

China Soil Moisture Dataset (2000-2020)

1. Introduction

We developed a 1km resolution long-term soil moisture dataset over China derived through machine learning trained with in-situ measurements of 1,648 stations, named as SMCII.0(Soil moisture over China based on In-situ data, Li et al, 2022). SMCII.0 provides 10-layer soil moisture with 10 cm intervals up to 100 cm deep at daily resolution over the period 2000-2020. Random Forest is used to predict soil moisture using ERA5-land time series, leaf area index, land cover type, topography and soil properties as covariates. Using in-situ soil moisture as the benchmark, two independent experiments are conducted to investigate the estimation accuracy of the SMCII.0: year-to-year experiment (ubRMSE ranges from 0.041-0.052 and R ranges from 0.883-0.919) and station-to-station experiment (ubRMSE ranges from 0.045-0.051 and R ranges from 0.866-0.893). As SMCII.0 is based on in-situ data, it can be useful complements of existing model-based and satellite-based datasets for various hydrological, meteorological, and ecological analyses and modeling, especially for those applications requiring high resolution SM maps.

2. Data description

The dataset in NetCDF4 format can be downloaded in the following table. NetCDF files are provided for each depth and each year. There are many freely available softwares or programming language such as python, NCL, Panoply for manipulating or displaying NetCDF Data.

We provided two versions with different resolution, i.e., 30 arc seconds(~1km) and 0.1 degree (~9km).

The **30 arc seconds(1km)** version:

Temporal Coverage	2000 - 2020, Daily
Depth Coverage	10-layer soil moisture with 10 cm intervals up to 100 cm
Projection	Sinusoidal / Geographic Coordinates
Resolution	~1 kilometer (30 arc seconds)
Spatial Coverage	China,1km (4320×7560 rows/columns) ,73° - 136°E and 18°-54° N
Data Format	NetCDF4(.nc)
Units	0.001m ³ /m ³
Filled Value	-999

The **5 minutes(~9km)** version:

Temporal Coverage	2000 - 2020, Daily
Depth Coverage	10-layer soil moisture with 10 cm intervals up to 100 cm
Projection	Sinusoidal / Geographic Coordinates
Resolution	~9 kilometer (0.1 degree)
Spatial Coverage	China, ~9km (360×630 rows/columns) ,73° - 135.9°E and 18.1°- 54°N
Data Format	NetCDF4 (.nc)
Units	0.001 m ³ /m ³
Filled Value	-999

3. Reference method

References to data:

Shangguan, W., Li, Q., Shi, G. (2022). **China Soil Moisture Dataset (2000-2020)**. National Tibetan Plateau Data Center, DOI: [10.11888/Terre.tpdn.272415](https://doi.org/10.11888/Terre.tpdn.272415). CSTR: [18406.11.Terre.tpdn.272415](https://cstr.cn/18406.11.Terre.tpdn.272415).

References to articles:

Li, Q., Shi, G., Shangguan, W., Nourani, V., Li, J., Li, L., Huang, F., Zhang, Y., Wang, C., Wang, D., Qiu, J., Lu, X., and Dai, Y.: **A 1 km daily soil moisture dataset over China using in situ measurement and machine learning**, Earth Syst. Sci. Data, 14, 5267–5286, <https://doi.org/10.5194/essd-14-5267-2022>, 2022.

4. Contact

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