Variations and Seasonal Prediction of Wet and Dry Season Precipitation over the Maritime Continent: Roles of ENSO and Monsoon Circulation

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1. Introduction

The authors analyze the seasonal-interannual variations of precipitation over the Maritime Continent (MC) and their relationships with large-scale climate anomalies. They also investigate the predictability of MC precipitation variations. The hindcast of the National Centers for Environmental Prediction (NCEP) Climate Forecast System version 2 (CFSv2) and several analysis/reanalysis products are used.

2. Results

The seasonal evolution of MC precipitation does not apparently exhibit distinct features for four seasons. Instead, it is clearly characterized by a wet season (from December to March) and a dry season (from July to October) (Figs. 1 and 2). The

![Fig. 1 Observed monthly mean of MC precipitation (mm day⁻¹, black line) and its standard deviations (shaded) from January to December. The MC domain can be seen from Fig. 2. The horizontal line denotes the annual average of MC precipitation. July-October are defined as dry season and December-March as wet season.](image1)

![Fig. 2 Anomalies of observed precipitation (mm day⁻¹, shading) and 850-hPa winds (m s⁻¹, vectors) in (a) wet season (December-March) and (b) dry season (July-October). The domain used to define the MC is outlined with red boxes. The figure displays that during wet season rainfall maximizes near 10S and during dry season rainfall band moves to around 15N.](image2)
precipitation over MC for both wet and dry seasons is significantly related to El Niño–Southern Oscillation (ENSO) and large-scale Asian-Australian monsoon features. When ENSO signals are removed, the MC precipitation is more strongly related to the climate features over East Asia.

The NCEP CFSv2 shows a high skill in predicting the main features of MC precipitation variations and their relationships with large-scale climate anomalies. It predicts the MC precipitation variation and its related circulation patterns skillfully in advance by several months, especially for the dry season (Fig. 3). The relatively low skill for wet season is contributed mainly from the low prediction skill of the precipitation over Sumatra, Malay, and Borneo (SMB), which is due partly to the unrealistically predicted relationship between the variations of SMB precipitation and ENSO in the wet season (Fig. 4).

The figure clearly shows that, for dry season, predictions of precipitation and ENSO-precipitation relationship always have high skills. For wet season, however, high skills can only be found for the predictions of eastern MC precipitation and its relationship with ENSO. No skill can be seen for the predictions of SMB precipitation and its relationship with ENSO.