[EE] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-OS Ocean Sciences & Ocean Environment

[A-OS08]Seasonal-to-decadal climate variability and predictability

convener:Takashi Mochizuki(Japan Agency for Marine-Earth Science and Technology), V Ramaswamy(NOAA GFDL), Yushi Morioka(海洋研究開発機構)

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Climate variability on seasonal-to-decadal timescale (e.g. ENSO, IOD, PDO, AMO) involves processes and multiple physical interactions among atmosphere, land, ocean and sea-ice. Many efforts have been made for understanding the underlying physical processes and its predictability, but there remain large uncertainties in model simulation and prediction results of the seasonal-to-decadal climate variability. This indicates that some important gaps still exist in our current knowledge which are not fully resolved in current climate models, for example, atmosphere-ocean-ice interaction, troposphere-stratosphere coupling, initialization, and role of anthropogenic forcings. This session aims to narrow the gaps in our knowledge and identify the unresolved issues for better understanding and prediction of seasonal-to-decadal climate variability. All the observations, theoretical, process-level and modelling research on seasonal-to-decadal climate variability and its predictability are greatly welcome.

[AOS08-P06]Multiyear climate prediction using 4D-Var coupled data assimilation system

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An initialization relevant to interannual-to-decadal climate prediction has usually used a simple restoring approach for oceanic variables. Here, we demonstrate the potential use of four-dimensional variational (4D-Var) coupled data assimilation on the leading edge of initialization approach particularly in multi-year (5-year-long) climate prediction. We perform full-field initialization rather than anomaly initialization and assimilate the atmosphere states together with the ocean states to an atmosphere-ocean coupled climate model. In particular, it is noteworthy that ensembles of multi-year hindcasts using our assimilation results as initial conditions exhibit an improved skill in hindcasting the multi-year changes of the upper ocean-heat-content (OHC) over the central North Pacific. The 4D-Var approach enables us to directly assimilate a time trajectory of slow changes of the Aleutian Low that are compatible with the sea-surface-height and the OHC. Consequently, we can estimate a coupled climate state suitable for hindcasting dynamical changes over the extratropical North Pacific as observed.