On the Causes of the Poor Simulation and Forecast of the Intraseasonal Oscillation by Numerical Models

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Many attempts to simulate and forecast the Intraseasonal Oscillation (ISO) using numerical models have met with difficulties. In this work we present results from a series of extended forecasting simulations conducted jointly between Georgia Tech and the ECMWF aimed at improving our understanding of the problems that numerical models have in simulating and forecasting the ISO. This study evaluates the skill of a numerical model in simulating the processes that occur during the transition from suppressed to active convection which is considered key for skillful extended forecasts in the Indo-West Pacific region. Regional and local vertical structure of ISO-related anomalies from the numerical forecasts using the ECMWF model are compared to those in the ERA-40 data during different stages of the convective activity (suppressed, transition, and active). This analysis explores ISO numerical simulations during the TOGA COARE winter case, as well ISO events during the summers of 2002 and 2004. Results suggest that the skill of the model forecasting the vertical structure of the ISO strongly depends on the atmospheric thermodynamic state at the beginning of each forecast run. In addition, there are states of the system for which the skill of the forecast is always low associated with convective events for which the skill of the forecast decreases regardless of the starting date of the forecast. The forecast skill of circulation anomalies is higher than the skill of

moist convective associated anomalies. The time scale of skillful forecasts during summer is half of that obtained for winter, indicating that the skill of the forecast is greater for winter ISO cases than for summer events. Analyses of the summer simulations indicate that the model is always predicting an active-like phase of the monsoon. Since the model is not able to forecast skillfully the generation of specific humidity anomalies in the equatorial Indian Ocean, convective anomalies do not propagate from the equator resulting in the lack of intraseasonal modulation of the monsoon.

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