



Different Impacts of Various El Niño Events on the Indian Ocean Dipole

Xin Wang (1) and Chunzai Wang (2)

(1) South China Sea Institute of Oceanology, Chinese Academy of Sciences, Guangzhou, China, (2) NOAA Atlantic Oceanographic and Meteorological Laboratory, Miami, USA

Our early work (Wang and Wang 2013) separates El Niño Modoki events into El Niño Modoki I and II because they show different impacts on rainfall in southern China and typhoon landfall activity. The warm SST anomalies originate in the equatorial central Pacific and subtropical northeastern Pacific for El Niño Modoki I and II, respectively. El Niño Modoki I features a symmetric SST anomaly distribution about the equator with the maximum warming in the equatorial central Pacific, whereas El Niño Modoki II shows an asymmetric distribution with the warm SST anomalies extending from the northeastern Pacific to the equatorial central Pacific. The present paper investigates the influence of the various groups of El Niño events on the Indian Ocean Dipole (IOD). Similar to canonical El Niño, El Niño Modoki I is associated with a weakening of the Walker circulation in the Indo-Pacific region which decreases precipitation in the eastern tropical Indian Ocean and maritime continent and thus results in the surface easterly wind anomalies off Java-Sumatra. Under the Bjerknes feedback, the easterly wind anomalies induce cold SST anomalies off Java-Sumatra, and thus a positive IOD tends to occur in the Indian Ocean during canonical El Niño and El Niño Modoki I. However, El Niño Modoki II has an opposite impact on the Walker circulation, resulting in more precipitation and surface westerly wind anomalies off Java-Sumatra. Thus, El Niño Modoki II is favorable for the onset and development of a negative IOD on the frame of the Bjerknes feedback.