A Big Earth Data Platform for Three Poles

**Qilian Mountains integrated observatory network: Dataset of Heihe integrated observatory network (Cosmic-ray observation system of soil moisture of Arou Superstation, 2021)**

1、Description

This dataset includes data recorded by the Heihe integrated observatory network obtained from a Cosmic-ray Soil Moisture Observing System of soil moisture of Arou Superstation from January 1 to December 31, 2021. The site (100.4643° E, 38.0473° N) was located in the Caodaban Village, near Qilian County in Qinghai Province. The elevation is 3033 m. The bottom of the probe was 0.5 m above the ground; the sampling interval was 1 hour.  
The raw COSMOS data include the following: battery (Batt, V), temperature (T, C), relative humidity (RH, %), air pressure (P, hPa), fast neutron counts (N1C, counts per hour), thermal neutron counts (N2C, counts per hour), sample time of fast neutrons (N1ET, s), and sample time of thermal neutrons (N2ET, s). The distributed data include the following variables: Date, Time, P, N1C, N1C\_cor (corrected fast neutron counts) and VWC (volume soil moisture, %), which were processed as follows:  
1) Data were removed and replaced by -6999 when (a) the battery voltage was less than 11.8 V, (b) the relative humidity was greater than 80% inside the probe box, (c) the counting data were not of one-hour duration and (d) neutron count differed from the previous value by more than 20%; 2) An air pressure correction was applied to the quality-controlled raw data according to the equation contained in the equipment manual; 3) After the quality control and corrections were applied, soil moisture was calculated using the equation in Zreda et al. (2012), where N0 is the neutron counts above dry soil and the other variables are fitted constants that define the shape of the calibration function. Here, the parameter N0 was calibrated using the in situ observed soil moisture by SoilNET within the footprint; 4) Based on the calibrated N0 and corrected N1C, the hourly soil moisture was computed using the equation from the equipment manual. Moreover, suspicious data were marked in red.  
For more information, please refer to Liu et al. (2018) (for sites information), Zhu et al. (2015) for data processing) in the Citation section.

2、Keywords

Theme：Surface Freeze-thaw Cycle/State,Hydrology  
Discipline：Terrestrial Surface,Cryosphere  
Places：the cold region hydrology experimental area, Heihe River Basin, Arou Superstation  
Time：2021

3、Data details

1.Scale：None

2.Projection：None

3.Filesize：1.0MB

4.Data format：None

4、Space scope

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

5、Time frame:2020-12-31 16:00:00+00:00--2021-12-30 16:00:00+00:00

6、Reference method

References to data:

LIU Shaomin, ZHANG Yang, XU Ziwei, ZHU Zhongli, REN Zhiguo, TAN Junlei, CHE Tao. Qilian Mountains integrated observatory network: Dataset of Heihe integrated observatory network (Cosmic-ray observation system of soil moisture of Arou Superstation, 2021). A Big Earth Data Platform for Three Poles, doi:10.11888/Atmos.tpdc.2724692022

References to articles:

Zhu, Z.L., Tan, L., Gao, S.G., & Jiao, Q.S. (2015). Oberservation on soil moisture of irrigated cropland by cosmic-ray probe. IEEE Geoscience and Remote Sensing Letters, 12(3), 472-476. doi:10.1109/LGRS.2014.2346784.  
  
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.

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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