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Roles of Remote and Local Forcings in the Variation and Prediction of Regional Maritime Continent Rainfall in Wet and Dry Seasons

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ABSTRACT

Seasonal prediction of extratropical climate (*e.g.*, the East Asian climate) is partly dependent upon the prediction skill for rainfall over the Maritime Continent (MC). A previous study by the authors found that the NCEP Climate Forecast System, version 2 (CFSv2), had difference in skill between predicting rainfall over the western MC (WMC) and the eastern MC (EMC), especially in the wet season (Fig. 1). In this study, the potential mechanisms for this phenomenon are examined. It is shown that observationally in the wet season (from boreal winter to early spring) the EMC rainfall is closely linked to both ENSO and local sea surface temperature (SST) anomalies, whereas the WMC rainfall is only moderately correlated with ENSO. The model hindcast unrealistically predicts the relationship of the WMC rainfall with local SST and ENSO (even opposite to the observed feature), which contributes to lower prediction skill for the WMC rainfall. In the dry season (from boreal late summer to fall), the rainfall over the entire MC is significantly influenced by both ENSO and local SST in observations and this feature is well captured by the CFSv2. Therefore, the hindcasts do not show apparently different skill in rainfall prediction for EMC and WMC in the dry season (Fig. 1). The possible roles of atmospheric internal processes are also discussed.

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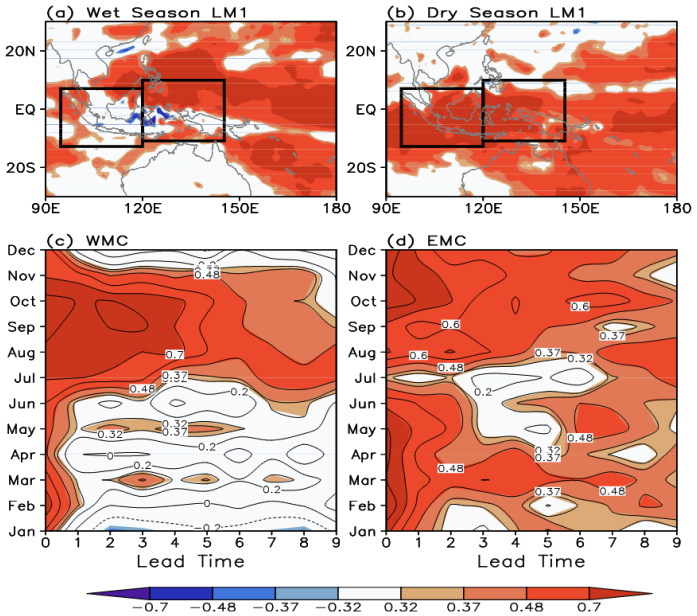

Fig. 1 Correlations of rainfall (mm/day) between observation and CFSv2 in 1-month lead for (a) wet season and (b) dry season, and correlations between observation and CFSv2 predictions for area-averaged rainfall for (c) WMC and (d) EMC. Values exceeding the 90%, 95%, and 99% confidence levels are shaded. The domains used to define WMC (13°S-7°N, 95°E-120°E) and EMC (11°S-10°N, 120°E-145°E) are outlined with black boxes in (a) and (b).

References

Zhang, T., S. Yang, X. Jiang, B. Huang, 2016: Roles of remote and local forcings in the variation and prediction of regional Maritime Continent rainfall in wet and dry Seasons. *J. Climate*, **29**, 8871-8879.

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