SIMULATING and FORECASTING EL NINO WITH A DYNAMIC OCEAN-ATMOSPHERE MODEL AND SEA LEVEL DATA

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Sea level data derived from altimetry or XBT are used to initialize the Cane and Zebiak's model (Zebiak and Cane, 1987) and examine their impact on El Nino forecasting. Projecting observed sea level anomalies on equatorial Kelvin waves over 1980-1995 allows to derive the fields available for initializing the baroclinic model. These observed baroclinic fields are introduced in the ocean-atmosphere model to compute a series of sea surface temperature and wind anomalies over 1980-1995 available for initialisation of forecasts.
Series of two-year long forecasts are computed over this period. They were performed either with the standard version of the model or with a modified version based on the set of parameterizations proposed in Dewitte and Perigaud (1996).
Sea level data used to inialize the model with the standard parametrization do not allow to improve the predictive skill of the model in SST. This is because the model has a tendency to predict overly warm events during the first 20 months.
With the new parametrization of subsurface temperature as a function of thermocline anomalies, the model tendency to predict warm events is greatly reduced, and forecast are in better agreement with data.
With the new parameterizations, initializing the model with sea level data allow to improve the predictive skill in sea level, wind and SST during about 20 months.
This is because the new parametrization allows the model to respond to the sea level data with realistic changes in SST and wind.
Nevertheless, the forecast error is larger than the observed variability past 4 months. The only solution to further reduce the forecast error is to further reduce the model error.
Simulations with a model including two baroclinic modes show better agreement with sea level, SST and wind observations than the 1.5-layer Cane and Zebiak's simple.