ROLE of MERIDIONAL WIND ANOMALIES in a COUPLED MODEL of ENSO

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The role of the meridional wind anomalies on the El Nino Southern Oscillation as simulated by a simple coupled tropical Pacific ocean-atmosphere model is investigated. It is found that these anomalies play a key role in maintaining finite amplitude interannual variability in the coupled simulations. When the meridional wind stress anomalies are not allowed to feed back to the ocean, the simulated oscillations are damped out within a few years.

During a warm (cold) event, the simulated meridional wind stress anomalies drive convergent (divergent) surface currents in the equatorial east Pacific, inducing downwelling (upwelling) anomalies that act to reinforce the sea surface temperature and wind anomalies. This is in contrast to the model zonal wind stress anomalies, which due to the tendency to reverse sign in the eastern Pacific, induce upwelling (downwelling) anomalies in the east.

Observed wind stress anomalies present some similarity with those simulated by the coupled model in the near-equatorial region. The zonal component reverses sign between the central and the eastern Pacific. There, the meridional component induces a vertical current anomaly of opposite sign, and similar in magnitude to that induced by the zonal one.