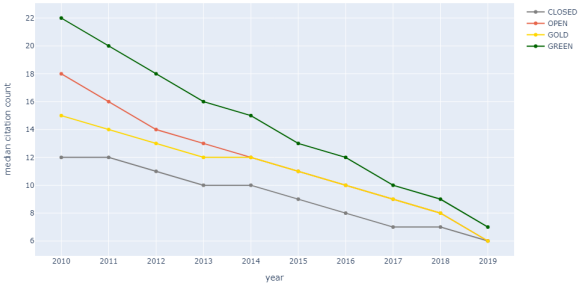


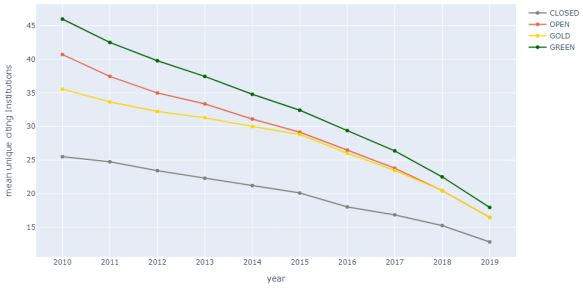
Figure: The median citation count per OA category



Section B: Number of unique citing groups - mean and median

The following figures track the mean and median numbers of unique citing groups over time and compares them across different OA categories and for closed papers. For example, to calculate the number of unique citing countries for a particular paper, we count the number of (unique) countries for which its citing papers are affiliated to. The main finding here is that OA papers garners more unique citing groups almost consistently over time. Furthermore, papers that are Green OA garners the highest number of unique citing groups. We do note however that papers published Gold OA are also likely to be published Green OA. This means these papers potentially gets the benefits of both routes of OA. We also note that flat pattern for the median number of unique citing regions is the result of low number of possible regions, and a similar pattern is shown for the median number of unique citing fields due to most citations occurring within-field for a large portion of papers that have low citation counts.

Figure: The mean number of unique citing Institutions



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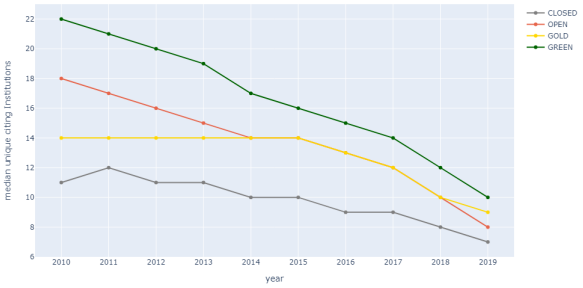


Figure: The mean number of unique citing Countries

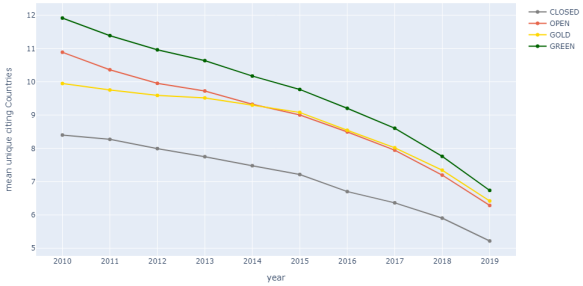


Figure: The median number of unique citing Countries

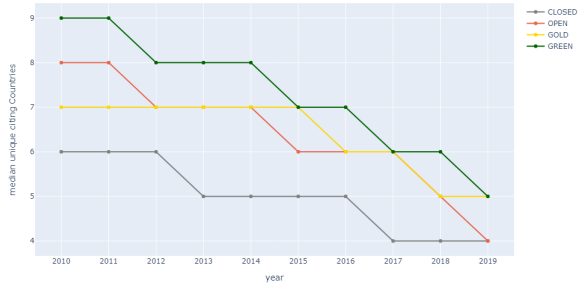


Figure: The mean number of unique citing Subregions

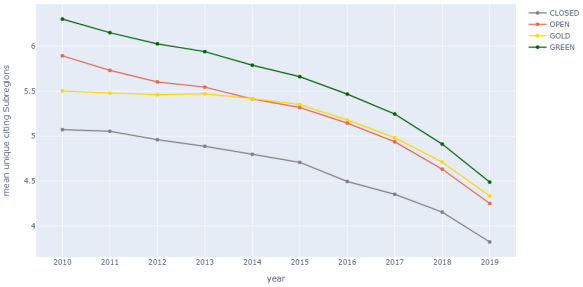


Figure: The median number of unique citing Subregions

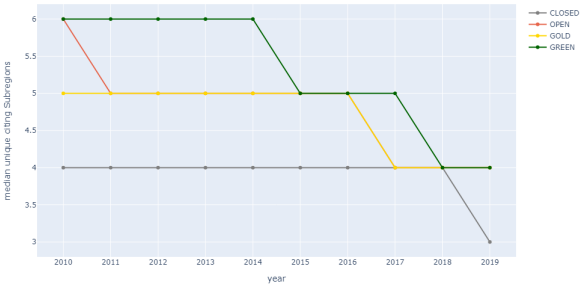


Figure: The mean number of unique citing Fields

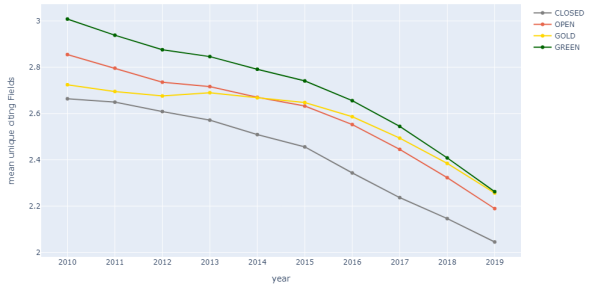


Figure: The median number of unique citing Fields

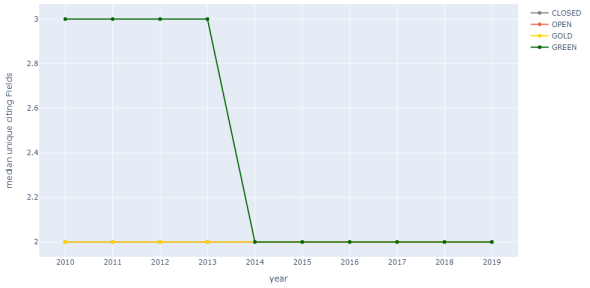


Figure: The mean number of unique citing Regions

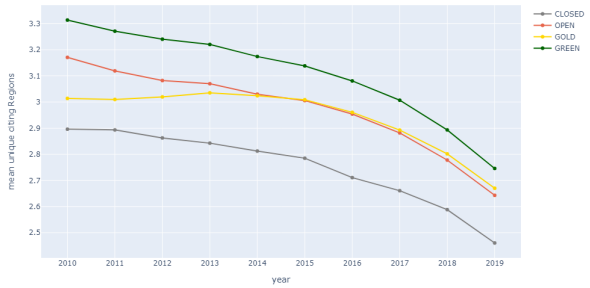
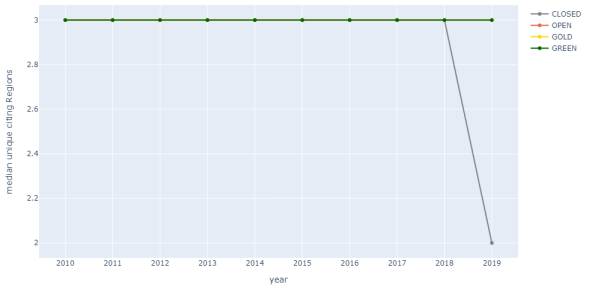


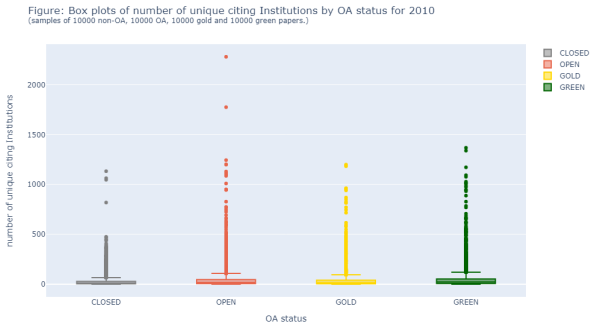
Figure: The median number of unique citing Regions

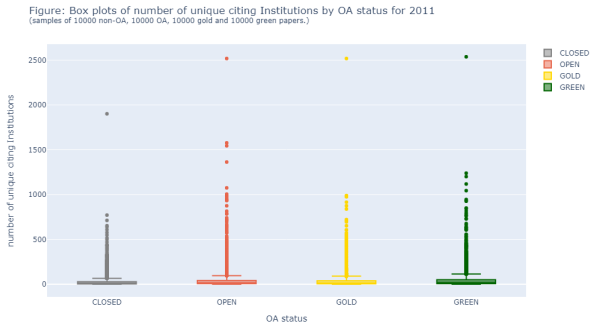


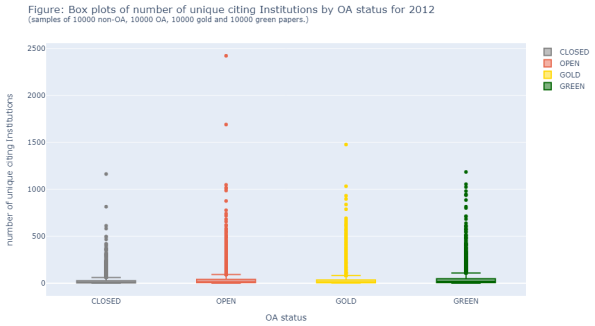
Section C: Number of unique citing groups - box plots

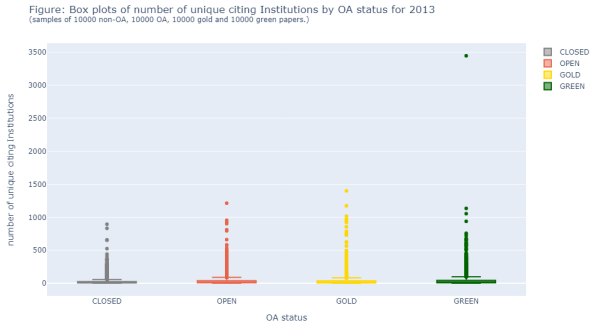
This section extends the comparison of unique citing groups to their respective distributions, as represented by box plots. To ensure robust comparisons, we sample 10,000 papers independently from each OA category and closed papers, for each year of publication. The quartiles of numbers of unique citing groups are shown together with potential outliers in each category. The general pattern observed is that OA papers attract higher number of unique citing groups, which is signalled both by the distributional differences and many more outliers in the upper tail. Again, it is noted that this general pattern can be diluted by the low number of regions in the regional comparisons. For the cases of institutional groupings, the very high numbers of upper outliers skew the figures but the general pattern applies.

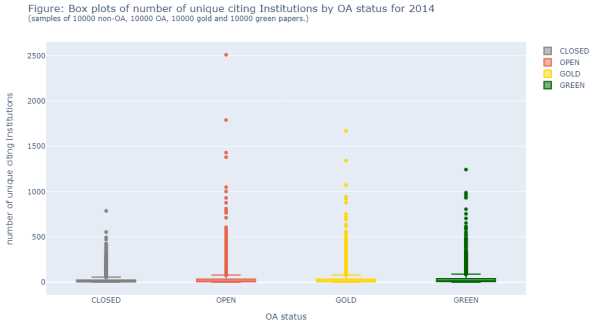
The first set of these is based on Institutions as citing groups:

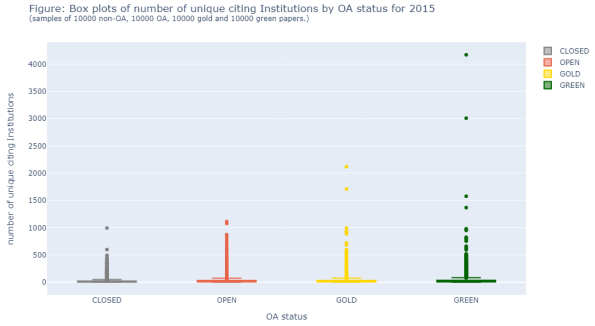


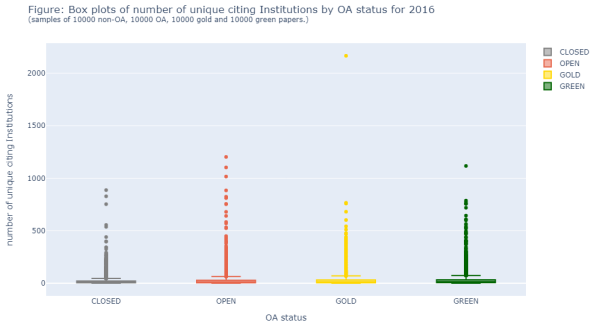












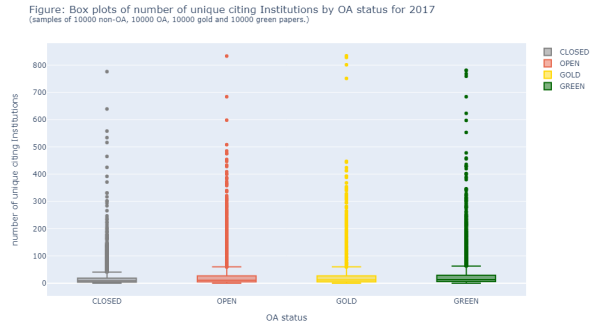


Figure: Box plots of number of unique citing Institutions by OA status for 2018
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

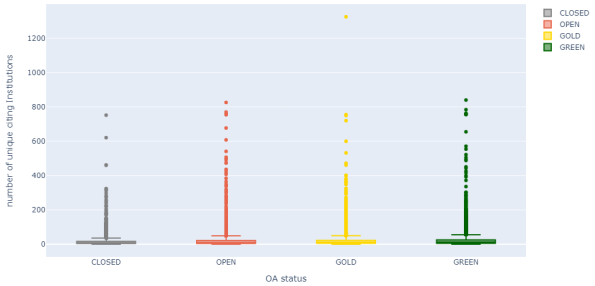


Figure: Box plots of number of unique citing Institutions by OA status for 2019
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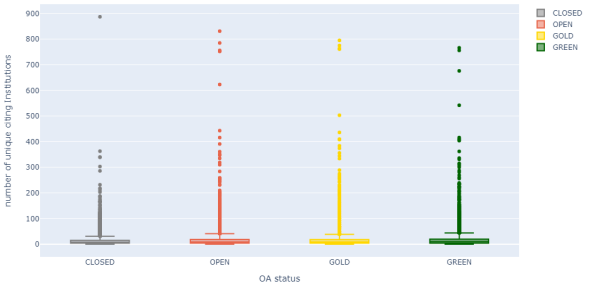
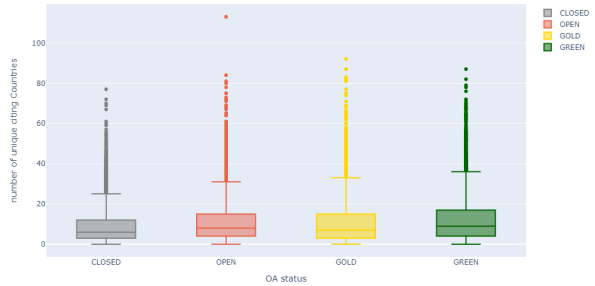


The next set is based on Countries as citing groups:

Figure: Box plots of number of unique citing Countries by OA status for 2010
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



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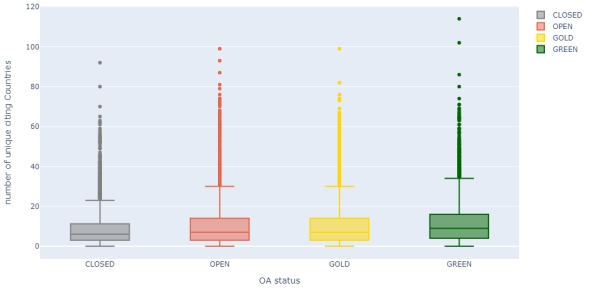

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(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

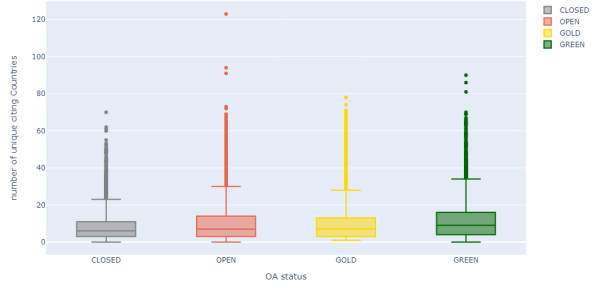


Figure: Box plots of number of unique citing Countries by OA status for 2013
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

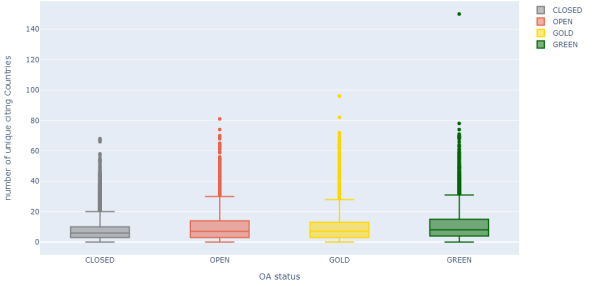


Figure: Box plots of number of unique citing Countries by OA status for 2014
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

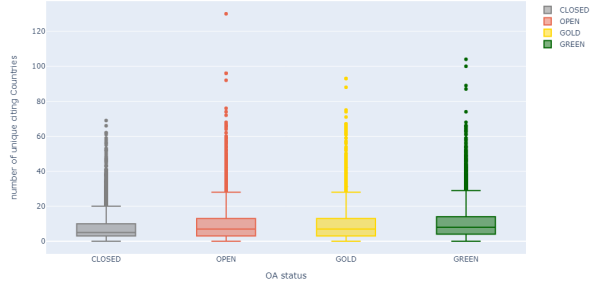
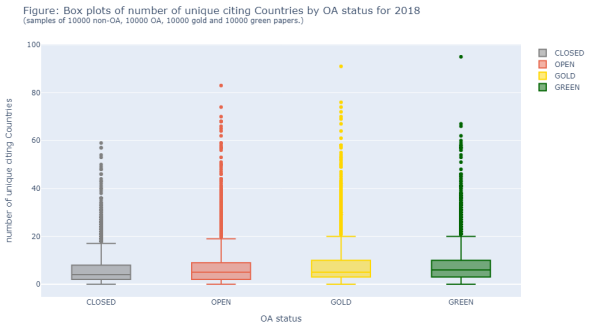
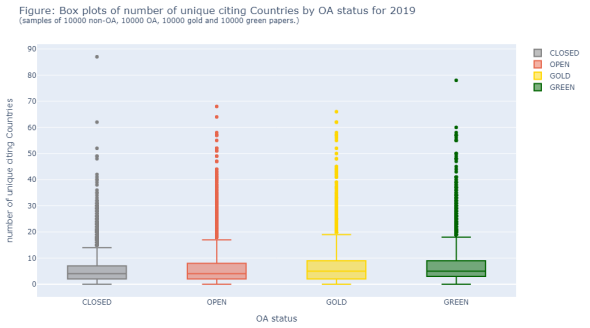


Figure: Box plots of number of unique citing Countries by OA status for 2015
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

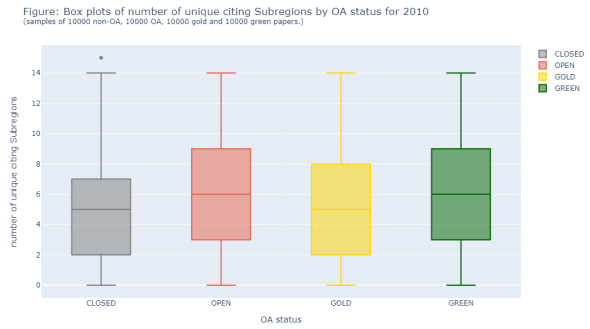
Figure: Box plots of number of unique citing Countries by OA status for 2016
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

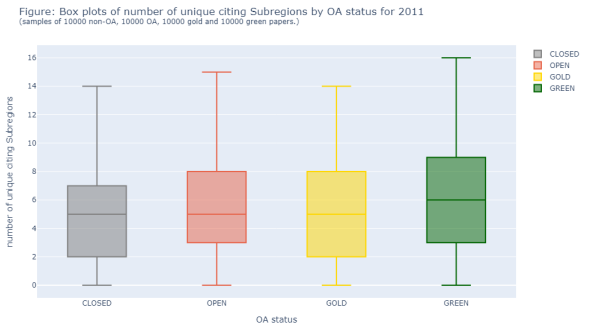
Figure: Box plots of number of unique citing Countries by OA status for 2017
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

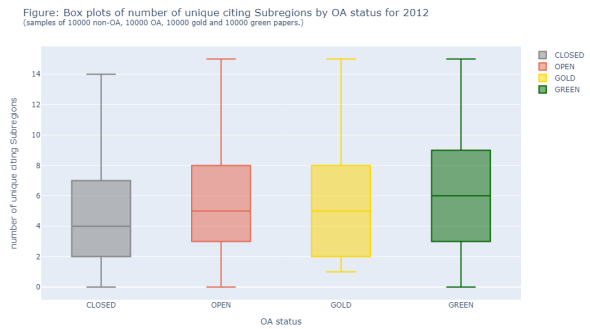


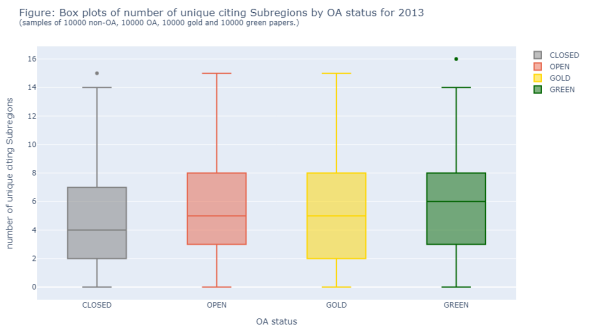


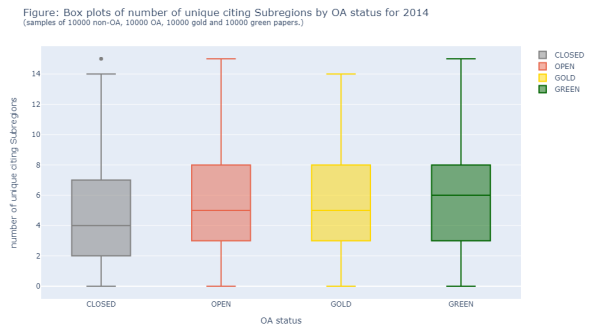
The next set is based on Subregions as citing groups:

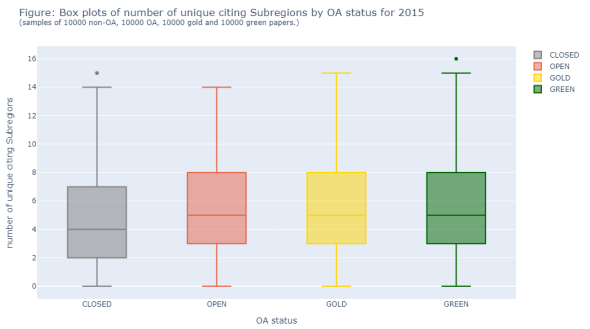


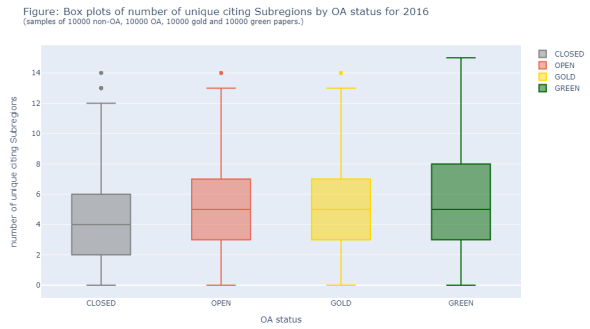












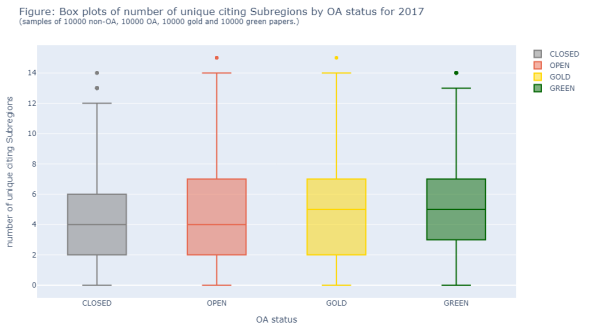


Figure: Box plots of number of unique citing Subregions by OA status for 2018
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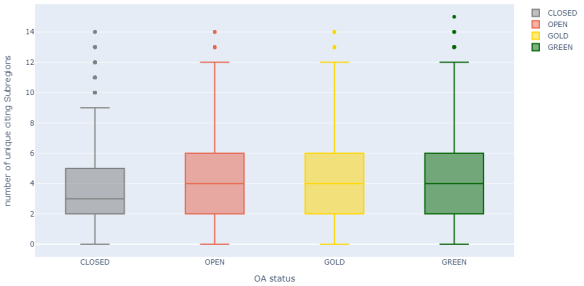


The next set is based on Regions as citing groups:

Figure: Box plots of number of unique citing Regions by OA status for 2010
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

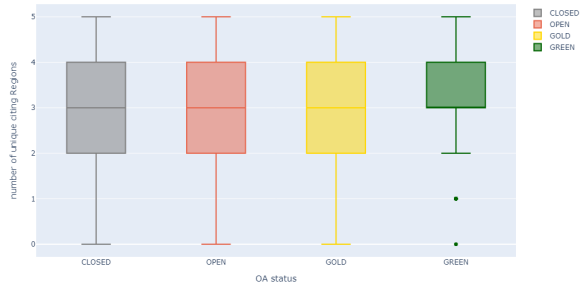
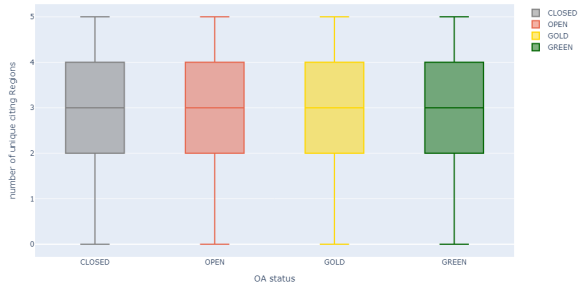


Figure: Box plots of number of unique citing Regions by OA status for 2011
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



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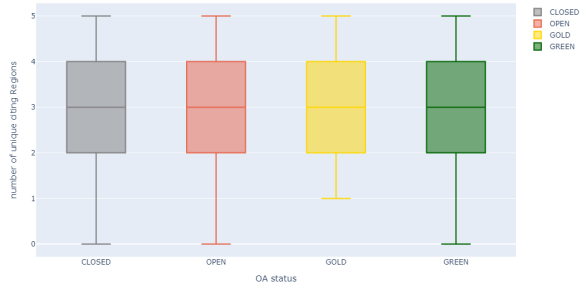

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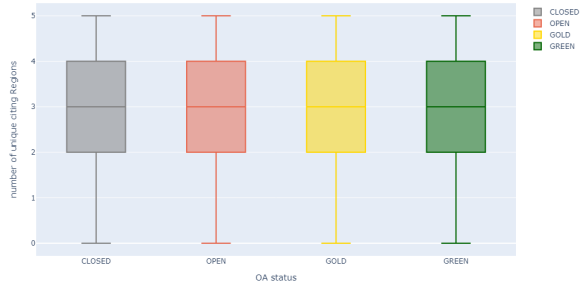


Figure: Box plots of number of unique citing Regions by OA status for 2015
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

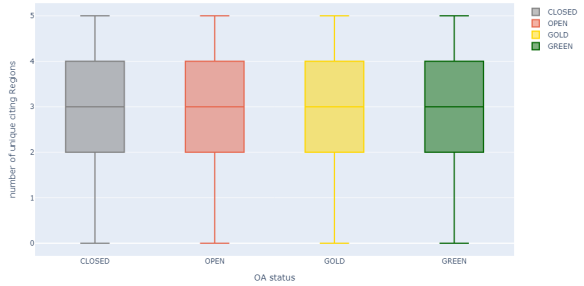


Figure: Box plots of number of unique citing Regions by OA status for 2016
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

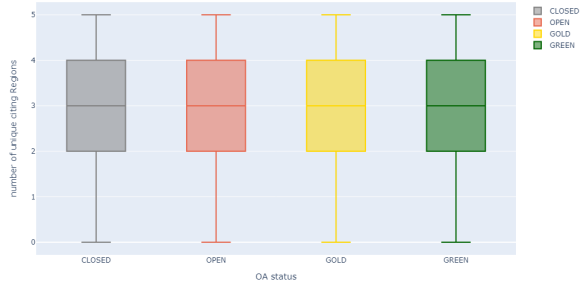


Figure: Box plots of number of unique citing Regions by OA status for 2017
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

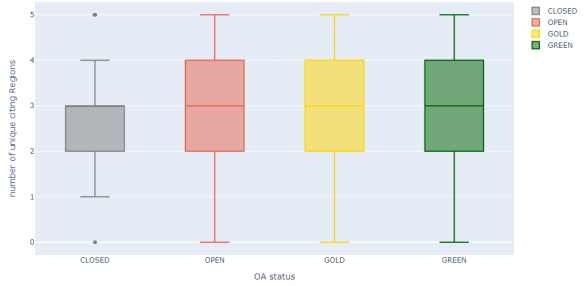


Figure: Box plots of number of unique citing Regions by OA status for 2018
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

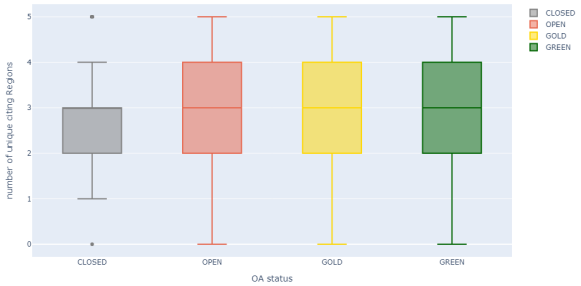
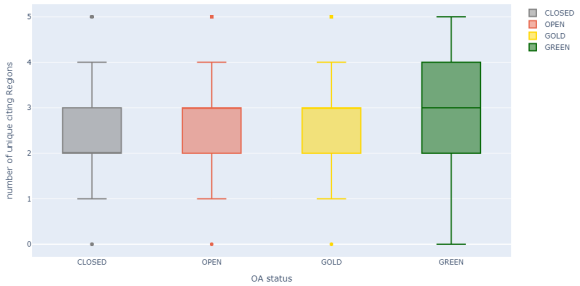


Figure: Box plots of number of unique citing Regions by OA status for 2019
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



The next set is based on the Fields as citing groups:

Figure: Box plots of number of unique citing Fields by OA status for 2010
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of number of unique citing Fields by OA status for 2011
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

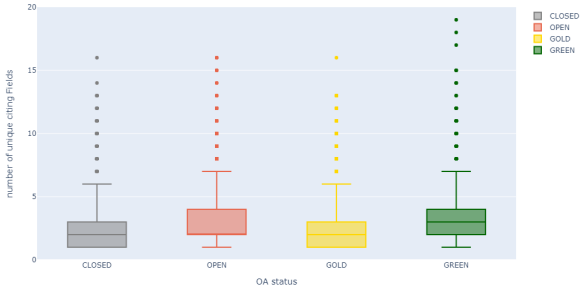


Figure: Box plots of number of unique citing Fields by OA status for 2012
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of number of unique citing Fields by OA status for 2013
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of number of unique citing Fields by OA status for 2014
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of number of unique citing Fields by OA status for 2015
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of number of unique citing Fields by OA status for 2016
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of number of unique citing Fields by OA status for 2017
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

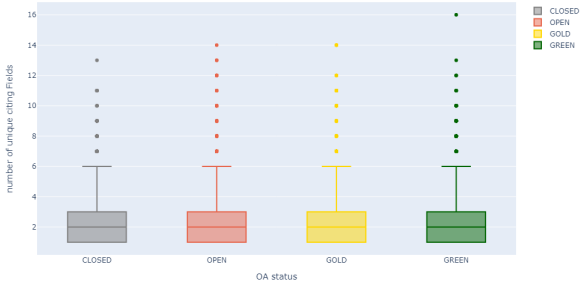


Figure: Box plots of number of unique citing Fields by OA status for 2018
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

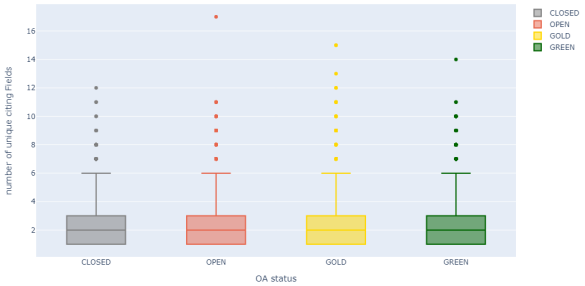
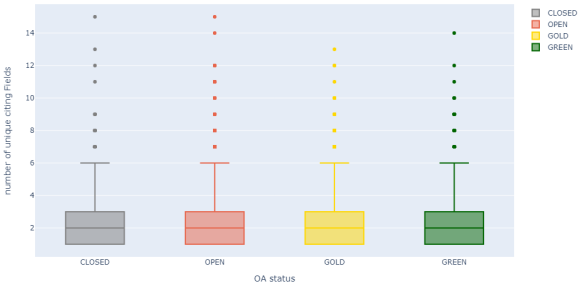


Figure: Box plots of number of unique citing Fields by OA status for 2019
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



Section D: Citation diversity scores - mean and median

In this section, we present the summary results of the diversity scores for papers in the various OA categories. Here, we include all papers in our study. In the following figures, mean and median diversity scores are tracked over ten years. This is plotted for various combinations of diversity measure and citing group. Throughout the different measures across different citing groups, we find OA papers to score higher in diversity. This is also consistently observed for all years included in the analysis. Green OA seems to lead in the diversity scores, which is also consistent with earlier comparisons on numbers of unique citing groups.

The first set of these is based on the Gini-Simpson index:

Figure: The mean GiniSim index of citing Institutions

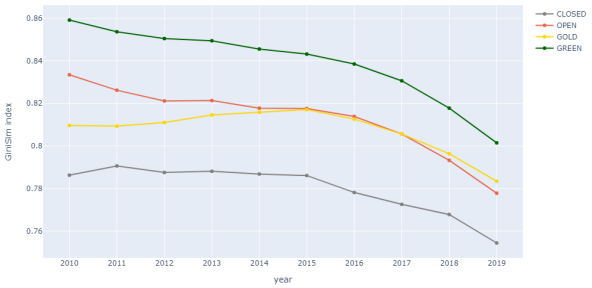


Figure: The median GiniSim index of citing Institutions

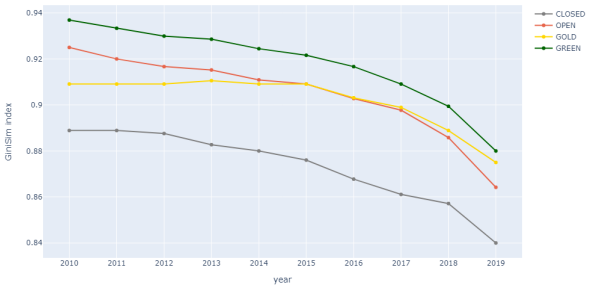


Figure: The mean GiniSim index of citing Countries

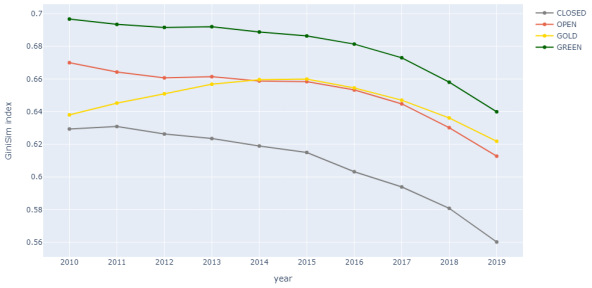


Figure: The median GiniSim index of citing Countries

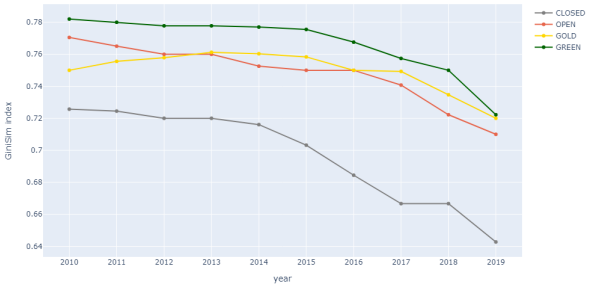


Figure: The mean GiniSim index of citing Subregions

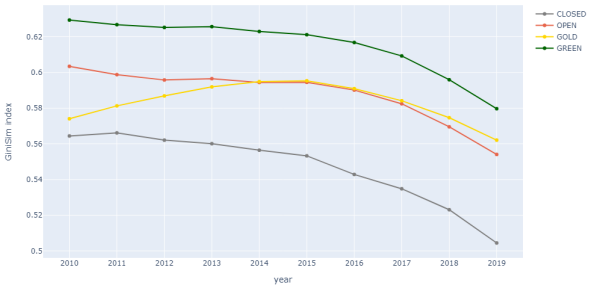


Figure: The median GiniSim index of citing Subregions

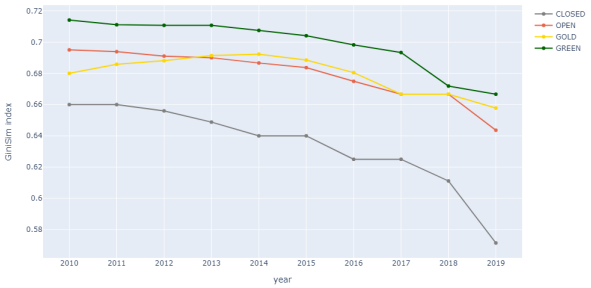


Figure: The mean GiniSim index of citing Regions

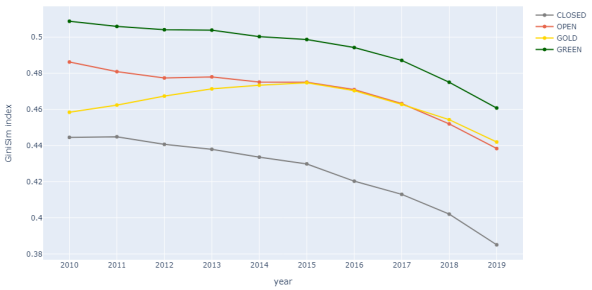


Figure: The median GiniSim index of citing Regions

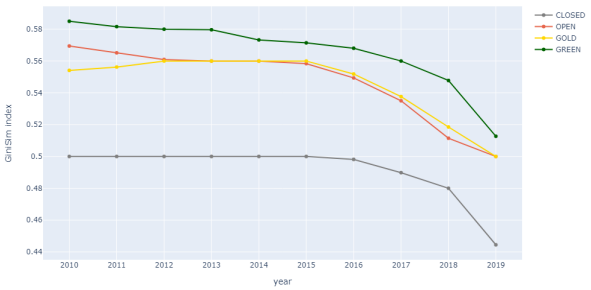


Figure: The mean GiniSim index of citing Fields

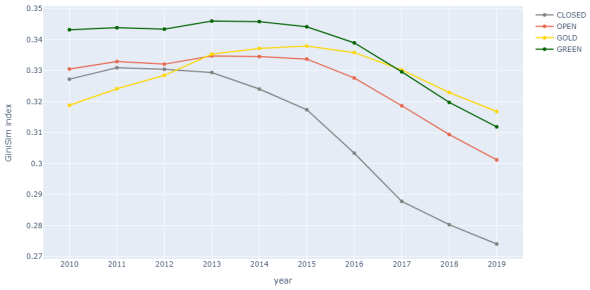
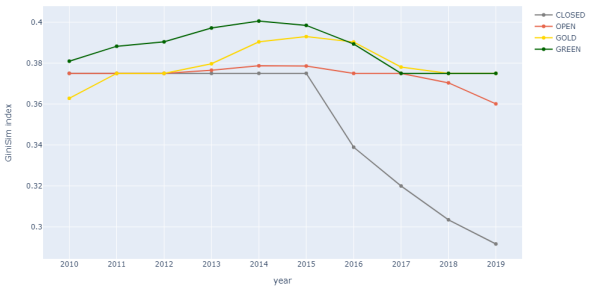


Figure: The median GiniSim index of citing Fields



The next set is based on the Shannon index:

Figure: The mean Shannon index of citing Institutions

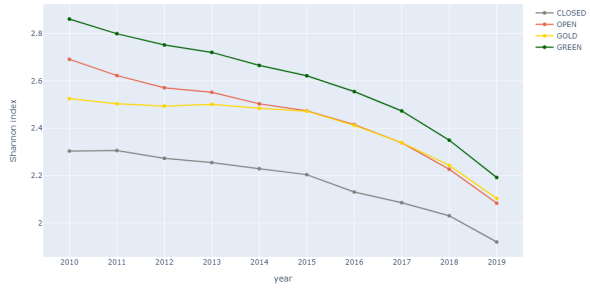


Figure: The median Shannon index of citing Institutions

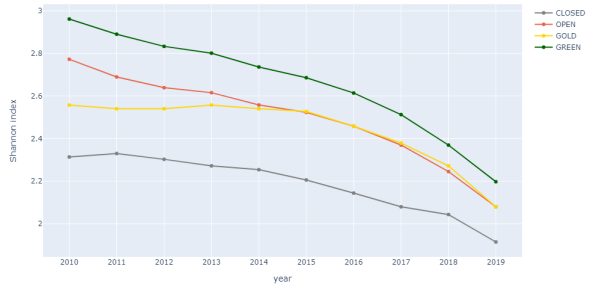


Figure: The mean Shannon index of citing Countries

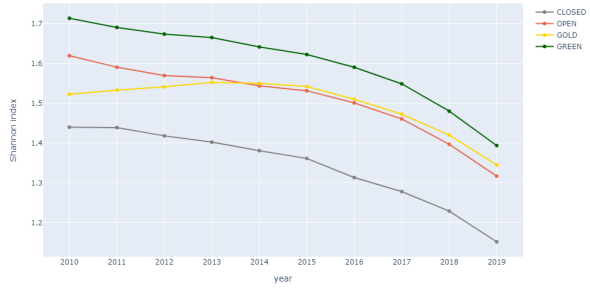


Figure: The median Shannon index of citing Countries

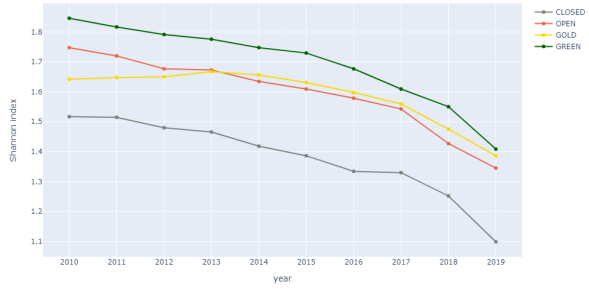


Figure: The mean Shannon index of citing Subregions

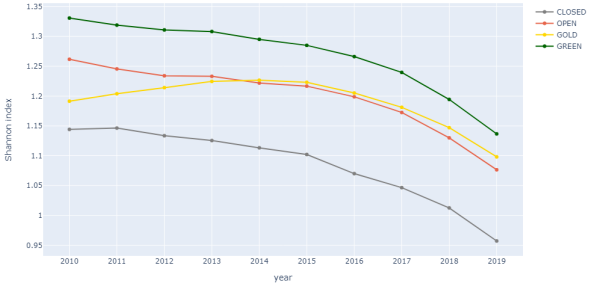


Figure: The median Shannon index of citing Subregions

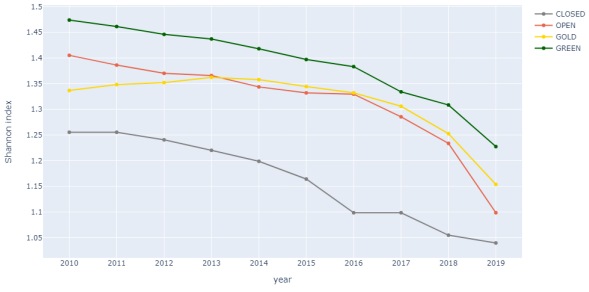


Figure: The mean Shannon index of citing Regions

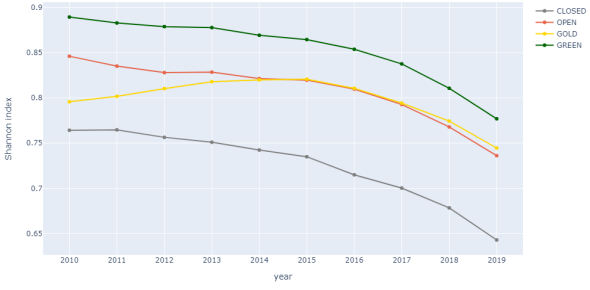


Figure: The median Shannon index of citing Regions

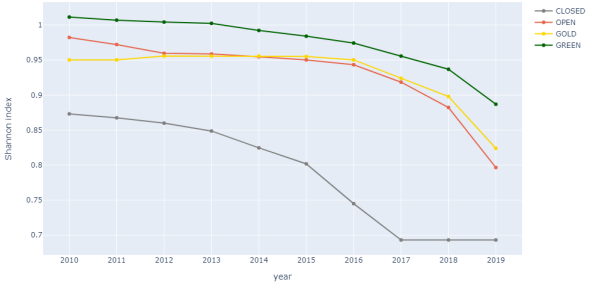


Figure: The mean Shannon index of citing Fields

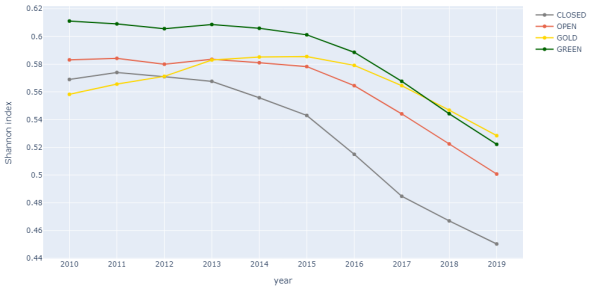
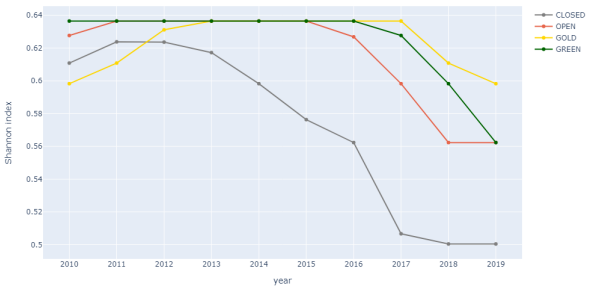


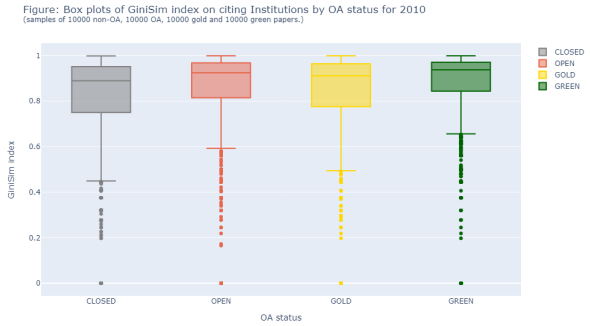
Figure: The median Shannon index of citing Fields

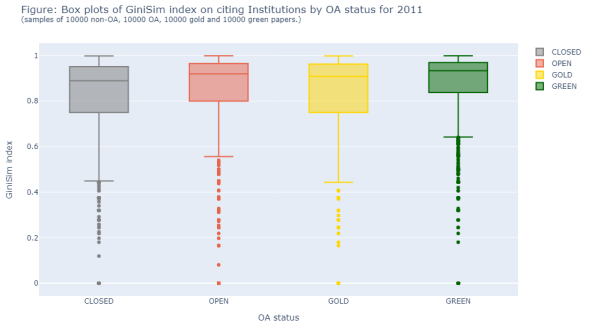


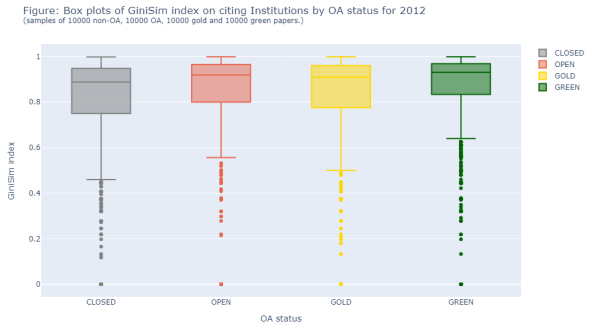
Section E: Citation diversity scores - box plots

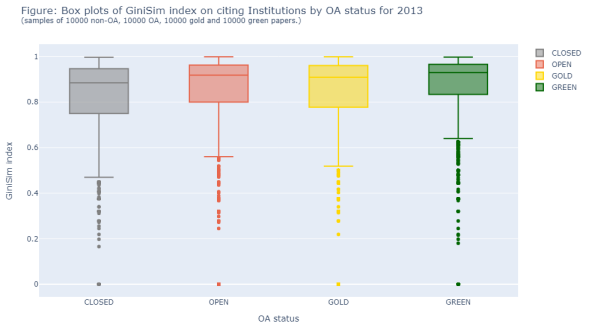
In the following figures, the distributions of diversity scores of papers (as per citing group) of different OA categories are compared. Random samples of 10,000 papers from each OA category and 10,000 closed papers are used in this comparison. The skewness towards the lower tails in the case of Gini-Simpson index scores is driven by the high number of papers that receives low number of citations (hence low diversity scores). In line with earlier findings, OA papers produce higher diversity scores. Again, it is interesting to note the raised distribution of Green OA compared to other categories. The non-OA category consistently have a longer lower tail in the Gini-Simpson scores, while Green OA papers often have the shortest lower tail. For the Shannon index, a parallel observation can be made with non-OA papers producing shorter upper tails. We note again the small number effect on some figures.

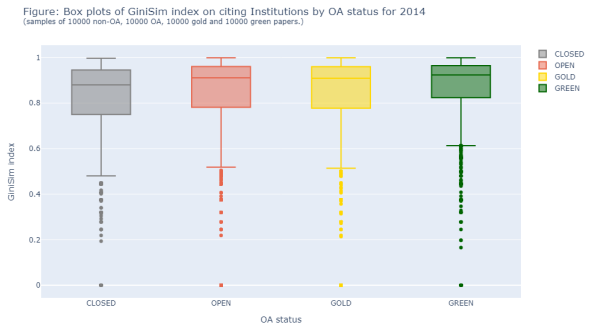
The first set of these is based on the Gini-Simpson index and institutions as citing groups:











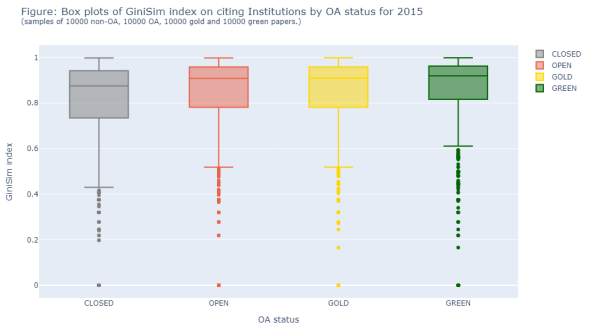


Figure: Box plots of GiniSim index on citing Institutions by OA status for 2016
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

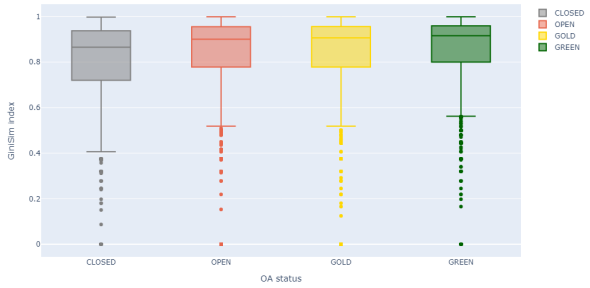


Figure: Box plots of GiniSim index on citing Institutions by OA status for 2017
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

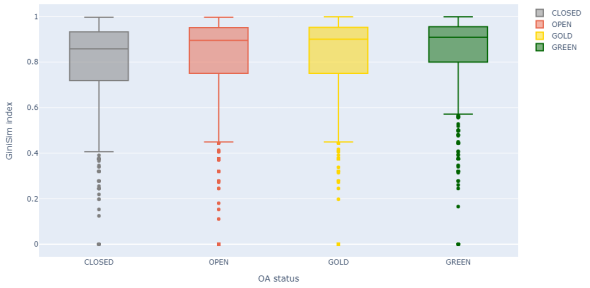


Figure: Box plots of GiniSim index on citing Institutions by OA status for 2018
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

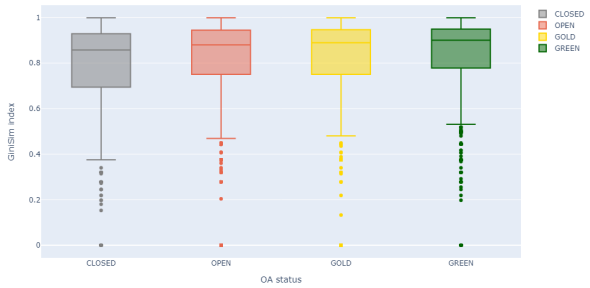
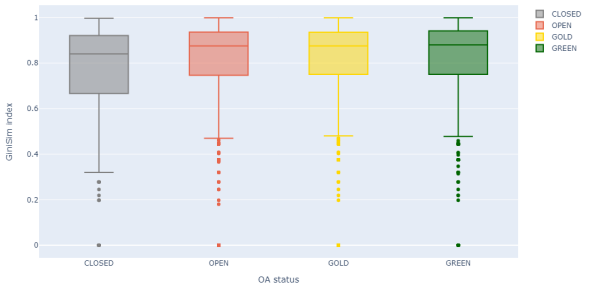


Figure: Box plots of GiniSim index on citing Institutions by OA status for 2019
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



The next set is based on the Gini-Simpson index and countries as citing groups:

Figure: Box plots of GiniSim index on citing Countries by OA status for 2010
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

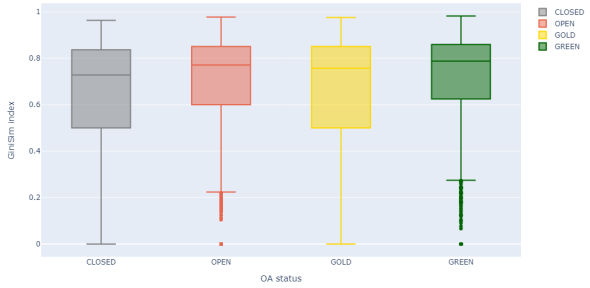


Figure: Box plots of GiniSim index on citing Countries by OA status for 2011
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

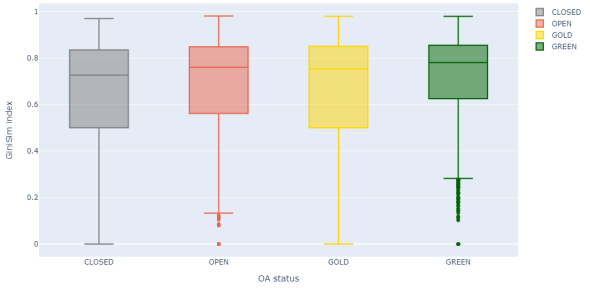


Figure: Box plots of GiniSim index on citing Countries by OA status for 2012
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

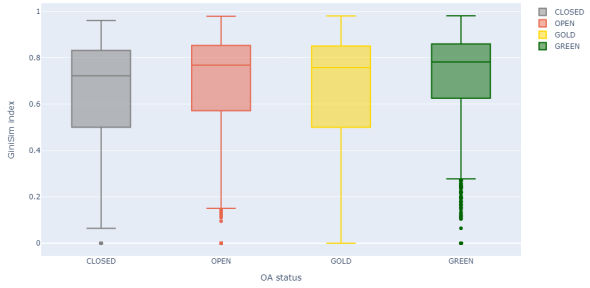


Figure: Box plots of GiniSim index on citing Countries by OA status for 2013
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

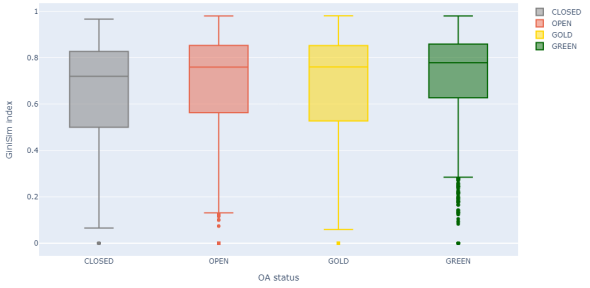


Figure: Box plots of GiniSim index on citing Countries by OA status for 2014
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

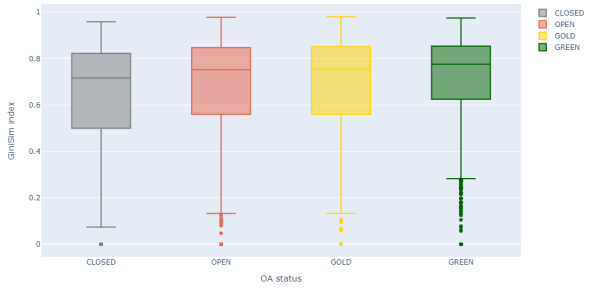
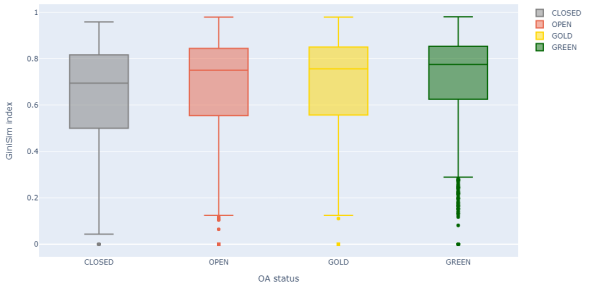
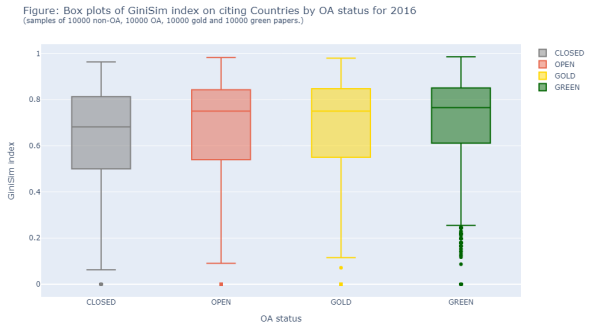
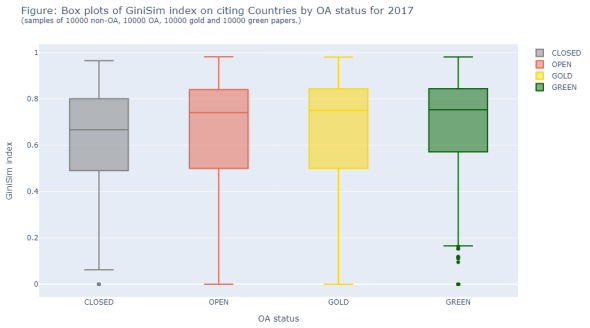
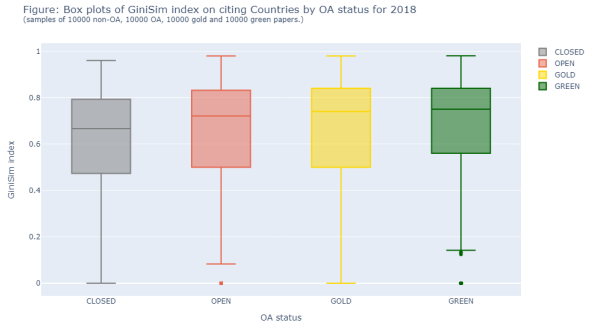


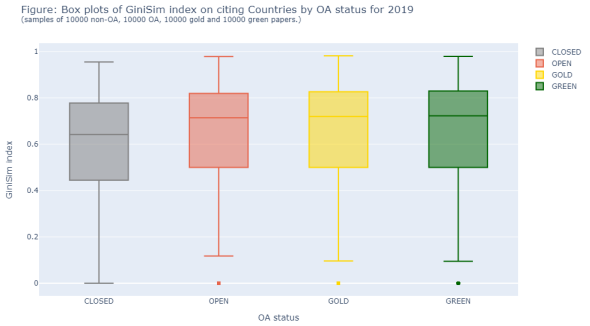
Figure: Box plots of GiniSim index on citing Countries by OA status for 2015
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



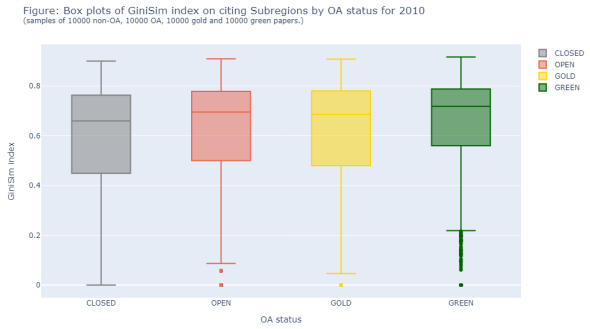


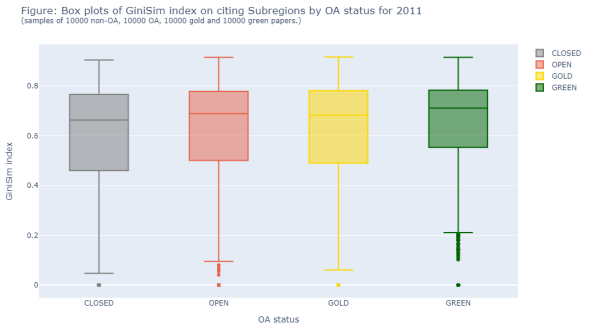


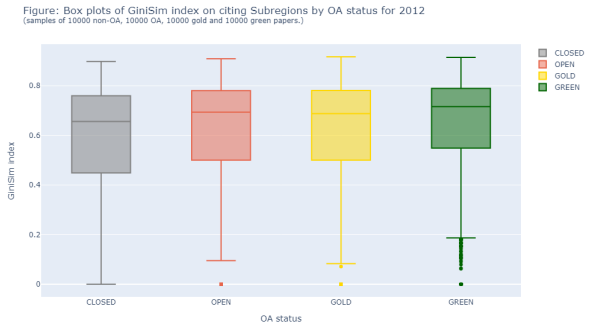


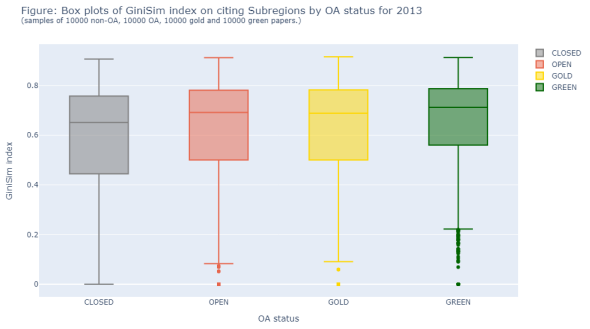


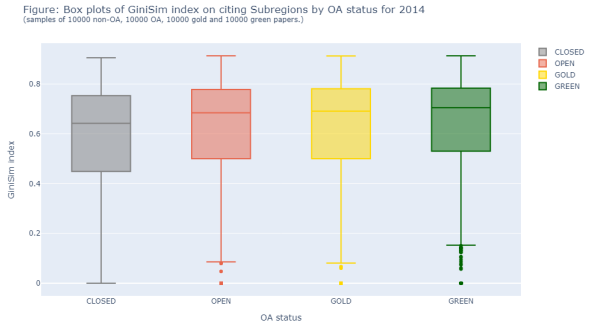
The next set is based on the Gini-Simpson index and Subregions as citing groups:











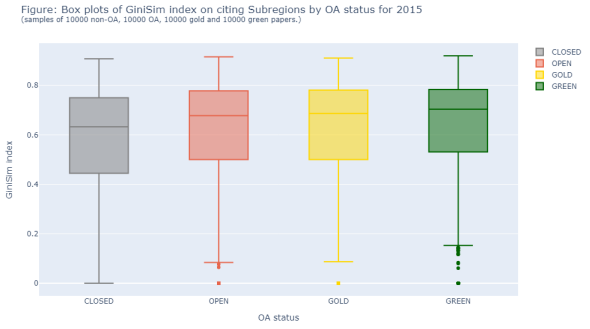


Figure: Box plots of GiniSim index on citing Subregions by OA status for 2016
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

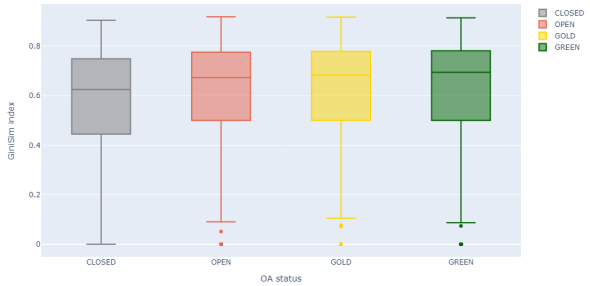


Figure: Box plots of GiniSim index on citing Subregions by OA status for 2017
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

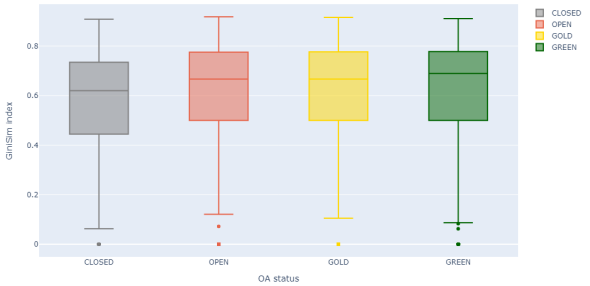


Figure: Box plots of GiniSim index on citing Subregions by OA status for 2018
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

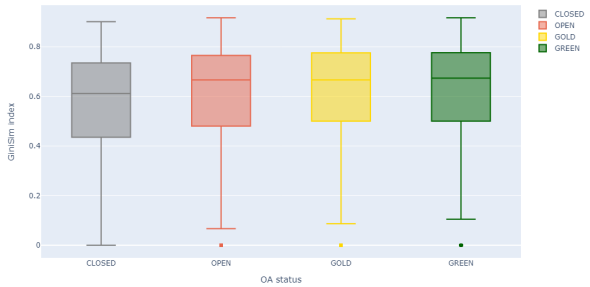
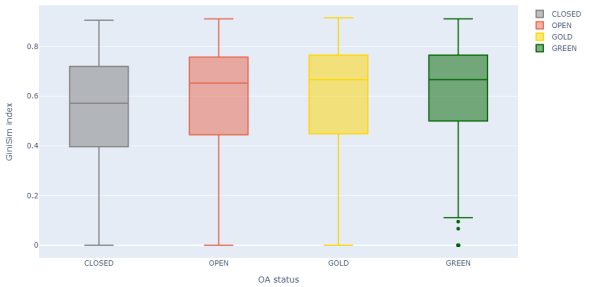


Figure: Box plots of GiniSim index on citing Subregions by OA status for 2019
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



The next set is based on the Gini-Simpson index and Regions as citing groups:

Figure: Box plots of GiniSim index on citing Regions by OA status for 2010
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

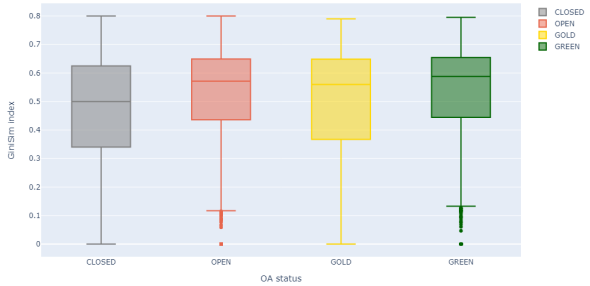


Figure: Box plots of GiniSim index on citing Regions by OA status for 2011
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

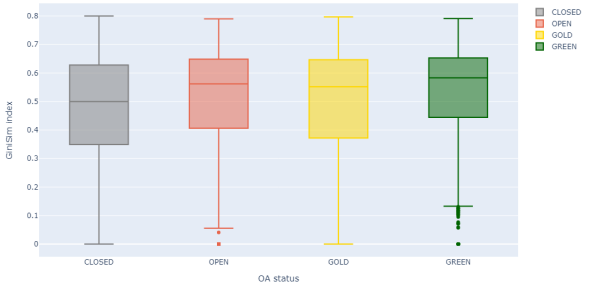


Figure: Box plots of GiniSim index on citing Regions by OA status for 2012
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

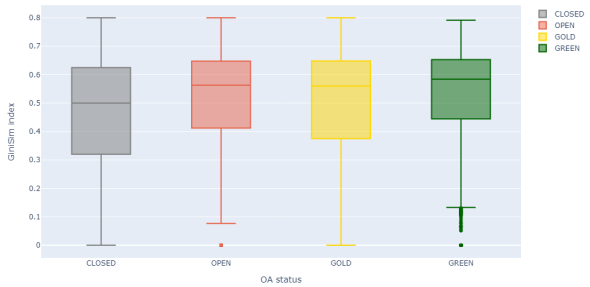


Figure: Box plots of GiniSim index on citing Regions by OA status for 2013
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

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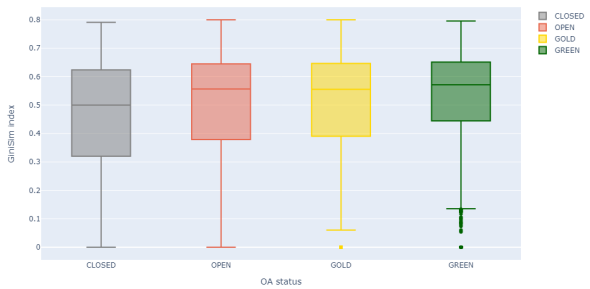


Figure: Box plots of GiniSim index on citing Regions by OA status for 2015
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

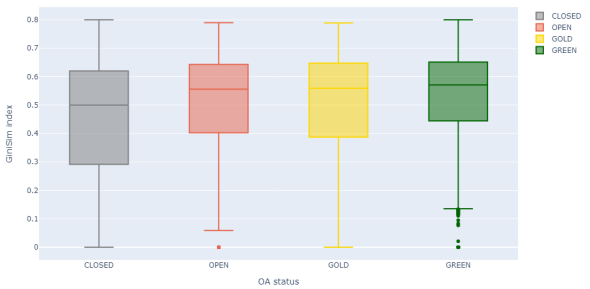


Figure: Box plots of GiniSim index on citing Regions by OA status for 2016
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

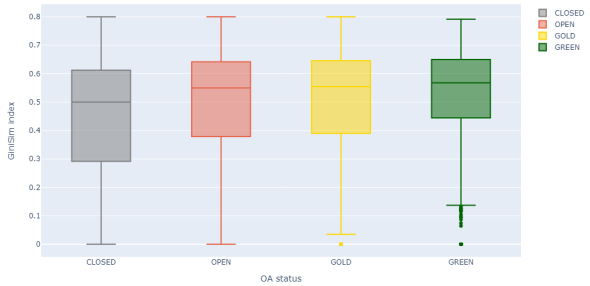


Figure: Box plots of GiniSim index on citing Regions by OA status for 2017
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

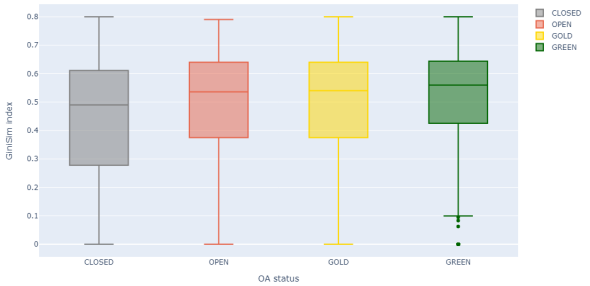


Figure: Box plots of GiniSim index on citing Regions by OA status for 2018
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

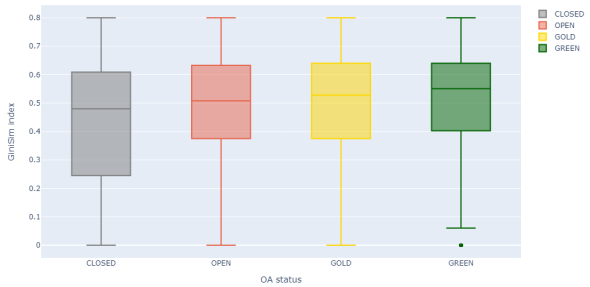


Figure: Box plots of GiniSim index on citing Regions by OA status for 2019
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

The next set is based on the Gini-Simpson index and Fields as citing groups:

Figure: Box plots of GiniSim index on citing Fields by OA status for 2010
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

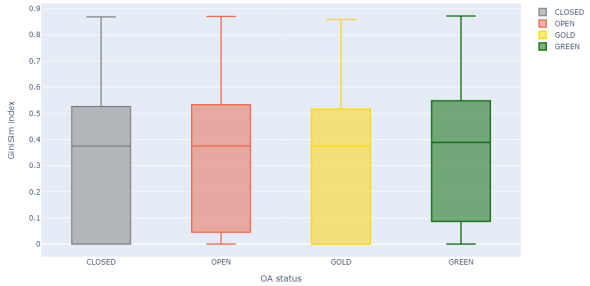


Figure: Box plots of GiniSim index on citing Fields by OA status for 2011
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of GiniSim index on citing Fields by OA status for 2012
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of GiniSim index on citing Fields by OA status for 2013
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

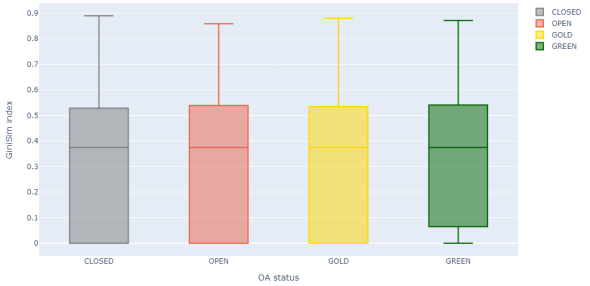


Figure: Box plots of GiniSim index on citing Fields by OA status for 2014
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

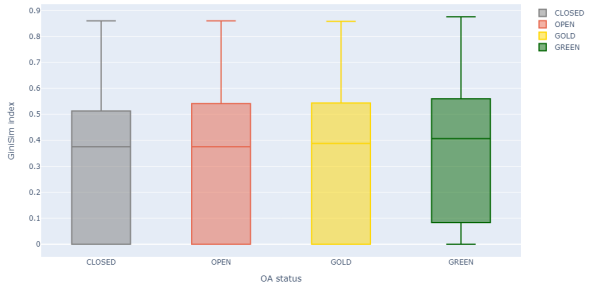


Figure: Box plots of GiniSim index on citing Fields by OA status for 2015
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

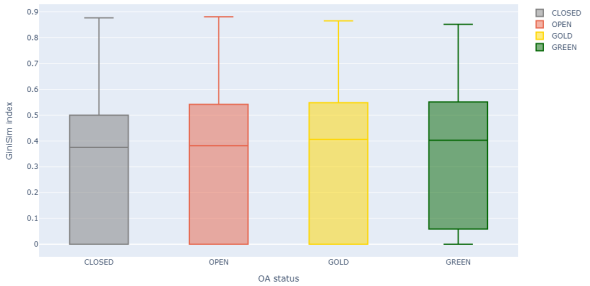


Figure: Box plots of GiniSim index on citing Fields by OA status for 2016
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

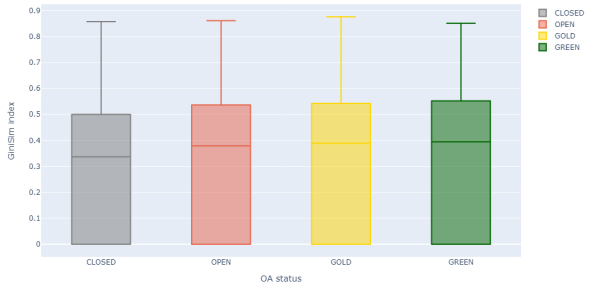


Figure: Box plots of GiniSim index on citing Fields by OA status for 2017
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

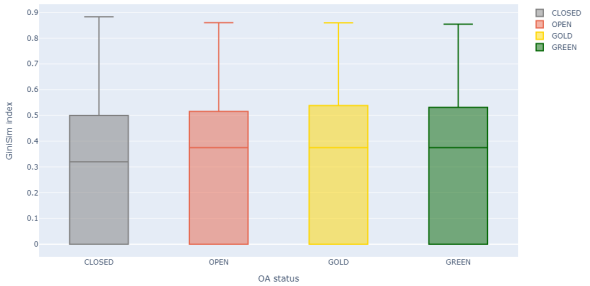


Figure: Box plots of GiniSim index on citing Fields by OA status for 2018
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

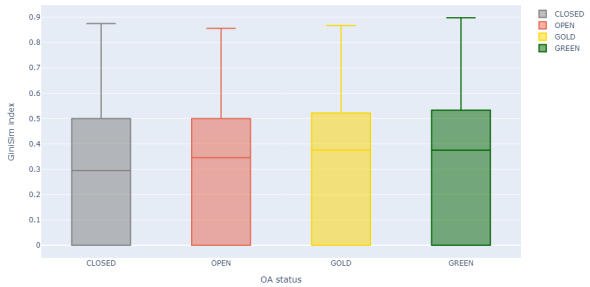
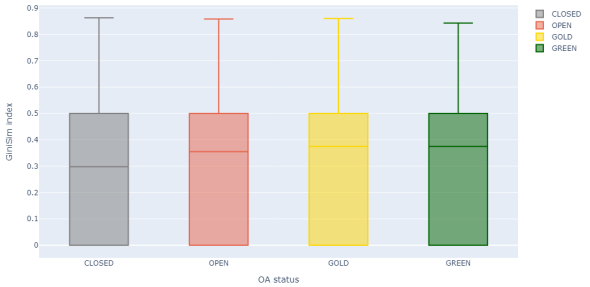


Figure: Box plots of GiniSim index on citing Fields by OA status for 2019
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



The next set is based on the Shannon index and institutions as citing groups:

Figure: Box plots of Shannon index on citing Institutions by OA status for 2010
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

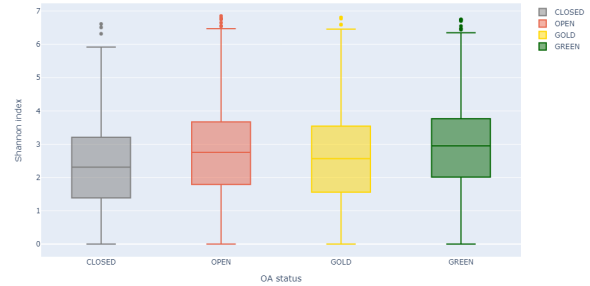


Figure: Box plots of Shannon index on citing Institutions by OA status for 2011
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

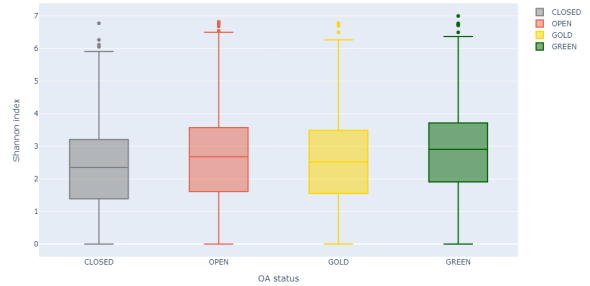


Figure: Box plots of Shannon index on citing Institutions by OA status for 2012
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of Shannon index on citing Institutions by OA status for 2013
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

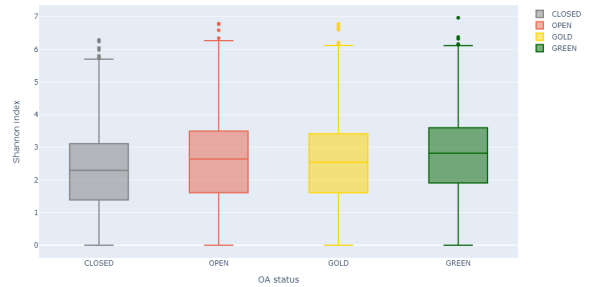


Figure: Box plots of Shannon index on citing Institutions by OA status for 2014
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

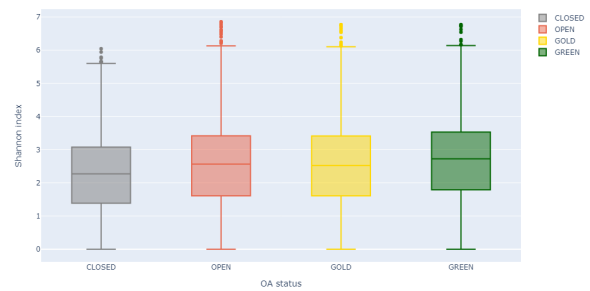


Figure: Box plots of Shannon index on citing Institutions by OA status for 2015
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of Shannon index on citing Institutions by OA status for 2016
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

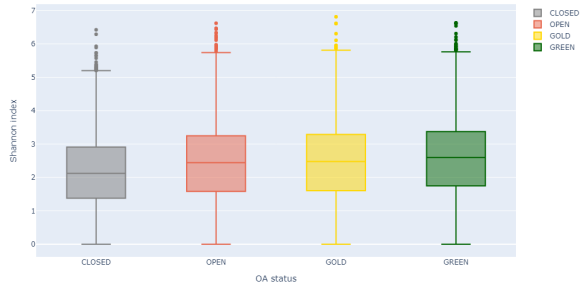


Figure: Box plots of Shannon index on citing Institutions by OA status for 2017
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

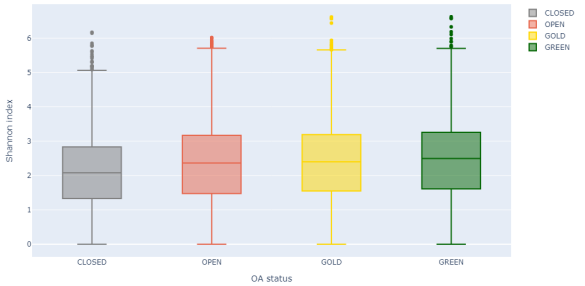


Figure: Box plots of Shannon index on citing Institutions by OA status for 2018
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

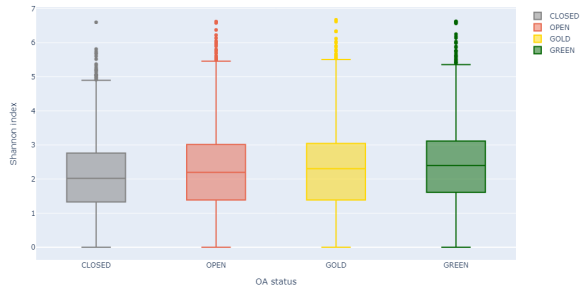
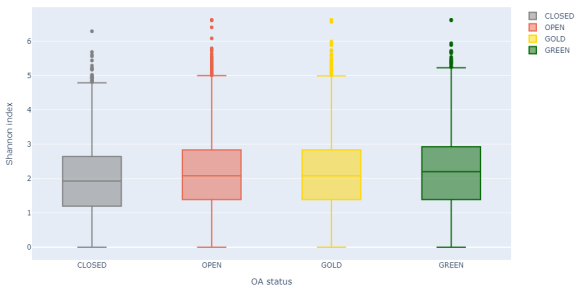


Figure: Box plots of Shannon index on citing Institutions by OA status for 2019
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



The next set is based on the Shannon index and countries as citing groups:

Figure: Box plots of Shannon index on citing Countries by OA status for 2010
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

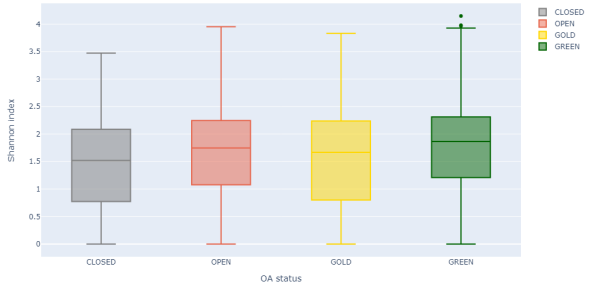


Figure: Box plots of Shannon index on citing Countries by OA status for 2011
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of Shannon index on citing Countries by OA status for 2012
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

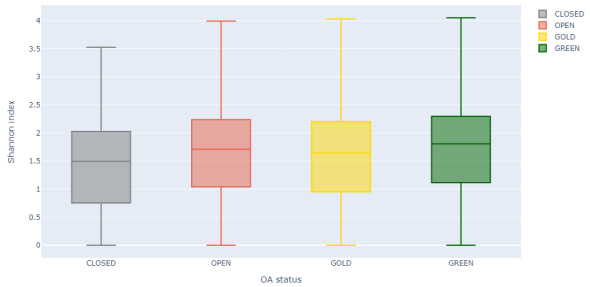


Figure: Box plots of Shannon index on citing Countries by OA status for 2013
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of Shannon index on citing Countries by OA status for 2014
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

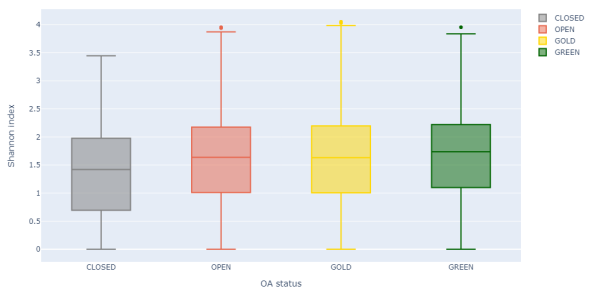


Figure: Box plots of Shannon index on citing Countries by OA status for 2015
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of Shannon index on citing Countries by OA status for 2016
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

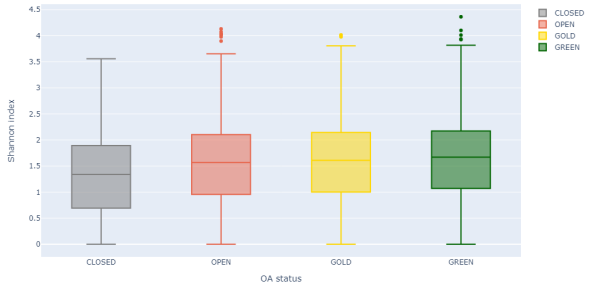


Figure: Box plots of Shannon index on citing Countries by OA status for 2017
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of Shannon index on citing Countries by OA status for 2018
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

