



Distributions of Chlorofluorocarbons in South Atlantic and Indian Oceans in 2003.

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Thermohaline circulation of the ocean drives heat and material transports and then is principally controlling the global climate system. In 2003-2004, we have revisited three WOCE-WHP sections of A10 in South Atlantic and I04 and I03 in South Indian by R/V MIRAI cruise (MR03-K04) named BEAGLE 2003. Concentrations of dissolved chlorofluorocarbons (CFCs) have been measured on the shipboard. Here we report distributions of CFCs and compare them with WHP data (around 10 years interval). In mode water and intermediate water, CFC concentrations increased 2 times in maximum in South Atlantic. The increases mean that the water masses have been sunk from sea surface when atmospheric CFCs have been increasing. In surface water, significant changes of CFC concentrations from WHP data to our observations have not been found in almost all stations. It is due to nearly constant value of atmospheric mixing ratios of CFCs during this decade. In North Atlantic Deep Water (NADW), CFC concentrations have been less than detection limits in both observations except western boundary of South Atlantic. We have detected significant increases of CFCs in core water of Western Boundary Current of upper NADW. Antarctic Bottom Water (AABW), mixture of lower Circumpolar Deep Water and Weddell Sea Bottom water, occupies bottom of several basins in the South Atlantic and western Indian Ocean. Low but significant CFCs have been detected in our study in AABW of all basins including Cape Basin and Madagascar Basin. In those two basins CFC concentrations had been less than detection limit in WHP observation. The existences of CFCs in bottom waters of the basins mean that the water mass ages are at least younger than CFC accumulation histories (i.e. around 70 years).