

Forecast skill of intraseasonal oscillation events over the Maritime Continent in a global cloud-system-resolving model

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Forecast skill of the intraseasonal oscillation (ISO) events over the Maritime Continent in Nonhydrostatic Icosahedral Atmospheric Model (NICAM) simulations is evaluated, with an intention to understand factors that control the behavior of the simulated ISO. We focused on the periods of recent field campaigns (Pre-YMC in November-December 2015 and YMC-Sumatra in November 2017-January 2018). In both the periods, ISO events amplified over the eastern Indian Ocean and passed over the Maritime Continent. We used datasets of global 14-km (7-km) mesh 30-day (14-day) long ensemble simulations with varying initial date during the 2015 (2017) campaign period. The forecast skill of the ISO event in 2015 was closely related to the path of the convective envelope and the maximum low-level westerly associated with the ISO, consistent with the findings from previous studies. In good cases, the model successfully simulated a southward shifting path around the Maritime Continent, whereas in poor cases, the model produced an equatorial moving path over the Maritime Continent. Mean biases of stronger low-level equatorial westerlies and weaker convective organization affected the model performances. The westerly bias causes moisture accumulation to the east of the Maritime Continent, which further alters the moisture gradient and affected the ISO path. A notable difference in the simulated ISO convection between the 2015 and 2017 events was found. In 2015 under a peak El Niño condition, the anomalous humidity was negative over the Maritime Continent. This caused a weakening of eastward-propagating ISO over the Maritime Continent. The situation was opposite in 2017 under a La Niña condition, where higher moisture broadly distributed over the Maritime Continent. This facilitates the maintenance and continuous propagation of ISO convection across the Maritime Continent. The result suggests the non-linear effect of the ENSO background conditions on the simulated ISO behavior.

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