An Interactive Platform for Climate Analysis using a Climate Indices Tool

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ABSTRACT

Researchers and end users using climate data face a challenge when they analyze the data they need. Data volumes are increasing very rapidly, and the ability to download all needed data is often no longer possible. Most of the climate analysis tools for research and application needs must use very large datasets, often distributed among several data centres and into a large quantity of files. This is especially true when they are stored in a federated architecture like the ESGF.

One of these tools is icclim[1], a flexible python software package to calculate climate indices and indicators. This tool adheres as much as possible to metadata conventions such as CF, implementing also provenance information. It also aims at providing increasing support for all FAIR aspects. It is designed with performance and optimisation in mind, because the goal is to provide on-demand calculations for users. It provides the implementation of most of the international standard climate indices such as ECAD, ETCCDI, ET-SCI, including the correct methodology for calculating percentile indices using the bootstrapping method. It has been validated against R.Climdex[2] as well.

The new 5.x version of icclim is now based on functions from the xclim python library, which was inspired by earlier versions of icclim, but using xarray and dask for data access and processing. icclim is also a candidate as the software to calculate climate indices for the C3S toolbox[3].

This tool is integrated in the IS-ENES C4I 2.0 platform[4] using a Jupyter notebook collection in a SWIRRL[5] environment (Software for Interactive Reproducible Research Labs). Having access to this type of complex analysis tool is very useful, and integrating them with front-ends like C4I enable the use of those tools by a larger number of researchers and end users.

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Keywords—climate analysis; climate indices; climate indicators; jupyter notebook; scientific data; interactive platform; data analysis; big data; python software.

REFERENCES

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