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Impact of intraseasonal equatorial Kelvin waves on eddy activity in an eddy-resolving model of the Humboldt system

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A regional eddy-resolving oceanic model spanning the 1992-2000 period is used to study the influence of 50- to 80-day intraseasonal equatorial Kelvin waves (IEKW) on mesoscale eddy activity off the west coast of Peru and northern Chile. The model is shown to realistically simulate nearshore intraseasonal sea level variability, poleward propagation of equatorially-forced variability along the coastal wave guide as well as mesoscale and Rossby wave-related offshore variability. A vertical mode decomposition of the model variability and sensitivity experiments to the open boundary conditions (OBC) are used to estimate to what extent eddy activity is controlled by the remote equatorial forcing. It is shown that, whereas linear theory predicts that Rossby waves should be confined equatorward of $\sim$12°S in the 50-80 days period range, westward propagation of energetic mesoscale signals takes place south of that latitude. The latter is not induced by the incoming IEKW, but rather results mainly from coastal flow instability. Westward propagation of mesoscale structures is also impacted by the $\sim$60-days coastal-trapped waves. A reduced eddy activity in the coastal transition zone off central Peru and central Chile is observed in the model when the energetic 60-days IEKW activity is considered in the OBC forcing.