

An Enhanced Influence of Tropical Indian Ocean on the South Asia High after the Late 1970s

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Based on the ensemble simulations of two atmospheric general circulation models (AGCMs), it is found that the tropical Indian Ocean (TIO)'s predictability on the South Asia high (SAH) experiences a decadal change in the late 1970s; after (before) the decadal shift, the predictable skill is high (low). The present study investigates the role of tropospheric temperature in relaying the impact of sea surface temperature (SST) to the SAH and the change in the TIO's predictability. During the two epochs, the local tropospheric temperature responses to the TIO warming are distinct—more significant during the second epoch. It is inferred that this change may be responsible for the strengthening of the TIO's influence on the SAH. The AGCMs' results indicates that the enhanced influence is attributed to the SST forcing.

There are two possible reasons for the change in the TIO's predictability. The first reason is the change in the locations of the SST anomalies in the TIO. During the second epoch, positive SST anomalies lie in the Indian Ocean warm pool. Through the background vigorous convection and moist adjustment, the SST anomalies affect largely the tropospheric temperature and thus the SAH. The second reason is the decadal change in mean SST and the SST variability. During the recent decades, both the background SST and the variability of the TIO SST increase, which enhance the influence of the SST anomalies on the atmosphere. The influence of the remote oceanic forcing on the enhanced TIO's predictability and its comparison with the contribution of the TIO SST are also discussed.