

SESSION: (C3) Time scale interaction (includes teleconnections)

(C3-01)

MULTI-SCALE INTERACTIONS IN A HIGH-RESOLUTION TROPICAL-BELT EXPERIMENT USING WRF MODEL

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The Weather Research and Forecasting (WRF) model is used to dynamically downscale 27 years of the Climate Forecast System Reanalysis (CFSR) in a tropical belt configuration at 36 km horizontal grid spacing. WRF is found to give a good rainfall climatology as observed by the Tropical Rainfall Measuring Mission (TRMM) and to reproduce well the large-scale circulation and surface radiation fluxes. The impact of conventional and Modoki-type El Niño-Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD) are confirmed by linear regression in the model. Madden-Julian Oscillation (MJO) and Boreal Summer Intra-seasonal Oscillation (BSISO) are also well-simulated. However, WRF does not capture well the diurnal cycle of precipitation over the Maritime Continent. For the investigation of multi-scale interactions through the local diurnal cycle, TRMM data is used instead.

The WRF simulation shows that in the boreal summer, conventional ENSO modifies the MJO amplitude while Modoki-type ENSO and IOD impacts are MJO-phase dependent; in boreal winter, inter-annual variations have little impact on MJO amplitude. The TRMM observations show that in the Maritime Continent, moderate ENSO modifies the MJO's influence on the diurnal cycle in specific ways; strong ENSO leads to non-linear impacts on the diurnal cycle.