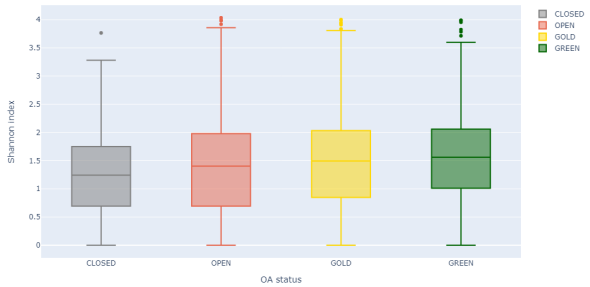
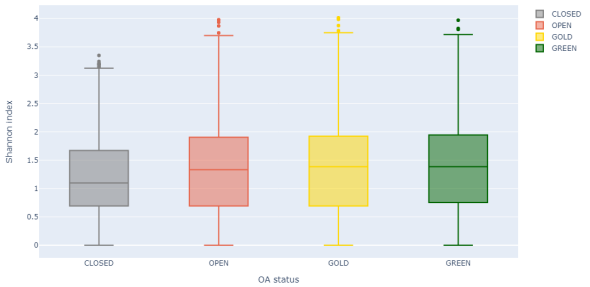


Figure: Box plots of Shannon index on citing Countries by OA status for 2019
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



The next set is based on the Shannon index and Subregions as citing groups:

Figure: Box plots of Shannon index on citing Subregions by OA status for 2010
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

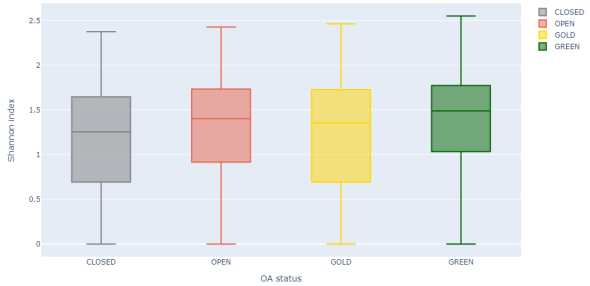


Figure: Box plots of Shannon index on citing Subregions by OA status for 2011
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of Shannon index on citing Subregions by OA status for 2012
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

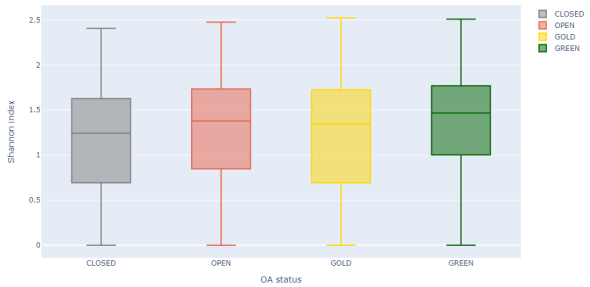


Figure: Box plots of Shannon index on citing Subregions by OA status for 2013
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

Figure: Box plots of Shannon index on citing Subregions by OA status for 2014
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

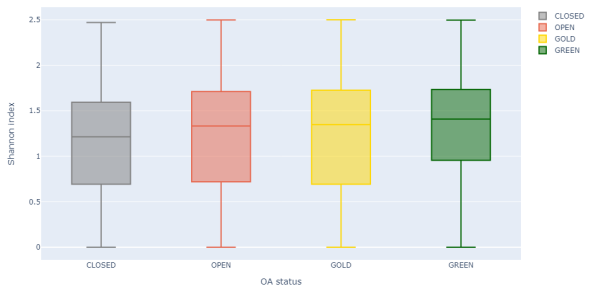


Figure: Box plots of Shannon index on citing Subregions by OA status for 2015
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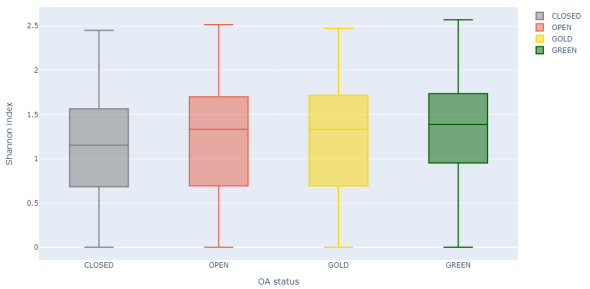

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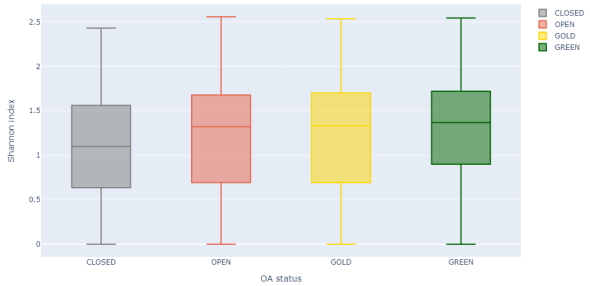

Figure: Box plots of Shannon index on citing Subregions by OA status for 2017
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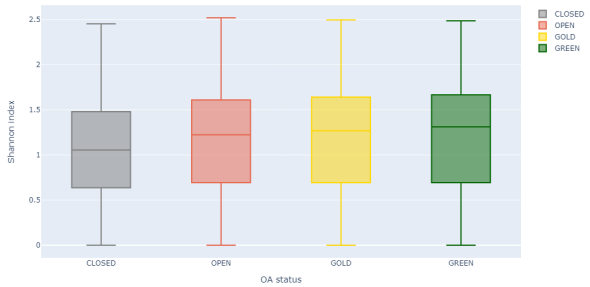
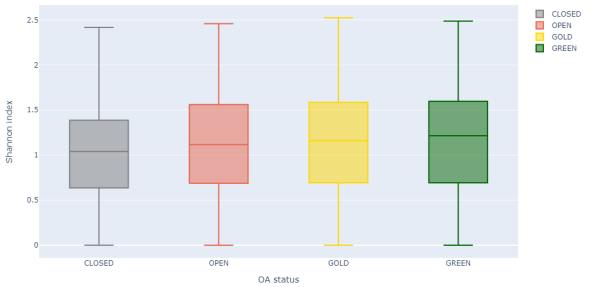


Figure: Box plots of Shannon index on citing Subregions by OA status for 2019
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



The next set is based on the Shannon index and Regions as citing groups:

Figure: Box plots of Shannon index on citing Regions by OA status for 2010
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

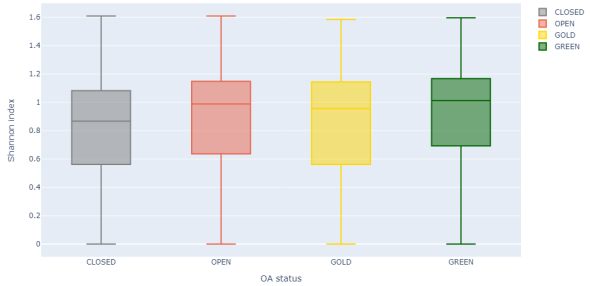


Figure: Box plots of Shannon index on citing Regions by OA status for 2011
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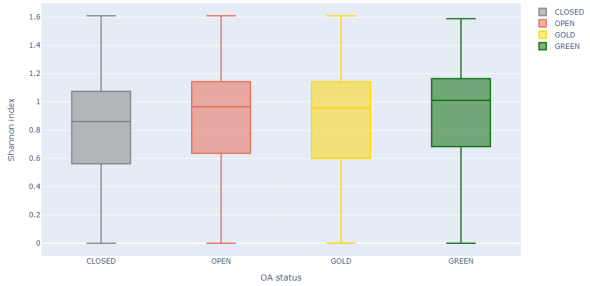

Figure: Box plots of Shannon index on citing Regions by OA status for 2013
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

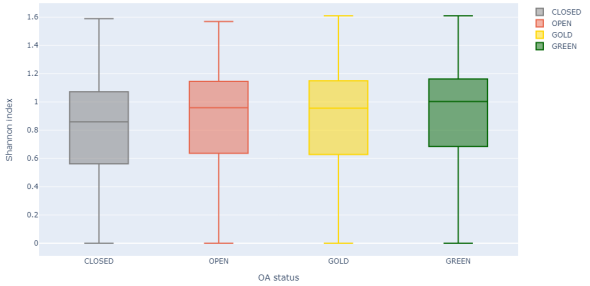

Figure: Box plots of Shannon index on citing Regions by OA status for 2014
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

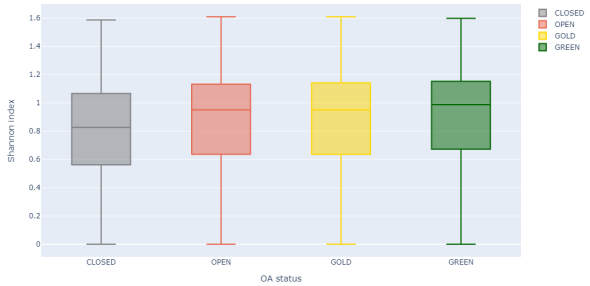

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Figure: Box plots of Shannon index on citing Regions by OA status for 2016
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

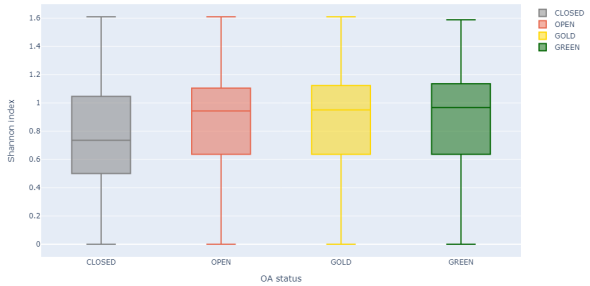

Figure: Box plots of Shannon index on citing Regions by OA status for 2017
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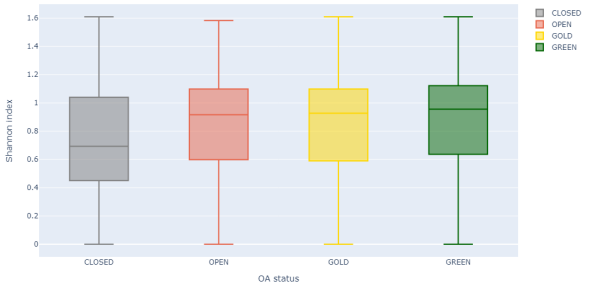

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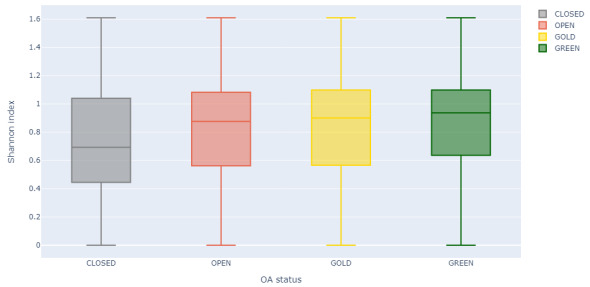
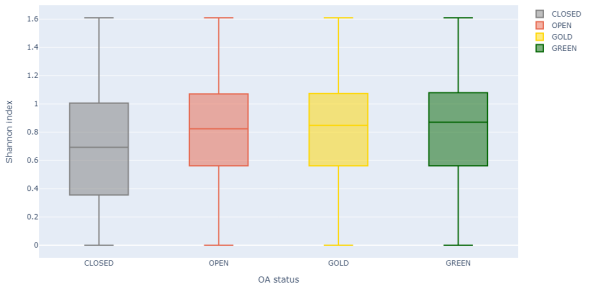


Figure: Box plots of Shannon index on citing Regions by OA status for 2019
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



The next set is based on the Shannon index and Fields as citing groups:

Figure: Box plots of Shannon index on citing Fields by OA status for 2010
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

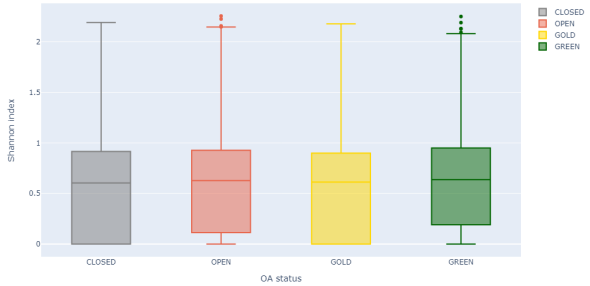


Figure: Box plots of Shannon index on citing Fields by OA status for 2011
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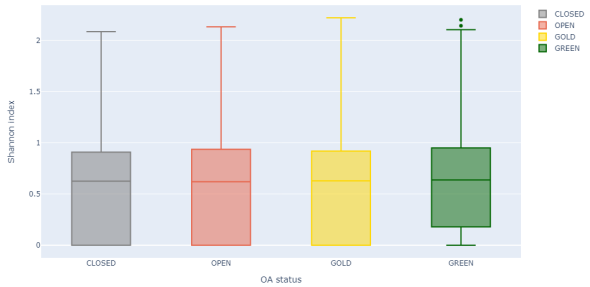
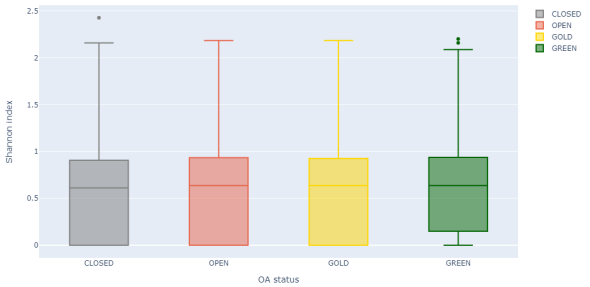


Figure: Box plots of Shannon index on citing Fields by OA status for 2013
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



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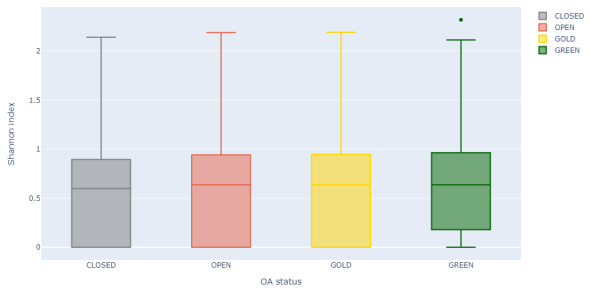
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)



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(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

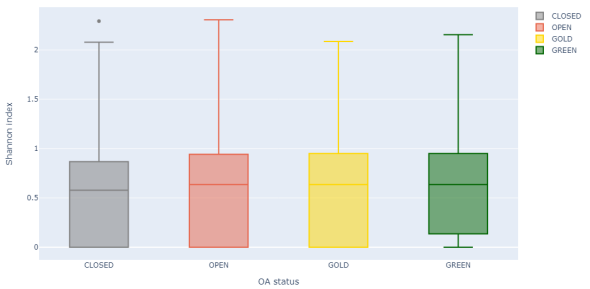

Figure: Box plots of Shannon index on citing Fields by OA status for 2016
(samples of 10000 non-OA, 10000 OA, 10000 gold and 10000 green papers.)

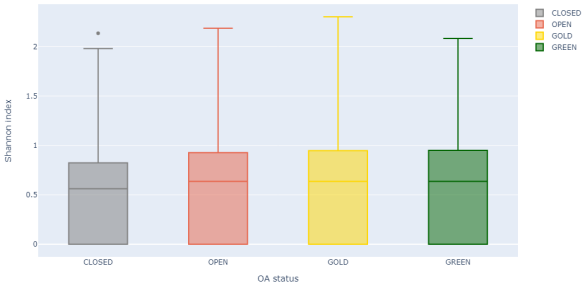

Figure: Box plots of Shannon index on citing Fields by OA status for 2017
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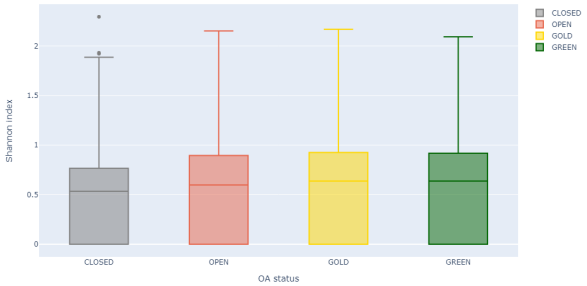

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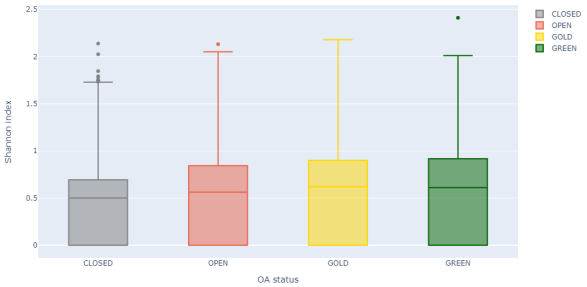

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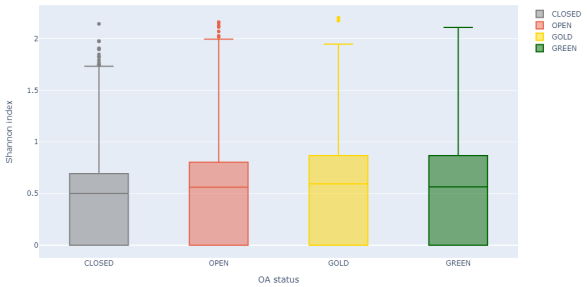
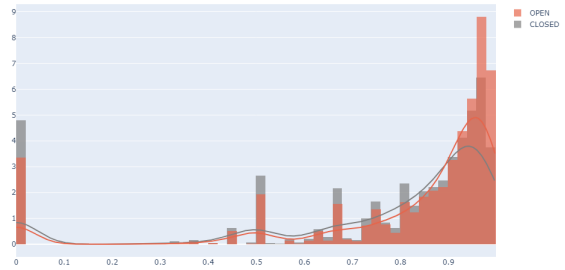


Section F: Citation diversity scores - density estimation

We apply kernel density estimation (KDE) to citation diversity scores for each year, type of citing group, and diversity measure. These are paired with the corresponding histograms. Samples used contain 10,000 OA papers and 10,000 non-OA papers for each publication year. These graphs provide overviews of the distributions of citation diversity scores. The clusters around zero, and around 0.5 for Gini-Simpson index and around 0.6 for Shannon index, are results of large portions of low-citation papers. The most important signal from these graphs is the consistently better performance of the OA papers. This can be seen from the upward shifts of the distributions, decreases of proportions of papers with low scores (including the cluster around zero), and the heavier upper tails, for the OA papers.

The first set of these is based on the Gini-Simpson index and institutions as citing groups:

Figure: KDE of GiniSim scores on citing Institutions for 2010



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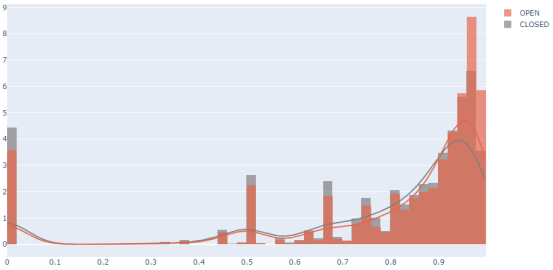

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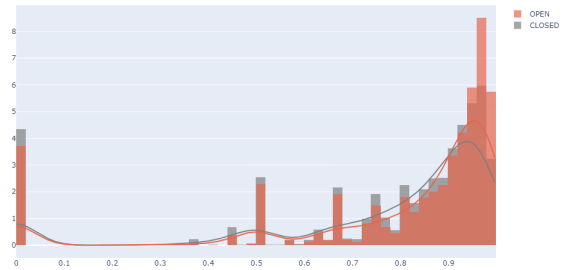
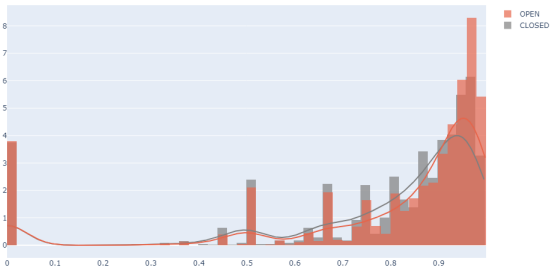


Figure: KDE of GiniSim scores on citing Institutions for 2013



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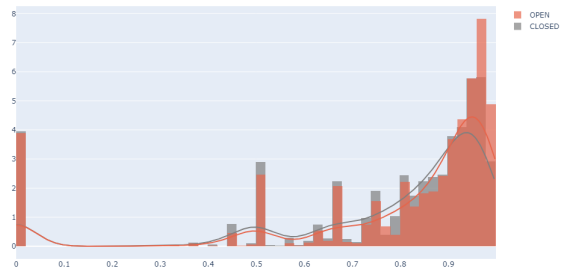

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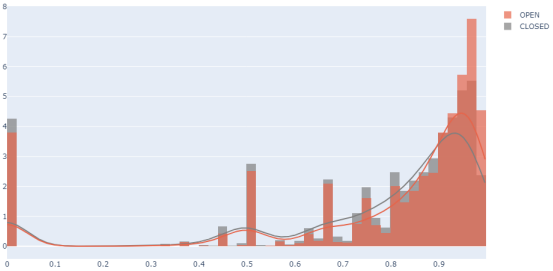
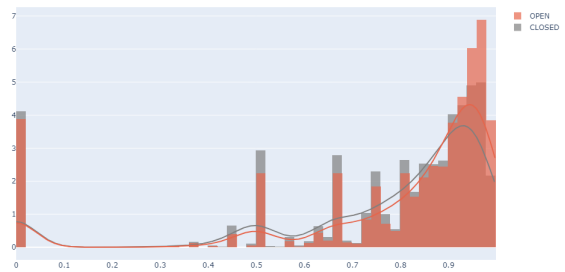


Figure: KDE of GiniSim scores on citing Institutions for 2016



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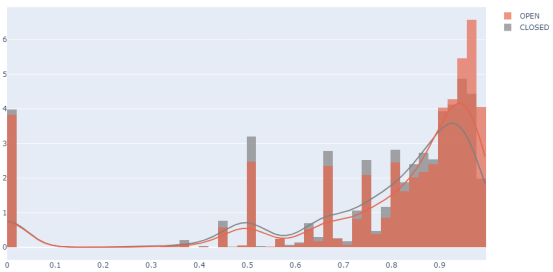


Figure: KDE of GiniSim scores on citing Institutions for 2018

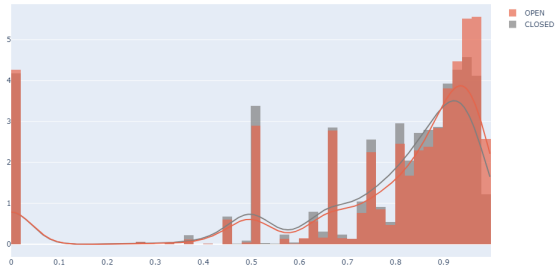
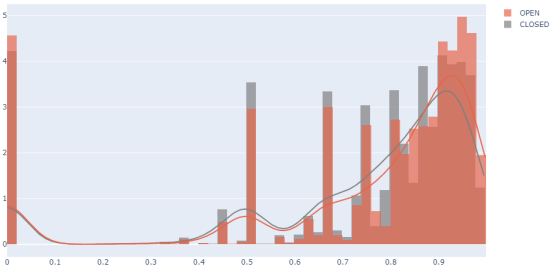


Figure: KDE of GiniSim scores on citing Institutions for 2019



The first set of these is based on the Gini-Simpson index and countries as citing groups:

Figure: KDE of GiniSim scores on citing Countries for 2010

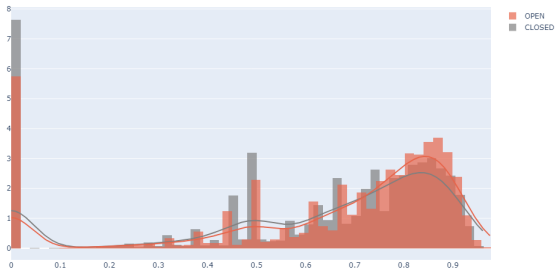


Figure: KDE of GiniSim scores on citing Countries for 2011

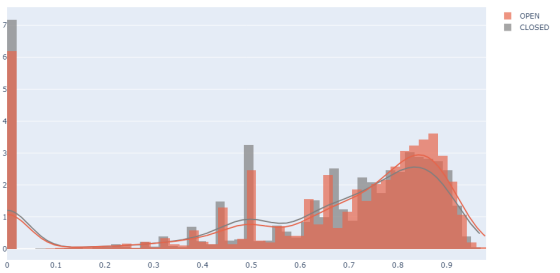
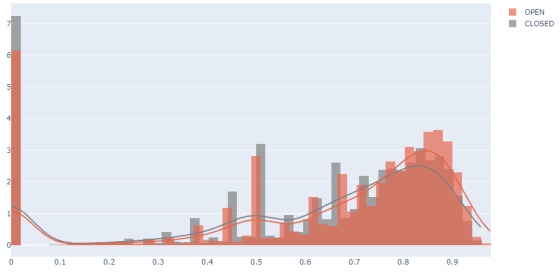


Figure: KDE of GiniSim scores on citing Countries for 2012



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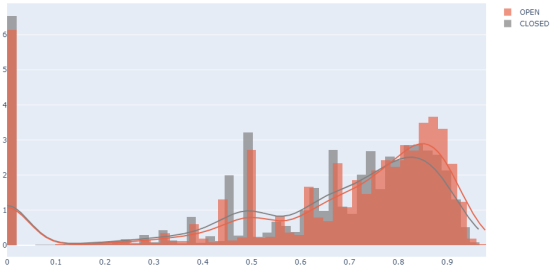

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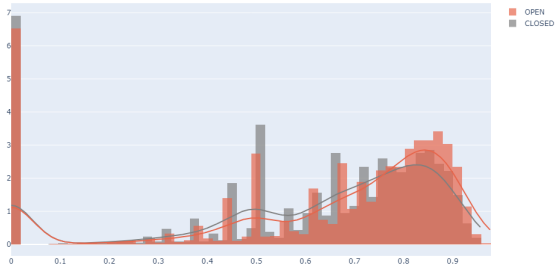

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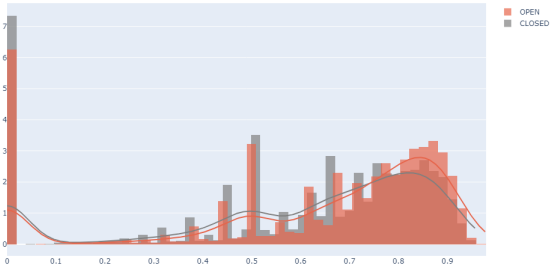


Figure: KDE of GiniSim scores on citing Countries for 2016

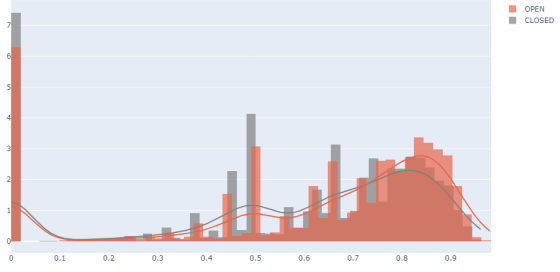


Figure: KDE of GiniSim scores on citing Countries for 2017

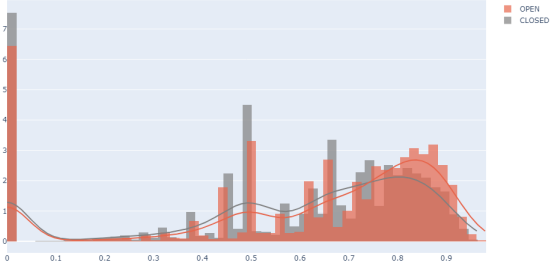


Figure: KDE of GiniSim scores on citing Countries for 2018

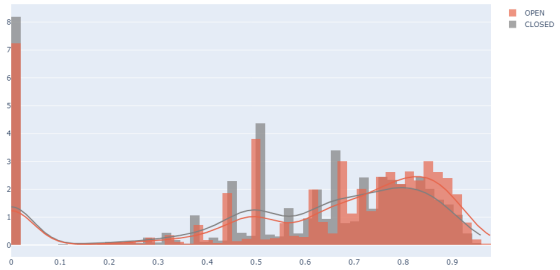
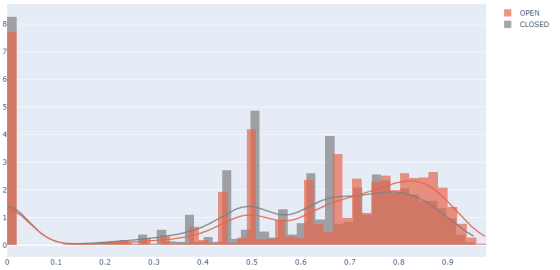


Figure: KDE of GiniSim scores on citing Countries for 2019



The first set of these is based on the Gini-Simpson index and subregions as citing groups:

Figure: KDE of GiniSim scores on citing Subregions for 2010

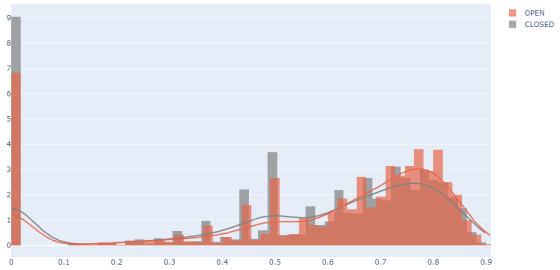


Figure: KDE of GiniSim scores on citing Subregions for 2011

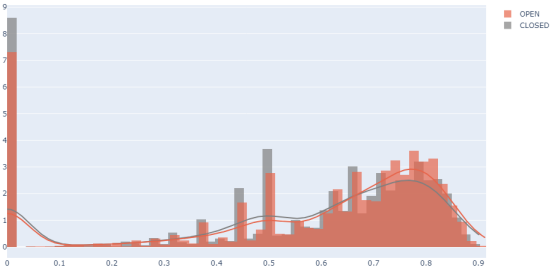
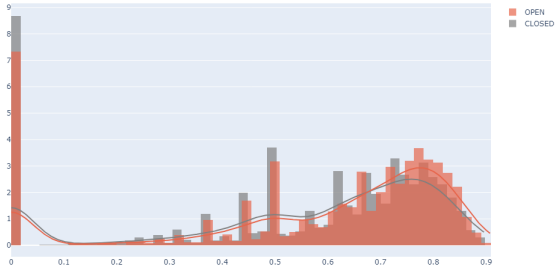


Figure: KDE of GiniSim scores on citing Subregions for 2012



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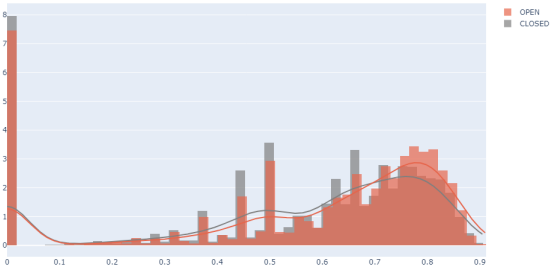


Figure: KDE of GiniSim scores on citing Subregions for 2014

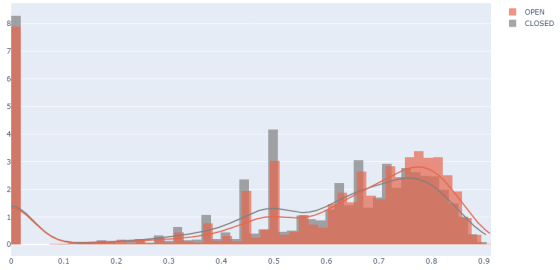


Figure: KDE of GiniSim scores on citing Subregions for 2015

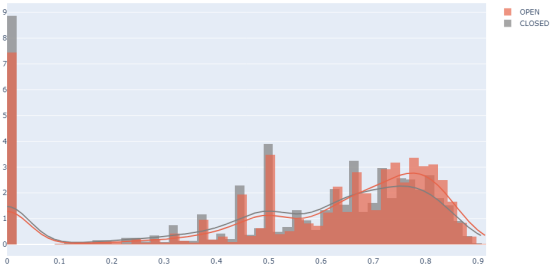


Figure: KDE of GiniSim scores on citing Subregions for 2016

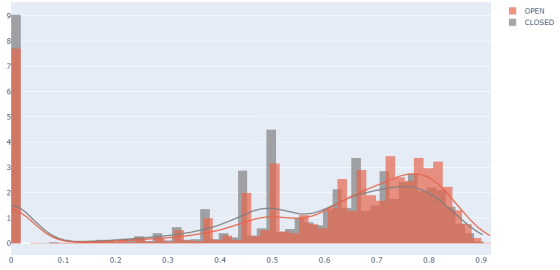


Figure: KDE of GiniSim scores on citing Subregions for 2017

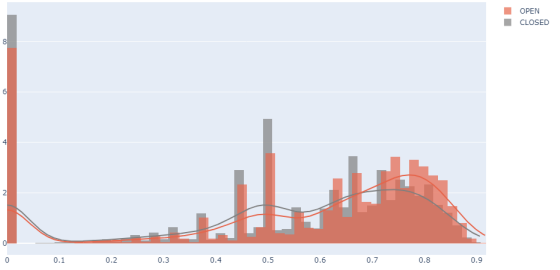


Figure: KDE of GiniSim scores on citing Subregions for 2018

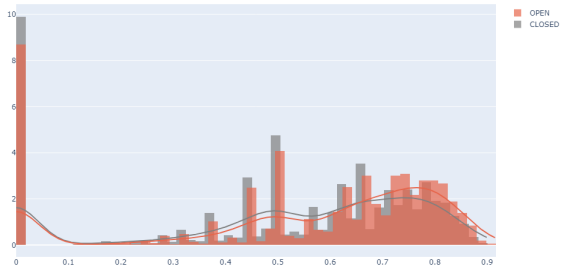
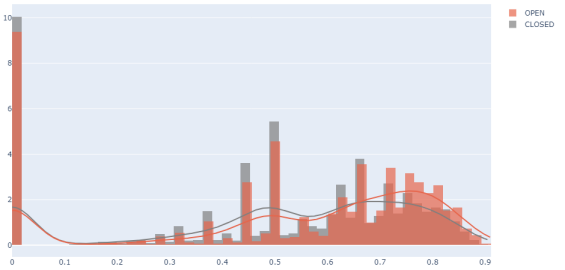
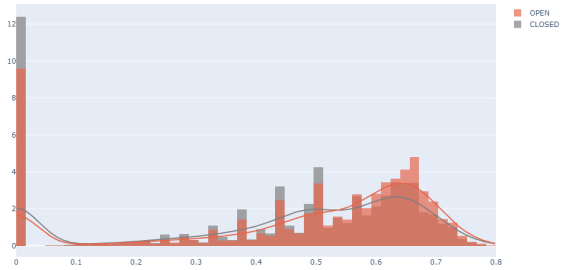


Figure: KDE of GiniSim scores on citing Subregions for 2019



The first set of these is based on the Gini-Simpson index and regions as citing groups:

Figure: KDE of GiniSim scores on citing Regions for 2010



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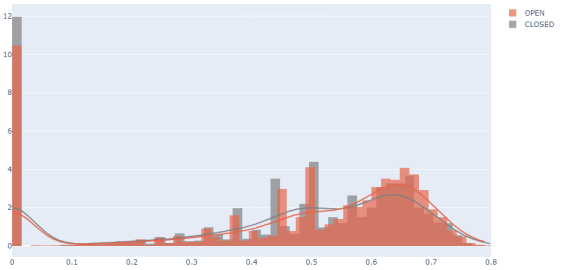

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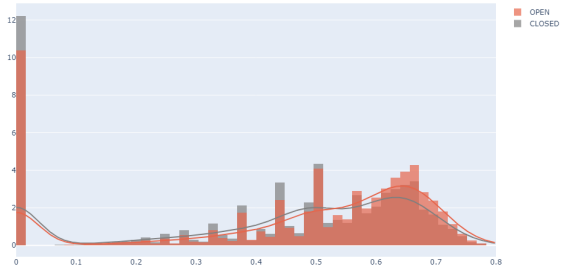

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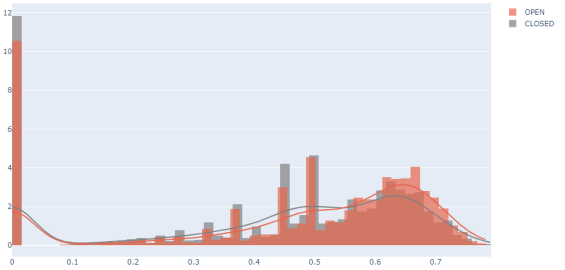

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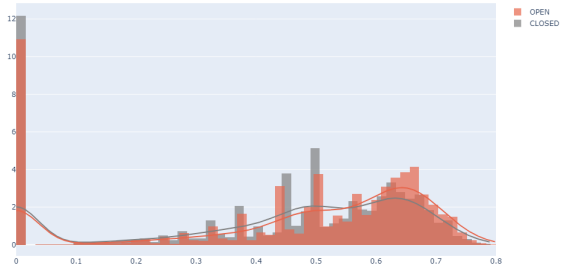

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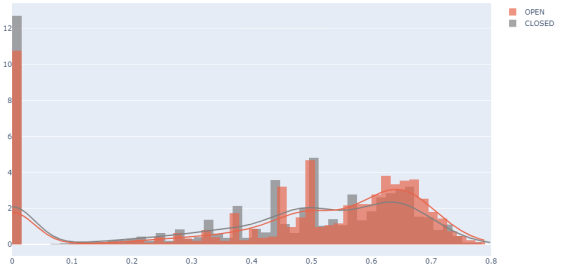

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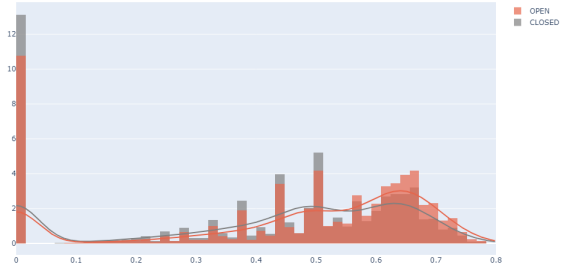

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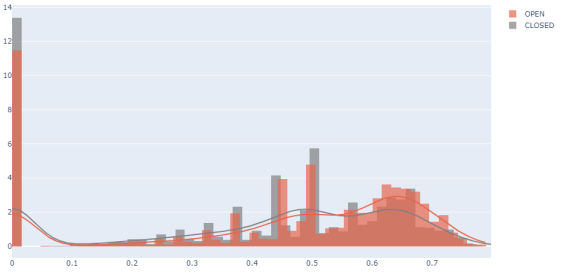

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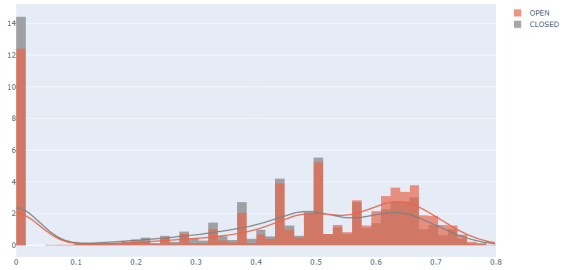

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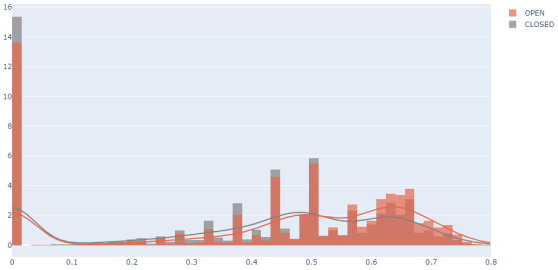
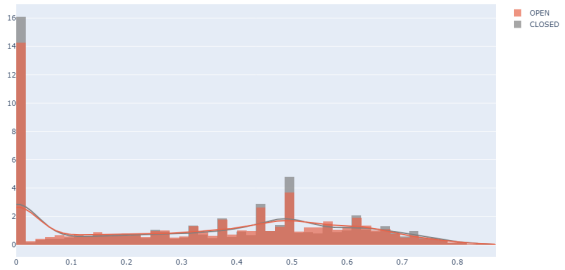


The first set of these is based on the Gini-Simpson index and fields as citing groups:

Figure: KDE of GiniSim scores on citing Fields for 2010



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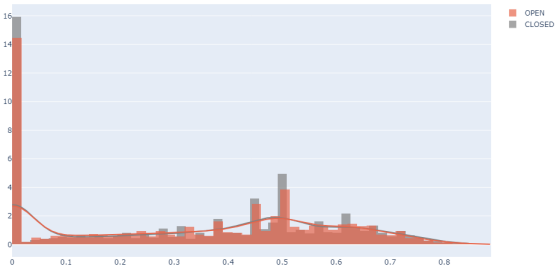

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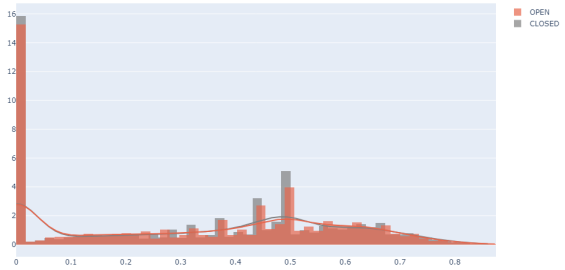

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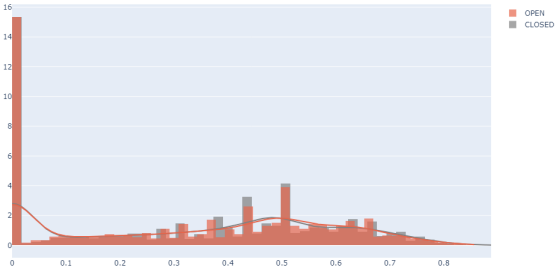

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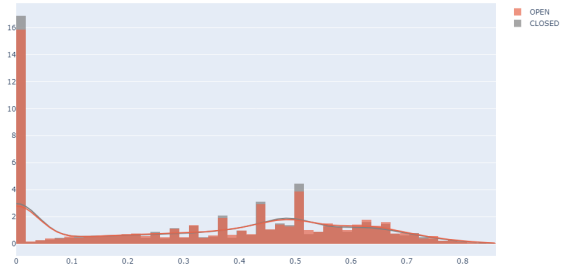

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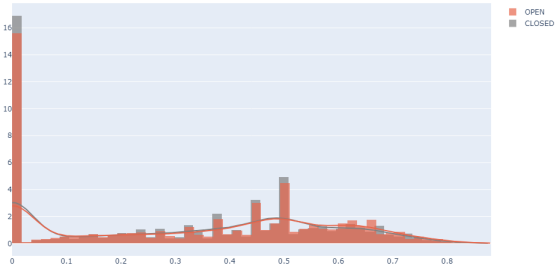
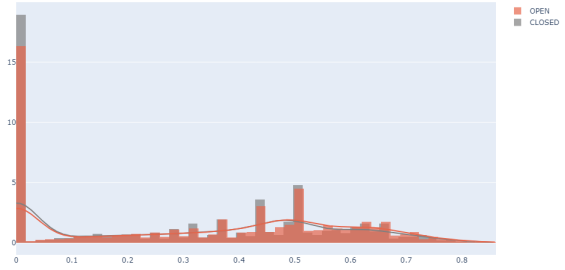


Figure: KDE of GiniSim scores on citing Fields for 2016



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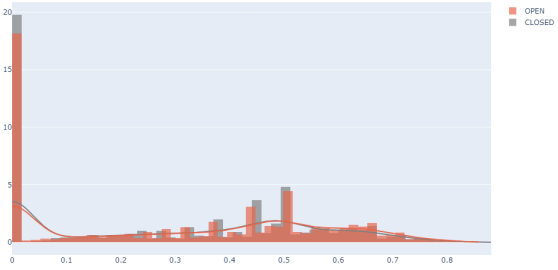

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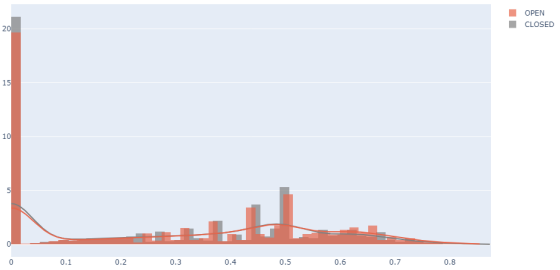

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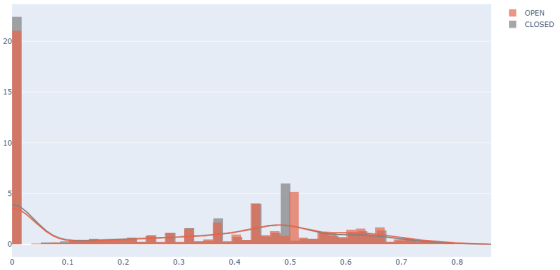
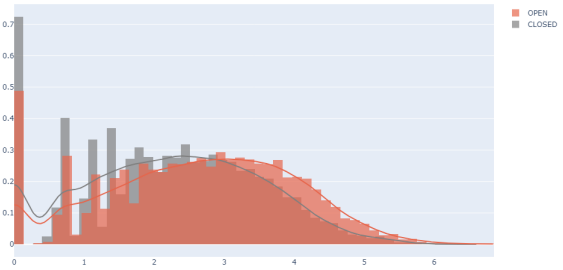


The first set of these is based on the Shannon index and institutions as citing groups:

Figure: KDE of Shannon scores on citing Institutions for 2010



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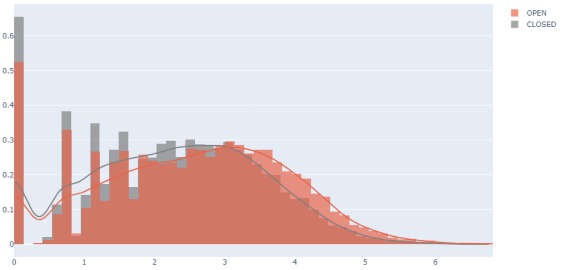

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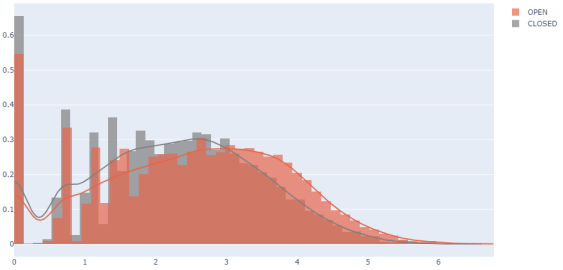

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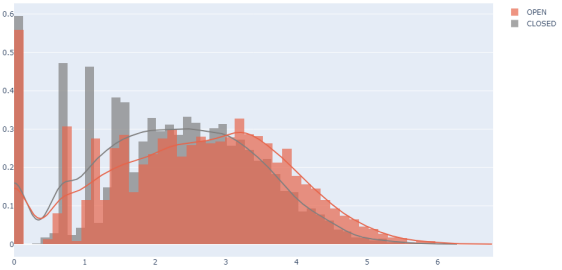

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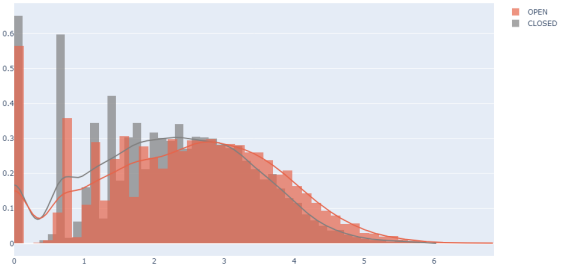

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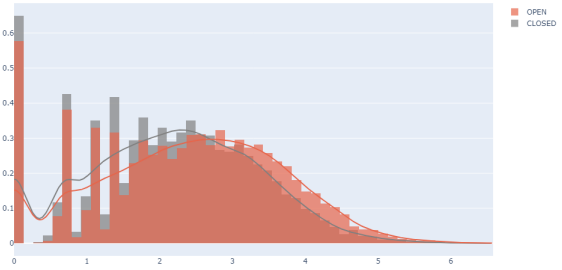
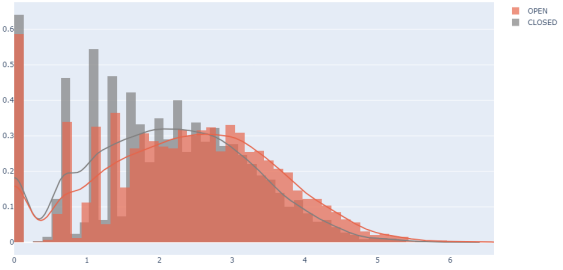


Figure: KDE of Shannon scores on citing Institutions for 2016



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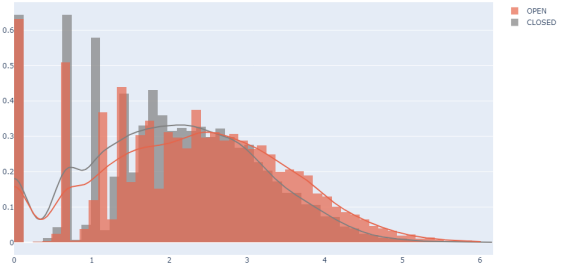

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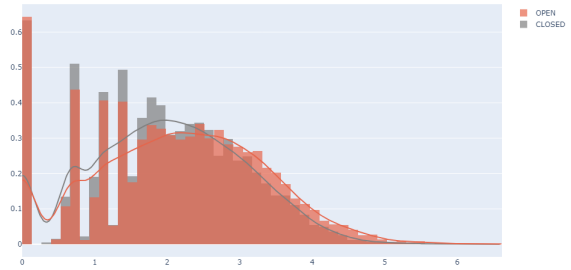

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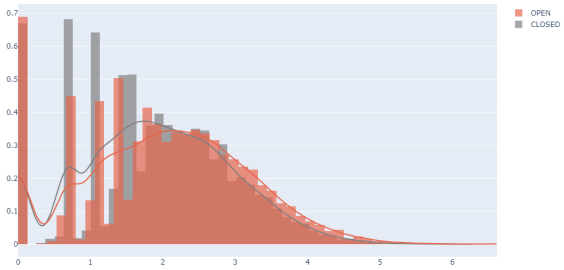
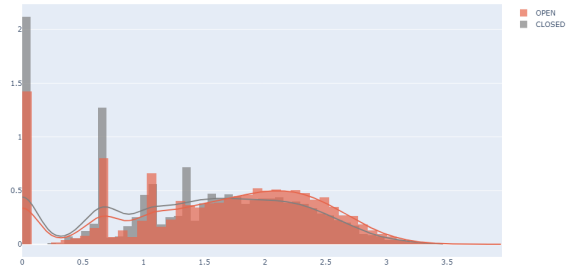


The first set of these is based on the Shannon index and countries as citing groups:

Figure: KDE of Shannon scores on citing Countries for 2010



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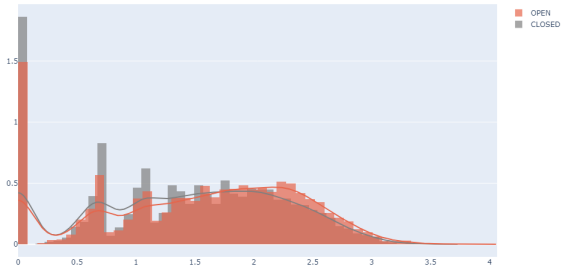

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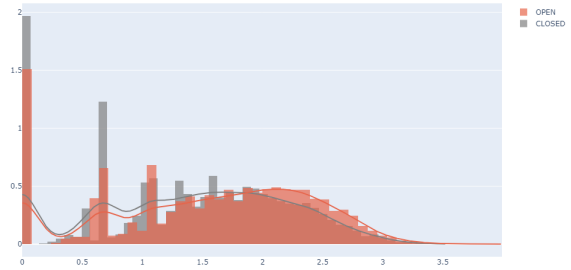

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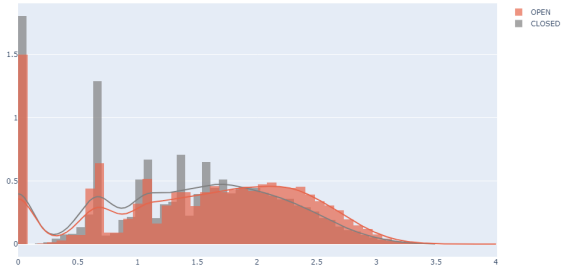

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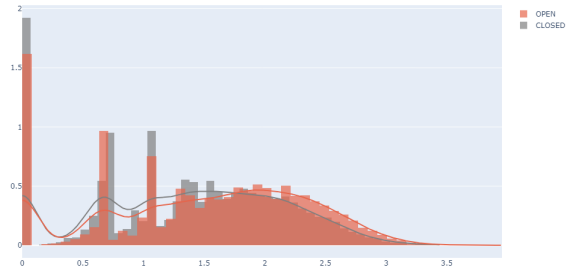

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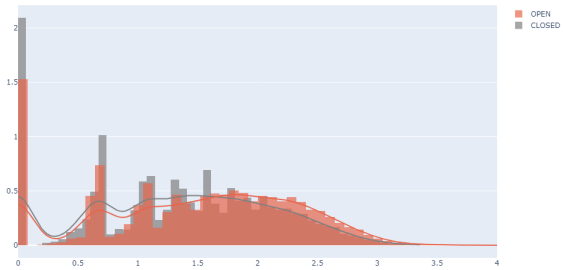
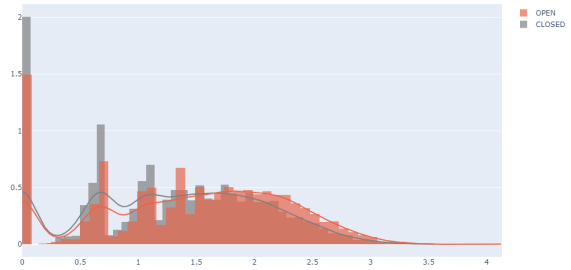


Figure: KDE of Shannon scores on citing Countries for 2016



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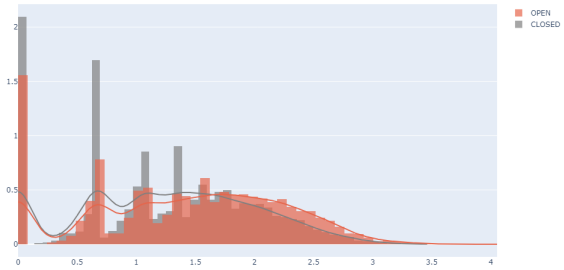

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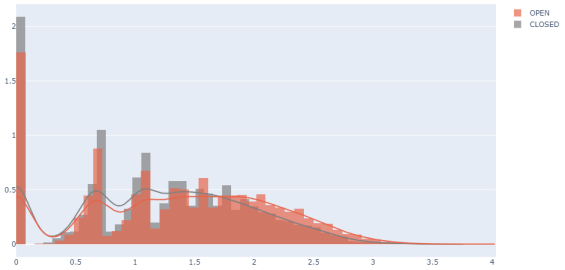

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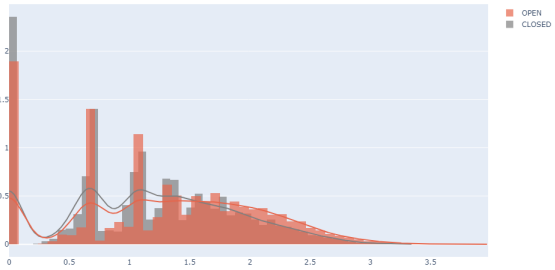
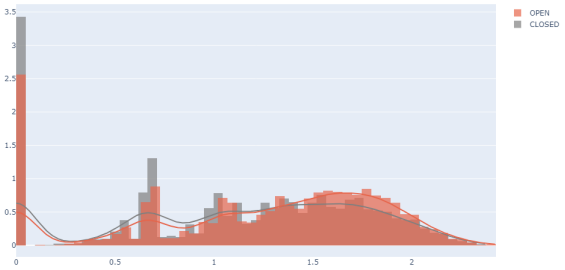


The first set of these is based on the Shannon index and subregions as citing groups:

Figure: KDE of Shannon scores on citing Subregions for 2010



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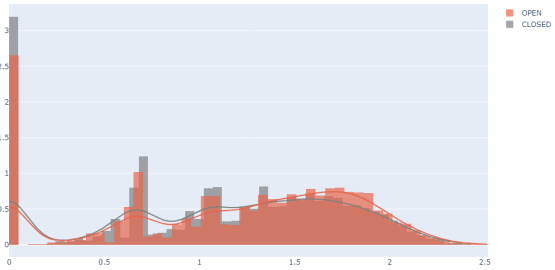

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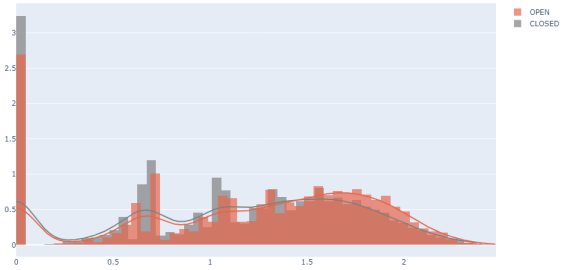

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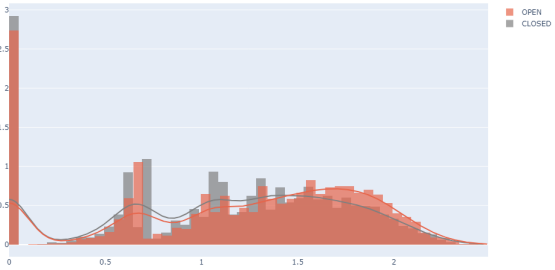


Figure: KDE of Shannon scores on citing Subregions for 2014

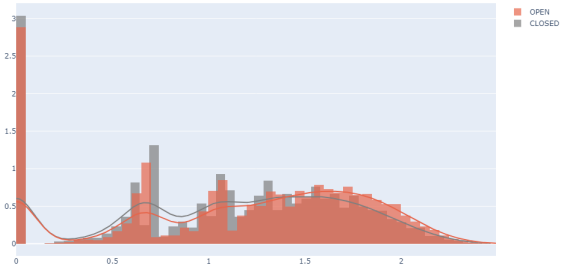


Figure: KDE of Shannon scores on citing Subregions for 2015

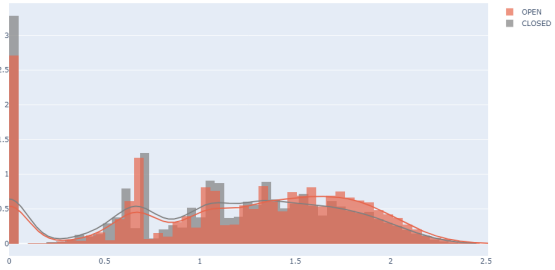


Figure: KDE of Shannon scores on citing Subregions for 2016

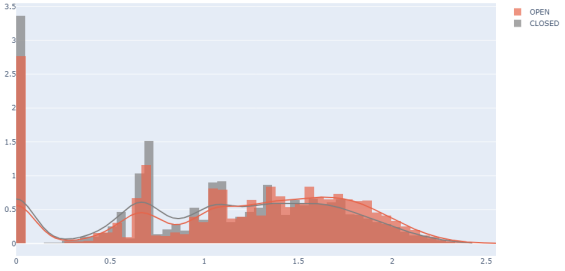


Figure: KDE of Shannon scores on citing Subregions for 2017

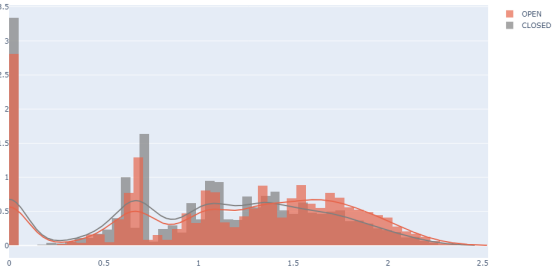


Figure: KDE of Shannon scores on citing Subregions for 2018

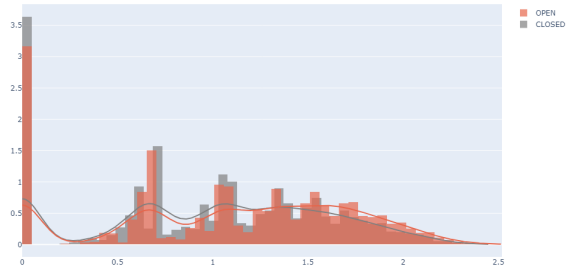
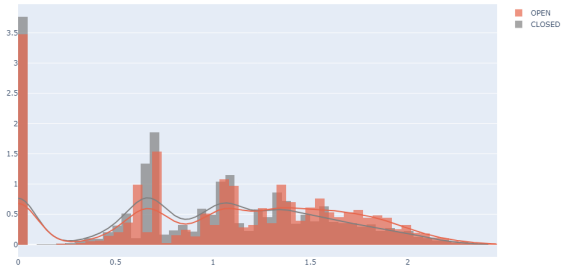


Figure: KDE of Shannon scores on citing Subregions for 2019



The first set of these is based on the Shannon index and regions as citing groups:

Figure: KDE of Shannon scores on citing Regions for 2010

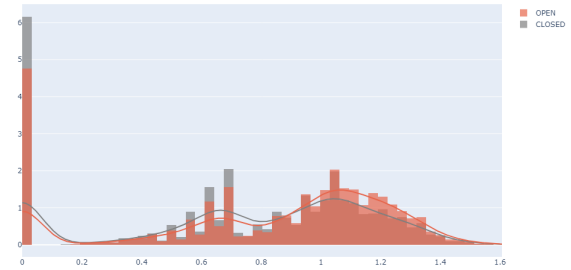


Figure: KDE of Shannon scores on citing Regions for 2011

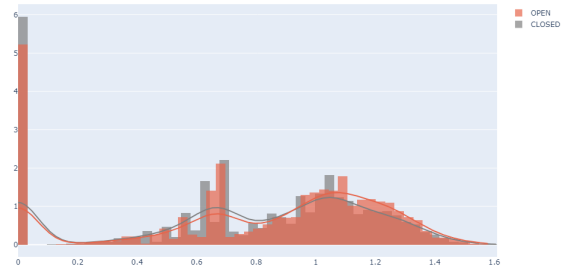


Figure: KDE of Shannon scores on citing Regions for 2012

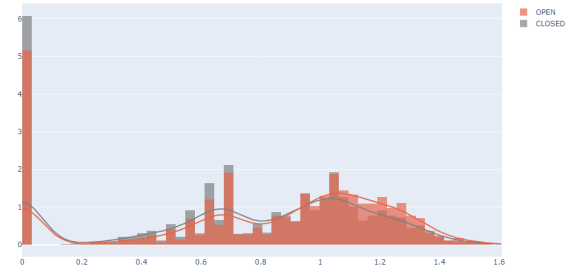


Figure: KDE of Shannon scores on citing Regions for 2013

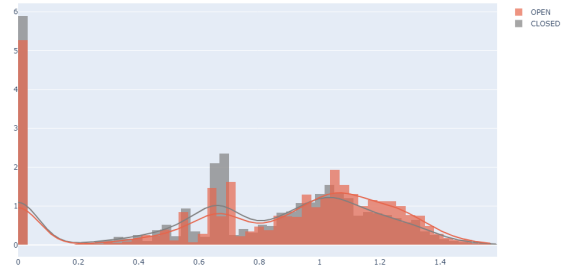


Figure: KDE of Shannon scores on citing Regions for 2014

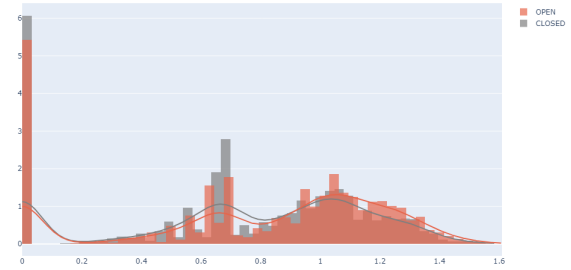


Figure: KDE of Shannon scores on citing Regions for 2015

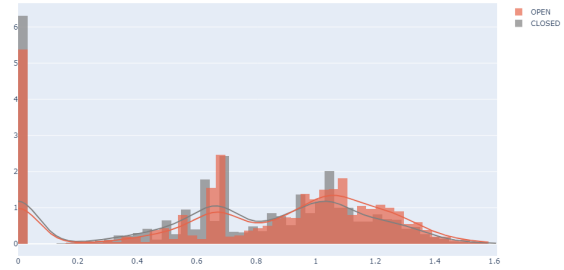


Figure: KDE of Shannon scores on citing Regions for 2016

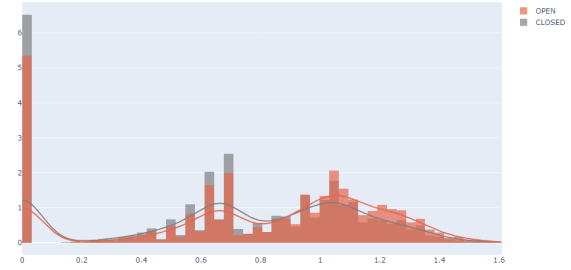


Figure: KDE of Shannon scores on citing Regions for 2017

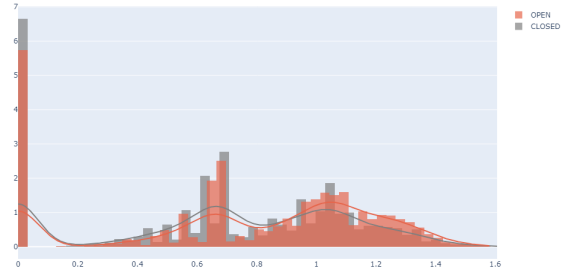


Figure: KDE of Shannon scores on citing Regions for 2018

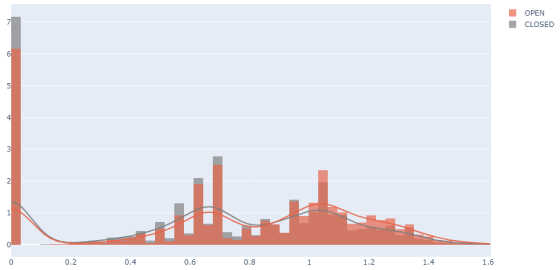
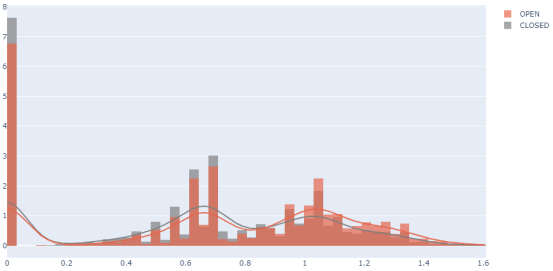


Figure: KDE of Shannon scores on citing Regions for 2019



The first set of these is based on the Shannon index and fields as citing groups:

Figure: KDE of Shannon scores on citing Fields for 2010

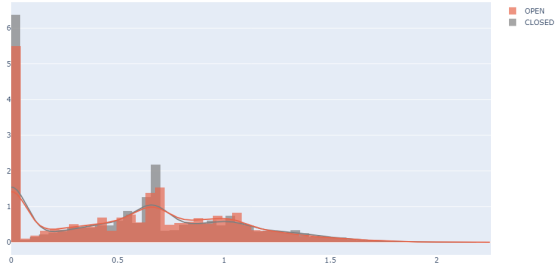


Figure: KDE of Shannon scores on citing Fields for 2011

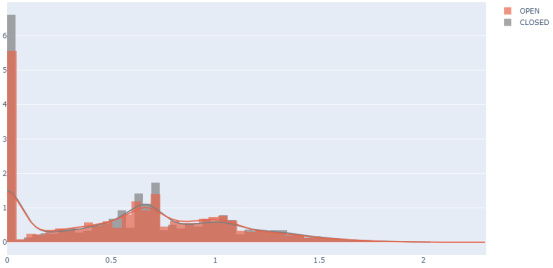


Figure: KDE of Shannon scores on citing Fields for 2012

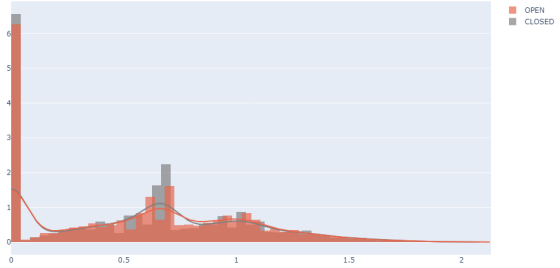


Figure: KDE of Shannon scores on citing Fields for 2013

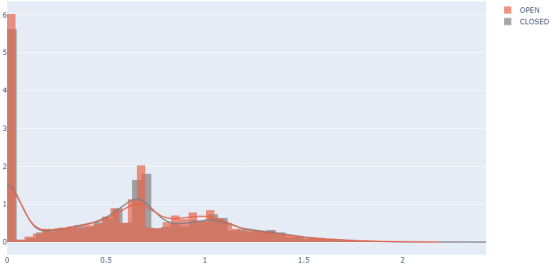


Figure: KDE of Shannon scores on citing Fields for 2014

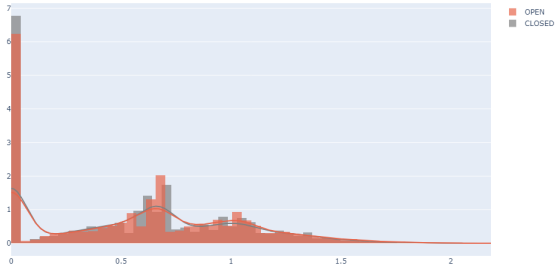


Figure: KDE of Shannon scores on citing Fields for 2015

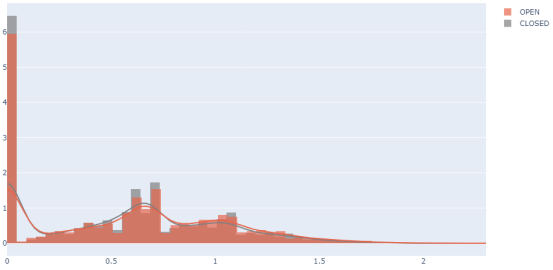


Figure: KDE of Shannon scores on citing Fields for 2016

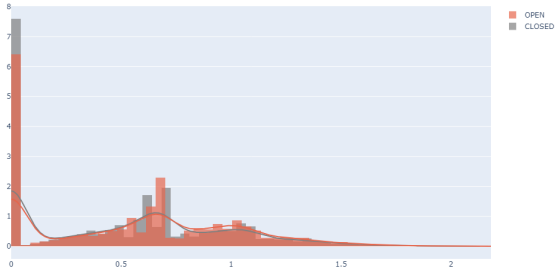


Figure: KDE of Shannon scores on citing Fields for 2017

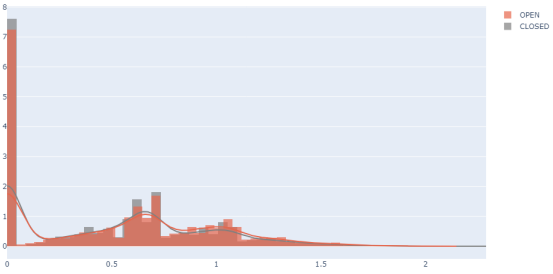


Figure: KDE of Shannon scores on citing Fields for 2018

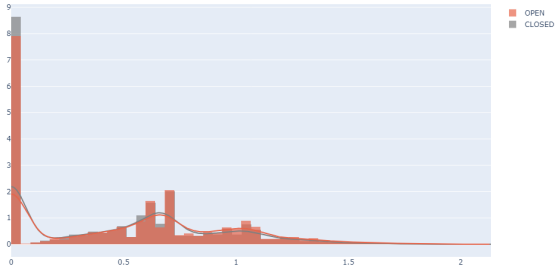
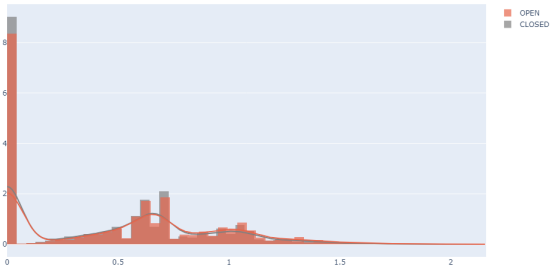


Figure: KDE of Shannon scores on citing Fields for 2019



Section G: Citation diversity scores - comparing fields of research

This section explores the OA effect on citation diversity as per field of research. For each field of research (as defined by the MAG Level 0 fields), we track the mean and median Shannon and Gini-Simpson scores for the OA categories and for closed papers, as per type of citing group. For most fields of research, we find Green OA as the standout performer. Performance of overall OA and Gold OA varies widely for selected fields.

For Gini-Simpson scores on citing institutions:

Figure: Comparing mean GiniSim on citing Institutions for Art

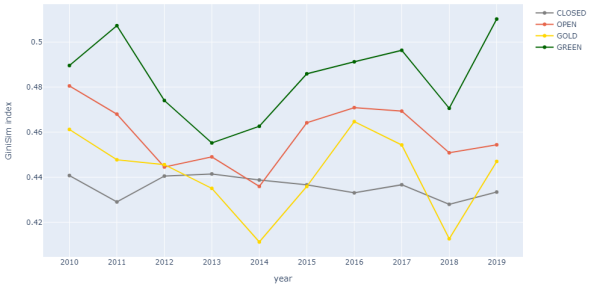


Figure: Comparing median GiniSim on citing Institutions for Art

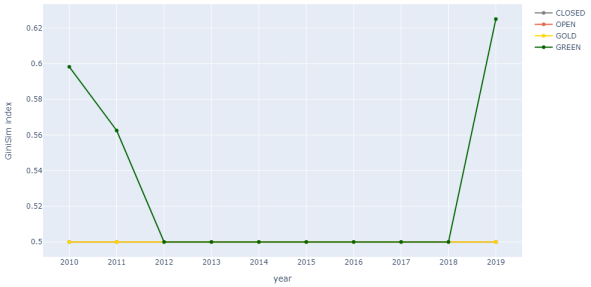


Figure: Comparing mean GiniSim on citing Institutions for Biology

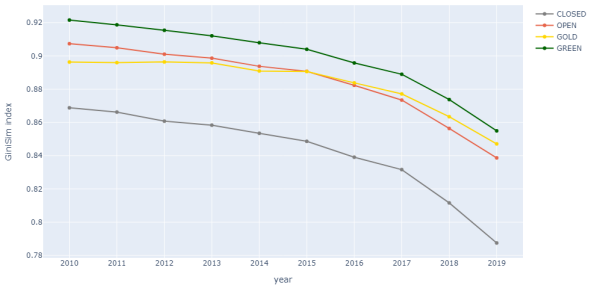


Figure: Comparing median GiniSim on citing Institutions for Biology

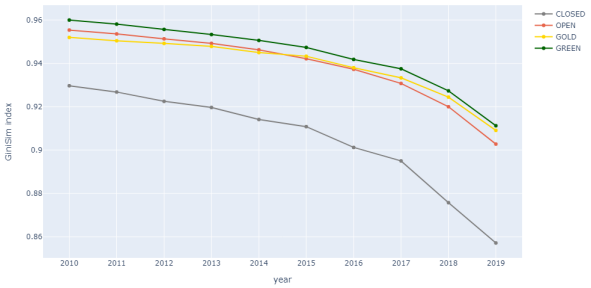


Figure: Comparing mean GiniSim on citing Institutions for Business

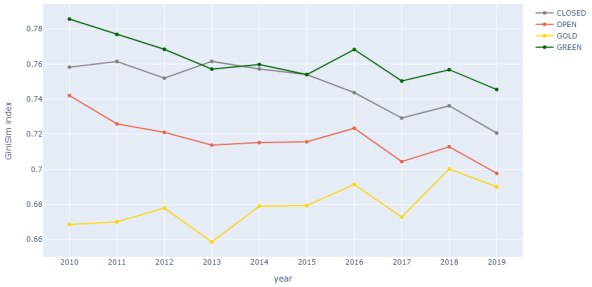


Figure: Comparing median GiniSim on citing Institutions for Business

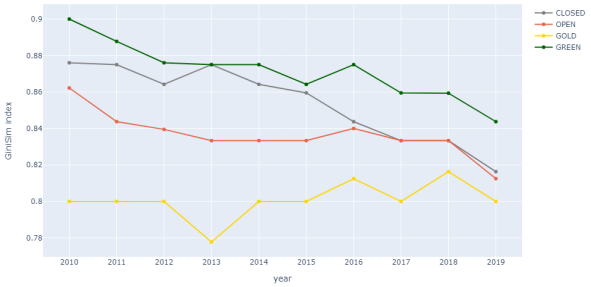


Figure: Comparing mean GiniSim on citing Institutions for Chemistry

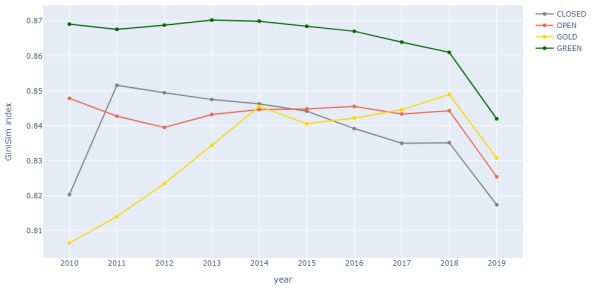


Figure: Comparing median GiniSim on citing Institutions for Chemistry

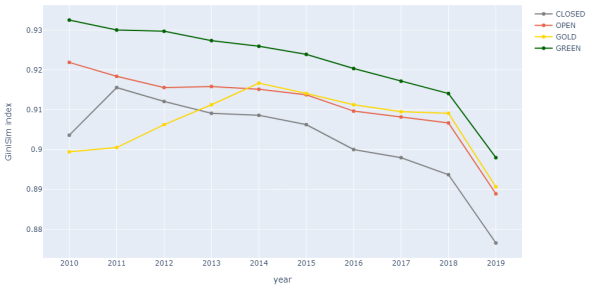


Figure: Comparing mean GiniSim on citing Institutions for Computer science

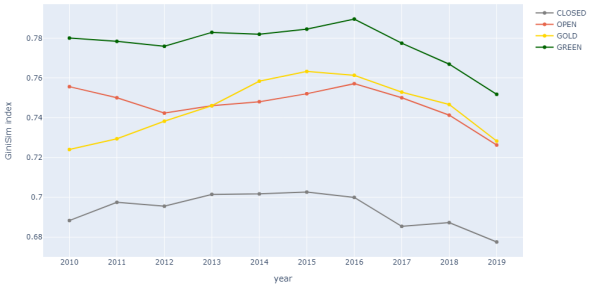


Figure: Comparing median GiniSim on citing Institutions for Computer science

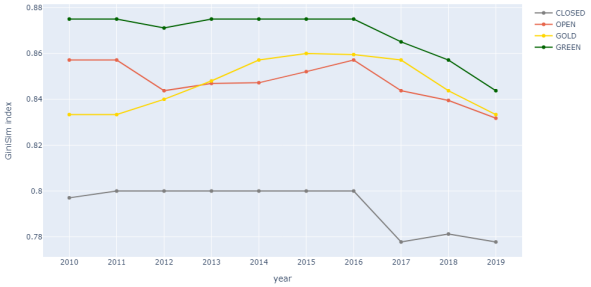


Figure: Comparing mean GiniSim on citing Institutions for Economics

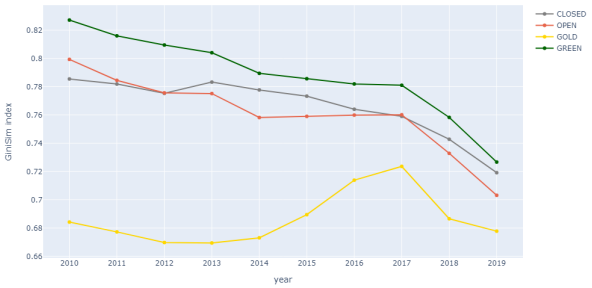


Figure: Comparing median GiniSim on citing Institutions for Economics

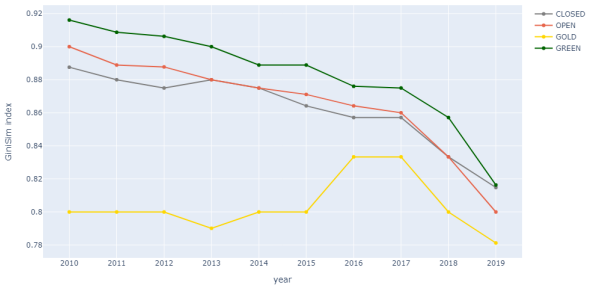


Figure: Comparing mean GiniSim on citing Institutions for Engineering

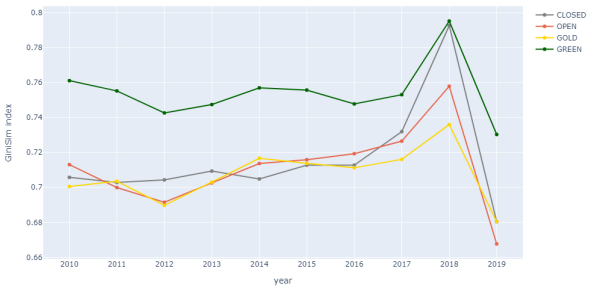


Figure: Comparing median GiniSim on citing Institutions for Engineering

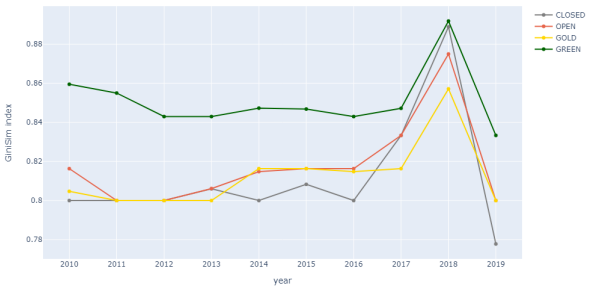


Figure: Comparing mean GiniSim on citing Institutions for Environmental science

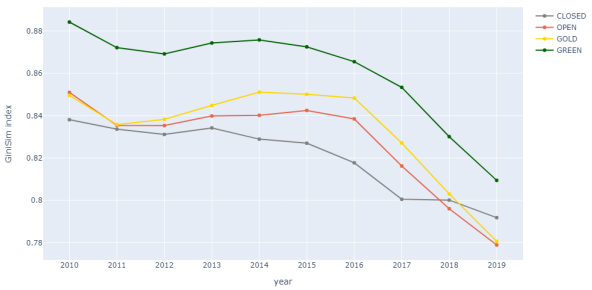


Figure: Comparing median GiniSim on citing Institutions for Environmental science

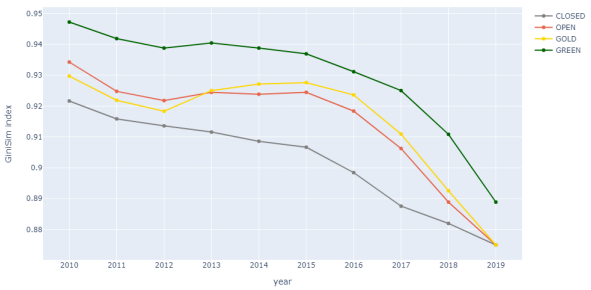


Figure: Comparing mean GiniSim on citing Institutions for Geography

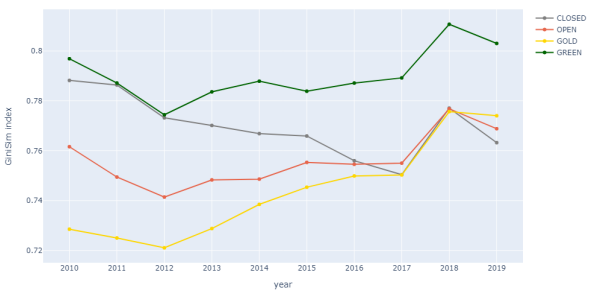


Figure: Comparing median GiniSim on citing Institutions for Geography

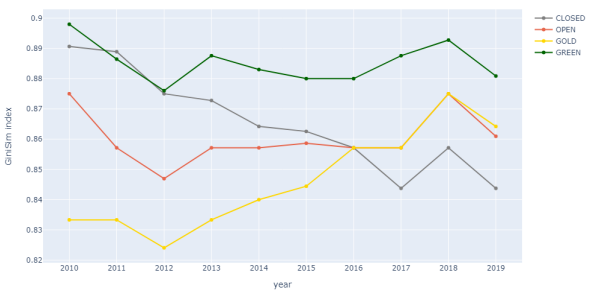


Figure: Comparing mean GiniSim on citing Institutions for Geology

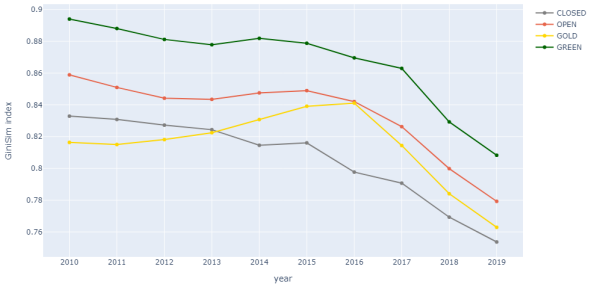


Figure: Comparing median GiniSim on citing Institutions for Geology

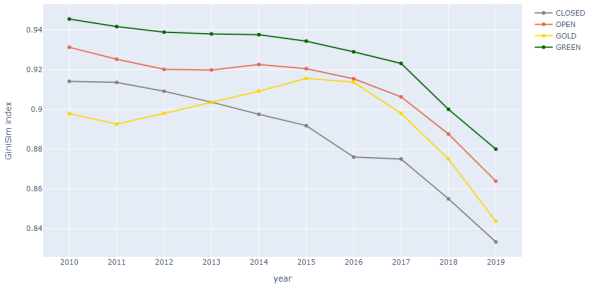


Figure: Comparing mean GiniSim on citing Institutions for History

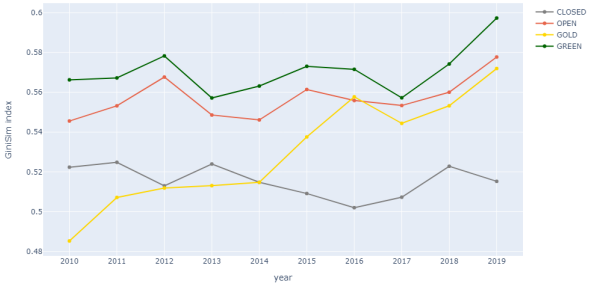


Figure: Comparing median GiniSim on citing Institutions for History

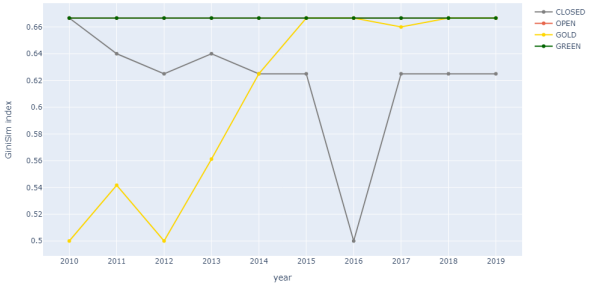


Figure: Comparing mean GiniSim on citing Institutions for Materials science

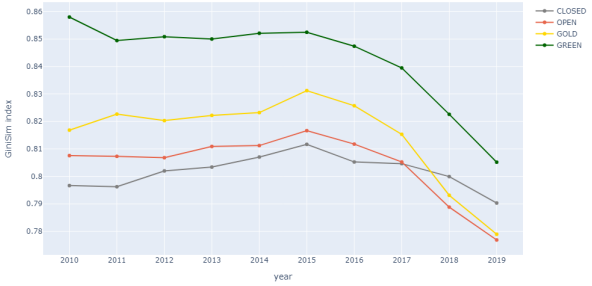


Figure: Comparing median GiniSim on citing Institutions for Materials science

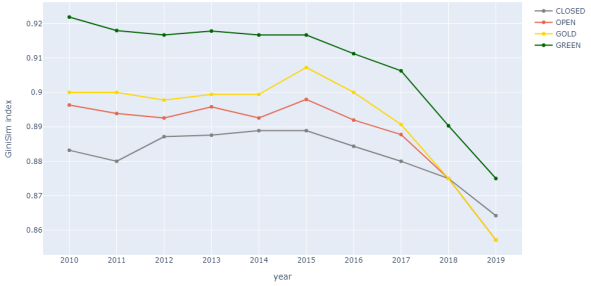
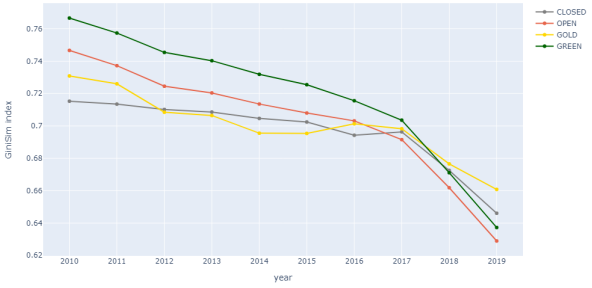


