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Simulated and observed interannual EUC variability

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The interannual variability of the Atlantic Equatorial Undercurrent (EUC) is studied using a simulation for the period 1990 to 2002 with a high-resolution ocean general circulation model (FLAME). Simulated mean transports of the Atlantic EUC are in good agreement with new transport estimates derived from ship observations, i.e. 19.9 and 14.0 Sv at 35°W and 23°W, respectively. In agreement with satellite observations of sea surface temperature and height the model shows a strong interannual boreal summer variability of the equatorial cold tongue. Cold tongue indices, defined either by near-surface temperature or steric height anomalies, are anticorrelated with thermocline EUC transport anomalies: a strong EUC corresponds to low near-surface temperatures and steric heights. Cross correlation analyses between eastward transport anomalies at 23°W and 10°W and both near-surface temperature and steric height anomalies yield significant correlations in the equatorial and coastal upwelling regions. The corresponding cross correlation time scales point at an eastward phase propagation along the equator towards the African coast where the signal bifurcates into two poleward branches along the coast and is reflected into a westward propagating wave. While the available cross-equatorial ship sections are very useful for determining the mean flow and possibly also the seasonal cycle of EUC transport, simulated interannual EUC transport variability can only be verified by moored observations. Here we present first results from the analysis of current time series obtained by recently recovered equatorial moorings at 35°W and 23°W.