A Big Earth Data Platform for Three Poles

**The atmospheric forcing data in the Heihe River Basin (2000-2021)**

1、Description

Near surface atmospheric forcing data were produced by using Wether Research and Forecasting (WRF) model over the Heihe River Basin at hourly 0.05 \* 0.05 DEG resolution, including the following variables: 2m temperature, surface pressure, water vapor mixing ratio, downward shortwave & upward longwave radiation, 10m wind field and the accumulated precipitation. The forcing data were validated by observational data collected by 15 daily Chinese Meteorological Bureau conventional automatic weather station (CMA), a few of Heihe River eco-hydrological process comprehensive remote sensing observation (WATER and HiWATER) site hourly observations were verified in different time scales, draws the following conclusion: 2m surface temperature, surface pressure and 2m relative humidity are more reliable, especially 2m surface temperature and surface pressure, the average errors are very small and the correlation coefficients are above 0.96; correlation between downward shortwave radiation and WATER site observation data is more than 0.9; The precipitation agreed well with observational data by being verified based on rain and snow precipitation two phases at yearly, monthly, daily time scales . the correlation coefficient between rainfall and the observation data at monthly and yearly time scales were up to 0.94 and 0.84; the correlation between snowfall and observation data at monthly scale reached 0.78, the spatial distribution of snowfall agreed well with the snow fractional coverage rate of MODIS remote sensing product. Verification of liquid and solid precipitation shows that WRF model can be used for downscaling analysis in complex and arid terrain of Heihe River Basin, and the simulated data can meet the requirements of watershed scale hydrological modeling and water resources balance.  
The data for 2000-2012 was provided in 2013.  
The data for 2013-2015 was updated in 2016.  
The data for 2016-2018 was updated in 2019.  
The data for 2019-2021 was updated in 2021.

2、Keywords

Theme：Precipitation,Radiation,Temperature,Precipitation rate,Winds,Shortwave radiation,Humidity/Dryness,Longwave radiation,Air temperature  
Discipline：Atmosphere  
Places：Heihe River Basin  
Time：2000-2021

3、Data details

1.Scale：None

2.Projection：

3.Filesize：80000.0MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：42.5 | - |
| west：97.5 | - | east：102.5 |
| - | south：37.5 | - |

5、Time frame:1999-12-31 16:00:00+00:00--2021-12-31 16:00:00+00:00

6、Reference method

References to data:

PAN Xiaoduo. The atmospheric forcing data in the Heihe River Basin (2000-2021). A Big Earth Data Platform for Three Poles, doi:10.11888/Meteoro.tpdc.2712452020

References to articles:

Pan, X.D., Li, X., Shi, X.K., Han, X.J., Luo, L.H., Wang, L.X.. (2012). Dynamic downscaling of near-surface air temperature at the basin scale using WRF–a case study in the Heihe River Basin, China. Frontiers of Earth Science, 6(3): 314-323, doi: 10.1007/s11707-012-0306-2.  
  
Pan, X.D., Li, X.. (2011). Validation of WRF model on simulating forcing data for Heihe River Basin. Sciences in Cold and Arid Regions, 3(4): 344-357, doi: 10.3724/SP.J.1226.2011.00344.  
  
潘小多, & 马瀚青. (2019). 2000—2016年基于wrf模式的0.05°×0.05°黑河流域近地表大气驱动数据. 高原气象, 38(01), 209-219.

7、Supporting project information

8、Data resource provider

name: PAN Xiaoduo  
unit: Institute of Tibetan Plateau Research, CAS  
email: panxd@itpcas.ac.cn