Figure: Comparing mean GiniSim on citing Institutions for Mathematics



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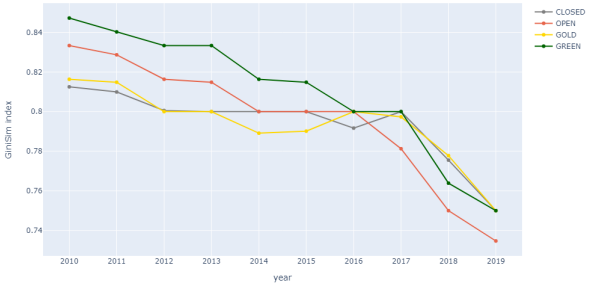

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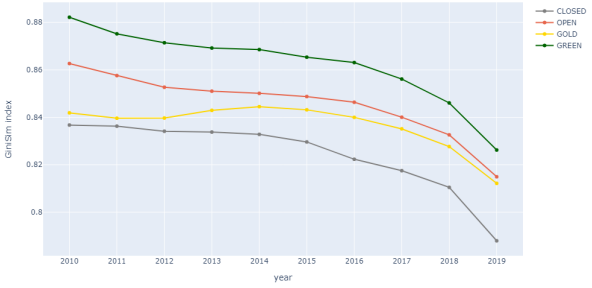

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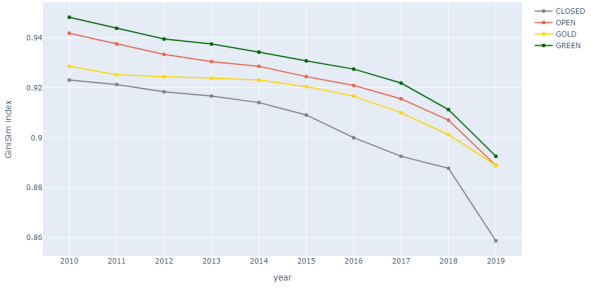

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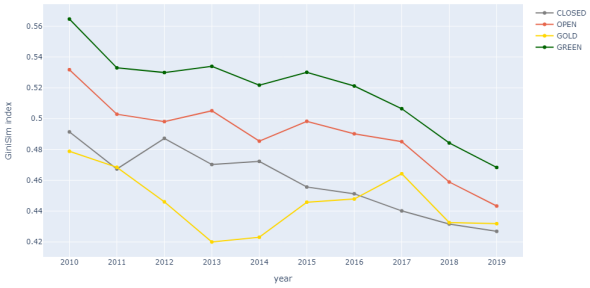

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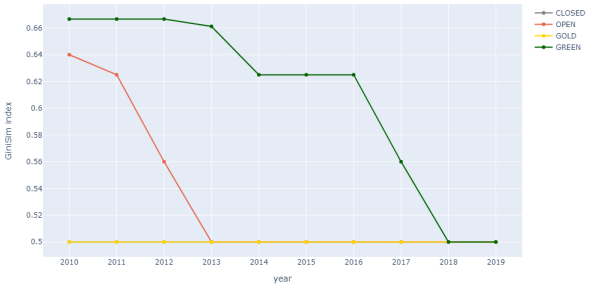

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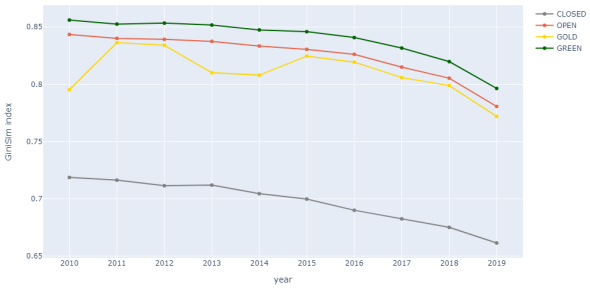

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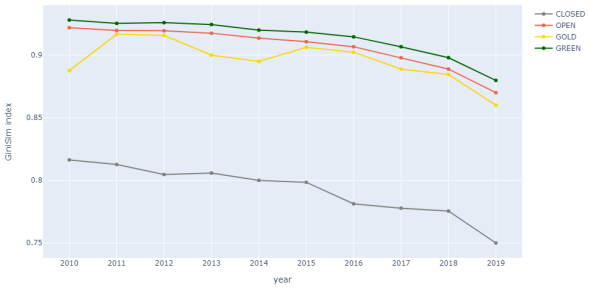

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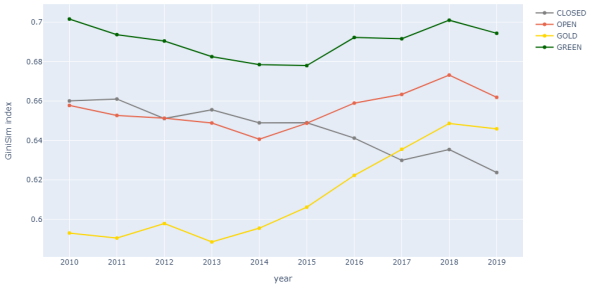

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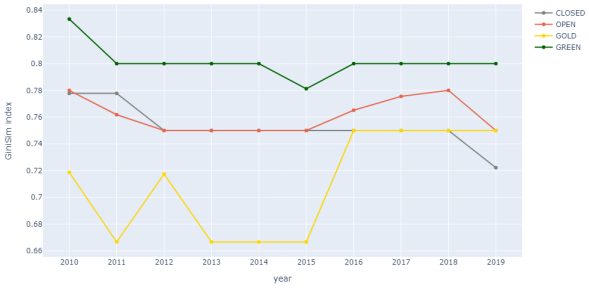

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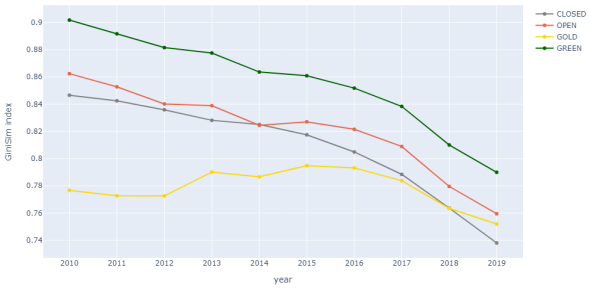

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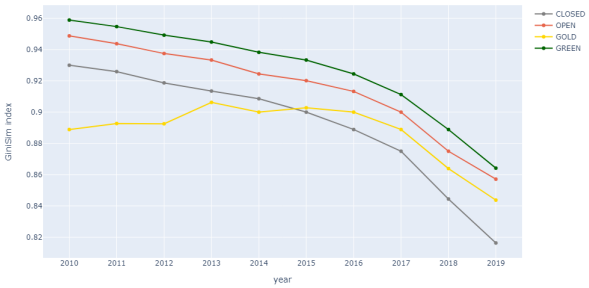
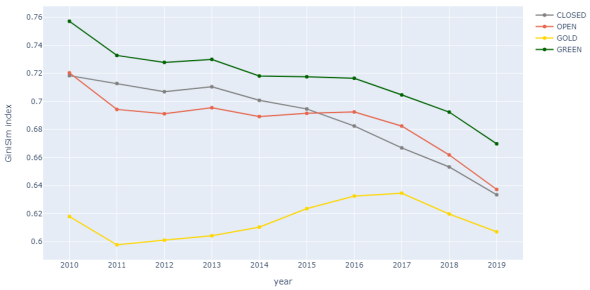


Figure: Comparing mean GiniSim on citing Institutions for Sociology



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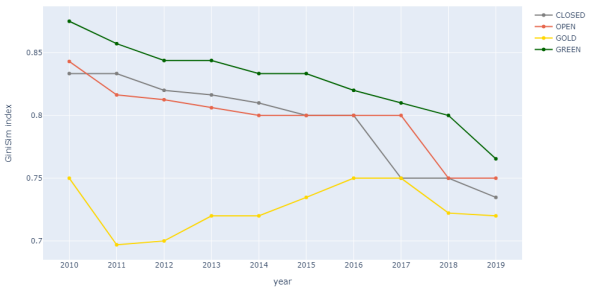


For Shannon scores on citing institutions:

Figure: Comparing mean Shannon on citing Institutions for Art

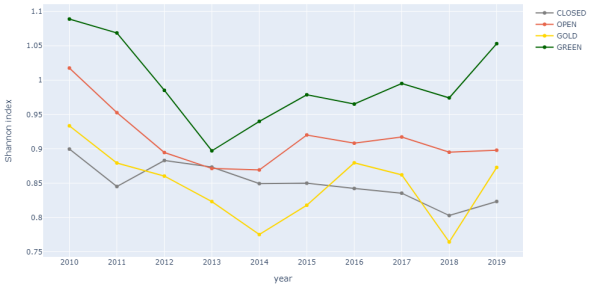


Figure: Comparing median Shannon on citing Institutions for Art

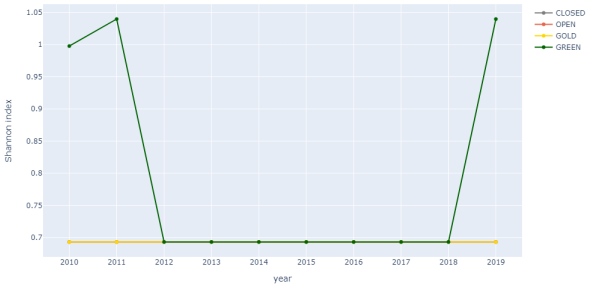


Figure: Comparing mean Shannon on citing Institutions for Biology

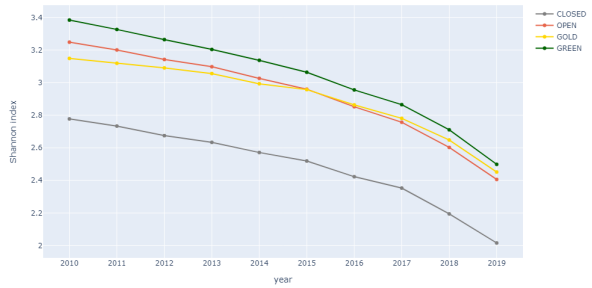


Figure: Comparing median Shannon on citing Institutions for Biology

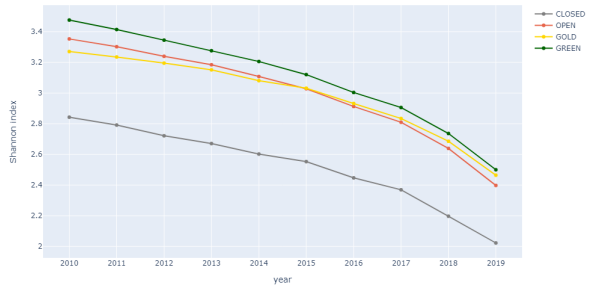
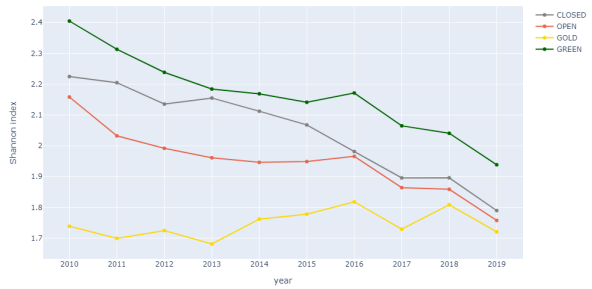


Figure: Comparing mean Shannon on citing Institutions for Business



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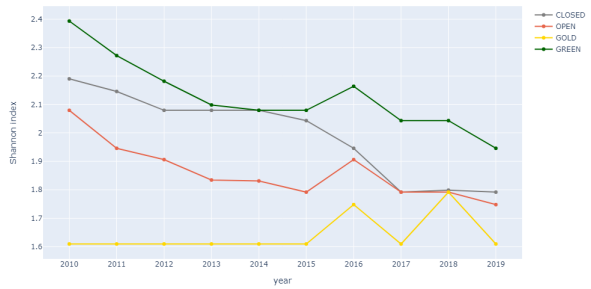

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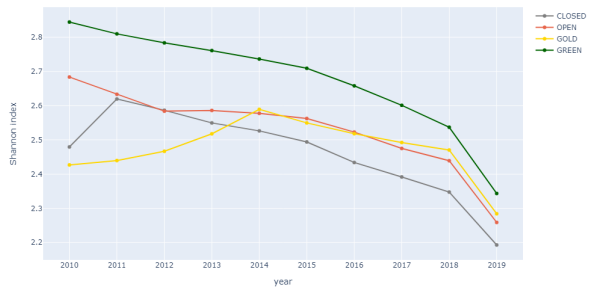

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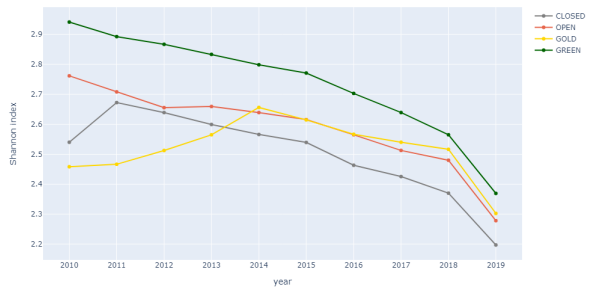


Figure: Comparing mean Shannon on citing Institutions for Computer science

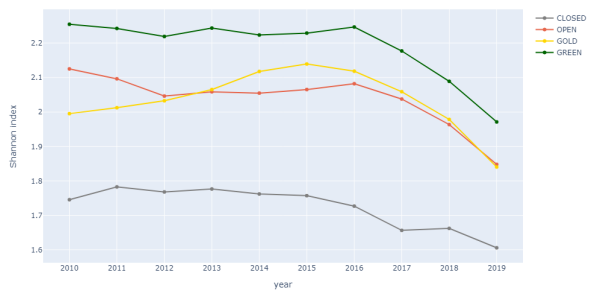


Figure: Comparing median Shannon on citing Institutions for Computer science

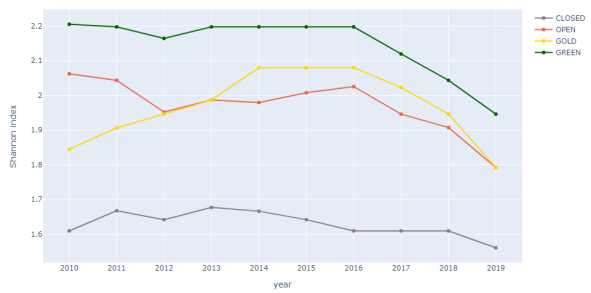
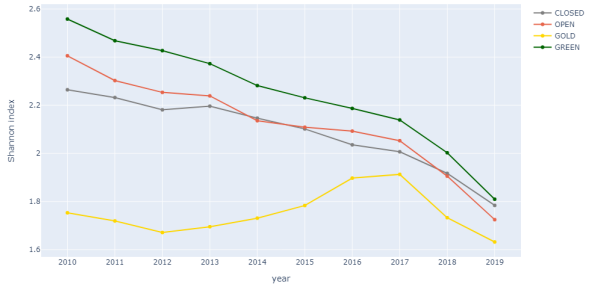


Figure: Comparing mean Shannon on citing Institutions for Economics



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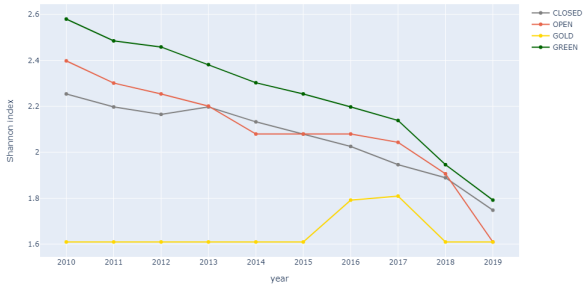
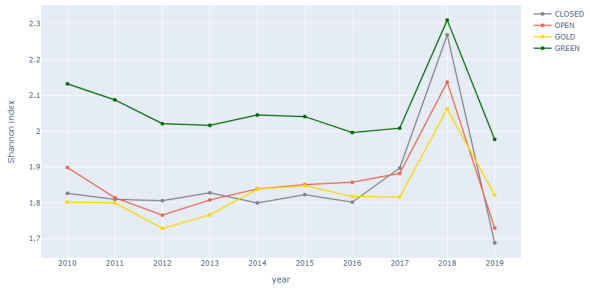


Figure: Comparing mean Shannon on citing Institutions for Engineering



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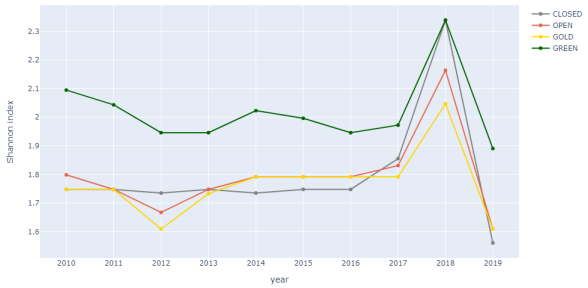
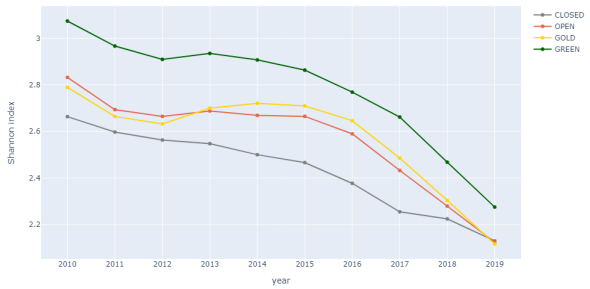


Figure: Comparing mean Shannon on citing Institutions for Environmental science



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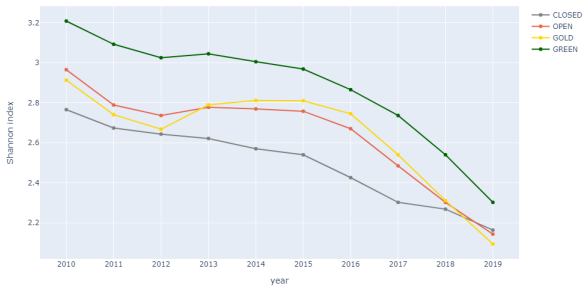


Figure: Comparing mean Shannon on citing Institutions for Geography

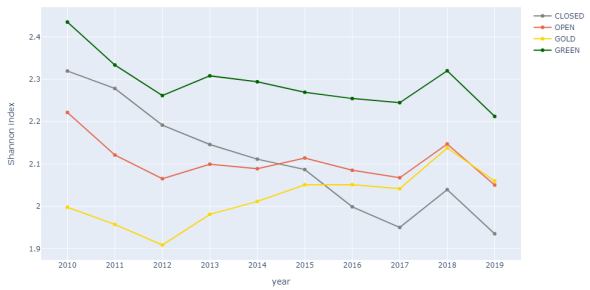


Figure: Comparing median Shannon on citing Institutions for Geography

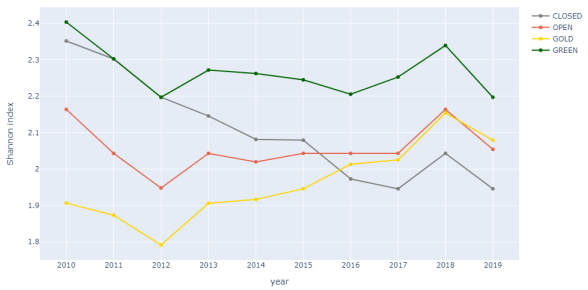
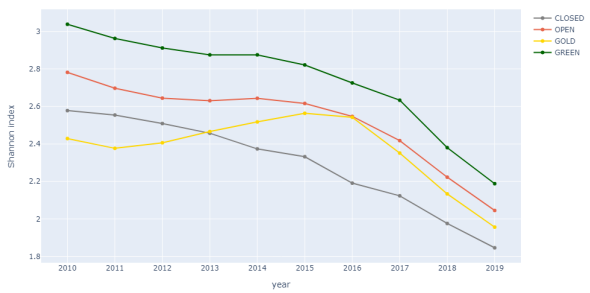


Figure: Comparing mean Shannon on citing Institutions for Geology



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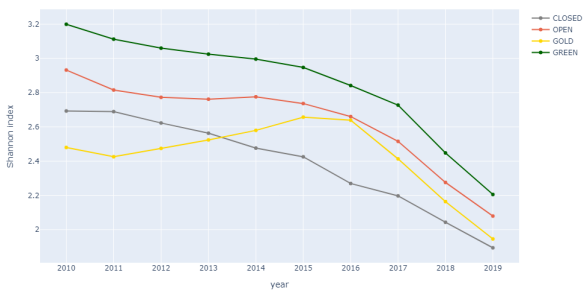
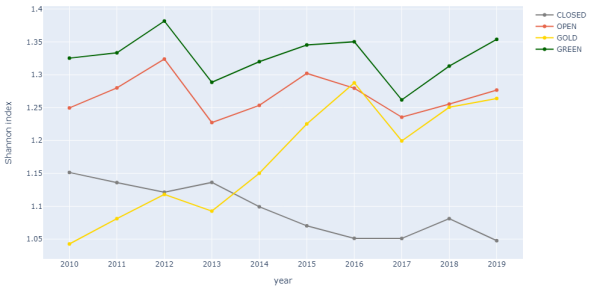


Figure: Comparing mean Shannon on citing Institutions for History



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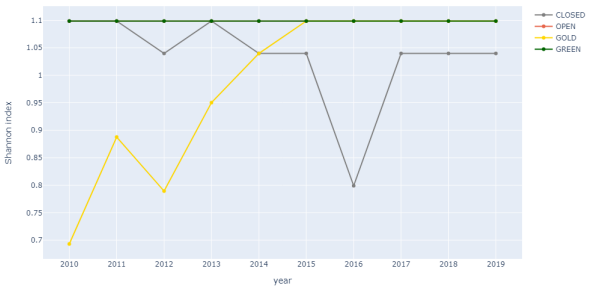
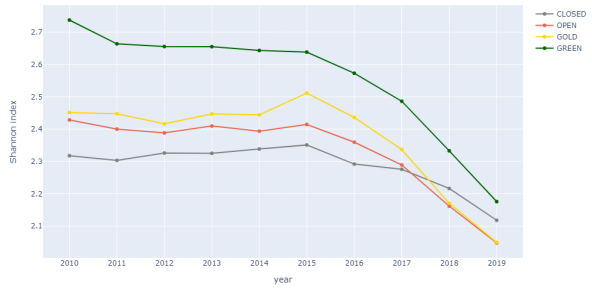


Figure: Comparing mean Shannon on citing Institutions for Materials science



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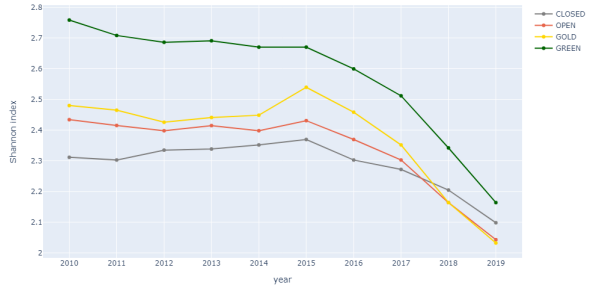

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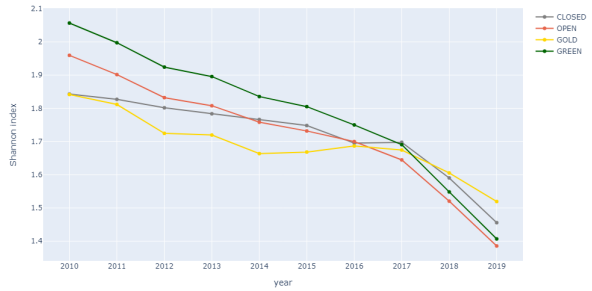

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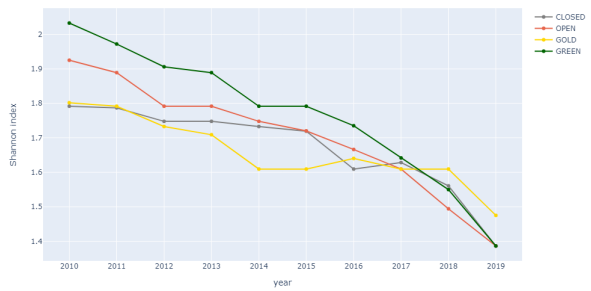

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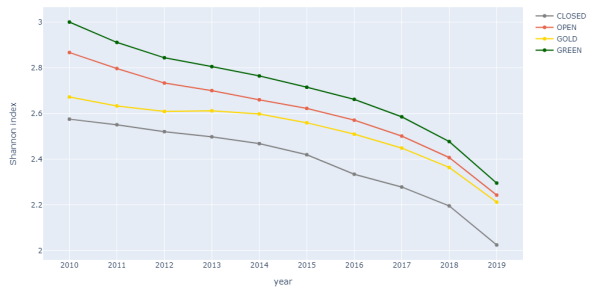

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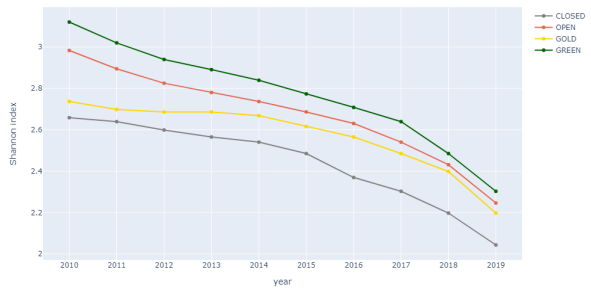
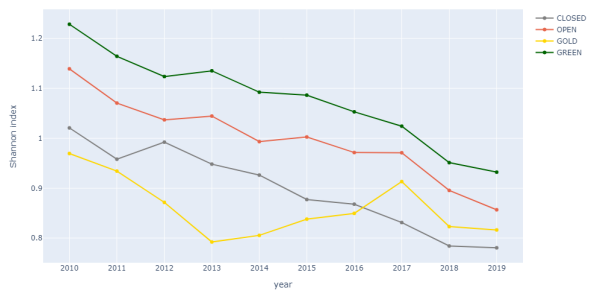


Figure: Comparing mean Shannon on citing Institutions for Philosophy



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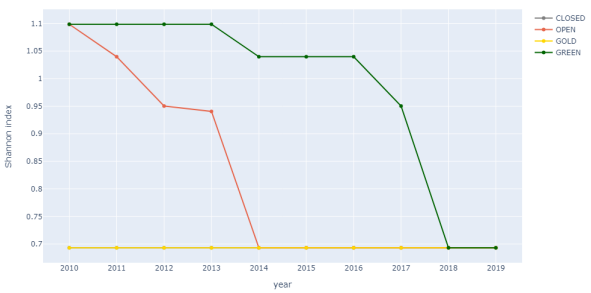

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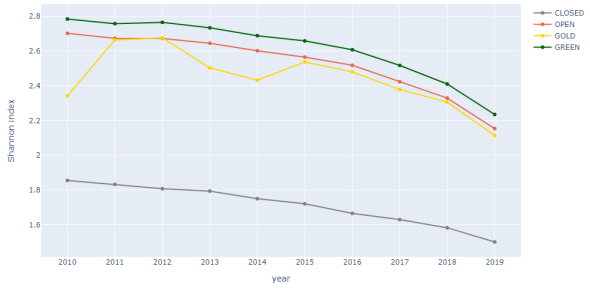

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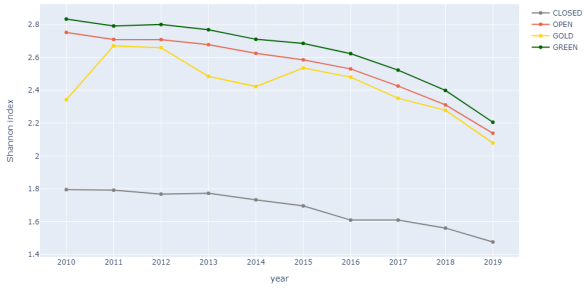
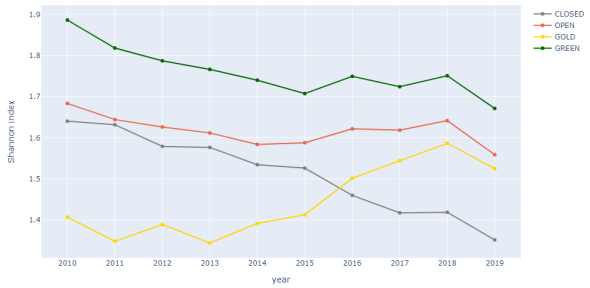


Figure: Comparing mean Shannon on citing Institutions for Political science



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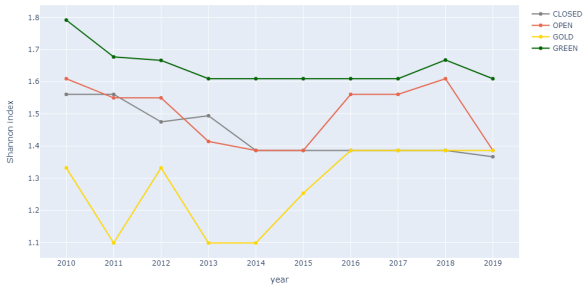

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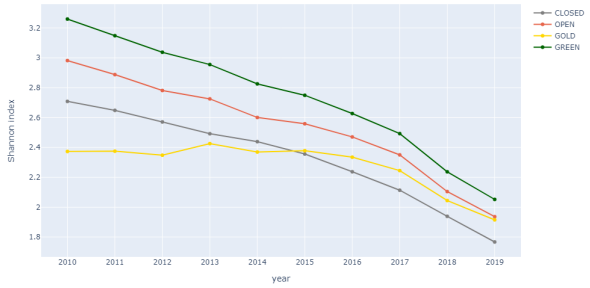

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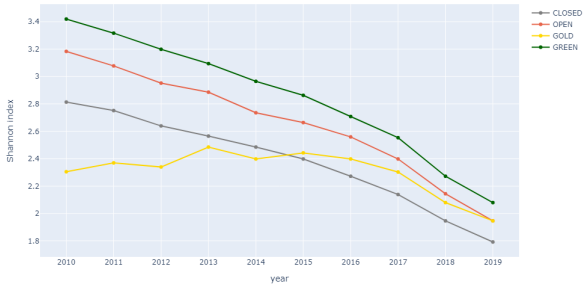


Figure: Comparing mean Shannon on citing Institutions for Sociology

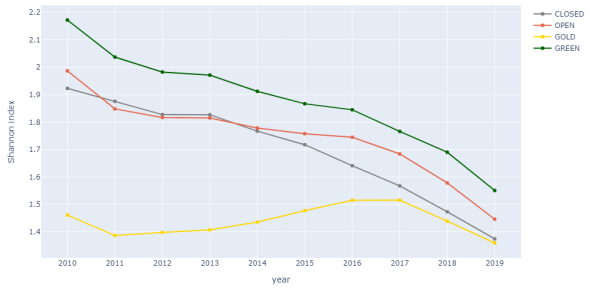
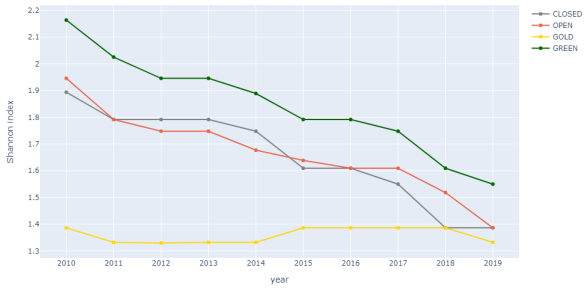


Figure: Comparing median Shannon on citing Institutions for Sociology



For Gini-Simpson scores on citing countries:

Figure: Comparing mean GiniSim on citing Countries for Art

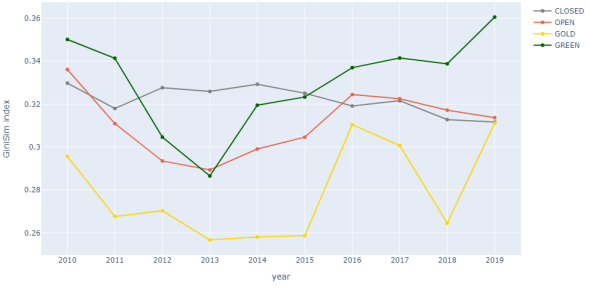


Figure: Comparing median GiniSim on citing Countries for Art

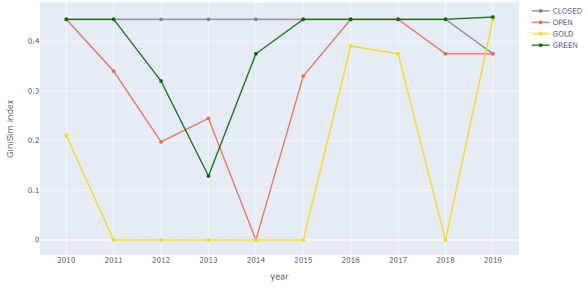


Figure: Comparing mean GiniSim on citing Countries for Biology

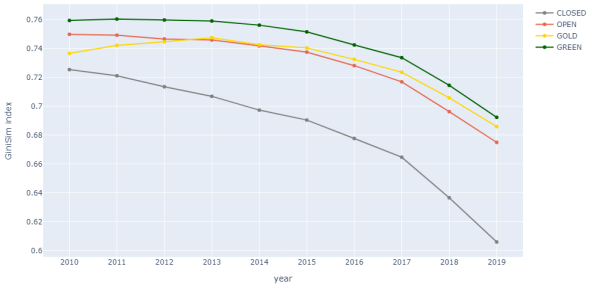


Figure: Comparing median GiniSim on citing Countries for Biology

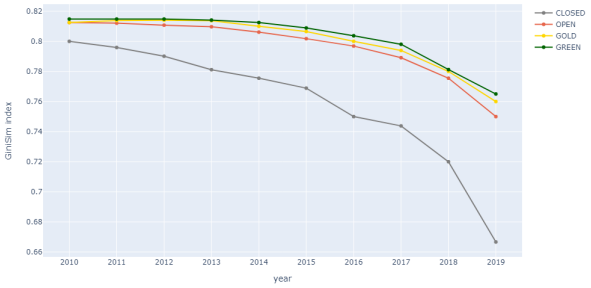


Figure: Comparing mean GiniSim on citing Countries for Business

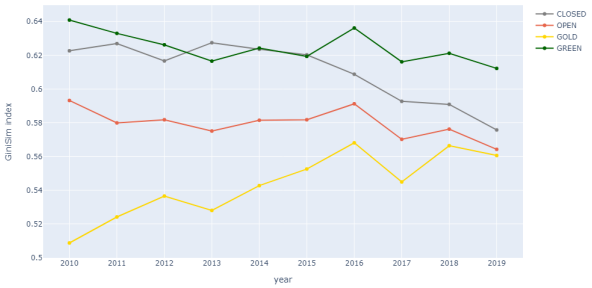


Figure: Comparing median GiniSim on citing Countries for Business

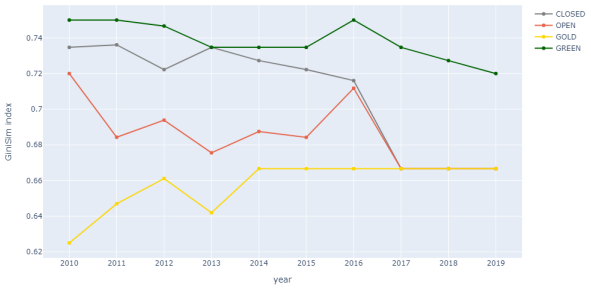


Figure: Comparing mean GiniSim on citing Countries for Chemistry

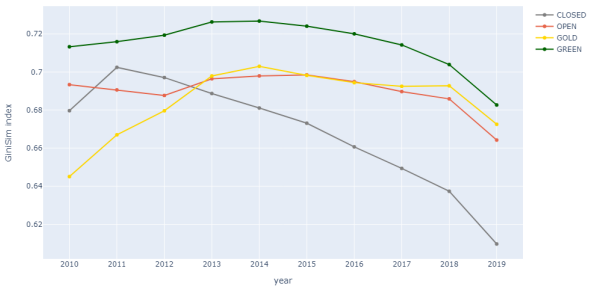


Figure: Comparing median GiniSim on citing Countries for Chemistry

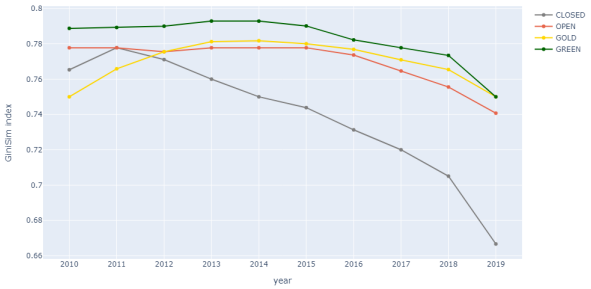


Figure: Comparing mean GiniSim on citing Countries for Computer science

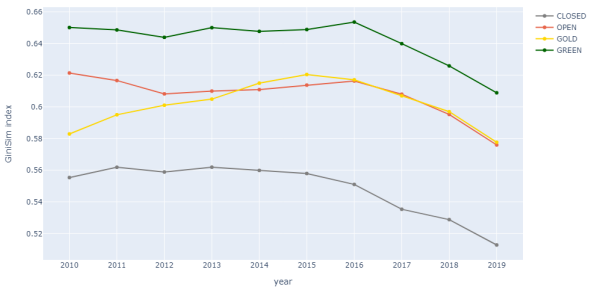


Figure: Comparing median GiniSim on citing Countries for Computer science

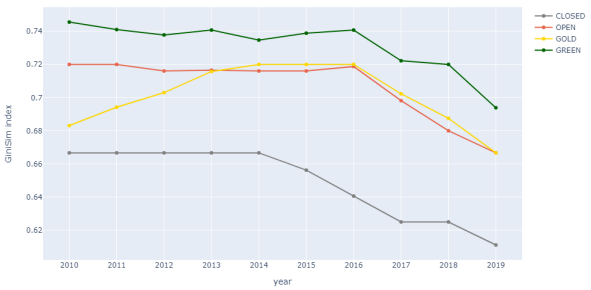


Figure: Comparing mean GiniSim on citing Countries for Economics

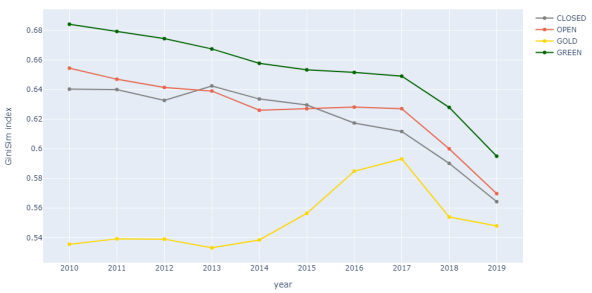


Figure: Comparing median GiniSim on citing Countries for Economics

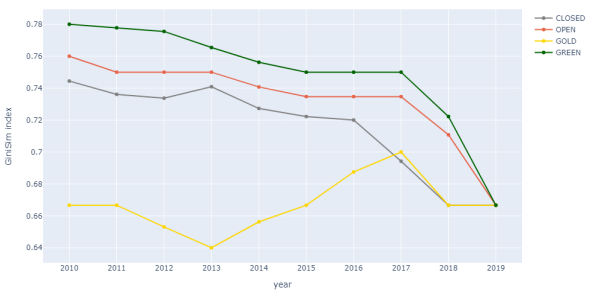


Figure: Comparing mean GiniSim on citing Countries for Engineering

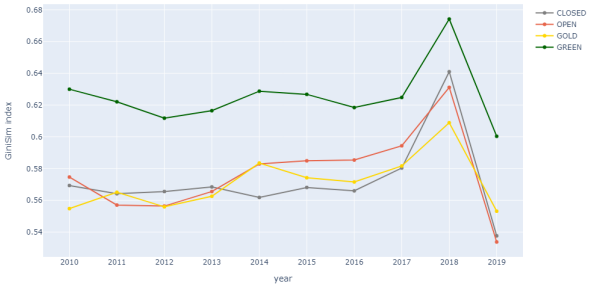


Figure: Comparing median GiniSim on citing Countries for Engineering

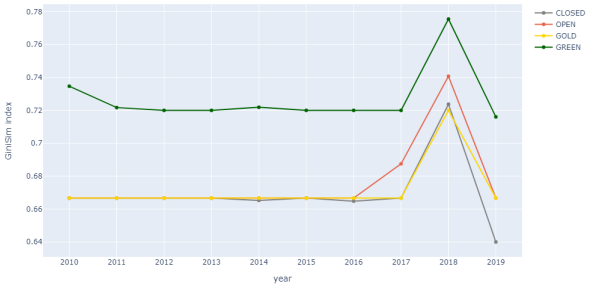


Figure: Comparing mean GiniSim on citing Countries for Environmental science

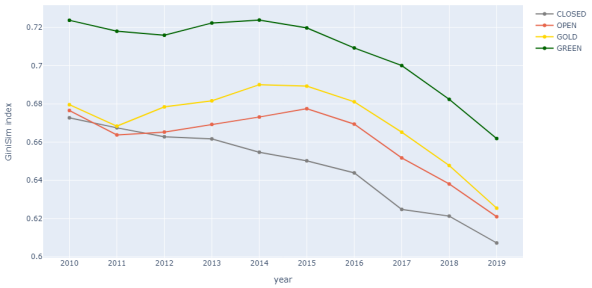


Figure: Comparing median GiniSim on citing Countries for Environmental science

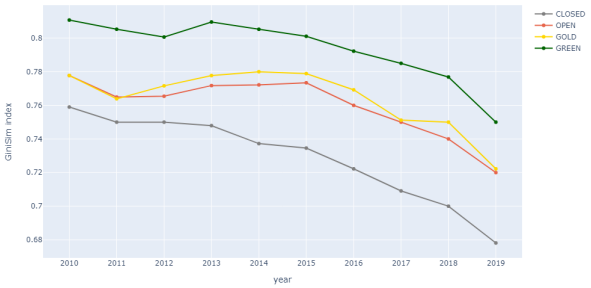


Figure: Comparing mean GiniSim on citing Countries for Geography

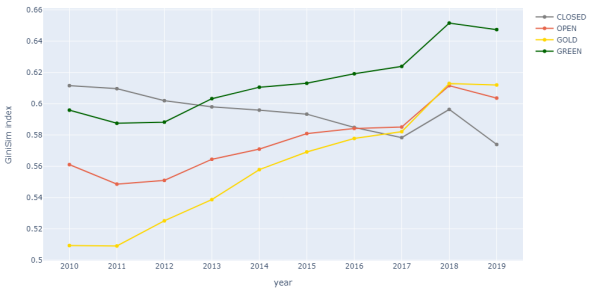


Figure: Comparing median GiniSim on citing Countries for Geography

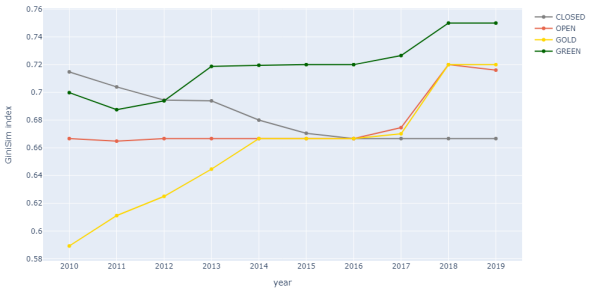
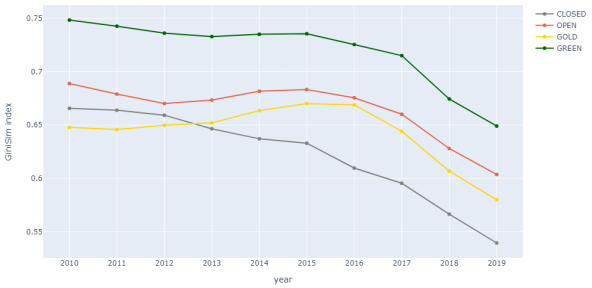


Figure: Comparing mean GiniSim on citing Countries for Geology



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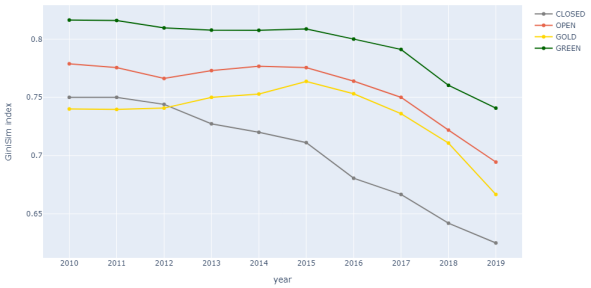


Figure: Comparing mean GiniSim on citing Countries for History

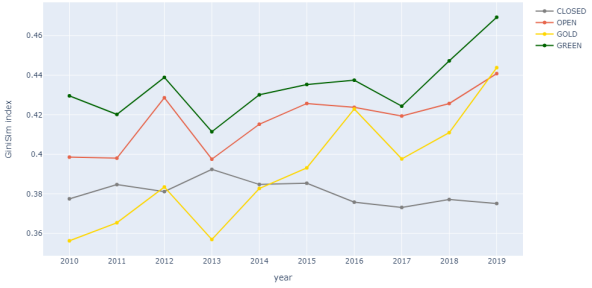


Figure: Comparing median GiniSim on citing Countries for History

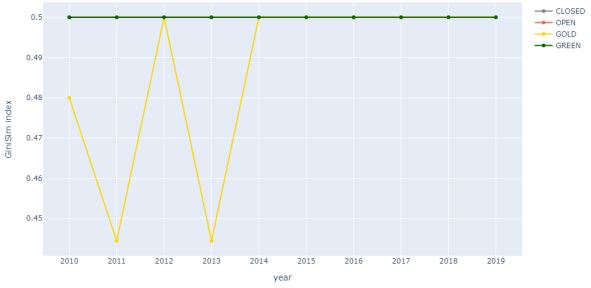


Figure: Comparing mean GiniSim on citing Countries for Materials science

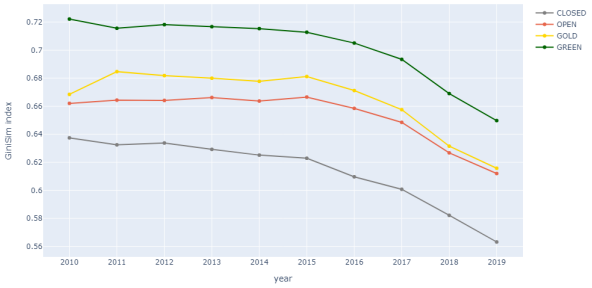


Figure: Comparing median GiniSim on citing Countries for Materials science

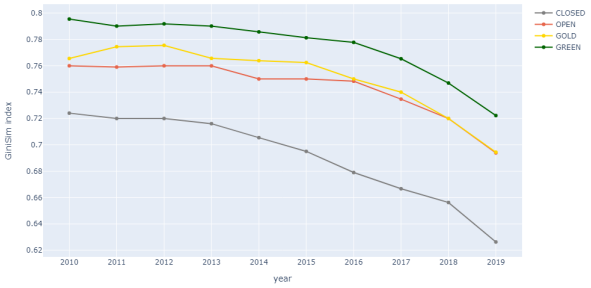


Figure: Comparing mean GiniSim on citing Countries for Mathematics

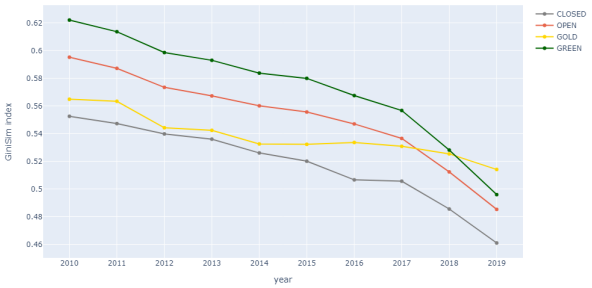


Figure: Comparing median GiniSim on citing Countries for Mathematics

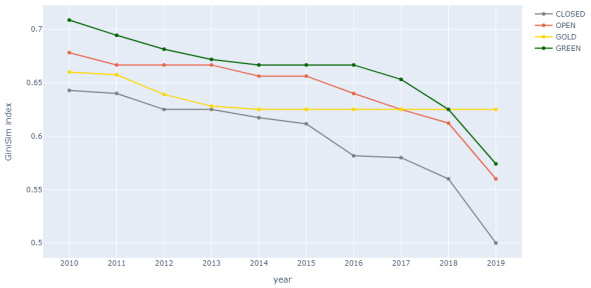


Figure: Comparing mean GiniSim on citing Countries for Medicine

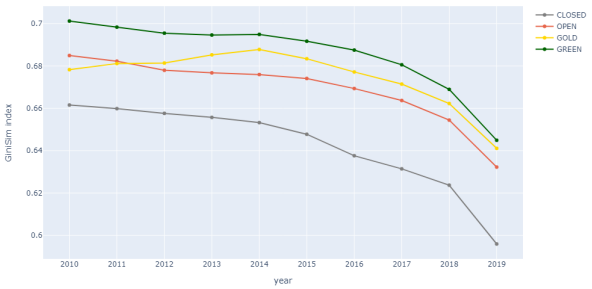


Figure: Comparing median GiniSim on citing Countries for Medicine

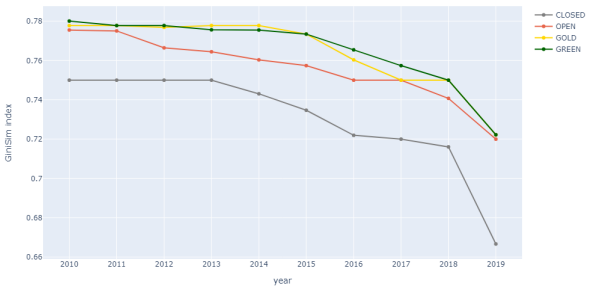


Figure: Comparing mean GiniSim on citing Countries for Philosophy

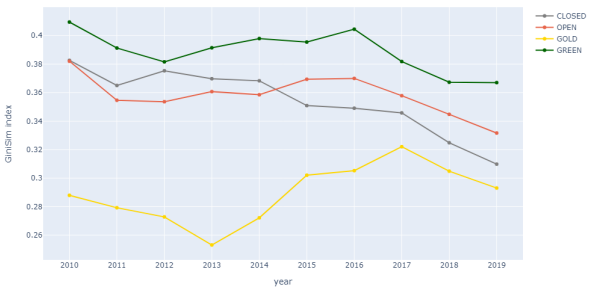


Figure: Comparing median GiniSim on citing Countries for Philosophy

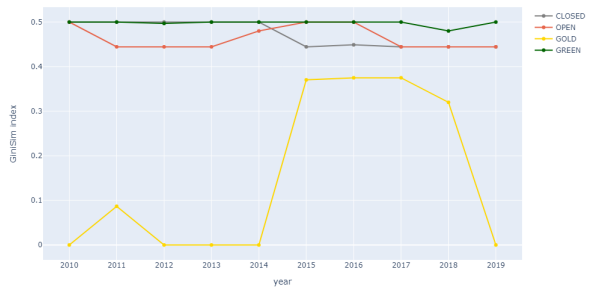


Figure: Comparing mean GiniSim on citing Countries for Physics

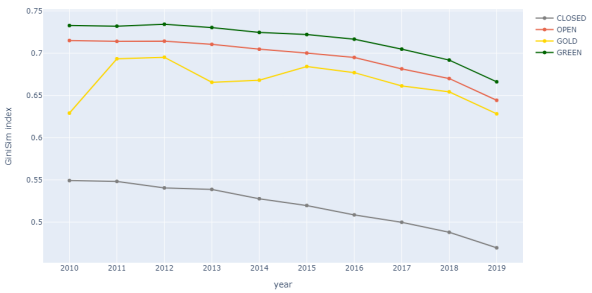


Figure: Comparing median GiniSim on citing Countries for Physics

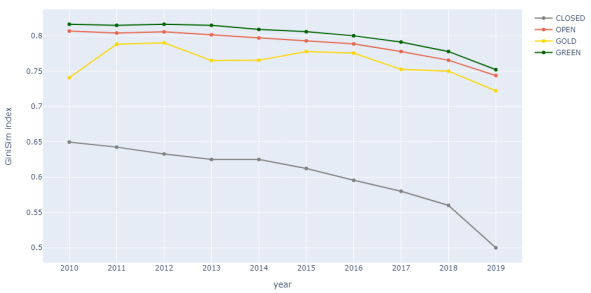


Figure: Comparing mean GiniSim on citing Countries for Political science

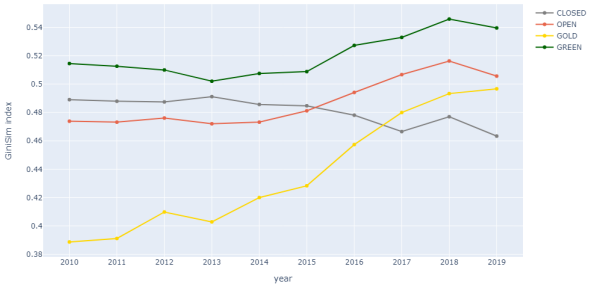


Figure: Comparing median GiniSim on citing Countries for Political science

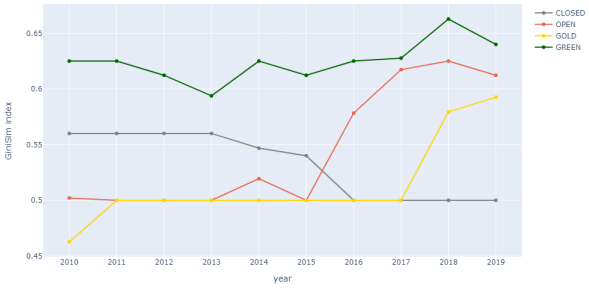


Figure: Comparing mean GiniSim on citing Countries for Psychology

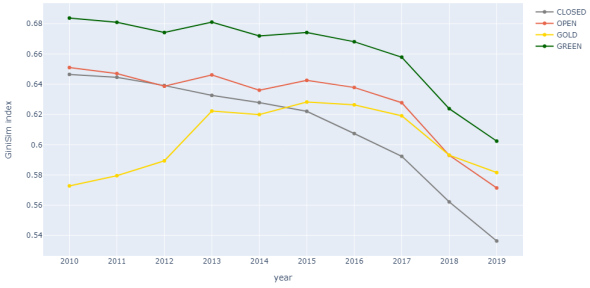


Figure: Comparing median GiniSim on citing Countries for Psychology

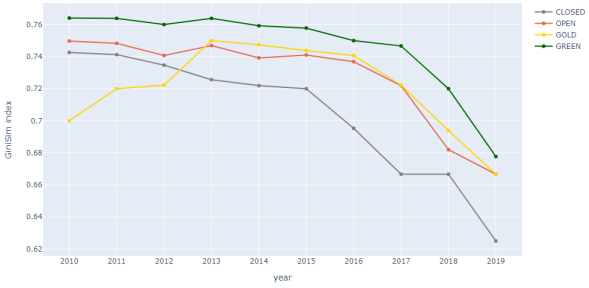


Figure: Comparing mean GiniSim on citing Countries for Sociology

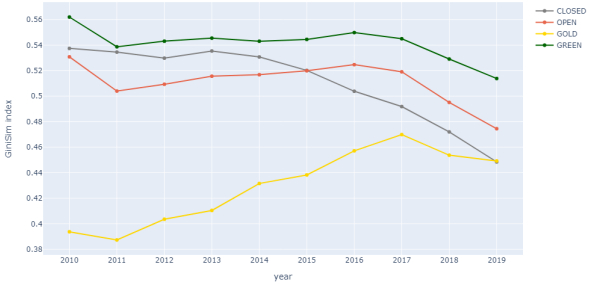
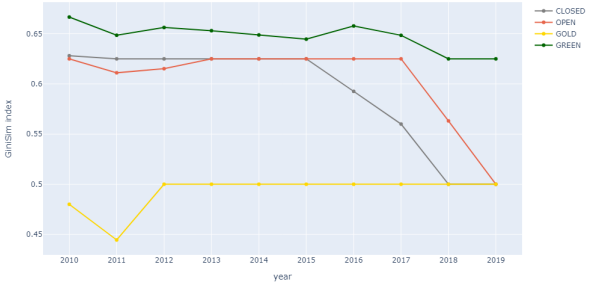


Figure: Comparing median GiniSim on citing Countries for Sociology



For Shannon scores on citing countries:

Figure: Comparing mean Shannon on citing Countries for Art

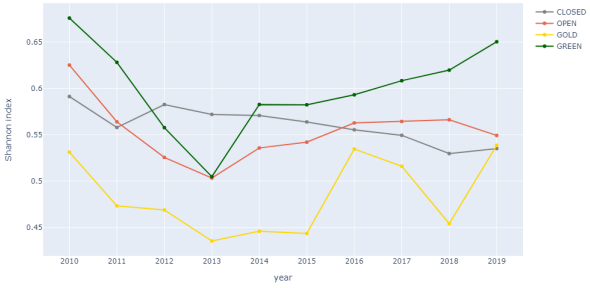


Figure: Comparing median Shannon on citing Countries for Art

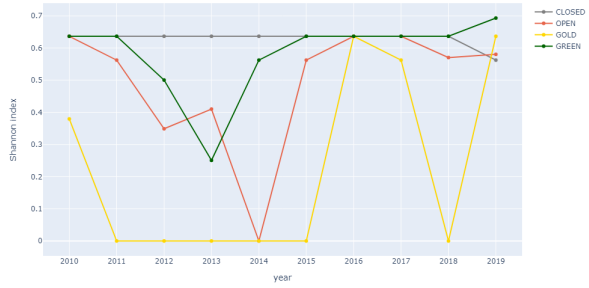


Figure: Comparing mean Shannon on citing Countries for Biology

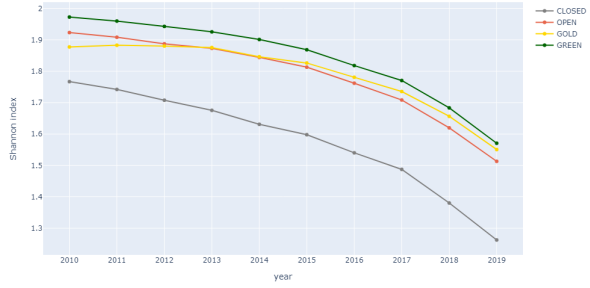


Figure: Comparing median Shannon on citing Countries for Biology

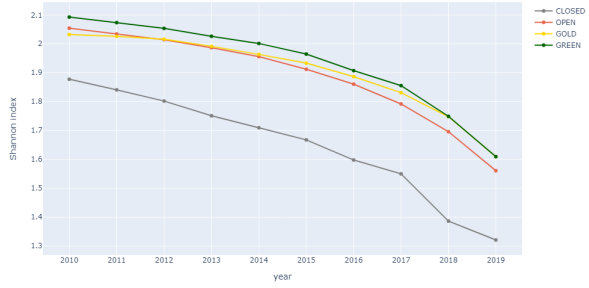


Figure: Comparing mean Shannon on citing Countries for Business

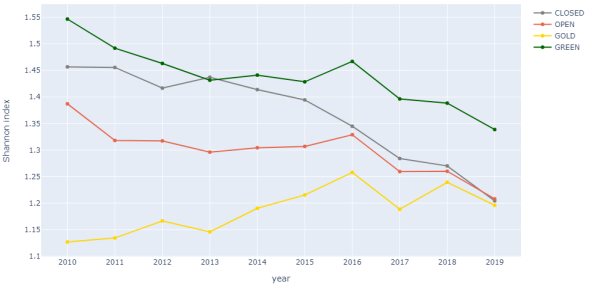


Figure: Comparing median Shannon on citing Countries for Business

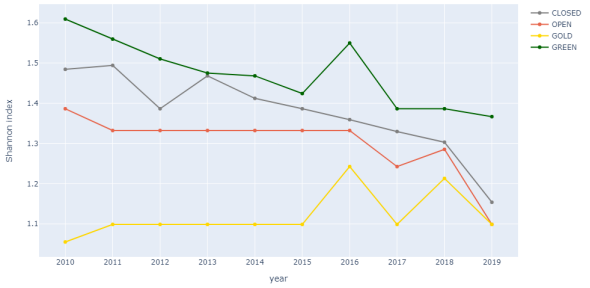


Figure: Comparing mean Shannon on citing Countries for Chemistry

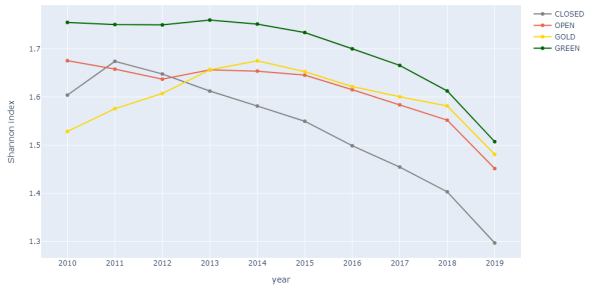


Figure: Comparing median Shannon on citing Countries for Chemistry

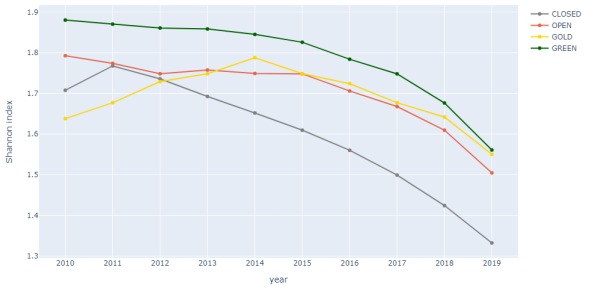


Figure: Comparing mean Shannon on citing Countries for Computer science

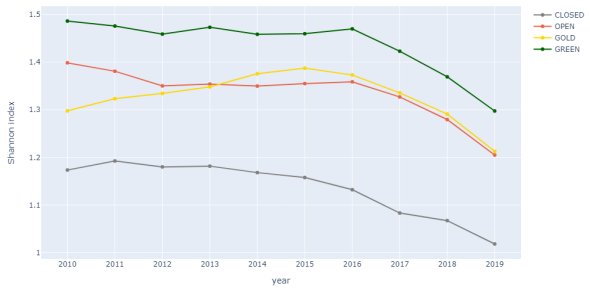


Figure: Comparing median Shannon on citing Countries for Computer science

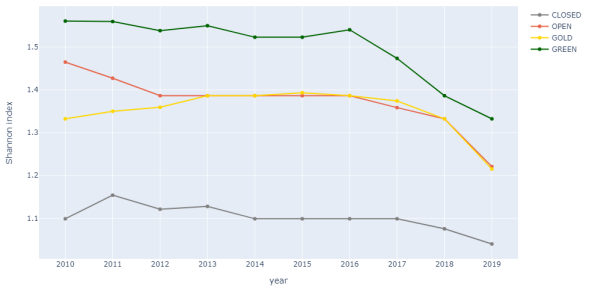


Figure: Comparing mean Shannon on citing Countries for Economics

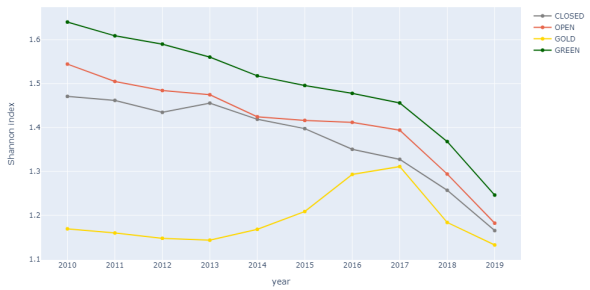


Figure: Comparing median Shannon on citing Countries for Economics

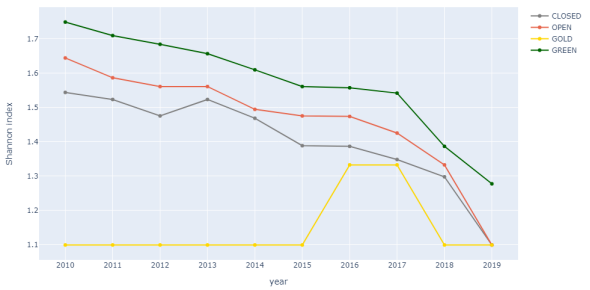


Figure: Comparing mean Shannon on citing Countries for Engineering

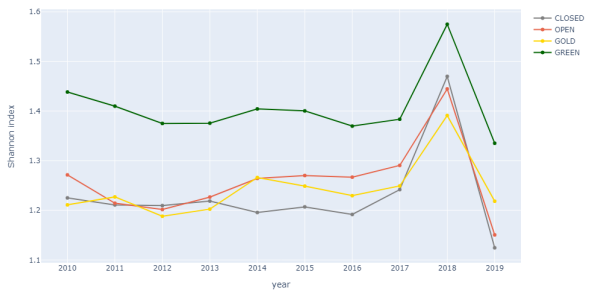


Figure: Comparing median Shannon on citing Countries for Engineering

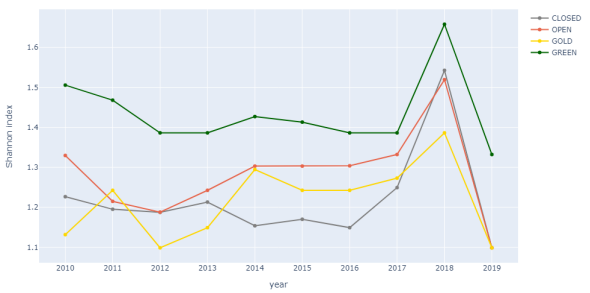


Figure: Comparing mean Shannon on citing Countries for Environmental science

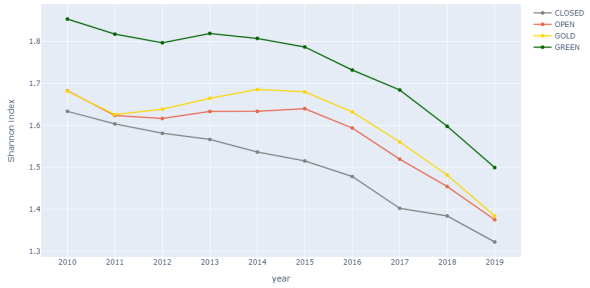


Figure: Comparing median Shannon on citing Countries for Environmental science

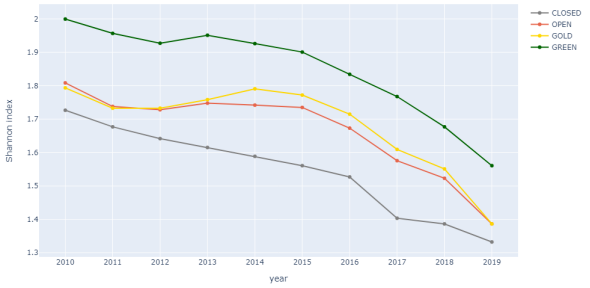


Figure: Comparing mean Shannon on citing Countries for Geography

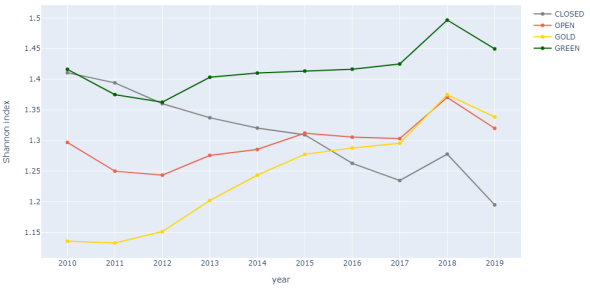


Figure: Comparing median Shannon on citing Countries for Geography

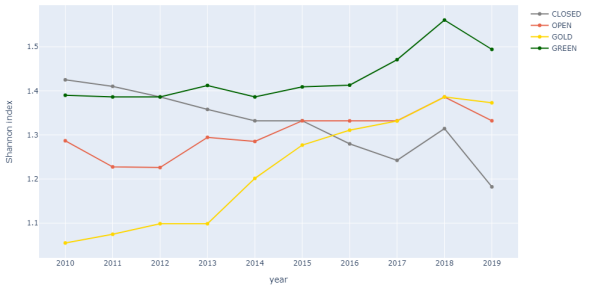


Figure: Comparing mean Shannon on citing Countries for Geology

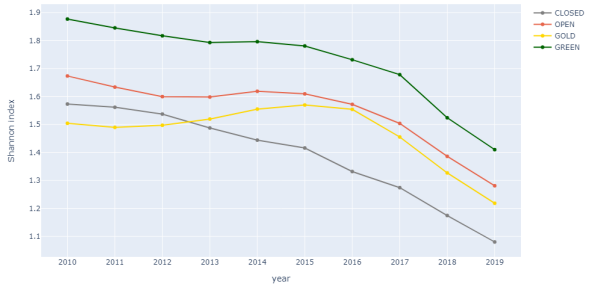


Figure: Comparing median Shannon on citing Countries for Geology

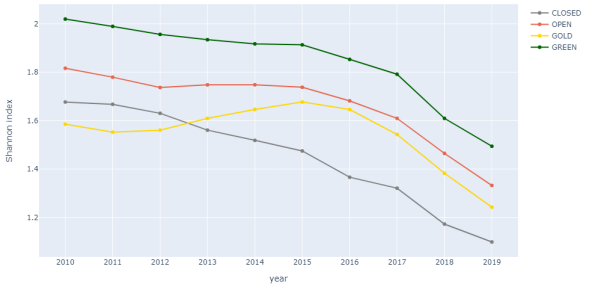


Figure: Comparing mean Shannon on citing Countries for History

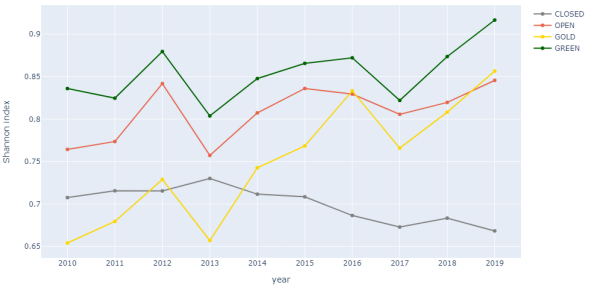


Figure: Comparing median Shannon on citing Countries for History

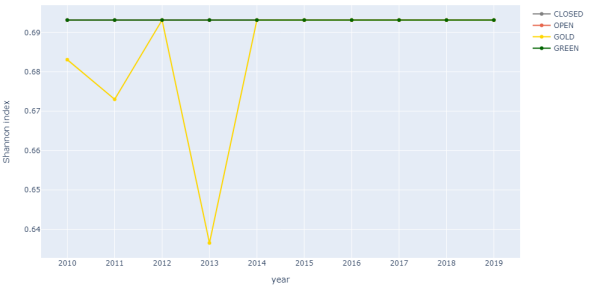


Figure: Comparing mean Shannon on citing Countries for Materials science

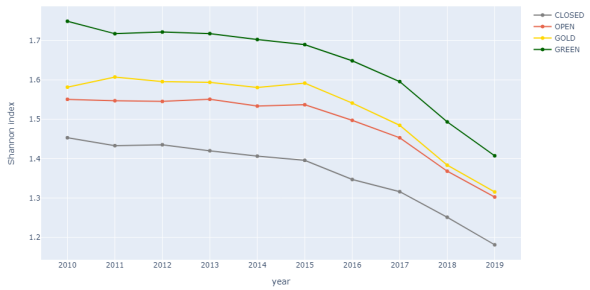


Figure: Comparing median Shannon on citing Countries for Materials science

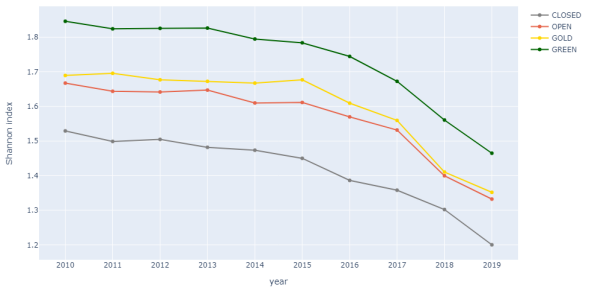
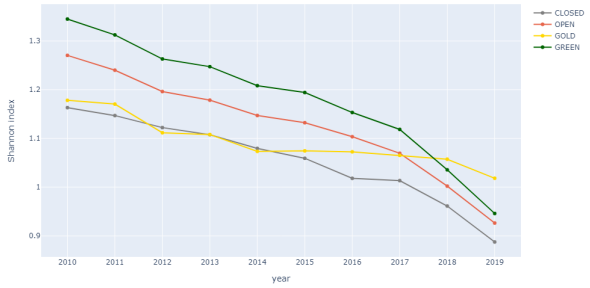


Figure: Comparing mean Shannon on citing Countries for Mathematics



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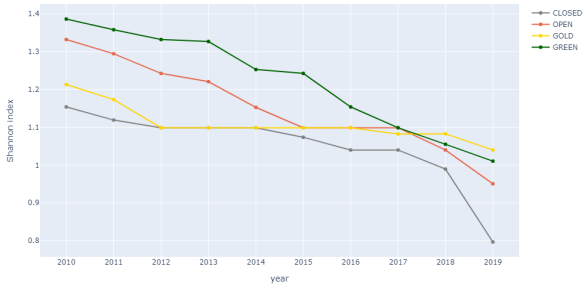


Figure: Comparing mean Shannon on citing Countries for Medicine

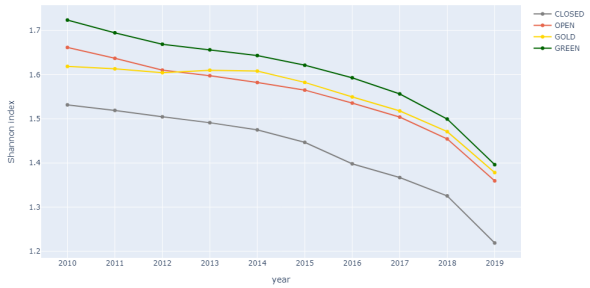


Figure: Comparing median Shannon on citing Countries for Medicine

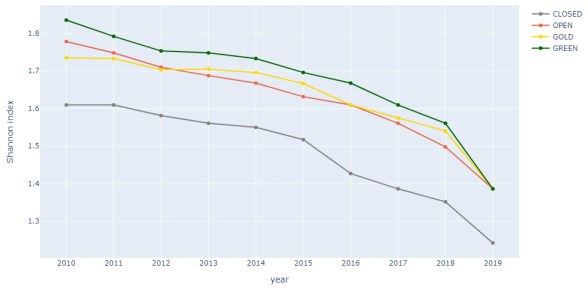


Figure: Comparing mean Shannon on citing Countries for Philosophy

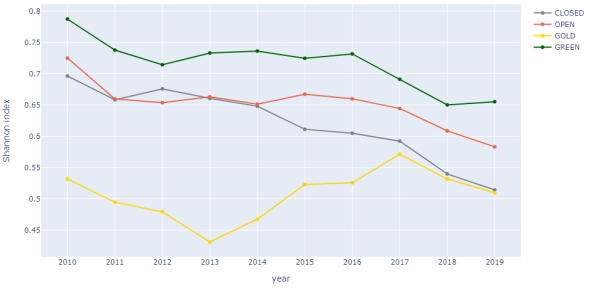


Figure: Comparing median Shannon on citing Countries for Philosophy

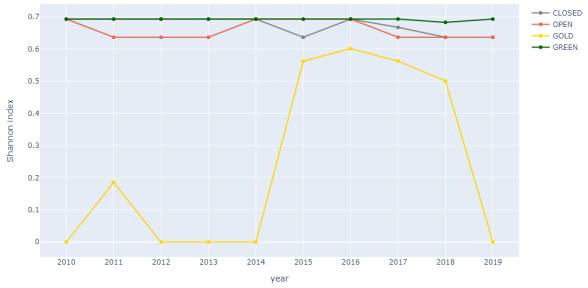
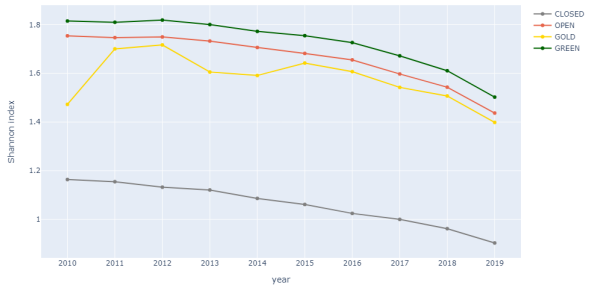


Figure: Comparing mean Shannon on citing Countries for Physics



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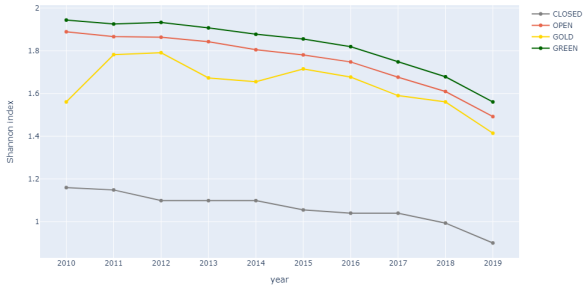


Figure: Comparing mean Shannon on citing Countries for Political science

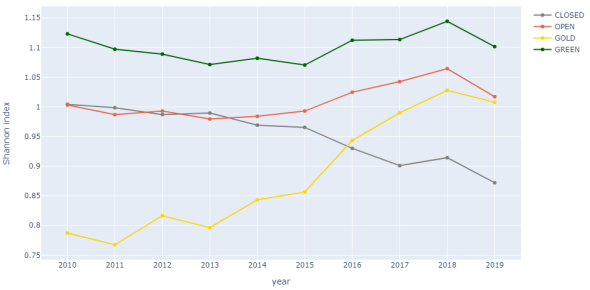


Figure: Comparing median Shannon on citing Countries for Political science

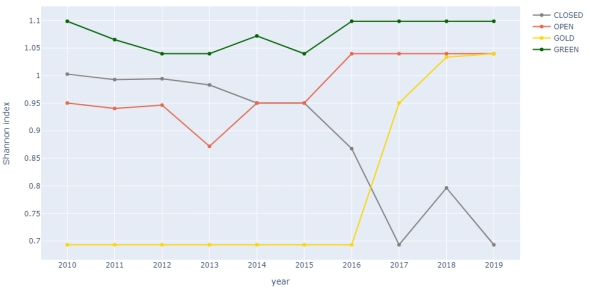


Figure: Comparing mean Shannon on citing Countries for Psychology

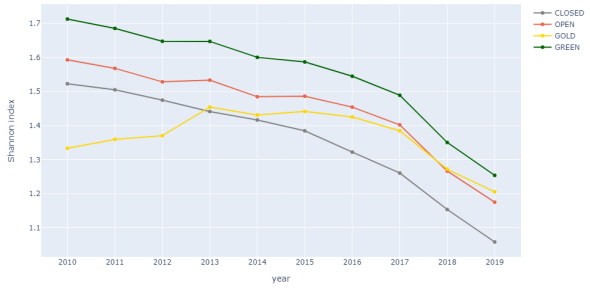


Figure: Comparing median Shannon on citing Countries for Psychology

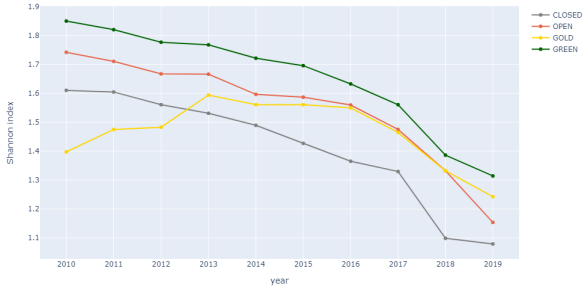


Figure: Comparing mean Shannon on citing Countries for Sociology

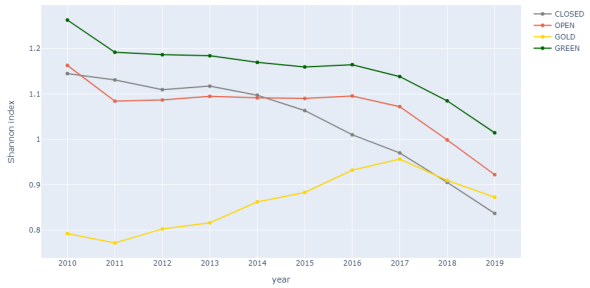
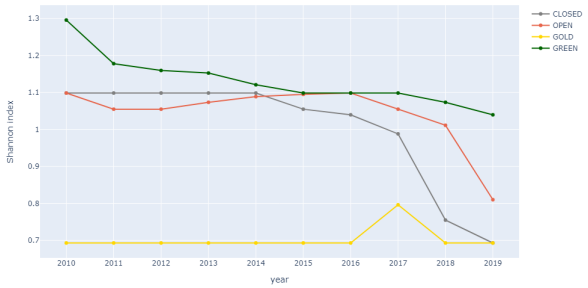


Figure: Comparing median Shannon on citing Countries for Sociology



For Gini-Simpson scores on citing subregions:

