A Big Earth Data Platform for Three Poles

**CNRDv1.0: the China natural runoff dataset version 1.0（1961-2018）**

1、Description

Water is one of the most direct mediums through which people perceive the effects of climate change. The flow regimes that people rely on are influenced by large-scale climate change, and identifying changes to these regimes and determining their causes requires reliable, spatiotemporally continuous runoff records. China is climate vulnerable due to its remarkable topographic gradients, monsoon climate, and rapid economic development. Climate change has increased the urgency of understanding, regulating, and forecasting China’s freshwater flows. Yet, available global and regional runoff data in China are produced from sparse, poor-quality gauged station data that have been acquired over different time scales. Our research presents a new long-term, high-quality natural runoff dataset, named the China Natural Runoff Dataset version 1.0 (CNRD v1.0) for driving hydrological and climate studies over China. It will also contribute to the global runoff database. CNRD v1.0 provides daily, monthly, and annual 0.25-degree natural runoff estimates for the period of 1 January 1961 to 31 December 2018 over China.

CNRD v1.0 is generated using the Variable Infiltration Capacity macroscale hydrological model, which was used to fill in gaps or construct time series of comparable lengths. To control the model performance and thus our dataset quality, the model’s sensitive parameters are automatically calibrated using an adaptive surrogate modeling‐based optimization algorithm based on monthly natural or near-natural streamflow data from 200 hydrological gauge stations—more than in previous studies—with low fractions of missing data. Another important quality control adopted for this dataset was the use of a multiscale parameter regionalization technique to estimate model parameters for ungauged basins.

Overall, the results show well-calibrated parameters for most gauged catchments, and the skill scores, the Nash–Sutcliffe model efficiency coefficient (NSE) present high values for all catchments, with an average of 0.83 and 0.80 for calibration and validation modes, respectively. The multiscale parameter regionalization technique offered the best regionalization solution (median NSE = 0.76 for the calibration period and 0.72 for the validation period. The results overall show well-calibrated and regionalized parameters for the hydrological model thus for the long-term runoff reconstruction. By the cell-to-cell comparisons between the CNRD v1.0 with the two global runoff datasets, ISIMIP and GRUN, we found that our datasets show more continuous transitions in runoff dis¬tribution compared to ISIMIP and GRUN across China, and perform well in representing the geographic distribution of China’s water resources across complex terrain and climate regions.

2、Keywords

Theme：Surface Water,Drainage Basin and River System,Hydrology,Hydrological models,main channel and tributary,Runoff
Discipline：Terrestrial Surface
Places：China
Time：1961-2018

3、Data details

1.Scale：None

2.Projection：WGS84

3.Filesize：201.44MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：55.0 | - |
| west：70.0 | - | east：140.0 |
| - | south：17.0 | - |

5、Time frame:1960-12-31 16:00:00+00:00--2018-12-30 16:00:00+00:00

6、Reference method

References to data:

GOU Jiaojiao, MIAO Chiyuan. CNRDv1.0: the China natural runoff dataset version 1.0（1961-2018）. A Big Earth Data Platform for Three Poles, doi:10.11888/Atmos.tpdc.2728642022

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7、Supporting project information

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