Abstract Details

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Abstract:

Dominant mode of Asian-Australian Monsoon variability And the Role Monsoon-Ocean interaction Bin Wang, Xiouhua Fu and Tim Li Departn meteorology and International Pacific Research Center, University of H The dominant mode of the Asian-Australian monsoon (A-AM) interann variability is season-dependent and has a biennial tendency. This moc coincides with turnabouts of El Nino (La Nina) events. Its evolution fr summer to the next is characterized by two anomalous surface anticy dominating, respectively, the South Indian Ocean (SIO) and western Pacific (WNP). The SIO anticyclone occurs during development of El N the WNP anticyclone attains maximum intensity during mature and de El Ni&#65533;o. The anomalous rainfall in India, Africa, Australia-Indonesia a Asia are associated with these two anomalous anticyclones. A widely view is that El Nino/La Nina and warm-pool SST anomalies primarily f AM anomalies. In contrast to this view, we show that the warm pool S anomalies are largely a result of anomalous monsoon and cannot be regarded as a cause to A-AM variation; furthermore, while the remote forcing alone explains neither the extraordinary amplification of the S anticyclone nor the maintenance of the WNP anticyclone. We propose the interannual variability of A-AM is attributed to three factors: the r ENSO forcing, the local monsoon-warm ocean interaction, and the an cycle of monsoon circulations. The atmosphere-ocean conditions in SI WNP are similar, namely, an east-west anomalous SST dipole with col to the east and warm water to the west of the anticyclone centers. Th conditions result from a positive feedback between the anomalous descending atmospheric Rossby waves and SST dipole. The air-sea interaction in the two regions share common wind-evaporation/entrai and cloud-radiation feedbacks but differ in the roles of oceanic dynam SST variability. Numerical experimentations with coupled ECHAM AGC ocean model demonstrate that the monsoon-ocean interaction plays a important role. In addition to the monsoon-ocean interaction and ENS forcing, the seasonal march of the background flows also plays a criti It controls the nature of the monsoon-ocean feedback and can remarl modify the atmospheric response to remote forcing. During the summ Ni&#65533;o development, a tilted anticyclonic ridge originates from the mar continent and extends to southern India. This considerable equatorial asymmetry results from the effects of monsoon easterly vertical shea Rossby waves. The understanding obtained from this study leads to a paradigm for TBO.