[EE] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-AS Atmospheric Sciences, Meteorology & Atmospheric Environment

[A-AS05]Precipitation Extreme

convener:Akiyo Yatagai(Hirosaki University)
Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
Predicting future hydro-meteorological conditions due to human-induced climate change is a major concern. In particular, the change of extreme events are focused by the international scientific and political frameworks, such as WCRP and IPCC. Especially, heavy precipitation often induces disasters such as flood and landslides, and drought is often linked to food crisis. Japanese science community has lead establishment of a dense network of rain-gauge observation such as AMeDAS and developing accurate grid precipitation data over Asia such as APHRODITE as well as high-resolution climate modeling and satellite precipitation estimates. Facing the urgent task of evaluating, forecasting precipitation extremes and mitigating consequence disasters, there seems to be some gaps between the communities. Hence, we propose a session with focusing on extreme precipitation to assemble scientists of tacking this issue with different methods. We also welcome topics on evaluating related meteorological parameters such as snowfall and temperature and studying disasters which are related to extreme precipitation (e.g. typhoon, landslides and drought).

[AAS05-P02]Fidelity of the precipitation and reanalysis datasets and global climate models in representation of extreme precipitation in East China

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Disasters caused by extreme precipitation account for 70% of the natural disasters in China. Reliable prediction of extreme precipitation is vitally important in disaster prevention and mitigation. Realistic reproduction of historical extreme precipitation events has been challenging for both data reanalysis and global climate models (GCMs) simulation. This work aimed to assess the fidelities of the combined gridded observational precipitation datasets, reanalysis datasets and GCMs (CMIP5 and the FGOALS-f2) in representing extreme precipitation over East mainland China. The assessment uses 756 stations rain gauge data as ground truth, and focuses on the probability distribution function of daily precipitation as a function of intensity and the spatial structure of the extreme precipitation days. The TRMM satellite observation displays similar rainfall intensity–frequency distributions as the station data. However, three combined gridded observational precipitation datasets, four reanalysis datasets and most of the CMIP5 models are unable to capture the extreme precipitation exceeding 150 mm/day and all underestimate the frequency of heavy rainfall. The observed spatial distribution of extreme precipitation exhibit two centers of maximum rainfall, which are located over the lower-middle reach of Yangtze River Basin and the deep South China region, respectively. The gridded observations and the

JRA-55 model captured these two centers, but the ERA-Interim, MERRA and CFSR and almost all the CMIP5 models failed to capture the two centers. The percentage of heavy rainfall in the total amount of rainfall is generally underestimated by 25–75% in all CMIP5 models. Higher resolution models tend to have a better performance than the lower resolution models; and physical parameterization may be crucial for simulating correct heavy rainfall, especially those exceeding 150 mm/day. The performances are significantly improved in the newly released FGOALS-f2 model as a result of increased resolution and more realistic simulation of the moisture and heating profiles in the troposphere. This work pinpoints the common biases in the current compiled datasets and reanalysis data sets and suggests ways to improve models’ performance in representing extreme precipitation, which is critical important for reliable projection of future changes in the extreme precipitation.