Predictability of the coupled ocean-atmosphere process during the onset of MJO in DYNAMO period

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The tropical channel version of the regional ocean-atmosphere coupled model (SCOAR2) is used to examine the impact of interactive SSTs on the MJO characteristics in the multi-year simulations, and then to explore the predictability of the coupled boundary layer process during the onset of the 2nd DYNAMO MJO event. We have executed two coupled downscaling simulations, COUPLE with the full O-A coupling every day for October-March, 2005-2010,and CONST-SST in which the time-averaged mean SST computed from COUPLE is prescribed for the WRF model over the same time period. We found a significant power in OLR and zonal winds in the MJO frequency wavenumber band for both cases, with slight enhancement in COUPLE. Cross-correlation between zonal winds and OLR clearly reveals an eastward propagation at roughly 5 m/s, indicating significant convective coupling in the MJO rather than free linear Kelvin waves being dominant. We subsequently ran the SCOAR2 model with the 2-day and 5-day forecast configurations, in which the ocean and atmosphere models are initialized every 48 hrs and 120 hrs in the 33-day-long simulations targeting the 2nd MJO event. These forecast runs are compared with the free-running standard coupled model simulation and with the observations. While the skill in the atmospheric fields is higher in the forecast run with the shorter lead time, the continuous run produces a significantly better skill in the oceanic evolution such as Sthe ST, the Wyrtki Jet, and the mixed layer depth. This implies that a short-term coupled forecast models may have lower skill in the onset of MJO because of the less well resolved oceanic evolution.