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# Interannual variability in the tropical western Indian Ocean

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## Abstract

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A regional ocean model was used to study interannual variations in the Tanzanian shelf region and offshore in the tropical western Indian Ocean for the period 1980–2007. The model was forced with surface winds and heat fluxes from the National Centers for Environmental Prediction (NCEP) reanalysis, and its initial and lateral boundary conditions were derived from the Simple Ocean Data Assimilation (SODA). The weakest interannual sea surface temperature (SST) variations occurred in the coastal waters off Tanzania, where there was a strong correlation with waters to the north of Madagascar. The coastal waters were dominated by variability at a period of about 5 y. The strongest interannual SST variations occurred offshore, being dominated by two periods, one at about 2.7 y and the other at about 5 y. The variability of the region seemed to be linked to *El Niño*–Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) events that induced changes in the thermocline and surface heat fluxes in the region. Local surface heat flux exchanges driven by the anomalous shortwave radiation dominated the interannual SST variability in the Tanzanian shelf region, with some contribution by the advection of heat anomalies from the North-East Madagascar Current. Farther offshore, the interannual variability of the SST was dominated by the thermocline variations induced by local Ekman pumping from local wind stress curl and by remote forcing from large-scale climate modes.