

Sub-seasonal to multi-annual predictions using the JMA seasonal prediction system (JMA/MRI-CPS2)

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During the past two decades, much progress has been made in initialized climate predictions and operational predictions have greatly reaped these benefits. This talk introduces the latest operational seasonal prediction system of the Japan Meteorological Agency (JMA/MRI-CPS2), which is based on an atmosphere-ocean-land-sea ice coupled model, and advanced atmosphere and ocean data assimilation systems. Sea ice and land components are initialized and greenhouse gasses are specified based on the IPCC AR5 RCP4.5. It embraces fundamental components to make predictions from sub-seasonal to multi-annual time-ranges. We holistically evaluated predictive skills of sub-seasonal and multi-annual predictions in addition to seasonal predictions. Some of the scores show better predictive skills, for instance, surface temperature or precipitation in the tropics up to one month compared with the operational sub-seasonal system, and comparable multi-annual predictive skills to the CMIP decadal prediction models. These promising results suggest that this system, which was originally developed for the operational seasonal prediction, is applicable to predictions of various time-ranges. This presentation also illustrates some examples of reforecasts and real-time forecast evaluations to highlight underlying mechanisms to give the relatively high predictability in the Asian region for sub-seasonal to multi-annual time-scales, resulting from successful predictions of ENSO and its inter-basin interactions with the Indian Ocean, western North Pacific and Asian monsoons.

Keywords: numerical model, atmosphere-ocean interaction, seasonal prediction, sub-seasonal prediction, decadal prediction