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Speaker:Hsin-Chieh Kuo

Advisor : Prof. Li-Chiao Wang

Modulation of ENSO Variance and Asymmetry by the Atlantic Multidecadal Oscillation

Abstract

The Atlantic Multidecadal Oscillation (AMO) is considered to be related to ENSO variability. Observations show that, in addition to affecting the magnitude of ENSO variability, the amplification of El Niño and La Niña by the AMO is asymmetric. Two models were used to investigate the mechanisms responsible for this variance and asymmetry. It is found that the AMO modulates the oceanic and atmospheric structures in the equatorial Pacific through an atmospheric bridge, affecting the distribution of convection and modifying wind stress anomalies. The wind stress anomalies then change the thermocline structure and lead to the thermocline feedback, affecting ENSO variability. Due to the exponential growth nature of convection in response to sea surface temperature (SST), the impact of wind stress anomalies is much more drastic on El Niño, thereby generating the asymmetry.

Keywords

Atlantic multidecadal oscillation

Reference

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