Upper Yangtze River Scientific Data Center

**1 km resolution daily all weather surface soil moisture data set in Southwest China (2003-2019)**

1、Description

Surface soil moisture (SSM) is a key parameter to understand the hydrological process on the earth's surface. For a long time, passive microwave (PM) technology has been the main choice for estimating SSM at satellite remote sensing scale. On the other hand, the coarse resolution (usually>10 km) of PM observation hinders its application at finer scales. Although quantitative research has been proposed to reduce the scale of satellite PM based SSM, few products are available to the public to meet the requirements of 1km resolution and daily revisit cycle under all-weather conditions. Therefore, in this study, we developed a SSM product with all these characteristics in China. The product is generated by downscaling the SSM based on AMSR-E and AMSR-2 at 36 km, covering all the on orbit time of the two radiometers from 2003 to 2019. MODIS optical reflectance data and daily thermal infrared surface temperature (LST) that fill the gap under cloudy conditions are the main data inputs of the downscaling model to achieve the "all-weather" quality of the SSM downscaling results. From April to September, the daily images of this developed SSM product achieved quasi full coverage nationwide. In other months, compared with the initial daily PM observations, the national coverage of developed products has also been greatly improved. We evaluated the product based on the field soil moisture measurement results of more than 2000 professional meteorological and soil moisture observation stations, and found that the accuracy of the product is stable under all weather conditions from clear sky to cloudy, and the average value of unbiased RMSE stations is between 0.053 vol and 0.056 vol. In addition, the evaluation results also show that the developed product is significantly superior to the well-known SMAP Sentinel (active passive microwave) combined SSM product at a resolution of 1km. This shows that the products we develop may bring potential important benefits in improving future hydrological process, agriculture, water resources and environmental management related investigations. Based on the national data set, this data set cuts out the data of Southwest China for sharing.

2、Keywords

Theme：Soil,Surface Water,All-weather,Surface Freeze-thaw Cycle/state Remote Sensing,hydrology,Soil moisture,Terrestrial Surface Remote Sensing
Discipline：Terrestrial Surface,Cryosphere
Places：Southwest China, China
Time：Ten years

3、Data details

1.Scale：None

2.Projection：WGS84

3.Filesize：54782.0MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：35.0 | - |
| west：96.0 | - | east：113.0 |
| - | south：20.5 | - |

5、Time frame:None--None

6、Reference method

References to data:

ZHANG Yongqiang, SONG Peilin. 1 km resolution daily all weather surface soil moisture data set in Southwest China (2003-2019). Upper Yangtze River Scientific Data Center, 2022

References to articles:

宋沛林, 张永强. (2021). 中国1千米分辨率逐日全天气地表土壤水分数据集（2003-2019）. 国家青藏高原科学数据中心, DOI: 10.11888/Hydro.tpdc.271762. CSTR: 18406.11.Hydro.tpdc.271762.

Song, P., Zhang, Y., Guo, J., Shi, J., Zhao, T., and Tong, B. (2022). A 1 km daily surface soil moisture dataset of enhanced coverage under all-weather conditions over China in 2003–2019, Earth Syst. Sci. Data, 14, 2613–2637, https://doi.org/10.5194/essd-14-2613-2022.

7、Supporting project information

8、Data resource provider

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