A Big Earth Data Platform for Three Poles

**Qilian Mountains integrated observatory network: Dataset of Heihe integrated observatory network (an observation system of meteorological elements gradient of A’rou Superstation, 2018)**

1、Description

This dataset includes data recorded by the Heihe integrated observatory network obtained from an observation system of Meteorological elements gradient of A’rou Superstation from January 1 to December 31, 2018. The site (100.464° E, 38.047° N) was located on a cold grassland surface in the Caodaban village, A’rou Town, Qilian County, Qinghai Province. The elevation is 3033 m. The installation heights and orientations of different sensors and measured quantities were as follows: air temperature and humidity profile (HMP45C; 1, 2, 5, 10, 15 and 25 m, towards north), wind speed profile (010C; 1, 2, 5, 10, 15 and 25 m, towards north), wind direction profile (020C; 2 m, towards north), air pressure (CS100; 2 m), rain gauge (TE525M; 5 m, towards south), four-component radiometer (CNR4; 5 m, towards south), two infrared temperature sensors (SI-111; 5 m, towards south, vertically downward), photosynthetically active radiation (PAR-LITE; 5 m, towards south, vertically upward), soil heat flux (HFP01SC; 3 duplicates, -0.06 m, 2 m in the south of tower), a TCAV averaging soil thermocouple probe (TCAV; -0.02, -0.04 m, 2 m in the south of tower), soil temperature profile (109; 0, -0.02, -0.04, -0.06, -0.1, -0.15, -0.2, -0.3, -0.4, -0.6, -0.8, -1.2, -1.6, -2, -2.4, -2.8 and -3.2 m, 3 duplicates in -0.04 m and -0.1 m), and soil moisture profile (CS616; -0.02, -0.04, -0.06, -0.1, -0.15, -0.2, -0.3, -0.4, -0.6, -0.8, -1.2, -1.6, -2, -2.4, -2.8 and -3.2 m, 3 duplicates in -0.04 m and -0.1 m).  
The observations included the following: air temperature and humidity (Ta\_1 m, Ta\_2 m, Ta\_5 m, Ta\_10 m, Ta\_15 m and Ta\_25 m; RH\_1 m, RH\_2 m, RH\_5 m, RH\_10 m, RH\_15 m and RH\_25 m) (℃ and %, respectively), wind speed (Ws\_1 m, Ws\_2 m, Ws\_5 m, Ws\_10 m, Ws\_15 m and Ws\_25 m) (m/s), wind direction (WD\_2 m) (°), air pressure (press) (hpa), precipitation (rain) (mm), four-component radiation (DR, incoming shortwave radiation; UR, outgoing shortwave radiation; DLR\_Cor, incoming longwave radiation; ULR\_Cor, outgoing longwave radiation; Rn, net radiation) (W/m2), infrared temperature (IRT\_1 and IRT\_2) (℃), photosynthetically active radiation (PAR) (μmol/(s m-2)), average soil temperature (TCAV, ℃), soil heat flux (Gs\_1, Gs\_2 and Gs\_3) (W/m2), soil temperature (Ts\_0 cm, Ts\_2 cm, Ts\_4 cm\_1, Ts\_4 cm\_2, Ts\_4 cm\_3, Ts\_6 cm, Ts\_10 cm\_1, Ts\_10 cm\_2, Ts\_10 cm\_3, Ts\_15 cm, Ts\_20 cm, Ts\_30 cm, Ts\_40 cm, Ts\_60 cm, Ts\_80 cm, Ts\_120 cm, Ts\_160 cm, Ts\_200 cm, Ts\_240 cm, Ts\_280 cm and Ts\_320 cm) (℃), and soil moisture (Ms\_2 cm, Ms\_4 cm\_1, Ms\_4 cm\_2, Ms\_4 cm\_3, Ms\_6 cm, Ms\_10 cm\_1, Ms\_10 cm\_2, Ms\_10 cm\_3, Ms\_15 cm, Ms\_20 cm, Ms\_30 cm, Ms\_40 cm, Ms\_60 cm, Ms\_80 cm, Ms\_120 cm, Ms\_160 cm, Ms\_200 cm, Ms\_240 cm, Ms\_280 cm and Ms\_320 cm) (%, volumetric water content).  
The data processing and quality control steps were as follows: (1) The AWS data were averaged over intervals of 10 min for a total of 144 records per day. The average soil temperature was rejected during February 16 to March 31 and April 15 to May 20 because of broken of the sensor line; Soil heat flux were wrong occasionally during November to December. The missing data were denoted by -6999. (2) Data in duplicate records were rejected. (3) Unphysical data were rejected. (4) The data marked in red are problematic data. (5) The format of the date and time was unified, and the date and time were collected in the same column, for example, date and time: 2018-9-10 10:30. (6) Finally, the naming convention was AWS+ site no. 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：Soil,Precipitation,Soil temperature,Soil moisture/Water content,Meteorological element  
Discipline：Atmosphere,Terrestrial Surface  
Places：Arou superstation, Heihe Rivr Basin, Hydrology experiment for cold region in the upstream  
Time：2018

3、Data details

1.Scale：None

2.Projection：

3.Filesize：26.1MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：38.047 | - |
| west：100.464 | - | east：100.464 |
| - | south：38.047 | - |

5、Time frame:2018-01-19 00:00:00+00:00--2019-01-18 00:00:00+00:00

6、Reference method

References to data:

TAN Junlei, LI Xin, LIU Shaomin, XU Ziwei, CHE Tao, ZHANG Yang. Qilian Mountains integrated observatory network: Dataset of Heihe integrated observatory network (an observation system of meteorological elements gradient of A’rou Superstation, 2018). A Big Earth Data Platform for Three Poles, doi:10.11888/Meteoro.tpdc.2707772019

References to articles:

Liu SM, Li X, Xu ZW, Che T, Xiao Q, Ma MG, Liu QH, Jin R, Guo JW, Wang LX, Wang WZ, Qi Y, Li HY, Xu TR, Ran YH, Hu XL, Shi SJ, Zhu ZL, Tan JL, Zhang Y, Ren ZG. The Heihe Integrated Observatory Network: A basin-scale land surface processes observatory in China. Vadose Zone Journal, 2018, 17:180072. 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  
  
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

name: XU Ziwei  
unit: Beijing Normal University  
email: xuzw@bnu.edu.cn  
  
name: TAN Junlei  
unit:   
email: tanjunlei@163.com  
  
name: ZHANG Yang  
unit:   
email: zhangyang@lzb.ac.cn  
  
name: LI Xin  
unit:   
email: xinli@itpcas.ac.cn  
  
name: LIU Shaomin  
unit: Beijing Normal University  
email: smliu@bnu.edu.cn  
  
name: CHE Tao  
unit:   
email: chetao@lzb.ac.cn