A Big Earth Data Platform for Three Poles

**Qilian Mountains integrated observatory network: Dataset of Heihe integrated observatory network (eddy covariance system of A’rou Superstation, 2019)**

1、Description

This dataset contains the flux measurements from the A’rou superstation eddy covariance system (EC) in the upperstream reaches of the Heihe integrated observatory network from January 1 to December 31 in 2019. The site (100.372° E, 38.856° N) was located in the Daban Village, near Qilian County in Qinghai 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 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 1-3 (high quality), class 4-6 (good), class 7-8 (poor, better than gap filling data), class9 (rejected). 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. There were 48 records per day, and the missing data were replaced with -6999. Suspicious data were marked in red. Data during insufficient power supply, data were missing occasionally.  
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 (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 Liu et al. (2018) and Che et al. (2019) (for sites information), Liu et al. (2011) for data processing) in the Citation section.

2、Keywords

Theme：Atmospheric Radioactive Substance  
Discipline：Atmosphere,Ocean,Cryosphere  
Places：Upper reaches of the Heihe River  
Time：2019

3、Data details

1.Scale：None

2.Projection：

3.Filesize：3.07MB

4.Data format：None

4、Space scope

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

5、Time frame:2020-01-14 16:00:00+00:00--2020-02-18 16:00:00+00:00

6、Reference method

References to data:

TAN Junlei, LIU Shaomin, XU Ziwei, CHE Tao, ZHANG Yang, REN Zhiguo. Qilian Mountains integrated observatory network: Dataset of Heihe integrated observatory network (eddy covariance system of A’rou Superstation, 2019). A Big Earth Data Platform for Three Poles, doi:10.11888/Meteoro.tpdc.2706912020

References to articles:

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.  
  
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  
  
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.

7、Supporting project information

Pan-Third Pole Environment Study for a Green Silk Road-A CAS Strategic Priority A Program  
the National Natural Science Foundation of China “Key Theory and Methods for Validation of Land Surface Remote Sensing Products”

8、Data resource provider

name: XU Ziwei  
unit: Beijing Normal University  
email: xuzw@bnu.edu.cn  
  
name: TAN Junlei  
unit:   
email: tanjunlei@163.com  
  
name: REN Zhiguo  
unit: Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences  
email:   
  
name: ZHANG Yang  
unit:   
email: zhangyang@lzb.ac.cn  
  
name: LIU Shaomin  
unit: Beijing Normal University  
email: smliu@bnu.edu.cn  
  
name: CHE Tao  
unit:   
email: chetao@lzb.ac.cn