A Big Earth Data Platform for Three Poles

**Monthly 0.01° terrestrial evapotranspiration datasets over the Tibetan Plateau from 2000 to 2018**

1、Description

Terrestrial actual evapotranspiration (ETa) is an important component of terrestrial ecosystems because it links the hydrological, energy, and carbon cycles. However, accurately monitoring and understanding the spatial and temporal variability of ETa over the Tibetan Plateau (TP) remains very difficult. Here, the multiyear (2000-2018) monthly ETa on the TP was estimated using the MOD16-STM model supported by datasets of soil properties, meteorological conditions, and remote sensing. The estimated ETa correlates very well with measurements from 9 flux towers, with low root mean square errors (average RMSE = 13.48 mm/month) and mean bias (average MB = 2.85 mm/month), and strong correlation coefficients (R = 0.88) and the index of agreement values (IOA = 0.92). The spatially averaged ETa of the entire TP and the eastern TP (Lon > 90°E) increased significantly, at rates of 1.34 mm/year (p < 0.05) and 2.84 mm/year (p < 0.05) from 2000 to 2018, while no pronounced trend was detected on the western TP (Lon < 90°E). The spatial distribution of ETa and its components were heterogeneous, decreasing from the southeastern to northwestern TP. ETa showed a significantly increasing trend in the eastern TP, and a significant decreasing trend throughout the year in the southwestern TP, particularly in winter and spring. Soil evaporation (Es) accounted for more than 84% of ETa and the spatial distribution of temporal trends was similar to that of ETa over the TP. The amplitudes and rates of variations in ETa were greatest in spring and summer. The multi-year averaged annual terrestrial ETa (over an area of 2444.18×103 km2) was 376.91±13.13 mm/year, equivalent to a volume of 976.52±35.7 km3/year. The average annual evapotranspirated water volume over the whole TP (including all plateau lakes, with an area of 2539.49×103 km2) was about 1028.22±37.8 km3/year. This new estimated ETa dataset is useful for investigating the hydrological impacts of land cover change and will help with better management of watershed water resources across the TP.

2、Keywords

Theme：Harmonized world soil database,soil moisture,Soil,Latent heat flux,Radiation,Surface Water,Soil particle size,Soil evapotranspiration,Energy balance closure,Soil moisture,Hydrology,Soil hydraulic parameters,Sensible heat flux  
Discipline：Atmosphere,Terrestrial Surface  
Places：The Tibetan Plateau  
Time：Monthly dataset

3、Data details

1.Scale：None

2.Projection：

3.Filesize：6677.0MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：40.0 | - |
| west：75.0 | - | east：105.0 |
| - | south：25.0 | - |

5、Time frame:1999-12-31 16:00:00+00:00--2018-12-30 16:00:00+00:00

6、Reference method

References to data:

CHEN Xuelong, MA Yaoming. Monthly 0.01° terrestrial evapotranspiration datasets over the Tibetan Plateau from 2000 to 2018. A Big Earth Data Platform for Three Poles, doi:10.11888/Hydro.tpdc.2712362021

References to articles:

7、Supporting project information

The Second Tibetan Plateau Scientific Expedition and Research (STEP) program  
The Strategic Priority Research Program of Chinese Academy of Sciences  
The National Natural Science Foundation of China

8、Data resource provider

name: MA Yaoming  
unit: Institute of Tibetan Plateau Research, Chinese Academy of Sciences  
email: ymma@itpcas.ac.cn  
  
name: CHEN Xuelong  
unit:   
email: x.chen@itpcas.ac.cn