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Discussions

Interactive comment on "Transformation of an Agulhas eddy near the continental slope" *by* S. Baker-Yeboah et al.

Anonymous Referee #2

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Review of "Transformation of an Agulhas eddy near the continental slope" by Baker-Yeboah et al.

This paper addresses the changes in Agulhas eddies and slope water due to their interaction. The paper contains new and interesting material on the subject, albeit in an idealized model set-up. In some parts the paper is lengthy and rather detailed, and appears quite descriptive and phenomenological. At those places it could perhaps gain quality in a more concise way of presenting the results. The figures are sometimes not well explained with captions that appear to be uninformative. But overall the quality of the paper is good and it can be accepted for publication with minor revisions, after the authors have addressed the points below.

Page 1824. I assume the water depth along the slope varies between 400 and 4500 m

i.s.o. 400-4500 m.

Page 1825. It appears to me that Figs 2,3,4 describe an anticyclone that splits due to baroclinic instability, see Drijfhout et al. (2003) and Katsman et al. (2003). The cyclones (C12C14) may appear as part of the m=2 mode that leads to splitting, also this mode may enhance the C0708 cyclone. I invite the authors to comment on that.

Caption of Fig.2 is unclear. What do we see? SSH I assume, from what source? Etc. C1214 is hardly detectable in Figure 3. It's only indicated in the last 2 panels with contours making the name unreadable.

I can't find L13 In Figure 4.

Page 1826. Figs 7-9 and their discussion seems redundant to me.

Page 1831. "he more interesting case for the Agulhas eddies involves an upper layer anticyclone and a lower layer cyclone". Why is this the more interesting case? I am not aware that this configuration is typical for Agulhas Eddies. Which obs support the assumption of a counter-rotating lower layer. I believe most Agulhas eddies are equivalent barotropic with a co-rotating lower layer, see e.g. van Aken et al. (2003).

Page 1834/1835. To what extent is the generation of cyclones shown in Fig. 13 dependent on the counter-rotating lower layer of the anticyclone?

You mention that the eddy-slope interaction increases the number of anticyclones in the Cape basin. High resolution models do not show such an increase. The PDF of relative vorticity becomes sharper when moving downstream from the Agulhas retroflection, but the average remains close to zero. Indicating that the generation of cyclones and anticyclones match already from the beginning of their formation, and only the relative vorticity decays with lifetime, see Van Sebille et al. (2009). How can you reconcile your results with this observation?

References: Drijfhout et al. 2003, DSR 50, 299-313. Katsman et al. 2003, JPO, 33 , 1197-1218. Van Sebille et al. 2009, JGR in press, doi:10.1029/2009JC005585.

Interactive comment on Ocean Sci. Discuss., 6, 1819, 2009.