[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)

Sun. May 20, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe) 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-todecadal 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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Keywords:Decadal prediction, 4D-Var data assimilation, Coupled data assimilation

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 multiyear (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 atmosphereocean 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.