



Influence of the Atlantic Ocean on the Northern Pacific Multidecadal Climate Variability

Rong Zhang and Thomas L. Delworth

GFDL, NOAA, Princeton, NJ, USA (rong.zhang@noaa.gov/ phone 1 609 9875061)

Large-scale multidecadal climate variability in the North Pacific, such as the Pacific Decadal Oscillation (PDO), has been observed during the 20th century. The PDO is characterized by a dipole pattern of sea surface temperature (SST) anomalies in the zonal direction and this SST dipole pattern of PDO is associated with the Pacific/North America (PNA) pattern. Previous modeling studies show the linkage between ENSO and PDO through the atmospheric bridge. However, the mechanism for multidecadal time scale variability in the North Pacific is still unclear. Observational analyses also found a North Pacific mode of interdecadal variability, which is linearly independent from ENSO and the SST signature is confined more over the extratropical North Pacific. The corresponding atmospheric signature is also stronger over the extratropical North Pacific, and more closely resembles the PNA pattern. Here we present modeling results of the influence of Atlantic Multidecadal Oscillation (AMO) on the PDO during the 20th century using a hybrid coupled model, along with discussions of the mechanism and a simple theory. We also present modeling results of the impact of weakening of the Atlantic thermohaline circulation on the Northern Pacific climate from water-hosing experiments using the fully coupled GFDL climate models. The results are consistent with some paleo observations of the teleconnections between the North Atlantic and the North Pacific during millennial timescale abrupt climate change events.