A Big Earth Data Platform for Three Poles

**HiWATER: Dataset of hydrometeorological observation network (eddy covariance system of A’rou Superstation, 2013)**

1、Description

This dataset contains the flux measurements from the A’rou Superstation eddy covariance system (EC) in the upper reaches of the Heihe hydrometeorological observation network from 29 December, 2012, to 19 November, 2013. The site (100.464° E, 38.047° N) was located in the Alpine grassland, Caodaban village, A’rou Country, Qilian County in Qilian Province. The elevation is 3033 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 & Li7500A) was 0.15 m.
The 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 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), as 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), which represent high-, medium-, and low-quality data, respectively. In addition to the above processing steps, the half-hourly flux data were screened using 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 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, and the missing data were replaced with -6999. Suspicious data were marked in red. The data from 14 February to 28 February were missing due to a storage problem of CF card in the datalogger.
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/m2), 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 \*.xls format.
For more information, please refer to Liu et al. (2018) (for hydrometeorological observation network or sites information), Liu et al. (2011) (for data processing) in the Citation section.

2、Keywords

Theme：Latent heat flux,Radiation,Carbon dioxide flux,Sensible heat flux
Discipline：Atmosphere
Places：Heihe River Basin, A’rou Superstation, the cold region hydrology experimental area in the upper reaches
Time：2013, 2012-12-29 to 2013-11-19

3、Data details

1.Scale：None

2.Projection：4326

3.Filesize：2.19MB

4.Data format：文本

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：38.0473 | - |
| west：100.4643 | - | east：100.4643 |
| - | south：38.0473 | - |

5、Time frame:2013-01-11 08:00:00+00:00--2013-12-02 08:00:00+00:00

6、Reference method

References to data:

TAN Junlei, LI Xin, XU Ziwei, CHE Tao, ZHANG Yang. HiWATER: Dataset of hydrometeorological observation network (eddy covariance system of A’rou Superstation, 2013). A Big Earth Data Platform for Three Poles, doi:10.3972/hiwater.194.2014.db2016

References to articles:

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., Li, X., Xu, Z.W., Che, T., Xiao, Q., Ma, M.G., Liu, Q.H., Jin, R., Guo, J.W., Wang, L.X., Wang, W.Z., Qi, Y., Li, H.Y., Xu, T.R., Ran, Y.H., Hu, X.L., Shi, S.J., Zhu, Z.L., Tan, J.L., Zhang, Y., & Ren, Z.G. (2018). The Heihe Integrated Observatory Network: A Basin-Scale Land Surface Processes Observatory in China. Vadose Zone Journal, 17(1), 180072. doi:10.2136/vzj2018.04.0072.

Che, T., Li, X., Liu, S., Li, H., Xu, Z., Tan, J., Zhang, Y., Ren, Z., Xiao, L., Deng, J., Jin, R., Ma, M., Wang, J., & Yang, X. (2019). Integrated hydrometeorological, snow and frozen-ground observations in the alpine region of the Heihe River Basin, China. Earth System Science Data, 11, 1483-1499

7、Supporting project information

National Natural Science Foundation of China

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