

Oceanography Seminar

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"A Reversal of Decadal Trends in the Equatorial and North Indian Ocean"

The importance of the Indian Ocean (IO) in global climate is becoming increasingly apparent. Sea level and upper ocean temperature trends north of 5°S in the IO reversed sign shortly after the turn of the century, which coincides with the onset of the much publicized "hiatus" in global mean surface warming. Recent research suggests that the hiatus is related to cooling Pacific sea surface temperatures and a redistribution of ocean heat into subsurface waters of the Pacific and Indian basins. Here we explore the dynamics and forcing of the decadal trend reversal in the Equatorial and North Indian Ocean (ENIO). Prior to the reversal, decadal variability of heat flux into the IO via the Indonesian Throughflow tends to be balanced by heat flux out of the Indian basin at the interface with the Southern Ocean. This balance breaks down over the last decade when a net positive advective contribution to IO temperature is accompanied by a warming of subsurface waters at equatorial and northern latitudes. Basin-scale changes in wind-stress-curl (WSC) precede the trend reversal, with the dominant change being a shift toward more negative WSC over equatorial and northern latitudes while southern latitudes experience comparatively little change. The changes in WSC are associated with circulation changes within the IO basin that may account for the reversal of ENIO decadal trends.

Thursday September 3, 2015 3:00 p.m. MSB 100