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Ocean Science
Discussions

Interactive comment on "Image of a subsurface current core in the southern South China Sea" *by* Q. S. Tang et al.

B. Ruddick (Referee)

barry.ruddick@dal.ca

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This paper examines a legacy seismic section in the SCS, and focuses on a lens-like structure that is somewhat distant from the SCS boundary. The authors use detailed comparison with HYCOM assimilative model results to deduce that the structure is not a subsurface eddy, and is more likely a subsurface ($\sim$500 m) current core associated with a near-surface baroclinic eddy dipole. I agree.

The authors have made good use of HYCOM results to get around the lack of corroborative data that occurs with legacy seismics. They should, to avoid reader confusion, state that models like HYCOM can predict mesoscale currents and associated hy-

drographic structure, but NOT the fine structures that results from intrusions, internal waves, and thermohaline tendrils created by stirring. However, there is a strong case to be made that reflectors occur in the presence of strong lateral T-S gradients.

The authors' conclusion is reasonably well-supported by the combination of model results and observations. The comments I have made below are fairly minor, and do not affect the conclusions.

1. The internal wave paragraph beginning on P4 line 26 is quite non-quantitative and superficial. In fact it's hard to see their conclusions with the naked eye in the figure. I would suggest either a proper quantitative analysis be done (track reflectors, compute slope spectra and so on, and perhaps try to estimate dissipation), with comparison to the papers they cite, or else pull this paragraph and do this analysis in a different paper.

2. The mixing zones alluded to (P 5, line 26) were seen and discussed by Song et. al. (2011) in the periphery of Meddies, as "spiral arm" regions that have likely been torn from the frontal zone by mesoscale ocean stirring. [Song et al, JMR 69, 827-842.]

3. Pinheiro et al (2009) show Meddies, cyclones, and the Med. Undercurrent cores (upper and lower), and support the conclusion that current cores and subsurface eddies will look very similar.

4. I think that you should show the thermal structure in figure 6. I suggest you show temperature as colour in the top panel, transverse velocity (related to geostrophic currents and therefore temperature) in the middle, and along-track velocity in the lower panel. You might even put the transverse velocity contours in black on top of the temperature.

5. Although this has never been done, I would suggest plotting the lateral temperature gradient from HYCOM to see if the regions of strongest gradient correlate spatially with the regions of strongest reflectors.

I have also attached an annotated pdf with other very minor comments.

Please also note the supplement to this comment:
http://www.ocean-sci-discuss.net/9/C1674/2013/osd-9-C1674-2013-supplement.pdf

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Interactive comment on Ocean Sci. Discuss., 9, 3739, 2012.