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Ocean Science Discussions

Interactive comment on "A clustering analysis of eddies' spatial distribution in the South China Sea" *by* J. Yi et al.

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Response to comment 1:

When we downloaded the NLOM output data from NLOM Live Access Server (http://apdrc.soest.hawaii.edu/las/servlets/dataset?catitem=757) in 2011, the website did not provide the data of 2003 and 2004. The earliest available data started from April 28, 2005. Recently we checked the website again, and found the earliest data still remained that date. So we can only study the eddies from 2005 by NLOM data. The sentence (P3454, L20) did not clearly express such reasons, and we will rewrite it in revision.

The major reason why we chose the output of NLOM for eddy identification and tracking

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is that, the dataset is of 1/32°spatial resolution and 1 day temporal resolution, which is quite better than AVISO's SLA in quantitative analysis. However, as the comment mentioned, nowadays the AVISO merged SLA/SSHA data are popular in studying eddies not only its time range is larger. but also the SLA of AVISO are in situ data, not model simulated. So, we also started to use the AVISO dataset in analyzing eddies' spatiotemporal characteristics.

Response to comment 2:

Indeed, different initial clustering centers would probably produce different clusters. In our study, the initial centers were generated randomly, therefore clustering result was different in each experiment. However, as we know, kmeans is a heuristic method, the clustering result was not promised to be optimal. In order to make the clustering more reliable, we adopted an object function (P. 3458, L17) to choose the best results in 100 experiments. So, although clustering result was different in each experiment due to the effects of initial random centers, we chose the best outcome in 100 experiment to overcome this problem.

Response to comment 3:

The comment is accepted and those sentences will be rewritten.

P3461 L7 will be rewritten as : A9 and A10 south of 12N may be viewed as the different patterns of the anticyclonic eddy of the dipole structure off the Vietnam coast.

P3462 L16 will be rewritten as : (3) Clusters A3, C3 and A6 are located sequentially apart, along 112E, and C3-A6 represent the dipole eddies off Vietnam; A9 and A10 may also be the south part, the anticyclonic eddy, of the dipole.

Response to comment 4:

According to Wang's result, the anticyclonic and cyclonic eddies are in an alternating order from north to south in the eastern SCS in winter because of orographic wind, but this phenomenon is only prominent along the east boundary of SCS except for

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southwest of Taiwan Island. We can see evidence in Fig. 3 of Wang's paper.

Although the model results (Fig. 3b and 3d) can show the alternative anticyclonic and cyclonic eddies west of the east boundary, which agrees with observation (Fig. 3a), the details southwest of Taiwan Island are obviously different from observation. The data used in this paper are reanalysis product which have assimilated SSH from altimeters, so our result may be more reliable in the area of southwest of Taiwan Island.

Response to comment 5:

Because of limited previous studies about the eddies in the southern SCS, we can only get partly support from one paper (Fang et al., 1997).

The last sentence in L22 will be rewritten as:

Fang et al. (1997) also thought one eddy observed in the southwestern SCS during southwest monsoon season was not produced directly by wind forcing, in stead, local baroclinic instability, boundary current on the slope and topography there can be other important causes as well, which partly supports our viewpoint above.

Thanks for all valuable comments, we will carefully revise the paper according to them.

Interactive comment on Ocean Sci. Discuss., 9, 3451, 2012.

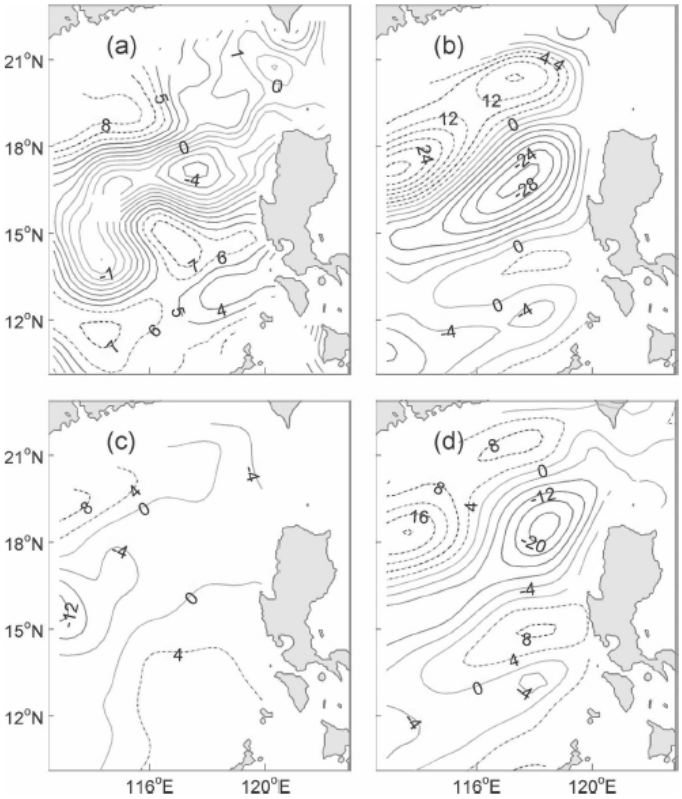

FIG. 3. (a) Observed sea surface height anomaly (cm) from altimetry, and model thermocline depth anomaly (m) driven by (b) QuikSCAT wind, (c) NCEP wind, and (d) both QuikSCAT wind and Kuroshio. All these fields are averages over the winters of August 1999–July 2002.

Fig. 1. Figure 3 of Wang's paper

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