A Big Earth Data Platform for Three Poles

**Generation of an improved precipitation data set from multisource information over the Tibetan Plateau （1998-2017）**

1、Description

Precipitation over the Tibetan Plateau (TP) known as Asia's water tower plays a critical role in regional water and energy cycles, largely affecting water availability for downstream countries. Rain gauges are indispensable in precipitation measurement, but are quite limited in the TP that features complex terrain and the harsh environment. Satellite and reanalysis precipitation products can provide complementary information for ground-based measurements, particularly over large poorly gauged areas. Here we optimally merged gauge, satellite, and reanalysis data by determining weights of various data sources using artificial neural networks (ANNs) and environmental variables including elevation, surface pressure, and wind speed. A Multi-Source Precipitation (MSP) data set was generated at a daily timescale and a spatial resolution of 0.1° across the TP for the 1998‒2017 period. The correlation coefficient (CC) of daily precipitation between the MSP and gauge observations was highest (0.74) and the root mean squared error was the second lowest compared with four other satellite products, indicating the quality of the MSP and the effectiveness of the data merging approach. We further evaluated the hydrological utility of different precipitation products using a distributed hydrological model for the poorly gauged headwaters of the Yangtze and Yellow rivers in the TP. The MSP achieved the best Nash-Sutcliffe efficiency coefficient (over 0.8) and CC (over 0.9) for daily streamflow simulations during 2004‒2014. In addition, the MSP performed best over the ungauged western TP based on multiple collocation evaluation. The merging method could be applicable to other data-scarce regions globally to provide high quality precipitation data for hydrological research. The latitude and longitude of the left bottom corner across the TP, the number of rows and columns, and grid cells information are all included in each ASCII file.

2、Keywords

Theme：Others,Precipitation,hydrology,Others,machine learning,Remote Sensing Technology,fusion,Precipitation,rainfall
Discipline：Atmosphere,Others,Remote Sensing Technology
Places：Qinghai Tibet Plateau
Time：long time series

3、Data details

1.Scale：None

2.Projection：WGS84

3.Filesize：272.0MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：39.75 | - |
| west：68.25 | - | east：104.25 |
| - | south：26.25 | - |

5、Time frame:1997-12-31 16:00:00+00:00--2017-12-31 03:59:59+00:00

6、Reference method

References to data:

LONG Di, HONG Zhongkun . Generation of an improved precipitation data set from multisource information over the Tibetan Plateau （1998-2017）. A Big Earth Data Platform for Three Poles, doi:10.11888/Atmos.tpdc.2722472022

References to articles:

Hong, Z., Han, Z., Li, X., Long, D., Tang, G., & Wang, J. (2021). Generation of an Improved Precipitation Dataset from Multisource Information over the Tibetan Plateau. Journal of Hydrometeorology, 22(5), 1275-1295

7、Supporting project information

Second Tibetan Plateau Scientific Expedition Program

8、Data resource provider

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