

Indian Ocean capacitor effect for the past 140 years

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The Indian Ocean responds to El Nino with a delayed basin-wide warming. This Indian Ocean basin mode and its effect on monsoons have intensified across the 1970s for the past six decades. These changes are consistent with those in response to global warming in a coupled GCM simulation. To investigate whether these changes are due to natural variability or global warming, a unique ocean-atmospheric dataset is constructed for the period of 1870-2007 using ship-board observations along a frequently travelled track across the North Indian Ocean (NIO) and the South China Sea. During the decades in the late 19th-early 20th century and in the late 20th century, the El Nino-induced NIO warming persists longer than during the 1910s-mid 1970s, well into the summer following the peak of El Nino. During the epochs of the prolonged NIO warming, rainfall drops and sea level pressure rises over the tropical Northwest Pacific in summer following El Nino. Conversely during the period when the NIO warming dissipates earlier, these atmospheric anomalies are not well developed.

The above centennial modulation of ENSO teleconnection to the Indo- Northwest Pacific region is correlated with the ENSO variance itself. The fact that enhanced ENSO teleconnections occurred 100 years ago during the late 19th-early 20th century indicates that the recent strengthening of ENSO correlation over the Indo-western Pacific may not owe entirely to global warming but reflect natural variability.

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