

## ***Interactive comment on “Seasonal variability of subsurface high salinity water in the northern South China Sea and its relationship with the northwestern Pacific currents” by A. Wang et al.***

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Received and published: 4 February 2015

This work examined the seasonal variation of the volume of the subsurface high salinity (>34.68) in the South China Sea (SCS) based on HYCOM model product. The obtained seasonal feature of the variation is useful for understanding the characteristics of SCS water masses and their relation with intrusion of the North Pacific waters into the SCS through the Luzon Strait. This manuscript can be published in Ocean Science after certain revision. My comments are given in the following:

Thank you for your positive evaluations on our manuscript. The manuscript has been revised following your constructive suggestions. The original comments are included

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and followed by our replies.

Comments: 1. Figure 1. (1) The colors used in panels a and b should be changed to be the same for facilitating a comparison. (2) There are many contour lines for maximum salinity depths, but very few have been labeled with numbers. It is very difficult to identify the depths, especially in the SCS. (3) The figure is shaded with stepwise colors to show the salinity values, hence the same stepwise colors should be used in the color bars.

Figure 1 has been corrected as suggested (see my revision manuscript Page 22).

2. Figure 3. The same as the points (2) and (3) above.

We have redrawn Figure 3 as suggested (Page 25). In order to clearly identify the depths, we redrawn the maximum salinity and its depth separately in two figures.

3. Figure 6. What NK stands for? By the way, don't use too many abbreviations, it is hard for readers to remember so many abbreviations. Captions of Figures 9 and 10 are more appropriate. Thanks for your comment. We have deleted the abbreviation NK in the text and polished the caption of Figure 6 as suggested (Page29 line 509-512).

4. Page 2427, line 4-5. “The daily model outputs during 2008-2013 are . . . used in this study”; but page 2432, line 3, “. . . from 2004 to 2013”.

Yes, it should be “2008-2013”. Thank you for pointing out this typo (page 13 line 281).

5. Page 2428, line 24. Change “though” to through.

Corrected as suggested (Page 8 line 160).

6. Page. 2429, line 28. The statement “In summer, there is no significant Kuroshio intrusion . . .” is questionable. Why the volume of high salinity can increase from May to September as seen in Fig. 4?

To check the statement “In summer, there is no significant Kuroshio intrusion . . .” is

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correct. We have drawn the Figure A1-A3. As shown in Figure A1 the high salinity structure (salinity=34.7) is displayed in isolation in the SCS, and is not extended from the northern pacific high salinity water. Also in Figure A2 the three-dimension structure of the high salinity water in summer achieves a minimum volume, But there exists maximum volume of filament or cluster structure. This means there are other factors rather than the Kuroshio intrusion influencing the change of the high salinity water in summer. In Figure A3 we have drawn the Seasonal variation of the salinity content in our computation domain. The salinity content decreases from May to September.

7. Page 2430, line 9-11. The statement “The lifting . . . probably due to the western Pacific warm water or the deep upwelling in the SCS” is most likely not correct. In fact, beneath any strong northward current the isopycnals must tilt up westward (in north hemisphere) so that the resulting zonal pressure gradient can balance the Coriolis force associated with the current.

Thanks very much for your suggestion. We accepted your suggestion and modified in our revised manuscript (Page 10 line 200-207).

8. Figure 8. Give the contour interval in the caption for zonal velocity.

Corrected as suggested (Page 31 line 521).

9. Page 2431, last two paragraphs. The description related with Fig. 10 is quite confusing. It should be reorganized.

Thanks for your suggestion. We have reorganized the last two paragraphs in revised paper (Page12-13).

10. Page 2431, line 12-13. (1) What is KST? Should that be KT? (2) The negative correlation should be changed to positive. This can be easily seen if one moves the KT curve leftward for 3 months.

Yes, it should have been “KT”. Thank you for pointing out this typo. And the correlation has been changed as suggested in the revised paper (Page 12 line247-249).

