A Big Earth Data Platform for Three Poles

**Surface energy balance based global land evapotranspiration (EB-ET 2000-2017)**

1、Description

Daily and Monthly evapotranspiration (5km x 5km spatial resolution) for global land area was derived from satellite data and a surface energy balance method (EB). The global 5 km daily and monthly ET dataset is produced with the revised SEBS algorithm in Chen et al. 2019 JGR and Chen et al. 2013 (JAMC). For how to obtain seamless daily evaporation data by thermal infrared, please refer to Chen et al. 2021 JGR. This paper also compares different evaporation products. The results show that this product is significantly better than Landflux, GLEAM, MOD16, GLDAS and ERA-Interim products in irrigation area. The downscaling of reanalysis forcing data is detailed in this paper. MODIS LST, NDVI, Global forest height, GlobAlbedo, GLASS LAI have been used in this ET calculation. The ET dataset will be updated to near-present with the availability of input dataset. The global 5 km sensible heat flux, net radiation, latent heat flux will be open with the email contact with Dr. Xuelong Chen.

Daily ET File name: 20001201-ET-V1.mat, 2000-year, 12-month,01-day, ET-Evapotranspiration, V1-version 1;unit: mm/day (unit8 need transfer to single or double and should be divided by 10);data type: unit8 was used to save the disk space, 255 is used for ocean and water body pixels.
Monthly ET File name: ETm200012-ET-V1.mat, 2000-year, 12-month, ET-Evapotranspiration, V1-version 1;unit: mm/month (int16 need transfer to single or double and should be divided by 10);data type: int16 was used to save the disk space, 0 is used for ocean and water body pixels.

The daily ET dataset is produced with a similar method and satellite data as in Chen, X., et al., 2014: Development of a 10 year (2001–2010) 0.1° dataset of land-surface energy balance for mainland China, Atmos. Chem. Phys., 14, 13097–13117, doi:10.5194/acp-14-13097-2014. The calculation of roughness length and kB\_1 for global land were updated by the method in Chen, X., et al, 2019, A Column Canopy‐Air Turbulent Diffusion Method for Different Canopy Structures, Journal of Geophysical Research: Atmospheres, 2019.01.15, 124. Most of the satellite input data were from MODIS. Meteorological data was from ERA-Interim. Global canopy height information was derived from GLAS and MODIS NDVI.

The daily ET has a mean bias (MB) of 0.04 mm/day, RMSE is 1.56 (±0.25) mm/day.

2、Keywords

Theme：Land surface flux,Lysimeter,Radiation,Remote sensing evapotranspiration,MODIS,Atmosphere Remote Sensing,Terrestrial Surface Remote Sensing
Discipline：Atmosphere,Terrestrial Surface
Places：globe
Time：2000-2017

3、Data details

1.Scale：None

2.Projection：

3.Filesize：2600.0MB

4.Data format：\*.mat

4、Space scope

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

5、Time frame:2000-03-20 08:00:00+00:00--2017-07-19 08:00:00+00:00

6、Reference method

References to data:

CHEN Xuelong. Surface energy balance based global land evapotranspiration (EB-ET 2000-2017). A Big Earth Data Platform for Three Poles, doi:10.5194/acp-14-13097-20142018

References to articles:

Chen, X.L., Su, Z.B., Ma, Y.M., Yang, K., Wen, J., Zhang, Y. (2012). An Improvement of Roughness Height Parameterization of the Surface Energy Balance System (SEBS) over the Tibetan Plateau. Journal of Applied Meteorology and Climatology, 52(3), 607-622.

Chen, X.L., Su, Z.B., Ma, Y.M., Liu, S.Q., Yu, Q., &Xu, Z. (2014). Development of a 10 year (2001–2010) 0.1 degrees dataset of land-surface energy balance for mainland China. Atmospheric Chemistry and Physics, 14(23), 13097–13117.

Chen, X., Su, Z., Ma, Y., Trigo, I., & Gentine, P. (2021). Remote sensing of global daily evapotranspiration based on a surface energy balance method and reanalysis data. Journal of Geophysical Research: Atmospheres, 126, e2020JD032873. https://doi.org/10.1029/2020JD032873

Chen, X. et al., 2019, A Column Canopy‐Air Turbulent Diffusion Method for Different Canopy Structures, Journal of Geophysical Research: Atmospheres, 2019.01.15, 124

7、Supporting project information

8、Data resource provider

name: CHEN Xuelong
unit:
email: x.chen@itpcas.ac.cn