Geophysical Research Abstracts
Vol. 21, EGU2019-5310, 2019
EGU General Assembly 2019
© Author(s) 2019. CC Attribution 4.0 license.

An evaluation of East Asian summer monsoon seasonal forecast with the North American Multimodel Ensemble hindcast data

Huiwen Nie (1) and Yan Guo (2,3)

(1) Beijing Normal University, Faculty of Geographical Science, Academy of Disaster Reduction and Emergency Management, Beijing, China (201621480025@mail.bnu.edu.cn), (2) Zhuhai Joint Innovative Center for Climate-Environment-Ecosystem, Future Earth Research Institute, Beijing Normal University, Zhuhai, China (guoyan@bnu.edu.cn), (3) State Key Laboratory of Earth Surface Processes and Resource Ecology, Beijing Normal University, Beijing, China (guoyan@bnu.edu.cn)

The abilities of three models (CFSv2, CanCM3 and CanCM4) in the North American Multimodel Ensemble for seasonal forecast of the East Asian summer monsoon (EASM) were evaluated with their 29-year hindcast data (1982-2010). Many EASM features including monsoon precipitation centers, large-scale monsoon circulations and monsoon onset and retreat are generally captured by the three models, and CFSv2 has the best performance. Since the East Asian domain includes the tropical western North Pacific summer monsoon (WNPSM) and the subtropical continent monsoon, two well-known monsoon indices, the WNPSM index (WNPSMI) and EASM index (EASMI), and their associated low-level winds and precipitation anomalies are well forecasted by the three models and their ensemble mean. However, the forecast performance generally decreases as the leads increase, and the performance of EASMI is not as good as that of WNPSMI. CFSv2 forecasts well at leads up to 6 months whereas the skill of CanCM3 (CanCM4) decreases rapidly when the lead increases to 2 months (3 months). The failure of CanCM3 is mainly attributed to the poor forecast of the relationship of the EASMI with the El Nin ˜o-Southern Oscillation and northern Indian Ocean-western North Pacific (WNP) sea surface temperature anomaly. However, the causes of the poor forecast of CanCM4 for EASMI require further investigation. Sources of the forecast error (FE), which is the difference between the model and observation for monsoon precipitation, are more significant than those of the predictability error (PE), which originates from the initial condition error, indicating that model deficiency plays a dominant role in limiting the EASM precipitation forecast. However, the PE cannot be neglected from the 0-month lead to 2-month lead over the tropical western Pacific in CFSv2, over the WNP in CanCM3 and over the Tibetan Plateau in CanCM4. As the lead time increases, the FE does not remarkably change whereas the PE decreases significantly.