Long-term mooring buoy observations in the eastern tropical Indian Ocean and the observed variability

Keisuke Mizuno[1], Rokkam Rao[1], Yukio Masumoto[1], Takanori Horii[1], Iwao Ueki1[1], and Yasuhisa Ishihara[1]
Japan Agency for Marine-Earth Science and Technology

In order to understand the variation from intraseasonal to interannual time scale in the Indian Ocean, JAMSTEC has constructed surface mooring buoy sites (Figure1) with one mooring sites of ADCP buoy (Equator, 90E) in the eastern tropical Indian Ocean. A new surface mooring buoy system has developed under JEPP (Japan Earth Observation Promotion Program) supported by Japanese government. The new buoy system is much smaller than traditional TRITON buoy for easy operation on general research vessel, and much higher temporal density data are available. Based on the long-term buoy observation mainly, we comprehensively describe the nature of variation in currents and thermal field and some of obtained findings are shown. In terms of the variation of zonal current on the equator (Figure 2), intraseasonal variation in the near-surface layer is an intense signal, and is primarily determined by equatorial zonal westerly wind burst and shows large inter annual variability. The zonal current shows a strong seasonal cycle in the entire water column with periodic east-west reversals most pronounced at semiannual frequency set up by the prevailing semiannual zonal wind, propagating Kelvin and Rossby wave and associated zonal pressure gradient field. The buoy array detected a signature of Indian Ocean Dipole Mode phenomenon (IOD) in 2006 clearly. Based on the observed thermal data, heat budget analysis of the mixed layer of a buoy site (5S,95E) near the eastern pole of IOD shows that the cooling of SST is significantly owe to horizontal advection of cool water. And model result analysis suggests that the origin of cool water is upwelling near the coast.

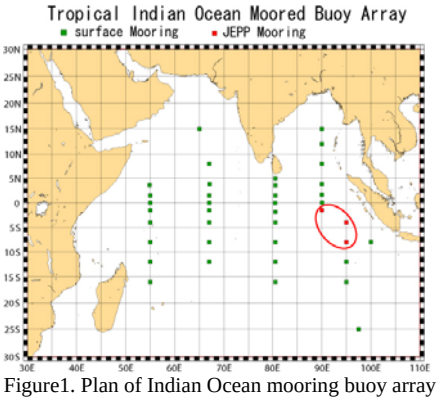

Figure1. Plan of Indian Ocean mooring buoy array (squares), and deployed JAMSTEC surface buoys (Red squres).

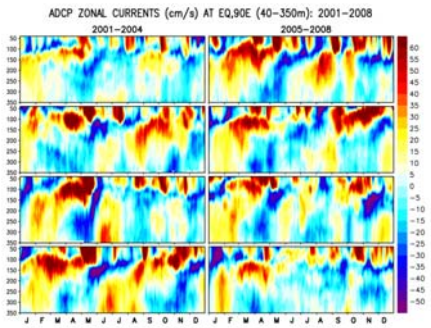

Figure 2. Observed eight year zonal component of velocity at the eqstern equatorial Indian Ocean (Eq, 90E).