A Big Earth Data Platform for Three Poles

**Satellite-based Global Irrigation Water Use data set (2011-2018)**

1、Description

Agricultural irrigation consumes a large amount of available freshwater resources and is the most immediate human disturbance to the natural water cycle process, with accelerated regional water cycles accompanied by cooling effects. Therefore, estimating irrigation water use (IWU) is important for exploring the impact of human activities on the natural water cycle, quantifying water resources budget, and optimizing agricultural water management. However, the current irrigation data are mainly based on the survey statistics, which is scattered and lacks uniformity, and cannot meet the demand for estimating the spatial and temporal changes of IWU. The Global Irrigation Water Use Estimation Dataset (2011-2018) is calculated by the satellite soil moisture, precipitation, vegetation index, and meteorological data (such as incoming radiation and temperature) based on the principle of soil water balance. The framework of IWU estimation in this study coupled the remotely sensed evapotranspiration process module and the data-model fusion algorithm based on differential evolution. The IWU estimates provided from this dataset have small bias at different spatial scales (e.g., regional, state/province and national) compared to traditional discrete survey statistics, such as at Chinese provinces for 2015 (bias = −3.10 km^3), at U.S. states for 2013 (bias = −0.42 km^3), and at various FAO countries (bias = −10.84 km^3). Also, the ensemble IWU estimates show lower uncertainty compared to the results derived from individual precipitation and soil moisture satellite products. The dataset is unified using a global geographic latitude and longitude grid, with associated metadata stored in corresponding NetCDF file. The spatial resolution is about 25 km, the time resolution is monthly, and the time span is 2011-2018. This dataset will help to quantitatively assess the spatial and temporal patterns of agricultural irrigation water use during the historical period and support scientific agricultural water management.

2、Keywords

Theme：Area,Soil,Surface Water,Land Use/Land Cover,Cropland,Cropland,Soil moisture,Soil infiltration,Soil moisture/Water content,Terrestrial Surface Remote Sensing,Irrigation
Discipline：Terrestrial Surface
Places：Global Scale
Time：From 2011 to 2018

3、Data details

1.Scale：None

2.Projection：WGS84

3.Filesize：759.0MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：90.0 | - |
| west：180.0 | - | east：180.0 |
| - | south：90.0 | - |

5、Time frame:2010-12-31 16:00:00+00:00--2018-12-30 16:00:00+00:00

6、Reference method

References to data:

ZHENG Donghai, LI Xin, ZHANG Kun, ZHU Gaofeng , ZHANG Ling. Satellite-based Global Irrigation Water Use data set (2011-2018). A Big Earth Data Platform for Three Poles, doi:10.11888/Hydro.tpdc.2712202021

References to articles:

Zhang, K., Li, X., Zheng, D., Zhang, L., & Zhu, G. (2022). Estimation of Global Irrigation Water Use by the Integration of Multiple Satellite Observations. Water Resources Research, 58(3), e2021WR030031. https://doi.org/10.1029/2021WR030031.

7、Supporting project information

8、Data resource provider

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