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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.

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This manuscript describes the relations among SST, SSH and MLD in the northwestern Pacific subtropical region and its SST front zone. Though the selected topic for study by the authors is important, discussions, interpretations, supporting evidence and conclusions are quite confusing and vague. I am of the opinion that the manuscript is not suitable for publication.

General Comments:

1) The subtropical front zone is not clearly defined. Is it subtropical SST front zone? 2) The manuscript describes the variations for all seasons but the title shows otherwise.

3) The periods and resolutions of data are not in uniformity. 4) The manuscript emphasizes only on the weakening period of the front zone. What is the rationale? 5) There is lack of proper physical interpretations in a numbers of derived parameters. 6) The linear relationship derived is not robust, as it shows poor correlation in the warm sector and does not indicate the applicable area of this relationship.

Specific comments:

1. Introduction

âĂć Paragraph 3: "...MLD is associated with the SSH variation, because SST..." The whole paragraph is not properly elaborated. For example, how could SST cooling induce convection? Also, how could convection deepen the MLD?

2. Data and methods

âĂć Page 85: "We use ... from 1 January 2003 to 31 December 2009". Page 86: "The data from 1 January 2003 to 30 September 2009..." Why are the data periods different? âĂć Paragraphs 1, 2, 3: "The original spatial resolution is ...10 km,...etc." What is the reason for using data of different resolutions?

3. Results and discussions

âĂć Section 3.1, paragraph 1, lines 3-4: "The SST front ...next June ..." should the next June be the following June? âĂć Same section, paragraph 2, line 5: the subtropical front and Kuroshio front are of different metrics. How could they lead to the different seasonality of front position? âĂć Same section, paragraph 3, lines 3-4: "...with shifting ...area $\pm$2" There is no unit attached. Also, the shaded band is not clearly defined (within $\pm$2 standard deviation?) âĂć Section 3.2, paragraph 1, and line 4: "...which might result from the study region and study period ..." can it be due to different study regions and periods? âĂć Same section, paragraph 1, lines 6-7: "In summer, the SLA has ..." Please explain and elaborate with Figure, if any. âĂć Section 3.2.2, paragraph 2, line1: "During the SST front weakening ..." what is your main reason in emphasiz-

ing occurrence only during the weakening period? âĂć Same section, paragraph 3-4: There is a mismatch of the time frame used here with that in the title of your manuscript. âĂć Same section, paragraph 5, lines 5-6:"...The correlation between SLA...,0.38 in ...and warm zone,..." your warm zone shows poor correlation. So, if a linear relationship is being derived then one should specify the area in which this relationship is applicable. âĂć Section 3.3, paragraph 3:"...the singular points ..." How do you define singular points? What is the significance of the singular points?

4. Summary: The summary is too brief and vague.

Please also note the supplement to this comment:
http://www.ocean-sci-discuss.net/12/C33/2015/osd-12-C33-2015-supplement.pdf

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