Figure: Comparing mean GiniSim on citing Subregions for Art

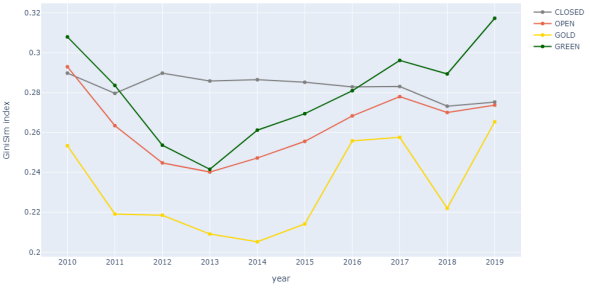


Figure: Comparing median GiniSim on citing Subregions for Art

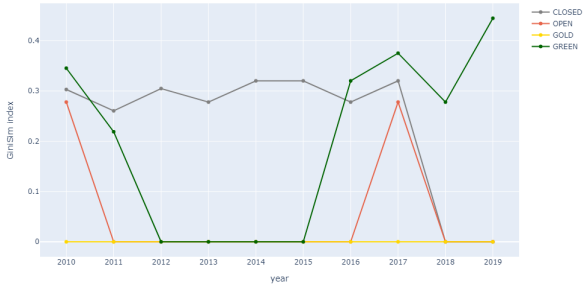


Figure: Comparing mean GiniSim on citing Subregions for Biology

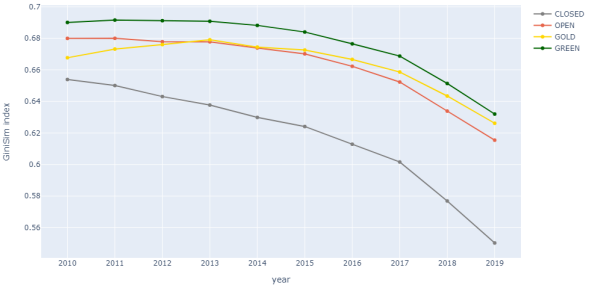


Figure: Comparing median GiniSim on citing Subregions for Biology

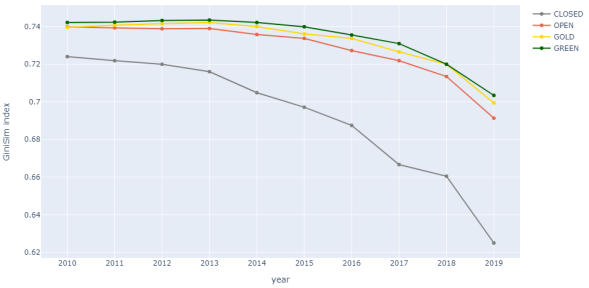


Figure: Comparing mean GiniSim on citing Subregions for Business

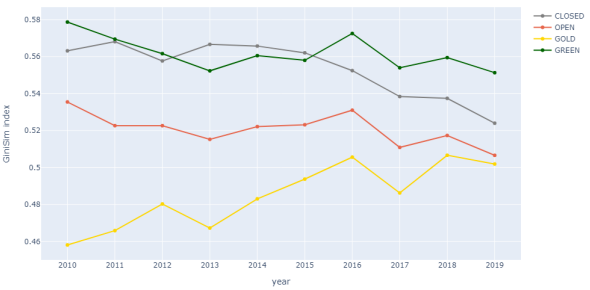


Figure: Comparing median GiniSim on citing Subregions for Business

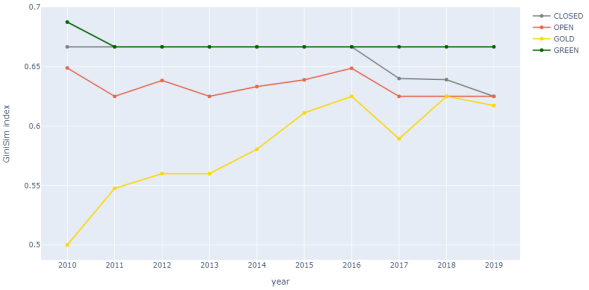


Figure: Comparing mean GiniSim on citing Subregions for Chemistry

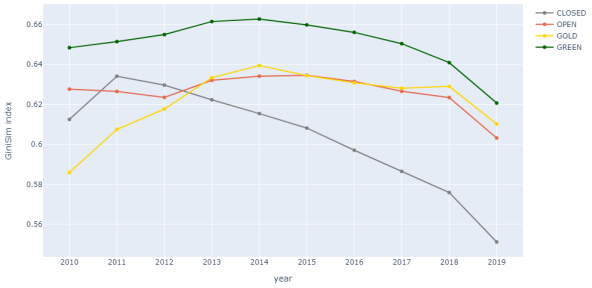


Figure: Comparing median GiniSim on citing Subregions for Chemistry

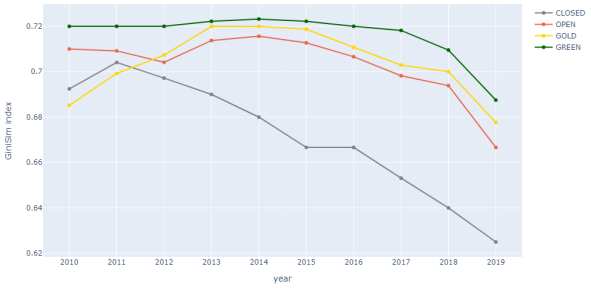


Figure: Comparing mean GiniSim on citing Subregions for Computer science

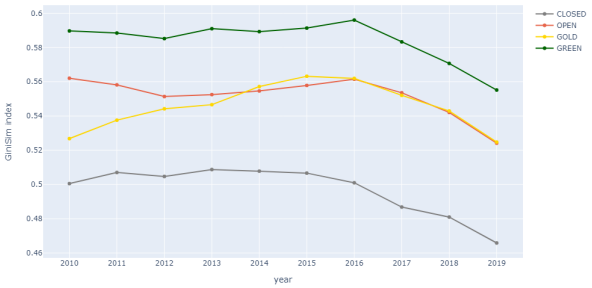


Figure: Comparing median GiniSim on citing Subregions for Computer science

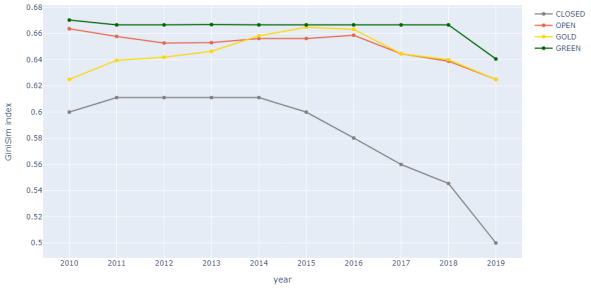


Figure: Comparing mean GiniSim on citing Subregions for Economics

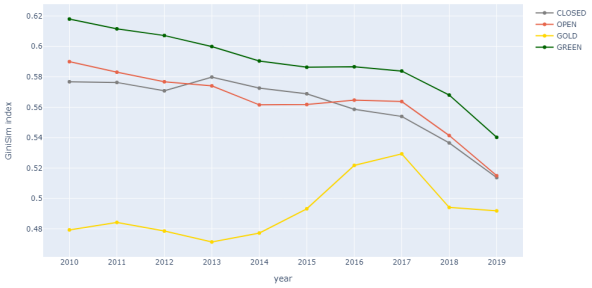


Figure: Comparing median GiniSim on citing Subregions for Economics

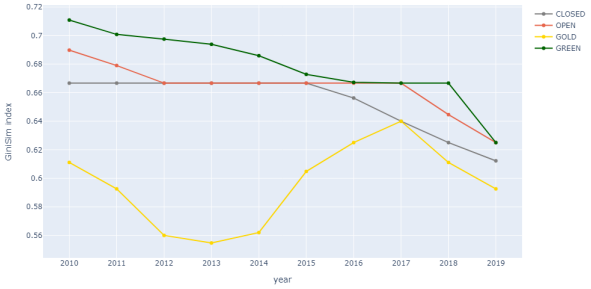


Figure: Comparing mean GiniSim on citing Subregions for Engineering

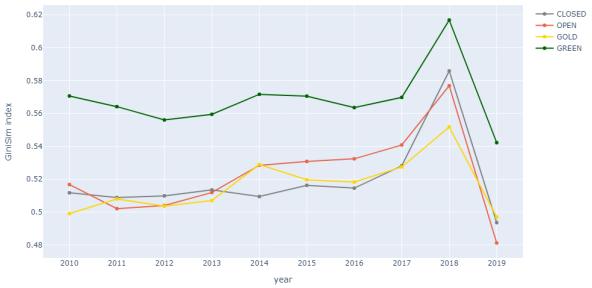


Figure: Comparing median GiniSim on citing Subregions for Engineering

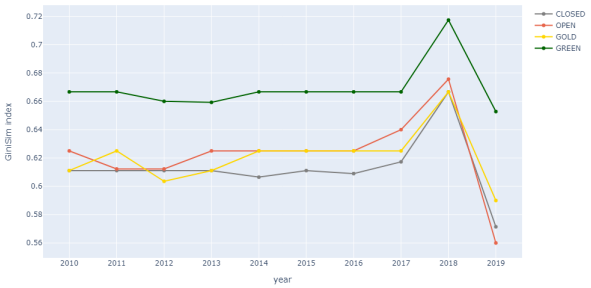


Figure: Comparing mean GiniSim on citing Subregions for Environmental science

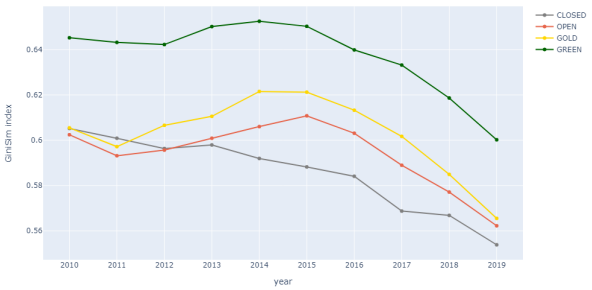


Figure: Comparing median GiniSim on citing Subregions for Environmental science

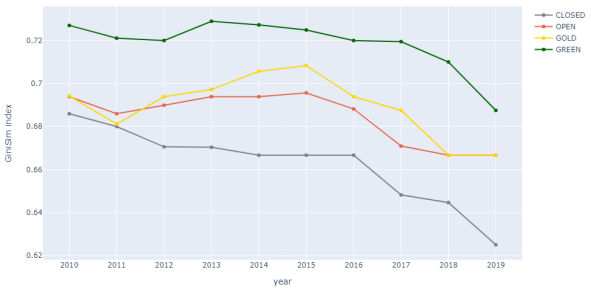


Figure: Comparing mean GiniSim on citing Subregions for Geography

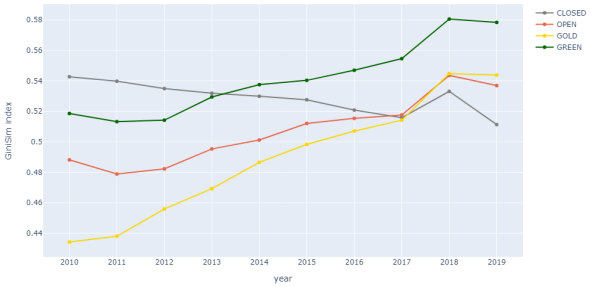


Figure: Comparing median GiniSim on citing Subregions for Geography

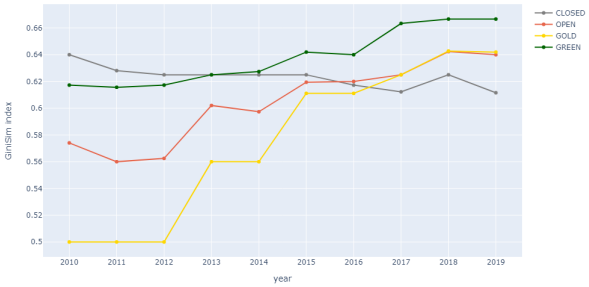
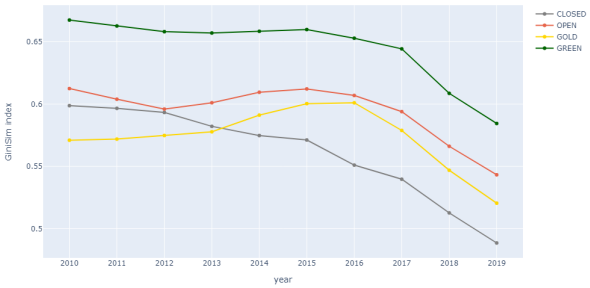


Figure: Comparing mean GiniSim on citing Subregions for Geology



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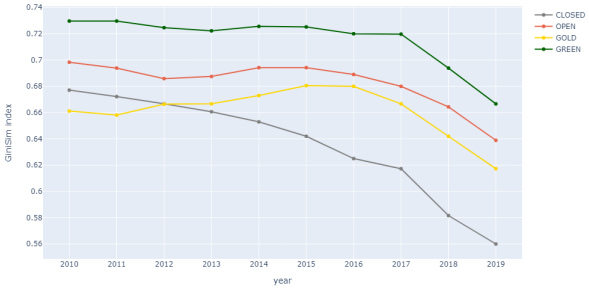


Figure: Comparing mean GiniSim on citing Subregions for History

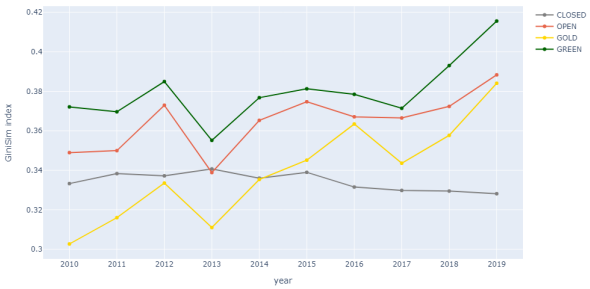


Figure: Comparing median GiniSim on citing Subregions for History

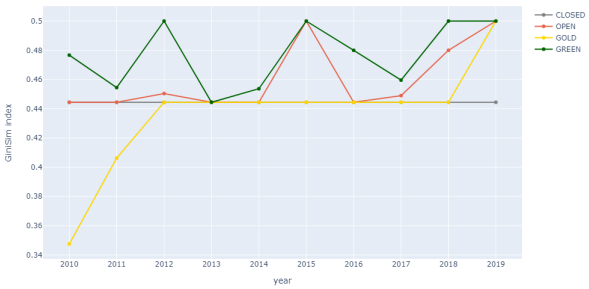


Figure: Comparing mean GiniSim on citing Subregions for Materials science

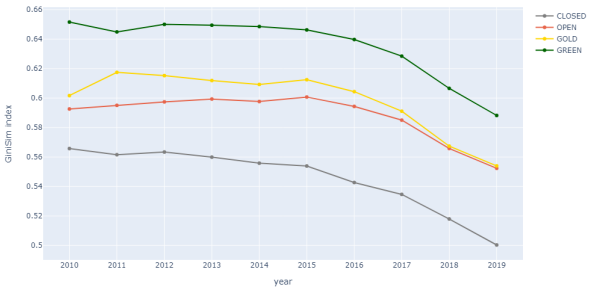


Figure: Comparing median GiniSim on citing Subregions for Materials science

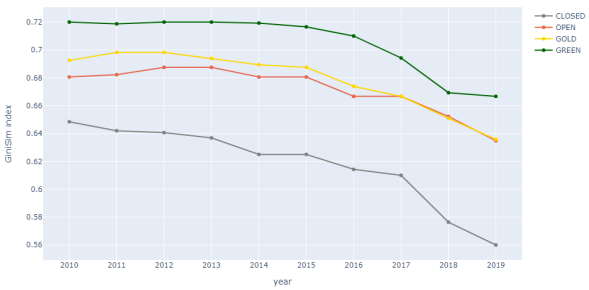


Figure: Comparing mean GiniSim on citing Subregions for Mathematics

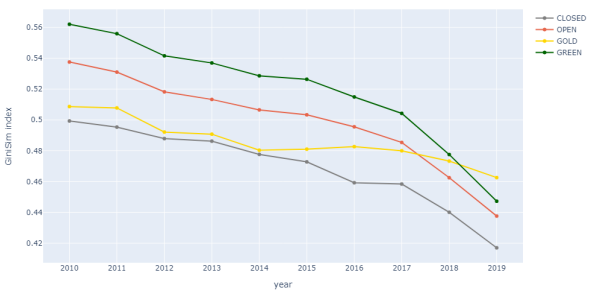


Figure: Comparing median GiniSim on citing Subregions for Mathematics

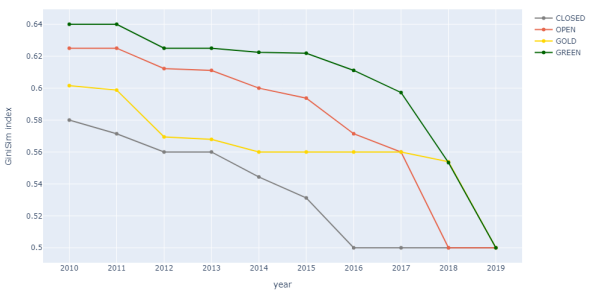


Figure: Comparing mean GiniSim on citing Subregions for Medicine

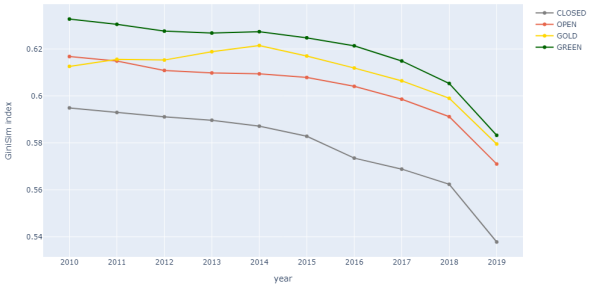


Figure: Comparing median GiniSim on citing Subregions for Medicine

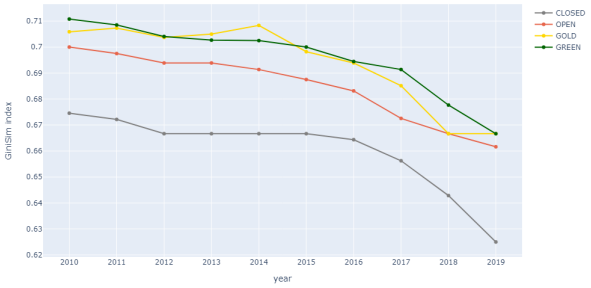


Figure: Comparing mean GiniSim on citing Subregions for Philosophy

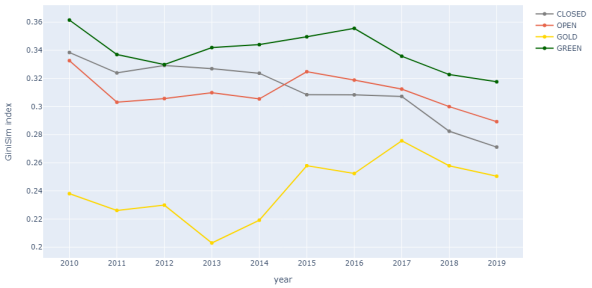


Figure: Comparing median GiniSim on citing Subregions for Philosophy

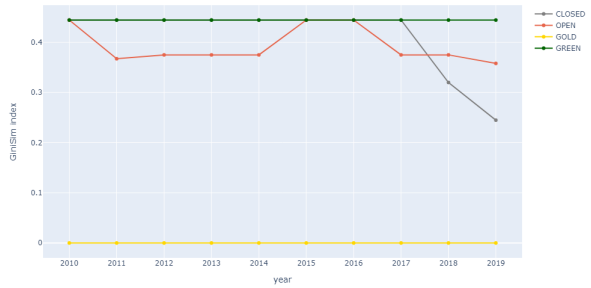


Figure: Comparing mean GiniSim on citing Subregions for Physics

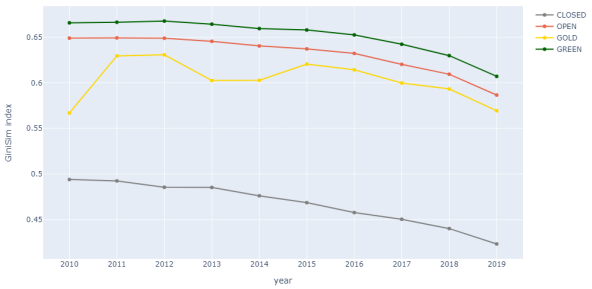


Figure: Comparing median GiniSim on citing Subregions for Physics

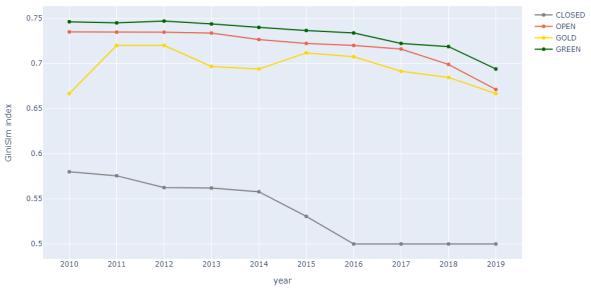


Figure: Comparing mean GiniSim on citing Subregions for Political science

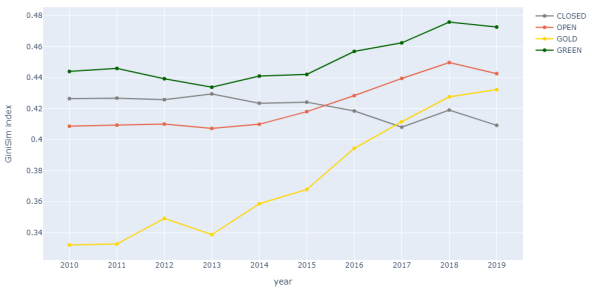


Figure: Comparing median GiniSim on citing Subregions for Political science

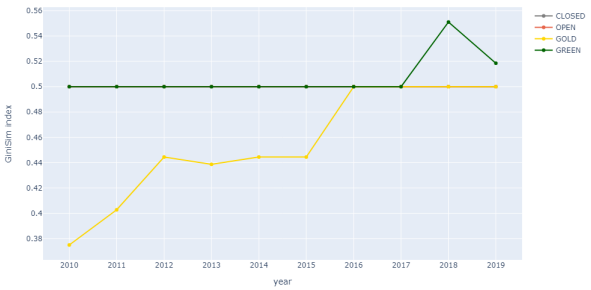


Figure: Comparing mean GiniSim on citing Subregions for Psychology

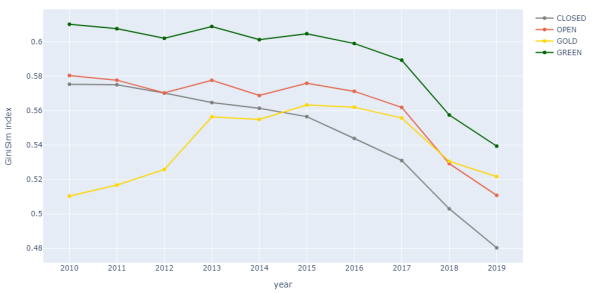


Figure: Comparing median GiniSim on citing Subregions for Psychology

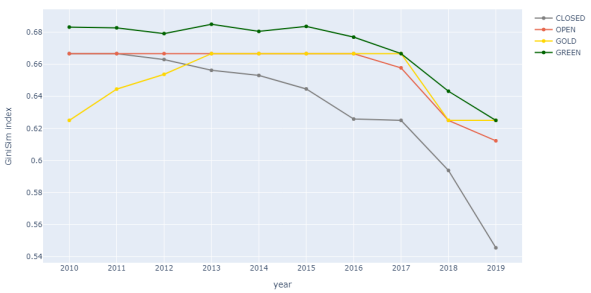


Figure: Comparing mean GiniSim on citing Subregions for Sociology

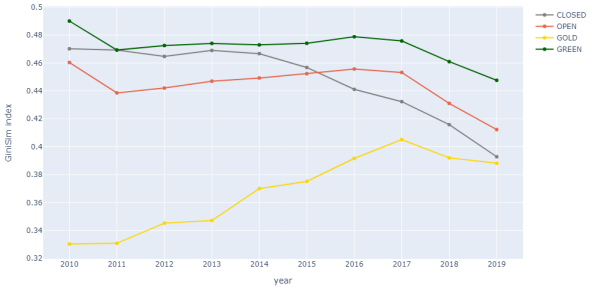
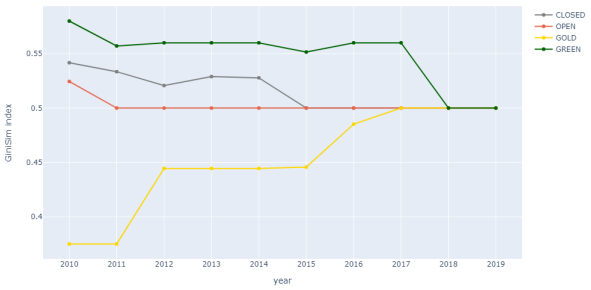


Figure: Comparing median GiniSim on citing Subregions for Sociology



For Shannon scores on citing subregions:

Figure: Comparing mean Shannon on citing Subregions for Art

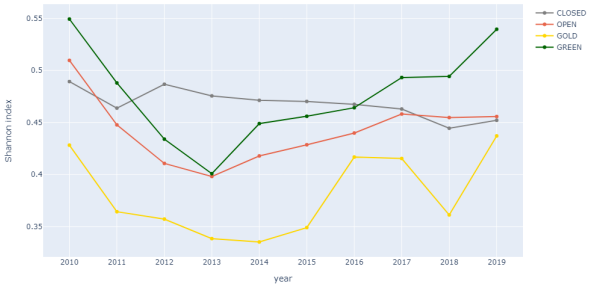


Figure: Comparing median Shannon on citing Subregions for Art

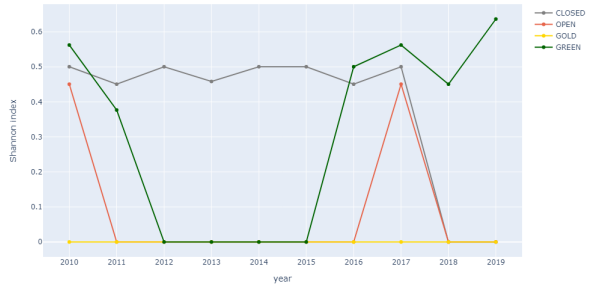


Figure: Comparing mean Shannon on citing Subregions for Biology

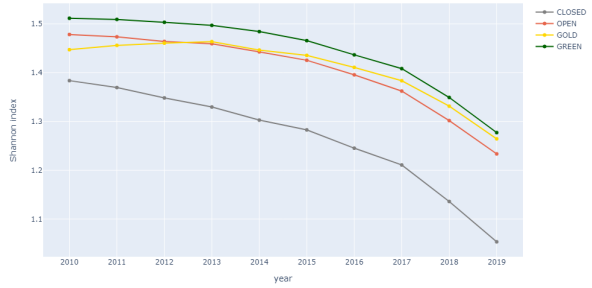


Figure: Comparing median Shannon on citing Subregions for Biology

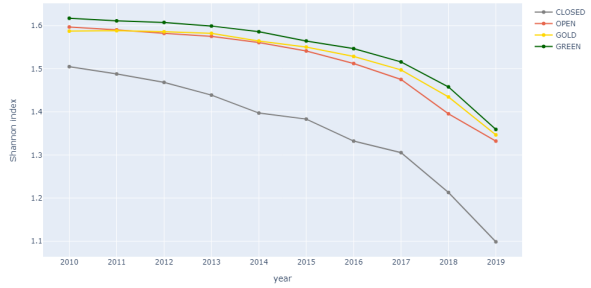


Figure: Comparing mean Shannon on citing Subregions for Business

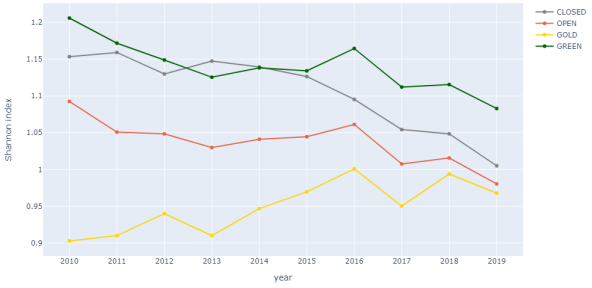


Figure: Comparing median Shannon on citing Subregions for Business

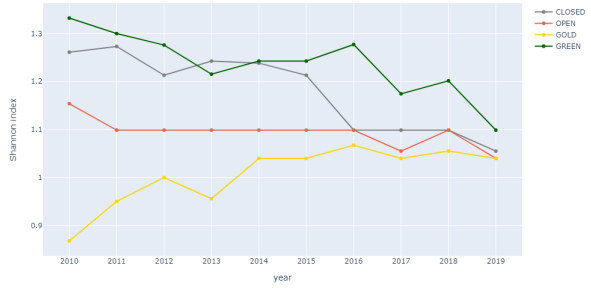


Figure: Comparing mean Shannon on citing Subregions for Chemistry

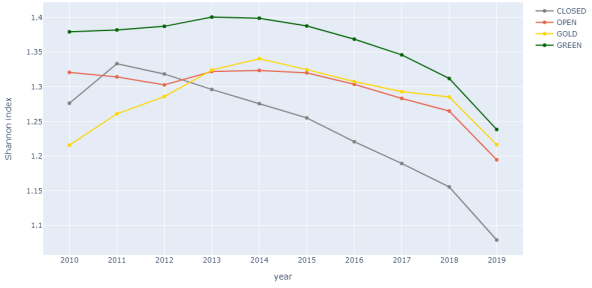


Figure: Comparing median Shannon on citing Subregions for Chemistry

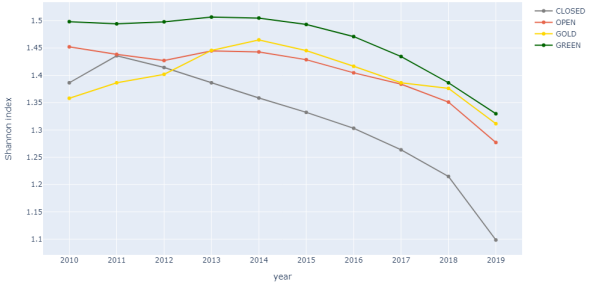


Figure: Comparing mean Shannon on citing Subregions for Computer science

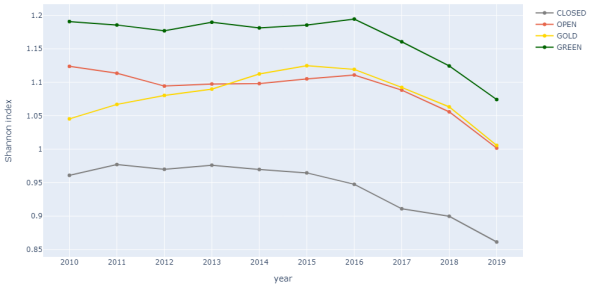


Figure: Comparing median Shannon on citing Subregions for Computer science

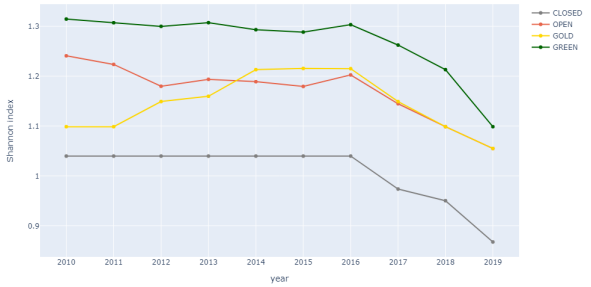


Figure: Comparing mean Shannon on citing Subregions for Economics

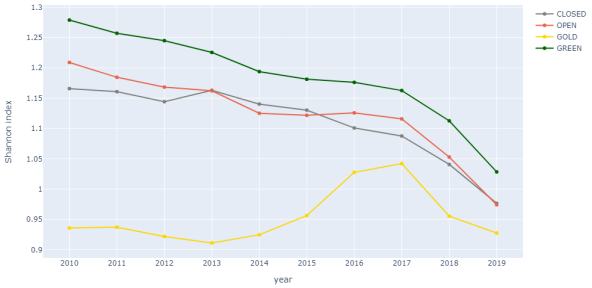


Figure: Comparing median Shannon on citing Subregions for Economics

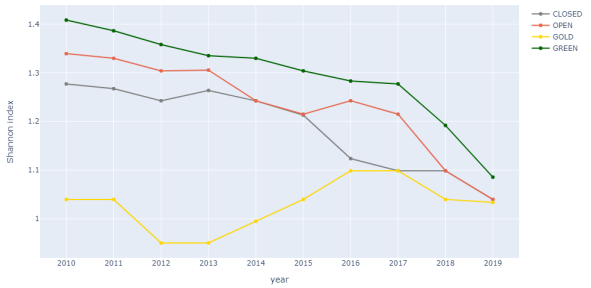


Figure: Comparing mean Shannon on citing Subregions for Engineering

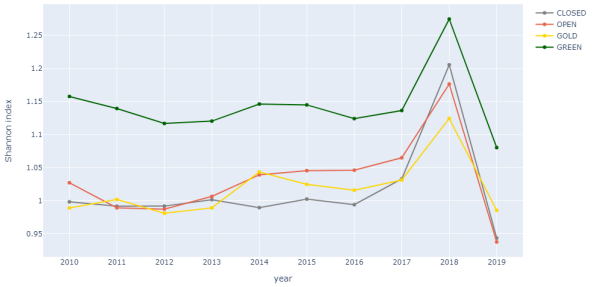


Figure: Comparing median Shannon on citing Subregions for Engineering

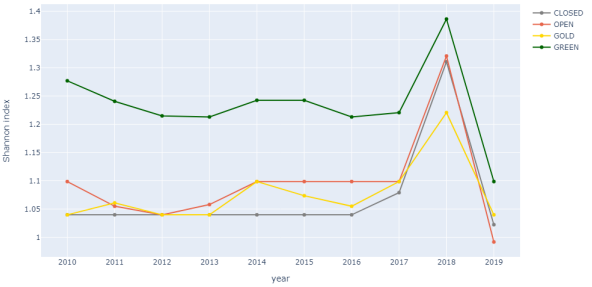


Figure: Comparing mean Shannon on citing Subregions for Environmental science

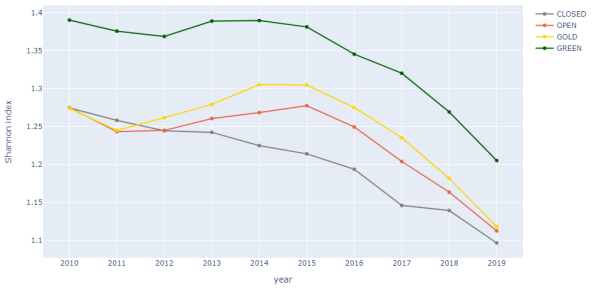


Figure: Comparing median Shannon on citing Subregions for Environmental science

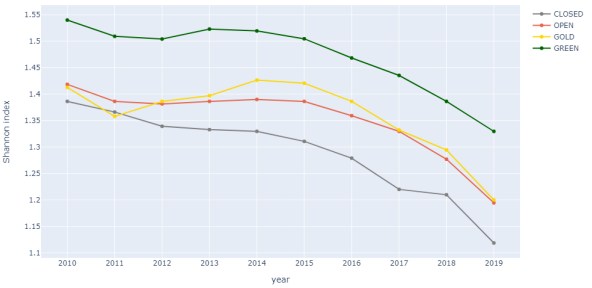


Figure: Comparing mean Shannon on citing Subregions for Geography

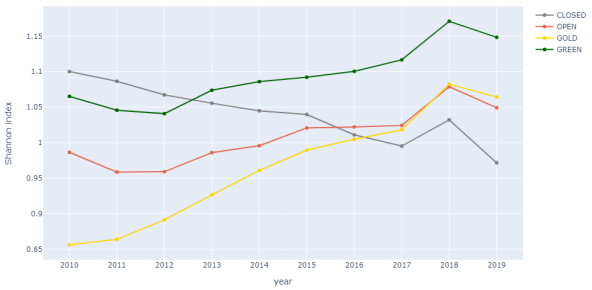


Figure: Comparing median Shannon on citing Subregions for Geography

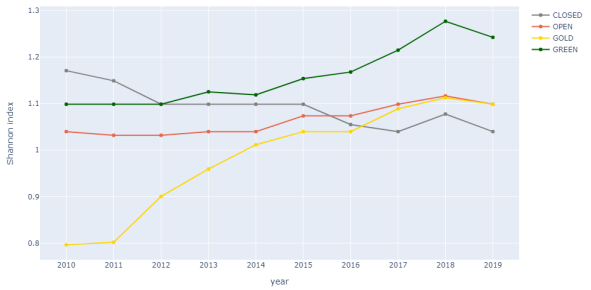


Figure: Comparing mean Shannon on citing Subregions for Geology

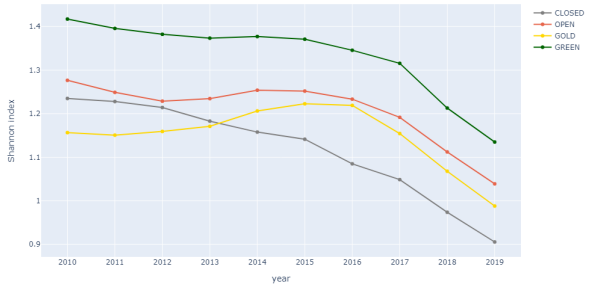


Figure: Comparing median Shannon on citing Subregions for Geology

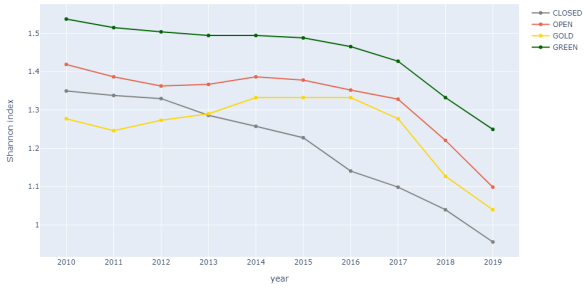


Figure: Comparing mean Shannon on citing Subregions for History

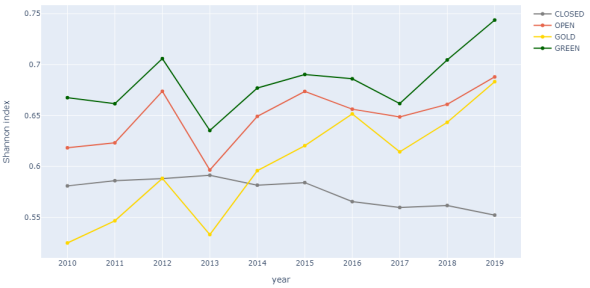


Figure: Comparing median Shannon on citing Subregions for History

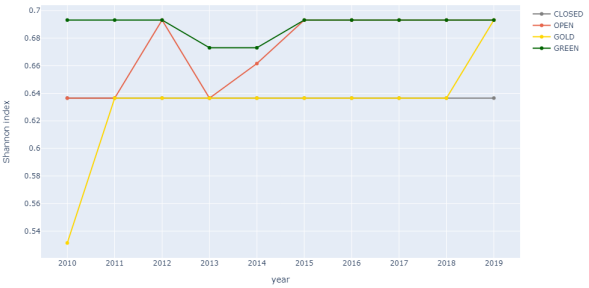


Figure: Comparing mean Shannon on citing Subregions for Materials science

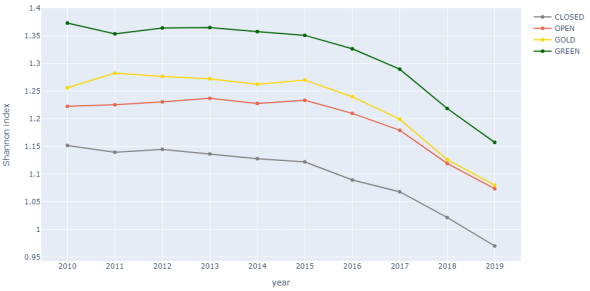


Figure: Comparing median Shannon on citing Subregions for Materials science

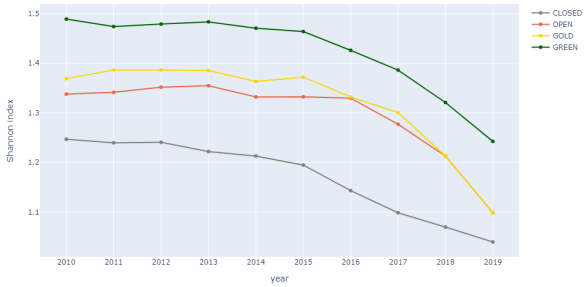


Figure: Comparing mean Shannon on citing Subregions for Mathematics

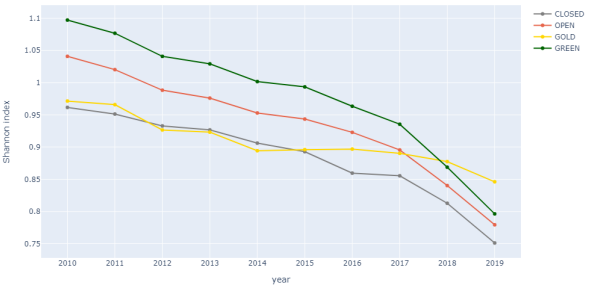


Figure: Comparing median Shannon on citing Subregions for Mathematics

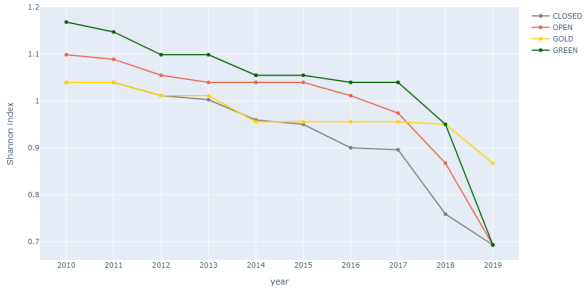


Figure: Comparing mean Shannon on citing Subregions for Medicine

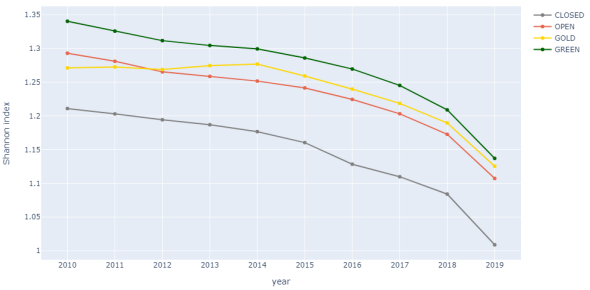


Figure: Comparing median Shannon on citing Subregions for Medicine

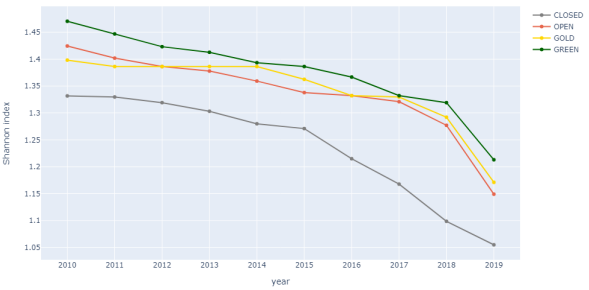


Figure: Comparing mean Shannon on citing Subregions for Philosophy

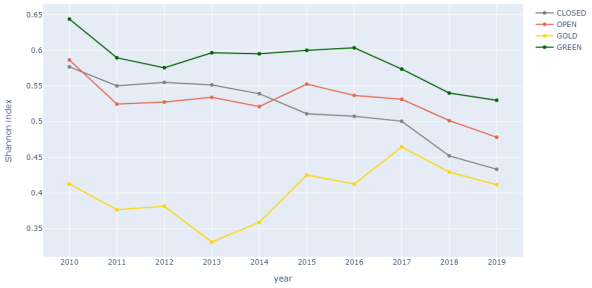


Figure: Comparing median Shannon on citing Subregions for Philosophy

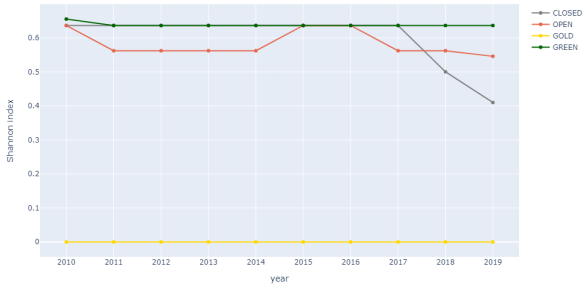


Figure: Comparing mean Shannon on citing Subregions for Physics

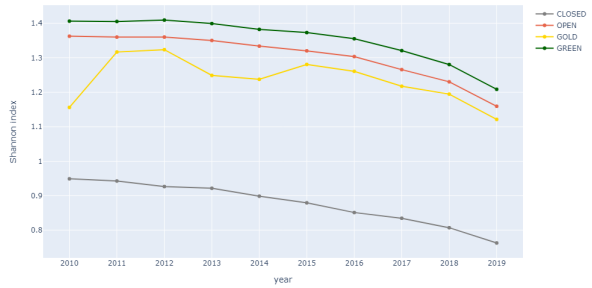


Figure: Comparing median Shannon on citing Subregions for Physics

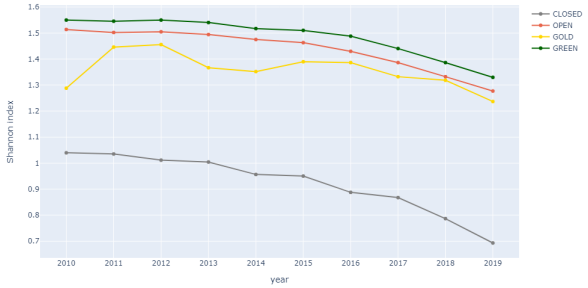


Figure: Comparing mean Shannon on citing Subregions for Political science

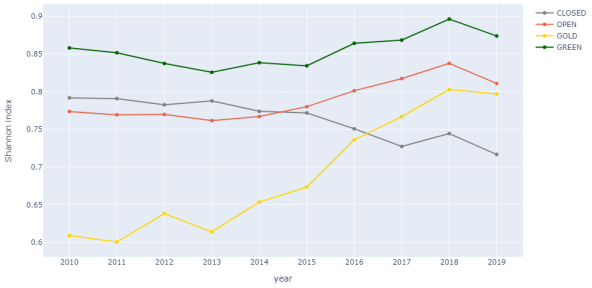


Figure: Comparing median Shannon on citing Subregions for Political science

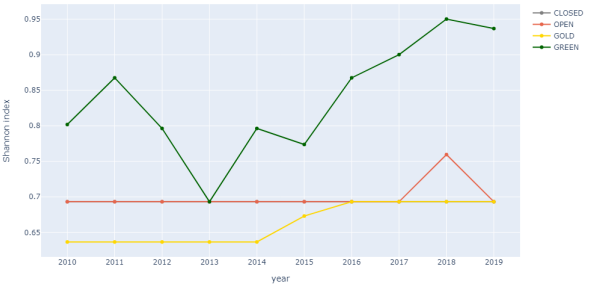


Figure: Comparing mean Shannon on citing Subregions for Psychology

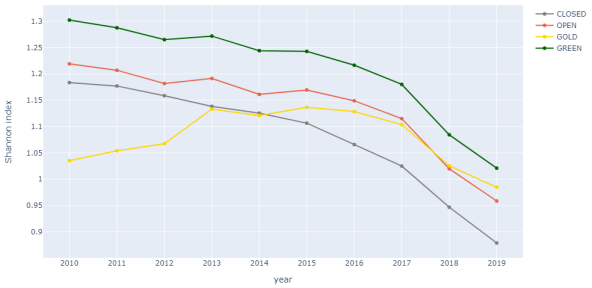


Figure: Comparing median Shannon on citing Subregions for Psychology

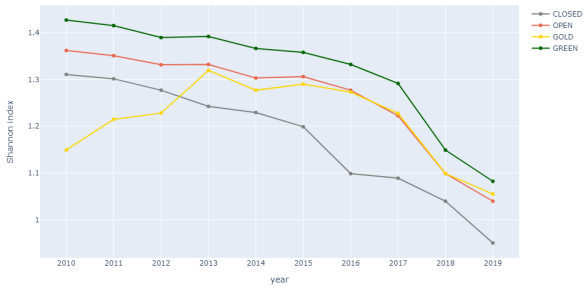


Figure: Comparing mean Shannon on citing Subregions for Sociology

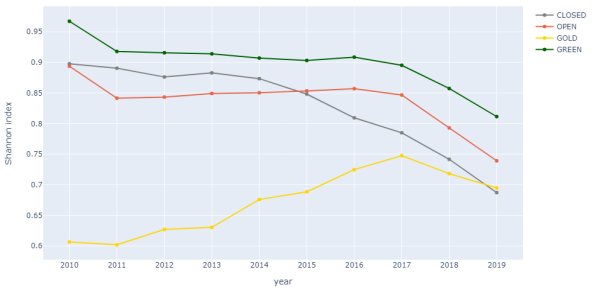
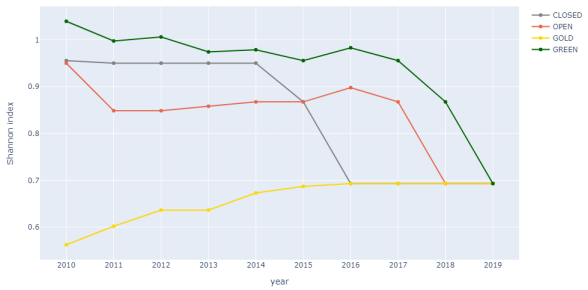


Figure: Comparing median Shannon on citing Subregions for Sociology



For Gini-Simpson scores on citing regions:

Figure: Comparing mean GiniSim on citing Regions for Art

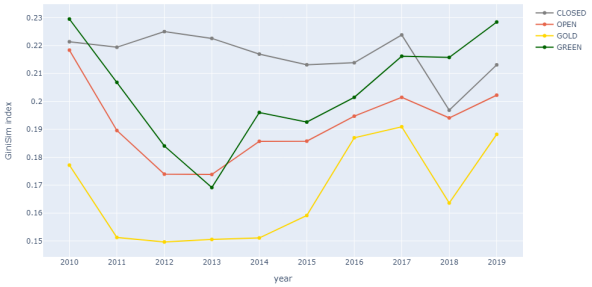
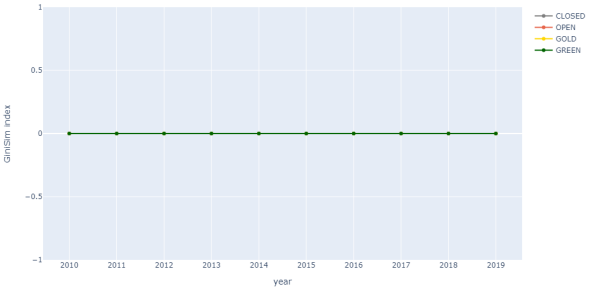


Figure: Comparing median GiniSim on citing Regions for Art



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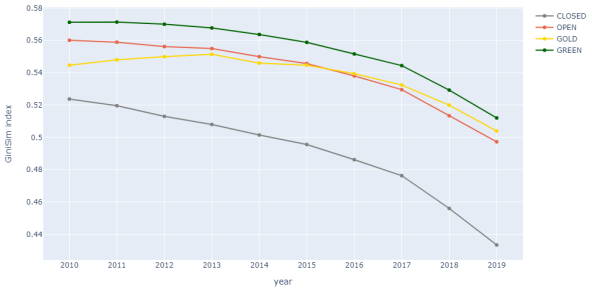

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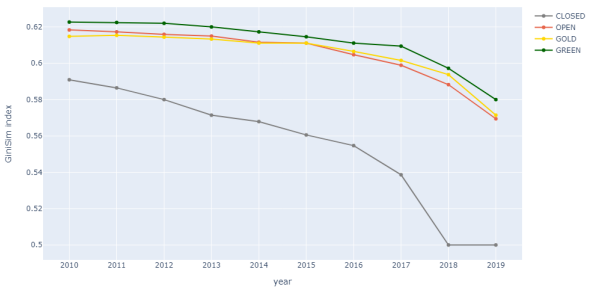

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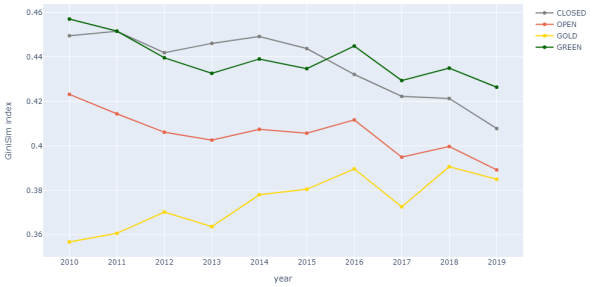

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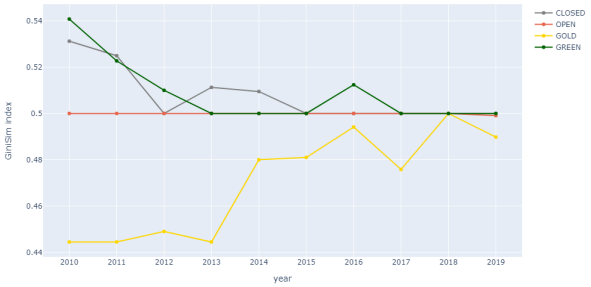

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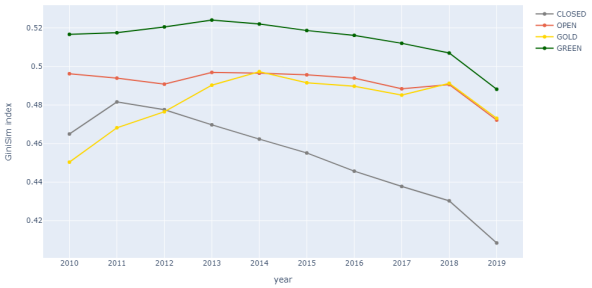

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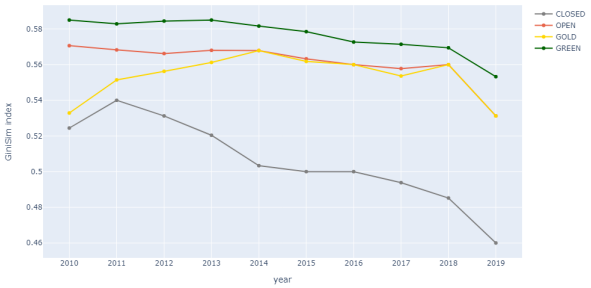

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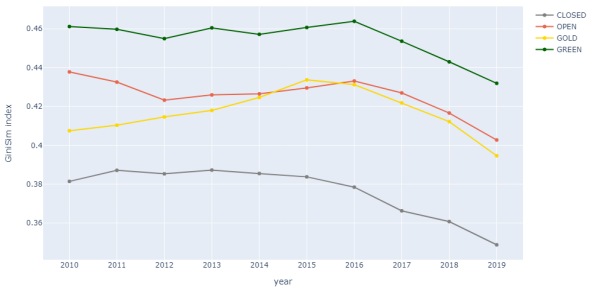

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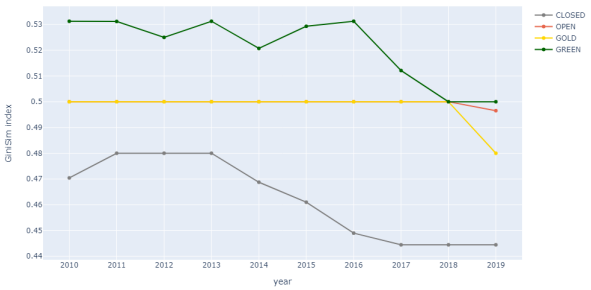

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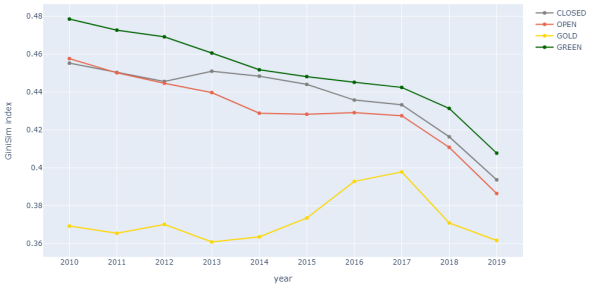

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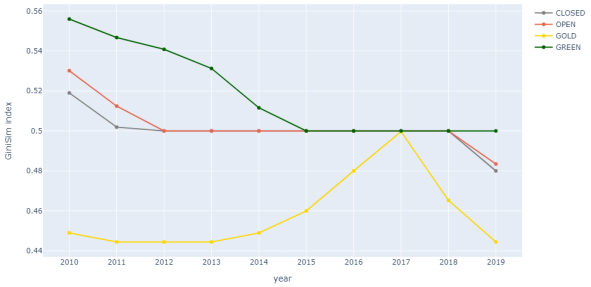

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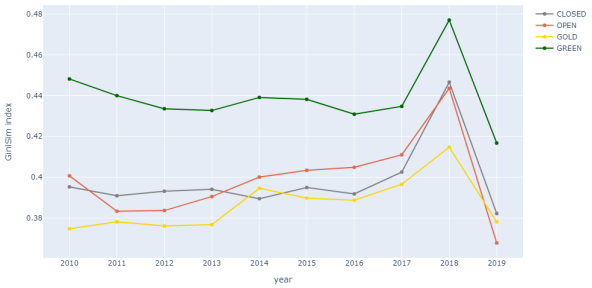

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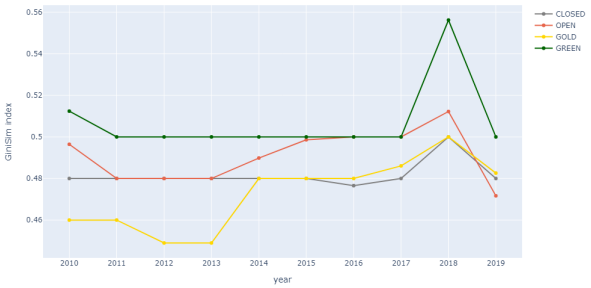

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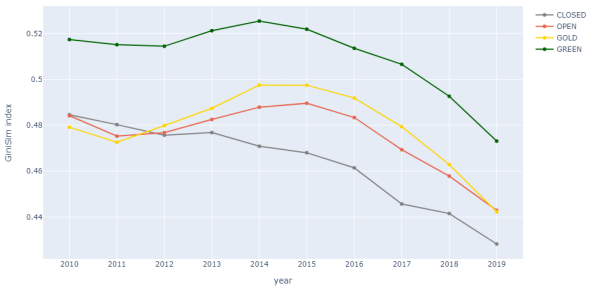

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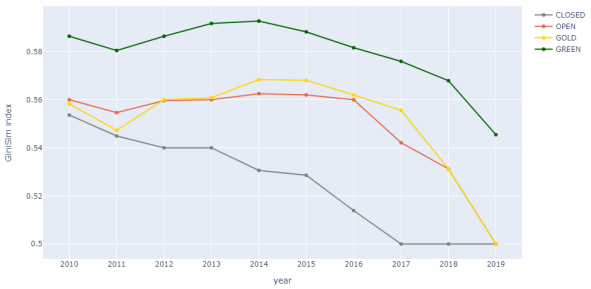
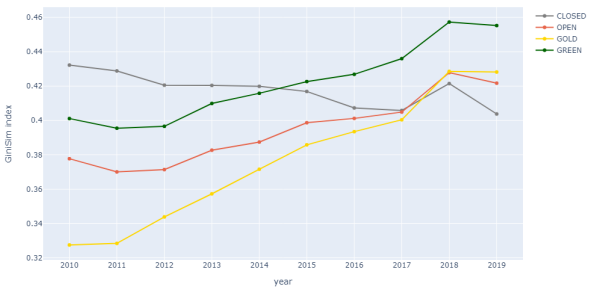


Figure: Comparing mean GiniSim on citing Regions for Geography



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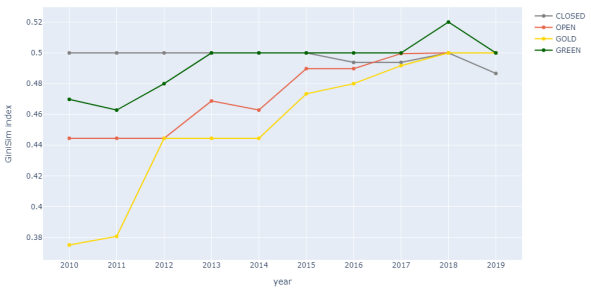
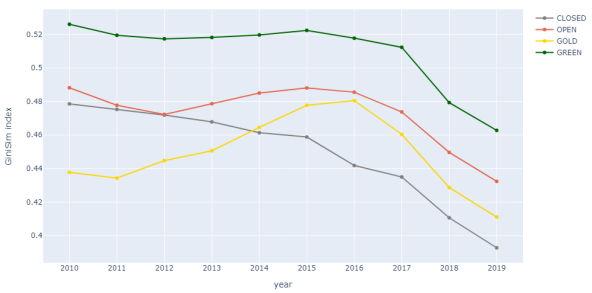


Figure: Comparing mean GiniSim on citing Regions for Geology



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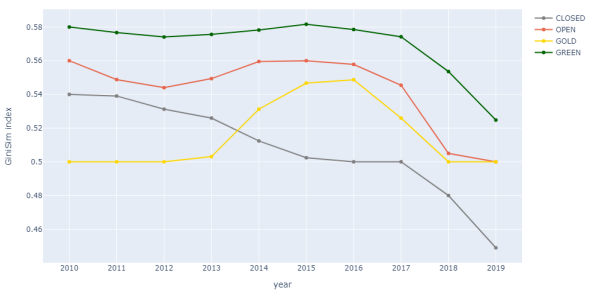
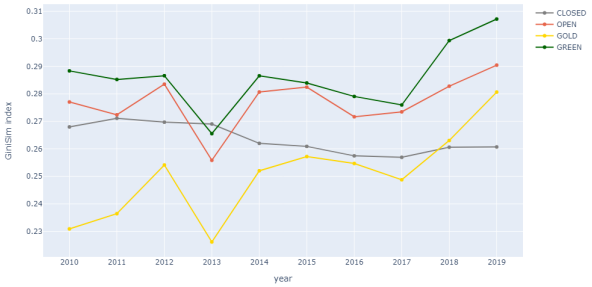


Figure: Comparing mean GiniSim on citing Regions for History



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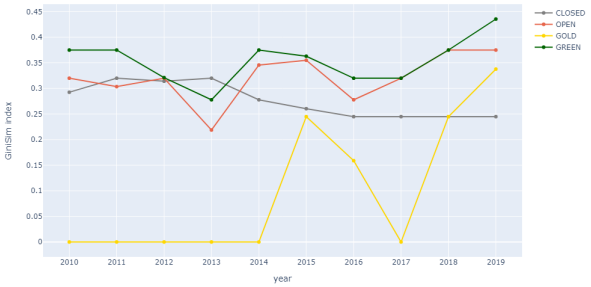
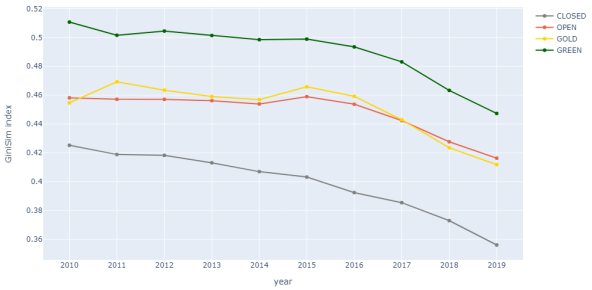


Figure: Comparing mean GiniSim on citing Regions for Materials science



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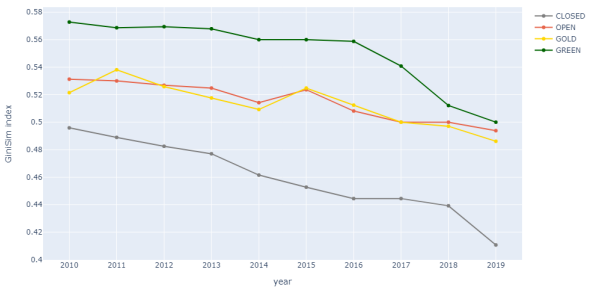

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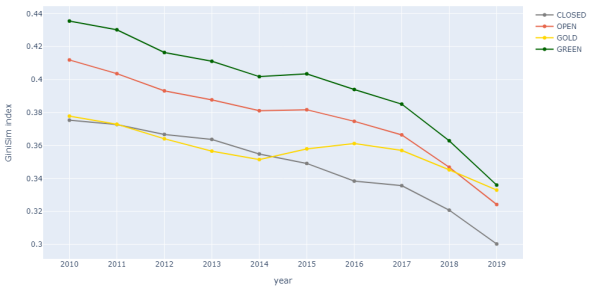

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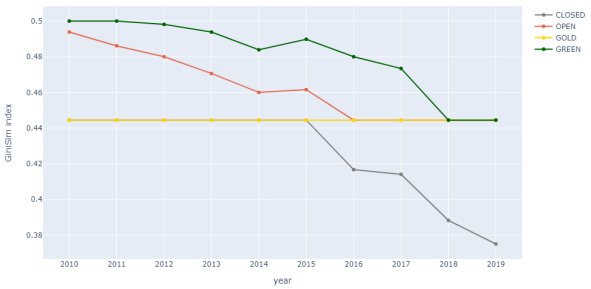

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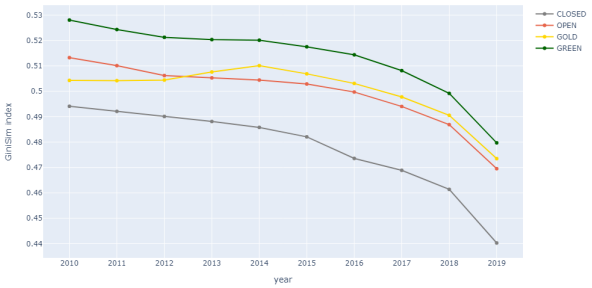

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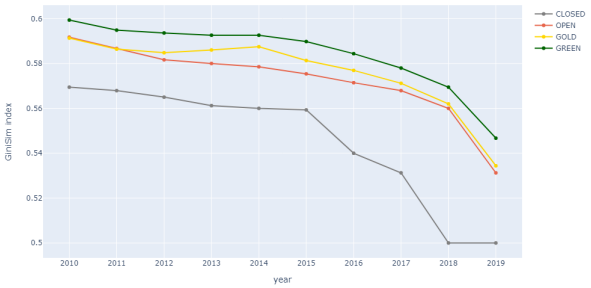

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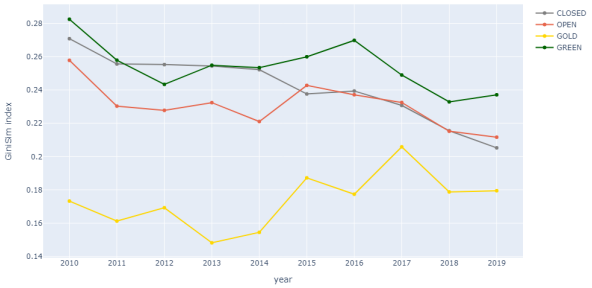

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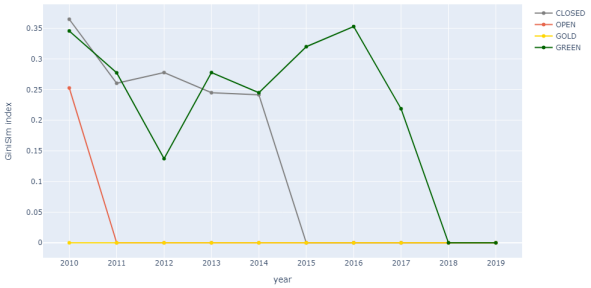

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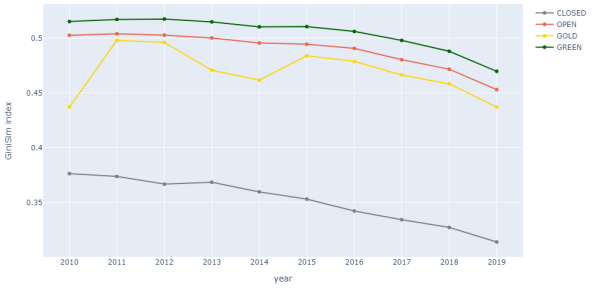

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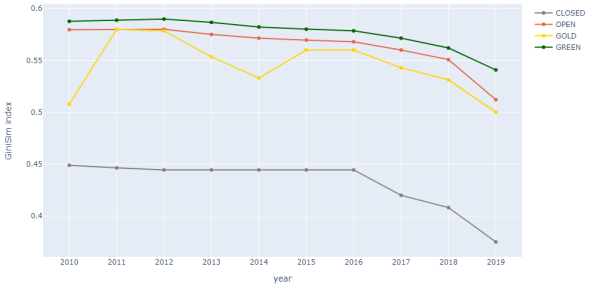
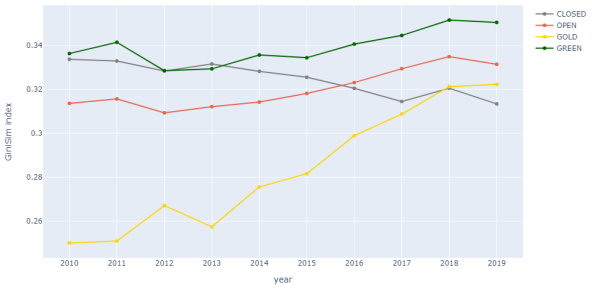


Figure: Comparing mean GiniSim on citing Regions for Political science



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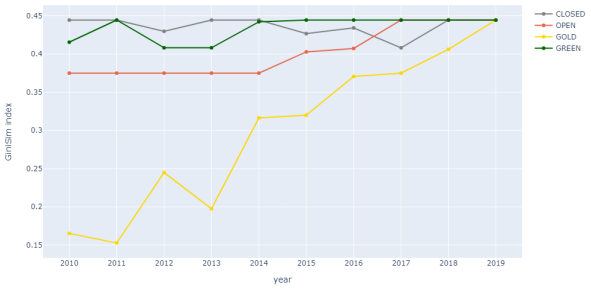

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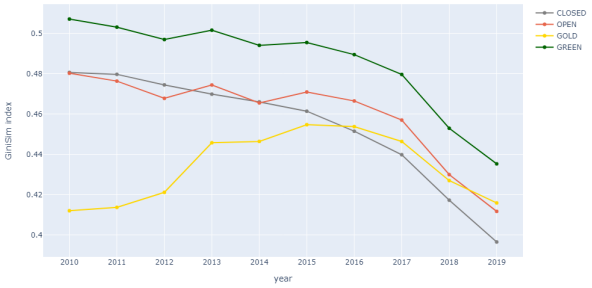

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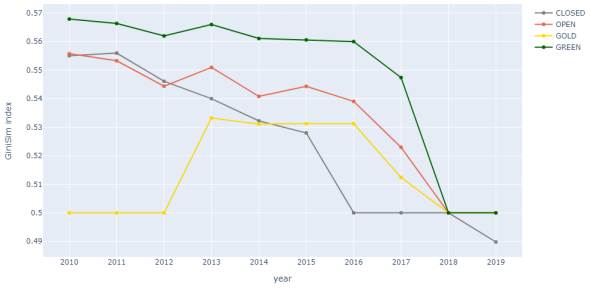
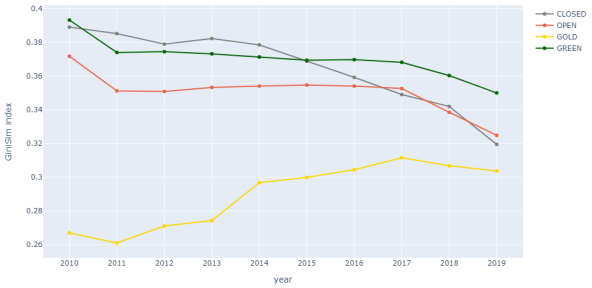


Figure: Comparing mean GiniSim on citing Regions for Sociology



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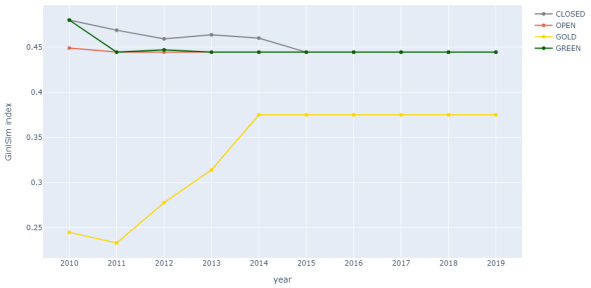


For Shannon scores on citing regions:

Figure: Comparing mean Shannon on citing Regions for Art

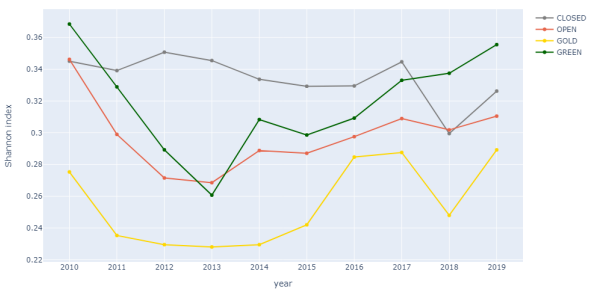


Figure: Comparing median Shannon on citing Regions for Art

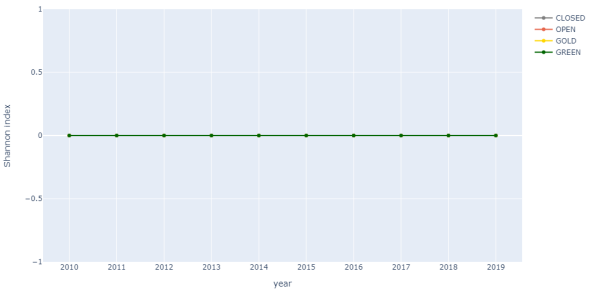


Figure: Comparing mean Shannon on citing Regions for Biology

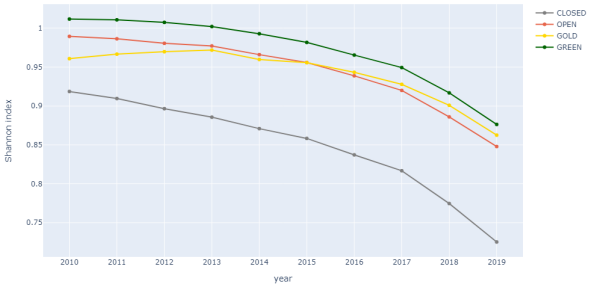


Figure: Comparing median Shannon on citing Regions for Biology

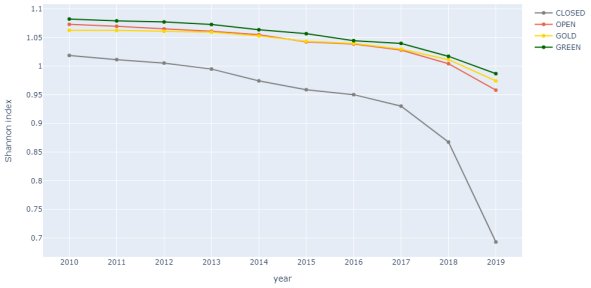


Figure: Comparing mean Shannon on citing Regions for Business

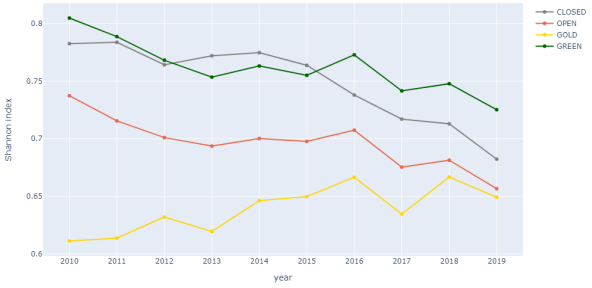
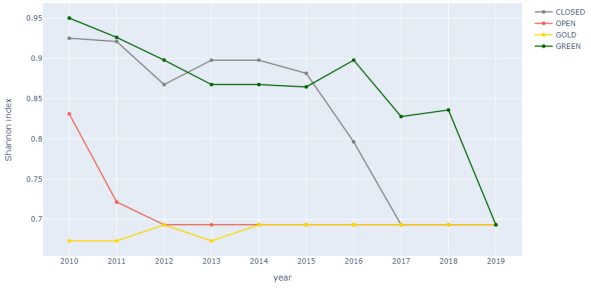


Figure: Comparing median Shannon on citing Regions for Business



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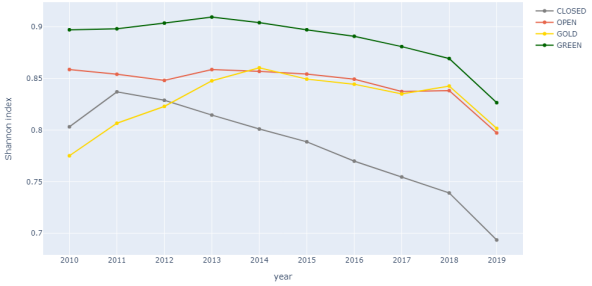


Figure: Comparing median Shannon on citing Regions for Chemistry

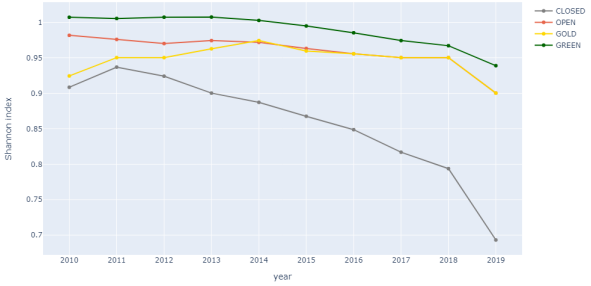
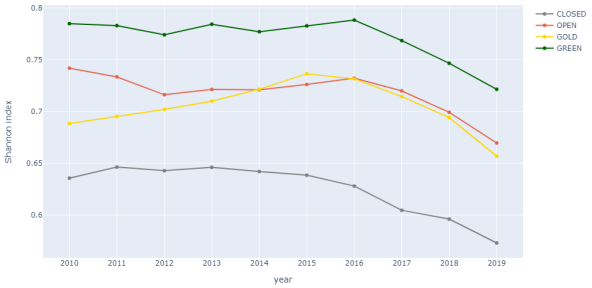


Figure: Comparing mean Shannon on citing Regions for Computer science



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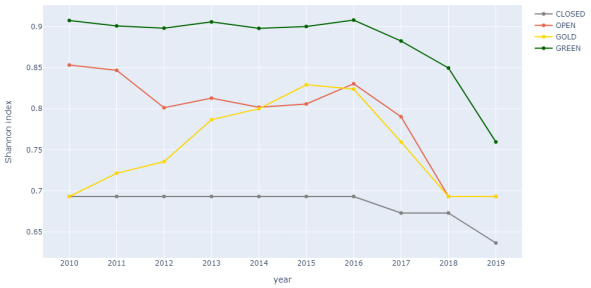
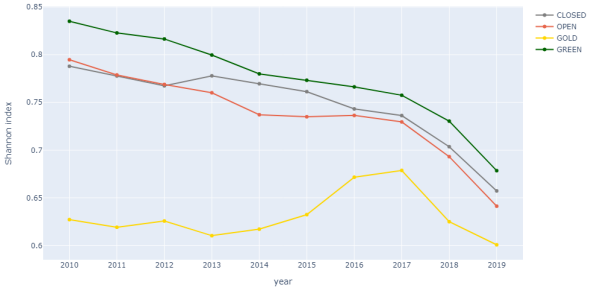


Figure: Comparing mean Shannon on citing Regions for Economics



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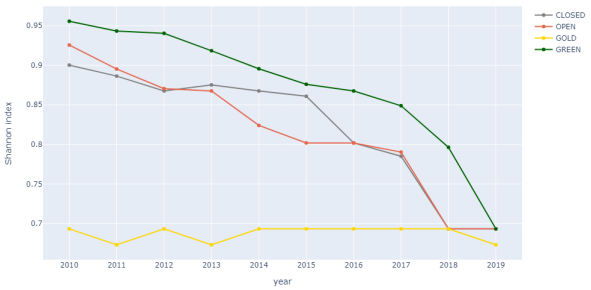


Figure: Comparing mean Shannon on citing Regions for Engineering

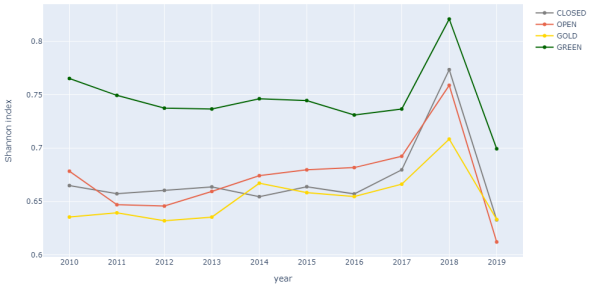


Figure: Comparing median Shannon on citing Regions for Engineering

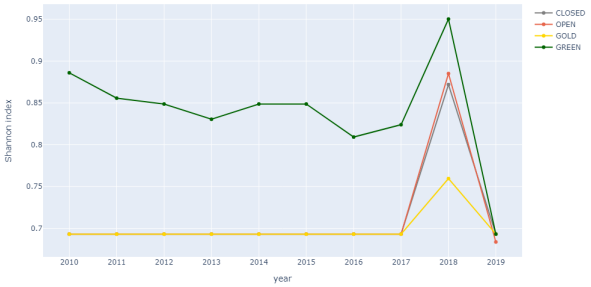


Figure: Comparing mean Shannon on citing Regions for Environmental science

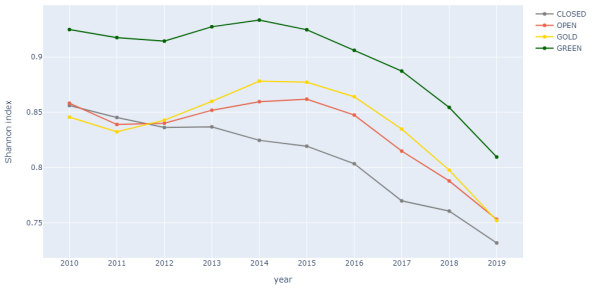


Figure: Comparing median Shannon on citing Regions for Environmental science

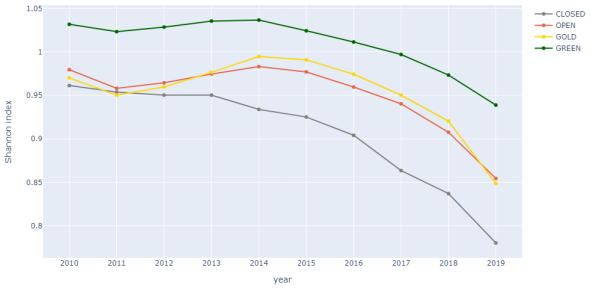


Figure: Comparing mean Shannon on citing Regions for Geography

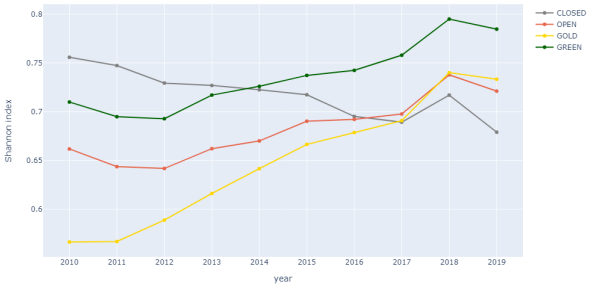


Figure: Comparing median Shannon on citing Regions for Geography

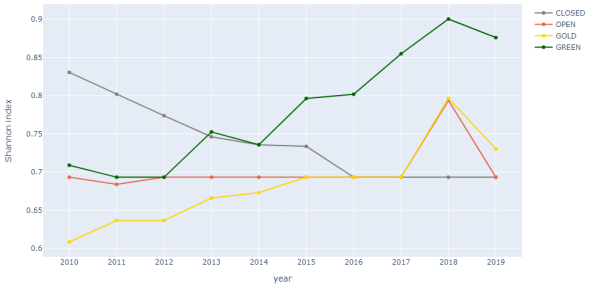


Figure: Comparing mean Shannon on citing Regions for Geology

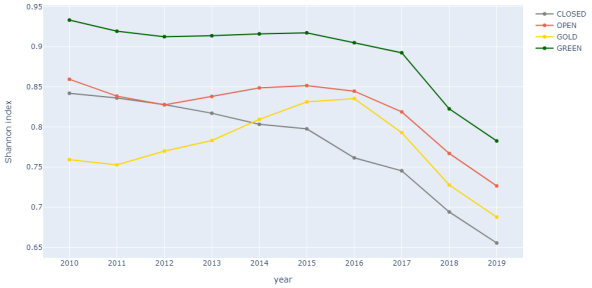


Figure: Comparing median Shannon on citing Regions for Geology

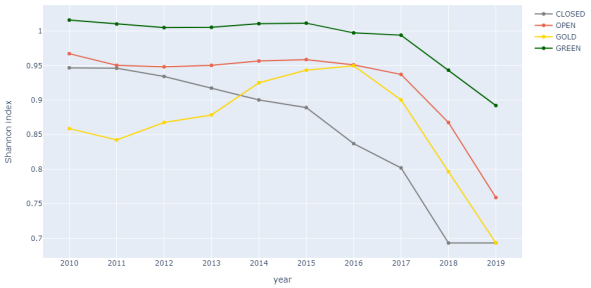
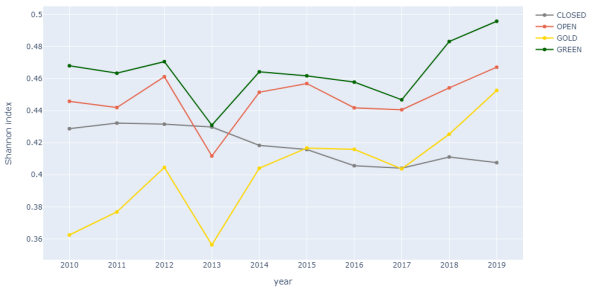


Figure: Comparing mean Shannon on citing Regions for History



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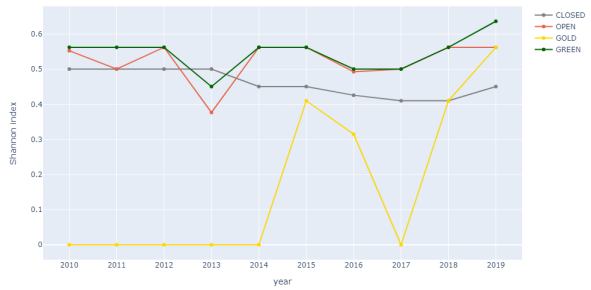
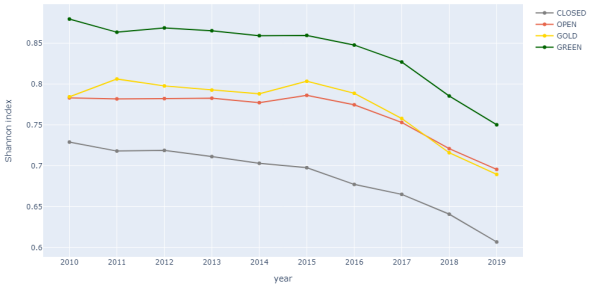


Figure: Comparing mean Shannon on citing Regions for Materials science



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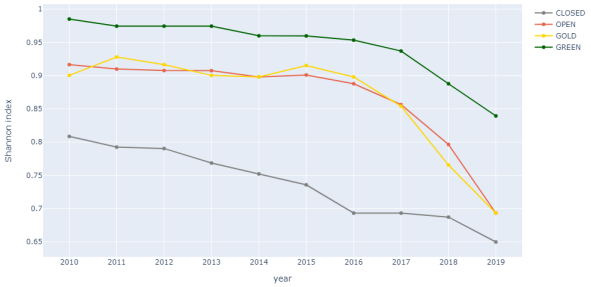
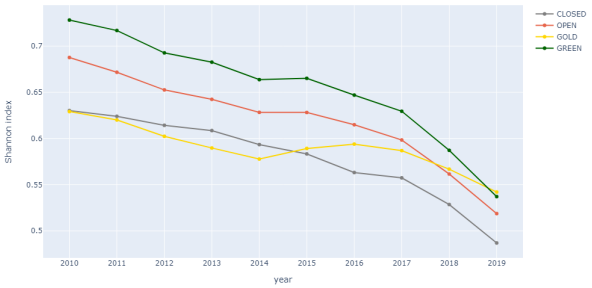


Figure: Comparing mean Shannon on citing Regions for Mathematics



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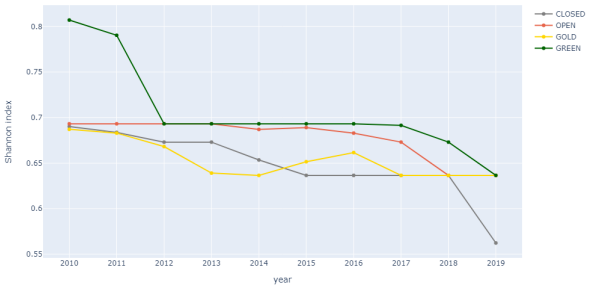
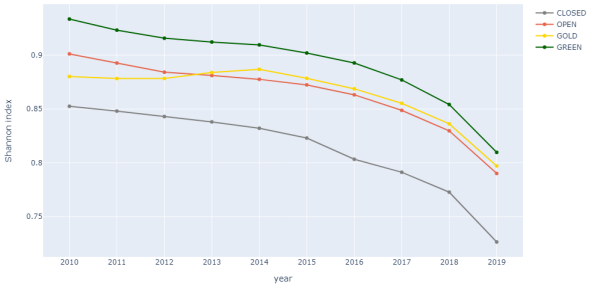


