

Remote influence of Interdecadal Pacific Oscillation on the South Atlantic Meridional Overturning Circulation variability.

Hosmay Lopez^{1,2}, Shenfu Dong², Sang-Ki Lee² and Edmo Campos^{1,3}

¹Cooperative Institute for Marine and Atmospheric Studies, University of Miami, Miami, Florida

²Atlantic Oceanographic and Meteorological Laboratory, NOAA, Miami, Florida

³Oceanographic Institute of the University of São Paulo, Brazil

Abstract

This study explores potential factors that may influence decadal variability of the South Atlantic Meridional Overturning Circulation (SAMOC) by using observational data as well as surface-forced ocean model runs and a fully coupled climate model run. Here, we show that SAMOC is strongly correlated with the leading mode of sea surface height (SSH) as well as sea surface temperature (SST) variability in the South Atlantic Ocean. The Interdecadal Pacific Oscillation (IPO) remotely modulates the South Atlantic SSH and SST variability, affecting the SAMOC. Further analysis shows that anomalous tropical Pacific convection associated with the IPO forces robust stationary Rossby wave patterns, modulating the wind stress curl over the South Atlantic Ocean. A positive (negative) phase IPO increases (decreases) the westerlies over the South Atlantic, which increases (decreases) the strength of the Subtropical Gyre in the South Atlantic and thus the SAMOC.

Corresponding author address:

Hosmay Lopez

UM/CIMAS/RSMAS and NOAA/AOML/PHOD 4301 Rickenbacker Causeway, Miami, FL 33149, USA.

E-mail: Hosmay.Lopez@noaa.gov