Title:
Role of long equatorial wave reflection in the low-frequency variability observed during the TOPEX/POSEIDON period: data analysis and coupled model study

by:
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The analysis of TOPEX/POSEIDON sea level and ERS-1 zonal wind stress data gives evidence that first mode meridional long Rossby waves fully reflected into Kelvin waves at the equatorial western Pacific boundary at different periods including the January - June 1994 period. The evolution of the conditions (zonal wind stress, sea surface temperature and sea level anomalies) in the central Pacific suggests that this reflection may have played a role in the reversal of cold to warm anomalies observed in the central Pacific in June- July 1994.
To investigate the actual role of reflected Kelvin waves observed by TOPEX/POSEIDON, a simple ocean-atmosphere coupled model is designed. Briefly, the model constitutes of four components: a linear barocline ocean, a wind- driven surface current layer, a mixed - layer and a linear atmosphere. Various datasets (SST, ocean temperature at. 50m, sea surface height, geostrophic zonal current and wind) are first used to validate the model and best fit. the, model parameters. I'hen, temperature at 50m, sea surface height anti geostrophic zonal current ant erannual anomalies are inserted smoothly into the model to improve the forced simulation as well as initial conditions for coupled simulations. Starting from these initial conditions, several simulations are run for testing the role of western boundary reflection evidenced in TOPEX/POSEIDON data. Coupled mechanisms are suggested to explain the low-frequency variability observed during this period.