Figure: Comparing mean Shannon on citing Regions for Medicine



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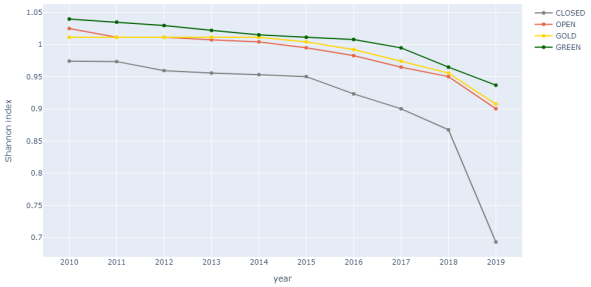
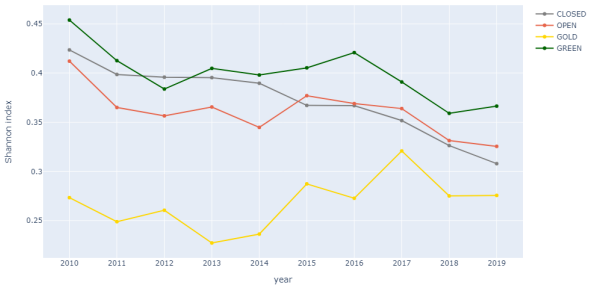


Figure: Comparing mean Shannon on citing Regions for Philosophy



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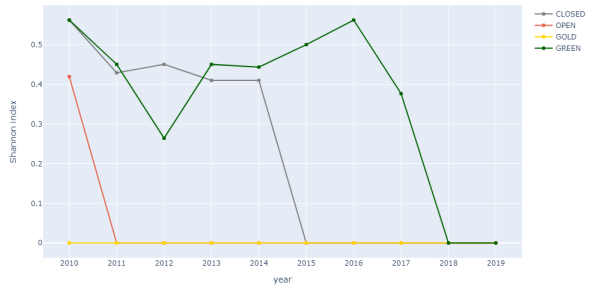

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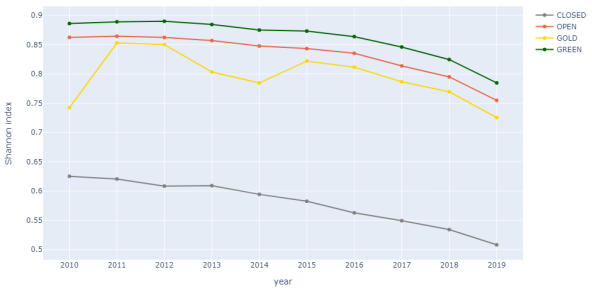

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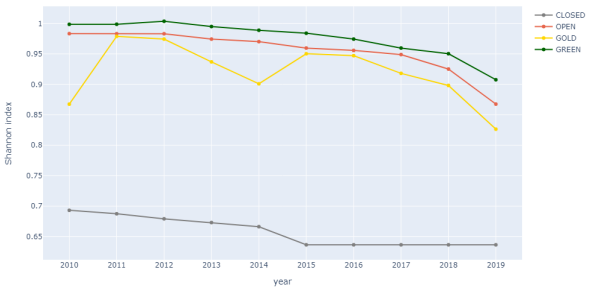
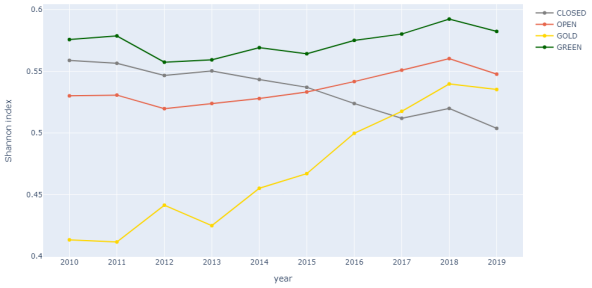


Figure: Comparing mean Shannon on citing Regions for Political science



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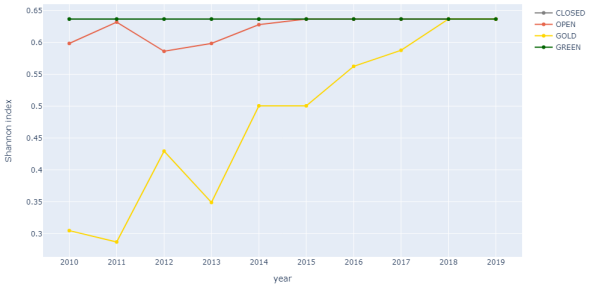
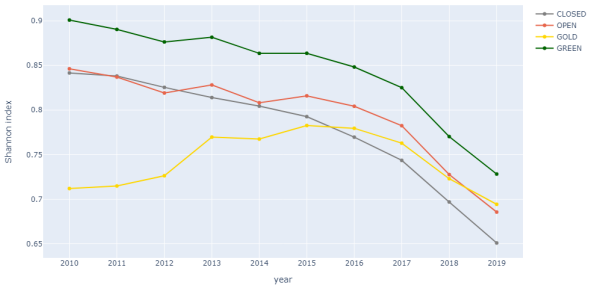


Figure: Comparing mean Shannon on citing Regions for Psychology



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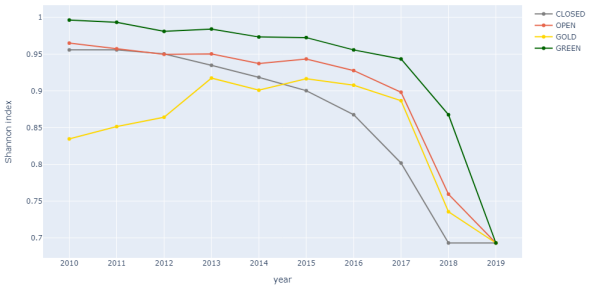
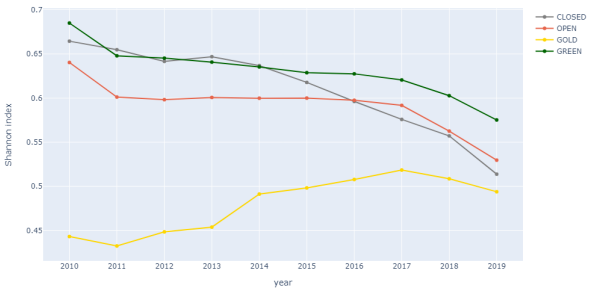


Figure: Comparing mean Shannon on citing Regions for Sociology



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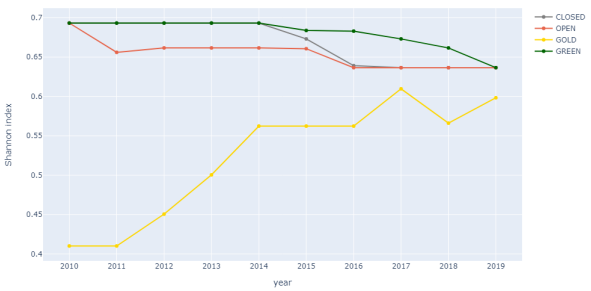


For Gini-Simpson scores on citing fields:

Figure: Comparing mean GiniSim on citing Fields for Art

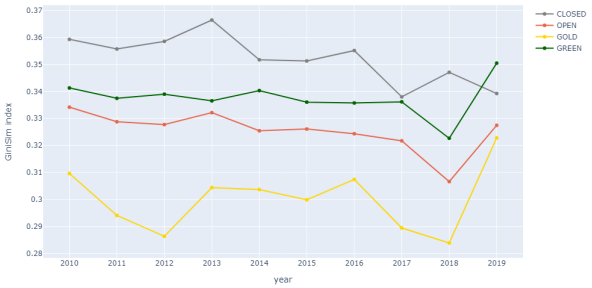


Figure: Comparing median GiniSim on citing Fields for Art

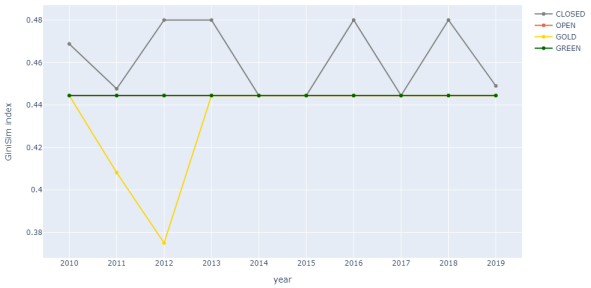


Figure: Comparing mean GiniSim on citing Fields for Biology

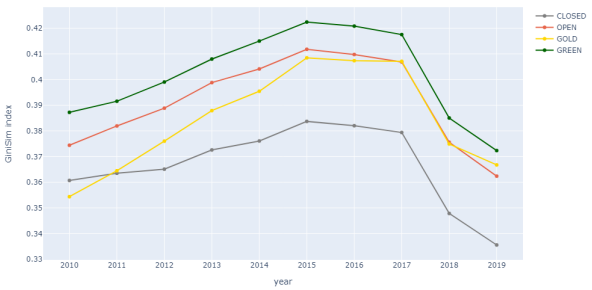


Figure: Comparing median GiniSim on citing Fields for Biology

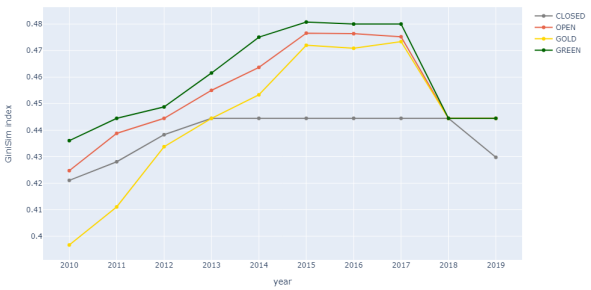


Figure: Comparing mean GiniSim on citing Fields for Business

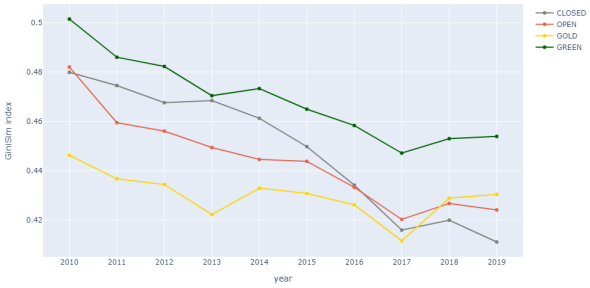


Figure: Comparing median GiniSim on citing Fields for Business

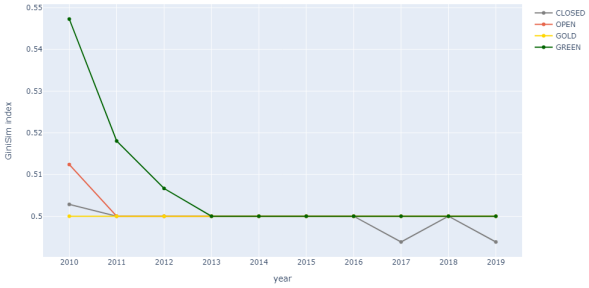
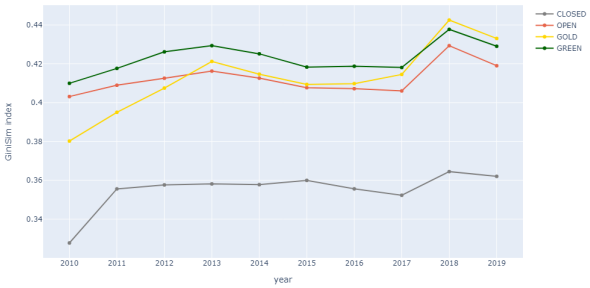


Figure: Comparing mean GiniSim on citing Fields for Chemistry



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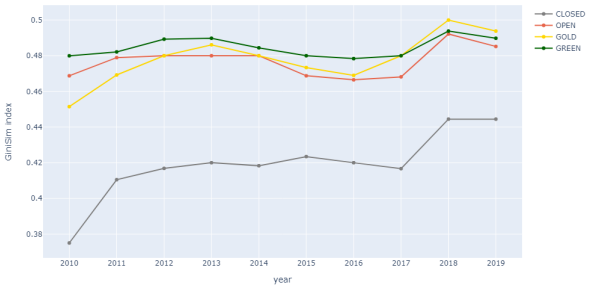


Figure: Comparing mean GiniSim on citing Fields for Computer science

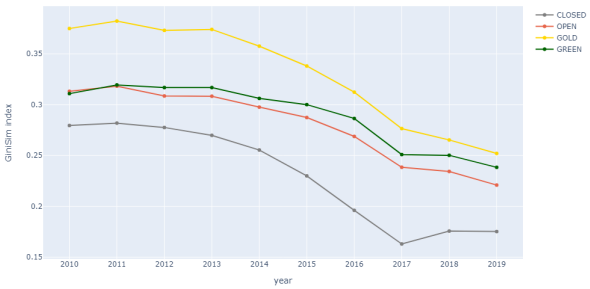


Figure: Comparing median GiniSim on citing Fields for Computer science

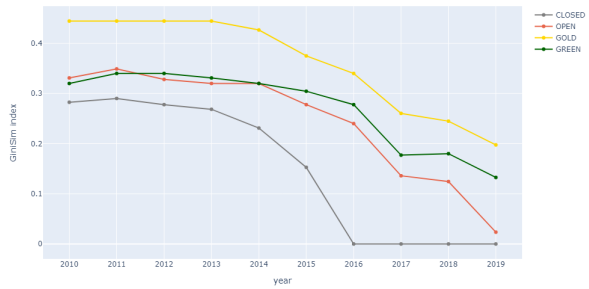


Figure: Comparing mean GiniSim on citing Fields for Economics

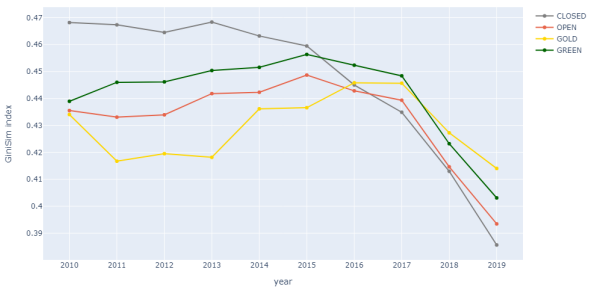


Figure: Comparing median GiniSim on citing Fields for Economics

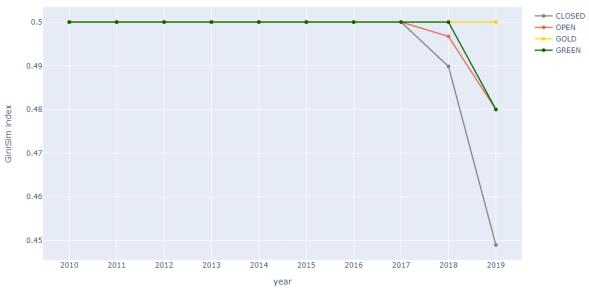


Figure: Comparing mean GiniSim on citing Fields for Engineering

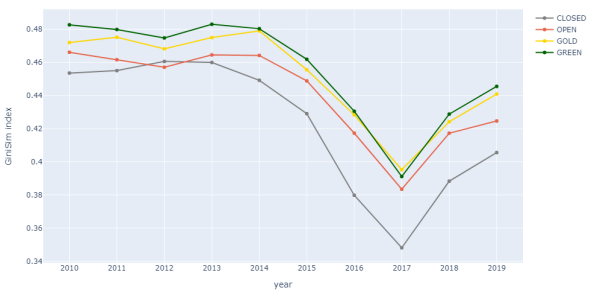


Figure: Comparing median GiniSim on citing Fields for Engineering

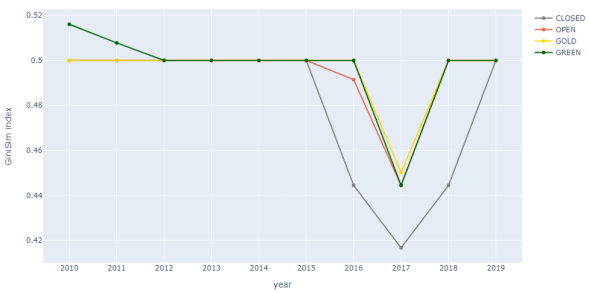


Figure: Comparing mean GiniSim on citing Fields for Environmental science

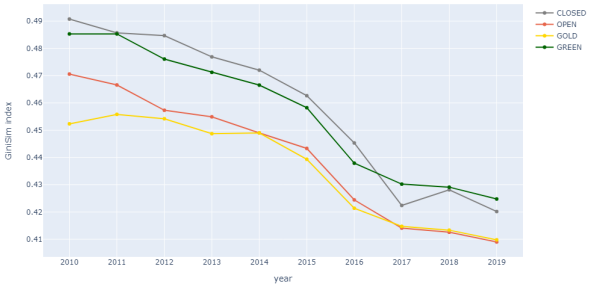


Figure: Comparing median GiniSim on citing Fields for Environmental science

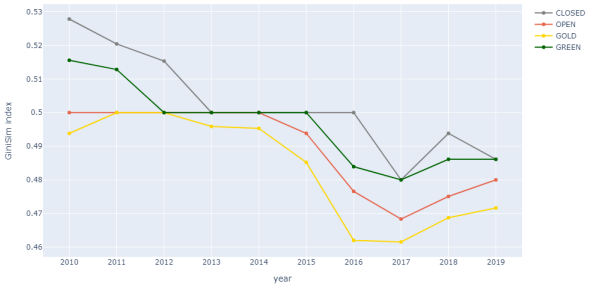


Figure: Comparing mean GiniSim on citing Fields for Geography

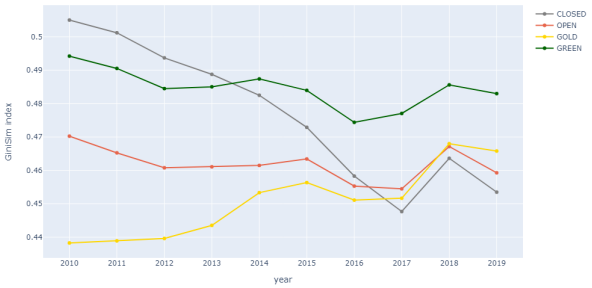


Figure: Comparing median GiniSim on citing Fields for Geography

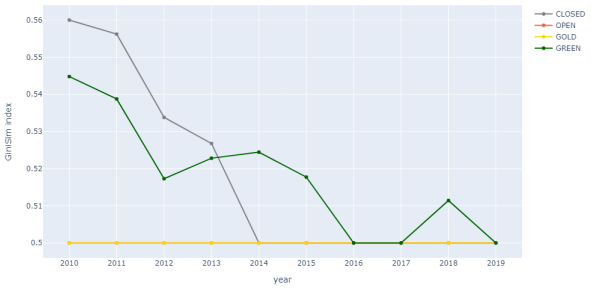
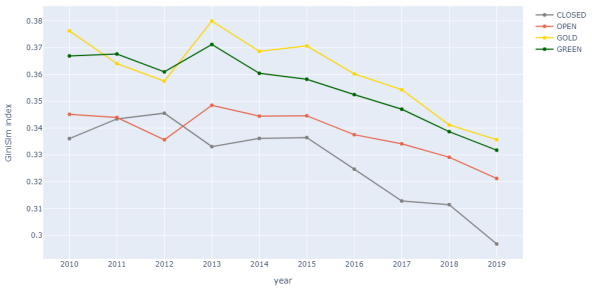


Figure: Comparing mean GiniSim on citing Fields for Geology



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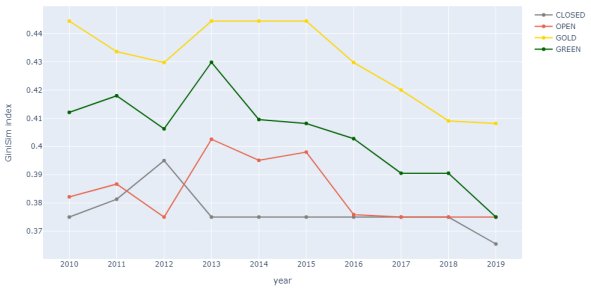


Figure: Comparing mean GiniSim on citing Fields for History

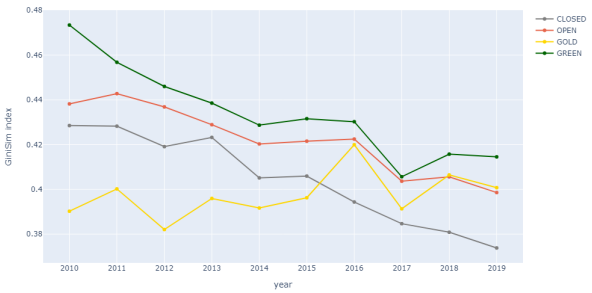


Figure: Comparing median GiniSim on citing Fields for History

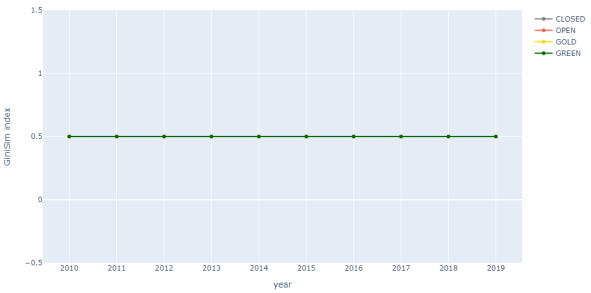


Figure: Comparing mean GiniSim on citing Fields for Materials science

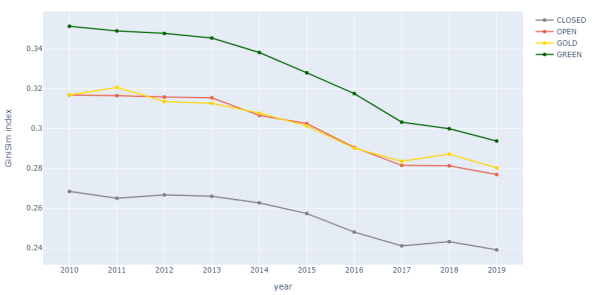


Figure: Comparing median GiniSim on citing Fields for Materials science

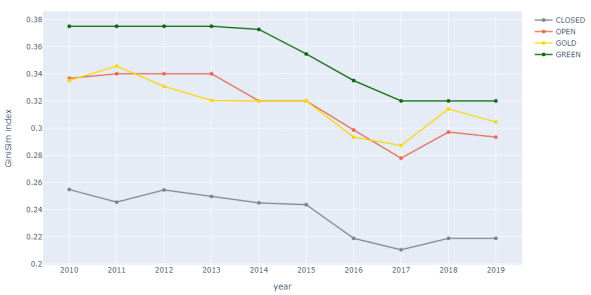


Figure: Comparing mean GiniSim on citing Fields for Mathematics

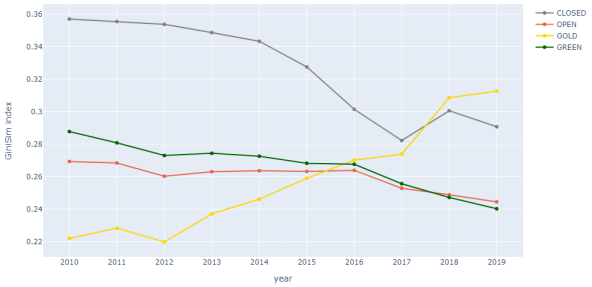


Figure: Comparing median GiniSim on citing Fields for Mathematics

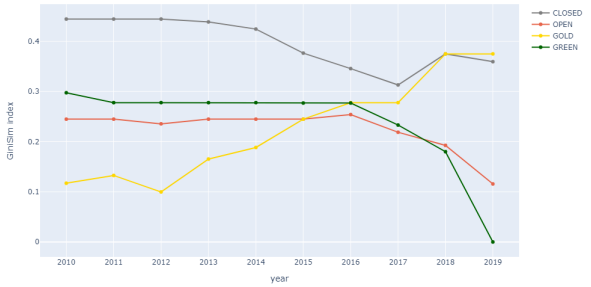


Figure: Comparing mean GiniSim on citing Fields for Medicine

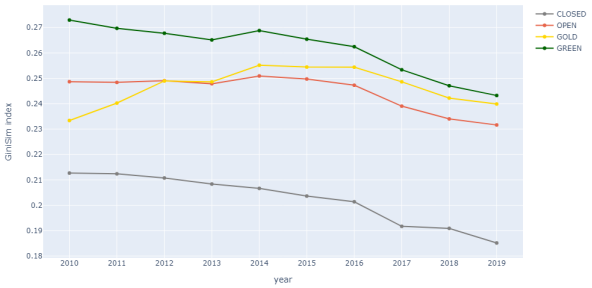


Figure: Comparing median GiniSim on citing Fields for Medicine

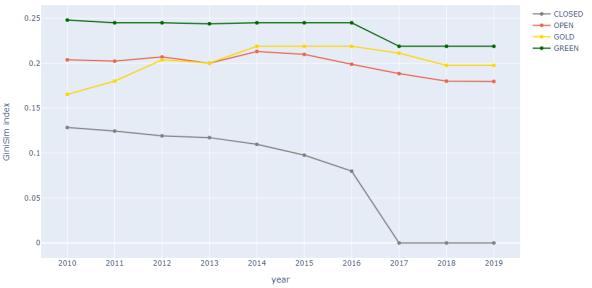


Figure: Comparing mean GiniSim on citing Fields for Philosophy

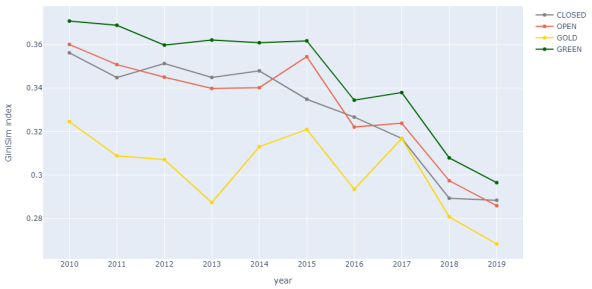


Figure: Comparing median GiniSim on citing Fields for Philosophy

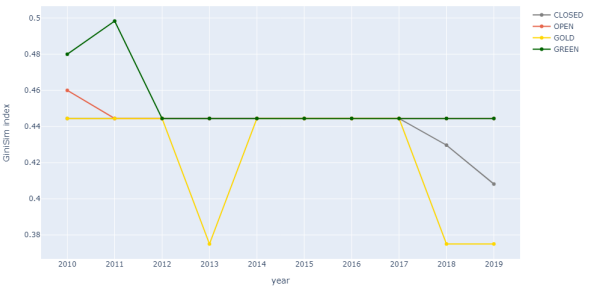


Figure: Comparing mean GiniSim on citing Fields for Physics

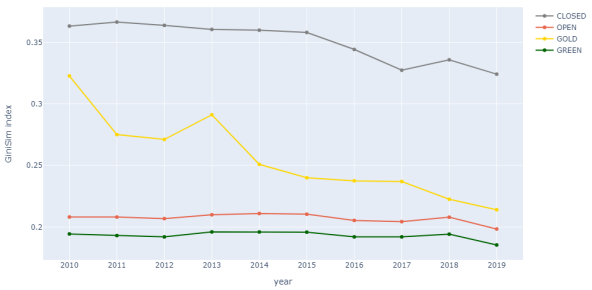


Figure: Comparing median GiniSim on citing Fields for Physics

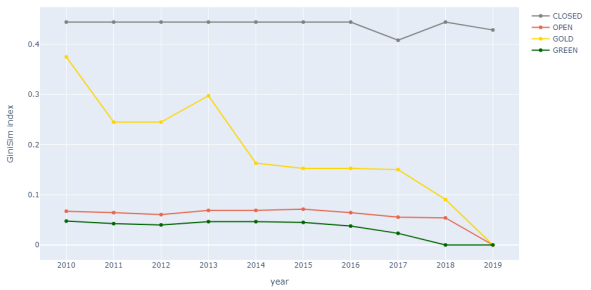


Figure: Comparing mean GiniSim on citing Fields for Political science

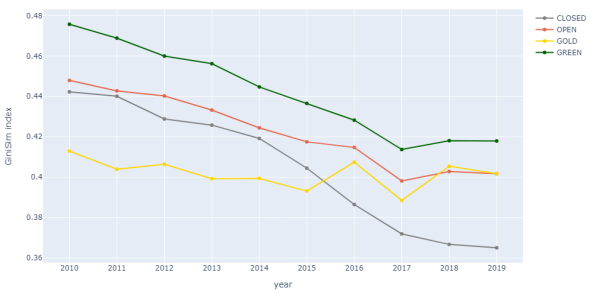


Figure: Comparing median GiniSim on citing Fields for Political science

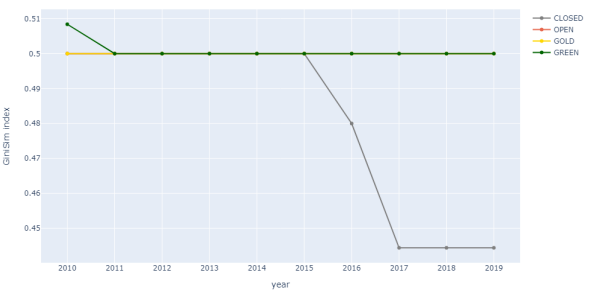


Figure: Comparing mean GiniSim on citing Fields for Psychology

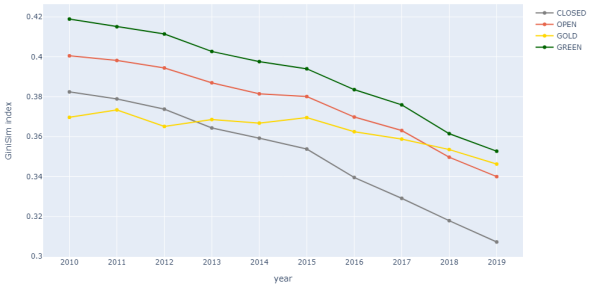


Figure: Comparing median GiniSim on citing Fields for Psychology

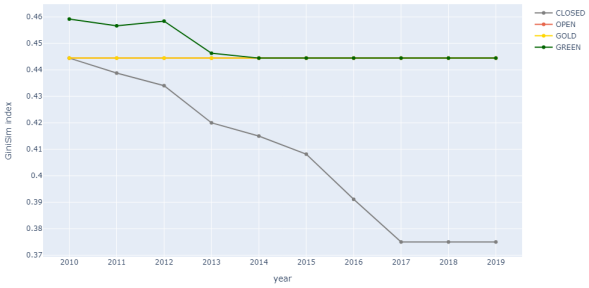
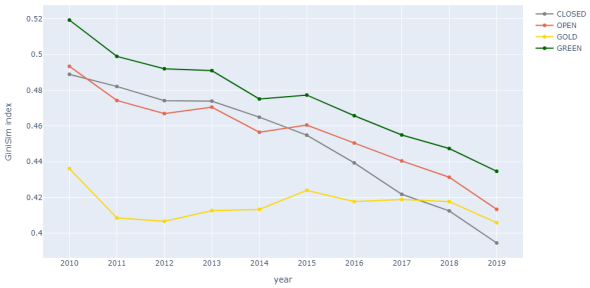


Figure: Comparing mean GiniSim on citing Fields for Sociology



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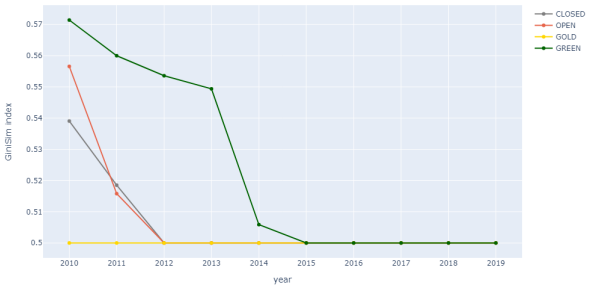


For Shannon scores on citing fields:

Figure: Comparing mean Shannon on citing Fields for Art

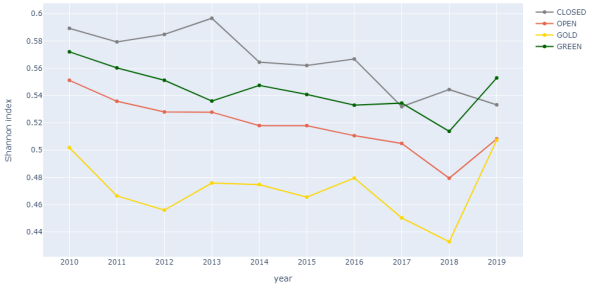


Figure: Comparing median Shannon on citing Fields for Art

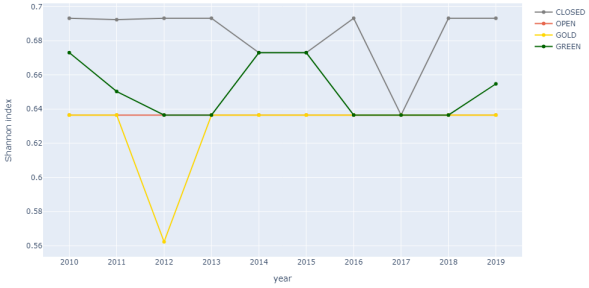


Figure: Comparing mean Shannon on citing Fields for Biology

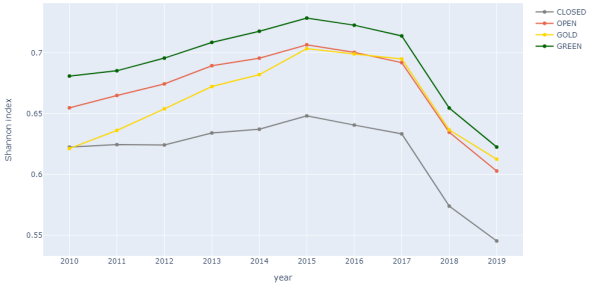


Figure: Comparing median Shannon on citing Fields for Biology

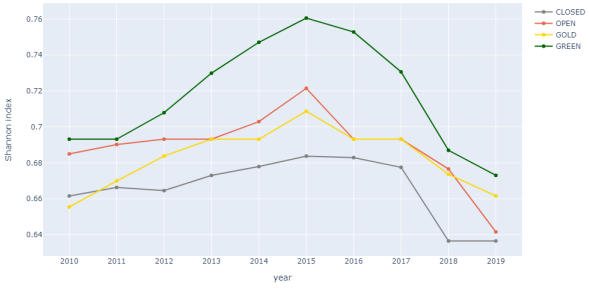


Figure: Comparing mean Shannon on citing Fields for Business

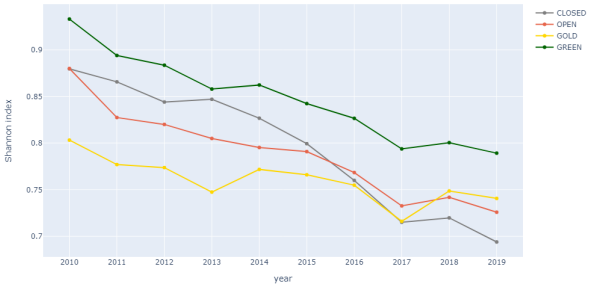


Figure: Comparing median Shannon on citing Fields for Business

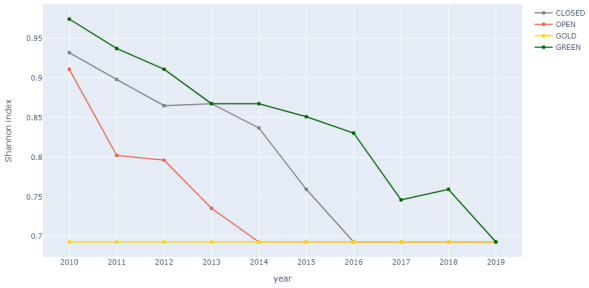


Figure: Comparing mean Shannon on citing Fields for Chemistry

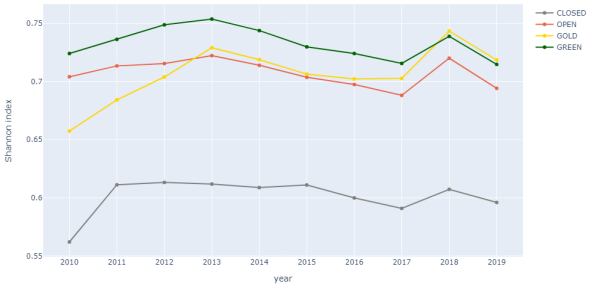


Figure: Comparing median Shannon on citing Fields for Chemistry

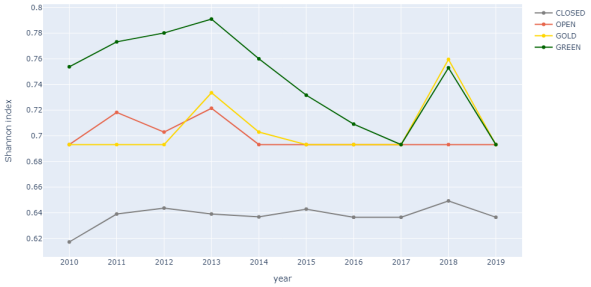


Figure: Comparing mean Shannon on citing Fields for Computer science

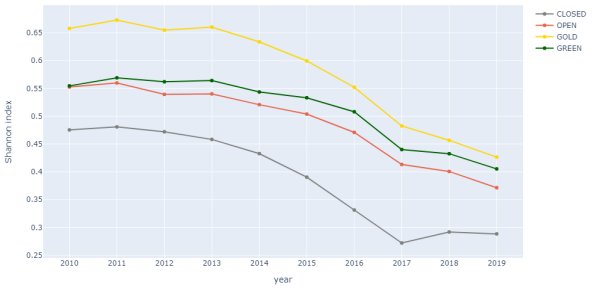


Figure: Comparing median Shannon on citing Fields for Computer science

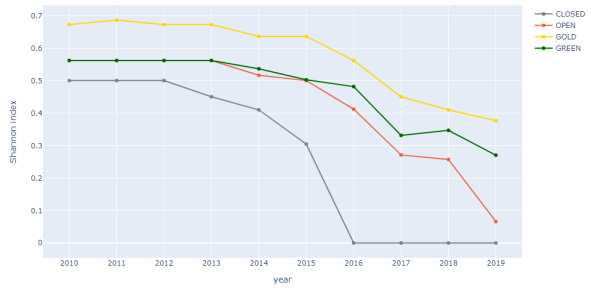


Figure: Comparing mean Shannon on citing Fields for Economics

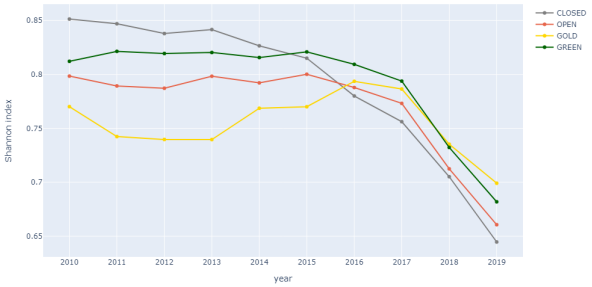


Figure: Comparing median Shannon on citing Fields for Economics

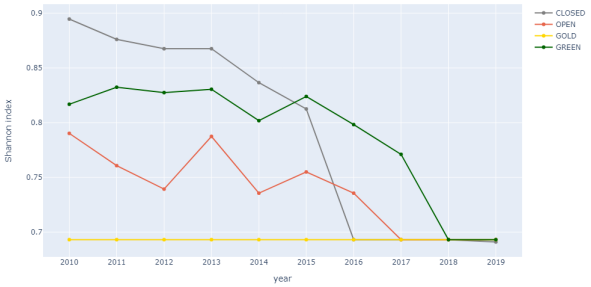


Figure: Comparing mean Shannon on citing Fields for Engineering

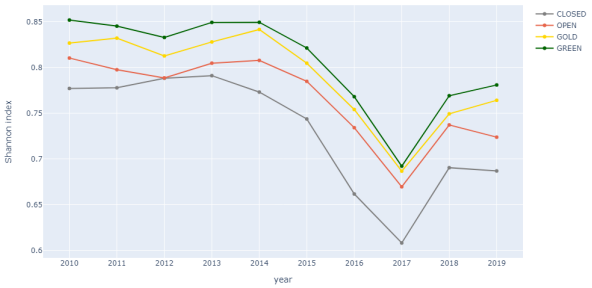


Figure: Comparing median Shannon on citing Fields for Engineering

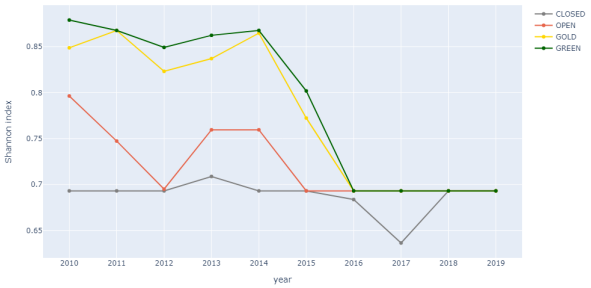


Figure: Comparing mean Shannon on citing Fields for Environmental science

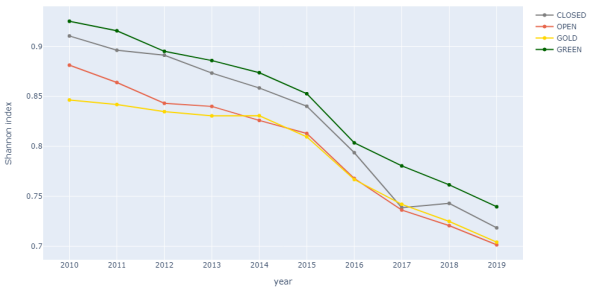


Figure: Comparing median Shannon on citing Fields for Environmental science

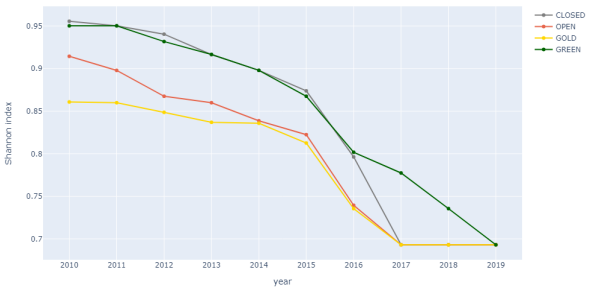


Figure: Comparing mean Shannon on citing Fields for Geography

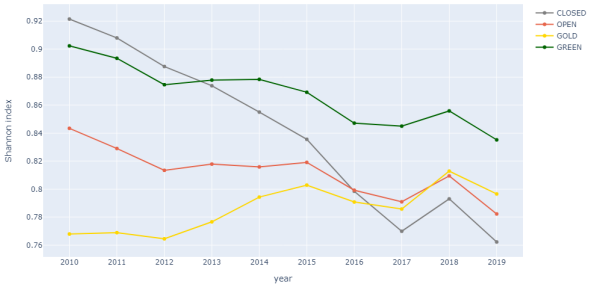


Figure: Comparing median Shannon on citing Fields for Geography

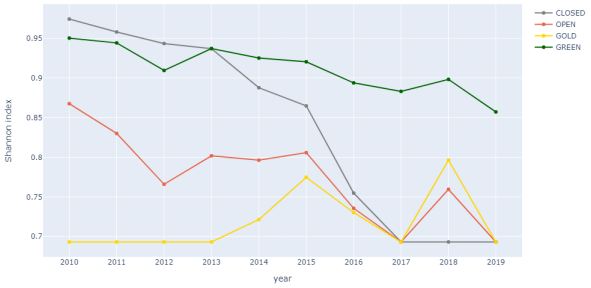


Figure: Comparing mean Shannon on citing Fields for Geology

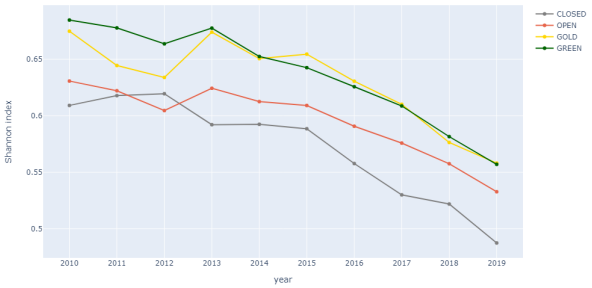


Figure: Comparing median Shannon on citing Fields for Geology

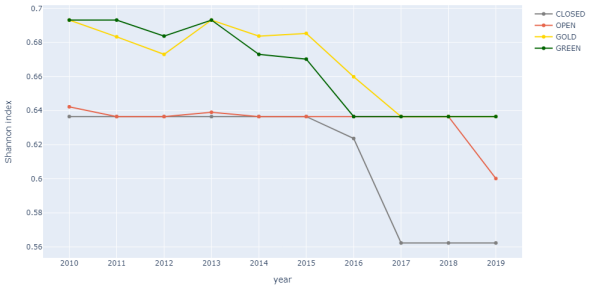


Figure: Comparing mean Shannon on citing Fields for History

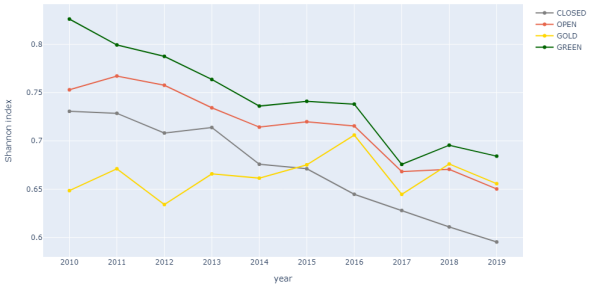


Figure: Comparing median Shannon on citing Fields for History

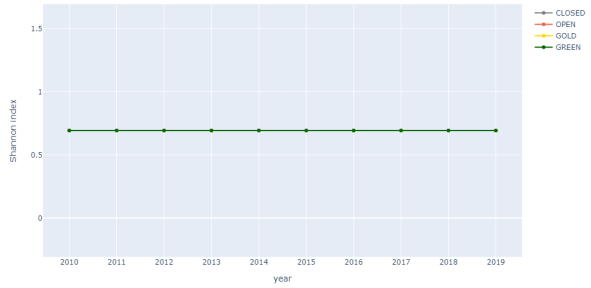
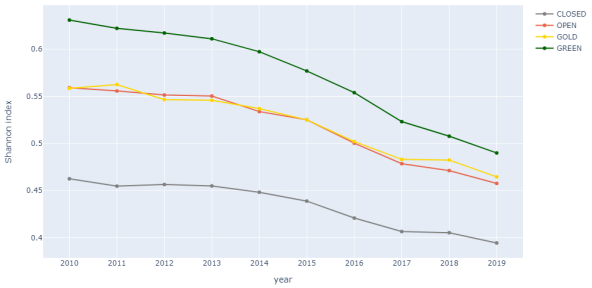


Figure: Comparing mean Shannon on citing Fields for Materials science



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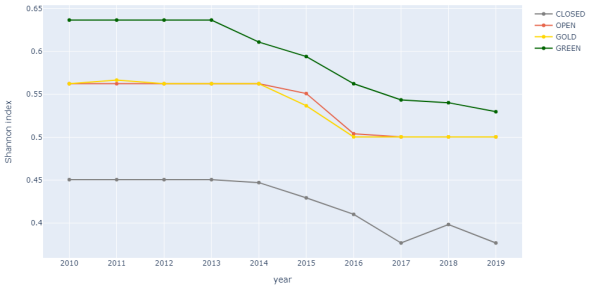


Figure: Comparing mean Shannon on citing Fields for Mathematics

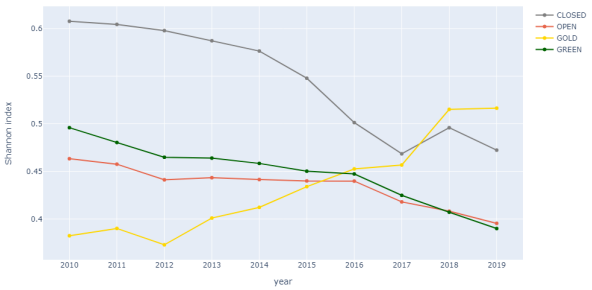


Figure: Comparing median Shannon on citing Fields for Mathematics

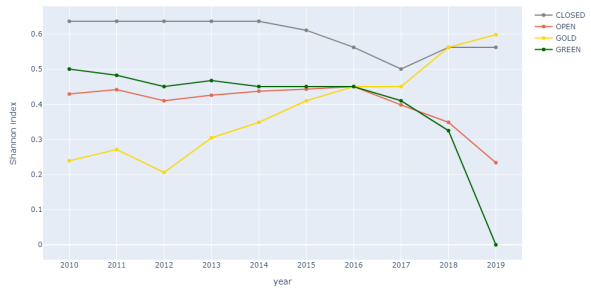


Figure: Comparing mean Shannon on citing Fields for Medicine

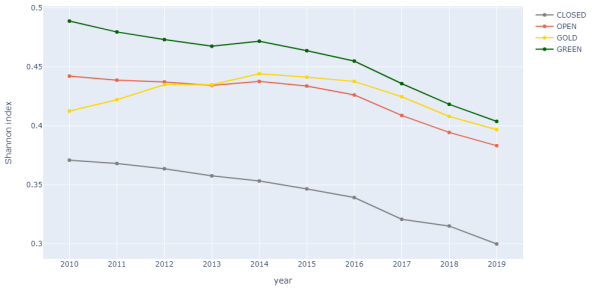


Figure: Comparing median Shannon on citing Fields for Medicine

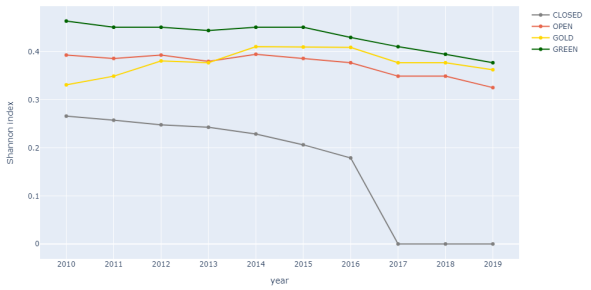


Figure: Comparing mean Shannon on citing Fields for Philosophy

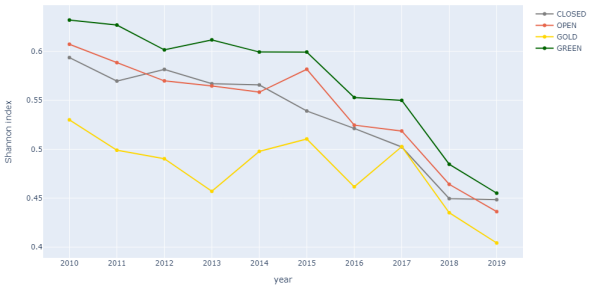


Figure: Comparing median Shannon on citing Fields for Philosophy

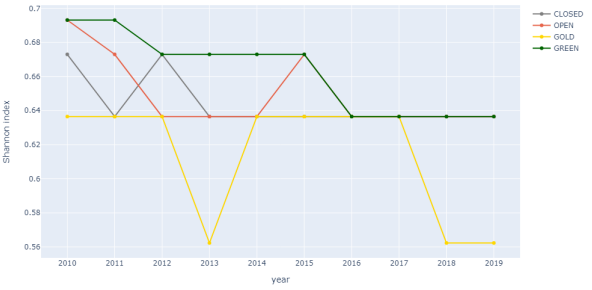


Figure: Comparing mean Shannon on citing Fields for Physics

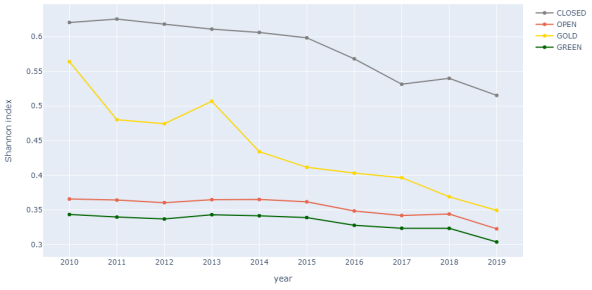


Figure: Comparing median Shannon on citing Fields for Physics

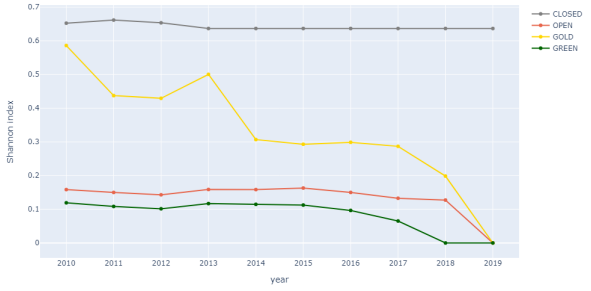


Figure: Comparing mean Shannon on citing Fields for Political science

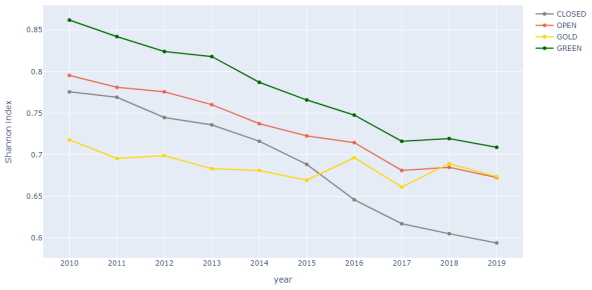


Figure: Comparing median Shannon on citing Fields for Political science

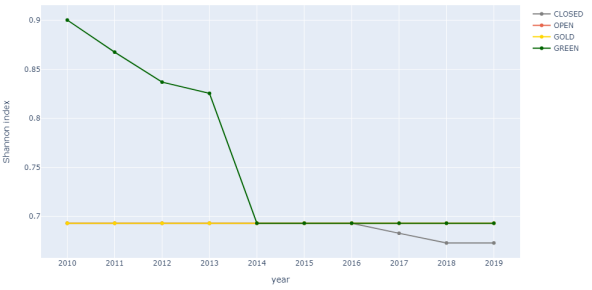


Figure: Comparing mean Shannon on citing Fields for Psychology

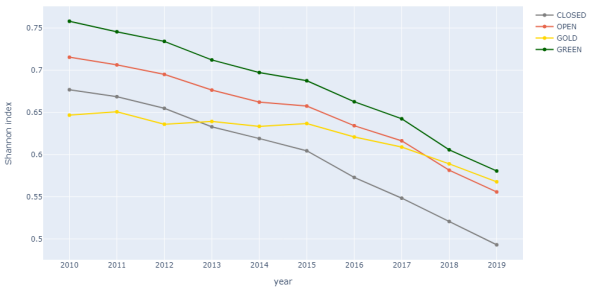


Figure: Comparing median Shannon on citing Fields for Psychology

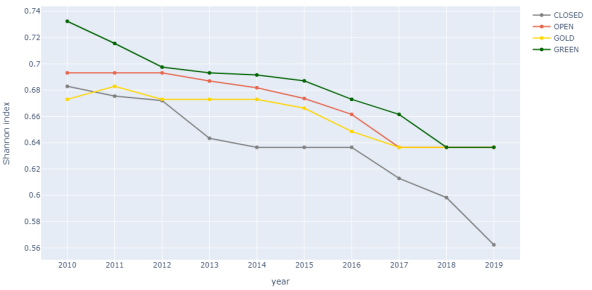


Figure: Comparing mean Shannon on citing Fields for Sociology

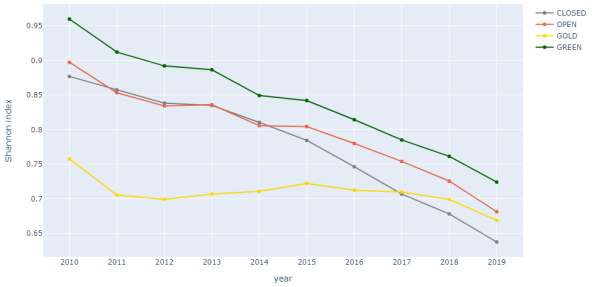
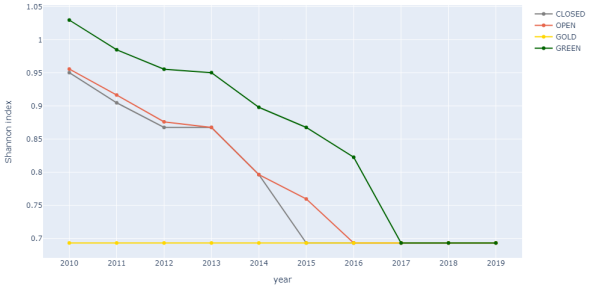


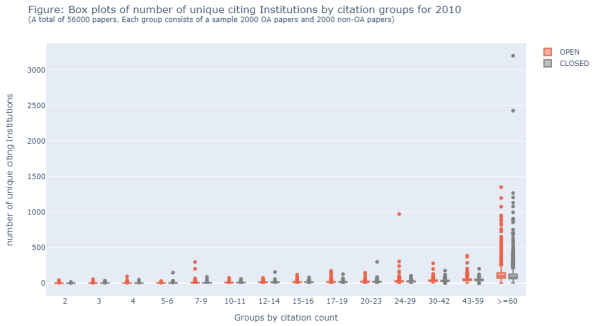
Figure: Comparing median Shannon on citing Fields for Sociology

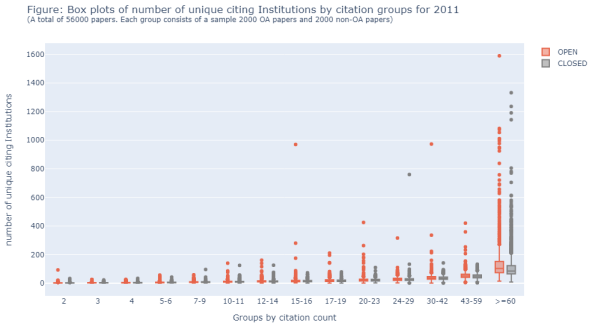


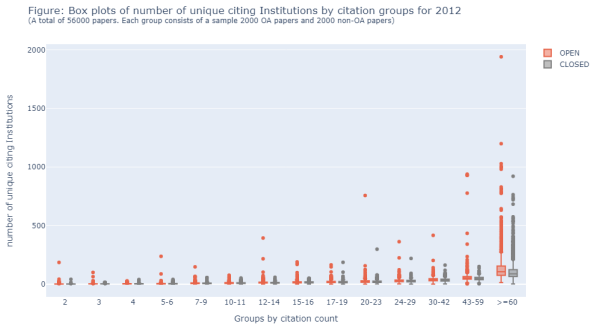
Section H: Citation groups vs number of unique citing groups

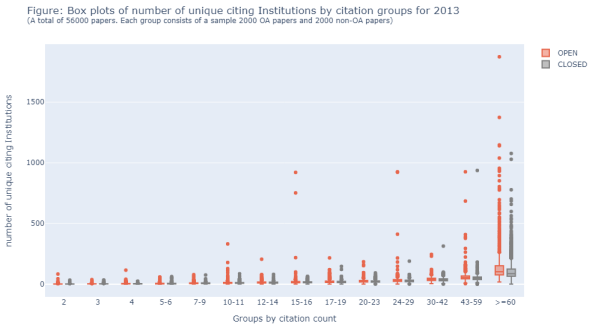
In this section, we split the papers into groups depending on citation numbers and by OA/non-OA status. The sample of papers includes 2,000 OA papers and 2,000 non-OA papers from each citation group (i.e., 56,000 papers in total), as per publication year. The number of unique citing groups is counted for each paper and compared across citation groups. This is to check whether the OA advantage observed in the previous sections remain consistent across the levels of citation. As expected, the number of unique citing groups may increase with the number of citations. However, the OA advantage also seems to remain in place irrespective of the level of citation. Again, we note that the level of effect of the OA advantage can be less obvious when the total numbers of potential counts are low. The performance of OA papers appears to be at least as good, or better, than the non-OA papers.

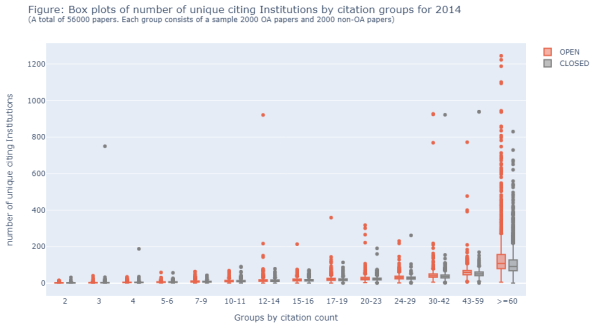
The first set of these is based on Institutions as citing groups:











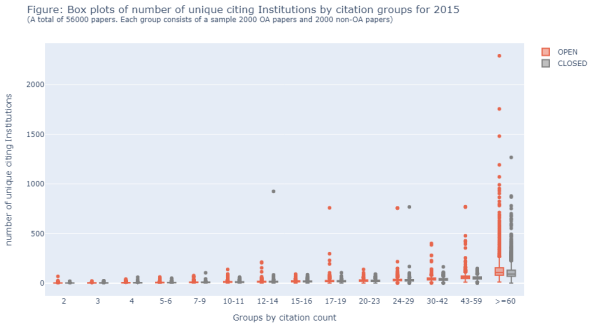
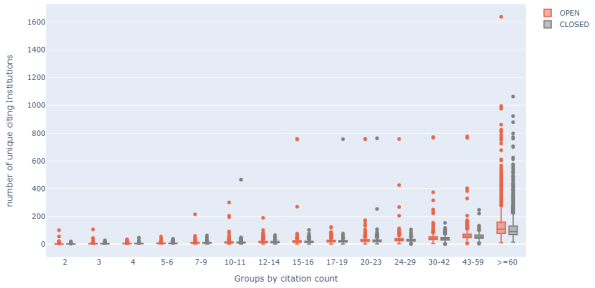


Figure: Box plots of number of unique citing Institutions by citation groups for 2016
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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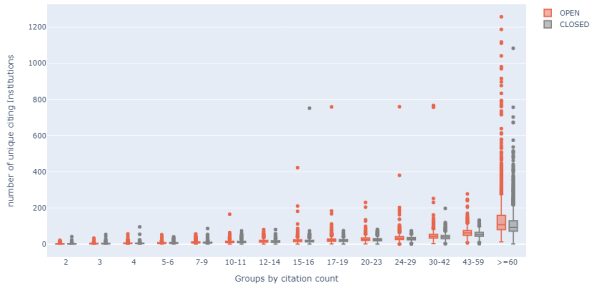

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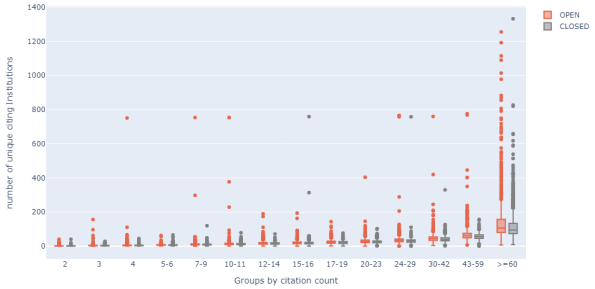

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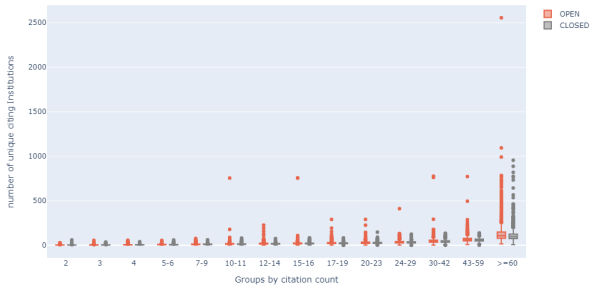

The next set is based on Countries as citing groups:

Figure: Box plots of number of unique citing Countries by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)

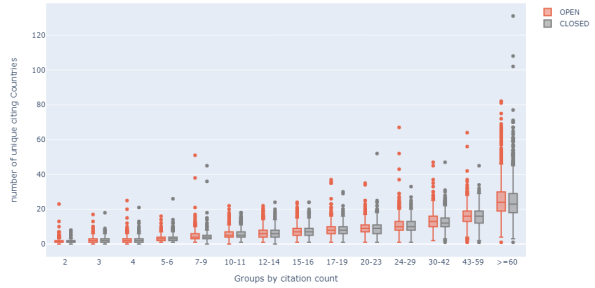

Figure: Box plots of number of unique citing Countries by citation groups for 2011
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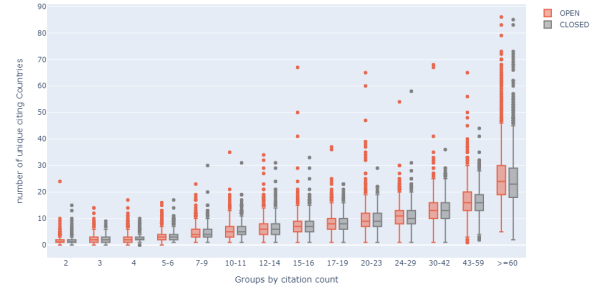

Figure: Box plots of number of unique citing Countries by citation groups for 2012
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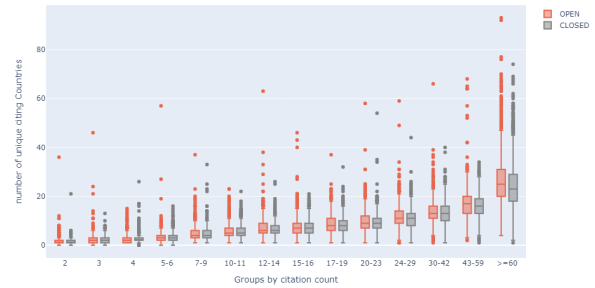

Figure: Box plots of number of unique citing Countries by citation groups for 2013
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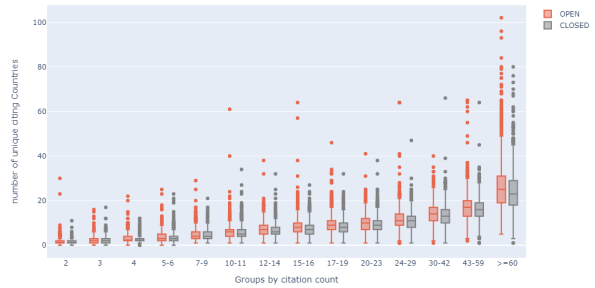
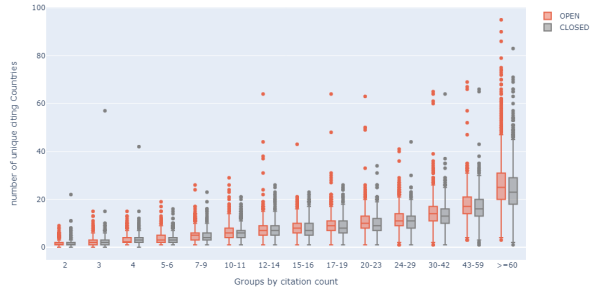


Figure: Box plots of number of unique citing Countries by citation groups for 2014
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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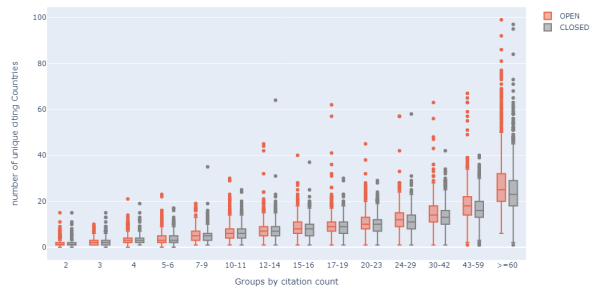

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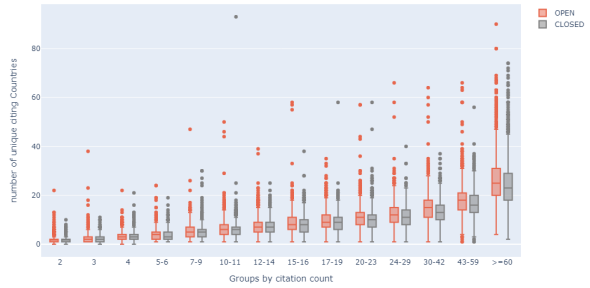

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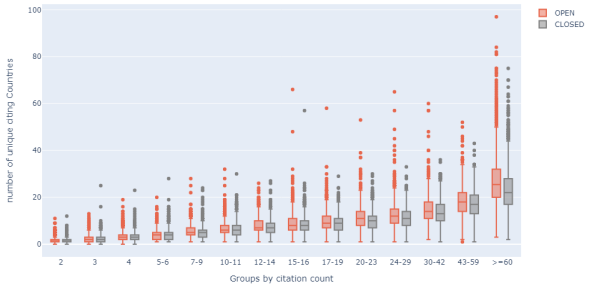

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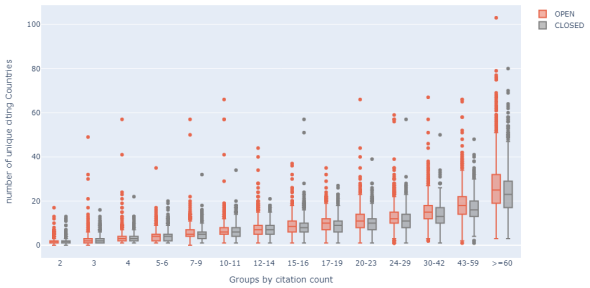

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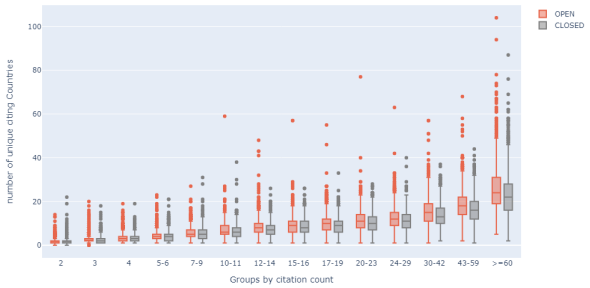
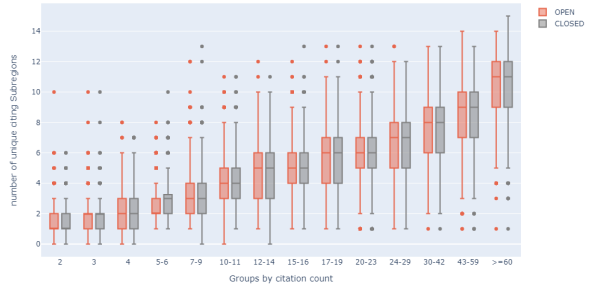


The next set is based on Subregions as citing groups:

Figure: Box plots of number of unique citing Subregions by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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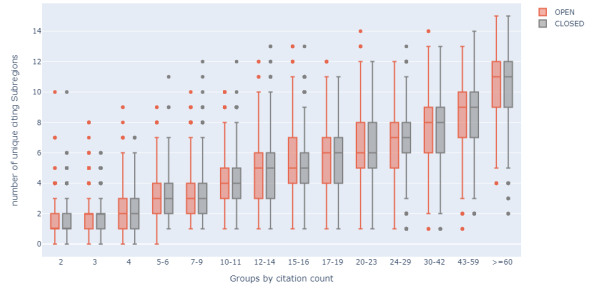
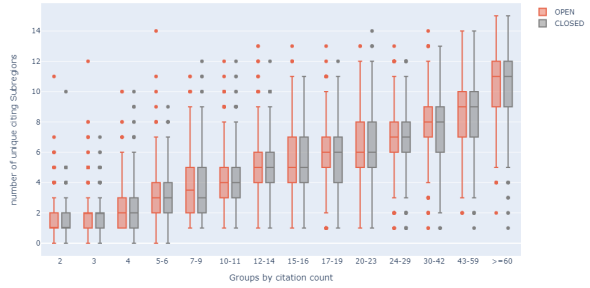


Figure: Box plots of number of unique citing Subregions by citation groups for 2012
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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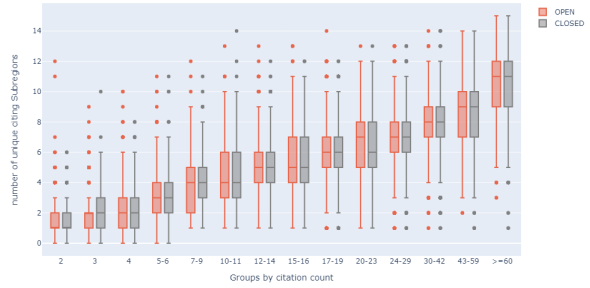

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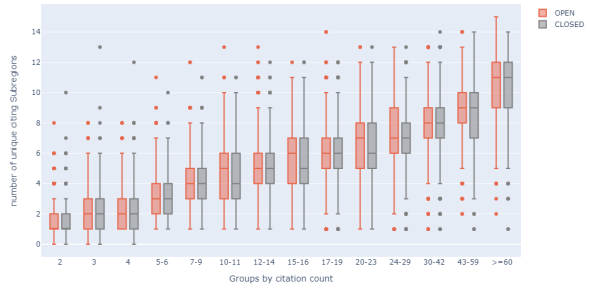

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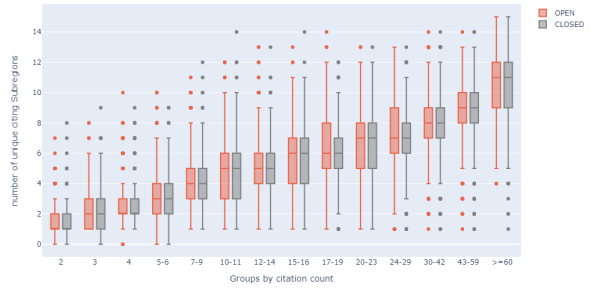

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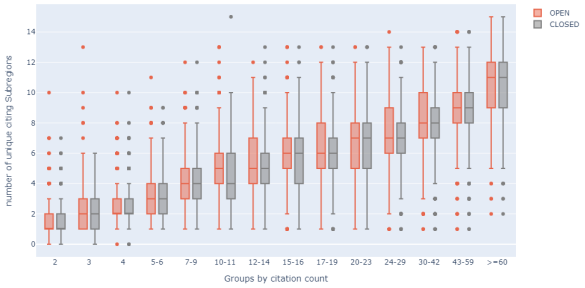

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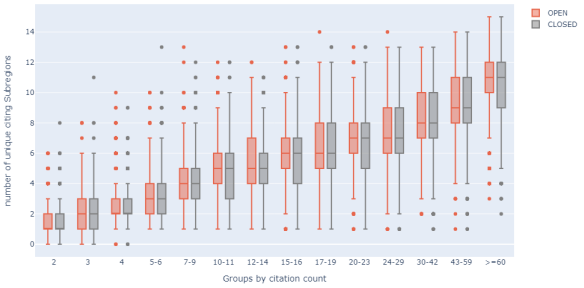

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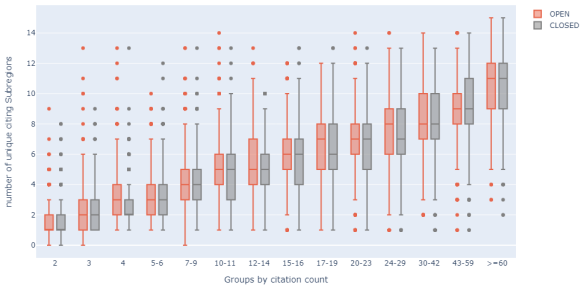

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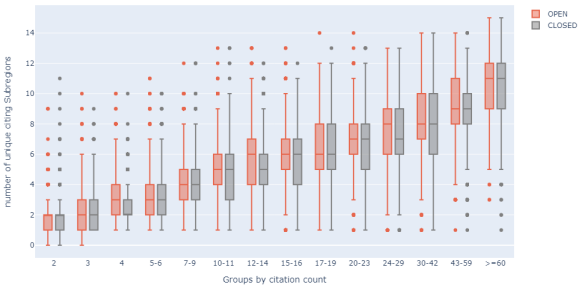
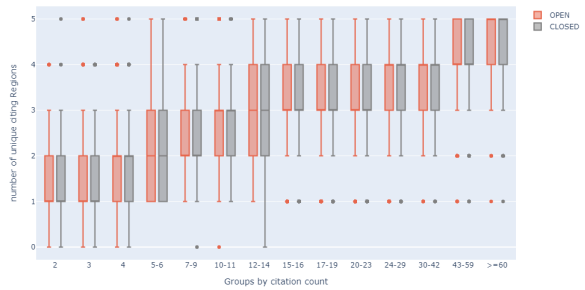
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



The next set is based on Regions as citing groups:

Figure: Box plots of number of unique citing Regions by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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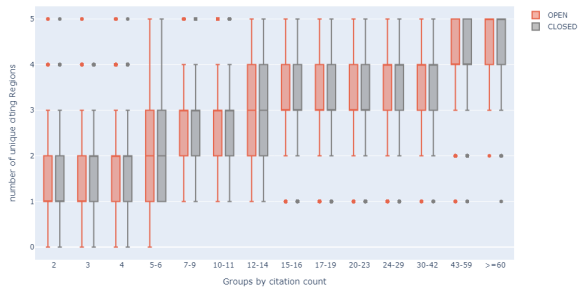

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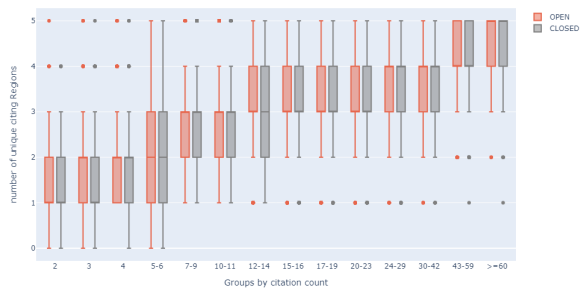

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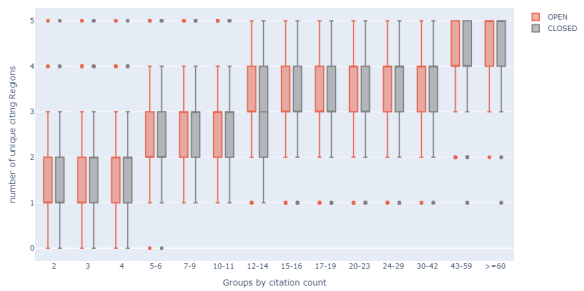

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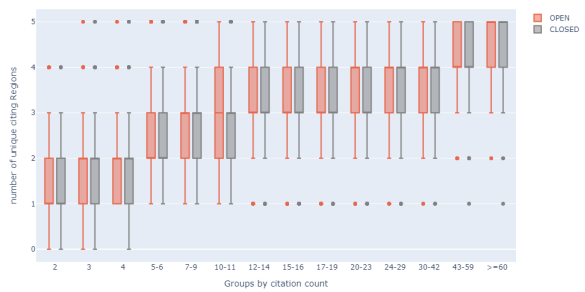

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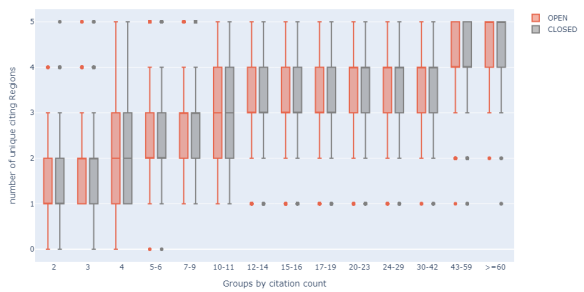

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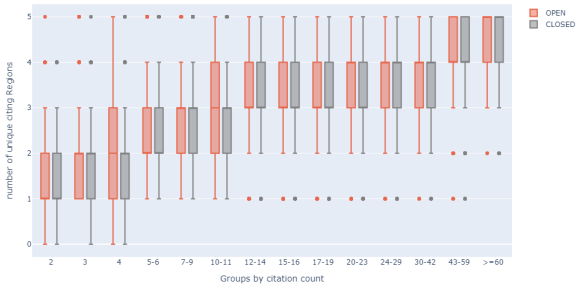
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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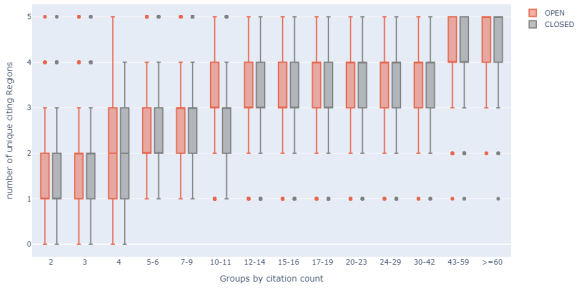

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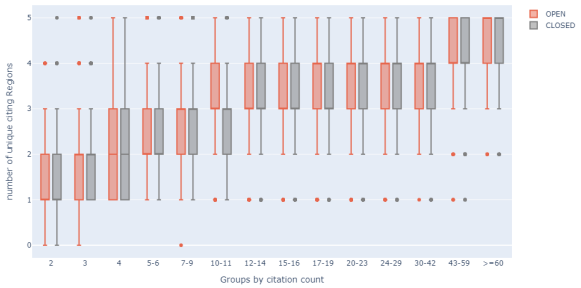

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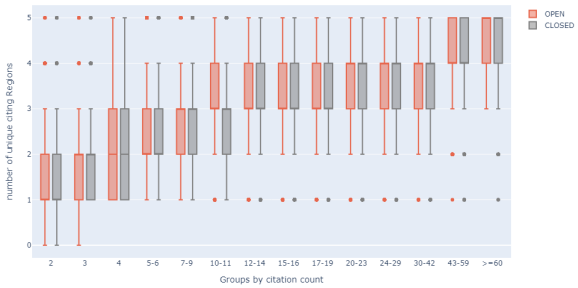
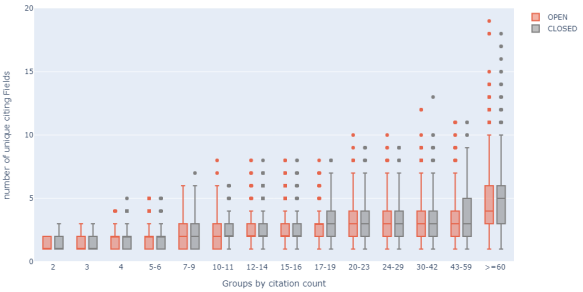


The next set is based on the Fields as citing groups:

Figure: Box plots of number of unique citing Fields by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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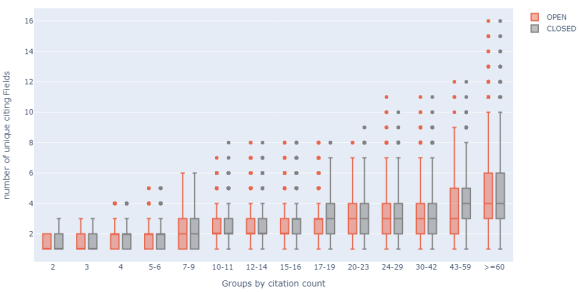
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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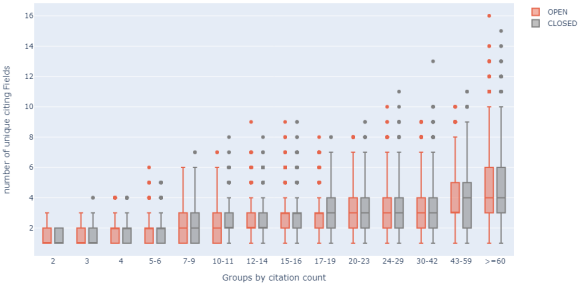
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)

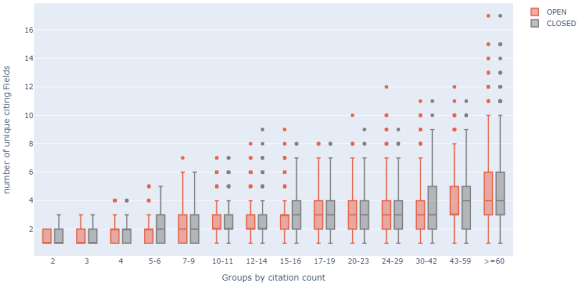

Figure: Box plots of number of unique citing Fields by citation groups for 2014
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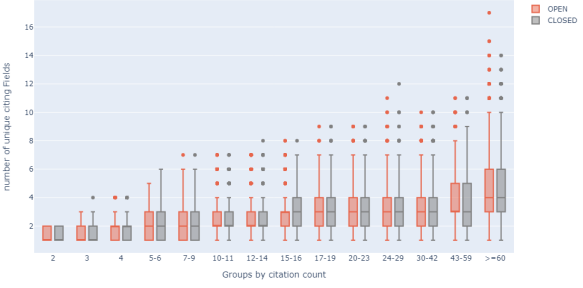
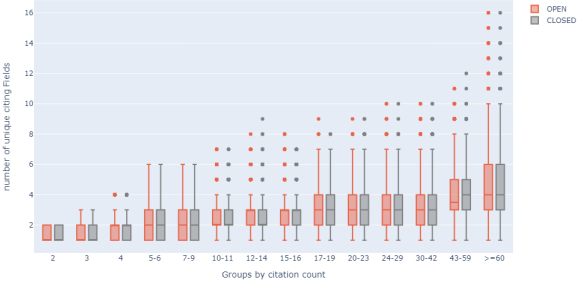


Figure: Box plots of number of unique citing Fields by citation groups for 2015
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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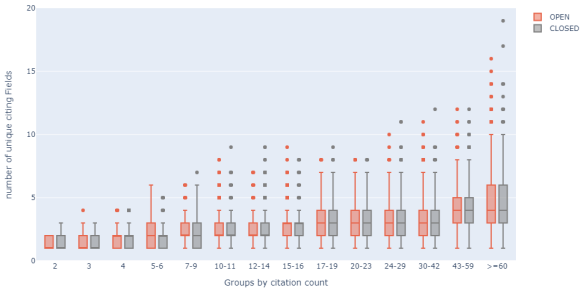
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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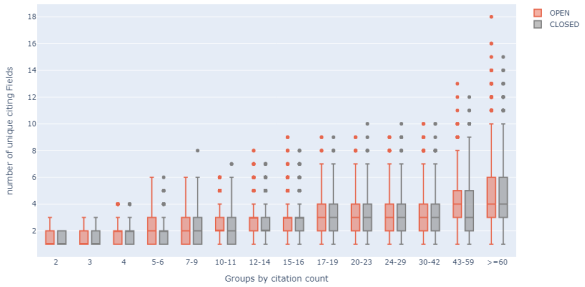

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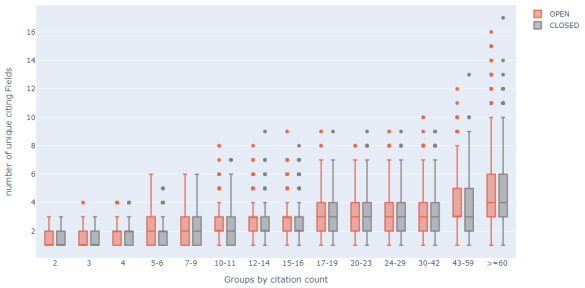

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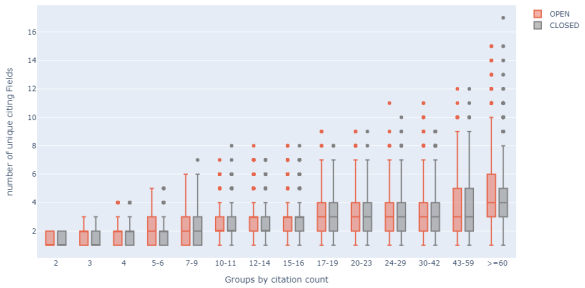
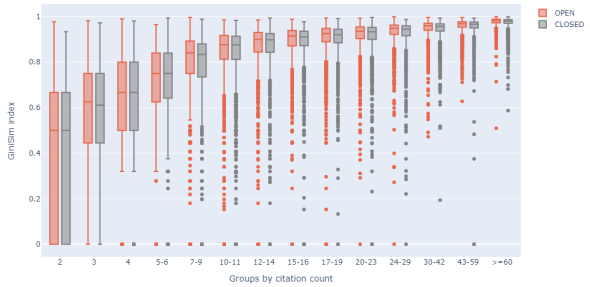


Section I: Citation groups vs citation diversity scores

Similar to the previous section, papers are split into groups by citation counts - 2,000 OA papers and 2,000 non-OA papers are sampled from each citation group. A diversity score is calculated based on citing groups for each paper and boxplot constructed for OA and non-OA papers. Each figure below represent the findings for each type of citing group and each publication year. Not unexpectedly the increase in citation count may correlate with slightly higher diversity scores for both diversity measures (i.e., higher likelihood of different sighting entities). The general pattern that OA papers scoring higher in diversity remains consistent through citation groups, types of citing groups, publication years, and across diversity measures.

