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Coupled Climate Models Fail to Simulate Observed Sea Surface Temperature Patterns, Weakening Constraints on Future Warming

Abstract

The pattern of changes in Sea Surface Temperatures (SSTs) over recent decades has been marked by enhanced warming in the western equatorial Pacific and cooling in the eastern Pacific and Southern Ocean. This pattern led to an acceleration of the Walker circulation, a strengthening of the trade inversion and an increase in low cloud cover in the East Pacific. Current state-of-the-art coupled atmosphere-ocean climate models fail to reproduce the observed SST pattern and attendant changes in atmospheric circulation and clouds. Due to this discrepancy in SST patterns, observations lie outside the coupled model ensemble across several key metrics – critically among them the net radiative feedback. Our analysis shows that this discrepancy in SST patterns could account for the inability of high climate sensitivity CMIP6 coupled models to reproduce the overall magnitude of historical warming. If the bias is due to either a transient in the forced response or natural variability, then high long-term warming cannot be discounted based on recent warming trends. It remains an open question whether the problem in the coupled models lies with a bias in the forced response or insufficient natural variability.

Zoom Link

<https://fsu.zoom.us/j/95514229100?pwd=ZWgxSnZYTEd2bGtONUtvRCtmZHpMZz09>

Time: Thursday, Mar. 11, 2021 @ 3:30 PM
Host: Dr. Allison Wing
Note: Meeting the speaker at 3:00 PM. A post-seminar student-speaker session will start immediately after the seminar.