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Discussions

Interactive comment on "Meanders and eddies formation by a buoyant coastal current flowing over a sloping topography" *by* Laura Cimoli et al.

Anonymous Referee #1

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This is a nice contribution to our understanding of instabilities of coastal current and their nonlinear saturation, and the role of bottom topography in this process. The paper should be definitely published. However, as the authors themselves insist on comparisons with two-layer results, they should, probably, include comparisons with the paper Gula, Zeitlin and Bouchut, JFM, 2010 (GZB10), where nonlinear saturation of the instabilities of coastal currents was studied in detail in the two-layer model. Mechanisms of vortex detachment, which are also observed in the present simulations, were analyzed in GZB10. They look similar, although the detached vortices in GZB10 had rodon structure (an upper-layer monopole over a lower-layer dipole). In general, differences between the upper and the lower-layer structures of the detached vortices merit more attention in the context of satellite altimetry. I understand that stratification here is not the same as in GZB10, so a discussion on dependence of the results on stratification

profile would be welcome. Another aspect which is not discussed in the present paper is the role of coastal Kelvin waves in instabilities and their nonlinear evolution. In particular, the authors can measure dissipation in their experiments, and try to identify the zones of enhanced dissipation which could be related to formation of Kelvin fronts (if any).

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