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Impacts of the Tropical Pacific Cold Tongue Mode on the ENSO Diversity Under Global Warming

Abstract

The causes of ENSO diversity, despite being a focal point in recent research, still lack a consistent explanation. This study provides a possible mechanism focused on the tropical Pacific background state change as a response to global warming. By performing empirical orthogonal function (EOF) analysis on sea surface temperature anomalies, we find that the second EOF exhibits an elongated band-like cold anomaly pattern, termed the cold tongue mode (CTM), which represents the background change of the tropical Pacific under global warming. Using composite analysis, we find that ENSO spatial structure diversity is closely associated with the CTM. This result suggests that the background shift in the tropical Pacific is one of the crucial drivers in shaping the diversity of ENSO patterns in a changing climate.

Keywords

cold tongue mode (CTM), Bjerknes feedback (BF)

Reference

Li, Y., Li, J., Zhang, W., Chen, Q., Feng, J., Zheng, F., & Zhou, X. (2017). Impacts of the tropical Pacific cold tongue mode on ENSO diversity under global warming.

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