A Big Earth Data Platform for Three Poles

**HiWATER: Dataset of hydrometeorological observation network (large aperture scintillometer of Daman superstation, 2013)**

1、Description

This dataset contains the flux measurements from the large aperture scintillometer (LAS) at Daman Superstation in the hydrometeorological observation network of Heihe River Basin between 15 September, 2012, and 31 December, 2013. There were two types of LASs at Daman Superstation: German BLS450 (labeled as NQ and AR) and Netherlands Kipp&zonen. The north tower was set up with the Kipp&zonen/BLS450\_AR receiver and the BLS450\_NQ transmitter, and the south tower was equipped with the Kipp&zonen/BLS450\_AR transmitter and the BLS450\_NQ receiver. BLS450\_NQ has been in use since 26 September, 2012, Kipp&zonen has been in use since 23 September, 2013, and the observation period of BLS450\_AR was from 15 September, 2012, to 25 July, 2013. The site (north: 100.379° E, 38.861° N; south: 100.369° E, 38.847° N) was located in Daman irrigation district, which is near Zhangye, Gansu Province. The underlying surfaces between the two towers were corn, orchard, and greenhouse. The elevation is 1556 m. The effective height of the LASs was 22.45 m, and the path length was 1854 m. The data were sampled at 5 Hz and 1 Hz intervals for BLS450 and Kipp&zonen, respectively, then averaged to 1 minute.
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 (BLS450: Cn2>1.43E-13, Kipp&zonen: Cn2>1.54E-13). (2) The data were rejected when the demodulation signal was small (BLS450: Average X Intensity<1000; Kipp&zonen: 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 BLS450 and Kipp&zonen, respectively.
Several instructions were included with the released data. (1) The data were primarily obtained from BLS450\_NQ measurements, and missing flux measurements from the BLS450\_NQ instrument were substituted with measurements from the BLS450\_AR and Kipp&zonen instrument. The missing data were denoted by -6999. Due to the problems of BLS450\_NQ SPU storing and wireless transmission, large amount of data from 11 August to 17 August, 18 August to 20 August, 22 August to 24 August, 27 August to 30 August, 2013, and 1 September to 3 September, 19 September to 23 September, 2013, were not collected. (2) The dataset contained the following variables: data/time (yyyy-m-d h:mm), the structural parameter of the air refractive index (Cn2, m-2/3), and the sensible heat flux (H\_LAS, 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 \*.xls format. Moreover, suspicious data were marked in red.
For more information, please refer to Li et al. (2013) (for hydrometeorological observation network or sites information), Liu et al. (2011) (for data processing) in the Citation section.

2、Keywords

Theme：Radiation,Sensible heat flux
Discipline：Atmosphere
Places：Heihe River Basin, the artificial oasis experimental area in the middle reaches, Daman Superstation
Time：2012-09-15 to 2013-12-31, 2013

3、Data details

1.Scale：None

2.Projection：4326

3.Filesize：0.75MB

4.Data format：文本

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：38.861 | - |
| west：100.379 | - | east：100.379 |
| - | south：38.861 | - |

5、Time frame:2012-09-23 16:00:00+00:00--2014-01-08 16:00:00+00:00

6、Reference method

References to data:

TAN Junlei, LI Xin, XU Ziwei, CHE Tao, REN Zhiguo. HiWATER: Dataset of hydrometeorological observation network (large aperture scintillometer of Daman superstation, 2013). A Big Earth Data Platform for Three Poles, doi:10.3972/hiwater.209.2014.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.

7、Supporting project information

National Natural Science Foundation of China

8、Data resource provider

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