

The role of interaction between the Pacific and the north Atlantic Oceans in the prediction of ENSO

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Observational and climate modelling studies indicate a close link between the north tropical Atlantic (NTA) sea surface temperature anomalies (SSTA) and the El Nino-Southern Oscillation (ENSO). An El Nino peak in boreal winter is followed by a warming of the NTA SSTA in the subsequent spring, which in turn leads to a La Nina in the following autumn/winter. Using the seasonal prediction system based on the atmosphere and ocean general circulation model (AOGCM) MIROC5, we conducted an ensemble of hindcast experiments from 1979 to present, in which the transition from El Nino to La Nina in 1997-1998 was successfully predicted. We also conducted a series of accompanying sensitivity experiments targeted at the transition event in 1997-1998, in which the NTA or equatorial Pacific air-sea interactions were decoupled. We found that NTA SSTA plays an important role in increasing the skill in predicting the following La Nina event. We also found that the preceding particularly-large El Nino SSTA and the associated atmospheric bridge are essential for the generation of NTA SSTA of the observed magnitude.

References

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