A Big Earth Data Platform for Three Poles

**Qilian Mountains integrated observatory network: Dataset of Heihe integrated observatory network (Large aperture scintillometer of Arou Superstation, 2021)**

1、Description

This dataset contains the flux measurements from the large aperture scintillometer (LAS) at Arou Superstation in the Heihe integrated observatory network from January 1 to December 31 in 2021. There were two types of LASs at Arou Superstation: BLS900 and RR-RSS460, produced by Germany and China, respectively. The north tower was set up with the RR-RSS460 receiver and the BLS900 transmitter, and the south tower was equipped with the RR-RSS460 transmitter and the BLS900 receiver. The site (north: 100.471° E, 38.057° N; south: 100.457° E, 38.038° N) was located in Caodaban village of A’rou town in Qilian county, Qinghai Province. The underlying surface between the two towers was alpine meadow. The elevation is 3033 m. The effective height of the LASs was 13.0 m, and the path length was 2390 m. The data were sampled 1 minute at both BLS900 and RR-RSS460.  
The raw data acquired at 1 min intervals were processed and quality controlled. The data were subsequently averaged over 30 min periods, in which sensible heat flux was iteratively calculated by combining Cn2 with meteorological data according to the Monin-Obukhov similarity theory. The main quality control steps were as follows: (1) The data were rejected when Cn2 exceeded the saturated criterion (BLS900: Cn2>7.25E-14, RR-RSS460: Cn2>7.84E-14). (2) The data were rejected when the demodulation signal was small (BLS900: Average X Intensity<1000; RR-RSS460: Demod>-20mv). (3) The data were rejected when collected during precipitation. (4) The data were rejected if collected at night when weak turbulence occurred (u\* was less than 0.1 m/s). In the iteration process, the universal functions of Thiermann and Grassl (1992) and Andreas (1988) were selected for BLS900 and RR-RSS460, respectively. Detailed can refer to Liu et al. (2011, 2013).   
Several instructions were included with the released data. (1) The data were primarily obtained from BLS900 measurements, and missing flux measurements from the BLS900 instrument were substituted with measurements from the RR-RSS460 instrument. The missing data were denoted by -6999. Due to the problems of storing and wireless transmission. (2) The dataset contained the following variables: Date/time (yyyy/m/d h:mm), the structural parameter of the air refractive index (Cn2, m-2/3), and the sensible heat flux (H, W/m^2). In this dataset, a time of 0:30 corresponds to the average data for the period between 0:00 and 0:30, and the data were stored in \*.xlsx format. Moreover, suspicious data were marked in red.  
For more information, please refer to Liu et al. (2018) (for sites information), Liu et al. (2011) (for data processing) in the Citation section.

2、Keywords

Theme：Temperature,Visibility  
Discipline：Atmosphere,Terrestrial Surface  
Places：the cold region hydrology experimental area, Upper reaches of Heihe River, Arou Superstation  
Time：2021

3、Data details

1.Scale：None

2.Projection：

3.Filesize：0.6MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：38.057 | - |
| west：100.457 | - | east：100.471 |
| - | south：38.038 | - |

5、Time frame:2020-12-31 16:00:00+00:00--2021-12-30 16:00:00+00:00

6、Reference method

References to data:

LIU Shaomin, ZHANG Yang, XU Ziwei, REN Zhiguo, TAN Junlei, CHE Tao. Qilian Mountains integrated observatory network: Dataset of Heihe integrated observatory network (Large aperture scintillometer of Arou Superstation, 2021). A Big Earth Data Platform for Three Poles, doi:10.11888/Meteoro.tpdc.2714382022

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.

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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