A Big Earth Data Platform for Three Poles

**HiWATER: The multi-scale observation experiment on evapotranspiration over heterogeneous land surfaces 2012 (MUSOEXE-4,12,14)-Dataset of flux observation matrix (No.4,12,14 eddy covariance system)**

1、Description

The data set contains data of three stations in the middle reaches: (1) the eddy related flux observation data of point 4 in the flux observation matrix from May 31 to September 17, 2012. The station is located in the Yingke irrigation area of Zhangye City, Gansu Province, and the underlying surface is the village. The longitude and latitude of the observation point are 100.35753e, 38.87752n and 1561.87m above sea level. The height of the eddy correlator is 4.2m (after August 19, the height of the eddy correlator is adjusted to 6.2m), the sampling frequency is 10Hz, the ultrasonic direction is due north, and the distance between the ultrasonic anemometer and the CO2 / H2O analyzer is 17cm. (2) Eddy related flux data of point 12 in the flux observation matrix from May 28 to September 21, 2012. The site is located in the farmland of Daman irrigation area, Zhangye City, Gansu Province, with corn as the underlying surface. The longitude and latitude of the observation point are 100.36631e, 38.86515n and 1559.25m above sea level. The height of the eddy correlator is 3.5m, the sampling frequency is 10Hz, the ultrasonic direction is north, and the distance between the ultrasonic anemometer and the CO2 / H2O analyzer is 15cm. (3) Eddy related flux data of point 14 in the flux observation matrix from May 30 to September 21, 2012. The site is located in the farmland of Yingke Irrigation District, Zhangye City, Gansu Province, with corn as the underlying surface. The longitude and latitude of the observation point are 100.35310e, 38.85867n and 1570.23m above sea level. The height of the eddy correlator is 4.6m, the sampling frequency is 10Hz, the ultrasonic direction is north, and the distance between the ultrasonic anemometer and the CO2 / H2O analyzer is 15cm.
The original observation data of the eddy correlator is 10Hz. The published data is the 30 minute data processed by the edire software. The main processing steps include: outliers elimination, delay time correction, coordinate rotation (secondary coordinate rotation), frequency response correction, ultrasonic virtual temperature correction and density (WPL) correction, etc. At the same time, the quality evaluation of each flux value is mainly the test of atmospheric stability (Δ st) and turbulence similarity (ITC). The 30min flux value output by edire software was also screened: (1) data in case of instrument error; (2) data in 1H before and after precipitation; (3) data with loss rate greater than 3% in every 30min of 10Hz original data; (4) observation data with weak turbulence at night (U \* less than 0.1M / s). The average period of observation data is 30 minutes, 48 data in a day, and the missing data is marked as - 6999. Suspicious data caused by instrument drift and other reasons shall be identified with red font.
The published observation data include: date / time, wind direction WDIR (?), horizontal wind speed wnd (M / s), standard deviation of lateral wind speed STD uuy (M / s), ultrasonic virtual temperature TV (℃), water vapor density H2O (g / m3), carbon dioxide concentration CO2 (mg / m3), friction velocity ustar (M / s), stability Z / L (dimensionless), sensible heat flux HS (w / m2), latent heat flux Le (w / m2), two Carbon dioxide flux FC (mg / (M2S)), quality mark of sensible heat flux QA ﹤ HS, quality mark of latent heat flux QA ﹐ Le, quality mark of carbon dioxide flux QA ﹐ FC. The quality identification of sensible heat, latent heat and carbon dioxide flux is divided into three levels (quality identification 0: (Δ st < 30, ITC < 30); 1: (Δ st < 100, ITC < 100); the rest is 2). The meaning of data time, for example, 0:30 represents the average of 0:00-0:30; data is stored in \*. XLS format.
For station information, please refer to Liu et al. (2015), and for observation data processing, please refer to Liu et al. (2011) and Xu et al. (2013).

2、Keywords

Theme：Latent heat flux,Radiation,Sensible heat flux
Discipline：Atmosphere
Places：Heihe River Basin, the artificial oasis experimental area in the middle reaches, flux observation matrix
Time：2012

3、Data details

1.Scale：None

2.Projection：None

3.Filesize：2.33MB

4.Data format：Excel

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：38.8775 | - |
| west：100.353 | - | east：100.366 |
| - | south：38.8587 | - |

5、Time frame:2012-06-07 03:09:00+00:00--2012-09-24 03:09:00+00:00

6、Reference method

References to data:

LI Xin, LIU Shaomin, XU Ziwei, XIE Zhenghui. HiWATER: The multi-scale observation experiment on evapotranspiration over heterogeneous land surfaces 2012 (MUSOEXE-4,12,14)-Dataset of flux observation matrix (No.4,12,14 eddy covariance system). A Big Earth Data Platform for Three Poles, doi:10.11888/Meteoro.tpdc.2705742016

References to articles:

Xu, Z.W., Liu, S.M., Li, X., Shi, S.J., Wang, J.M., Zhu, Z.L., Xu, T.R., Wang, W.Z., & Ma, M.G. (2013). Intercomparison of surface energy flux measurement systems used during the HiWATER-MUSOEXE. Journal of Geophysical Research, 118, 13140-13157, doi:10.1002/2013JD020260.

Liu, S.M., Xu, Z.W., Wang, W.Z., Bai, J., Jia, Z., Zhu, M., & Wang, J.M. (2011). A comparison of eddy-covariance and large aperture scintillometer measurements with respect to the energy balance closure problem. Hydrology and Earth System Sciences, 15(4), 1291-1306.

Liu, S.M., Xu, Z.W., Song, L.S., Zhao, Q.Y., Ge, Y., Xu, T.R., Ma, Y.F., Zhu, Z.L., Jia, Z.Z., & Zhang, F. (2016). Upscaling evapotranspiration measurements from multi-site to the satellite pixel scale over heterogeneous land surfaces. Agricultural and Forest Meteorology, 230-231, 97-113.

7、Supporting project information

National Natural Science Foundation of China

8、Data resource provider

name: XU Ziwei
unit: Beijing Normal University
email: xuzw@bnu.edu.cn

name: LI Xin
unit:
email: xinli@itpcas.ac.cn

name: XIE Zhenghui
unit: Institute of Atmospheric Physics,Chines Academy of Sciences
email: zxie@lasg.iap.ac.cn

name: LIU Shaomin
unit: Beijing Normal University
email: smliu@bnu.edu.cn