A Big Earth Data Platform for Three Poles

**HiWATER: Dataset of hydrometeorological observation network (an observation system of meteorological elements gradient of A’rou Superstation, 2013)**

1、Description

This dataset includes data recorded by the Hydrometeorological observation network obtained from an observation system of Meteorological elements gradient of A’rou Superstation between 14 October, 2012, and 31 December, 2013. 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 AWS data were averaged over intervals of 30 min before 4 December, 2012 for a total of 48 records per day). The average soil temperature, soil heat flux, soil temperature and soil moisture were missing during 30 November, 2012 and 8 December, 2012, 21 April, 2013 and 31 May, 2013 because of insufficient power supply; Wind speed in 2 m and 5 m were missing during 28 December, 2012 and 28 March, 2012 because of datalogger repairing. 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: 2013-6-10 10:30. (6) the naming rule is: AWS+ site name.  
For information of hydrometeorological network or station, please refer to Liu et al.(2018), and for observation data processing, please refer to Liu et al.(2011).

2、Keywords

Theme：Precipitation,Meteorological element  
Discipline：Atmosphere  
Places：Heihe River Basin, A’rou Superstation, the cold region hydrology experimental area in the upper reaches  
Time：2012-10-14 to 2013-12-31, 2013

3、Data details

1.Scale：None

2.Projection：4326

3.Filesize：30.41MB

4.Data format：文本

4、Space scope

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

5、Time frame:2012-10-26 11:00:00+00:00--2014-01-12 12:00:00+00:00

6、Reference method

References to data:

TAN Junlei, LI Xin, LIU Shaomin, XU Ziwei, CHE Tao, ZHANG Yang. HiWATER: Dataset of hydrometeorological observation network (an observation system of meteorological elements gradient of A’rou Superstation, 2013). A Big Earth Data Platform for Three Poles, doi:10.3972/hiwater.175.2014.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.  
  
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

7、Supporting project information

National Natural Science Foundation of China

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