Progress in CCRS’s Regional Coupled Model for Weather and Climate

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The Centre for Climate Research Singapore (CCRS) has developed "cSINGV," a high-resolution (1.5 km x 1.5 km) regional coupled modeling system. This advanced system integrates the SINGV atmosphere model (UM 12.2), the Nucleus for European Modelling of the Ocean (NEMO v4.0.4) general circulation model, and the WAVEWATCH III (WW3 v7.12) ocean surface wave model. We have conducted a six-month long simulation of cSINGV model from January to June 2019, where SINGV model is driven by ECMWF Reanalysis (ERA5). During this period, sea surface temperature (SST) was evaluated against OSTIA and reanalysis products, rainfall was compared to satellite-retrieved data from GPM-IMERG, and wave-state was assessed against altimeter data. Initial findings suggest comparable performance of marine models with reanalysis and satellite data, with improved precipitation predictions over ocean regions compared to the stand-alone atmospheric model. A comprehensive analysis of atmospheric variables is in progress. Recognizing the limitations of the current cSINGV domain for regional climate studies, CCRS has initiated the development of a coupled system for a larger domain. This effort aims to enhance climate research capabilities, with plans to develop a regional coupled model expected to significantly advance future climate projections. The presentation will highlight results from the cSINGV evaluation and introduce CCRS’s upcoming initiatives for regional coupled-climate projection studies.