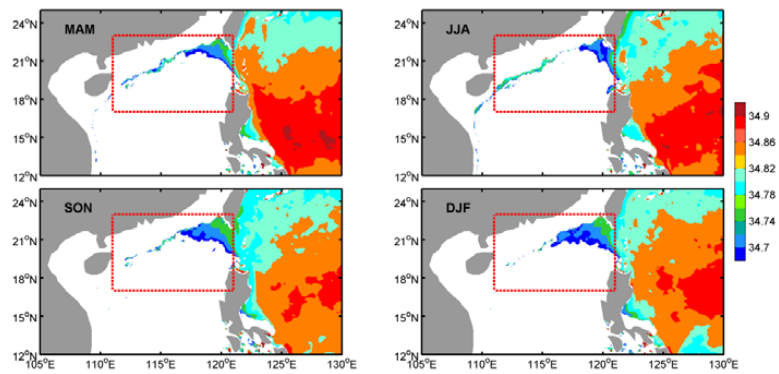
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Please also note the supplement to this comment:

<http://www.ocean-sci-discuss.net/11/C1325/2015/osd-11-C1325-2015-supplement.pdf>

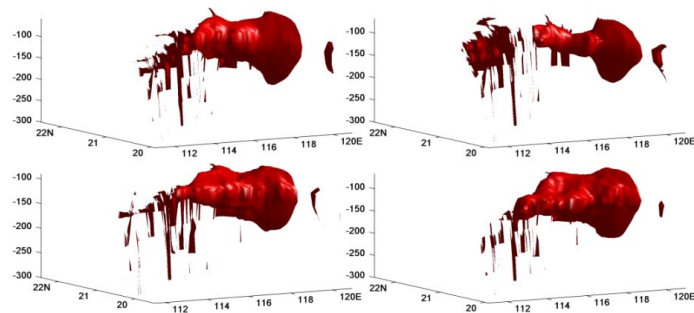
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Interactive comment on Ocean Sci. Discuss., 11, 2423, 2014.



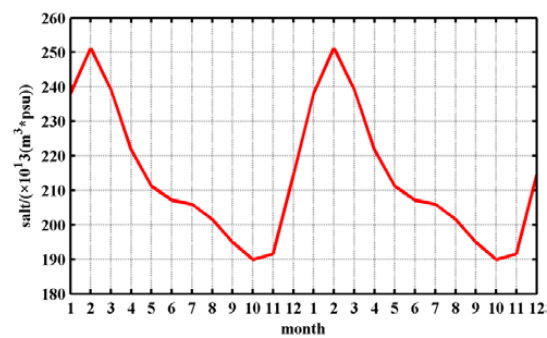
FigureA1. Seasonal variation of the salinity maximum (shaded; PSU) (salinity  $\geq 34.68$  PSU).

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FigureA2. Seasonal variation of the three-dimension structure of the salinity maximum (shaded; PSU) (salinity  $\geq 34.68$  PSU) in our computation domain.

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FigureA3. Seasonal variation of the salinity content  
(unit: m<sup>3</sup>\*psu) in our computation domain.

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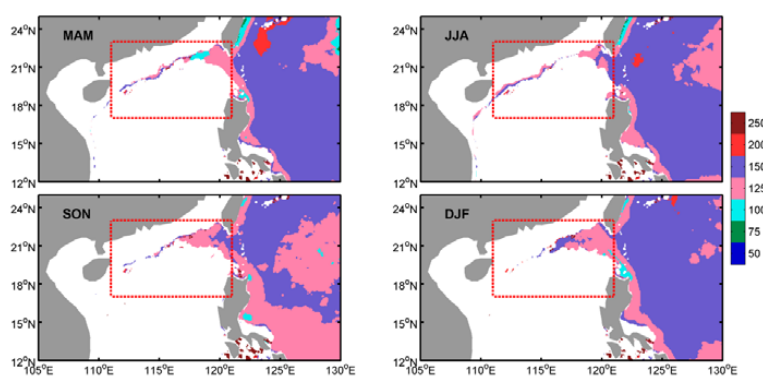


Figure A4. Seasonal variation of depth of the salinity maximum  
(salinity  $\geq$  34.68 PSU).red dotted box is our computation domain.

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