A Big Earth Data Platform for Three Poles

**Multi-scale surface flux and meteorological elements observation dataset in the Hai River Basin (Huailai station-eddy covariance system-40m tower, 2019)**

1、Description

This dataset contains the flux measurements from the Huailai station eddy covariance system (EC) from January 1 to October 24 in 2019. The site (115.7923° E, 40.3574°N) was located in the maize surface, near Donghuayuan town of Huailai city in Hebei Province. The elevation is 480 m. The EC was installed at a height of 3.5 m, and 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&EC150) was 0 m.
The raw data acquired at 10 Hz were processed using the Eddypro post-processing software, including the 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. 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): 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), which represent 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 collected before or after 1 h of precipitation were rejected; (3) incomplete 30 min data were rejected when the missing data constituted more than 10% 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, and the missing data were replaced with -6999. Suspicious data were marked in red. There were lots of negative values of H2O density in winter where filling by -6999.
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/m3), CO2 mass density (CO2, mg/m3), friction velocity (ustar, m/s), stability (z/L), sensible heat flux (Hs, W/m2), latent heat flux (LE, W/m2), carbon dioxide flux (Fc, mg/ (m2s)), 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 \*.xls format. Detailed information can be found in the suggested references.
For more information, please refer to Guo et al. (2020) (for sites information), Liu et al. (2013) for data processing) in the Citation section.

2、Keywords

Theme：Atmospheric Radioactive Substance
Discipline：Atmosphere
Places：Huailai, Hebei, Haihe river basin
Time：2019

3、Data details

1.Scale：None

2.Projection：None

3.Filesize：1.94MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：40.3574 | - |
| west：115.7923 | - | east：115.7923 |
| - | south：40.3574 | - |

5、Time frame:2018-12-31 16:00:00+00:00--2019-10-23 16:00:00+00:00

6、Reference method

References to data:

LIU Shaomin, XU Ziwei, BAI Junhua, XIAO Qing. Multi-scale surface flux and meteorological elements observation dataset in the Hai River Basin (Huailai station-eddy covariance system-40m tower, 2019). A Big Earth Data Platform for Three Poles, doi:10.11888/Meteoro.tpdc.2710912021

References to articles:

Guo, A.L., Liu, S.M., Zhu, Z.L., Xu, Z.W., Xiao, Q., Ju, Q., Zhang, Y., & Yang, X.F. (2020). Impact of Lake/Reservoir Expansion and Shrinkage on Energy and Water Vapor Fluxes in the Surrounding Area. Journal of Geophysical Research: Atmospheres, 125, e2020JD032833. https://doi.org/10.1029/2020JD032833.

Liu, S.M., Xu, Z.W., Zhu, Z.L., Jia, Z.Z., &Zhu, M.J. (2013). Measurements of evapotranspiration from eddy-covariance systems and large aperture scintillometers in the Hai River Basin, China. Journal of Hydrology, 487, 24-38.

7、Supporting project information

8、Data resource provider

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