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Response of the Equatorial Atlantic Ocean to wind forcing anomalies

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A multimode linear model is used to simulate the Equatorial Atlantic response to wind forcing anomalies. The model is forced with daily data from the operational ECMWF analyses spanning a ten year period of time. The model outputs are compared with satellite data derived from TMI-AMRS-E for the SSTs and from TOPEX/POSEIDON for the sea level anomalies. We focus our attention to the highly contrasted SST differences observed between year 2005 and 2006 . 2005 was characterized by unusual cool SSTs associated with an early cold tongue setup whereas 2006 exhibited abnormal warm SSTs in the Gulf of Guinea. The model simulates this occurrence quite well. There is evidence that in the band of latitude 3°S-3°N, the SST variability is mainly driven by the wind stress. The quantification of each term in the model SST equation indicates that east of 20°W, vertical advection plays a key role in the SST signal. Further north and south of the Equator, SSTs seem rather controlled by surface heat fluxes. However, the model does not successfully simulate the SST variability because it is only driven by the wind stress. Sea level and thermocline anomalies are also described to document the planetary waves in the Equatorial Atlantic.