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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.

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On a basis of a seismic survey conducted in 2009, the authors detected a subsurface lends (probably pycnostad) which is of approximately 60 km in diameter. The authors interpret that, using the satellite-derived altimetry and HYCOM, this lens-like structure is the current core of southwestward currents in the intermediate layer.

The seismic survey is indeed a novel observational method which potentially uncovers fine thermohaline structures that we have never seen before. In fact, the intermediate lends detected in this survey is of particular interest for the oceanography community. I however have three objections itemized below.

[1. Resolution of altimetry and HYCOM] As mentioned above, the subsurface lends

is of approximately 60 km in diameter (Fig.3; P.3748, line 18). In addition, Figure 3 demonstrates that a pycnostad was located within the lateral scale of 20-30 km. It seems unlikely to resolve such a fine structure by using relatively "coarse" altimetric and modeled datasets (the grid scale of HYCOM is $\sim$9 km). In fact, the fine structure related to the subsurface lends cannot be found in Figs. 5-7. Overall, it is unreasonable and less convincing to use the relatively "coarse" datasets (altimetry & HYCOM in the present case) for interpreting fine datasets like seismic data.

[2. Physical interpretation of the lens] The authors conclude that the subsurface lends is not a subsurface eddy, but a current core (P.3747, lines 20-21). I was confusing their interpretation. In the conventional physical oceanography, the current core should be associated with the slope of isopycnals by geostrophy. A dome-like (lens-like) structure of isopycnals is always associated with an eddy, regardless of whether the eddy is located in the surface or subsurface layers. Is the relationship between the thermohaline lends and current core justified by a geostrophic adjustment? One of the plausible interpretations is that the subsurface lends with the pycnostad was carried by the southwestward currents in the intermediate layer from somewhere else.

[3. Hydrographic surveys] It would be very interesting to compare their seismic data with hydrographic ones. Did the authors conduct XBT or CTD casts concurrently with the seismic survey? The hydrographic data obtained during the seismic survey are likely to be useful for validating the thermohaline structure mentioned in the present manuscript in spite of their relatively coarse resolution compared to the seismic data.

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