Evaluation of Wintertime Pacific North America Teleconnection in E3SM

Doo Young Lee1, Wuyin Lin2, Mark R. Petersen1

1Los Alamos National Laboratory 2Brookhaven National Laboratory

The ability to capture the major modes of variabilities is critical for an Earth system model to have meaningful skill in climate prediction and projections. In a series of studies, we have shown that E3SM Version 1 is capable to reproduce the patterns and variabilities associated with the Southern Annular Mode (SAM), the Arctic Oscillation (AO) and the North Atlantic Oscillation. In this study, we evaluate the E3SM’s performance in simulating wintertime Pacific North America (PNA) mode. The PNA teleconnection reflects the leading planetary-scale atmospheric mode of variability spanning over the North Pacific basin and North America continent. The variability in PNA can influence the position and strength of the Pacific jet stream and North Pacific storm track, leading to significant impact on winter time climate in North America. PNA, in turn, is strongly influenced by the phases and modes of El Nino Southern Oscillation (ENSO). Considering these connections, we deconstruct the E3SMv1 simulated PNA variability and the influence on North America winter climate in terms of Eastern Pacific El Nino, Central Pacific El Nino, and an internal mode, and evaluate them against observations in the same format. The mechanisms governing the variability of PNA are further investigated.