

Interactive comment on “Hydrographic survey over the Carlsberg Ridge in May 2012” by Hailun He et al.

Hailun He et al.

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Response to reviewer # 1

Based on CTD/XCTD obtained in May 2012 and Argo profiles along the Carlsberg Ridge, this study discussed water masses over the specific section, showed a ventilation structure, and calculated the absolute geostrophic currents. This study is interesting. However, I have the following concerns.

One of the main weaknesses is that this paper does not have a clear scientific theme and draws some quick conclusions. The authors first showed the observed temperature, salinity, and density. Then, they calculated the geostrophic currents and compared the results with SODA and HYCOM. Finally, they set some passive tracers at 100m and

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700m and tried to reveal pathways of the masses. It is difficult for the readers to understand what the paper focused on, just like we cannot obtain enough information in science from the title "Hydrographic survey over the Carlsberg Ridge in May 2012" Because of no in-depth analysis, the paper looks like a data analysis report, and the conclusions are not very convinced.

I thus suggest the authors focus on the water masses in the NWIO. The authors may want to start their analysis based on the CTD/XCTD data. Then, the obtained conclusions are expected to be verified using more data (e.g. more Argo profiles) in this region and more conclusions are expected. Finally, the analysis in section 3.4 is expected to be more solid to reveal the pathway of the water masses. The authors may want to delete the contents in section 3.3.

Response: We agree with reviewer's comments and suggestions. We revised the manuscript by

(1) We added the background on meso-scale eddy and west-propagating disturbance in Introduction Section. According to Maximenko et al. (2005), the vertical structure of west-propagating disturbance has not been observed.

(2) We moved the background of Red Sea Water from Results Section into Introduction Section.

(3) We added discussions on the main results of Lagrangian tracers (Section 3.4).

Therefore the main results include the snapshot of water masses, and the vertical structures of mesoscale eddy and west-propagating disturbance.

Reference

Maximenko, N. A., Bang, B., and Sasaki, H.: Observational evidence of alternating zonal jets in the world ocean, *Geophysical Research Letters*, 32, L12607, 2005.

Some minor comments:

1. Could you add the latitude (or longitude) in the x -axis of Fig. 3?

Response: Corrected.

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2. "Wind and SST have a close relationship." The wind pattern may be not a key factor for the SST distribution in the oceanic interior.

Response: [Page 7, line 4-6 in change-track-mode revised manuscript] We deleted the statement "Wind and SST have a close relationship".