A Big Earth Data Platform for Three Poles

**HiWATER: Dataset of hydrometeorological observation network (cosmic-ray soil moisture of Daman Superstation, 2013)**

1、Description

This dataset includes the observational data from 20 September, 2012, through 31 December, 2013, collected by the Cosmic-ray Soil Moisture Observation System (COSMOS), called crs, which waslocated at 100.372° E, 38.856° N and 1557 m above sea level,near the Daman Superstation in the Daman Irrigation District, Zhangye City, Gansu Province. The land cover in the footprint was a maize crop. The bottom of the probe was 0.5 m above the ground, and the sampling interval was 1 hour.  
The raw COSMOS data include the following: battery (Batt, V), temperature (T, ℃), relative humidity (RH, %), air pressure (P, hPa), fast neutron counts (N1C, counts per hour), thermal neutron counts (N2C, counts per hour), the sample time of fast neutrons (N1ET, s), and the 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) Quality control  
Data were deleted and replaced by -6999 when (a) the battery voltage was less than 11.8 V, (b) the relative humidity exceeded 80% inside the probe box, (c) the samping durationwere less than 59 minutes or greater than 61 minutes and (d) the neutron count differed from the previous value by more than 20%.  
2) Air pressure correction  
An air pressure correction was applied to the quality-controlled raw data according to the equation containedin the equipment manual.  
3) Calibration  
After the quality control and corrections were applied, the soil moisture was calculated using the equation in Desilets et al. (2010), 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 recordedby SoilNET within the footprint.   
4) Soil moisture computation  
Based on the calibrated N0 and corrected N1C, the hourly soil moisture was computed using the equation specified in the equipment manual.  
For more information, please refer to Liu et al. (2018) (for hydrometeorological observation network or sites information), Zhu et al. (2015) (for data processing) in the Citation section.

2、Keywords

Theme：Soil,Cosmic-ray soil moisture observing system,Soil moisture/Water content  
Discipline：Terrestrial Surface  
Places：Heihe River Basin, the artificial oasis experimental area in the middle reaches, Daman Superstation  
Time：2012-09-20 to 2013-12-31, 2013

3、Data details

1.Scale：None

2.Projection：4326

3.Filesize：0.44MB

4.Data format：CSV

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：38.8556 | - |
| west：100.3723 | - | east：100.3723 |
| - | south：38.8556 | - |

5、Time frame:2012-10-02 02:00:00+00:00--2014-01-12 03:00:00+00:00

6、Reference method

References to data:

LI Xin, LIU Shaomin, XU Ziwei, ZHU Zhongli. HiWATER: Dataset of hydrometeorological observation network (cosmic-ray soil moisture of Daman Superstation, 2013). A Big Earth Data Platform for Three Poles, doi:10.3972/hiwater.193.2014.db2016

References to articles:

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.  
  
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.

7、Supporting project information

National Natural Science Foundation of China

8、Data resource provider

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