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Ocean Science Discussions

Interactive comment on "A modelling study of eddy-splitting by an Island/Seamount" *by* Shengmu Yang et al.

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We are very grateful to your time and efforts. Your comments will greatly help us to improve our present manuscript and further work. We will consider your comments carefully and improve our manuscript following your (and others') comments.

General comments:

(1) The title is vague. . .As an ideal simulation. . .

Reply: Our study is motivated by eddy-splitting in the South China Sea. So we emphasize the South China Sea in our paper. Then we expand our experiments to different size islands and seamounts with different submergence depth. As a result, we decide our title including main components without many details. However, we will reconsider

this carefully in our revised manuscript.

(2) The study is in f-plane or β-plane. . .

Reply: The study is on β-plane. The β effect is primary force in the movement of the eddy, even though the study area is relatively small. On the f-plane, without any external forcing, the eddy will not move. This is why we choose β-plane.

(3) The eddy is mesoscale or sub-mesoscale. . .

Reply: The eddy in the study can be regarded as mesoscale. The scale of the eddy used in the model is based on statistics properties of ACEs in the northern SCS (e.g., Nan et al., 2011; Zhang et al., 2013; Chen et al., 2010, see references in the manuscript). Though the study is an ideal simulation, we prefer a more realistic eddy (here reflected in the eddy scale) for better applications in the future.

(4) There are lots of physical effects and control parameters. . .

Reply: There are indeed many factors influencing eddy splitting during the eddy-island interaction. The parameters mentioned in your comments are all important. Here we only investigate fully developed eddies; therefore the topography (dimensionless parameter R and S) will be the most important factor. The other parameters will be explored in the future work.

Special comments

(1) Page 2, line 1... line3...

Reply: Thank you for your suggestion, we will add their references in the revision.

(2) Page 3, line 10...

Reply: Reference of GEM: a dynamic tracking model for mesoscale eddies in the ocean will be added.

(3) Page 4, line 10...

Reply: Changes of the structure of the eddy are insignificant before the eddy-island interaction, we, therefore, don't give the details in the manuscript.

(4) Page 5, line 9...

Reply: Thank you for your correction. The results are not sensitive to these two different values of f or β.

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