The first set of these is based on the Gini-Simpson index and institutions as citing groups:

Figure: Box plots of GiniSim index on citing Institutions by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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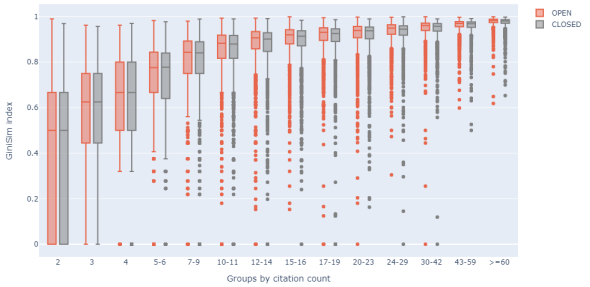

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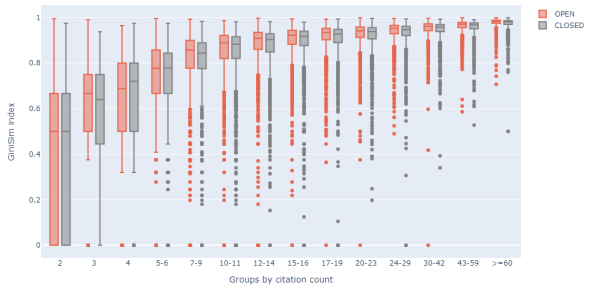

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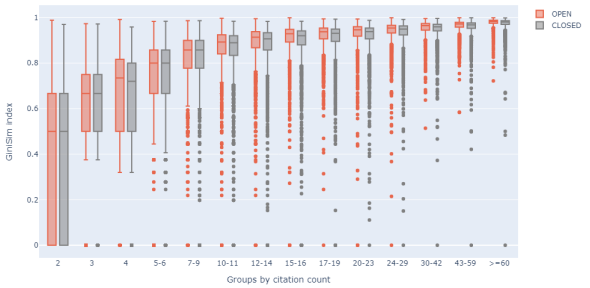

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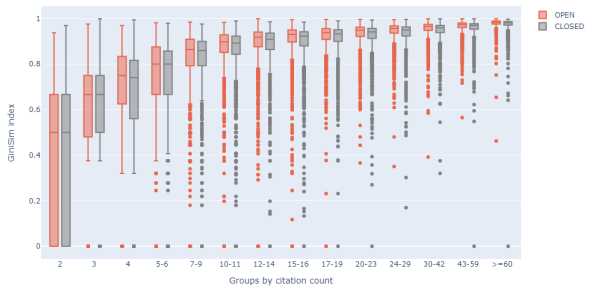

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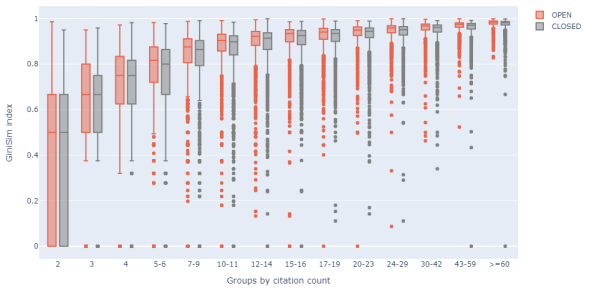

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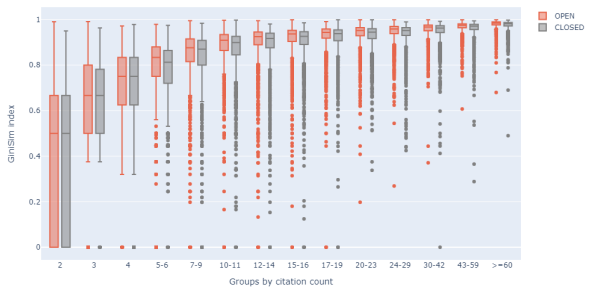

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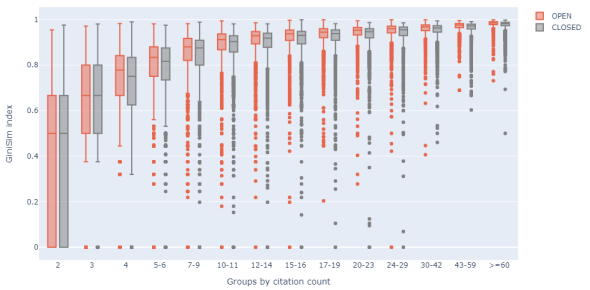

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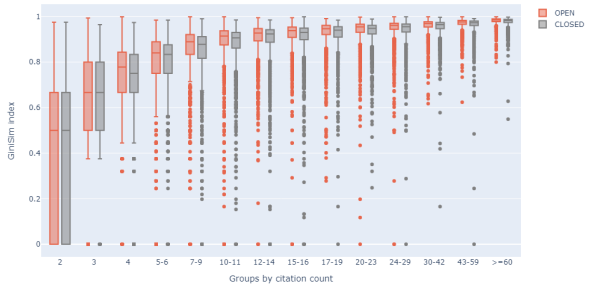

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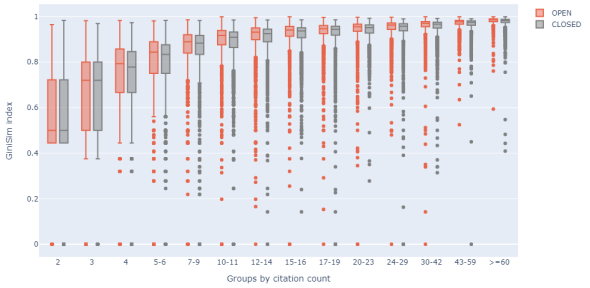
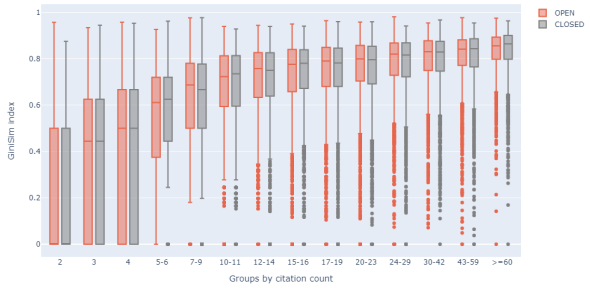


The next set is based on the Gini-Simpson index and countries as citing groups:

Figure: Box plots of GiniSim index on citing Countries by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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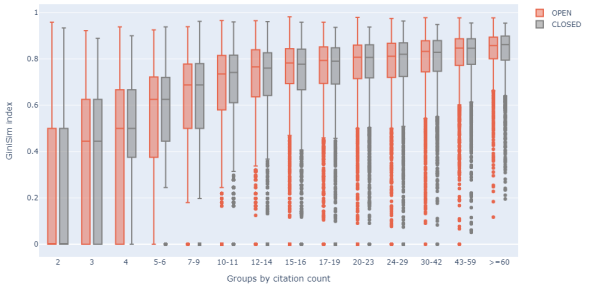

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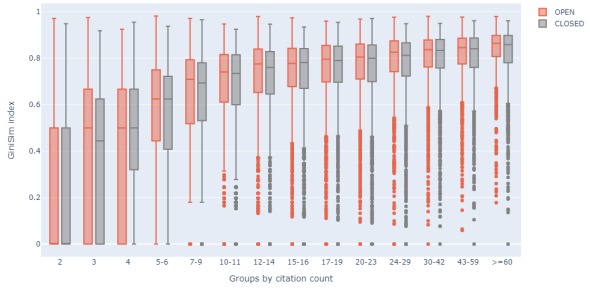

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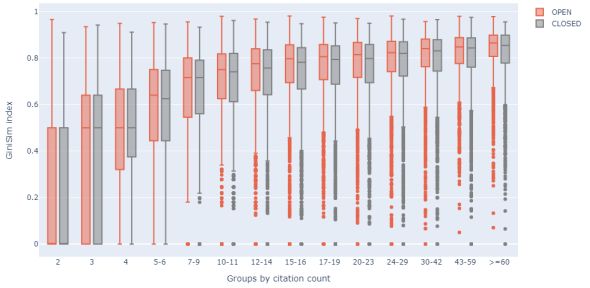

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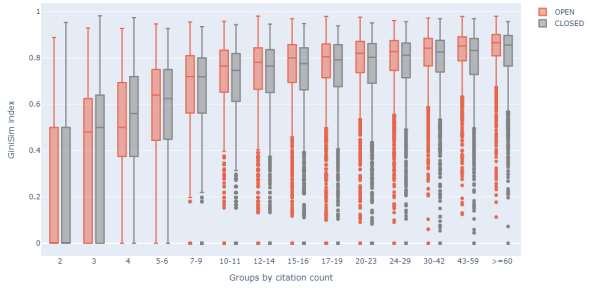

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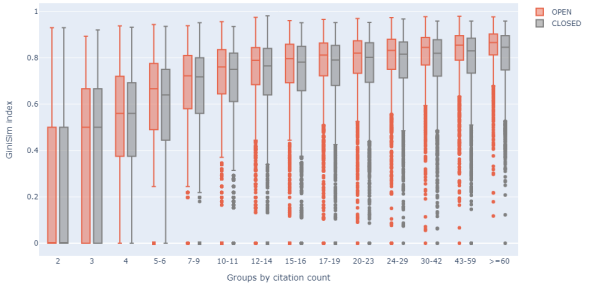

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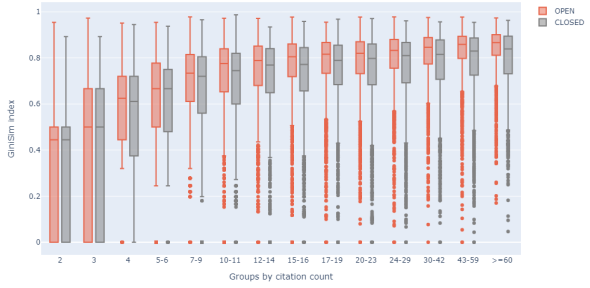

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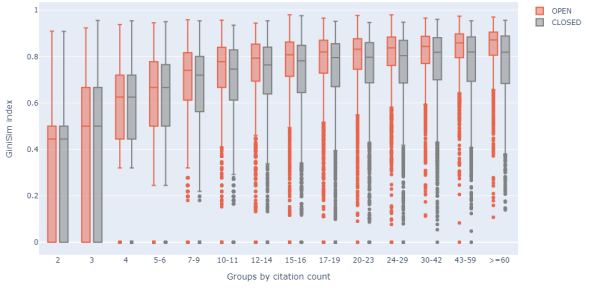

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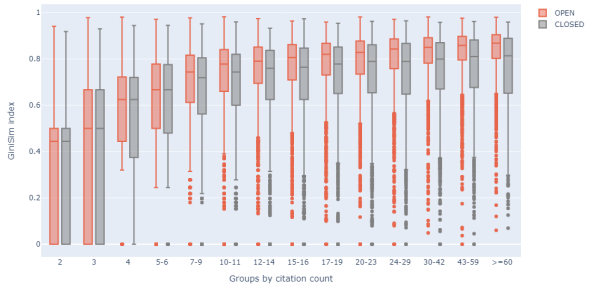

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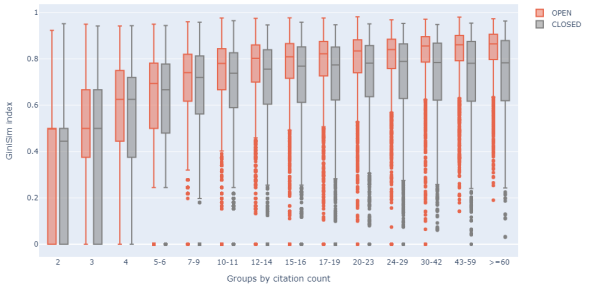
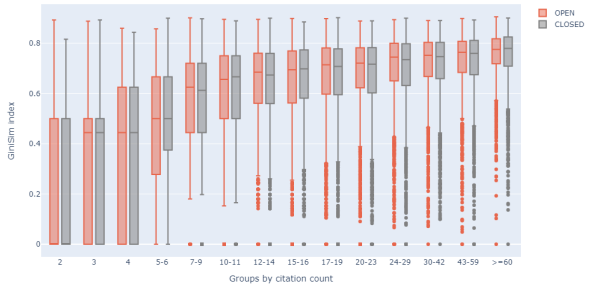


The next set is based on the Gini-Simpson index and Subregions as citing groups:

Figure: Box plots of GiniSim index on citing Subregions by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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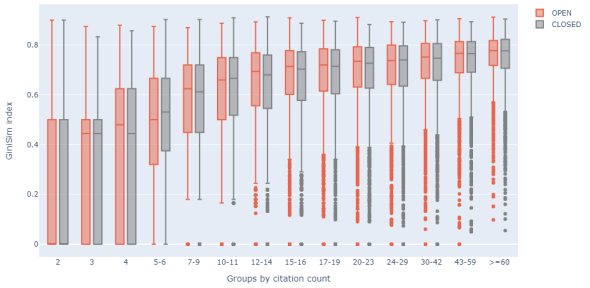

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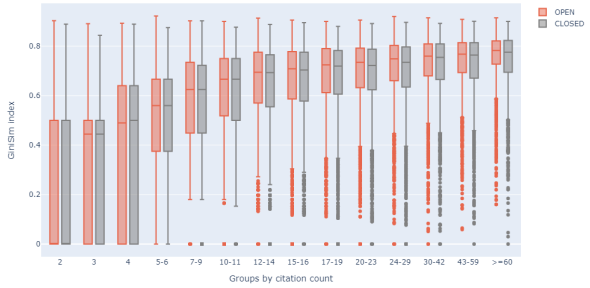

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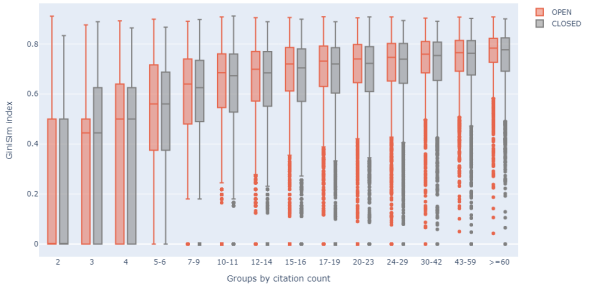

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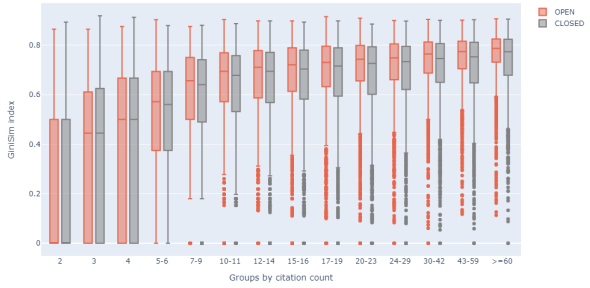

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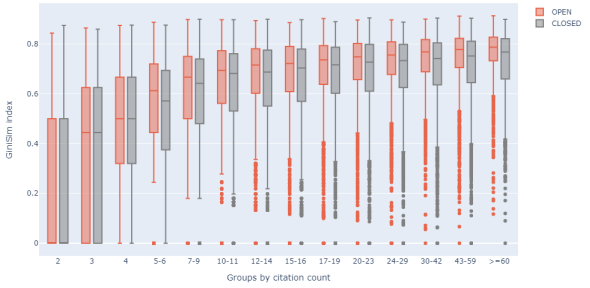
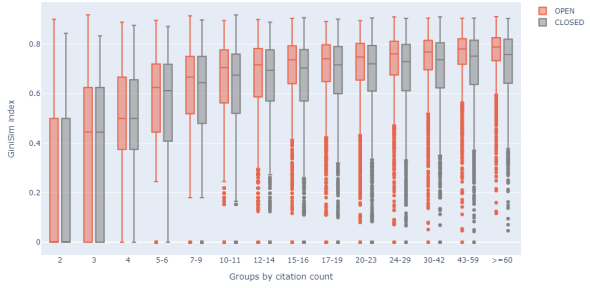


Figure: Box plots of GiniSim index on citing Subregions by citation groups for 2016
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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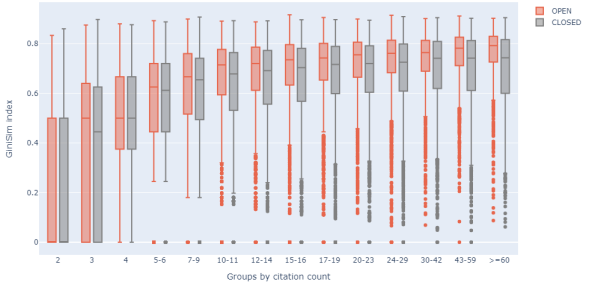

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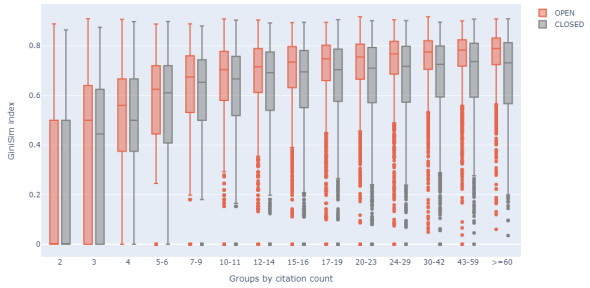

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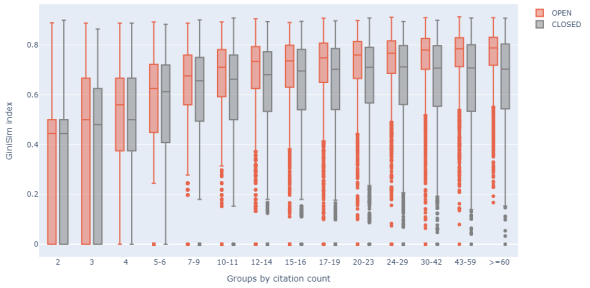
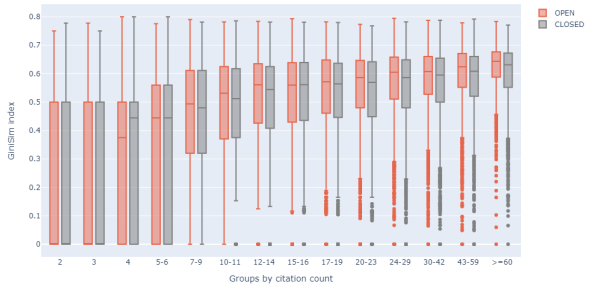


The next set is based on the Gini-Simpson index and Regions as citing groups:

Figure: Box plots of GiniSim index on citing Regions by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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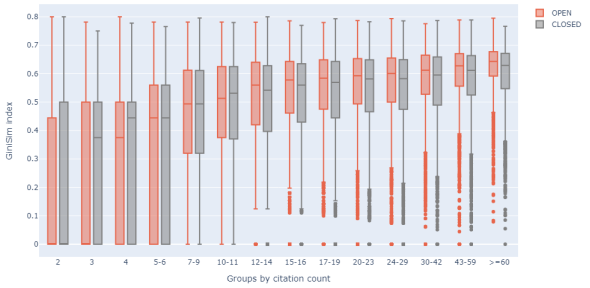

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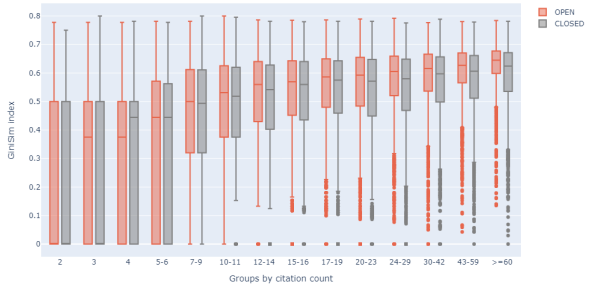

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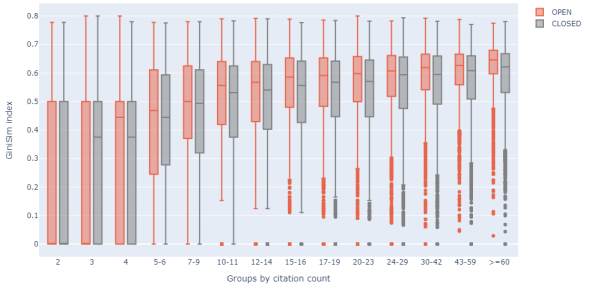

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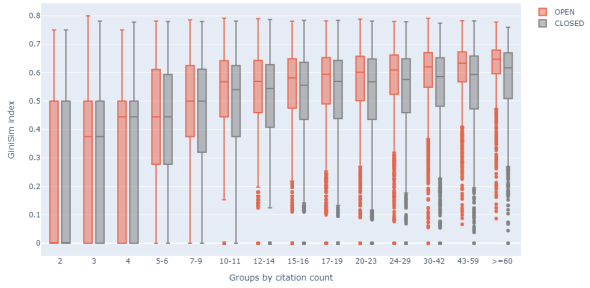

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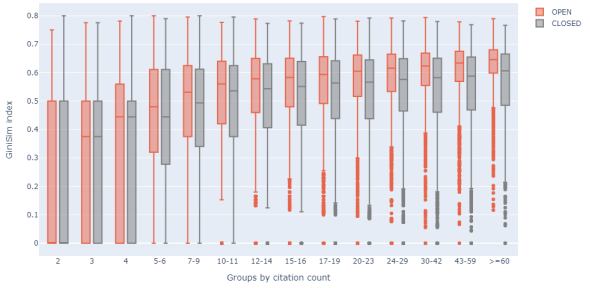

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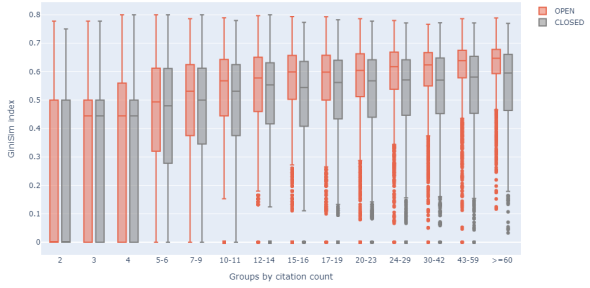

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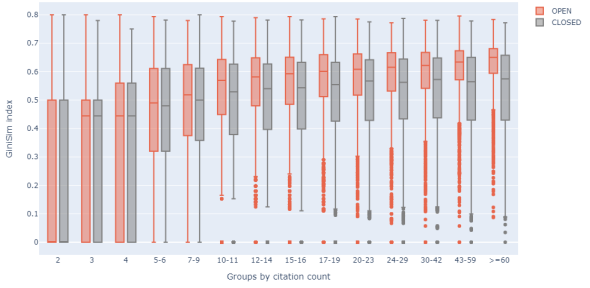

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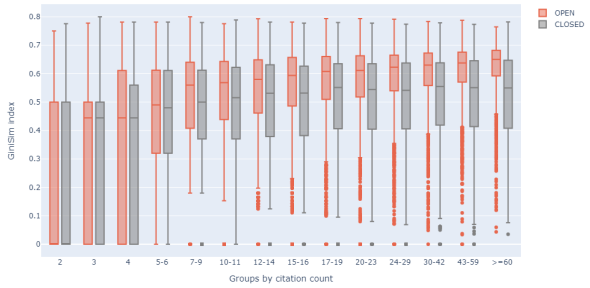

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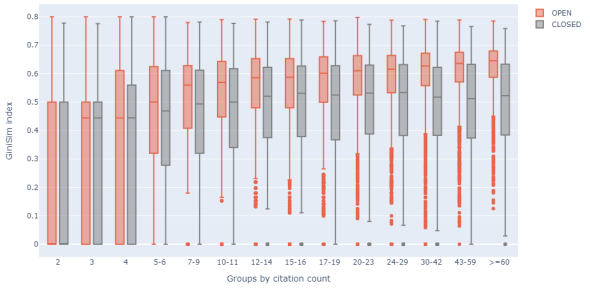
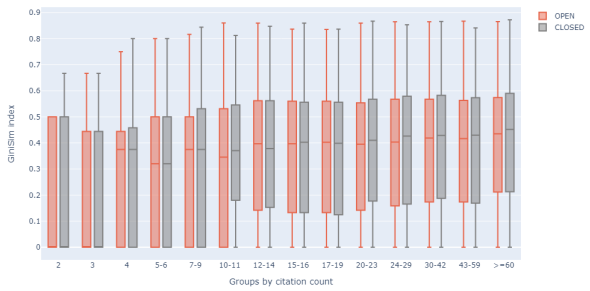


The next set is based on the Gini-Simpson index and Fields as citing groups:

Figure: Box plots of GiniSim index on citing Fields by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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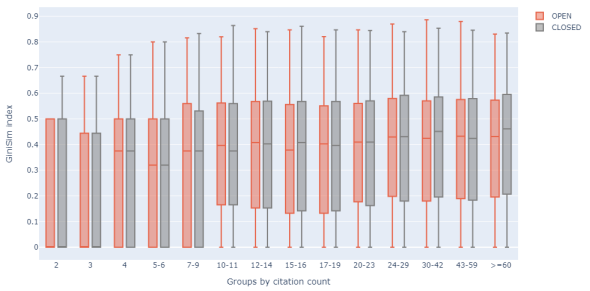

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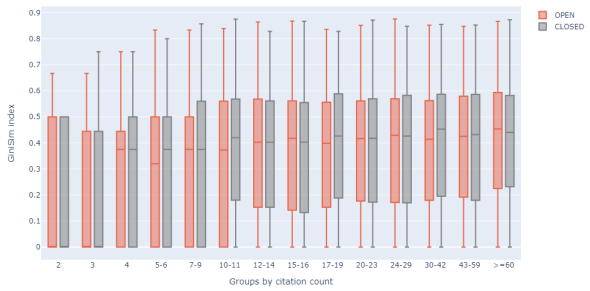

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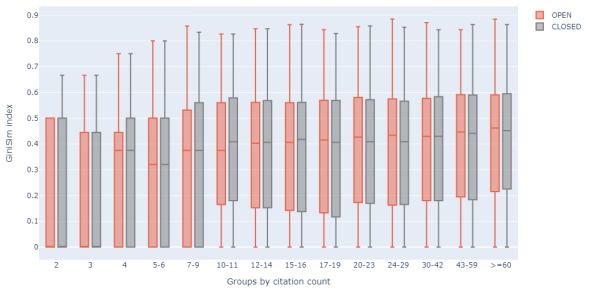

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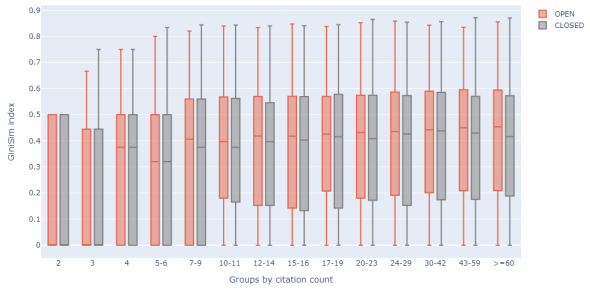

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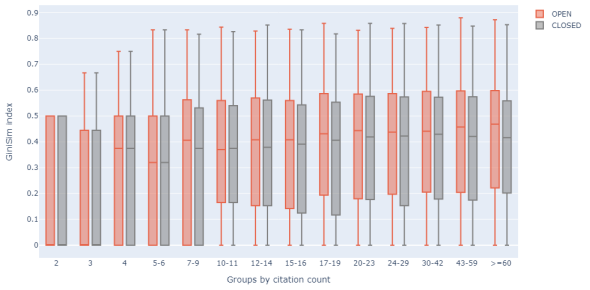

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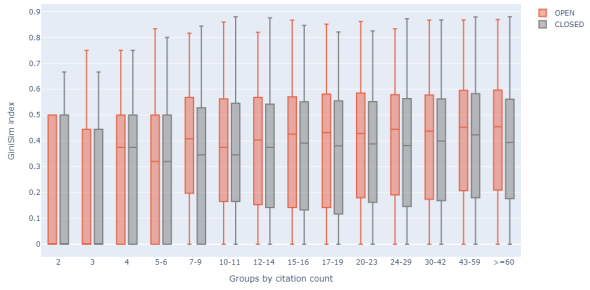

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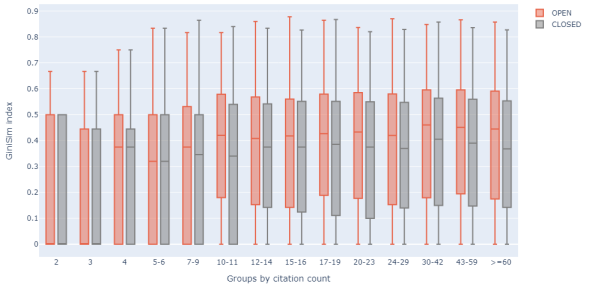

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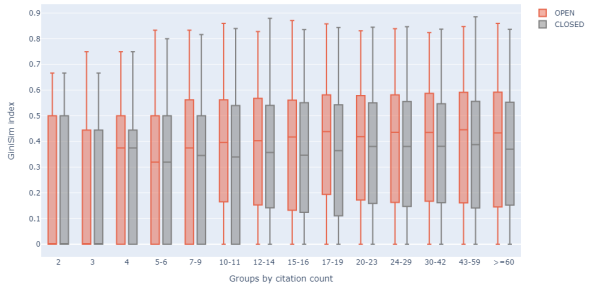

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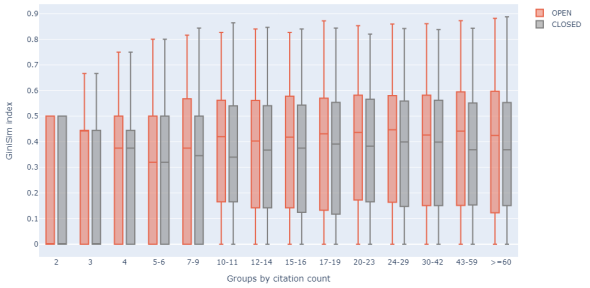
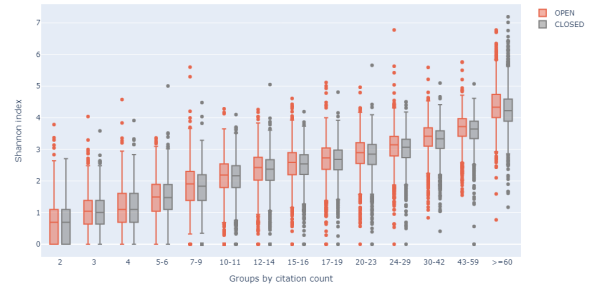


The next set is based on the Shannon index and institutions as citing groups:

Figure: Box plots of Shannon index on citing Institutions by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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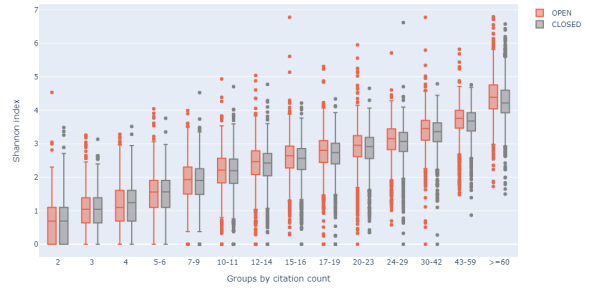

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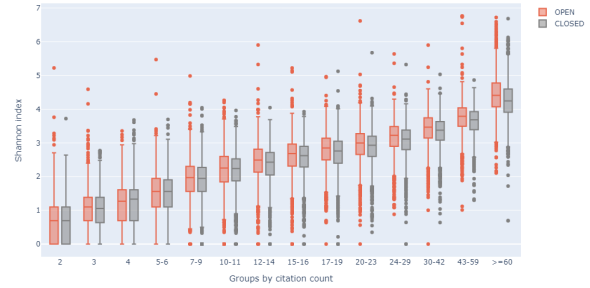

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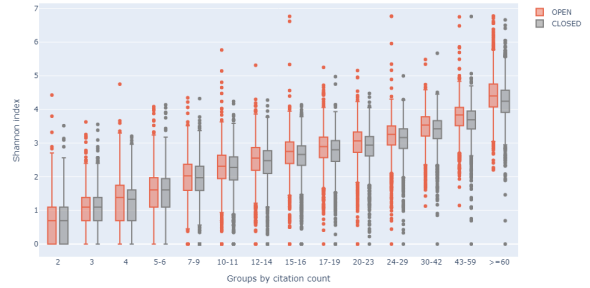

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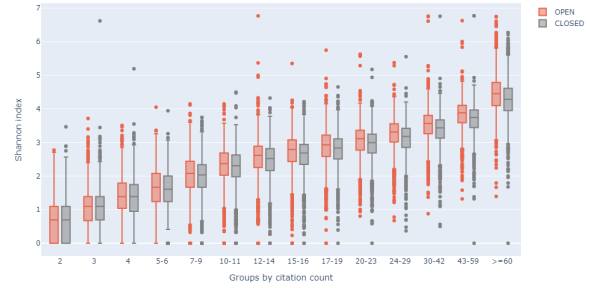

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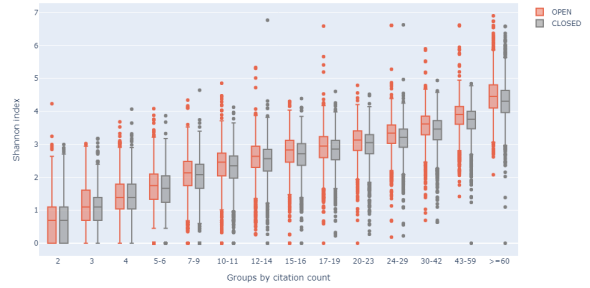

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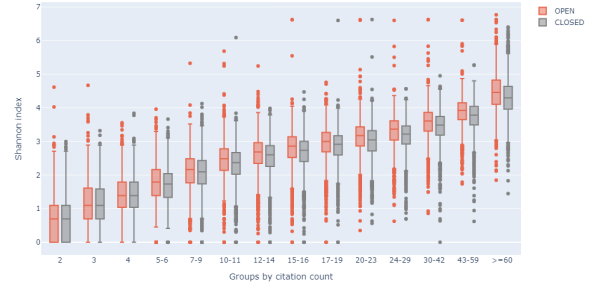

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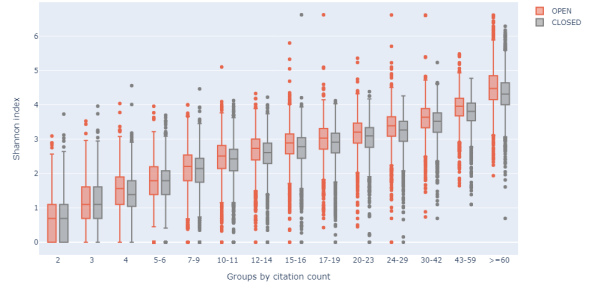

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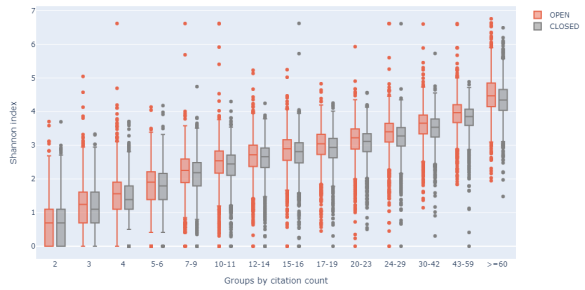

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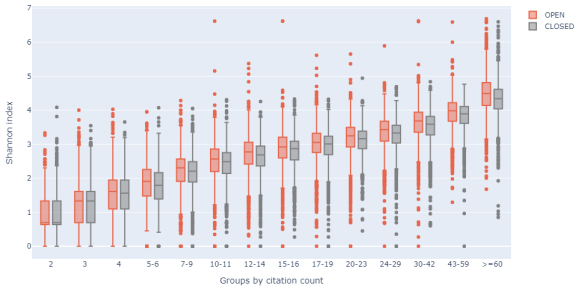
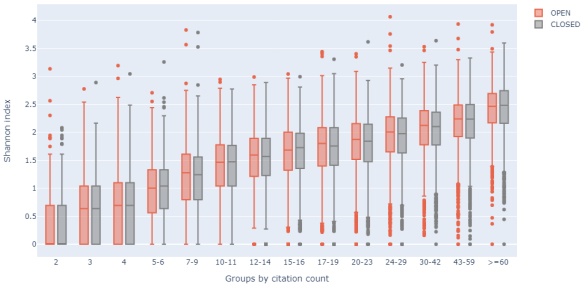


The next set is based on the Shannon index and countries as citing groups:

Figure: Box plots of Shannon index on citing Countries by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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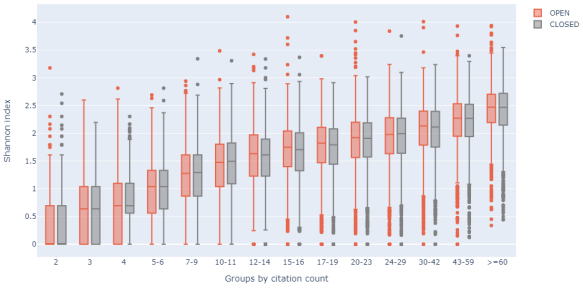

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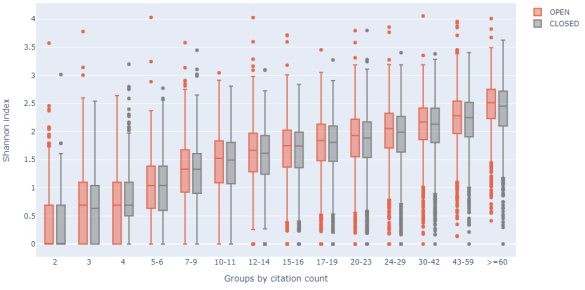

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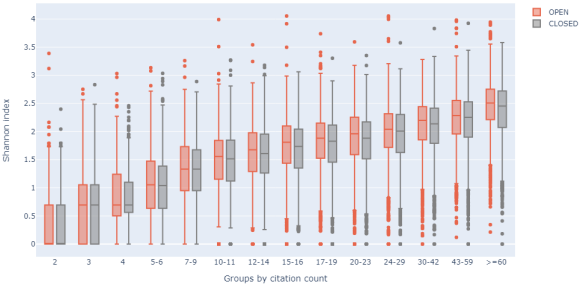

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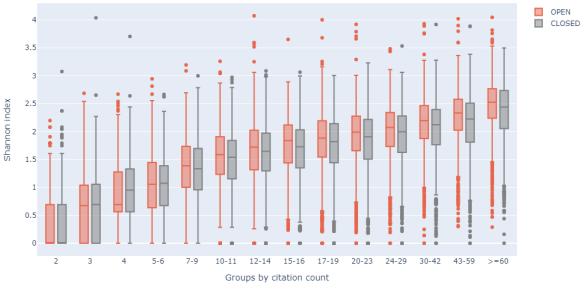

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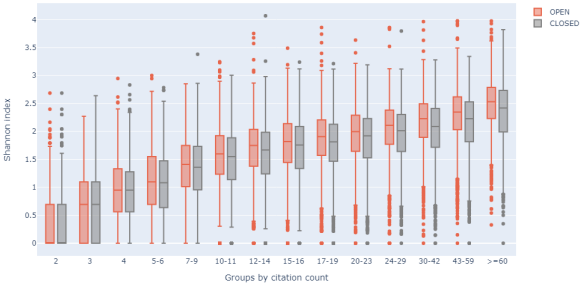

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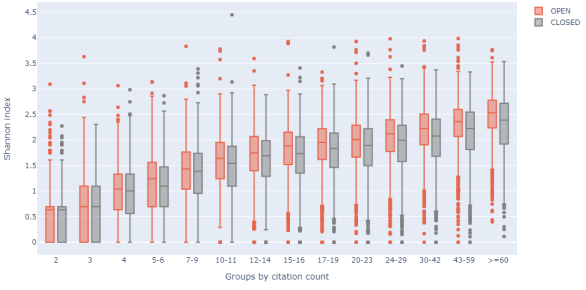

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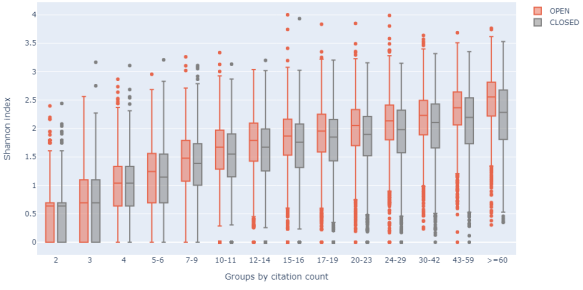

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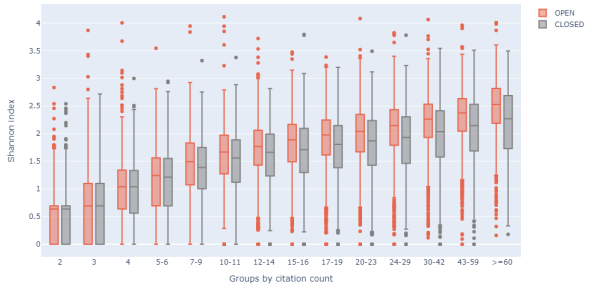

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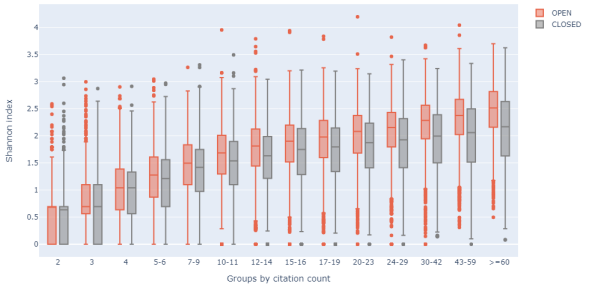
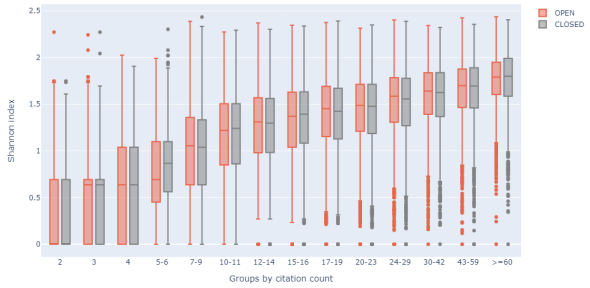


The next set is based on the Shannon index and Subregions as citing groups:

Figure: Box plots of Shannon index on citing Subregions by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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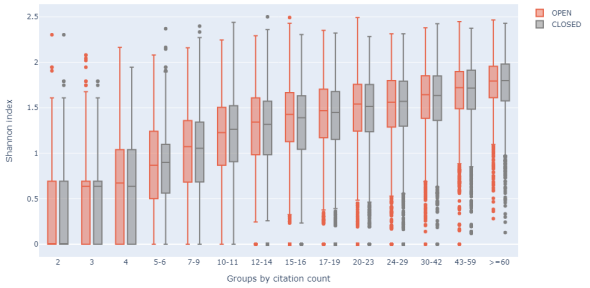

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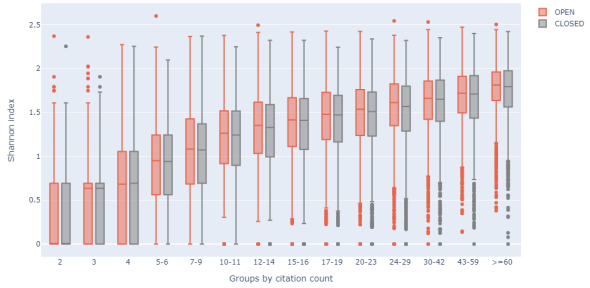

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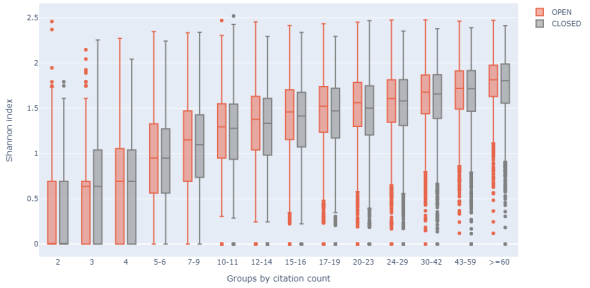

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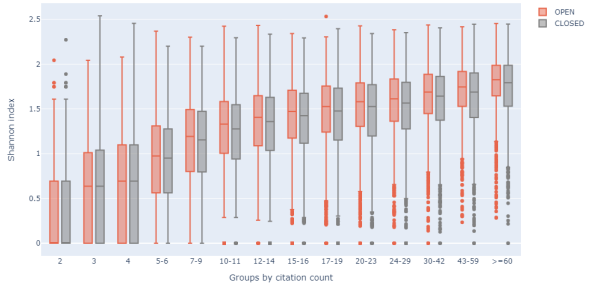

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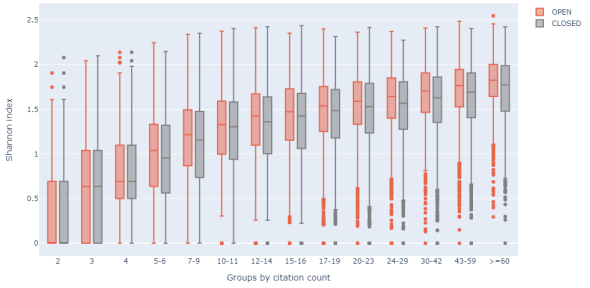

Figure: Box plots of Shannon index on citing Subregions by citation groups for 2016
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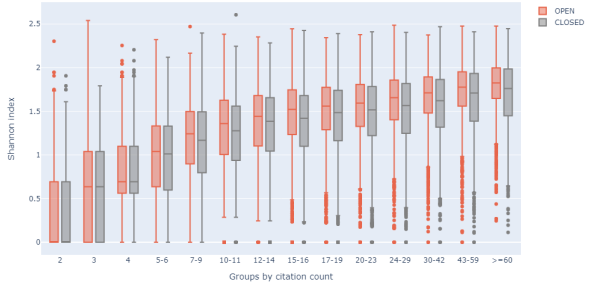

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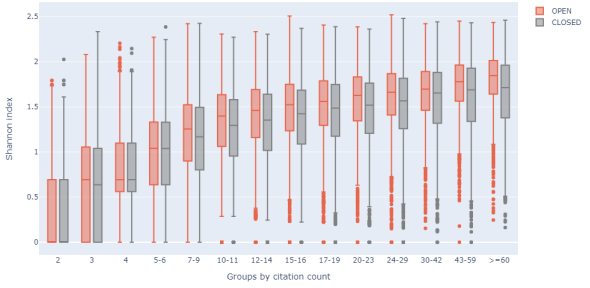

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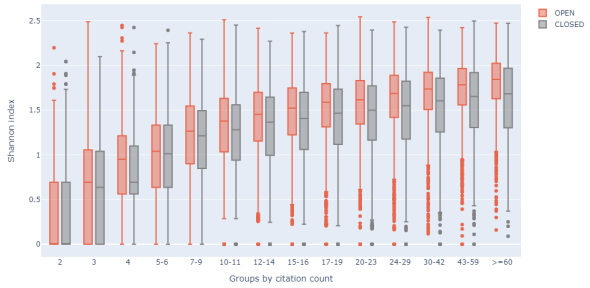

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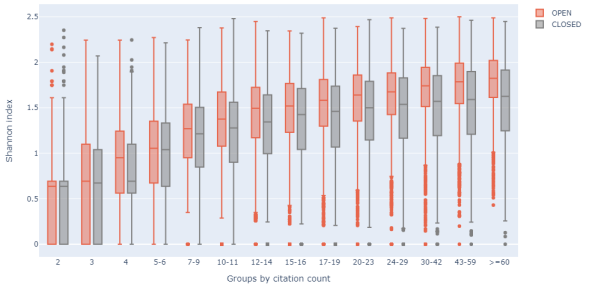
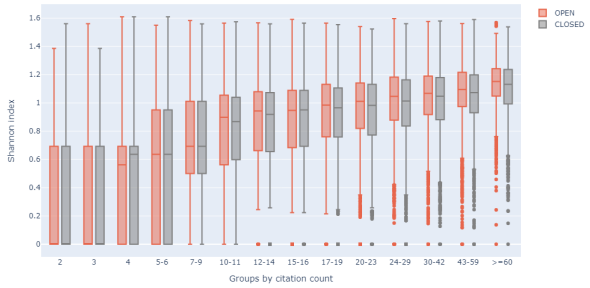


The next set is based on the Shannon index and Regions as citing groups:

Figure: Box plots of Shannon index on citing Regions by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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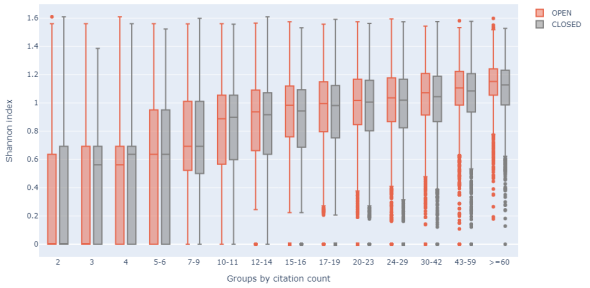

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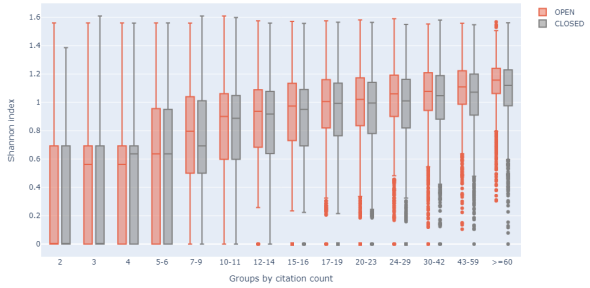

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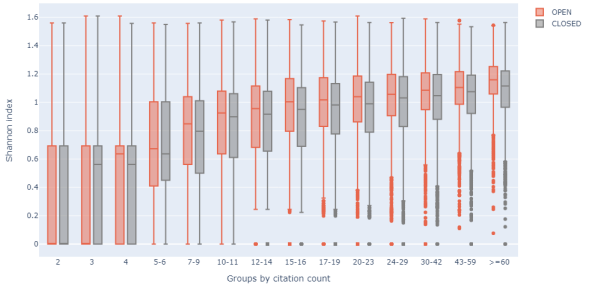

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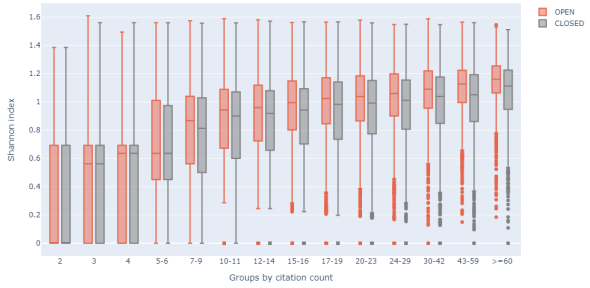

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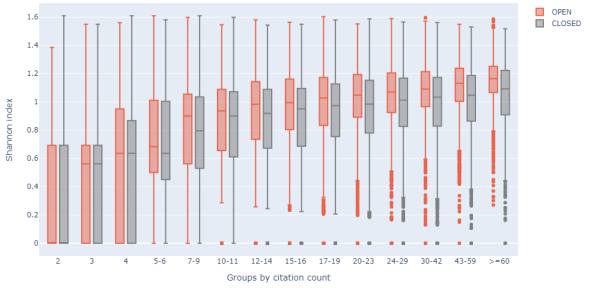
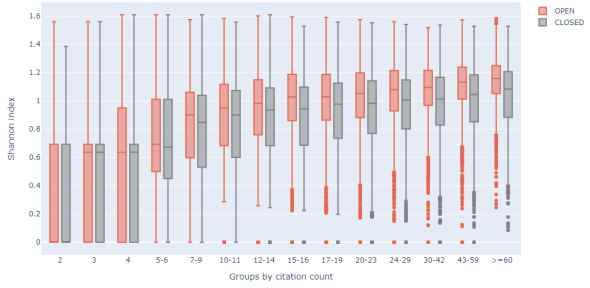


Figure: Box plots of Shannon index on citing Regions by citation groups for 2016
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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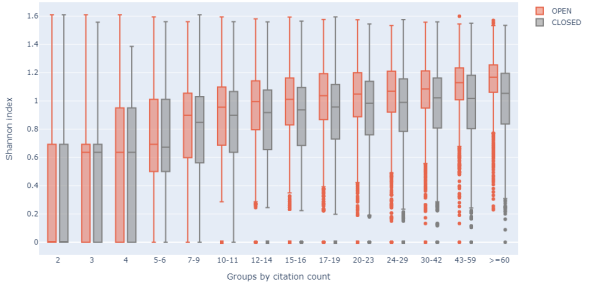

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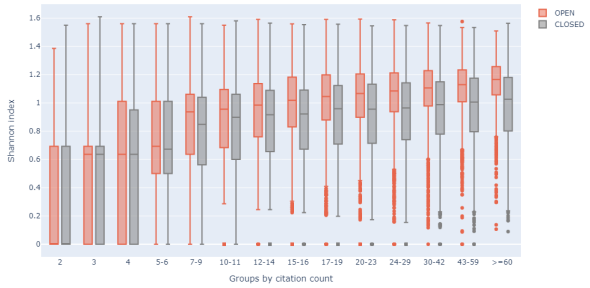
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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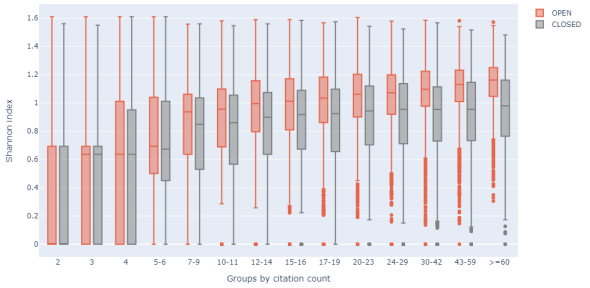

The next set is based on the Shannon index and Fields as citing groups:

Figure: Box plots of Shannon index on citing Fields by citation groups for 2010
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)

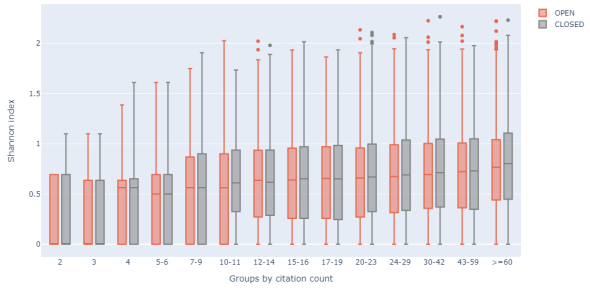

Figure: Box plots of Shannon index on citing Fields by citation groups for 2011
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)

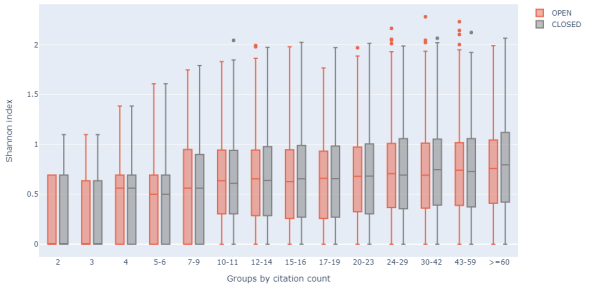

Figure: Box plots of Shannon index on citing Fields by citation groups for 2012
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)

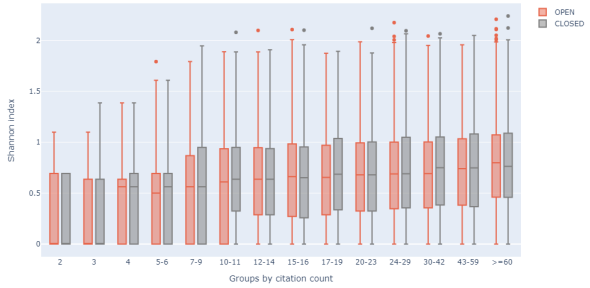

Figure: Box plots of Shannon index on citing Fields by citation groups for 2013
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)

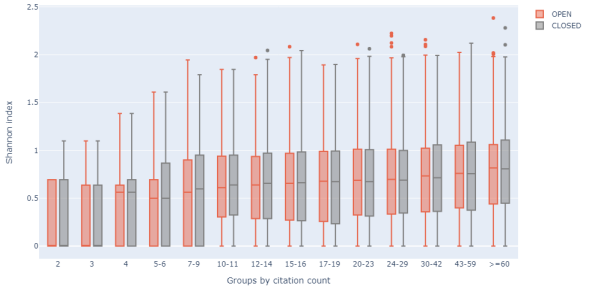

Figure: Box plots of Shannon index on citing Fields by citation groups for 2014
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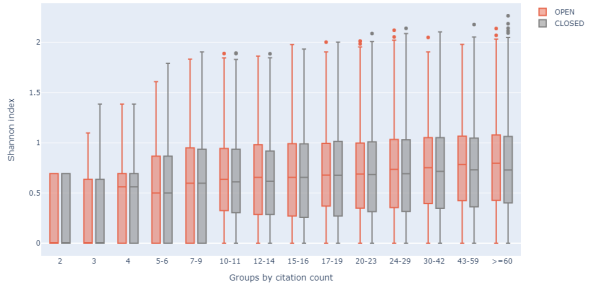

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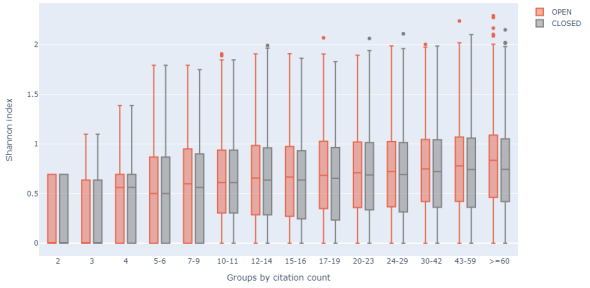
(A total of 56000 papers. Each group consists of a sample 2000 OA papers and 2000 non-OA papers)



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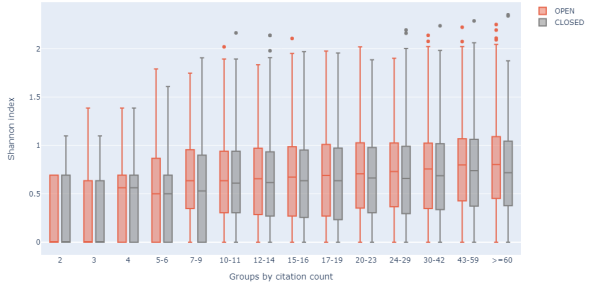

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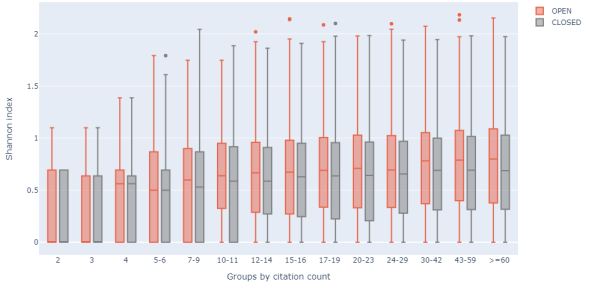

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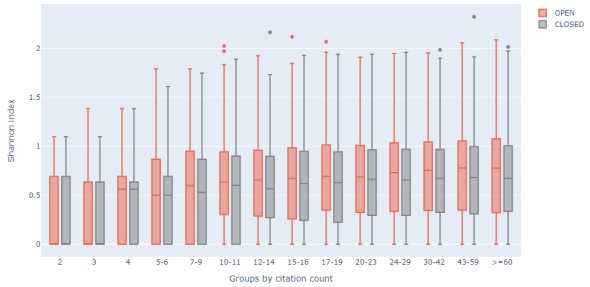

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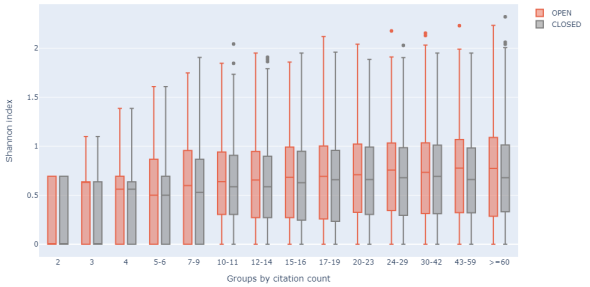
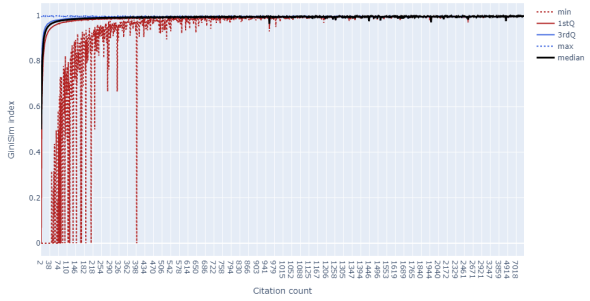


Section J: Citation counts vs citation diversity scores

In the following figures, quartiles of diversity scores are tracked against citation counts for the complete data set. Instead of sampling papers by citation groups in the previous section, we include all papers in the study in the following analysis and all citation counts (not groups). This is plotted for various combinations of diversity measure, type of citing groups and publication year. Results with fields of research as citing groups are excluded, as no meaningful results are produced due to very small numbers (i.e., most papers are cited within very few fields). The aim is to further explore potential relationships between diversity scores and citation counts. Interestingly, the mild positive relationship between diversity scores and citation counts observed in the lower end of the spectrum (which is consistent with the previous section) seems to fade away as we move towards papers with very high citations. Hence, in most cases, diversity scores are not completely driven by citation counts.

The first set of these is based on the Gini-Simpson index and institutions as citing groups:

Figure: Citation count versus GiniSim index of citing Institutions for 2010



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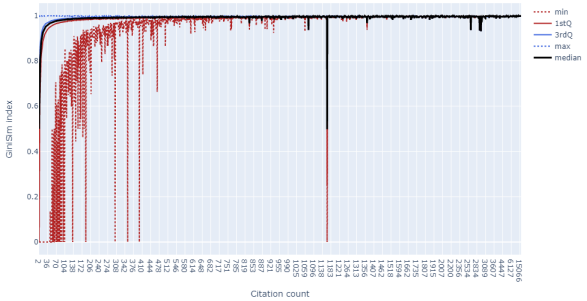

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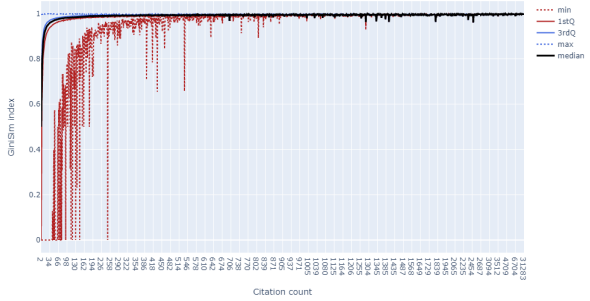

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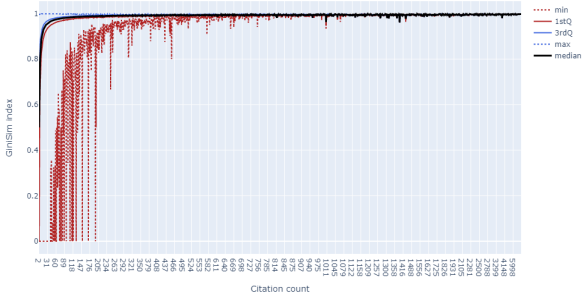

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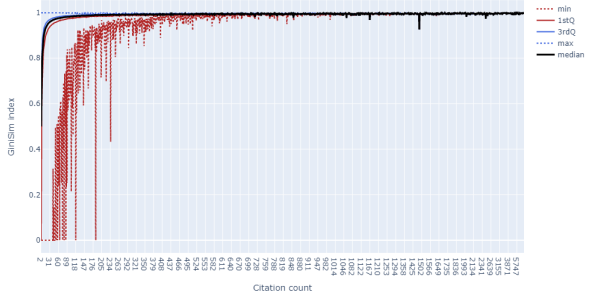


Figure: Citation count versus GiniSim index of citing Institutions for 2015

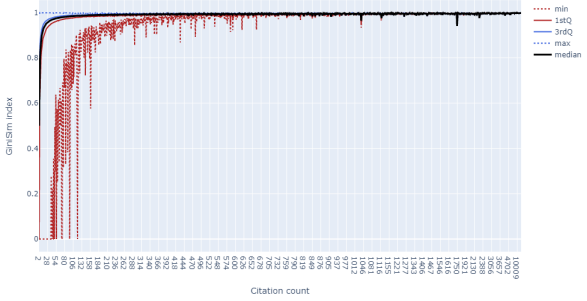
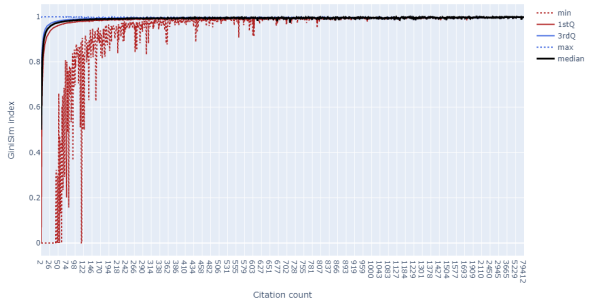


Figure: Citation count versus GiniSim index of citing Institutions for 2016



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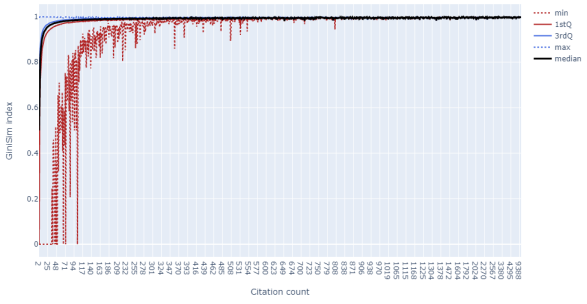

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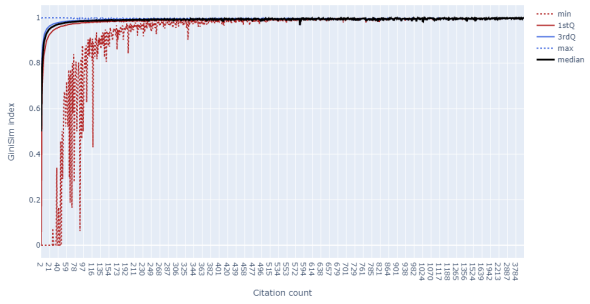
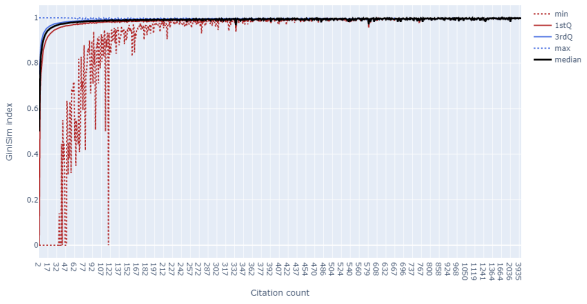


Figure: Citation count versus GiniSim index of citing Institutions for 2019



The next set is based on the Gini-Simpson index and countries as citing groups:

Figure: Citation count versus GiniSim index of citing Countries for 2010

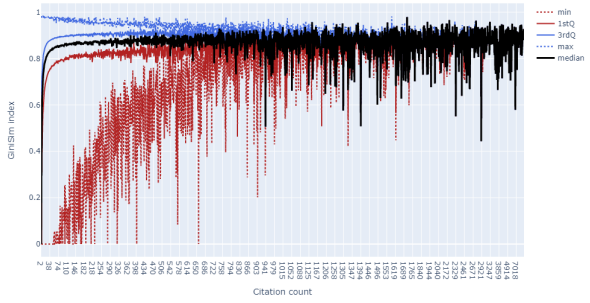


Figure: Citation count versus GiniSim index of citing Countries for 2011

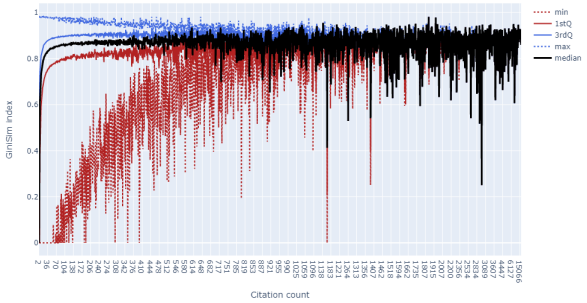
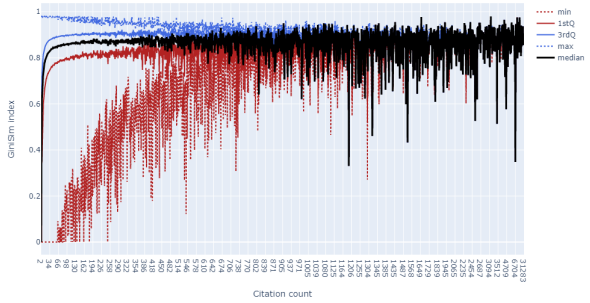


Figure: Citation count versus GiniSim index of citing Countries for 2012



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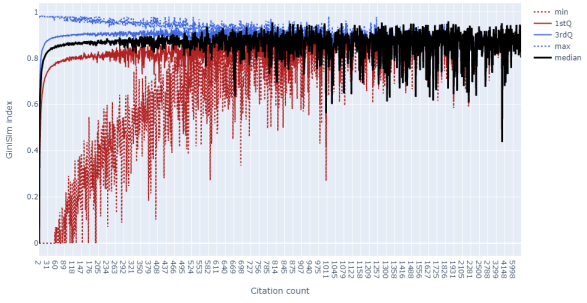

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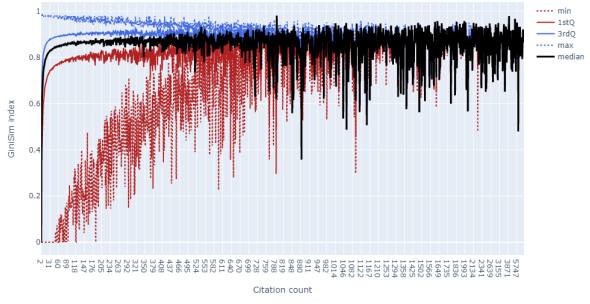

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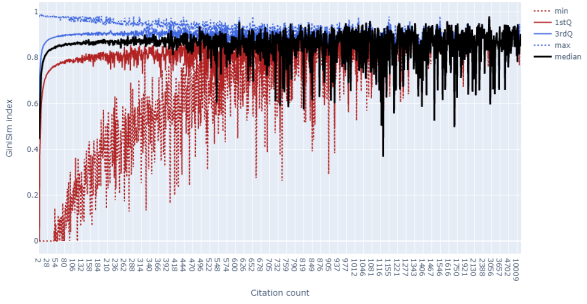


Figure: Citation count versus GiniSim index of citing Countries for 2016

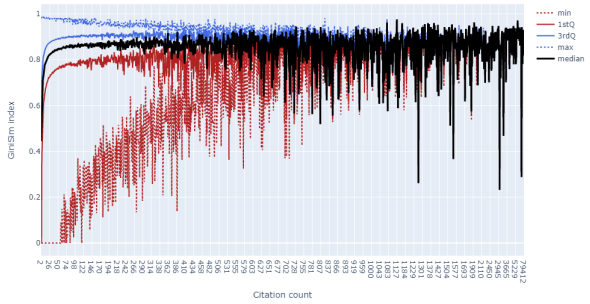
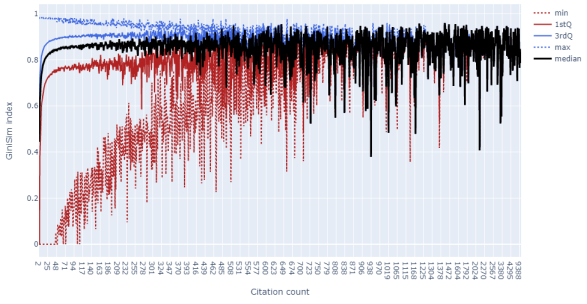


Figure: Citation count versus GiniSim index of citing Countries for 2017



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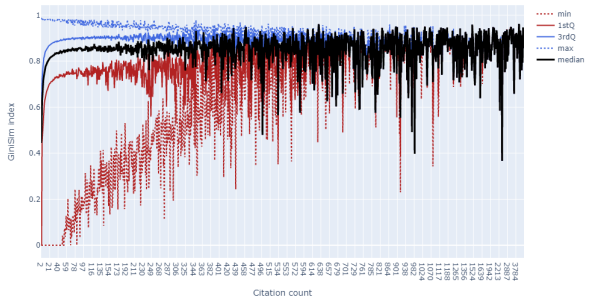
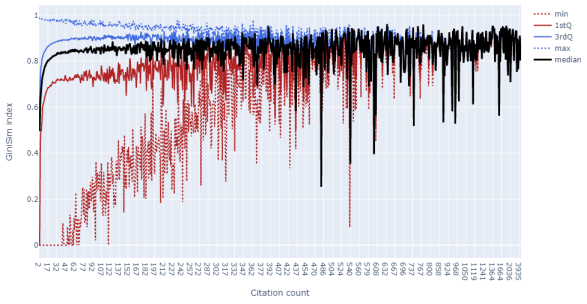


Figure: Citation count versus GiniSim index of citing Countries for 2019



The next set is based on the Gini-Simpson index and Subregions as citing groups:

Figure: Citation count versus GiniSim index of citing Subregions for 2010

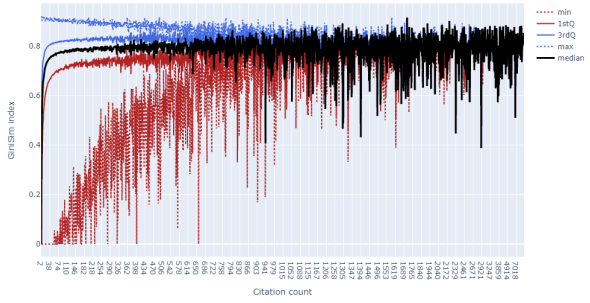


Figure: Citation count versus GiniSim index of citing Subregions for 2011

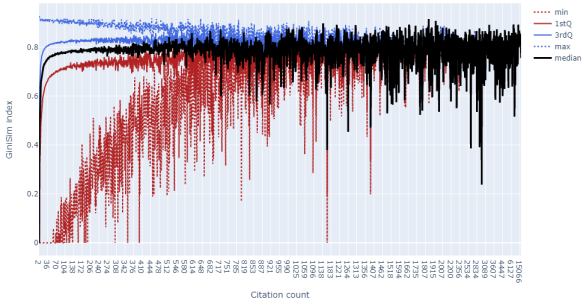


Figure: Citation count versus GiniSim index of citing Subregions for 2012

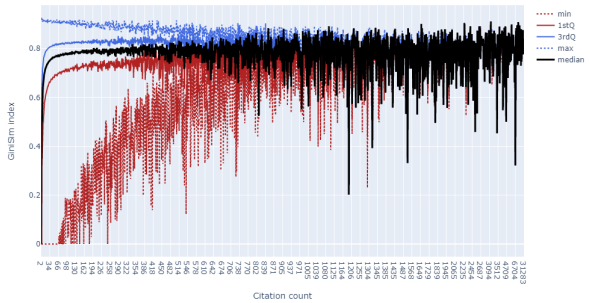


Figure: Citation count versus GiniSim index of citing Subregions for 2013

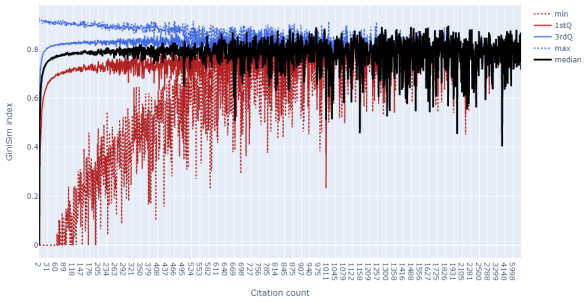


Figure: Citation count versus GiniSim index of citing Subregions for 2014

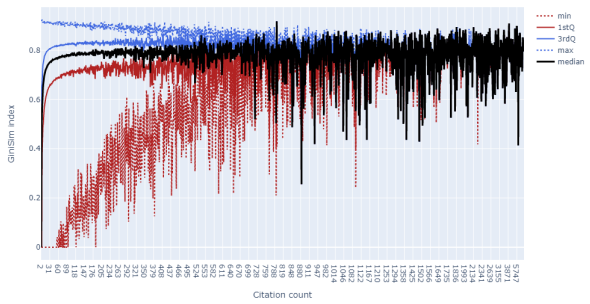


Figure: Citation count versus GiniSim index of citing Subregions for 2015

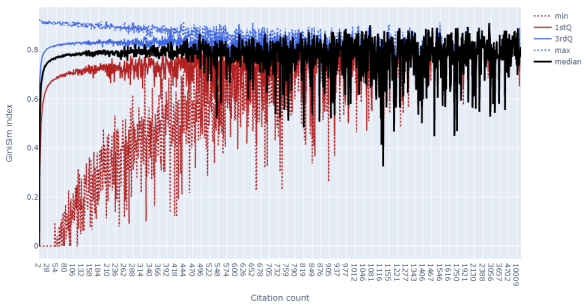


Figure: Citation count versus GiniSim index of citing Subregions for 2016

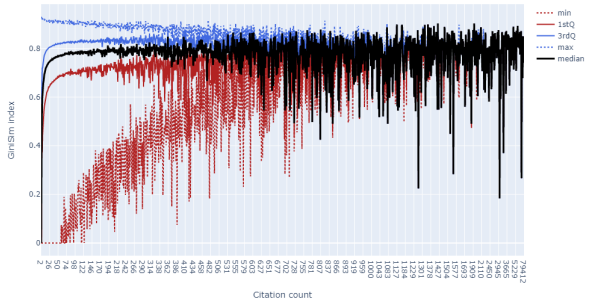


Figure: Citation count versus GiniSim index of citing Subregions for 2017

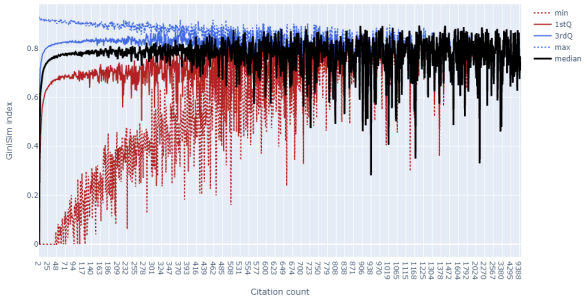


Figure: Citation count versus GiniSim index of citing Subregions for 2018

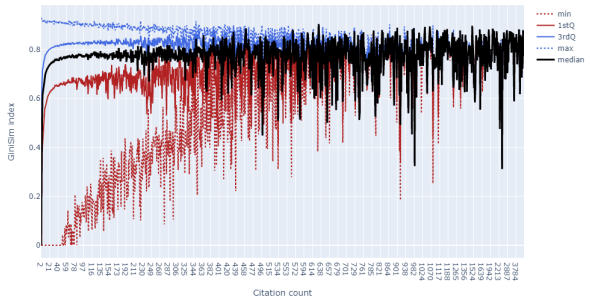
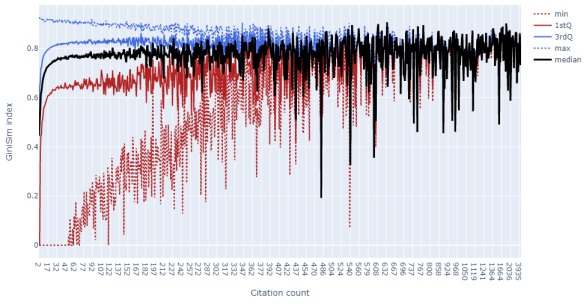


Figure: Citation count versus GiniSim index of citing Subregions for 2019



The next set is based on the Gini-Simpson index and Regions as citing groups:

Figure: Citation count versus GiniSim index of citing Regions for 2010

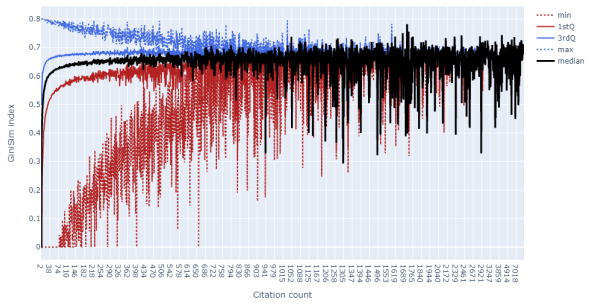


Figure: Citation count versus GiniSim index of citing Regions for 2011

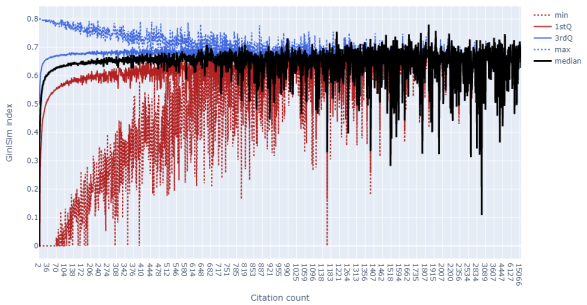


Figure: Citation count versus GiniSim index of citing Regions for 2012

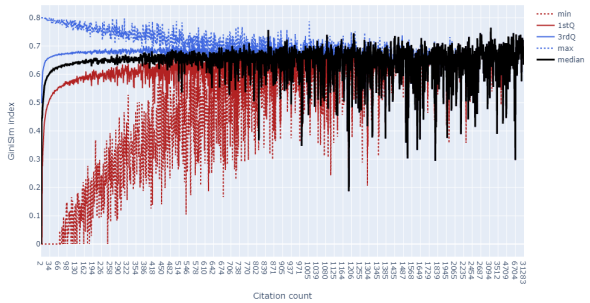


Figure: Citation count versus GiniSim index of citing Regions for 2013

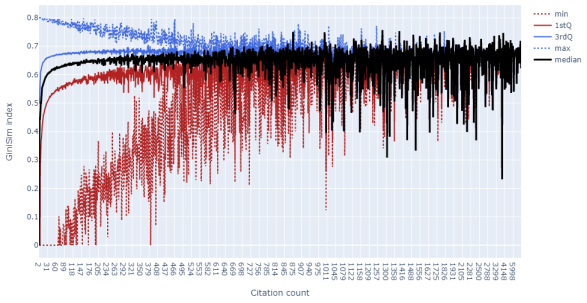


Figure: Citation count versus GiniSim index of citing Regions for 2014

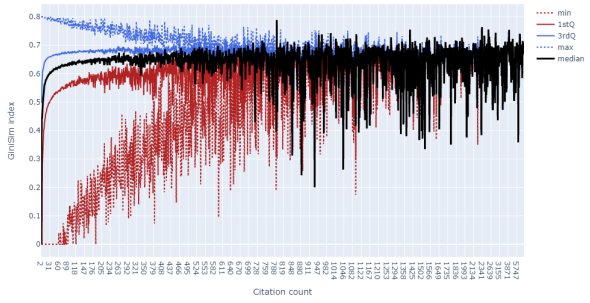


Figure: Citation count versus GiniSim index of citing Regions for 2015

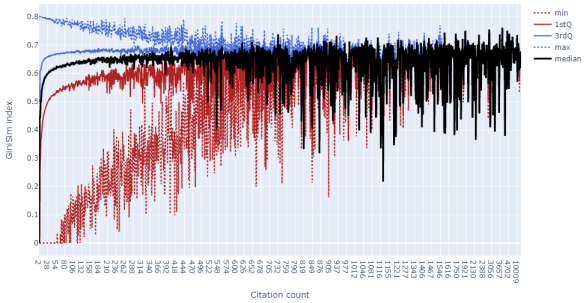


Figure: Citation count versus GiniSim index of citing Regions for 2016

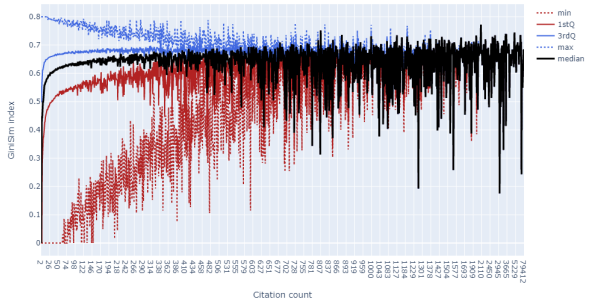


Figure: Citation count versus GiniSim index of citing Regions for 2017

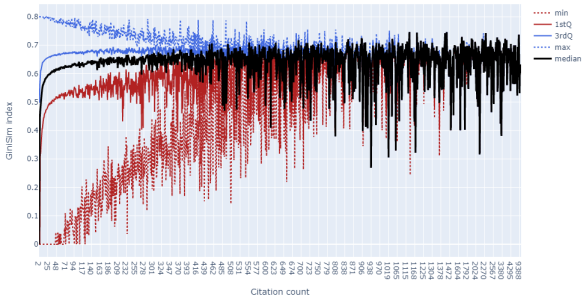


Figure: Citation count versus GiniSim index of citing Regions for 2018

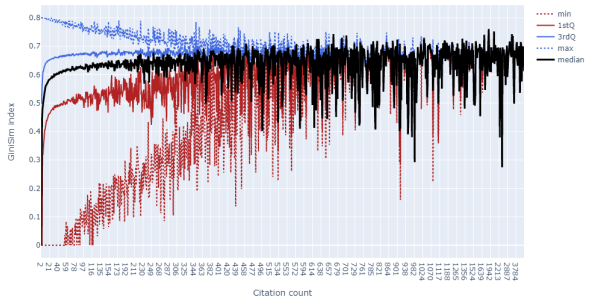
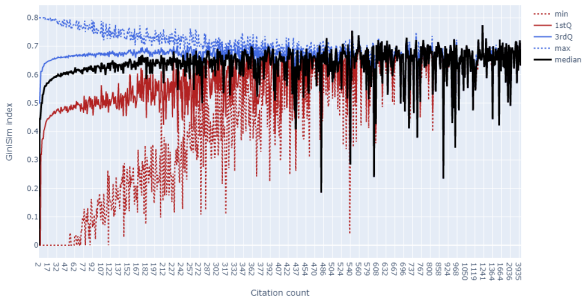


