

Interactive comment on “Sea surface height and mixed layer depth responses to sea surface temperature in northwestern Pacific subtropical front zone from spring to summer” by C. Qiu et al.

Anonymous Referee #2

Received and published: 2 March 2015

General Comments This manuscript describes the relations among SST, SSH and MLD in the northwestern Pacific subtropical region and SST frontal zone, and I think this direction is important to understand the SST changes in the Pacific region. But it is very difficult to understand what the authors emphasize, and frankly it seems to me that they just calculate relations among SST, SSH, and MLD. I found a lot of typos and mistakes, and lack of description to their results. I also see the less originality in the manuscript, as the correlations between SST, SSH and MLD can be expected in a phase of seasonal change. Therefore the manuscript needs to be revised in a major way. Supporting the authors, I guess the authors would want to show the oceanic processes to SST via MLD and SSH changes, that will contribute to the disappearance of

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SST front, which is well shown in Qiu et al (2014) from the point of view of surface heat budgets. Therefore my comment towards revision is to extend this work to understand the role of Mixed Layer Processes to the SST front disappearance. Qiu et al (2014) showed the importance of local air-sea flux exchanges (mainly latent heat flux due to anomalous wind), but does not show clearly roles of ocean mixed layer processes, and I guess that barrier layer effect may exist. Ocean remote forcing will not work in this region, the authors may not need to analyze SLA further.

Specific Comments 1) I don't see notable description about "formation of shallow mixed layer depth (MLD) is important" for SST front disappearance in the paper by Qiu et al (2014). 2) What kind of results the authors will have if the seasonal change will be removed from the analysis or if just focus on seasonal change only? As seasonal signal seems to be strong and the present results just show the seasonal characteristics. 3) Nowadays, GTSP include a large amount of Argo floats data, and Argo float data provide vertical high-resolution data than others, so good to use Argo data by extracting from GTSP datasets for estimating MLD and Barrier layer. 4) It will be necessary to show the three components of steric, dynamics, and barotropic components of SSH before showing analysis of steric component, although from Figure 5 it seems that steric component will be largest. Also, it is necessary to show the errors from freshwater component to steric component.

Interactive comment on Ocean Sci. Discuss., 12, 83, 2015.

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