



Impact of the South China Sea Summer Monsoon on the Indian Ocean Dipole

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This paper investigates the impact of the South China Sea summer monsoon (SCSSM) on the Indian Ocean Dipole (IOD). The results show that the SCSSM has a significant positive relationship with the IOD over the boreal summer (June–August, JJA) and fall (September–November, SON). When the SCSSM is strong, the enhanced southwesterly winds which bringing more water vapor to the western North Pacific (WNP) lead to surplus precipitation in the NWP, inducing anomalous ascending there. Consequently, the anomalous descending branch of the SCSSM Hadley circulation (SCSSMHC) develops over the Maritime Continent (MC), favoring deficit precipitation in situ. The precipitation dipole over the WNP and MC as well as the enhanced SCSSMHC lead to intensification of the southeasterly anomalies off Sumatra and Java, which then contributes to the negative sea surface temperature (SST) anomalies through the positive wind–evaporation–SST and wind–thermocline–SST (Bjerknes) feedbacks. Consequently, a positive IOD develops due to the increased zonal gradient of the tropical Indian Ocean SST anomalies, and vice versa. The SCSSM has a peak correlation with the IOD when the former leads the latter by three months. This implies that a positive IOD can persist from JJA to SON and reach its mature phase within the frame of the positive Bjerknes feedback in SON. In addition, the local and remote SST anomalies in the tropical Indian and Pacific Ocean have slight influence on the relationship between the SCSSM and precipitation dipole over the WNP and MC.