A Big Earth Data Platform for Three Poles

**Observation of water and heat flux in alpine meadow ecosystem——an observation system of Meteorological elements gradient of A’rou Superstation, 2015-2017**

1、Description

The data set contains the data of the meteorological element gradient observation system of the upper reaches of the heihe hydrological and meteorological observation network's arou super station on January 1, 2015 and December 31, 2017.Site is located in qilian county, qinghai province, arou township grass daban village, the underlying surface is alpine grassland.The longitude and latitude of the observation point are 100.4643E,38.0473N, and the altitude is 3033m.The air temperature, relative humidity and wind speed sensors are installed at 1m, 2m, 5m, 10m, 15m and 25m, respectively. There are 6 floors in total, facing due north.Wind direction sensor is mounted at 10m, facing due north;The barometer is installed at 2m;The tilting rain gauge is installed on the 40m observation tower of the super station in aru.The four-component radiometer is installed at 5m, facing due south;Two infrared thermometers are mounted at 5m, facing due south, with the probe facing down vertically;The photosynthetic effective radiometer was installed at 5m, facing south, and the probe direction was vertical upward.Part of the soil sensor is buried 2m away from the south of the tower, and the soil heat flow plate (self-calibration) (3 pieces) are all buried 6cm underground.Mean soil temperature sensor (tcavr) was buried 2cm and 4cm underground.The soil temperature probe is buried at the surface 0cm and underground 2cm, 4cm, 6cm, 10cm, 15cm, 20cm, 30cm, 40cm, 60cm, 80cm, 120cm, 160cm, 200cm, 240cm, 280cm and 320cm. There are three duplicates in the two layers of 4cm and 10cm.The soil moisture sensor was buried in the ground at 2cm, 4cm, 6cm, 10cm, 15cm, 20cm, 30cm, 40cm, 60cm, 80cm, 120cm, 160cm, 200cm, 240cm, 280cm and 320cm respectively, and there were three replications in the two layers of 4cm and 10cm.  
Observation items include: wind speed (WS\_1m, WS\_2m, WS\_5m, WS\_10m, WS\_15m, WS\_25m) (unit: m/s), wind direction (WD\_10m) (unit: degrees), air temperature and humidity (Ta\_1m, Ta\_2m, Ta\_5m, Ta\_10m, Ta\_15m, Ta\_25m and RH\_1m, RH\_2m, RH\_5m, RH\_10m, RH\_5m) (unit: Celsius, percentage), air pressure (Press) (unit:Hundred mpa), precipitation (Rain) (unit: mm), the radiation of four component (DR, UR, DLR\_Cor, ULR\_Cor, Rn) (unit: watts per square meter), the surface radiation temperature (IRT\_1, IRT\_2) (unit: c), photosynthetic active radiation (PAR) (unit: second micromoles/m2), the average soil temperature (TCAV) (unit: c), soil heat flux (Gs\_1, Gs\_2, Gs\_3) (unit:W/m2), soil moisture (Ms\_2cm, Ms\_4cm\_1, Ms\_4cm\_2, Ms\_4cm\_3, Ms\_6cm, Ms\_10cm\_1, Ms\_10cm\_2, Ms\_10cm\_3, Ms\_15cm, Ms\_20cm, Ms\_30cm, Ms\_60cm, Ms\_80cm, Ms\_120cm, Ms\_160cm, Ms\_280cm, Ms\_320cm) (unit:Soil temperature (Ts\_0cm, Ts\_2cm, Ts\_4cm\_1, Ts\_4cm\_2, Ts\_4cm\_3, Ts\_6cm, Ts\_10cm\_1, Ts\_10cm\_2, Ts\_15cm, Ts\_20cm, Ts\_30cm, Ts\_60cm, Ts\_80cm, Ts\_120cm, Ts\_160cm, Ts\_280cm, Ts\_320cm) (unit:Degrees Celsius.  
Processing and quality control of observation data :(1) 144 data per day (every 10min) should be ensured.The data of soil temperature and humidity and soil heat flux were missing between September 9, 2015 and September 19, 2015 and between September 30 and October 20, 2015 due to power supply problems.(2) eliminate the moments 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 letters in the data is questionable data;(5) the format of date and time is uniform, and the date and time are in the same column.For example, the time is: June 10, 2015 10:30;(6) naming rules: AWS+ site name.  
For information of hydrometeorological network or site, please refer to Li et al. (2013), and for data processing, please refer to Liu et al. (2011).

2、Keywords

Theme：Soil,Precipitation,Winds,Precipitation amount,Soil temperature,Humidity/Dryness,Soil moisture/Water content  
Discipline：Atmosphere,Terrestrial Surface  
Places：A’rou Superstation, the cold region hydrology experimental area in the upper reaches, The upper reaches of heihe river basin  
Time：2015-2017

3、Data details

1.Scale：None

2.Projection：

3.Filesize：77.5MB

4.Data format：None

4、Space scope

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

5、Time frame:2015-01-13 00:00:00+00:00--2018-01-12 00:00:00+00:00

6、Reference method

References to data:

TAN Junlei, LI Xin, LIU Shaomin, XU Ziwei, CHE Tao, ZHANG Yang. Observation of water and heat flux in alpine meadow ecosystem——an observation system of Meteorological elements gradient of A’rou Superstation, 2015-2017. A Big Earth Data Platform for Three Poles, doi:10.11888/Geogra.tpdc.2702022019

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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., 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.  
  
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

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