

Anomalous Precipitation Patterns During ENSO Using SODA and 20CRv2

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An atmospheric reanalysis (20CRv2) and an ocean reanalysis (SODA 2.2.4) are used to study anomalous precipitation patterns during ENSO. In particular we focus on precipitation anomalies over the Indian subcontinent and Southwestern United States. Both of these regions have been described as having significant ENSO teleconnections. During El Niño strong convection over the anomalously warm waters of the central and eastern equatorial Pacific shifts the Walker circulation eastward so that the ascending branch spreads over the eastern equatorial Pacific and the descending branch spreads over Southeast Asia and Australia. This results in dry monsoon season in India and wet winters in southern United States. But this pattern is not consistent for all El Niño years, with normal precipitation occurring during some El Niños in the Indian subcontinent and dry winters during some El Niños in the southwestern United States. Recent studies propose that the inconsistent response to ENSO is linked to the varying location of anomalous warming in the equatorial Pacific during ENSO, so that central Pacific El Niño is related to Indian drought and east Pacific El Niño is not.

We use the 138-year ocean and atmosphere reanalyses to investigate the variation in the precipitation response during El Niño. In this study the El Niño years have been determined using an index called CHI (Center of Heat Index), which relies on the first moment of the anomalous heat distribution. The CHI identifies the longitude, amplitude, and area of SST warming associated with ENSO. A statistical analysis of CHI obtained from SODA 2.2.4 and precipitation rate from 20CRv2 will be presented.