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Biweekly ocillations in the Gulf of Guinea: a case of strong currents on an eastern boundary

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Current data on the continental slope off Angola show very energetic biweekly oscillations at 1300 m depth (peak-to-peak amplitude reaching 20-30 cm/s at 30 meters above the bottom). Here we present a synthesis of recent modelling work and observations aimed at understanding the dynamics of these currents. A high resolution primitive equation model demonstrates that this deep variability is forced by equatorial winds, through the generation of equatorial Yanai waves that propagate eastward and at depth, and then poleward as coastal-trapped waves upon reaching the coast of Africa. We have used both the three-dimensional, nonlinear model and a linear model to investigate the kinetic energy at intraseasonal frequencies in the Gulf of Guinea, and the role of equatorial and coastal-trapped waves in its spatial distribution and temporal intermittency. Additional current meter data on the continental slope north of the equator display an energy profile in the 10-20 day period band that is strikingly different from the our previous observations, with surface intensification rather than bottom intensification and a secondary maximum near 800 m. The model reproduces these features and explains them: the surface intensification in the north is due to the regional wind forcing, and the north-south dissymetry of the deep signal is due to shape of the African coast.