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Generation mechanisms of mesoscale eddies in the Tropical Atlantic Ocean off north-western Africa

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The tropical Atlantic Ocean off north-western Africa (14˚N-22˚N; 16˚W-26˚W) is characterized by a contrasting oceanic circulation with only sluggish flow in the offshore shadow zone region and energetic flow along the coast. During the upwelling season, the coastal mean flow is dominated by a poleward undercurrent beneath the equatorward coastal jet whereas during the relaxation period, a stronger poleward flow from the surface to about 250-m depth prevails. This seasonality in the flow field has been associated to the seasonal wind patterns. Given the sluggish interior flow, mesoscale eddies in the region originate primarily from the coastal current system. Both, surface- and subsurface-intensified eddies occur. However, the mechanisms associated to the generation of these features remain elusive. We use here a high-resolution (∼1.5 km) configuration of GFDL's modular ocean model (MOM) with realistic topography, to study the respective roles of wind fluctuations and internal instability mechanisms on the eddy generation in this region. The model reproduces the complex coastal flow structures well and surface and subsurface eddies with characteristics comparable to observed eddies are formed. First results of the generation mechanisms are presented.