Figure: Citation count versus GiniSim index of citing Regions for 2019



The next set is based on the Shannon index and institutions as citing groups:

Figure: Citation count versus Shannon index of citing Institutions for 2010

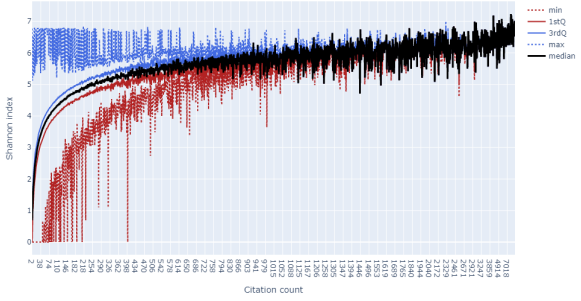


Figure: Citation count versus Shannon index of citing Institutions for 2011

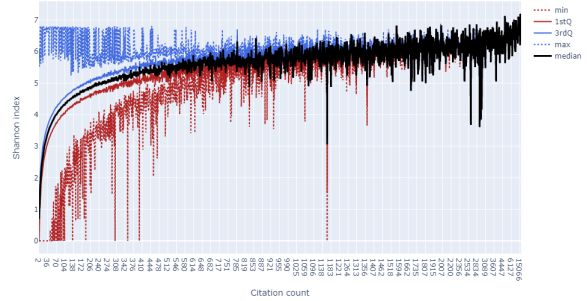


Figure: Citation count versus Shannon index of citing Institutions for 2012

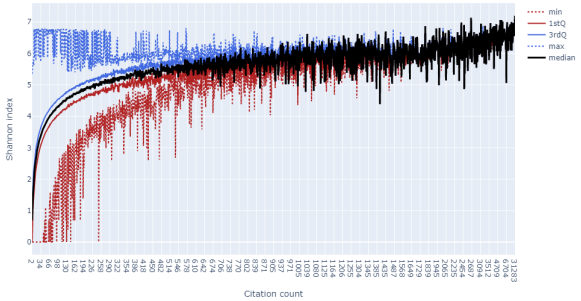


Figure: Citation count versus Shannon index of citing Institutions for 2013

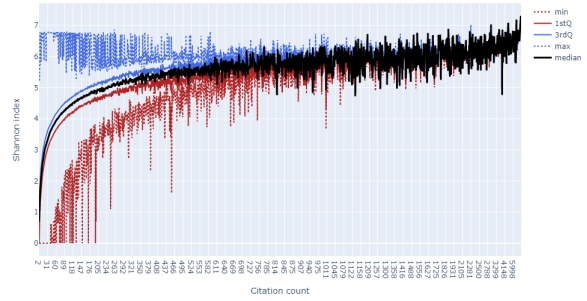


Figure: Citation count versus Shannon index of citing Institutions for 2014

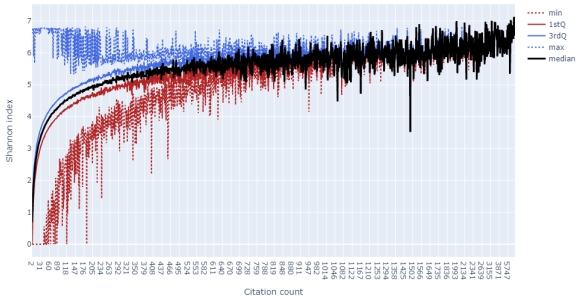


Figure: Citation count versus Shannon index of citing Institutions for 2015

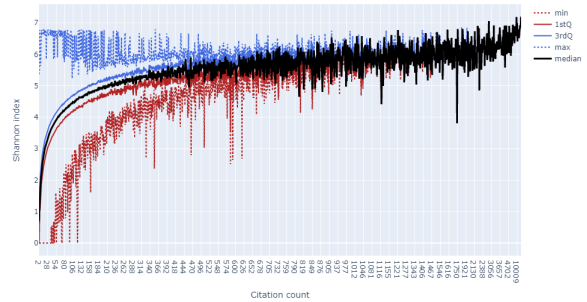


Figure: Citation count versus Shannon index of citing Institutions for 2016

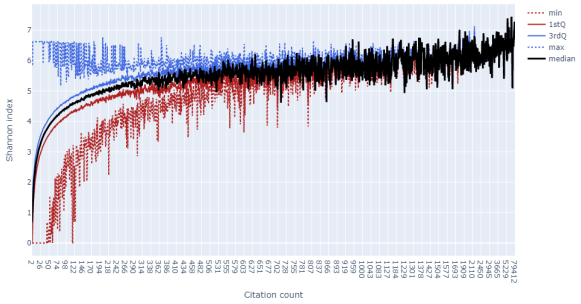


Figure: Citation count versus Shannon index of citing Institutions for 2017

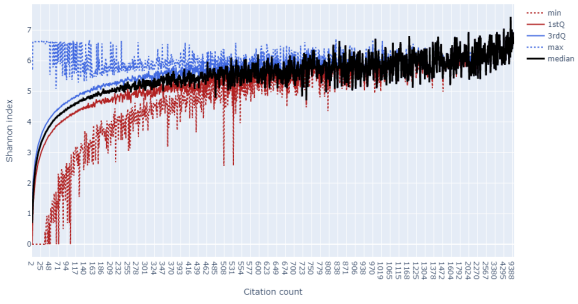


Figure: Citation count versus Shannon index of citing Institutions for 2018

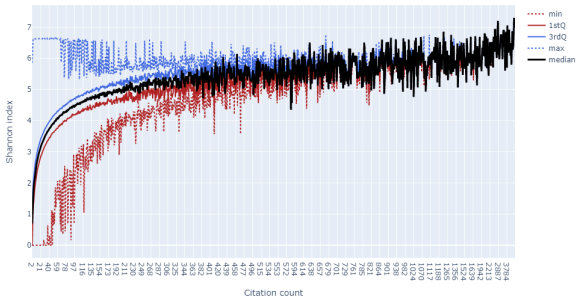
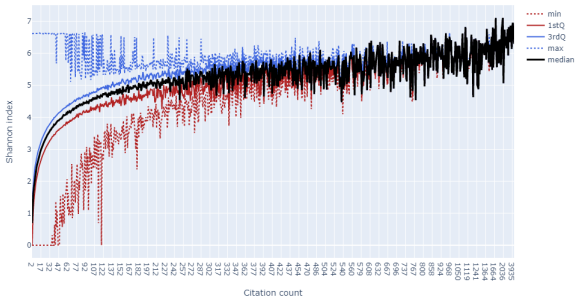


Figure: Citation count versus Shannon index of citing Institutions for 2019



The next set is based on the Shannon index and countries as citing groups:

Figure: Citation count versus Shannon index of citing Countries for 2010

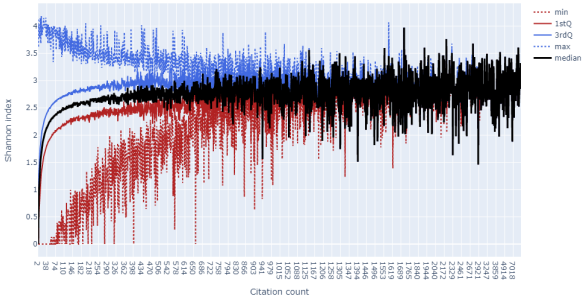


Figure: Citation count versus Shannon index of citing Countries for 2011

Figure: Citation count versus Shannon index of citing Countries for 2012

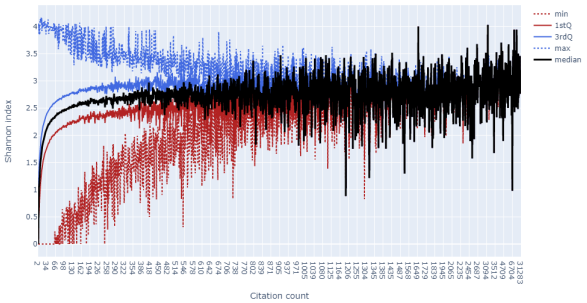


Figure: Citation count versus Shannon index of citing Countries for 2013

Figure: Citation count versus Shannon index of citing Countries for 2014

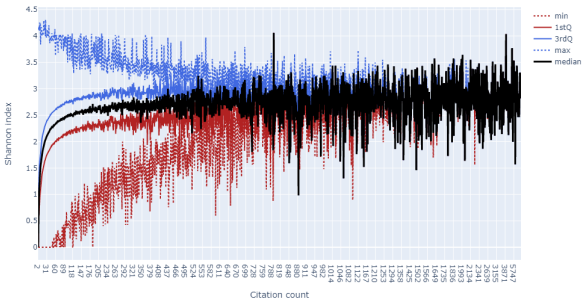


Figure: Citation count versus Shannon index of citing Countries for 2015

Figure: Citation count versus Shannon index of citing Countries for 2016

Figure: Citation count versus Shannon index of citing Countries for 2017

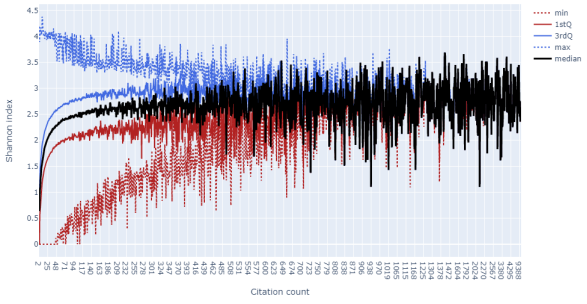
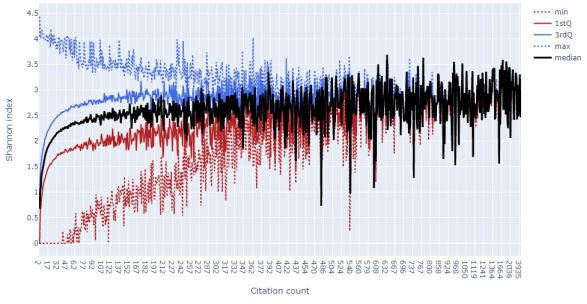


Figure: Citation count versus Shannon index of citing Countries for 2018

Figure: Citation count versus Shannon index of citing Countries for 2019



The next set is based on the Shannon index and Subregions as citing groups:

Figure: Citation count versus Shannon index of citing Subregions for 2010

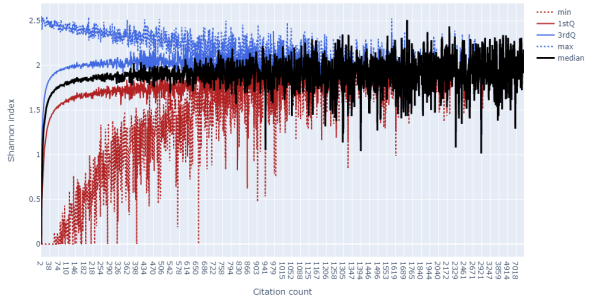


Figure: Citation count versus Shannon index of citing Subregions for 2011

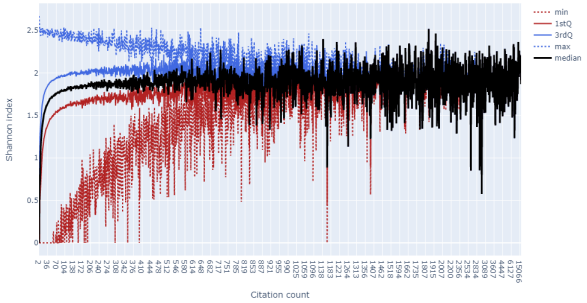


Figure: Citation count versus Shannon index of citing Subregions for 2012

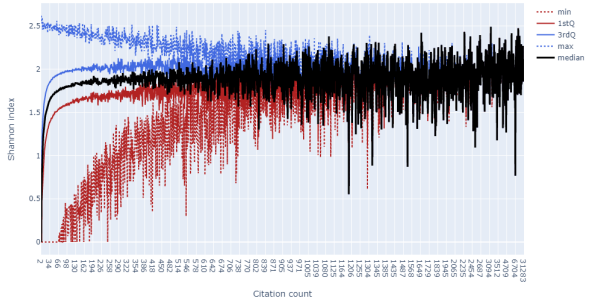


Figure: Citation count versus Shannon index of citing Subregions for 2013

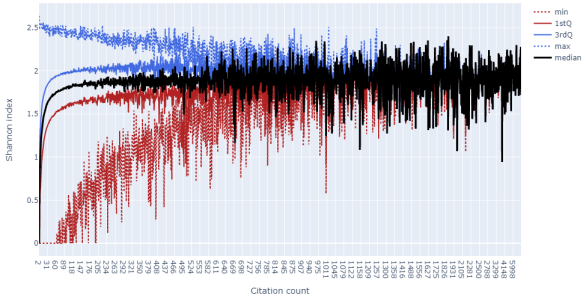


Figure: Citation count versus Shannon index of citing Subregions for 2014

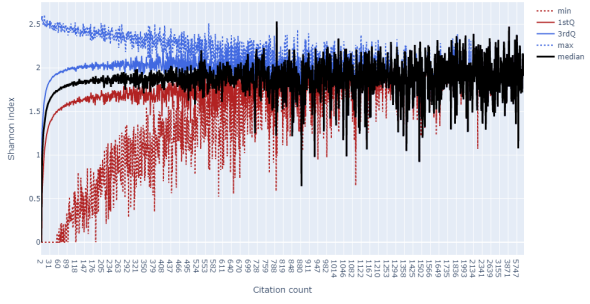


Figure: Citation count versus Shannon index of citing Subregions for 2015

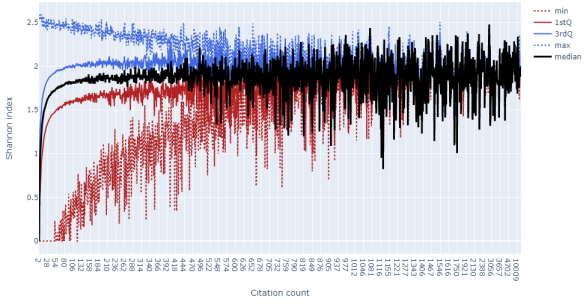


Figure: Citation count versus Shannon index of citing Subregions for 2016

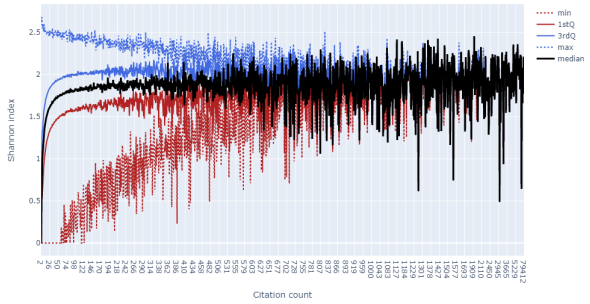


Figure: Citation count versus Shannon index of citing Subregions for 2017

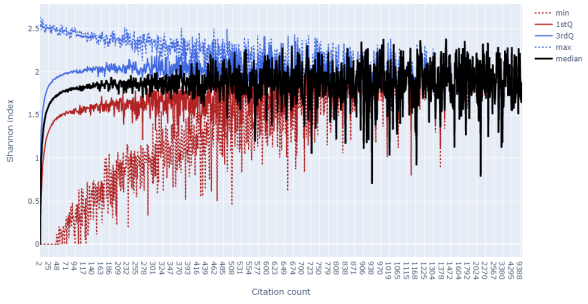


Figure: Citation count versus Shannon index of citing Subregions for 2018

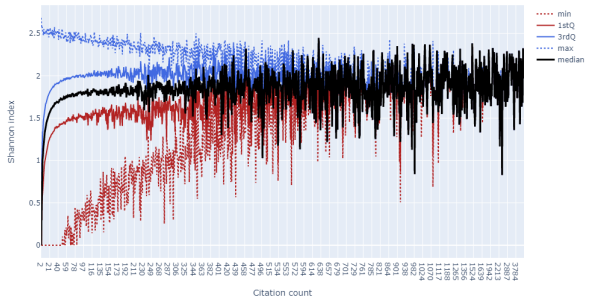
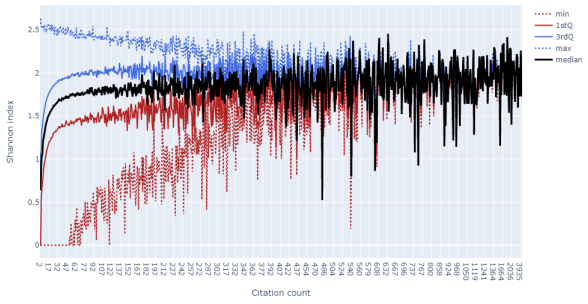


Figure: Citation count versus Shannon index of citing Subregions for 2019



The next set is based on the Shannon index and Regions as citing groups:

Figure: Citation count versus Shannon index of citing Regions for 2010

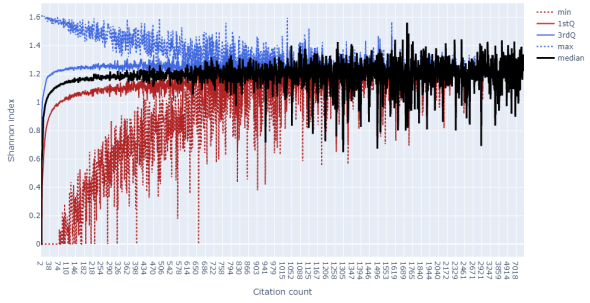


Figure: Citation count versus Shannon index of citing Regions for 2011

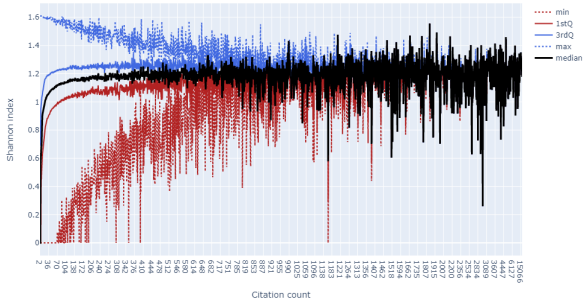


Figure: Citation count versus Shannon index of citing Regions for 2012

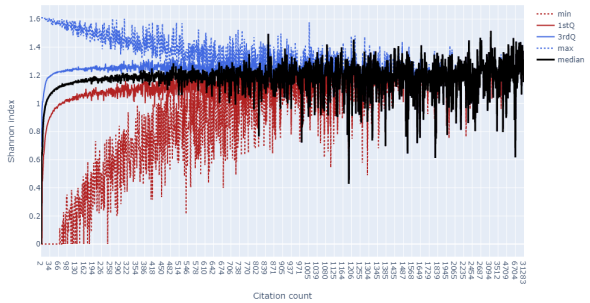


Figure: Citation count versus Shannon index of citing Regions for 2013

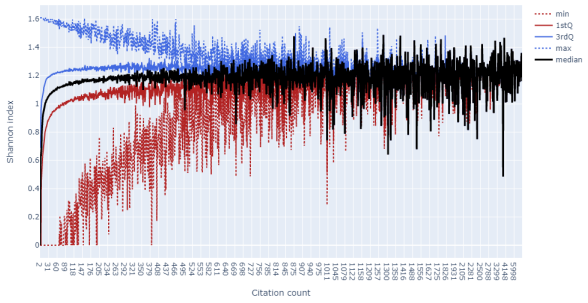


Figure: Citation count versus Shannon index of citing Regions for 2014

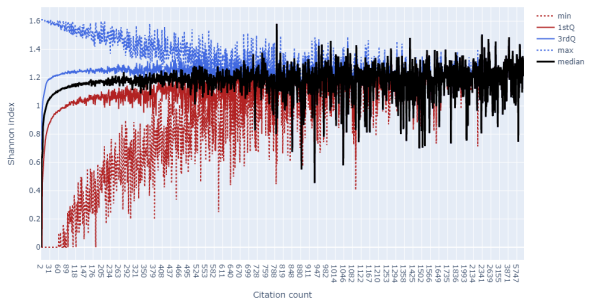


Figure: Citation count versus Shannon index of citing Regions for 2015

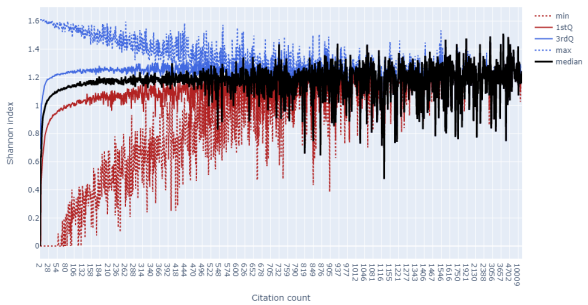


Figure: Citation count versus Shannon index of citing Regions for 2016

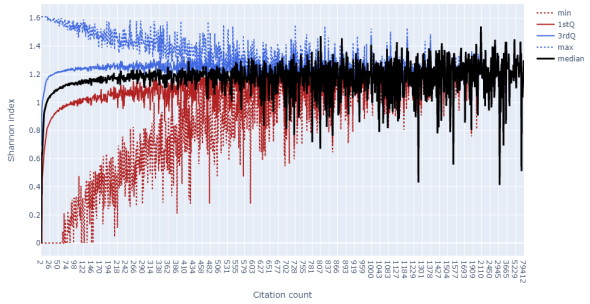


Figure: Citation count versus Shannon index of citing Regions for 2017

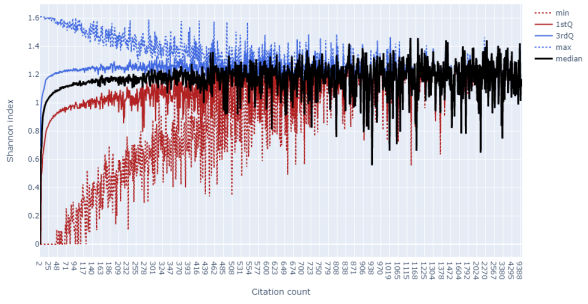


Figure: Citation count versus Shannon index of citing Regions for 2018

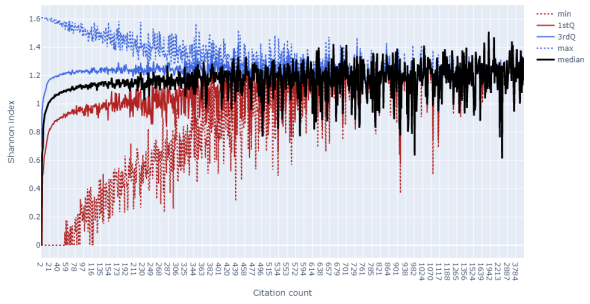
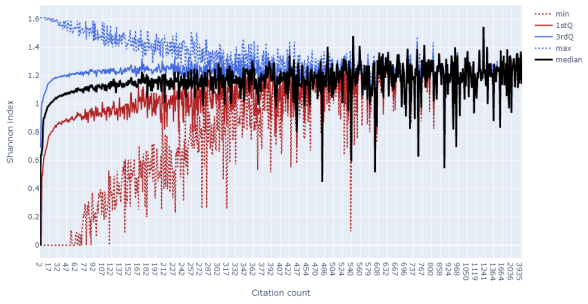


Figure: Citation count versus Shannon index of citing Regions for 2019



Section K: OA citation advantage for subregions using average citation ratios

This section explores the OA citation advantage in terms of how much more citations OA papers garner, on average, over time. The average citation ratio (i.e., percentage ratio in average citation) is calculated as the average number of citations to OA papers, divided by the average number of citations to non-OA papers, and times by one hundred. For papers affiliated to a given subregion, this percentage is calculated for all inward citations from each subregion, for each of the ten-year period. A value above 100% indicates the set of OA papers attracts more citations than the corresponding set of non-OA papers, from a specific subregion in that year.

Figure: % ratios in average citations to papers affiliated to Eastern Asia
(% ratios are calculated based on citations to OA over non-OA papers)

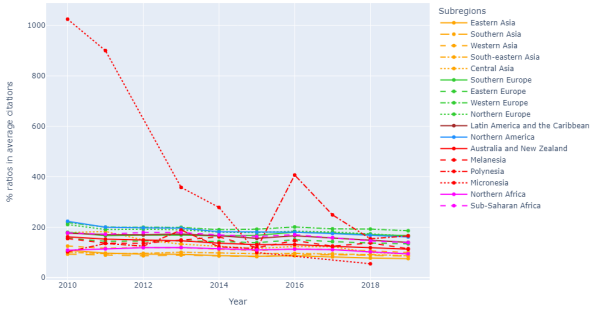


Figure: % ratios in average citations to papers affiliated to Southern Asia
(% ratios are calculated based on citations to OA over non-OA papers)

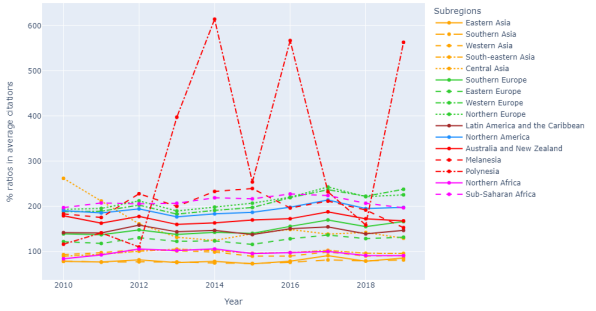


Figure: % ratios in average citations to papers affiliated to Western Asia
(% ratios are calculated based on citations to OA over non-OA papers)

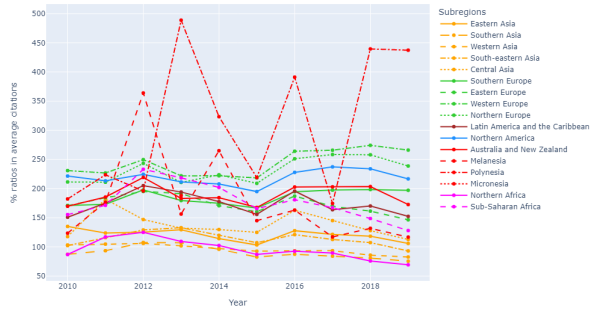


Figure: % ratios in average citations to papers affiliated to South-eastern Asia
(% ratios are calculated based on citations to OA over non-OA papers)

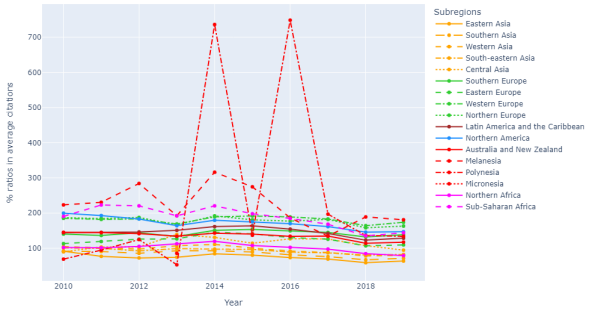


Figure: % ratios in average citations to papers affiliated to Central Asia
(% ratios are calculated based on citations to OA over non-OA papers)

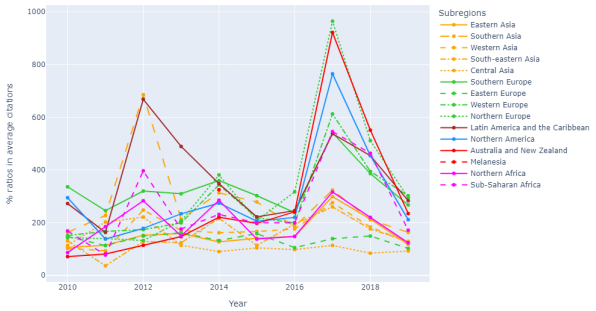


Figure: % ratios in average citations to papers affiliated to Southern Europe
(% ratios are calculated based on citations to OA over non-OA papers)

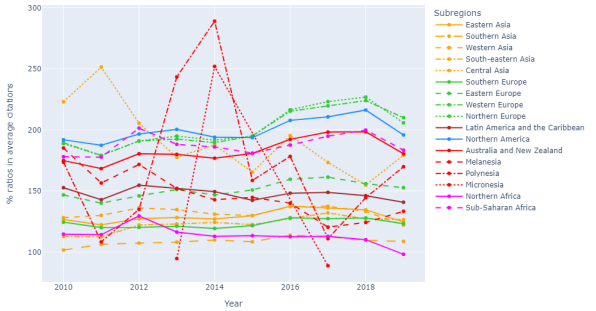


Figure: % ratios in average citations to papers affiliated to Eastern Europe
(% ratios are calculated based on citations to OA over non-OA papers)

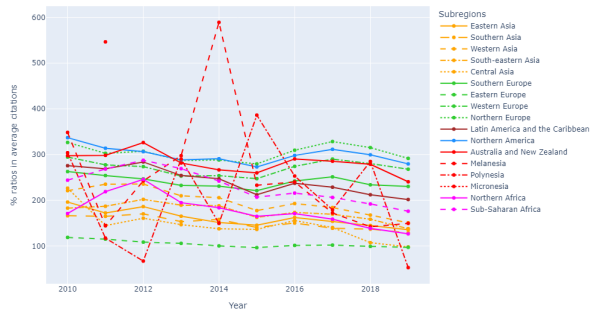


Figure: % ratios in average citations to papers affiliated to Western Europe
(% ratios are calculated based on citations to OA over non-OA papers)

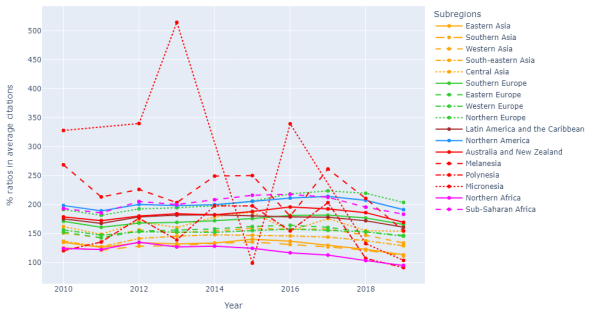


Figure: % ratios in average citations to papers affiliated to Northern Europe
(% ratios are calculated based on citations to OA over non-OA papers)

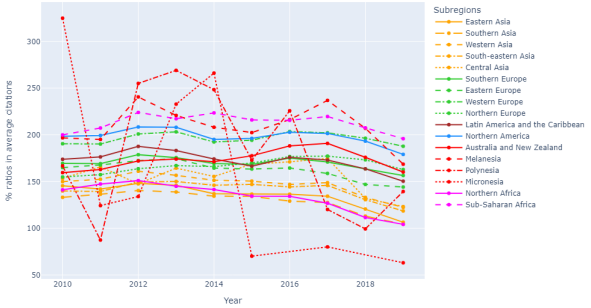


Figure: % ratios in average citations to papers affiliated to Latin America and the Caribbean
(% ratios are calculated based on citations to OA over non-OA papers)

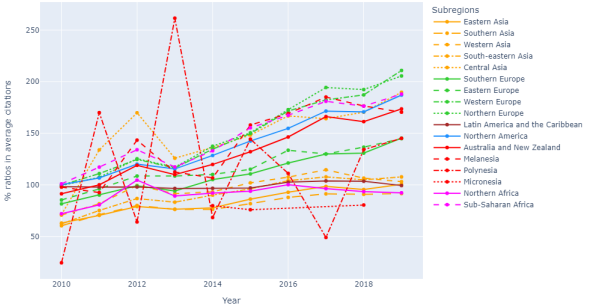


Figure: % ratios in average citations to papers affiliated to Northern America
(% ratios are calculated based on citations to OA over non-OA papers)

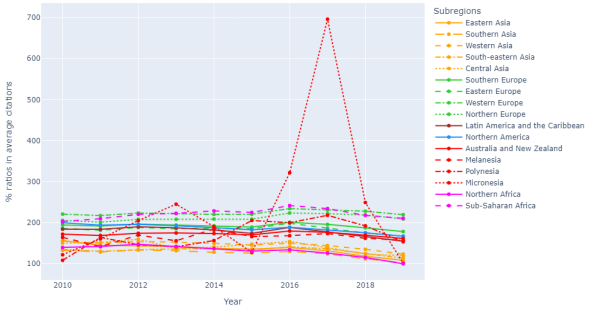


Figure: % ratios in average citations to papers affiliated to Australia and New Zealand
(% ratios are calculated based on citations to OA over non-OA papers)

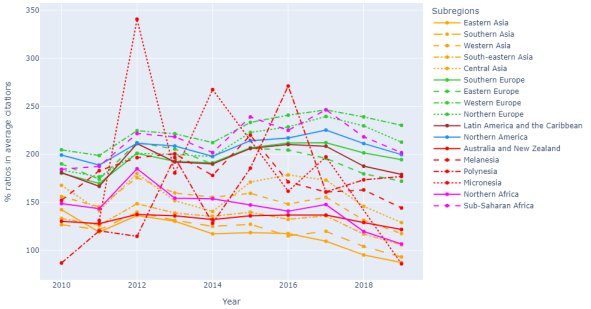


Figure: % ratios in average citations to papers affiliated to Melanesia
(% ratios are calculated based on citations to OA over non-OA papers)

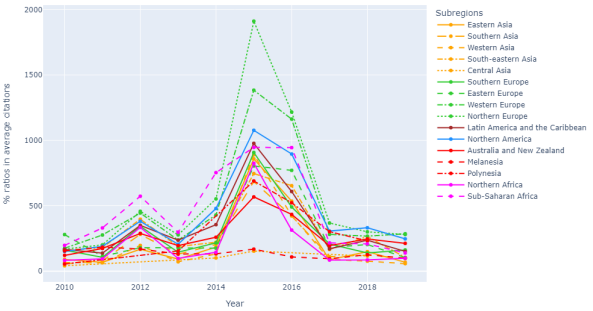


Figure: % ratios in average citations to papers affiliated to Polynesia
(% ratios are calculated based on citations to OA over non-OA papers)

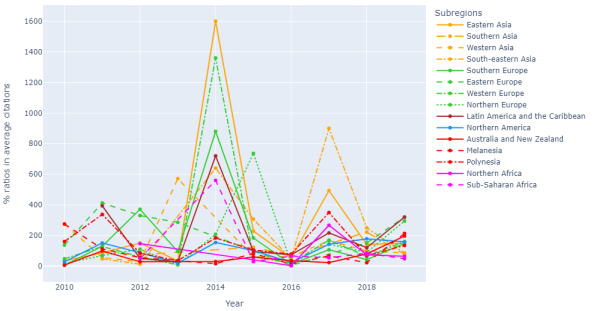


Figure: % ratios in average citations to papers affiliated to Micronesia
(% ratios are calculated based on citations to OA over non-OA papers)

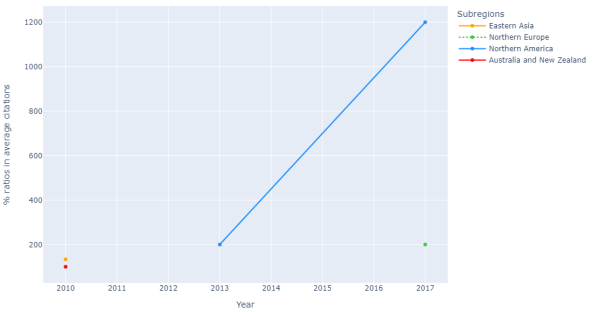


Figure: % ratios in average citations to papers affiliated to Northern Africa
(% ratios are calculated based on citations to OA over non-OA papers)

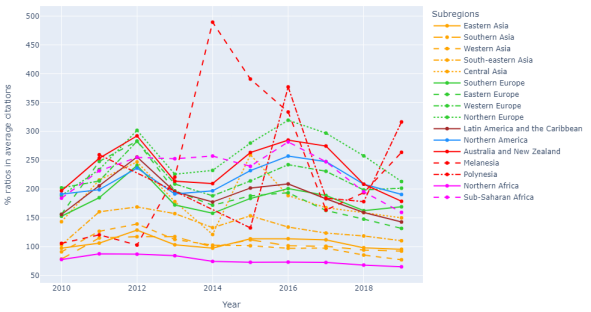
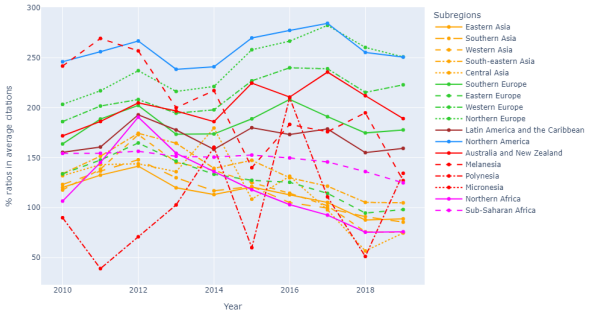


Figure: % ratios in average citations to papers affiliated to Sub-Saharan Africa
(% ratios are calculated based on citations to OA over non-OA papers)



Section L: OA citation advantage for regions using average citation ratios

Continuing from the previous section, the corresponding results for regions are presented here. Similar to the previous section, there appears to be something peculiar with papers affiliated to Asia and Asian subregions. This is potentially the result of several factors. First, our data's coverage of the Chinese language publications are relatively low as a result of using only Crossref DOIs. Secondly, Asia-affiliated papers in our data show a lower level of OA as compared to other regions.

Figure: % ratios in average citations to papers affiliated to Asia
(% ratios are calculated based on citations to OA over non-OA papers)

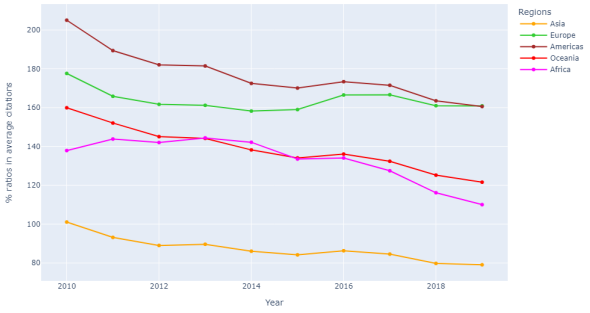


Figure: % ratios in average citations to papers affiliated to Europe
(% ratios are calculated based on citations to OA over non-OA papers)

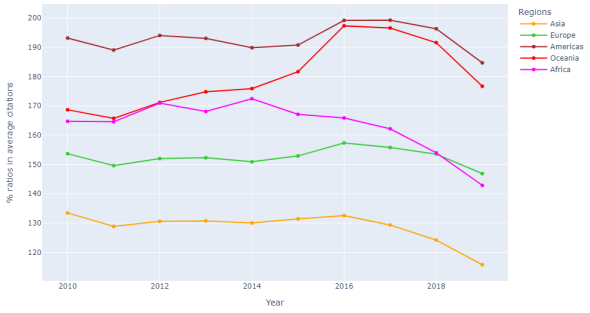


Figure: % ratios in average citations to papers affiliated to Americas
(% ratios are calculated based on citations to OA over non-OA papers)

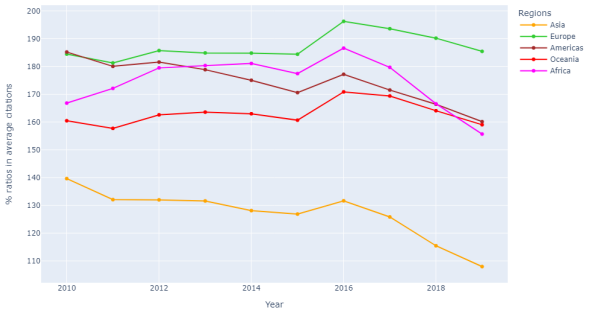


Figure: % ratios in average citations to papers affiliated to Oceania
(% ratios are calculated based on citations to OA over non-OA papers)

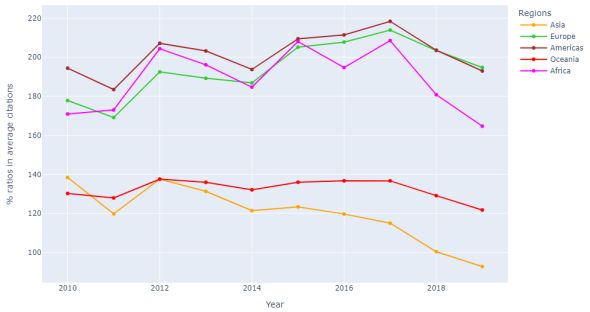
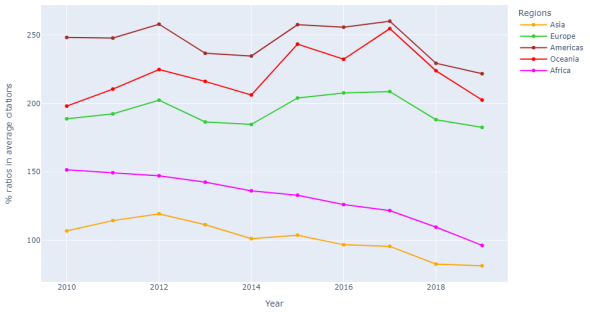


Figure: % ratios in average citations to papers affiliated to Africa
(% ratios are calculated based on citations to OA over non-OA papers)



Section M: OA citation advantage for subregions using percentage change in total citations

In this section we take an alternative look at where citations are coming from. Total citation numbers are used to calculate the percentage changes, i.e., total citations to OA papers minus total citations to non-OA papers, then divided by total citations to non-OA papers, and multiplied by one hundred. We note that the levels of OA are lower in earlier years as compared to more recent years and this has an effect on the total citation counts. As the level of OA becomes more comparable with the proportion of non-OA papers (more recent years), the effect of OA becomes far more clear. While the general trend is that most subregions benefits from received increased citations, there are subregions that benefits more than others, i.e., Northern America and Western Europe. However, there are also signals that some traditionally disadvantaged subregions benefiting greatly from OA, such as Sub-Saharan Africa.

For papers affiliated to Eastern Asia:

Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Asia for 2010

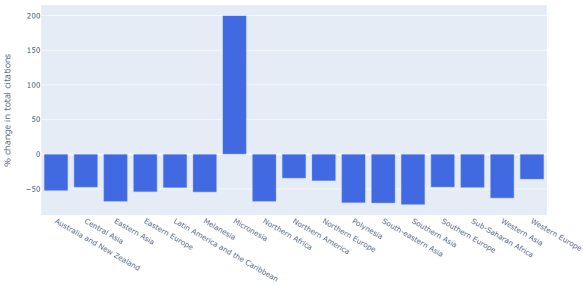


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Asia for 2011

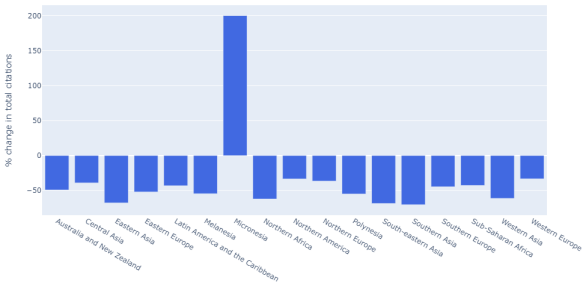


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Asia for 2012

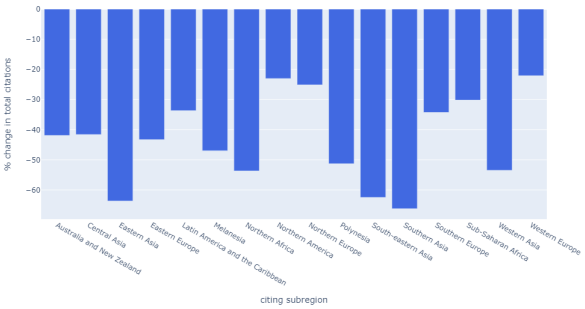


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Asia for 2013

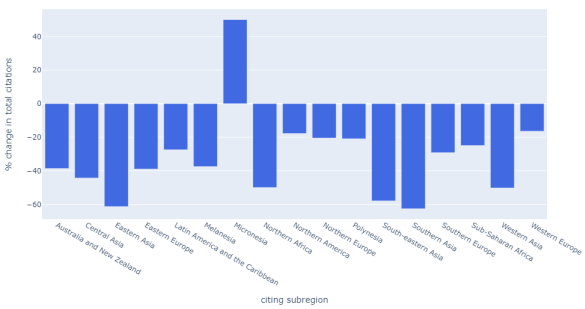


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Asia for 2014

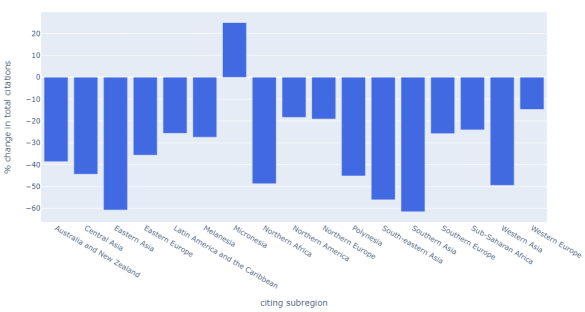


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Asia for 2015

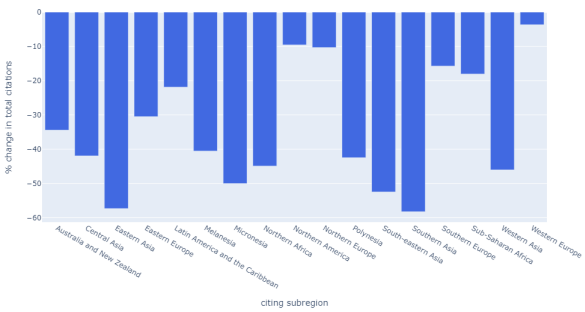


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Asia for 2016

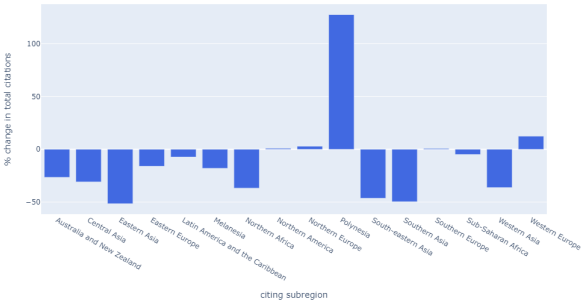


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Asia for 2017

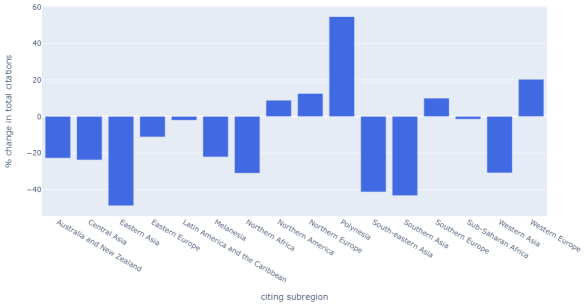


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Asia for 2018

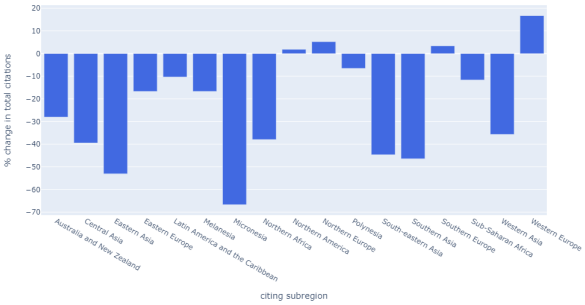
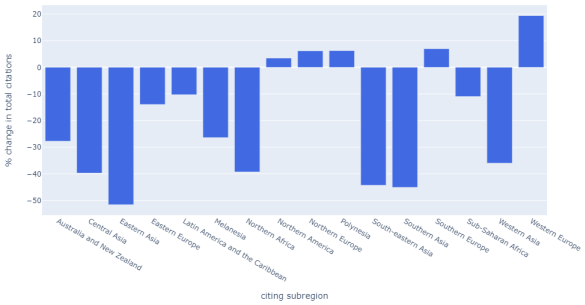


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Asia for 2019



For papers affiliated to Southern Asia:

Figure: % change in total citations to OA/non-OA paper affiliated to Southern Asia for 2010

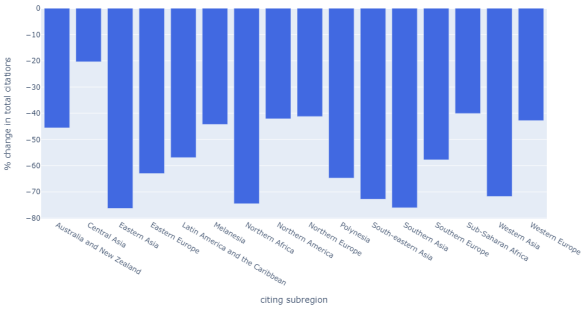


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Asia for 2011

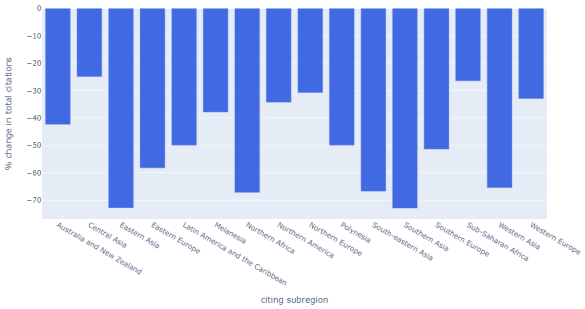


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Asia for 2012

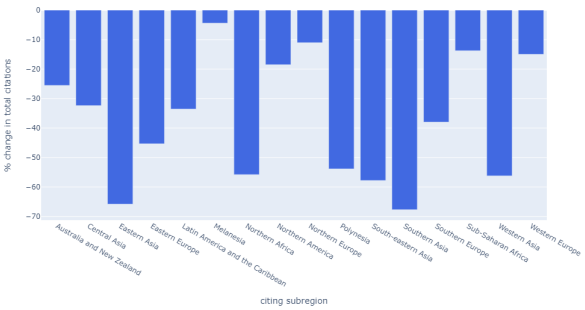


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Asia for 2013

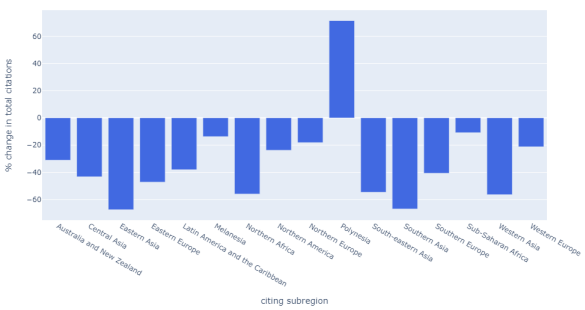


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Asia for 2014

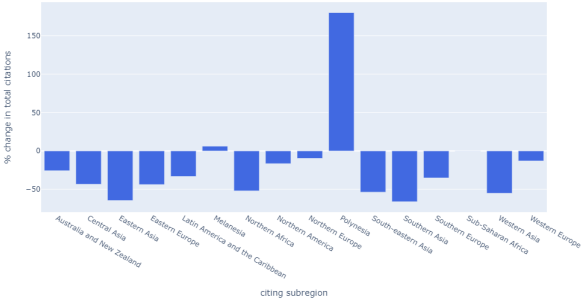


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Asia for 2015

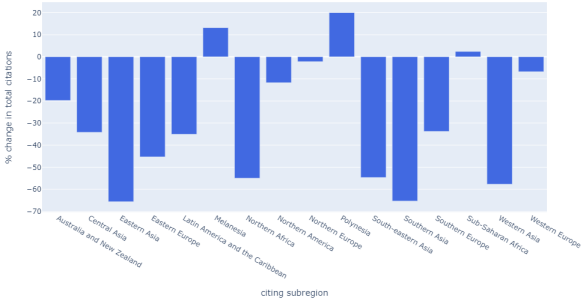


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Asia for 2016

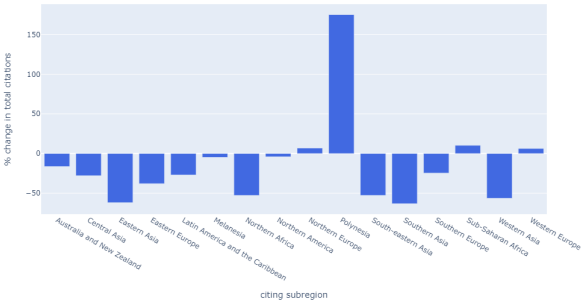


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Asia for 2017

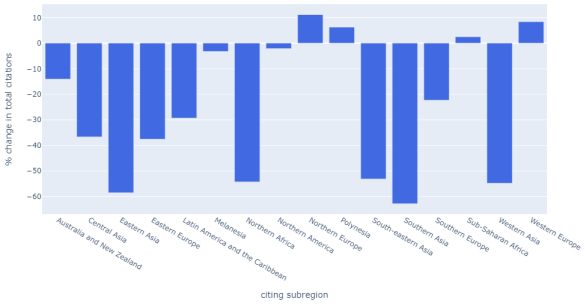


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Asia for 2018

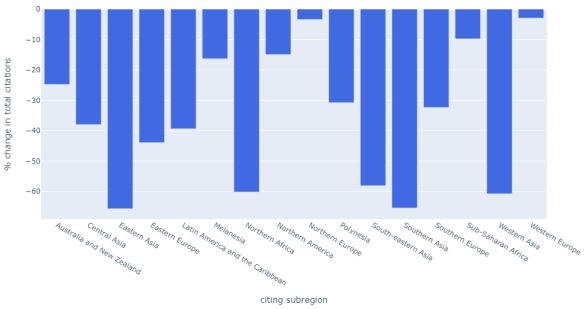
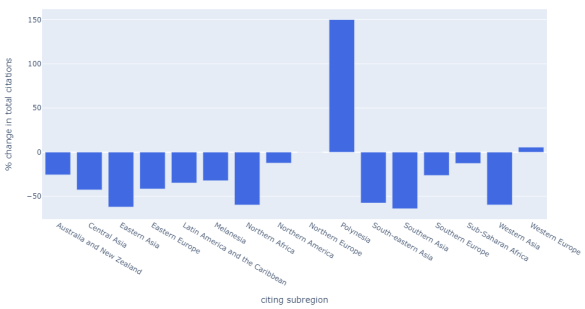


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Asia for 2019



For papers affiliated to Western Asia:

Figure: % change in total citations to OA/non-OA paper affiliated to Western Asia for 2010

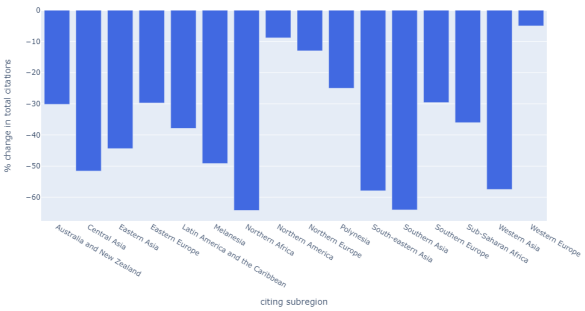


Figure: % change in total citations to OA/non-OA paper affiliated to Western Asia for 2011

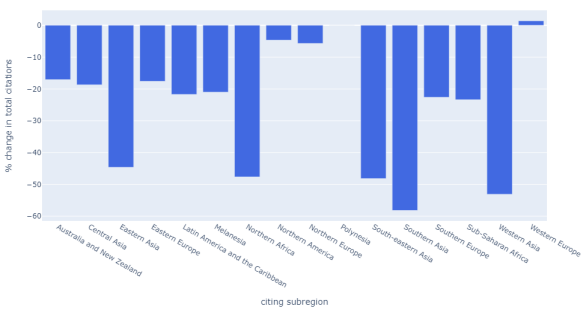


Figure: % change in total citations to OA/non-OA paper affiliated to Western Asia for 2012

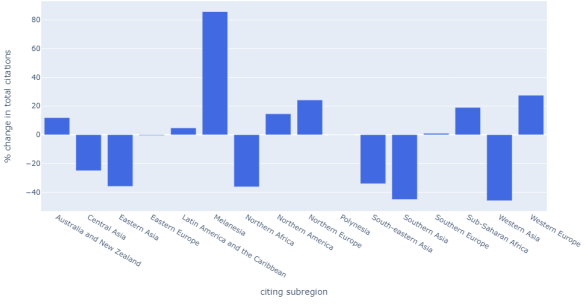


Figure: % change in total citations to OA/non-OA paper affiliated to Western Asia for 2013

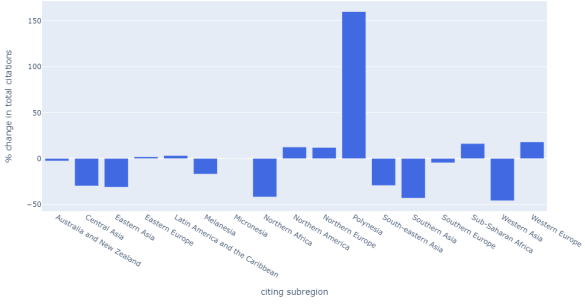


Figure: % change in total citations to OA/non-OA paper affiliated to Western Asia for 2014

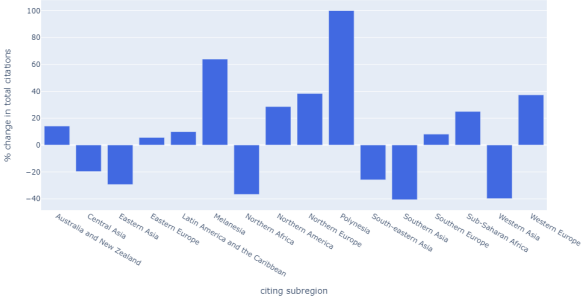


Figure: % change in total citations to OA/non-OA paper affiliated to Western Asia for 2015

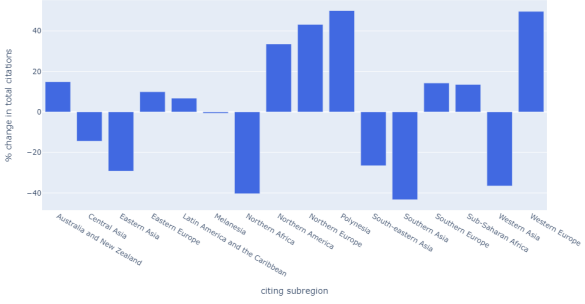


Figure: % change in total citations to OA/non-OA paper affiliated to Western Asia for 2016

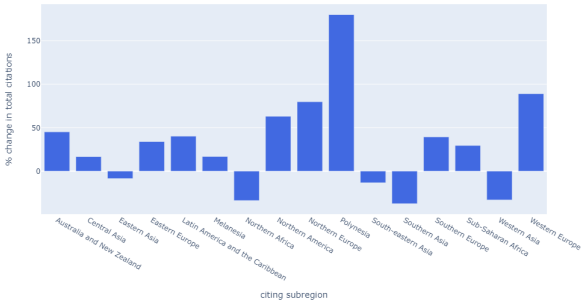


Figure: % change in total citations to OA/non-OA paper affiliated to Western Asia for 2017

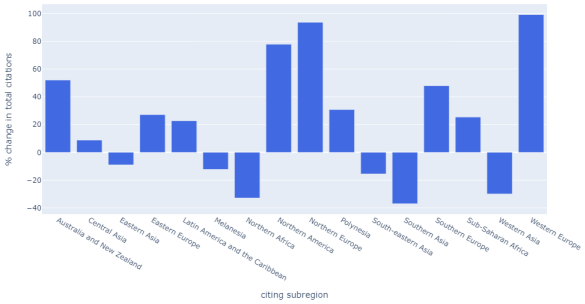


Figure: % change in total citations to OA/non-OA paper affiliated to Western Asia for 2018

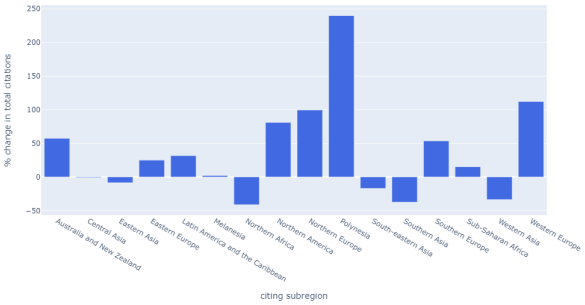
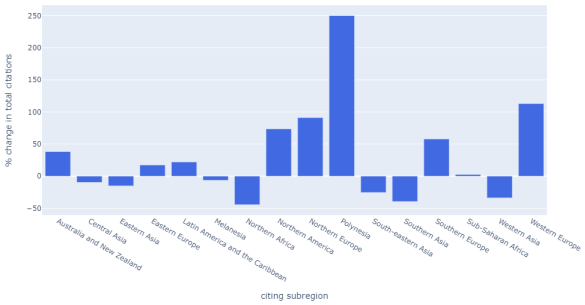


Figure: % change in total citations to OA/non-OA paper affiliated to Western Asia for 2019



For papers affiliated to South-eastern Asia:

Figure: % change in total citations to OA/non-OA paper affiliated to South-eastern Asia for 2010

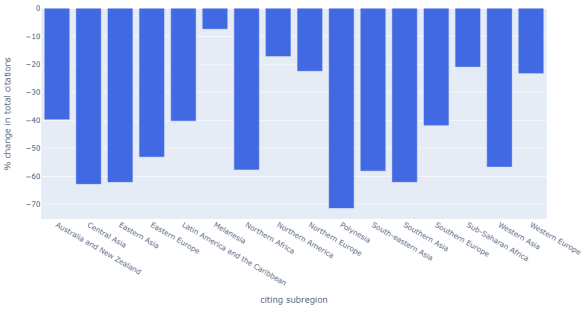


Figure: % change in total citations to OA/non-OA paper affiliated to South-eastern Asia for 2011

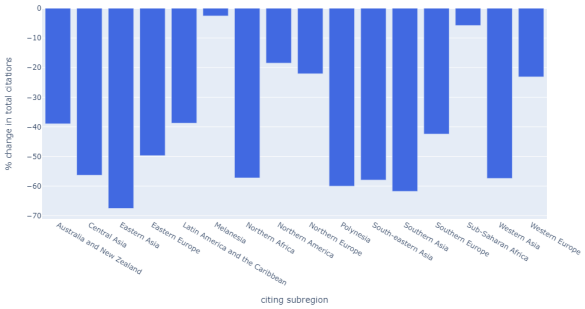


Figure: % change in total citations to OA/non-OA paper affiliated to South-eastern Asia for 2012

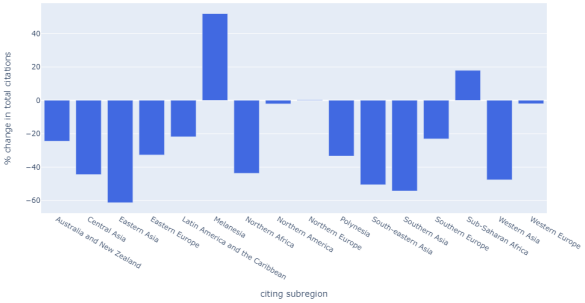
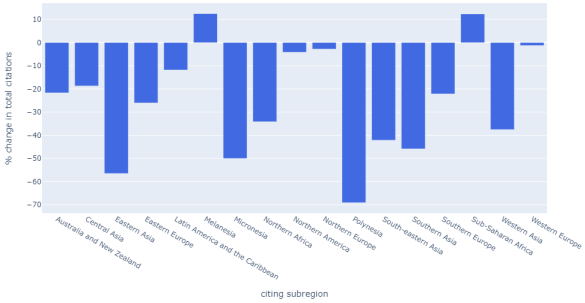


Figure: % change in total citations to OA/non-OA paper affiliated to South-eastern Asia for 2013



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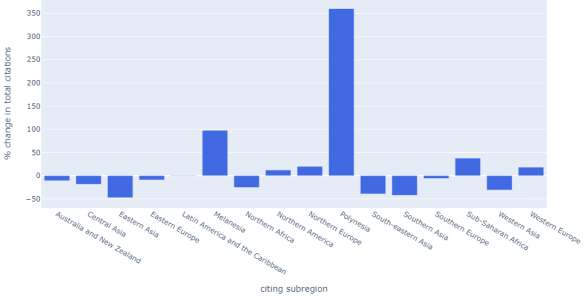
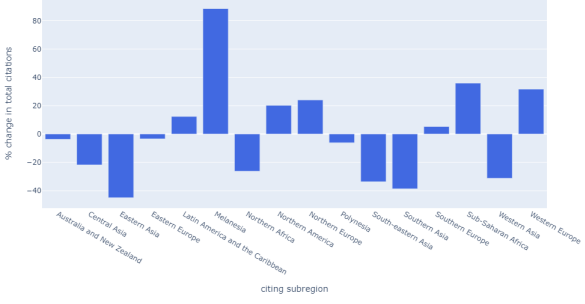


Figure: % change in total citations to OA/non-OA paper affiliated to South-eastern Asia for 2015



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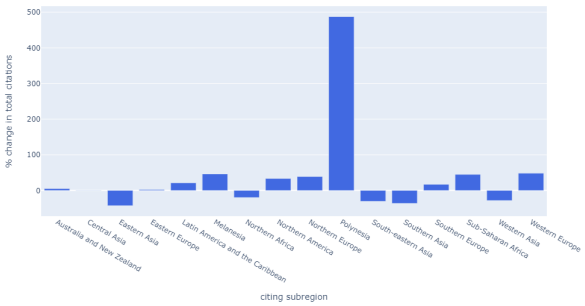


Figure: % change in total citations to OA/non-OA paper affiliated to South-eastern Asia for 2017

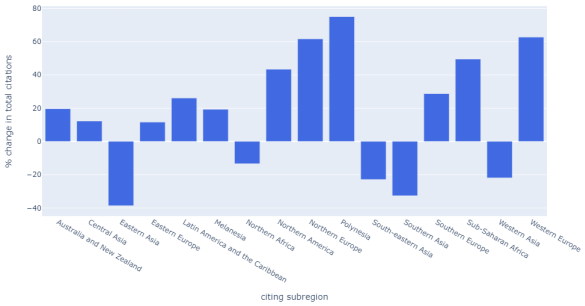
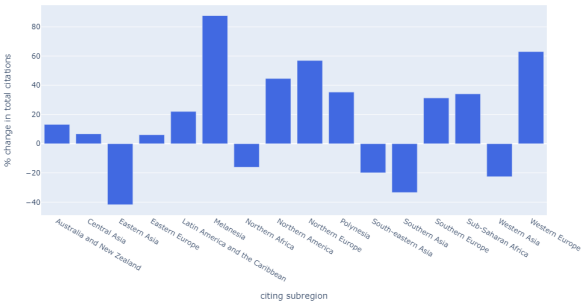


Figure: % change in total citations to OA/non-OA paper affiliated to South-eastern Asia for 2018



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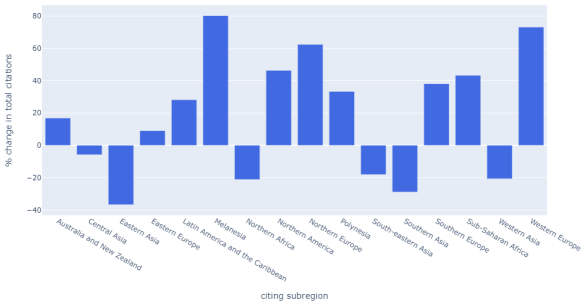


For papers affiliated to Central Asia:

Figure: % change in total citations to OA/non-OA paper affiliated to Central Asia for 2010

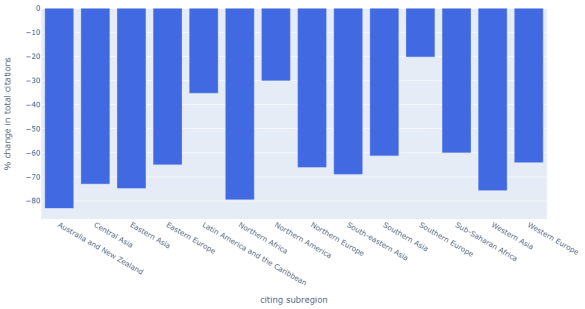


Figure: % change in total citations to OA/non-OA paper affiliated to Central Asia for 2011

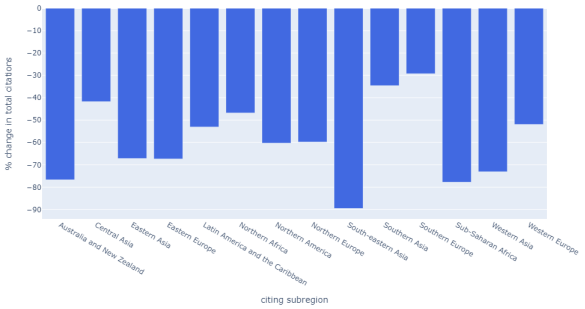


Figure: % change in total citations to OA/non-OA paper affiliated to Central Asia for 2012

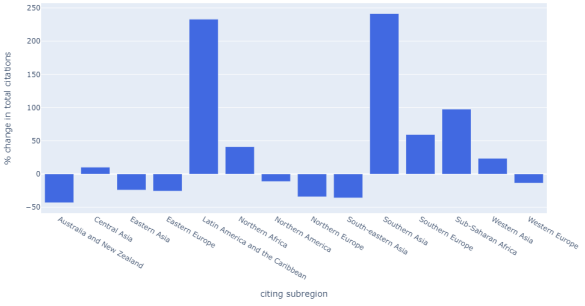


Figure: % change in total citations to OA/non-OA paper affiliated to Central Asia for 2013

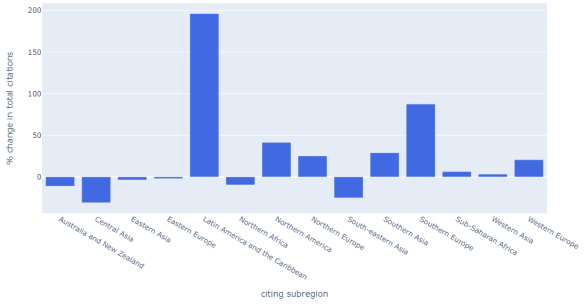


Figure: % change in total citations to OA/non-OA paper affiliated to Central Asia for 2014

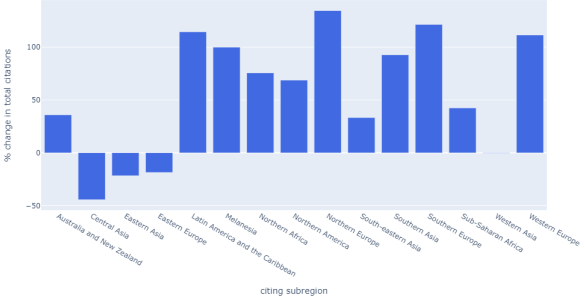


Figure: % change in total citations to OA/non-OA paper affiliated to Central Asia for 2015

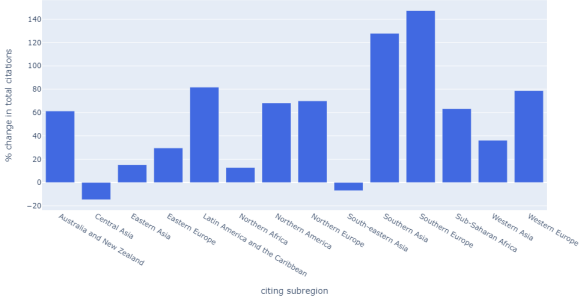
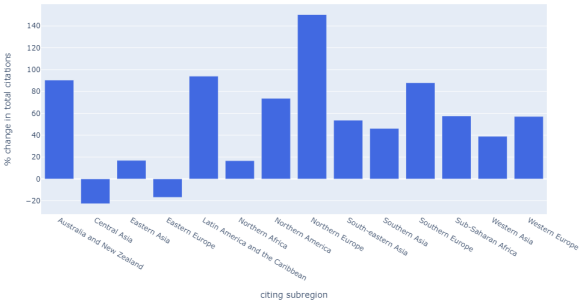


Figure: % change in total citations to OA/non-OA paper affiliated to Central Asia for 2016



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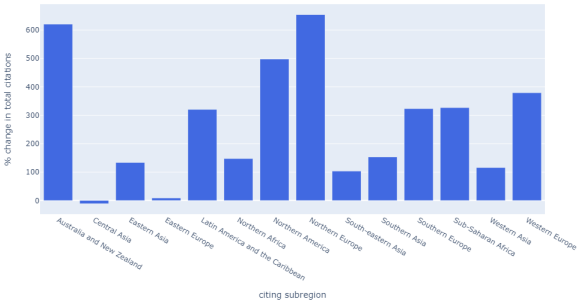

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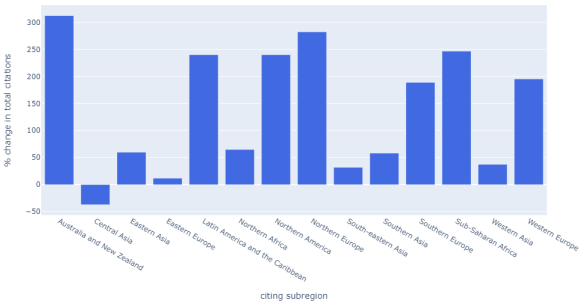

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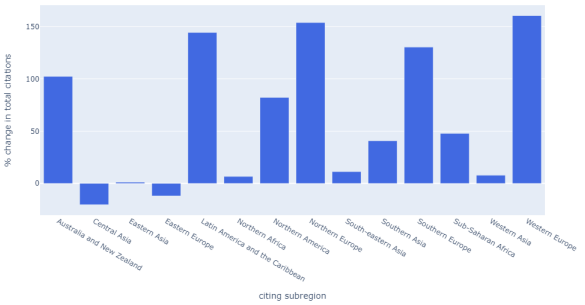


For papers affiliated to Southern Europe:

Figure: % change in total citations to OA/non-OA paper affiliated to Southern Europe for 2010

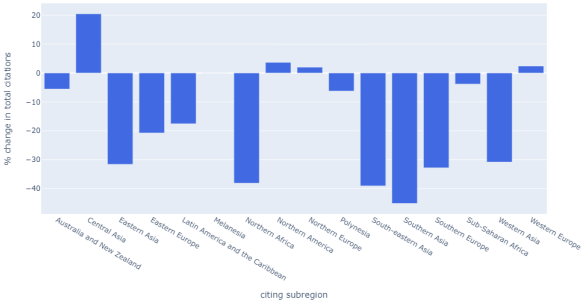


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Europe for 2011

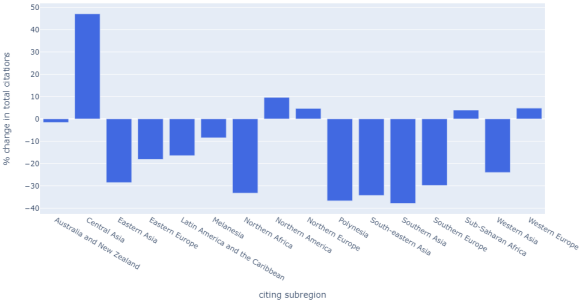


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Europe for 2012

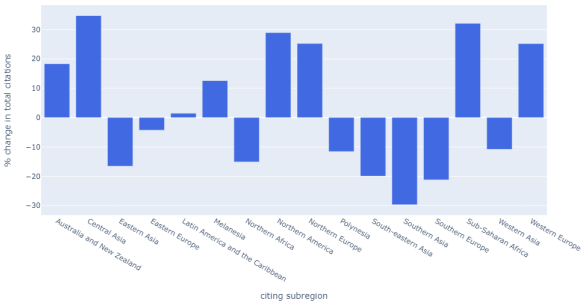


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Europe for 2013

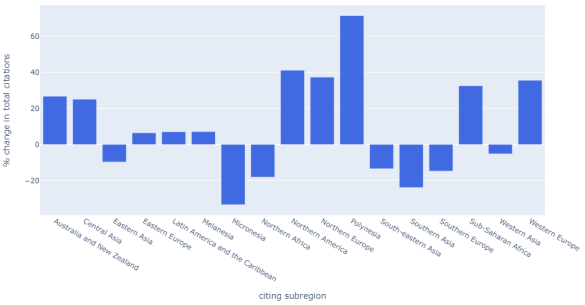


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Europe for 2014

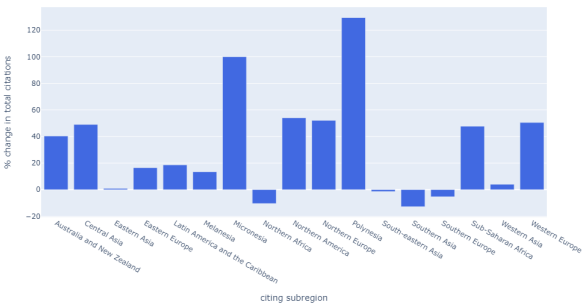


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Europe for 2015

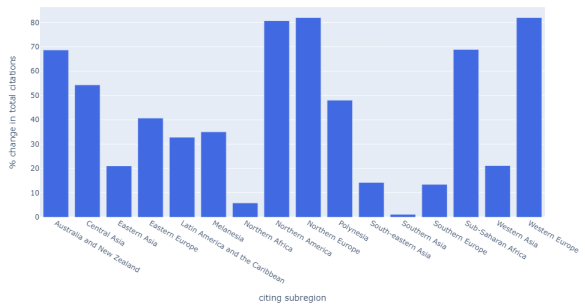


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Europe for 2016

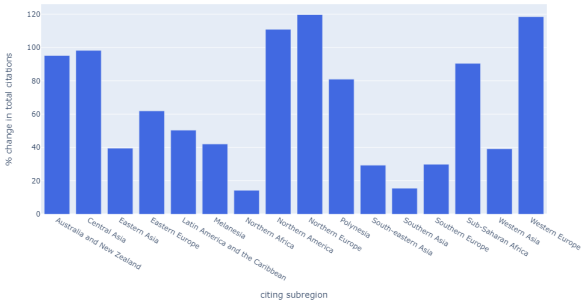


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Europe for 2017

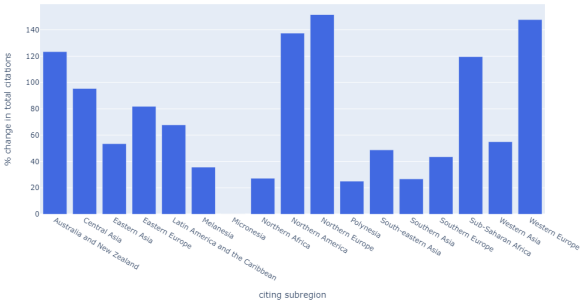


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Europe for 2018

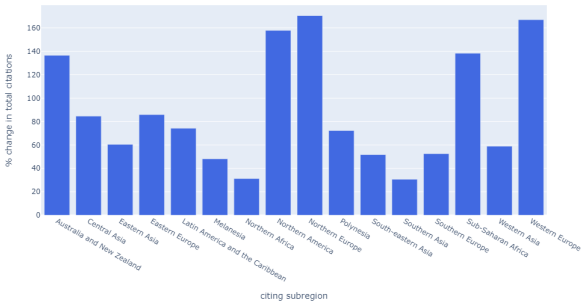
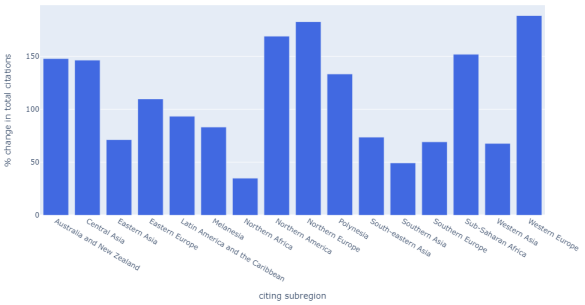


Figure: % change in total citations to OA/non-OA paper affiliated to Southern Europe for 2019



For papers affiliated to Eastern Europe:

Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Europe for 2010

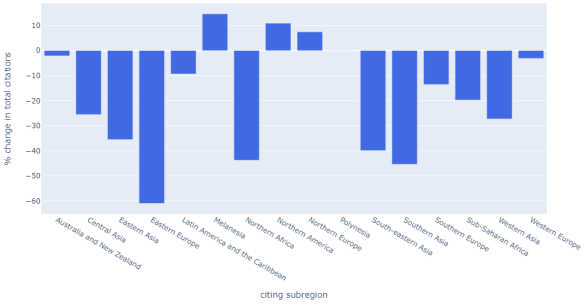


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Europe for 2011

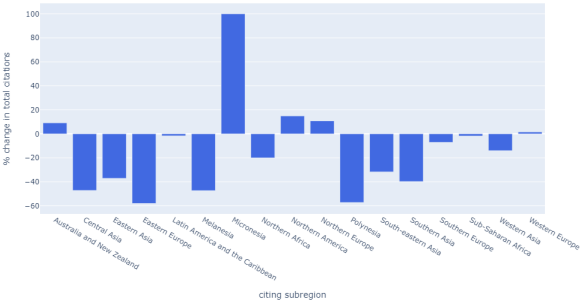
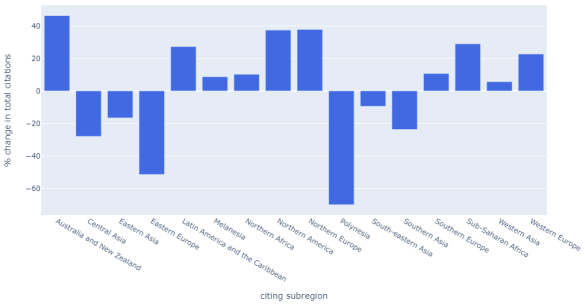


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Europe for 2012



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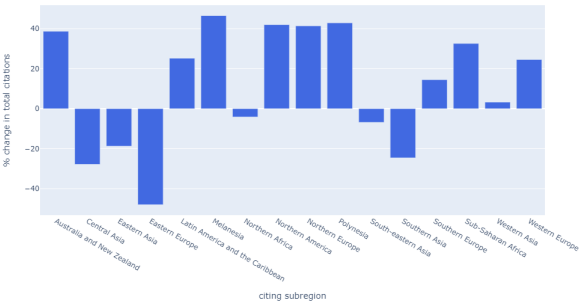
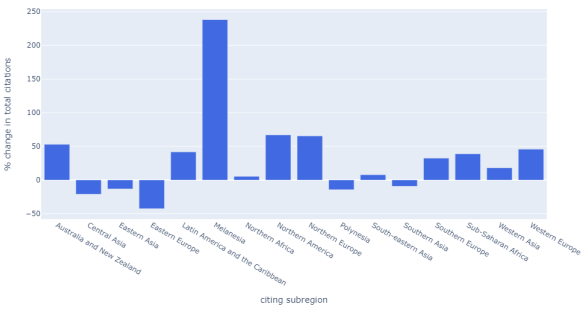


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Europe for 2014



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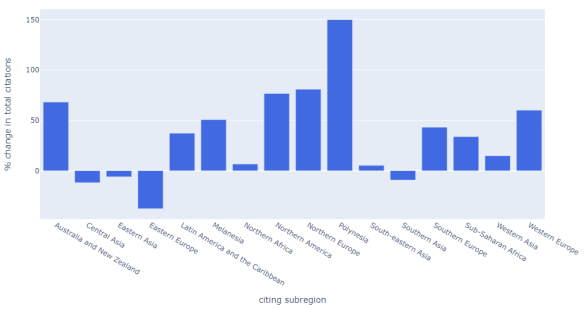


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Europe for 2016

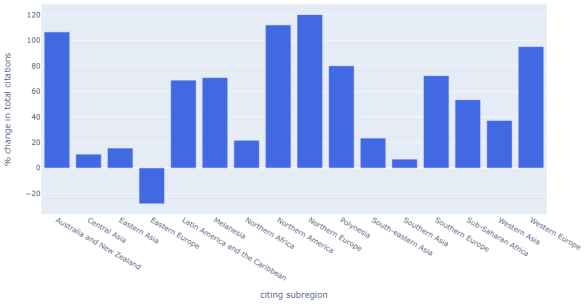
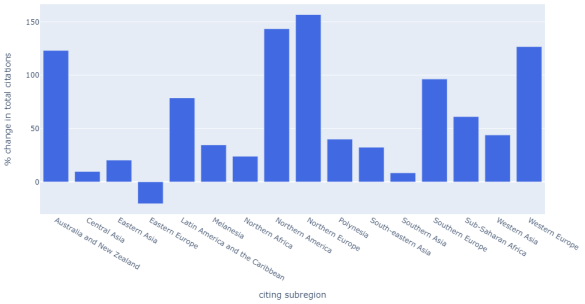


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Europe for 2017



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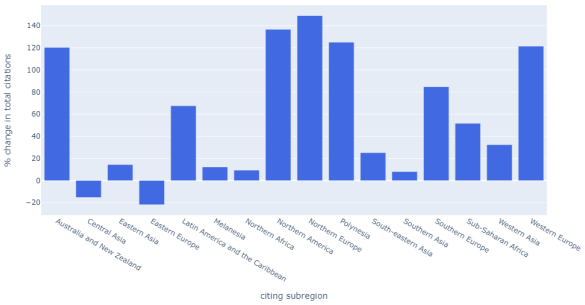
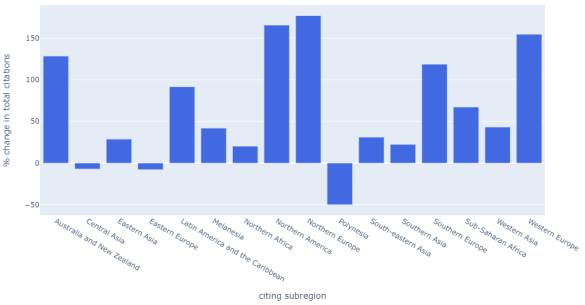


Figure: % change in total citations to OA/non-OA paper affiliated to Eastern Europe for 2019



For papers affiliated to Western Europe:

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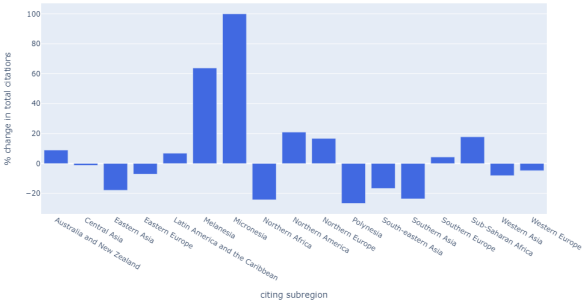


Figure: % change in total citations to OA/non-OA paper affiliated to Western Europe for 2011

