A Big Earth Data Platform for Three Poles

**GRFRV1.0: Global Reach-level 3-hourly river flood reanalysis (1980-2019)**

1、Description

The global reach-level 3-hourly river flood reanalysis (GRFR) dataset includes 1) global 0.05 degree, 3-hourly/daily runoff data, 2) 3hourly/daily naturalized river discharge at 2.94 million river reaches, 3) global 3-hourly river flood events from 1980 to 2019, 4) underlying hydrography MERIT-Basins.  
Grounded on recent breakthroughs in global runoff hydrology, river modeling, high-resolution hydrography, and climate reanalysis, the 3-hourly river discharge record globally for 2.94 million river reaches during the 40-yr period of 1980–2019 was developed. The underlying modeling chain consists of the VIC land surface model (0.05°, 3-hourly) that is well calibrated and bias-corrected and the RAPID routing model (2.94 million river and catchment vectors), with precipitation input from MSWEP and other meteorological fields downscaled from ERA5. Flood events (above 2-yr return) and their characteristics (number, spatial distribution, and seasonality) were extracted and studied. Validations against 3-hourly flow records from 6,000+ gauges in CONUS and daily records from 14,000+ gauges globally show good modeling performance across all flow ranges, good skills in reconstructing flood events (high extremes), and the benefit of (and need for) sub-daily modeling.  
The GRFR database represents a pioneering effort on global reach-level flood reanalysis and may offer new opportunities for global flood studies in terms of baseline data and potential research pathways. Also, it can better help river-observing satellite missions to develop their discharge algorithms.

2、Keywords

Theme：river routing,Runoff,Surface Water,Floods,land surface model,global hydrology,Discharge/Flow,Hydrology  
Discipline：Terrestrial Surface  
Places：Globe  
Time：1980-2019

3、Data details

1.Scale：None

2.Projection：

3.Filesize：491520.0MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：90.0 | - |
| west：-180.0 | - | east：180.0 |
| - | south：-60.0 | - |

5、Time frame:1978-12-31 16:00:00+00:00--2019-12-30 16:00:00+00:00

6、Reference method

References to data:

LIN Peirong , PAN Ming , YANG Yuan . GRFRV1.0: Global Reach-level 3-hourly river flood reanalysis (1980-2019). A Big Earth Data Platform for Three Poles, doi:10.11888/Terre.tpdc.2729012022

References to articles:

Yang, Y., Pan, M., Lin, P.R., Beck, H.E., Zeng, Z.Z., Yamazaki, D., David, C.H., Lu, H., Yang, K., Hong, Y., and Wood, E.F. (2021). Global Reach-level 3-hourly river flood reanalysis (1980-2019). Bulletin of the American Meteorological Society, 102(11), E2086-E2105.

7、Supporting project information

8、Data resource provider

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