SM-BASED INVERSION APPROACH – IRRIGATION DATA SETS

This file contains the description of the irrigation data sets obtained through the SM-based inversion approach (Brocca et al., 2018; Dari et al., 2020; 2022). The data sets were produced over the Ebro basin (Spain), the Po valley (Italy), and the Murray-Darling basin (Australia).

The .nc file name point to the specific location:

- "SM_based_inversion_approach_EBRO_Irrigation.nc" refers to the Ebro basin;
- "SM_based_inversion_approach_PO_Irrigation.nc" refers to the Po valley;
- "SM_based_inversion_approach_MURRAY-DARLING_Irrigation.nc" refers to the Murray-Darling basin.

Description:

For the Ebro and the Po river basins, weekly irrigation estimates obtained by forcing the SM-based inversion algorithm with surface soil moisture from the RT1 Sentinel-1 data set, rainfall from ERA5-Land, and potential evapotranspiration data from the GLEAM v3.5b product. For the Murray-Darling river basin, weekly irrigation estimates obtained by forcing the SM-based inversion algorithm with surface soil moisture from the CYGNSS data set, rainfall from ERA5-Land, and potential evapotranspiration data from the GLEAM v3.5b product.

Files creator institution:

National Research Council of Italy- Research Institute for Geo-hydrological Protection, Italy (CNR-IRPI).

Dept. of Civil and Environmental Engineering, University of Perugia, Italy (DICA-UNIPG).

Files creator institution email:

jacopo.dari@unipg.it

Space extension:

The data sets are produced over the agricultural areas of the Ebro basin (Spain), the Po valley (Italy), and the Murray-Darling basin (Australia); for the Ebro and the Po regions, such areas have been derived from the Corine Land Cover referring to 2018 (CLC2018). The CCI Land Cover referring to 2018 has been used for the Murray-Darling basin. For the Ebro and Po basins, a regular 1 km grid has been adopted. For the Murray-Darling basin, a regular 6 km grid has been used.

Time extension:

Irrigation estimates cover the period January 2016 – July 2020 for the Ebro and Po river basins and the period April 2017 – July 2020 for the Murray-Darling basin.

Temporal aggregation:

Irrigation estimates are delivered with a weekly temporal aggregation. It is noteworthy that, for each product, the first time stamp refers to the irrigation estimated in the first day only, then weekly aggregated values are provided.

Map projection:

Ebro: ETRS89 / UTM zone 33N (EPSG:25833).

Po: WGS 84 / UTM zone 32N (EPSG:32632).

Murray-Darling: GDA94 / Geoscience Australia Lambert (EPSG:3112).

Variables:

1. *Time* [days since 2000-01-01 00:00:00]
2. *Longitude* [degree]
3. *Latitude* [degree]
4. *X* [m], projected x coordinate
5. *Y* [m], projected y coordinate
6. *Irrigation* [mm/week], irrigation estimates retrieved through the SM-based inversion approach

The postprocessing of the data sets with ancillary site-specific information on irrigation extent and duration is recommended. Hence, users are encouraged to exploit such information, when available, to refine the data.

The irrigation data sets are an outcome of the ESA Irrigation+ project (https://esairrigationplus.org/).

References:

Brocca, L., Tarpanelli, A., Filippucci, P., Dorigo, W., Zaussinger, F., Gruber, A., Fernández-Prieto, D. (2018). How much water is used for irrigation? A new approach exploiting coarse resolution satellite soil moisture products. Int. J. Earth Obs. Geoinformation, 73, 752-766.

Dari, J., Brocca, L., Quintana-Seguí, P., Escorihuela, M.J., Stefan, V., Morbidelli, R. (2020). Exploiting high-resolution remote sensing soil moisture to estimate irrigation water amounts over a Mediterranean region. Remote Sens., 12, 2593.

Dari, J., Quintana-Seguí, P., Morbidelli, R., Saltalippi, C., Flammini, A., Giugliarelli, E., Escorihuela, M.J., Stefan, V., Brocca, L. (2022). Irrigation estimates from space: Implementation of different approaches to model the evapotranspiration contribution within a soil-moisture-based inversion algorithm. Agricultural Water Management, 265, 107537.