## Intensification of Circum Antarctic Circulation in Late Quaternary and Its Effect on Eastern Indian Ocean Circulation: Planktic Foraminiferal Evidences

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Our detailed investigations on the late Neogene planktic foraminifera from the Eastern Indian Ocean indicates that the southward flowing Leeuwin Current off western Australia has been weakened several times during Quaternary. The Leeuwin Current is the product of throughflow between Western Pacific and Indian Ocean via the Indonesian Archipelago due to the piling up of waters in Western Pacific Warm Pool. The intervals of decreasing strength of the Leeuwin Current is demonstrated by a corresponding increase in the abundance of upwelling planktic foraminiferal groups at ODP Site 763A and reduction in the percentages of the warm mixed layer dwellers. Because the southward flowing Leeuwin Current nullifies the upwelling in modern times despite northward blowing winds, an increase in the upwelling planktic groups during Late Quaternary is indicative of diminishing Leeuwin current as a result of restricted surface water circulation or partial closure of the Indonesian Seaway. The invasion of typical temperate water planktic foraminifera Globoconella inflata at the region of site 763A is indicative of expansion and intensification of West Australian Current which is northward flowing arm of Circum Antarctic circulation. We envisage that during the expansion of the polar ice cap and subsequent intensification of West Australian Current (Circum Antarctic circulation) the sea level fall could have caused the Indonesian throughflow to reduce and resulting into diminishing strength of the Leeuwin Current. Although direct current measurements of the Indonesian Throughflow (ITF) in modern times are of limited duration, none long enough to properly describe greater than annual variability of the ITF, observations indicate that the bulk of the ITF passes through Makassar Strait which may be shallow enough to restrict surface water flows from Pacific to Indian ocean during glacial sea level fall. Thus the diminishing strength of the Leeuwin Current during late Quaternary onwards and restricted Indonesian through flow as inferred from the planktic foraminiferal study of the ODP site 763A in the present study is attributed to intensification of Circum Antarctic Circulation.