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# A model study of the tropical Atlantic variability, with a focus on upwelling events along the African coasts

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A process-oriented model study of the tropical Atlantic Ocean is presented. It is based on a hierarchy of reduced-gravity primitive equation layer models, including one, two or three active layers; the domain of integration spans the latitudes from 35°S to 35°N and the wind forcing is provided by the ECMWF Re-Analysis data, which are decomposed in EOF. The full oceanic response is first compared with that obtained with a limited number of EOF in order to identify the main patterns of the wind-driven circulation. Particular attention is devoted to the analysis of beta-refracted baroclinic Rossby waves, that shape the oceanic variability in the eastern tropical region. The wind forcing is then confined to zonal bands with different meridional widths centered at the equator, so that the thermocline variability along the African coasts outside such bands is merely due to coastal Kelvin waves originating from eastward-traveling equatorial Kelvin waves through a well known teleconnection mechanism. Comparison of the obtained results with the full oceanic response allows us to distinguish between remotely-forced and locally forced upwelling events. A preliminary validation with altimeter data is finally presented.