A Big Earth Data Platform for Three Poles

**HiWATER: Dataset of hydrometeorological observation network (cosmic-ray soil moisture of Daman Superstation, 2016)**

1、Description

The data set contains cosmic ray instrument (CRS) observations from January 1, 2016 to December 31, 2016.The station is located in gansu province zhangye city da man irrigated area farmland, under the surface is corn field.The longitude and latitude of the observation point are 100.3722e, 38.8555n, and 1556m above sea level. The bottom of the instrument probe is 0.5m from the ground, and the sampling frequency is 1 hour.  
Original observations of cosmic ray instruments include: voltage Batt (V), temperature T (c), relative humidity RH (%), pressure P (hPa), fast neutron number N1C (hr), thermal neutron number N2C (hr), fast neutron sampling time N1ET (s) and thermal neutron sampling time N2ET (s).The data published are processed and calculated. The data headers include Date Time, P (pressure hPa), N1C (fast neutron number/hour), N1C\_cor (fast neutron number/hour with revised pressure) and VWC (soil volume moisture content %). The main processing steps include:  
1) data filtering  
There are four criteria for data screening :(1) data with voltage less than and equal to 11.8 volts are excluded;(2) remove the data of air relative humidity greater than and equal to 80%;(3) data whose sampling interval is not within 60±1 minute are excluded;(4) the number of fast neutrons removed changed by more than 200 in one hour compared with that before and after.In addition, the missing data was supplemented by -6999.  
2) air pressure correction  
According to the fast neutron pressure correction formula mentioned in the instrument instruction manual, the original data were revised to obtain the revised fast neutron number N1C\_cor.  
3) instrument calibration  
In the process of calculating soil moisture, N0 in the calculation formula should be calibrated.N0 is the number of fast neutrons under the condition of soil drying. The measured soil moisture (or through relatively dense soil moisture wireless sensor) m (Zreda et al.  
Here, according to Soilnet soil water data in the source area of the instrument, the instrument was calibrated to establish the relationship between soil volumetric water content v and fast neutrons.Selection of dry and wet conditions are the obvious difference of June 26, 2012-27 and July 16-17, four days of data, including June 26-27 rate data showed that soil moisture is small, so the selection of 4 cm, 10 and 20 cm as the rate of the three values of average data, its range is 22% 30%, and July 16-17 rate data showed that soil moisture is bigger, so select 4 cm and 10 cm as two value average rate data, the range of 28% - 39%, final N0 an average of 3597.  
4) soil moisture calculation  
According to the formula, the hourly soil water content data were calculated.  
Please refer to Liu et al. (2018) for information of hydrometeorological network or site, and Zhu et al. (2015) for observation data processing.

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：2016-01-01 to 2016-12-31, 2016

3、Data details

1.Scale：None

2.Projection：4326

3.Filesize：433.0MB

4.Data format：CSV

4、Space scope

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

5、Time frame:2016-01-21 16:00:00+00:00--2017-01-20 16:00:00+00:00

6、Reference method

References to data:

TAN Junlei, LI Xin, LIU Shaomin, XU Ziwei, ZHU Zhongli, CHE Tao, REN Zhiguo. HiWATER: Dataset of hydrometeorological observation network (cosmic-ray soil moisture of Daman Superstation, 2016). A Big Earth Data Platform for Three Poles, doi:10.3972/hiwater.440.2016.db2017

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.  
  
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

7、Supporting project information

8、Data resource provider

name: ZHU Zhongli  
unit:   
email: zhuzl@bnu.edu.cn  
  
name: XU Ziwei  
unit: Beijing Normal University  
email: xuzw@bnu.edu.cn  
  
name: TAN Junlei  
unit:   
email: tanjunlei@163.com  
  
name: REN Zhiguo  
unit: Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences  
email:   
  
name: LI Xin  
unit:   
email: xinli@itpcas.ac.cn  
  
name: LIU Shaomin  
unit: Beijing Normal University  
email: smliu@bnu.edu.cn  
  
name: CHE Tao  
unit:   
email: chetao@lzb.ac.cn