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Evaluation of Reanalysis and TRMM Products Using a New Gauge-Based Analysis of Daily Precipitation over China

Tianbao Zhao^{1*}, Akiyo Yatagai², Ailikun¹

¹IAP/CAS, ²RIHN

In this study, a new gauge-based analysis of daily precipitation (regard as observations) developed by the "Asian Precipitation Highly-Resolved Observational Data Integration Towards Evaluation of the Water Resources (APHRODITE)" project will be used to validate the precipitation products from NCEP-NCAR, NCEP-DOE, ERA-40 and JRA-25 reanalysis over China, a typical monsoon region in East Asia for a 25-year period from 1979 to 2003. The applicability represented by reanalyzed precipitation in climate research will be analyzed through multi-statistical diagnostic analysis methods on different spatio-temporal scales, especially in seasonal and interannual variation over China. At same time, we developed the 0.25-degree daily precipitation data from 756 Chinese stations using the APHRODITE data analysis system from 1960 to 2008. And such products were used to evaluate the Tropical Rainfall Measuring Mission (TRMM) merged high quality (HQ)/infrared (IR) precipitation over south China, especially in the Yangtze-Huai River Valley of China during the periods 1998-2008. The main results about this study reveal that the ERA-40 and JRA-25 are better than NCEP-NCAR and NCEP-DOE to describe the spatial distribution and temporal variation represented by observations in most regions of East Asia, but the NCEP-DOE has a better ability to represent the variation of Meiyu belt in the Yangtze-Huai River Valley of China. With regard to the magnitude of the precipitation difference between the reanalyses and the observations, the JRA-25 is closer to the observed precipitation than others over most domains. The TRMM product has a good performance to depict the spatio-temporal variations of rainfall in south China, but has larger variability than observations. Whereas, some uncertainties existed in our results are still needed to discuss due to the difference of data resolution and other issues.

Keywords: reanalysis datasets, daily precipitation, applicability evaluation, China