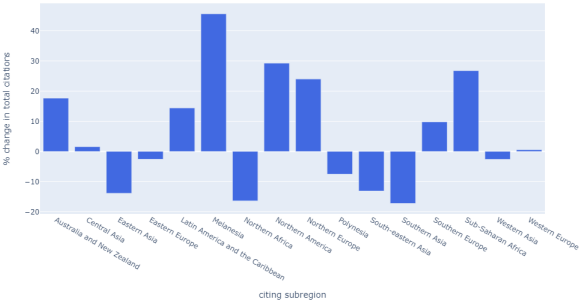


Figure: % change in total citations to OA/non-OA paper affiliated to Western Europe for 2012

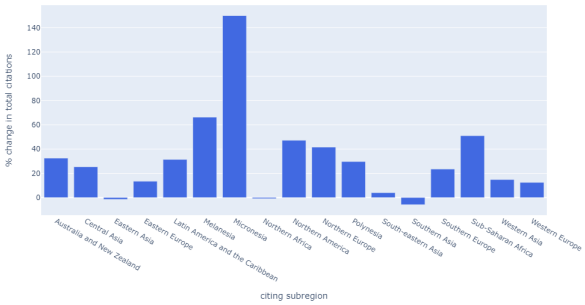


Figure: % change in total citations to OA/non-OA paper affiliated to Western Europe for 2013

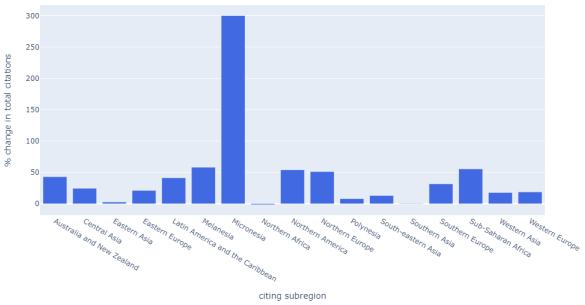


Figure: % change in total citations to OA/non-OA paper affiliated to Western Europe for 2014

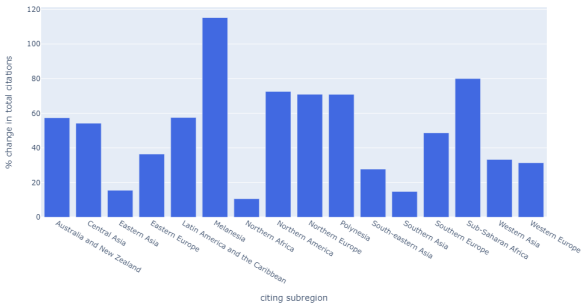


Figure: % change in total citations to OA/non-OA paper affiliated to Western Europe for 2015

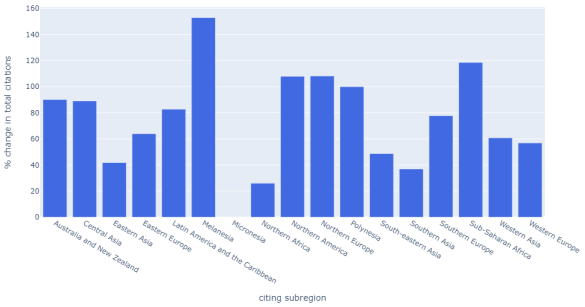


Figure: % change in total citations to OA/non-OA paper affiliated to Western Europe for 2016

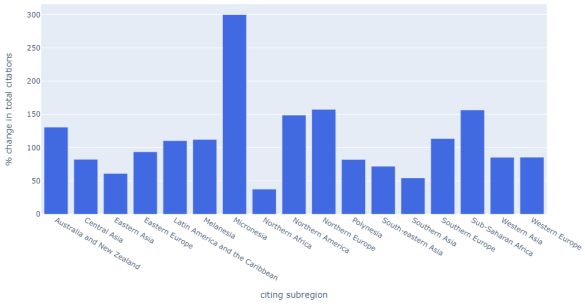


Figure: % change in total citations to OA/non-OA paper affiliated to Western Europe for 2017

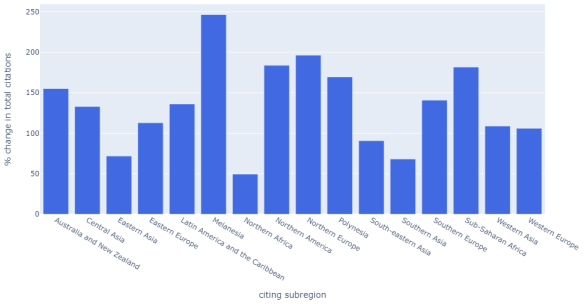


Figure: % change in total citations to OA/non-OA paper affiliated to Western Europe for 2018

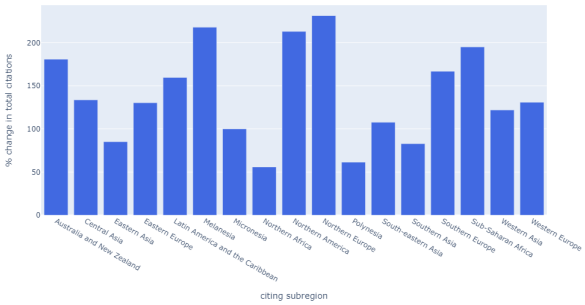
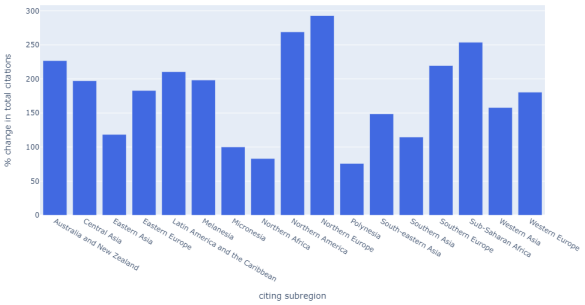


Figure: % change in total citations to OA/non-OA paper affiliated to Western Europe for 2019



For papers affiliated to Northern Europe:

Figure: % change in total citations to OA/non-OA paper affiliated to Northern Europe for 2010

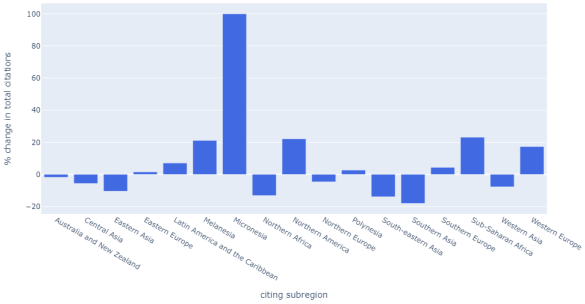


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Europe for 2011

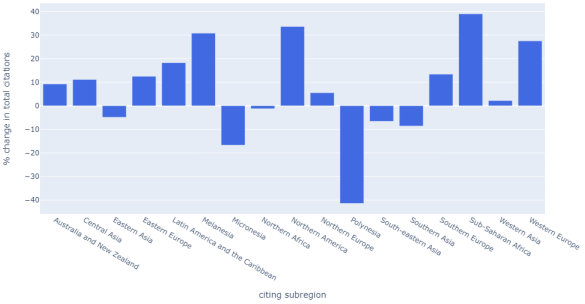
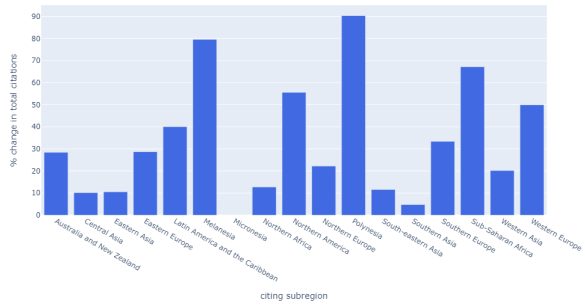


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Europe for 2012



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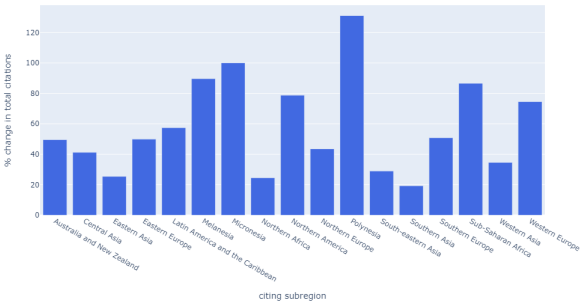


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Europe for 2014

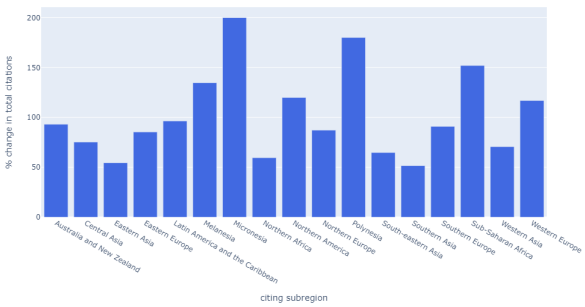


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Europe for 2015

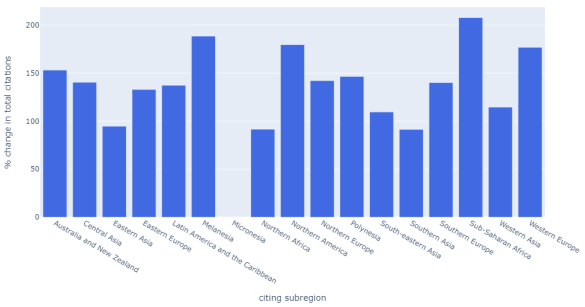
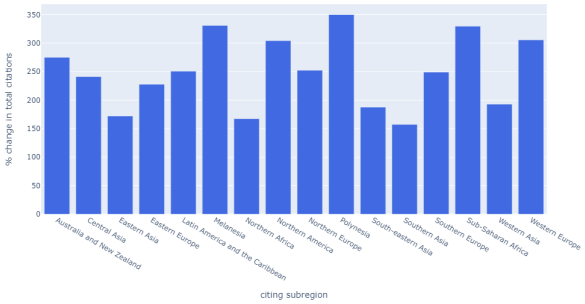


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Europe for 2016



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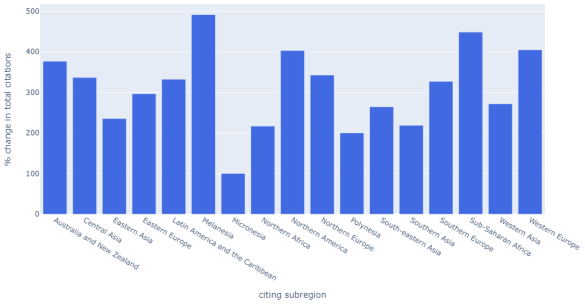

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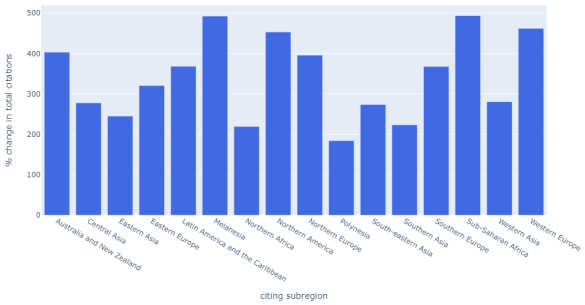
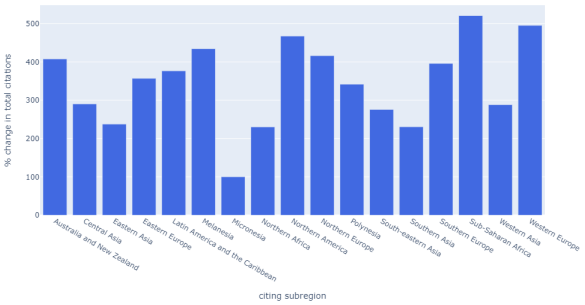


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Europe for 2019



For papers affiliated to Latin America and the Caribbean:

Figure: % change in total citations to OA/non-OA paper affiliated to Latin America and the Caribbean for 2010

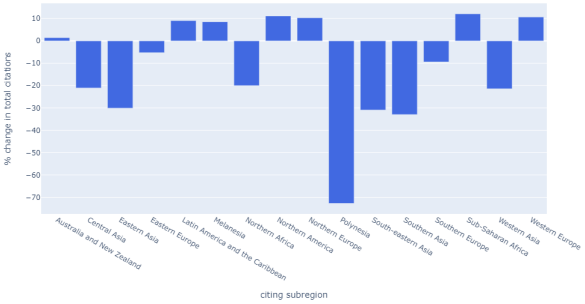


Figure: % change in total citations to OA/non-OA paper affiliated to Latin America and the Caribbean for 2011

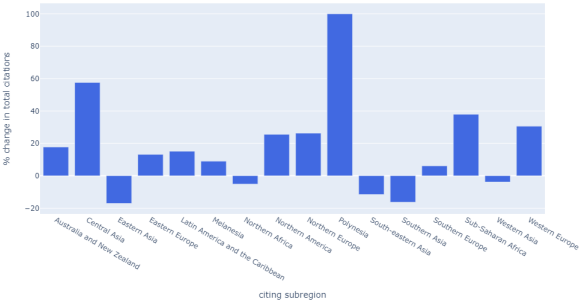


Figure: % change in total citations to OA/non-OA paper affiliated to Latin America and the Caribbean for 2012

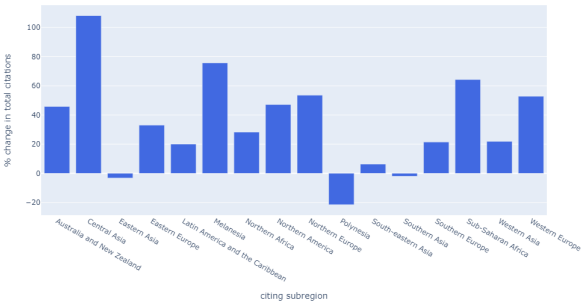


Figure: % change in total citations to OA/non-OA paper affiliated to Latin America and the Caribbean for 2013

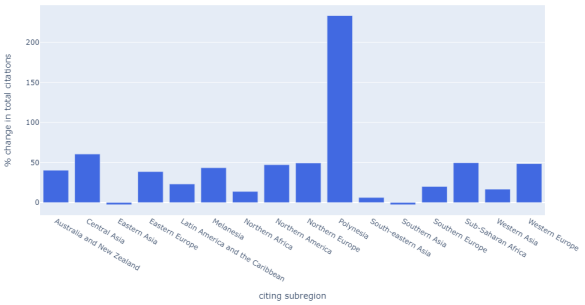


Figure: % change in total citations to OA/non-OA paper affiliated to Latin America and the Caribbean for 2014

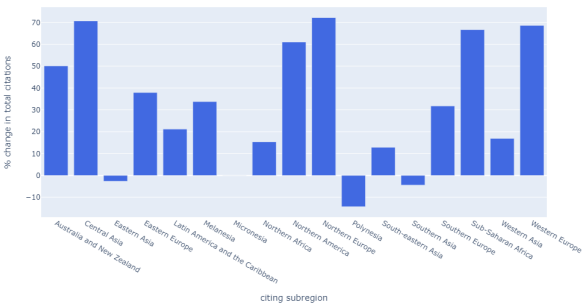


Figure: % change in total citations to OA/non-OA paper affiliated to Latin America and the Caribbean for 2015

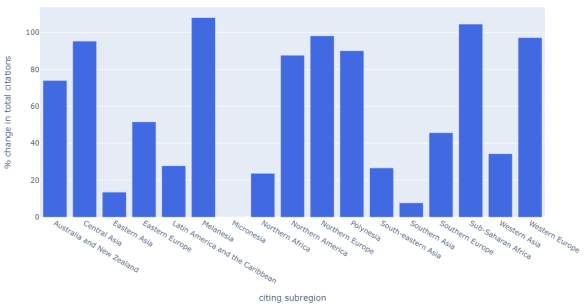
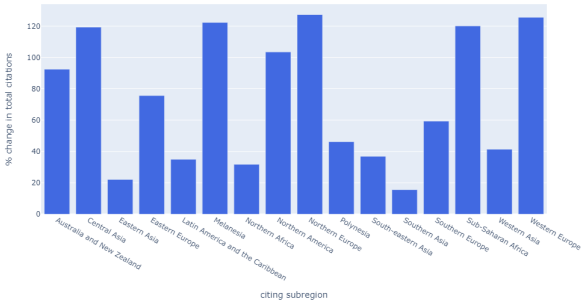


Figure: % change in total citations to OA/non-OA paper affiliated to Latin America and the Caribbean for 2016



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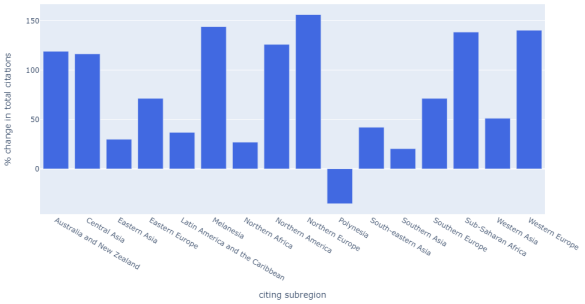

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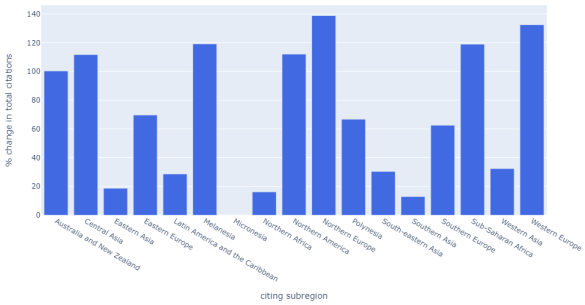

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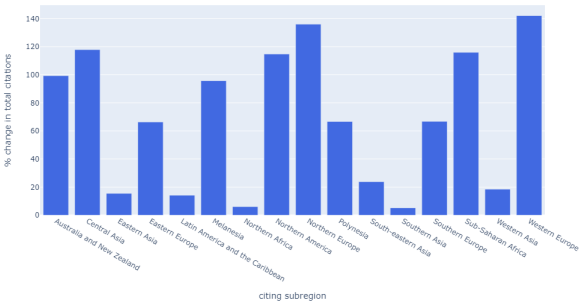


For papers affiliated to Northern America:

Figure: % change in total citations to OA/non-OA paper affiliated to Northern America for 2010

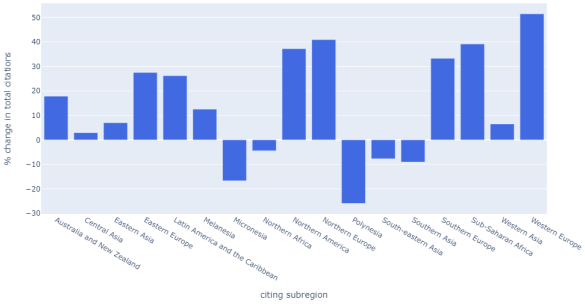


Figure: % change in total citations to OA/non-OA paper affiliated to Northern America for 2011

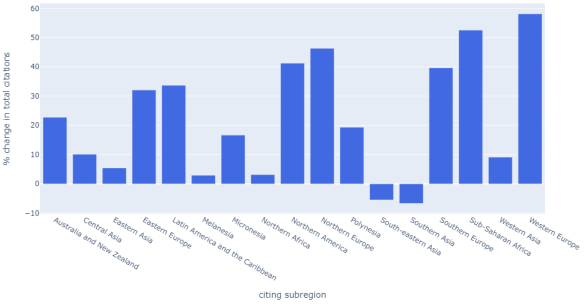


Figure: % change in total citations to OA/non-OA paper affiliated to Northern America for 2012

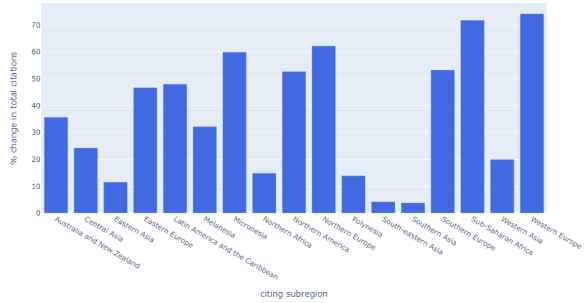
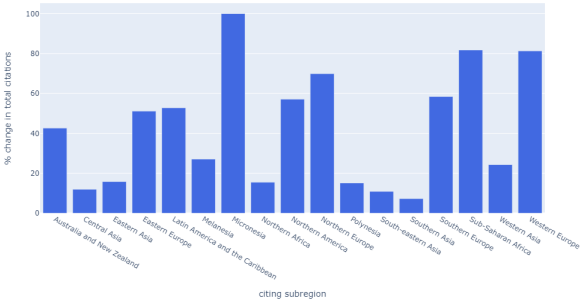


Figure: % change in total citations to OA/non-OA paper affiliated to Northern America for 2013



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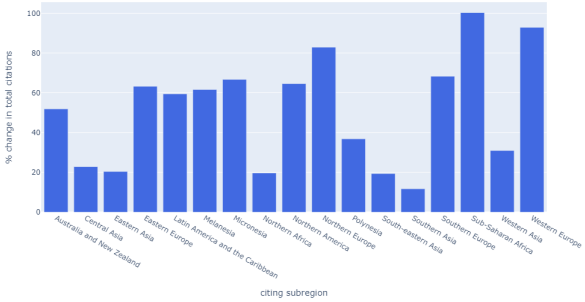

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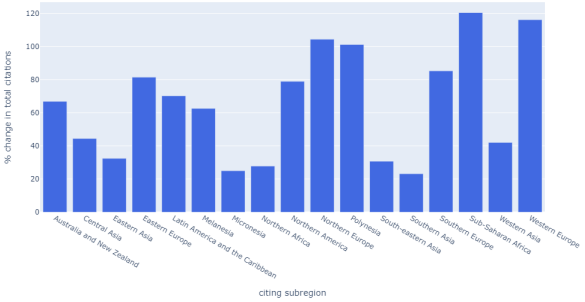


Figure: % change in total citations to OA/non-OA paper affiliated to Northern America for 2016

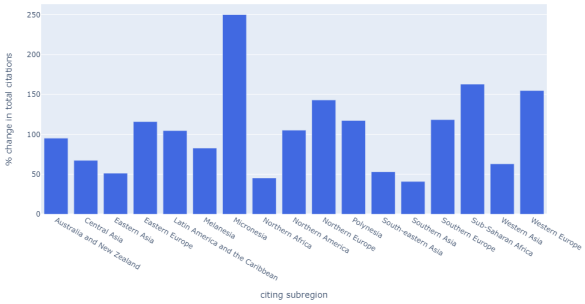
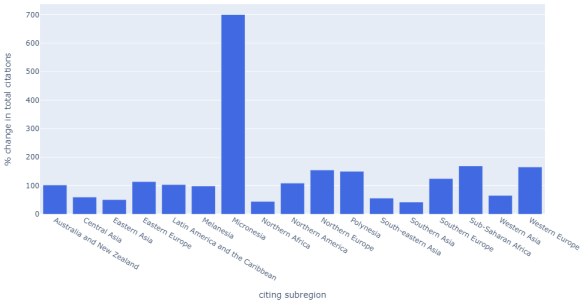


Figure: % change in total citations to OA/non-OA paper affiliated to Northern America for 2017



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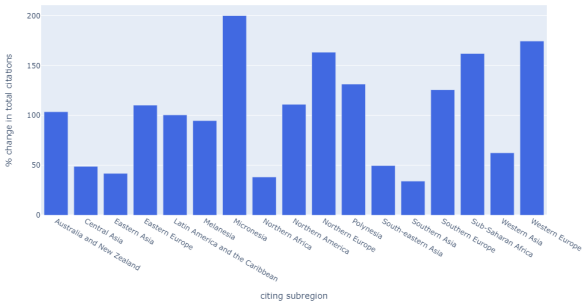

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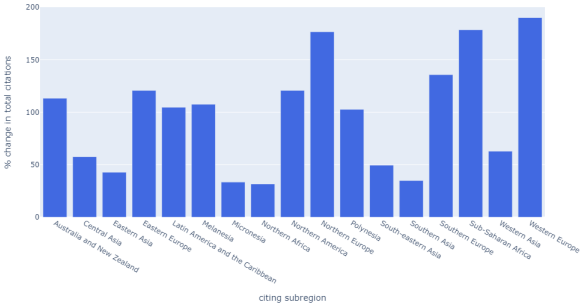


For papers affiliated to Australia and New Zealand:

Figure: % change in total citations to OA/non-OA paper affiliated to Australia and New Zealand for 2010

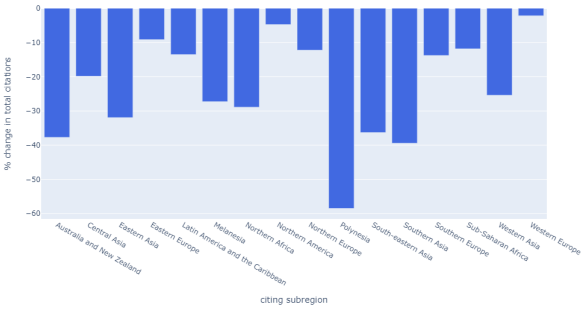


Figure: % change in total citations to OA/non-OA paper affiliated to Australia and New Zealand for 2011

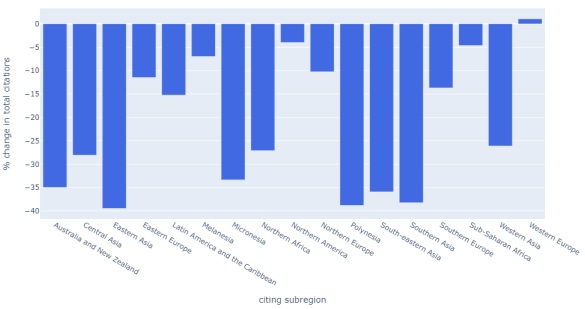


Figure: % change in total citations to OA/non-OA paper affiliated to Australia and New Zealand for 2012

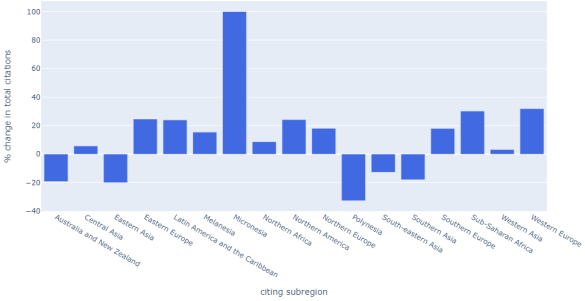


Figure: % change in total citations to OA/non-OA paper affiliated to Australia and New Zealand for 2013

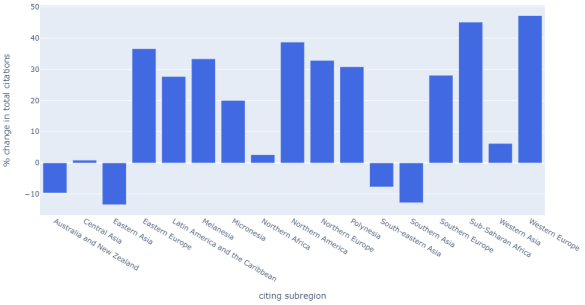


Figure: % change in total citations to OA/non-OA paper affiliated to Australia and New Zealand for 2014

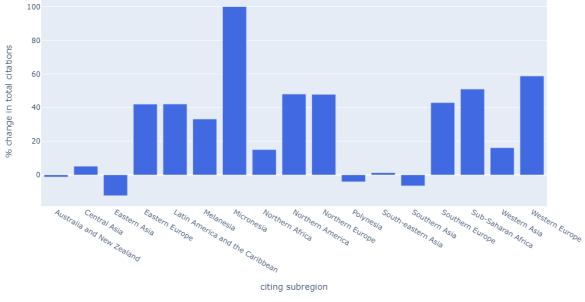
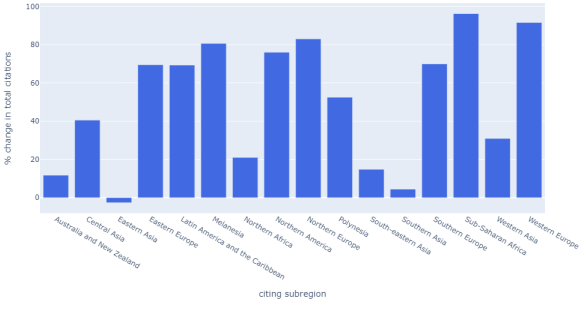


Figure: % change in total citations to OA/non-OA paper affiliated to Australia and New Zealand for 2015



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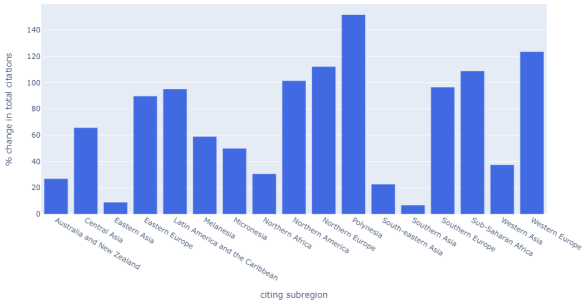


Figure: % change in total citations to OA/non-OA paper affiliated to Australia and New Zealand for 2017

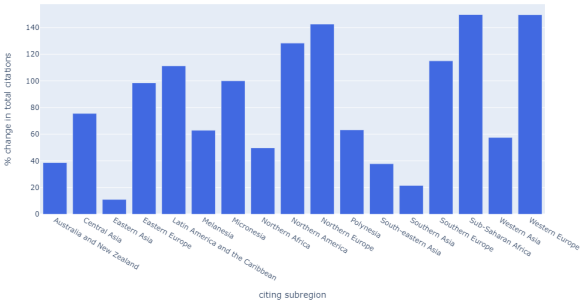


Figure: % change in total citations to OA/non-OA paper affiliated to Australia and New Zealand for 2018

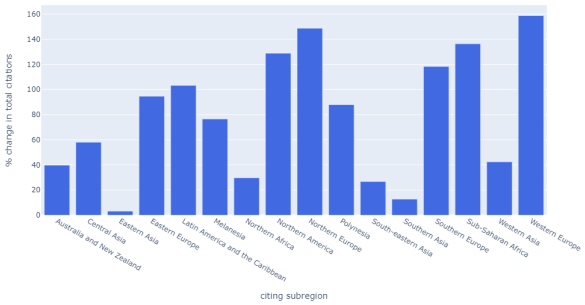
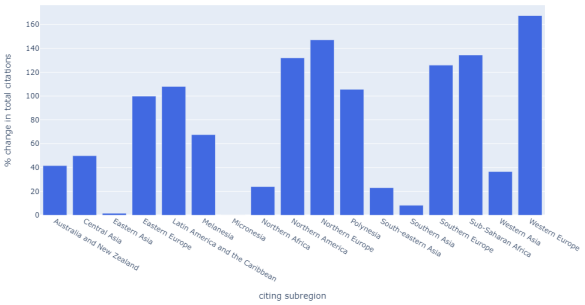


Figure: % change in total citations to OA/non-OA paper affiliated to Australia and New Zealand for 2019



For papers affiliated to Melanesia:

Figure: % change in total citations to OA/non-OA paper affiliated to Melanesia for 2010

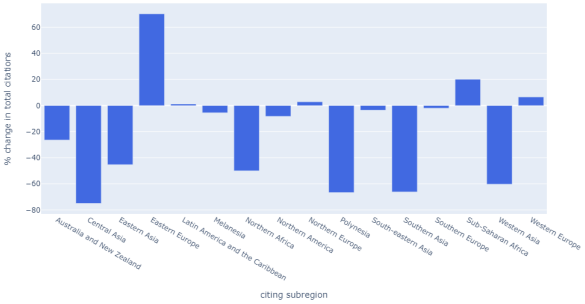


Figure: % change in total citations to OA/non-OA paper affiliated to Melanesia for 2011

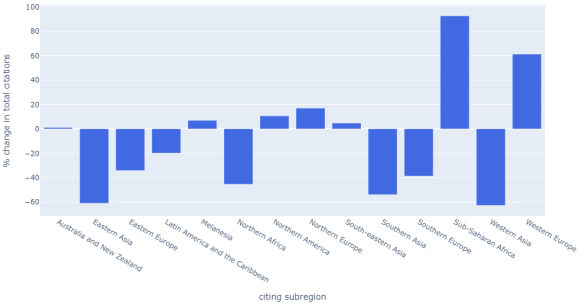


Figure: % change in total citations to OA/non-OA paper affiliated to Melanesia for 2012

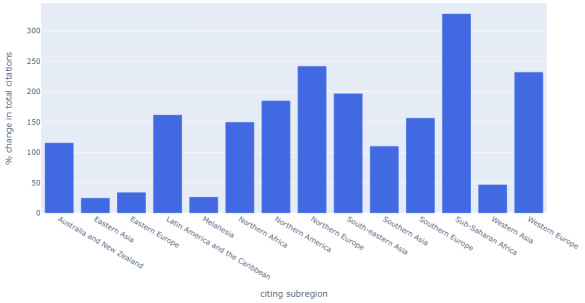


Figure: % change in total citations to OA/non-OA paper affiliated to Melanesia for 2013

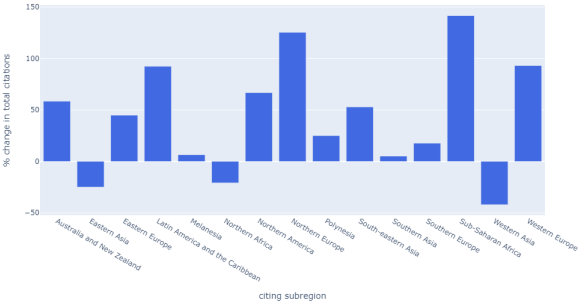


Figure: % change in total citations to OA/non-OA paper affiliated to Melanesia for 2014

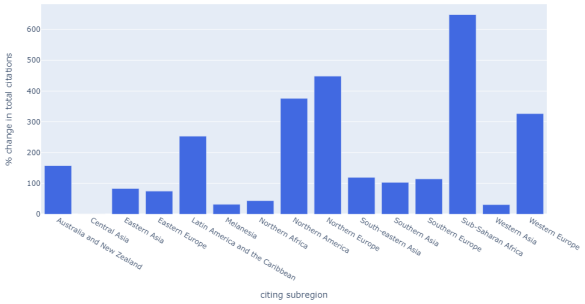


Figure: % change in total citations to OA/non-OA paper affiliated to Melanesia for 2015

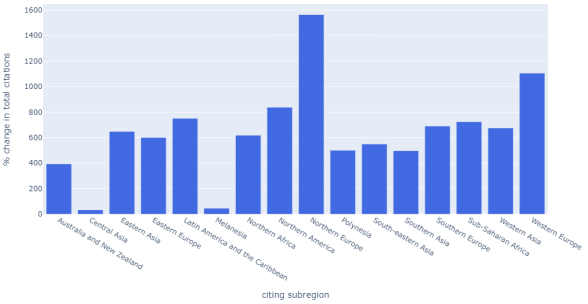


Figure: % change in total citations to OA/non-OA paper affiliated to Melanesia for 2016

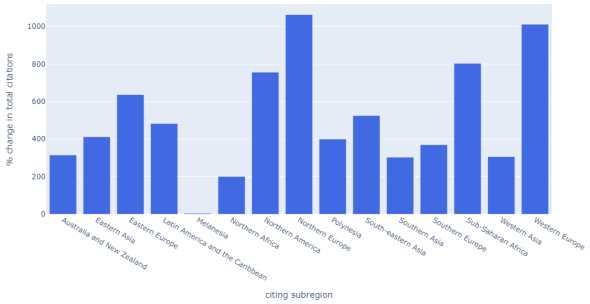


Figure: % change in total citations to OA/non-OA paper affiliated to Melanesia for 2017

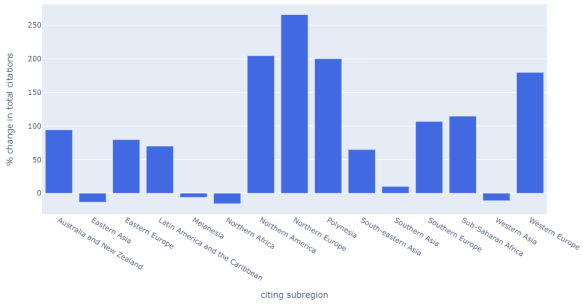


Figure: % change in total citations to OA/non-OA paper affiliated to Melanesia for 2018

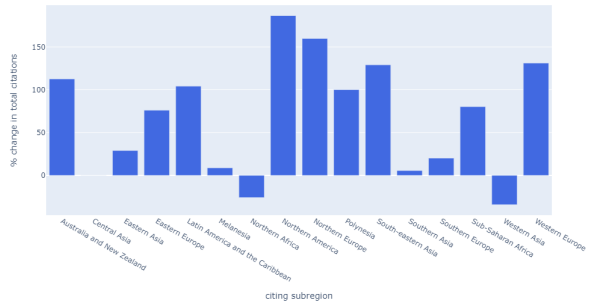
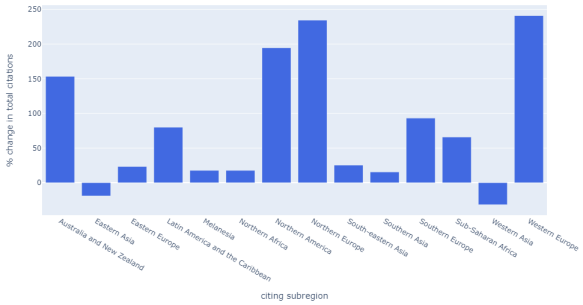


Figure: % change in total citations to OA/non-OA paper affiliated to Melanesia for 2019



For papers affiliated to Polynesia:

Figure: % change in total citations to OA/non-OA paper affiliated to Polynesia for 2010

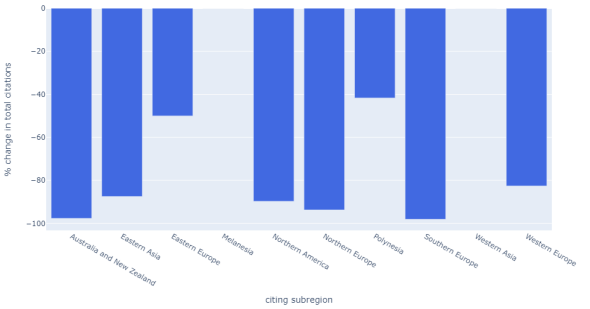


Figure: % change in total citations to OA/non-OA paper affiliated to Polynesia for 2011

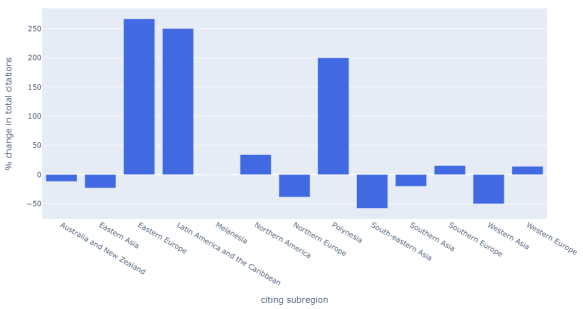


Figure: % change in total citations to OA/non-OA paper affiliated to Polynesia for 2012

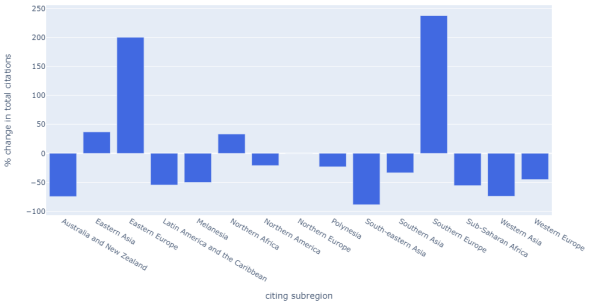


Figure: % change in total citations to OA/non-OA paper affiliated to Polynesia for 2013

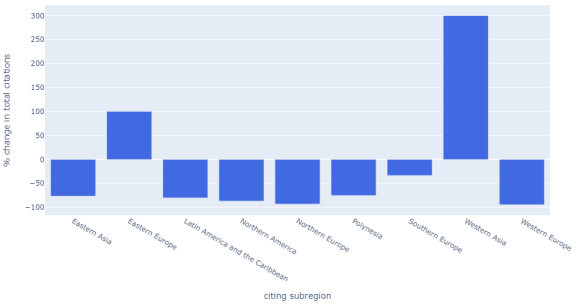


Figure: % change in total citations to OA/non-OA paper affiliated to Polynesia for 2014

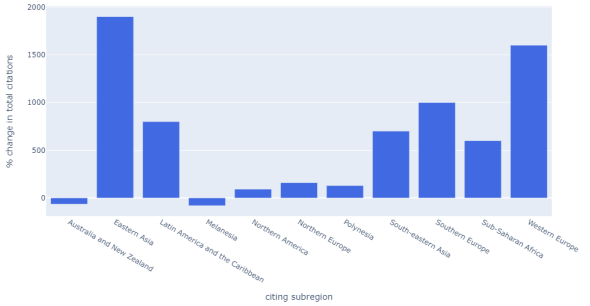


Figure: % change in total citations to OA/non-OA paper affiliated to Polynesia for 2015

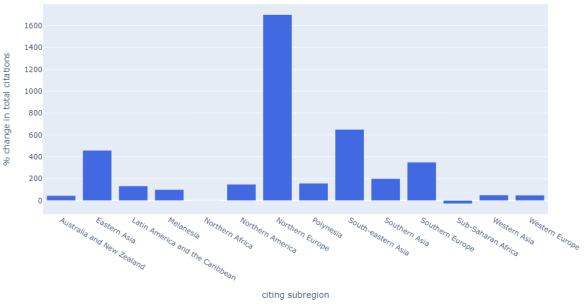


Figure: % change in total citations to OA/non-OA paper affiliated to Polynesia for 2016

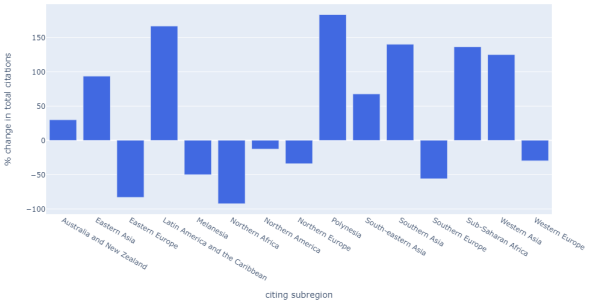


Figure: % change in total citations to OA/non-OA paper affiliated to Polynesia for 2017

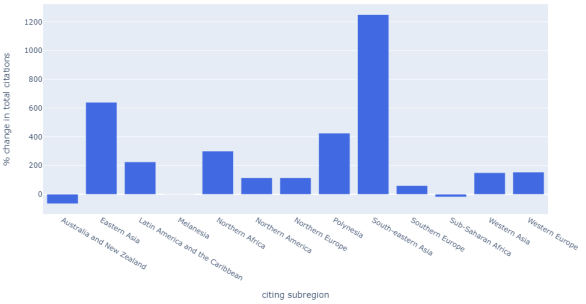


Figure: % change in total citations to OA/non-OA paper affiliated to Polynesia for 2018

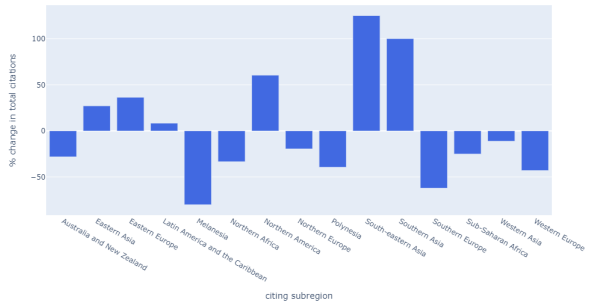
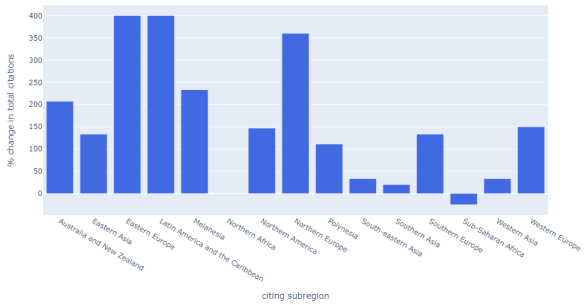


Figure: % change in total citations to OA/non-OA paper affiliated to Polynesia for 2019



For papers affiliated to Micronesia:

Figure: % change in total citations to OA/non-OA paper affiliated to Micronesia for 2010

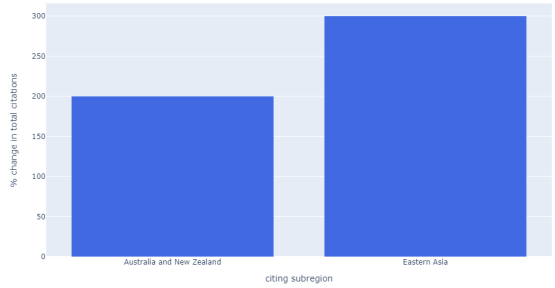
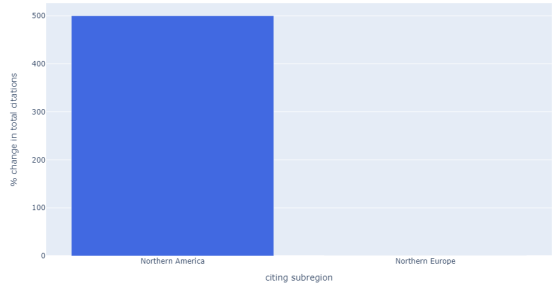


Figure: % change in total citations to OA/non-OA paper affiliated to Micronesia for 2013

Figure: % change in total citations to OA/non-OA paper affiliated to Micronesia for 2017



For papers affiliated to Northern Africa:

Figure: % change in total citations to OA/non-OA paper affiliated to Northern Africa for 2010

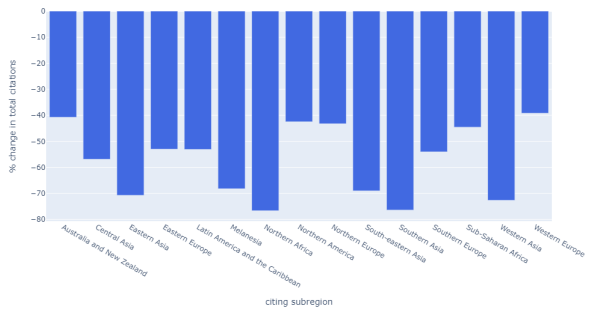


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Africa for 2011

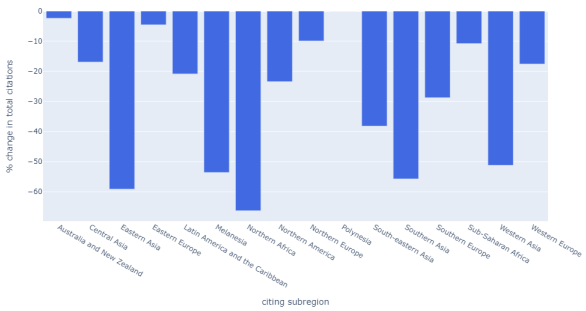


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Africa for 2012

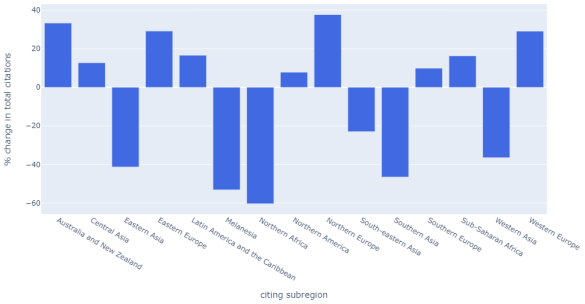


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Africa for 2013

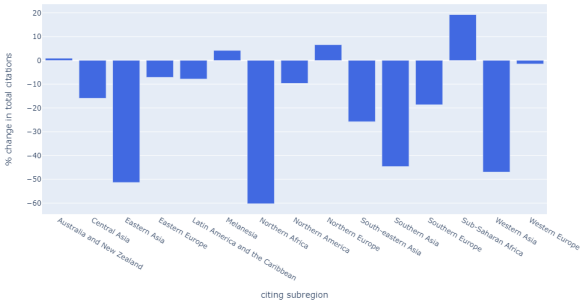


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Africa for 2014

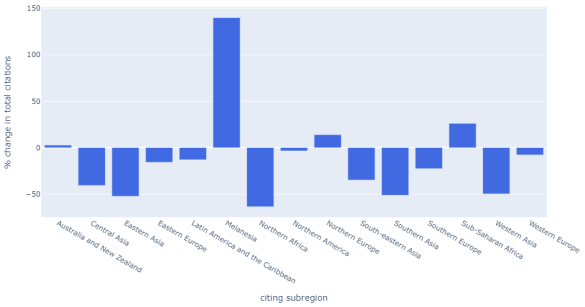


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Africa for 2015

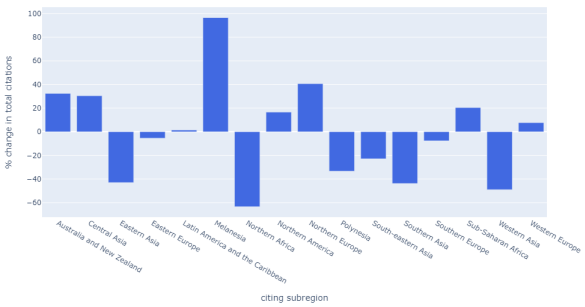


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Africa for 2016

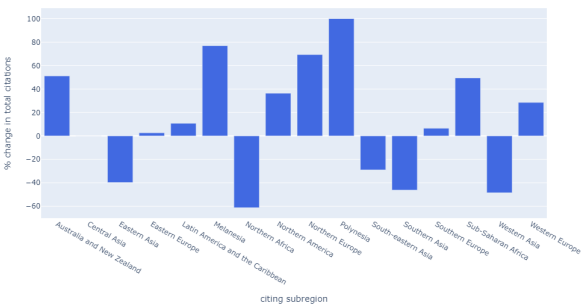


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Africa for 2017

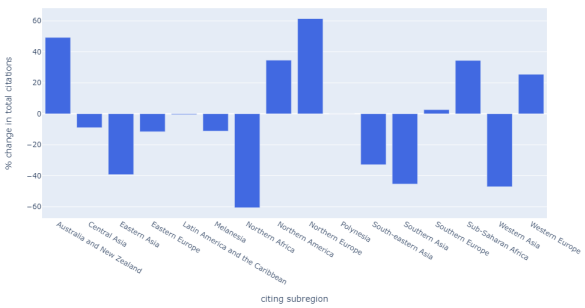


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Africa for 2018

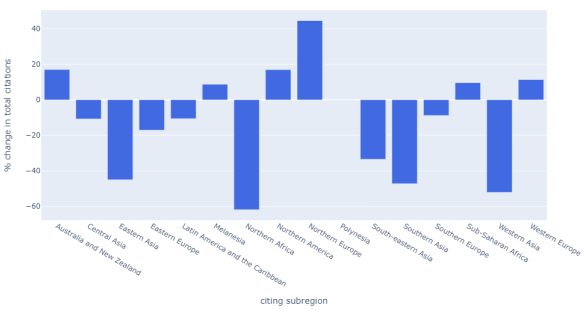
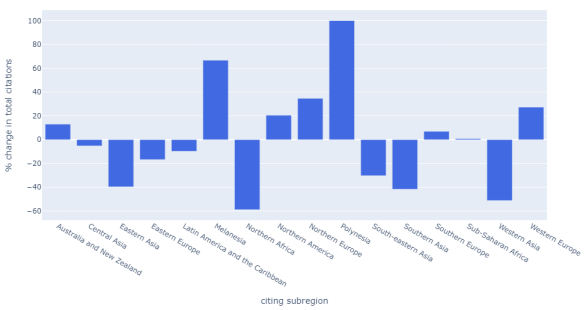


Figure: % change in total citations to OA/non-OA paper affiliated to Northern Africa for 2019



For papers affiliated to Sub-Saharan Africa:

Figure: % change in total citations to OA/non-OA paper affiliated to Sub-Saharan Africa for 2010

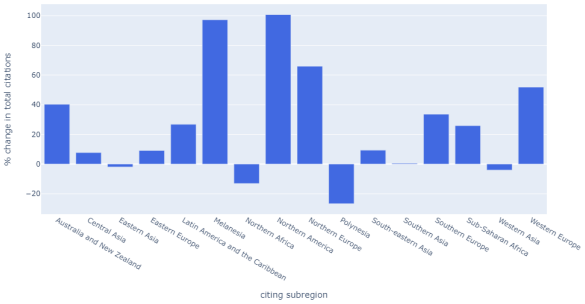


Figure: % change in total citations to OA/non-OA paper affiliated to Sub-Saharan Africa for 2011

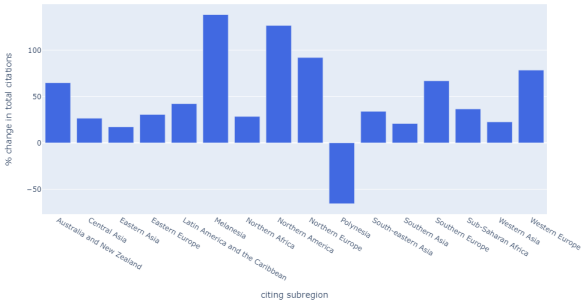


Figure: % change in total citations to OA/non-OA paper affiliated to Sub-Saharan Africa for 2012

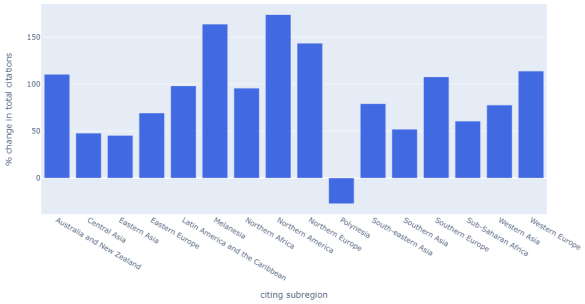


Figure: % change in total citations to OA/non-OA paper affiliated to Sub-Saharan Africa for 2013

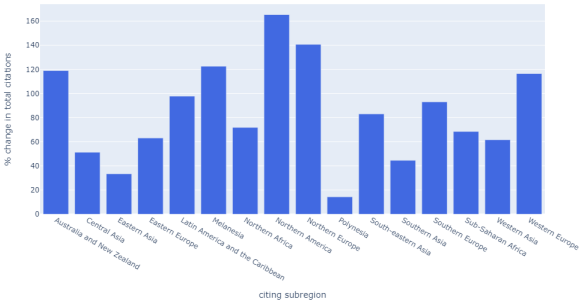


Figure: % change in total citations to OA/non-OA paper affiliated to Sub-Saharan Africa for 2014

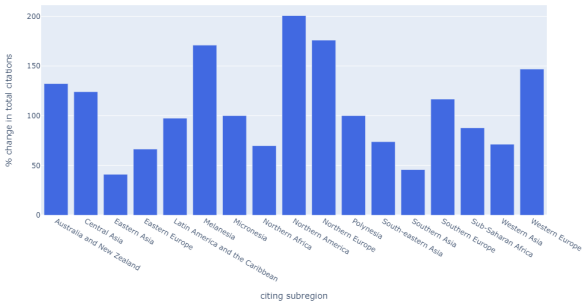


Figure: % change in total citations to OA/non-OA paper affiliated to Sub-Saharan Africa for 2015

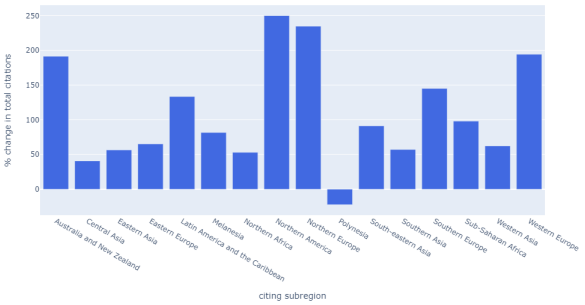


Figure: % change in total citations to OA/non-OA paper affiliated to Sub-Saharan Africa for 2016

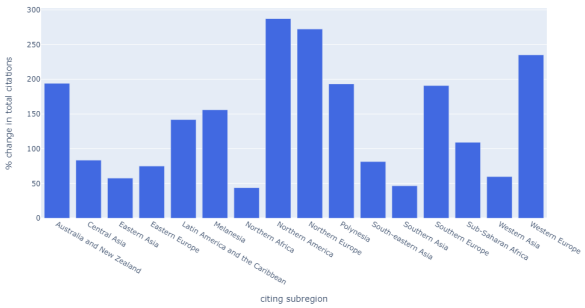


Figure: % change in total citations to OA/non-OA paper affiliated to Sub-Saharan Africa for 2017

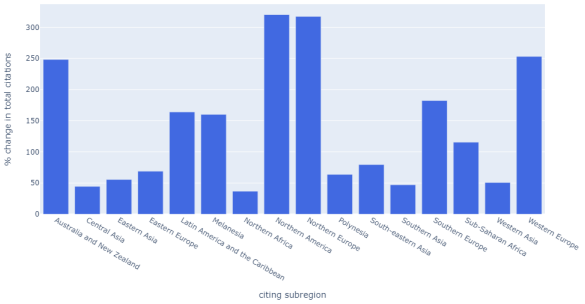


Figure: % change in total citations to OA/non-OA paper affiliated to Sub-Saharan Africa for 2018

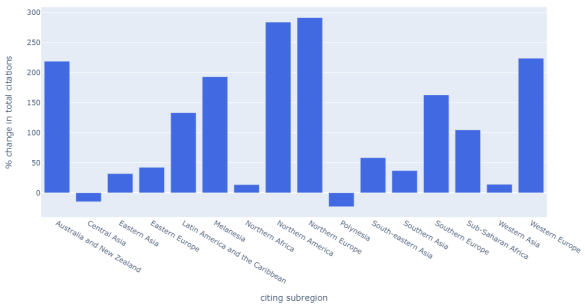
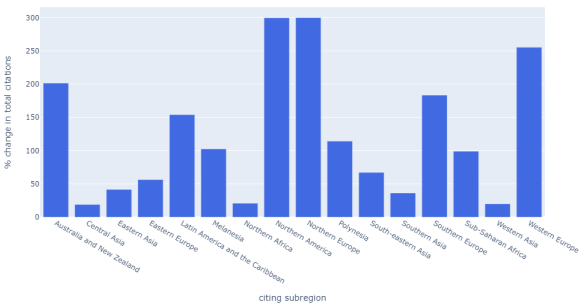


Figure: % change in total citations to OA/non-OA paper affiliated to Sub-Saharan Africa for 2019



Section N: OA citation advantage for regions using percentage change in total citations

Continuing from the previous section, we present parallel results for regions below.

For papers affiliated to Asia:

Figure: % change in total citations to OA/non-OA paper affiliated to Asia for 2010

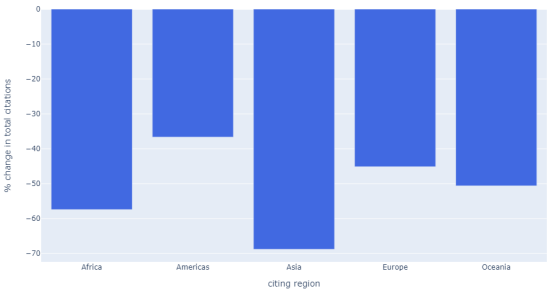


Figure: % change in total citations to OA/non-OA paper affiliated to Asia for 2011

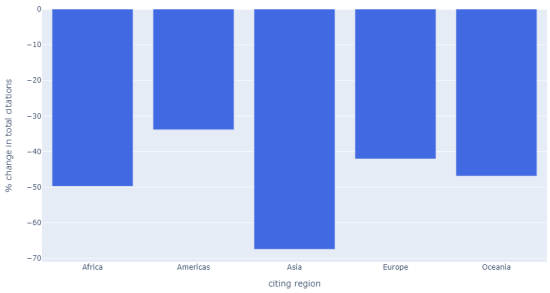


Figure: % change in total citations to OA/non-OA paper affiliated to Asia for 2012

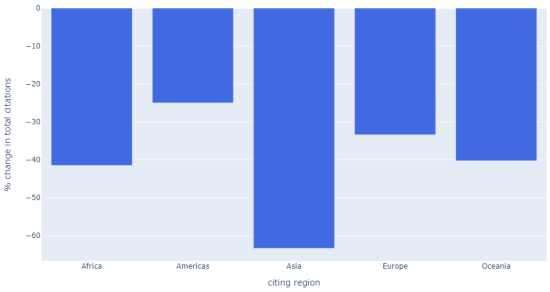


Figure: % change in total citations to OA/non-OA paper affiliated to Asia for 2013

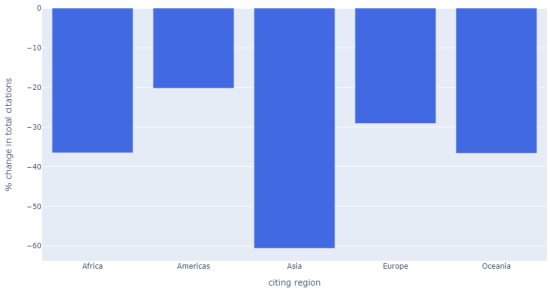


Figure: % change in total citations to OA/non-OA paper affiliated to Asia for 2014

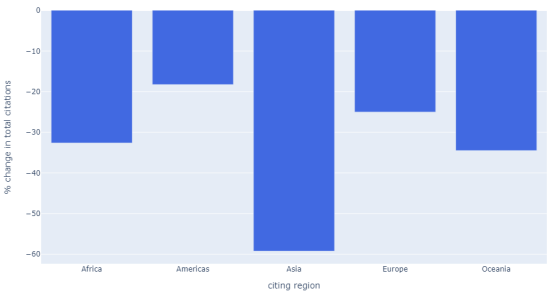


Figure: % change in total citations to OA/non-OA paper affiliated to Asia for 2015

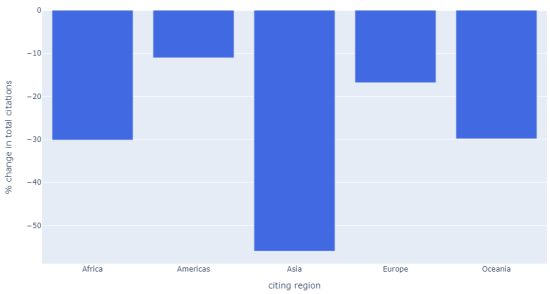


Figure: % change in total citations to OA/non-OA paper affiliated to Asia for 2016

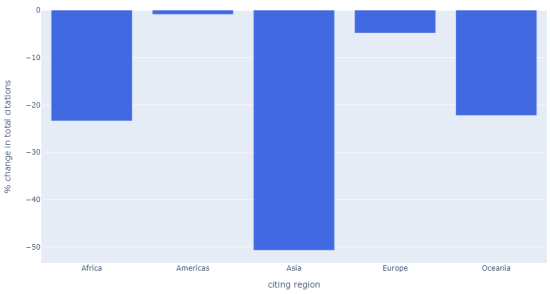


Figure: % change in total citations to OA/non-OA paper affiliated to Asia for 2017

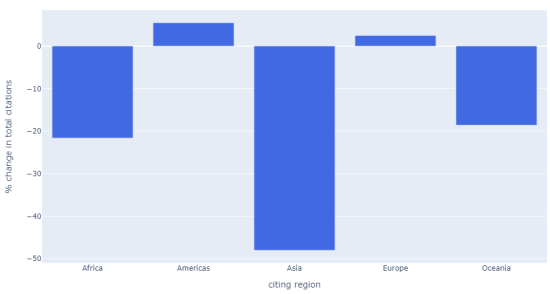


Figure: % change in total citations to OA/non-OA paper affiliated to Asia for 2018

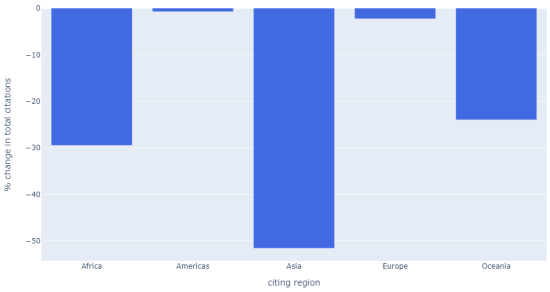
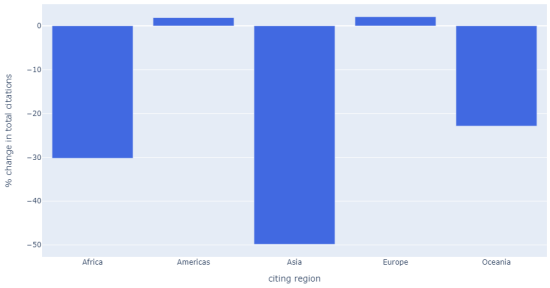


Figure: % change in total citations to OA/non-OA paper affiliated to Asia for 2019



For papers affiliated to Europe:

Figure: % change in total citations to OA/non-OA paper affiliated to Europe for 2010

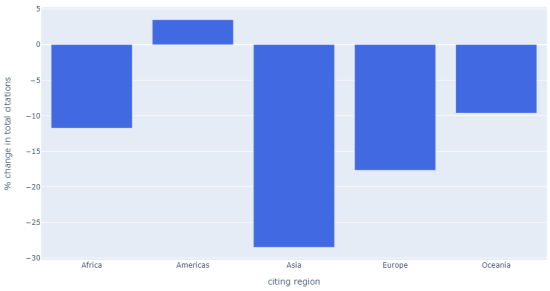


Figure: % change in total citations to OA/non-OA paper affiliated to Europe for 2011

Figure: % change in total citations to OA/non-OA paper affiliated to Europe for 2012

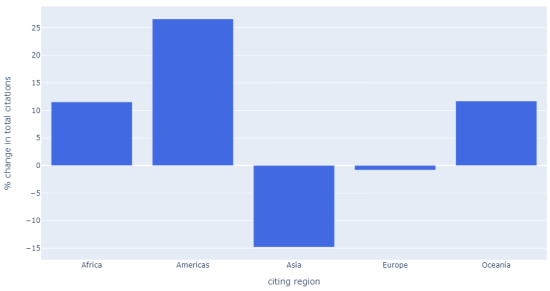


Figure: % change in total citations to OA/non-OA paper affiliated to Europe for 2013

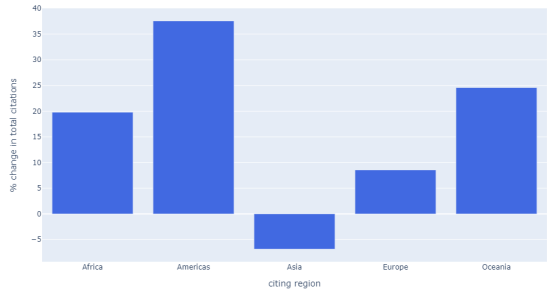


Figure: % change in total citations to OA/non-OA paper affiliated to Europe for 2014

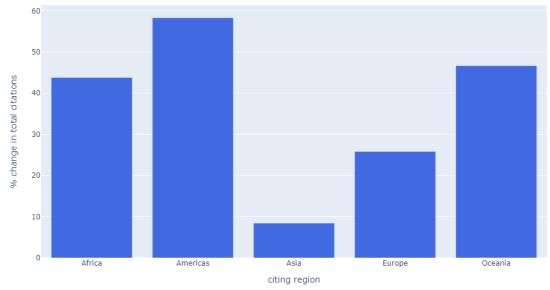


Figure: % change in total citations to OA/non-OA paper affiliated to Europe for 2015

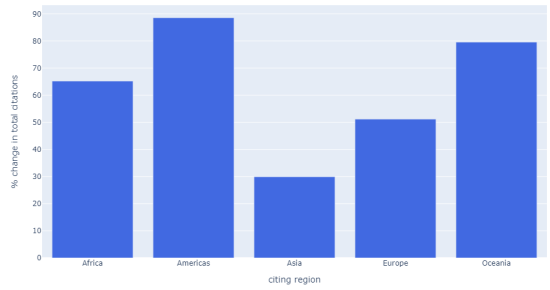


Figure: % change in total citations to OA/non-OA paper affiliated to Europe for 2016

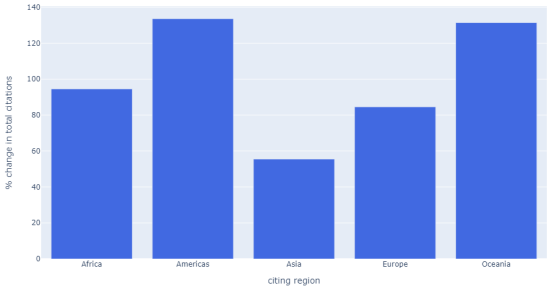


Figure: % change in total citations to OA/non-OA paper affiliated to Europe for 2017

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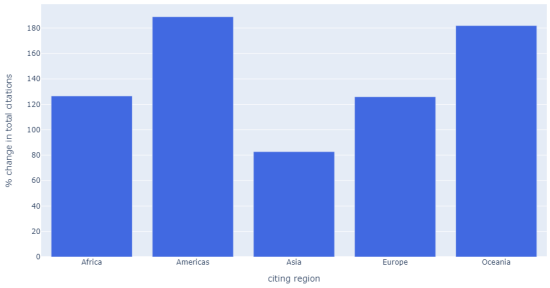

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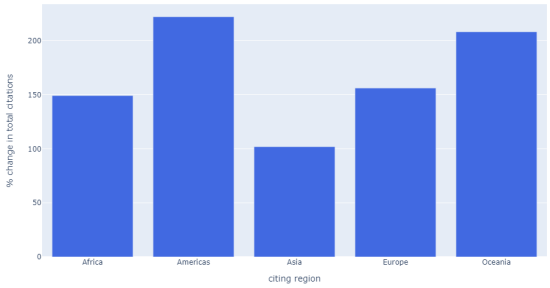

For papers affiliated to Americas:

Figure: % change in total citations to OA/non-OA paper affiliated to Americas for 2010

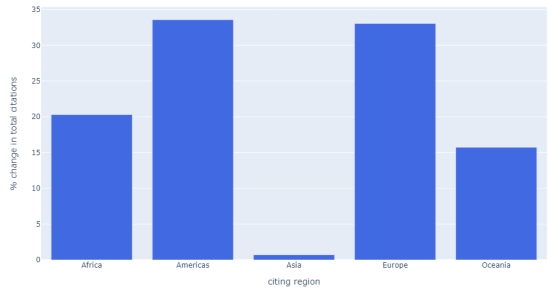

Figure: % change in total citations to OA/non-OA paper affiliated to Americas for 2011

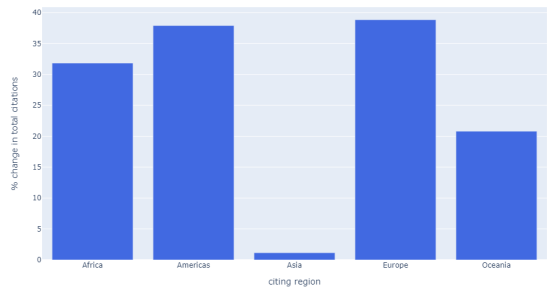

Figure: % change in total citations to OA/non-OA paper affiliated to Americas for 2012

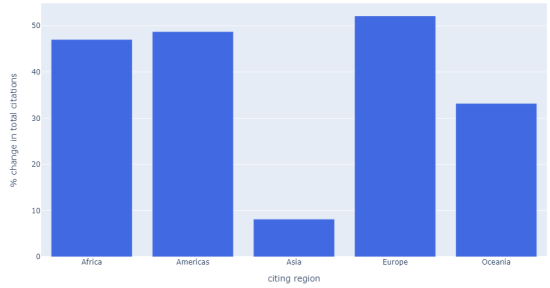

Figure: % change in total citations to OA/non-OA paper affiliated to Americas for 2013

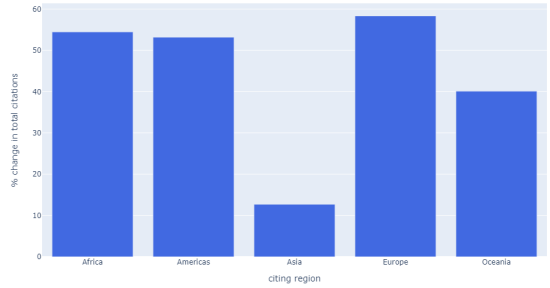

Figure: % change in total citations to OA/non-OA paper affiliated to Americas for 2014

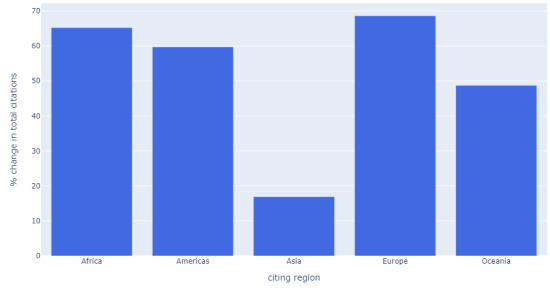

Figure: % change in total citations to OA/non-OA paper affiliated to Americas for 2015

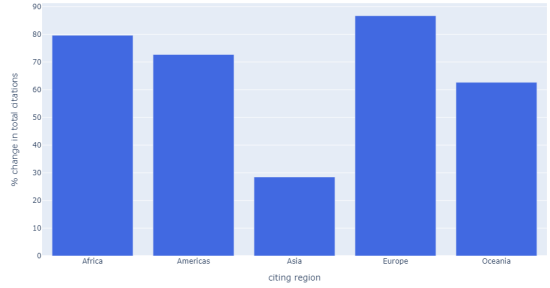

Figure: % change in total citations to OA/non-OA paper affiliated to Americas for 2016

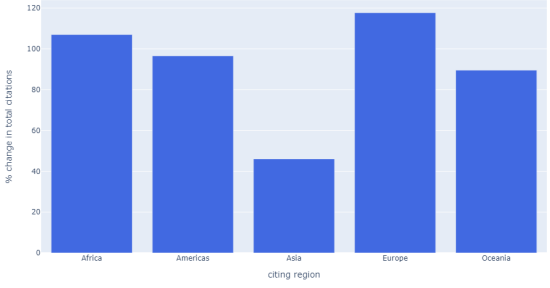

Figure: % change in total citations to OA/non-OA paper affiliated to Americas for 2017

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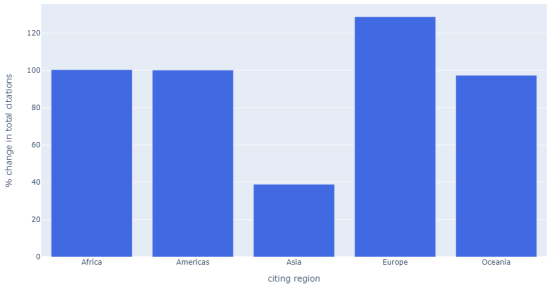
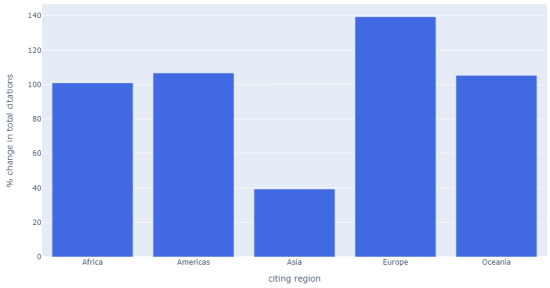


Figure: % change in total citations to OA/non-OA paper affiliated to Americas for 2019



For papers affiliated to Oceania:

Figure: % change in total citations to OA/non-OA paper affiliated to Oceania for 2010

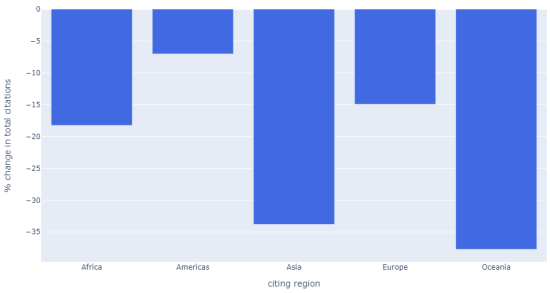


Figure: % change in total citations to OA/non-OA paper affiliated to Oceania for 2011

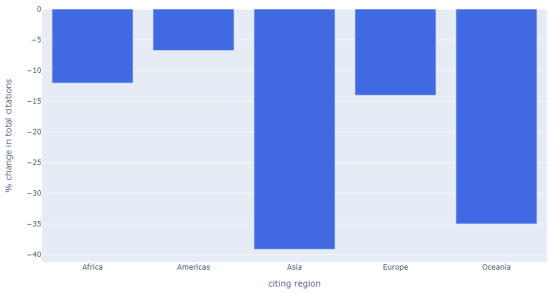


Figure: % change in total citations to OA/non-OA paper affiliated to Oceania for 2012

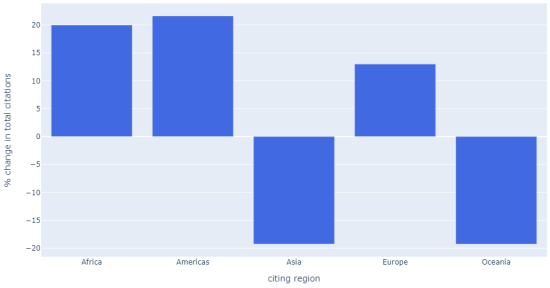
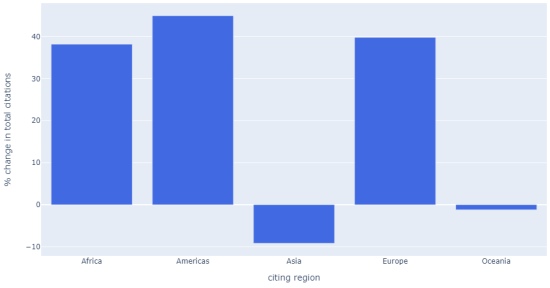


Figure: % change in total citations to OA/non-OA paper affiliated to Oceania for 2013

Figure: % change in total citations to OA/non-OA paper affiliated to Oceania for 2014



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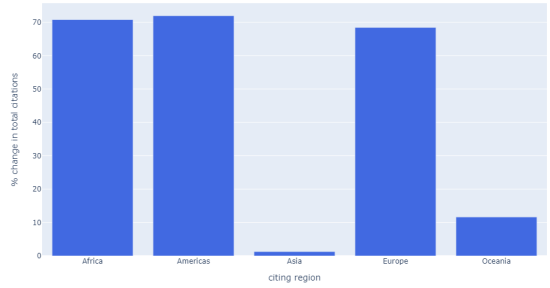

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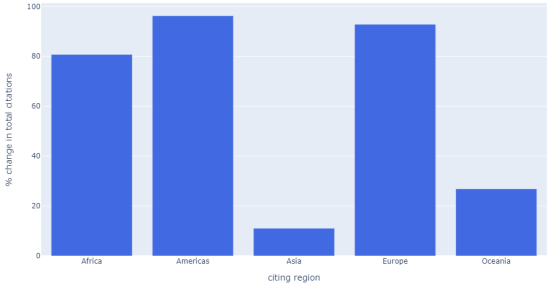

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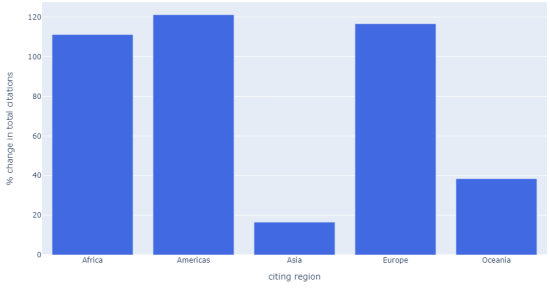
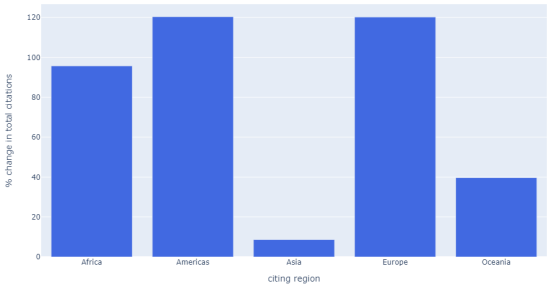


Figure: % change in total citations to OA/non-OA paper affiliated to Oceania for 2018



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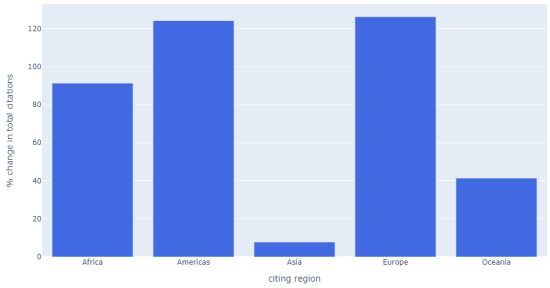


For papers affiliated to Africa:

Figure: % change in total citations to OA/non-OA paper affiliated to Africa for 2010

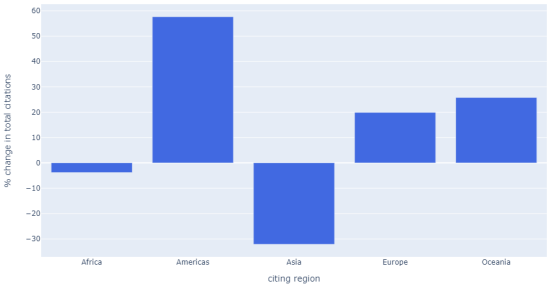


Figure: % change in total citations to OA/non-OA paper affiliated to Africa for 2011

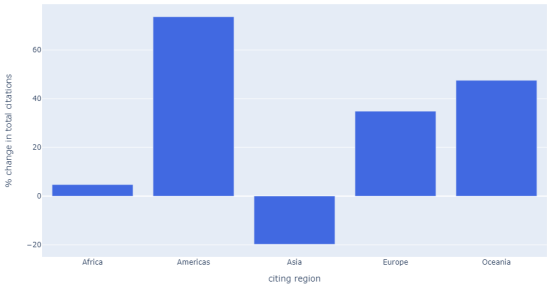
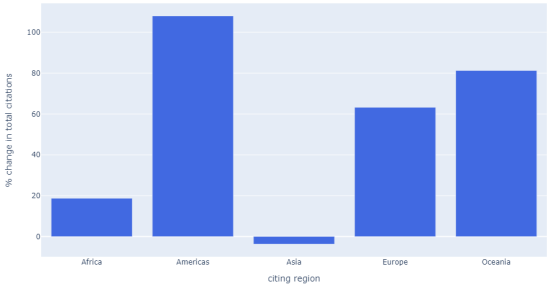


Figure: % change in total citations to OA/non-OA paper affiliated to Africa for 2012



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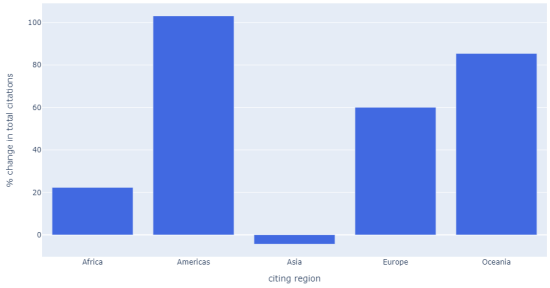

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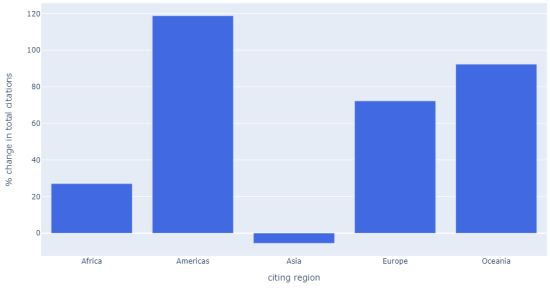

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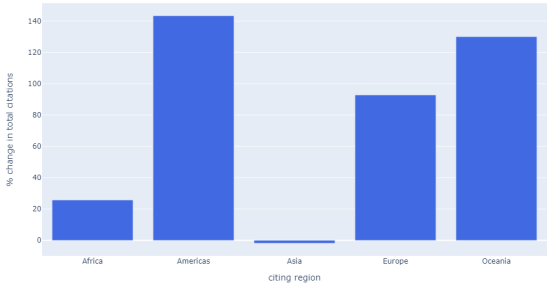

Figure: % change in total citations to OA/non-OA paper affiliated to Africa for 2016

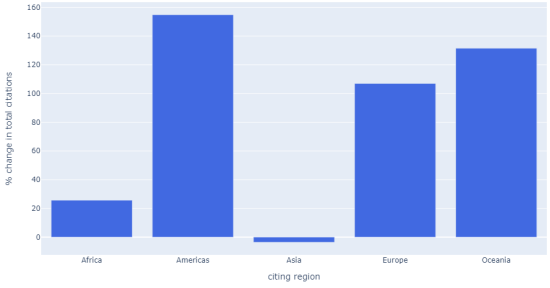

Figure: % change in total citations to OA/non-OA paper affiliated to Africa for 2017

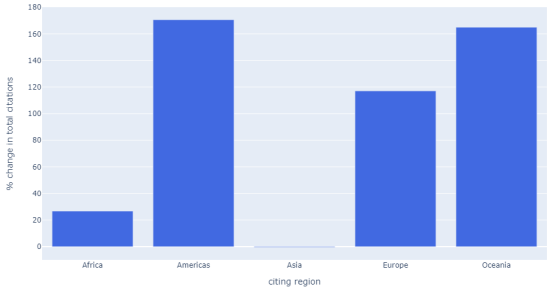

Figure: % change in total citations to OA/non-OA paper affiliated to Africa for 2018

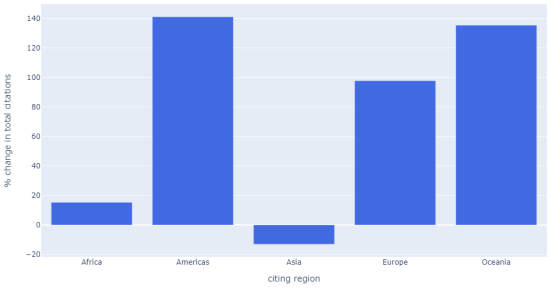
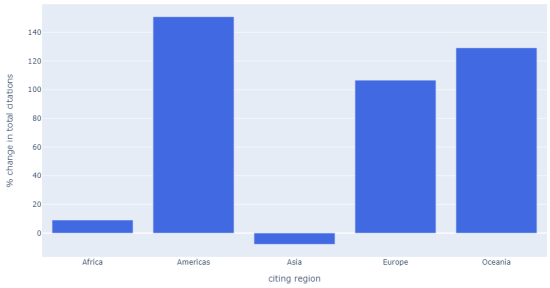
Figure: % change in total citations to OA/non-OA paper affiliated to Africa for 2019