

Response to the Reviewer #3

We wish to thank the referee for the criticism. In the light of the comments, we modified the manuscript wherever it was possible and point-wise modification is detailed below.

General Comments:

Reviewer's comment: *The authors purport to examine the connection between mixed layer variability and chlorophyll biomass in the Bay of Bengal. This is done by compiling gridded datasets of a number of variables. The results presented are a qualitative description of a number of (hard to see) plots with little discussion. Indeed, Section 3.6 is no more than a description of what is seen in the various figures, the link between the biogeochemical parameters and the physics is not discussed, and the authors give no justification for the last sentence in the Conclusion that they is a strong link between the two.*

Response: We have largely modified the manuscript. The Results were separated from Discussion and a separate Discussion section was added in which the results were appropriately linked and synthesized (Kindly note the modifications in the accompanying modified manuscript in RED).

Reviewer's comment: *As mentioned by Reviewer #2 the authors give no reference to previous studies of biological production in the region. This is also true for the characteristics of the surface mixed layer for which there are numerous studies. Three that come readily to hand are: Anitha et al, Ann. Geophys, 2008; Keerthi et al, Climate Dynamics, 2012; Seo et al J. Climate, 2009.*

Response: We have added several new references including the ones suggested by the reviewer in the discussion section. (Kindly note the modifications in the accompanying modified manuscript in RED).

Reviewer's comment: *(i) Put their study into the context of previous studies. What is new about their results and conclusions?*

Response: We have adopted this in the discussion section. Also we have completely rewritten the abstract in the light of comment to bring out what is new in our study and the limitation as well.

Reviewer's comment: *(ii) There are a number of freely available gridded datasets of MLD that include data from WOD05 and Argo. Why construct another one? In the context of the present study it would be instructive to have a regional comparison of WOD05 and Argo derived MLD.*

Response: As mentioned in the modified text we could assemble more data temperature and salinity data than what is available either in the WOD05 or in the Argo data. From Fig. 1 and

Table 1 it is amply evident that even by combining all the available data from hydrocast, CTD and Argo, there are data inadequacy in certain locations when constructing the monthly mean climatology. See for example Appendix Figure A1 for the month of May and June.

Reviewer's comment: (iii) *Be more quantitative and go beyond just a visual description of plots. For instance a plot of the rate of change of ML temperature as a function of month, averaged over some suitable area, compared with tendencies implied by surface heat fluxes would help greatly in determining the importance of particular processes.*

Response: There are earlier studies that have addressed aspect of relative importance heat flux and fresh water fluxes in regulating mixed layer which we have included in the Discussion section.

Reviewer's comment: (iv) *Consider the impact of mesoscale eddies, intraseasonal, and interannual variability on their results. A lot of the spatial variability in the biogeochemical properties presented appears to be induced by length and timescales not attributable to the monsoon. The Keerthi et al study mentioned above would be useful in this regard.*

Response: Mesoscale eddies cannot be resolved using spatial resolution of 1° longitude by 1° latitude which is what we have used in our study. Moreover, using a monthly mean climatology we cannot track the temporal evolution of mesoscale features.