A Big Earth Data Platform for Three Poles

**The development of devices monitoring ecosystem energy and water flux: Mesoscale soil moisture measurement system (2020)**

1、Description

This dataset includes data recorded by the Heihe integrated observatory network obtained from a mesoscale soil moisture measurement system of soil moisture of Daman Superstation from January 1 to December 31, 2020. The site (100.372° E, 38.856° N) was located on a cropland (maize surface) in the Daman irrigation, 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: battery (Batt, V), temperature (T, C), relative humidity (RH, %), air pressure (P, hPa), fast neutron counts (N1C, counts per hour). 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 moisture,Hydrology
Discipline：Terrestrial Surface
Places：Daman superstation, Heihe River basin,
Time：2020

3、Data details

1.Scale：None

2.Projection：

3.Filesize：0.5MB

4.Data format：None

4、Space scope

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

5、Time frame:2019-12-31 16:00:00+00:00--2020-12-30 16:00:00+00:00

6、Reference method

References to data:

LIU Shaomin, XU Ziwei, QIAO Yunfeng. The development of devices monitoring ecosystem energy and water flux: Mesoscale soil moisture measurement system (2020). A Big Earth Data Platform for Three Poles, doi:10.11888/Hydro.tpdc.2717922021

References to articles:

Li, X., Zhao, N., Jin, R., Liu, S.M., Sun, X.M., Wen, X.F., Wu, D.X., Zhou, Y., Guo, J.W., Chen, S.P., Xu, Z.W., Ma, M.G., Wang, T.M., Qu, Y.H., Wang, X.W., Wu, F.M., &Zhou, Y.K. (2019). Internet of Things to network smart devices for ecosystem monitoring. Science Bulletin, 64, 1234–1245.

Wang, Binbin, Ma, Yaoming, Chen, Xuelong, Ma, Weiqiang, Su, Zhongbo, Menenti, Massimo. Observation and simulation of lake-air heat and water transfer processes in a high-altitude shallow lake on the Tibetan Plateau. Journal of Geophysical Research: Atmospheres, 2015, 120(24):2015JD023863. doi:10.1002/2015JD023863

Liu, S., Li, X., Xu, Z., Che, T., Xiao, Q., Ma, M., Liu, Q., Jin, R., Guo, J., Wang, L., Wang, W., Qi, Y., Li, H., Xu, T., Ran, Y., Hu, X., Shi, S., Zhu, Z., Tan, J., Zhang, Y., Ren, Z. (2018). The Heihe Integrated Observatory Network: A basin‐scale land surface processes observatory in China. Vadose Zone Journal, 17,180072. https://doi.org/10.2136/vzj2018.04.0072.

7、Supporting project information

The development of devices monitoring ecosystem energy and water flux

8、Data resource provider

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