



Impacts of Indonesian Throughflow on seasonal circulation in the equatorial Indian Ocean

Jing Wang

China (wangjing@qdio.ac.cn)

Impacts of the Indonesian Throughflow (ITF) on the seasonal circulation of the equatorial eastern Indian Ocean are investigated using the ocean-only model LICOM by opening and closing ITF passages. LICOM is forced by daily forcing from NCEP reanalysis data during 2000-2011. And LICOM is capable of reproducing the vertical profiles of mean density and buoyancy frequency of WOA09 data, and also perform annual oscillation in central Indian Ocean and semiannual oscillation in the eastern Indian Ocean of sea level anomalies (SLA) from satellite altimeter data, and semiannual oscillation of surface zonal equatorial currents of OSCAR current data in the whole Indian Ocean very well. The wave decomposition method is used to analyze the propagation and reflection of equatorial long waves based on the LICOM output. Wave analysis suggests that ITF blockage mainly influence the waves generated from the equatorial Indian Ocean not the Pacific Ocean, and eastern boundary reflections play an important role in semiannual oscillation of SLA and zonal current difference associated with ITF in the equatorial Indian Ocean. Reconstructed ITF-caused SLA using wave decomposition coefficients difference between closed and open ITF passages experiment suggest both the Kelvin wave and Rossby waves from the first baroclinic mode have comparable contribution to the semiannual oscillations of SLA difference. However, reconstructed ITF-caused surface zonal current at the equator suggest the first meridional mode Rossby wave has much larger contribution than the Kelvin wave of the first baroclinic mode. Both reconstructed sea level and zonal currents demonstrate that the first baroclinic mode has larger contribution than other baroclinic modes.