



## Evaluation of Multi-scale Ocean-atmosphere Coupled Modelling System

A novel Multi-scale Ocean and Atmosphere Coupled Modeling System (MUSOACS) has been recently developed to enhance the predictability of extended-range forecasts at the Central Weather Administration in Taiwan. MUSOACS comprises four distinct components, seamlessly integrating global (23km resolution) and regional (5km resolution) ocean-atmosphere coupled models that run concurrently. The regional coupled model is online-driven by the global coupled model. Skill evaluations of the model predictability indicate that the global atmospheric forecast in MUSOACS surpasses the operational atmospheric forecast system at CWA up to 16 days in geopotential height, temperature, and wind vector below 200 hPa height. The predictability of the Madden Julian Oscillation, measured by the RMM index, extends from a 6-day to 20-day lead time. Furthermore, the regional prediction of the 2016/2018 cold surge events in the East Asian notably improves, extending the predictability lead time from 5 to 7 days in the Regional model compartment of MUSOACS. These improvements highlight the superior performance of MUSOACS compared to uncoupled models, attributed to its enhanced simulation of ocean-atmosphere interaction. These findings suggest that MUSOACS holds promising potential to deliver higher-quality extended-range forecast from both global and regional perspectives.

*SYun-Chuan Shao, National Taiwan University; Hsi-Hsien Tseng, National Taiwan University; Yu-Heng Tseng, National Taiwan University; Jian-He Chen, Central Weather Administration, Taiwan*