A Big Earth Data Platform for Three Poles

**HiWATER: Dataset of flux observation matrix (eddy covariance system of Upper Daman Superstation) of the MUlti-Scale Observation EXperiment on Evapotranspiration over heterogeneous land surfaces 2012 (MUSOEXE-12)**

1、Description

This dataset contains the flux measurements from the Daman superstation eddy covariance system (EC) at the highest layer in the flux observation matrix from 30 May to 15 September, 2012. The site (100.37223° E, 38.85551° N) was located in a cropland (maize surface) in Daman irrigation district, which is near Zhangye, Gansu Province. The elevation is 1556.06 m. The EC was installed at a height of 34 m; the sampling rate was 10 Hz. The sonic anemometer faced north, and the separation distance between the sonic anemometer and the CO2/H2O gas analyzer (CSAT3&Li7500A) was 0.17 m.
Raw data acquired at 10 Hz were processed using the Edire post-processing software (University of Edinburgh, http://www.geos.ed.ac.uk/abs/research/micromet/EdiRe/), including spike detection, lag correction of H2O/CO2 relative to the vertical wind component, sonic virtual temperature correction, coordinate rotation (2-D rotation), corrections for density fluctuation (Webb-Pearman-Leuning correction), and frequency response correction. The EC data were subsequently averaged over 30 min periods. Moreover, the observation data quality was divided into three classes according to the quality assessment method of stationarity (Δst) and the integral turbulent characteristics test (ITC), which was proposed by Foken and Wichura [1996]: class 1 (level 0: Δst<30 and ITC<30), class 2 (level 1: Δst<100 and ITC<100), and class 3 (level 2: Δst>100 and ITC>100), representing high-, medium-, and low-quality data, respectively. In addition to the above processing steps, the half-hourly flux data were screened in a four-step procedure: (1) data from periods of sensor malfunction were rejected; (2) data before or after 1 h of precipitation were rejected; (3) incomplete 30 min data were rejected when the missing data constituted more than 3% of the 30 min raw record; and (4) data were rejected at night when the friction velocity (u\*) was less than 0.1 m/s. There were 48 records per day; the missing data were replaced with -6999. Moreover, suspicious data were marked in red.
The released data contained the following variables: data/time, wind direction (Wdir, °), wind speed (Wnd, m/s), the standard deviation of the lateral wind (Std\_Uy, m/s), virtual temperature (Tv, ℃), H2O mass density (H2O, g/m^3), CO2 mass density (CO2, mg/m^3), friction velocity (ustar, m/s), stability (z/L), sensible heat flux (Hs, W/m^2), latent heat flux (LE, W/m^2), carbon dioxide flux (Fc, mg/ (m^2s)), quality assessment of the sensible heat flux (QA\_Hs), quality assessment of the latent heat flux (QA\_LE), and quality assessment of the carbon flux (QA\_Fc). In this dataset, the time of 0:30 corresponds to the average data for the period between 0:00 and 0:30; the data were stored in \*.xlsx format.
For more information, please refer to Liu et al. (2016) (for multi-scale observation experiment or sites information), Xu et al. (2013) (for data processing) in the Citation section.

2、Keywords

Theme：Heat flux,Radiation,Winds,Wind direction,wind speed
Discipline：Atmosphere
Places：Heihe River Basin, the artificial oasis experimental area in the middle reaches, flux observation matrix
Time：2012, 2012-05-30 to 2012-09-15

3、Data details

1.Scale：None

2.Projection：4326

3.Filesize：0.68MB

4.Data format：文本

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：38.85551 | - |
| west：100.37223 | - | east：100.37223 |
| - | south：38.85551 | - |

5、Time frame:2012-06-05 22:57:00+00:00--2012-09-21 08:00:00+00:00

6、Reference method

References to data:

LI Xin, LIU Shaomin, XU Ziwei. HiWATER: Dataset of flux observation matrix (eddy covariance system of Upper Daman Superstation) of the MUlti-Scale Observation EXperiment on Evapotranspiration over heterogeneous land surfaces 2012 (MUSOEXE-12). A Big Earth Data Platform for Three Poles, doi:10.3972/hiwater.097.2013.db2016

References to articles:

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. doi:10.1016/j.agrformet.2016.04.008.

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.

7、Supporting project information

National Natural Science Foundation of China

8、Data resource provider

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