



Decadal variations of Indian-Ocean wind and currents inferred from satellite data and reanalysis products

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Analysis of satellite measurements of sea level from TOPEX/Poseidon altimeter and wind stress from ERS scatterometers from 1992 to 2000 suggests (1) a near-decadal slowdown of the shallow overturning cell in the South Indian Ocean (SIO) associated with a significant weakening of the southeasterly trade wind, and (2) a relatively steady cross-equatorial shallow overturning cell. The slowdown of the SIO cell is estimated to be 6.8 Sv over the 9-year period, which is nearly 70% its averaged strength. The rate of the slowdown is larger than that of the shallow overturning circulation in the tropical-subtropical Pacific Ocean that took place during late 1970s-1990s. The implications of the results on upper-ocean heat budget, decadal climate variability, and biochemistry of the Indian-Ocean region are discussed. The ability of several atmospheric and oceanic reanalysis products to capture the observed changes in wind and sea level are evaluated.