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, 2016)**

1、Description

The data set contains data from January 1, 2016 to December 31, 2016 from the meteorological element gradient observation system of alou superstation, upstream of the heihe hydrometeorological observation network.The station is located in caoban village, aru township, qilian county, qinghai province.The longitude and latitude of the observation point are 100.4643e, 38.0473n and 3033m above sea level.The air temperature, relative humidity and wind speed sensors are located at 1m, 2m, 5m, 10m, 15m and 25m respectively, with a total of six layers facing due north.The wind direction sensor is located at 10m, facing due north;The barometer is installed at 2m;The tilting bucket rain gauge is installed on the observation tower 40m of super aru station;The four-component radiometer is installed at 5m, facing due south;Two infrared thermometers are installed at 5m, facing due south, and the probe facing vertically downward.The photosynthetic effective radiometer is installed at 5m, facing due south, and the probe facing vertically upward.Part of the soil sensor is buried at 2m in the south direction of the tower body, and the soil heat flow plate (self-correcting formal) (3 pieces) are all buried at 6cm underground.The mean soil temperature sensor TCAV is buried 2cm and 4cm underground.The soil temperature probe is buried at the surface of 0cm and underground of 2cm, 4cm, 6cm, 10cm, 15cm, 20cm, 30cm, 40cm, 60cm, 80cm, 120cm, 160cm, 200cm, 240cm, 280cm and 320cm, among which the 4cm and 10cm layers have three repeats.The soil water sensor is buried underground 2cm, 4cm, 6cm, 10cm, 15cm, 20cm, 30cm, 40cm, 60cm, 80cm, 120cm, 160cm, 200cm, 240cm, 280cm and 320cm respectively, among which the 4cm and 10cm layers have three duplexes.  
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).  
Processing and quality control of observed data :(1) ensure 144 pieces of data every day (every 10min), and mark by -6999 in case of data missing;Sensor problem of soil heat flux G1 between December 8, 2016 and December 16, 2016, data missing;(2) excluding the time with duplicate records;(3) data that obviously exceeds the physical significance or the range of the instrument is deleted;(4) the part marked with red letter in the data is the data in question;(5) date and time have the same format, and date and time are in the same column.For example, the time is: 2016-6-10-10:30;(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：2016-01-01 to 2016-12-31, 2016

3、Data details

1.Scale：None

2.Projection：4326

3.Filesize：25.9MB

4.Data format：文本

4、Space scope

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

5、Time frame:2016-01-11 08:00:00+00:00--2017-01-10 08:00:00+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, 2016). A Big Earth Data Platform for Three Poles, doi:10.3972/hiwater.454.2017.db2017

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

8、Data resource provider

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