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Title: Trigger a leap into cloud-resolving tropical seasonal prediction with NICAM
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Abstract:
A recent milestone outcome with the global non-hydrostatic model, NICAM, is the successful demonstration of the intra-seasonal (IS) predictability of boreal summer- and winter-time tropical variability from multiple-years experiments. For example, the boreal-summer case was estimated under a multi-institutional, inter-comparison framework, Athena project, by which the performance of prediction of Madden-Julian Oscillation (MJO), tropical cyclone (TC), and IS variability associated with monsoon has proven successful from 7-km mesh experiment for the eight-year period.

This is an important progress beyond the previous case-study based realizations, providing a promising incentive to elaborate global non-hydrostatic model for seamless weather-climate modeling (SWCM) framework. To promote the SWCM initiative, our plan at the next step is to investigate the predictability of ensemble of IS phenomena comprehensively in terms of the associated mechanisms of multi-scale interactions at work within and beyond the IS time scale under a strategy of seasonal prediction. For the target subjects, MJO and TC continue to be high on the list, as are the air-sea coupling effects on the phenomena. At longer time scale, a connection will also be investigated between the IS phenomena and short-term climate variability, such as ENSO and Indian-Ocean dipole. This consideration will help shape future agenda of global non-hydrostatic coupled modeling for seasonal prediction.

Our plan of contribution to S2S will be to share the insights from the activity, and the associated datasets for improving prediction of weather-climate system. An attempt of extended-range prediction research is already in progress in a K-computer project. Recent associated findings include: (1) extended predictability of prominent austral-summer MJOs with the lead time exceeding 20-days; and (2) extended prediction of TC genesis over the western Pacific based on suitable detection of tropical synoptic-scale disturbances. Combination of these efforts will provide key insights into the "gray-zone problem," another challenging aspect of SWCM elaboration.

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