A Big Earth Data Platform for Three Poles

**Qilian Mountains integrated observatory network: Dataset of Heihe integrated observatory network (an cosmic-ray observation system of soil moisture of Daman Superstation, 2018)**

1、Description

This dataset includes data recorded by the Heihe integrated observatory network obtained from a Cosmic-ray Soil Moisture Observing System for soil moisture observation at the Daman Superstation from January 1 to December 31, 2018. The site (100.372° E, 38.856° N) was located on a cropland (maize surface) in the Daman irrigation area, which is near Zhangye city, Gansu Province. The elevation is 1556 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 variables: 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：Soil,Cosmic-ray soil moisture observing system  
Discipline：Terrestrial Surface  
Places：The artificial oasis experimental area, Heihe River Basin, Daman superstation  
Time：2018

3、Data details

1.Scale：None

2.Projection：None

3.Filesize：1.0MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：38.8555 | - |
| west：100.3722 | - | east：100.3722 |
| - | south：38.8555 | - |

5、Time frame:2018-01-17 08:00:00+00:00--2019-01-16 08:00:00+00:00

6、Reference method

References to data:

TAN Junlei, LI Xin, XU Ziwei, ZHU Zhongli, CHE Tao, ZHANG Yang, REN Zhiguo. Qilian Mountains integrated observatory network: Dataset of Heihe integrated observatory network (an cosmic-ray observation system of soil moisture of Daman Superstation, 2018). A Big Earth Data Platform for Three Poles, doi:10.11888/Hydro.tpdc.2707642019

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.  
  
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.

7、Supporting project information

Pan-Third Pole Environment Study for a Green Silk Road-A CAS Strategic Priority A Program  
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8、Data resource provider

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