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Discussions

Interactive comment on "The life cycle of submesoscale eddies generated by topographic interactions" *by* Mathieu Morvan et al.

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In the present manuscript, authors study possible mechanisms of the submesoscale generation in the Gulf of Oman and the Gulf of Aden. They indicate on two mechanisms: the arrested Rossby waves and the frictional generation vorticity in the bottom layer and horizontal shear instability. Authors supposed that the submesoscale dynamics can be responsible for the spreading of the Persian Gulf Water and Red Sea Water. Based on the idealized numerical simulations, authors study comprehensively both mechanisms and indicate that the frictional mechanism is more effective than the arrested Rossby waves to the generation of submesoscale variability. The presented results no doubt are useful and give rise new understanding to the spreading the Persian Gulf Water and Red Sea Water. However, there are some shortcomings that need

to correct.

The major shortcoming is a poor comparing the simulation results with natural measurements. How to extent the considered mechanisms can characterize the spreading the Persian Gulf Water and Red Sea Water? As well as, authors do not compare their results with that from the other numerical simulation studies. The model configuration description is very brief. Please specify the used parameterizations of subgrid-scale, open boundary conditions, momentum fluxes, heat and salt fluxes on the upper boundary of the channel. Please compare the observed temperature and salinity profiles with these from the numerical simulations. What differences between them exist? The generation period of intensive submesoscale variability is about 200 days. During this period the background conditions: the spatial structure of mesoscale eddies and temperature and salinity can change. Please give proof the stability of the mesoscale eddy row during 200 days.

Short comments 1. Line 15. Please change, Figure 5a on Figure 5d. 2. Please give the definition of the SCV.

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