# Indo-Pacific Climate Modes in Warming Climate: Consensus and Uncertainty Across Model Projections

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Understanding the changes in climate variability in a warming climate is crucial for reliable projections of future climate change. In this talk, we show the recent progress in studies of how climate modes in the Indo-Pacific respond to greenhouse warming, including the consensus and uncertainty across climate models. Recent studies revealed a range of robust changes in the properties of climate modes, often associated with the mean state changes in the tropical Indo-Pacific. In particular, the intermodel diversity in the ocean warming pattern is a prominent source of uncertainty in mode changes. The internal variability also plays an important role in projected changes in climate modes. Model biases and intermodel variability remain major challenges for reducing uncertainty in projecting climate mode changes in warming climate. Improved models and research linking simulated present-day climate and future changes are essential for reliable projections of climate mode changes. In addition, large ensembles should be used for each model to reduce the uncertainty from internal variability and isolate the forced response to global warming.

Keywords: ENSO, Indian Ocean Dipole, Indo-western Pacific Oceanic Capacitor, Global Warming, Internal Variability, Uncertainty in model projections

 