A Big Earth Data Platform for Three Poles

**Observation dataset of water and heat flux in alpine meadow ecosystem -- eddy covariance system of A'rou Superstation (2015-2017)**

1、Description

This data set contains the eddy correlation observation data of arou super station upstream of heihe hydrological and meteorological observation network on January 1, 2015 and December 31, 2017.Site is located in qilian county, qinghai province, arou township grass daban village, the underlying surface is alpine grassland.The longitude and latitude of the observation point are 100.4643E, 38.0473N, and the altitude is 3033m.The height of the vortex correlative instrument is 3.5m, the sampling frequency is 10Hz, the ultrasonic orientation is due north, and the distance between the ultrasonic wind speed temperature meter (CSAT3) and the CO2/H2O analyzer (Li7500A) is 15cm.  
The original observation data of the vortex correlator is 10Hz, and the published data are the 30-minute data processed by Eddypro. The main steps of the processing include: elimination of outliers, correction of delay time, coordinate rotation (quadratic coordinate rotation), frequency response correction, ultrasonic virtual temperature correction and density (WPL) correction, etc.Quality assessment for each intercompared to at the same time, mainly is the atmospheric stability (Δ st) and turbulent characteristics of similarity (ITC) test.The 30min flux value output by Eddypro software was also screened :(1) to eliminate the data in case of instrument error;(2) data of 1h before and after precipitation were removed;(3) data with a miss rate of more than 10% per 30min in 10Hz original data were excluded;(4) observation data of weak turbulence at night (u\* less than 0.1m/s) were excluded.The average period of observation data was 30 minutes, with 48 data in a day, and the missing data was marked as -6999.Suspicious data caused by instrument drift and other reasons are marked with red font. Among them, calibration data of vortex system Li7500A on April 16-17 is missing.When the memory card fails to store data, resulting in the loss of 10Hz data (9.20-10.21,11.3-11.18), the data is replaced by the 30min flux data output by the collector.  
The published observations include:Date/Time for the Date/Time, wind Wdir (°), Wnd horizontal wind speed (m/s), standard deviation Std\_Uy lateral wind speed (m/s), ultrasonic virtual temperature Tv (℃), the water vapor density H2O (g/m3), carbon dioxide concentration CO2 (mg/m3), friction velocity Ustar) (m/s), Mr. Hoff length L (m), sensible heat flux Hs (W/m2), latent heat flux LE (W/m2), carbon dioxide flux Fc (mg/(m2s)), the quality of the sensible heat flux identifier QA\_Hs, the quality of the latent heat flux identifier QA\_LE,Mass identification of co2 flux.The quality of the sensible heat and latent heat, carbon dioxide flux identification is divided into three (quality id 0: (Δ st < 30, the 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;The data is stored in \*.xls format.  
For information of hydrometeorological network or site, please refer to Li et al. (2013), and for data processing, please refer to Liu et al. (2011).

2、Keywords

Theme：Heat flux,Radiative flux,Radiation,Winds,Wind tendency,Atmospheric Radioactive Substance  
Discipline：Atmosphere  
Places：Heihe River Basin, A’rou Superstation, the cold region hydrology experimental area in the upper reaches  
Time：2015-2017

3、Data details

1.Scale：None

2.Projection：None

3.Filesize：8.83MB

4.Data format：None

4、Space scope

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

5、Time frame:2015-01-11 16:00:00+00:00--2018-01-10 16:00:00+00:00

6、Reference method

References to data:

TAN Junlei, LI Xin, LIU Shaomin, XU Ziwei, CHE Tao, ZHANG Yang. Observation dataset of water and heat flux in alpine meadow ecosystem -- eddy covariance system of A'rou Superstation (2015-2017). A Big Earth Data Platform for Three Poles, doi:10.11888/Geogra.tpdc.2701952019

References to articles:

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., 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.  
  
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

8、Data resource provider

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