

The North Indian Ocean warming associated with ENSO and IODYan Du[†]; Shang-Ping Xie; Yanling Wu[†] LOT, South China Sea Institute of Oceanology, CAS, China, People's Republic ofLeading author: duyan@scsio.ac.cn

El Niño induces a basin-wide increase in tropical Indian Ocean (tropical IO, TIO) sea surface temperature (SST). The North IO (NIO), in particular, displays a peculiar double-peak warming with the second peak larger in magnitude and persisting well through the summer. The present study investigates the mechanisms for the two peak of the NIO warming. Our analysis reveals that internal air-sea interaction associated with ENSO and IOD within the TIO is key to the TIO warming. The first warming in the NIO results from IOD and its interface with ENSO. The second warming is related with a SST warming in the tropical Southwest IO (SWIO), which is caused by a downwelling Rossby wave in the South TIO. This SWIO SST warming sustains an anti-symmetric pattern of atmospheric anomalies with northeasterly (northwesterly) wind anomalies north (south) of the equator. Over the NIO as the mean winds turn into southwesterly monsoon in May, the northeasterly anomalies force the second SST peak that persists through summer by reducing the summer monsoon wind speed and surface evaporation. This study also discusses the responses of NIO SST to El Niño and La Niña.