[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-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-P02]Mid-latitude source of the ENSO-spread in SINTEX-F ensemble predictions

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Keywords:ENSO, seasonal prediction, spread

The ensemble spread of seasonal prediction is investigated in this study to understand its role in the predictability of El Nino/Southern Oscillation (ENSO) based on the results of SINTEX-F2, a coupled ocean-atmosphere general circulation model. In SINTEX-F2 seasonal prediction system, first precursor based on the ENSO spread appears as a cyclonic wind anomaly over the central north Pacific in boreal winter (January). Then, warm-SST, positive-rainfall and cross-equatorial southerly wind anomalies appear over the northern hemisphere during the following spring (particularly in April). Such anomalies in April also accompany westerly wind anomaly in the western equatorial Pacific. Finally, El Nino-like conditions with warmer-SST and higher-rainfall become dominant in inter-member deviation after boreal summer.

500 hPa geopotential height suggests that stochastic atmospheric precursor (without oceanic signal) during winter causes El Nino-like spread through air-sea interaction. The oceanic response in the form of upper heat content (in the top 150m) appears as a result of equatorial wind forcing during boreal spring and summer. These results of seasonal precursor signals in SINTEX-F2 ENSO spread suggest that the seasonal footprinting mechanism (SFM) type air-sea coupling process is important for ENSO spread related to the “spring-barrier”. The state dependence of ENSO spread to background ensemble-mean state (particularly sensitivity of the SFM and California Nino in “post El Nino” phase) was also discussed.