Response to the Reviewer #1

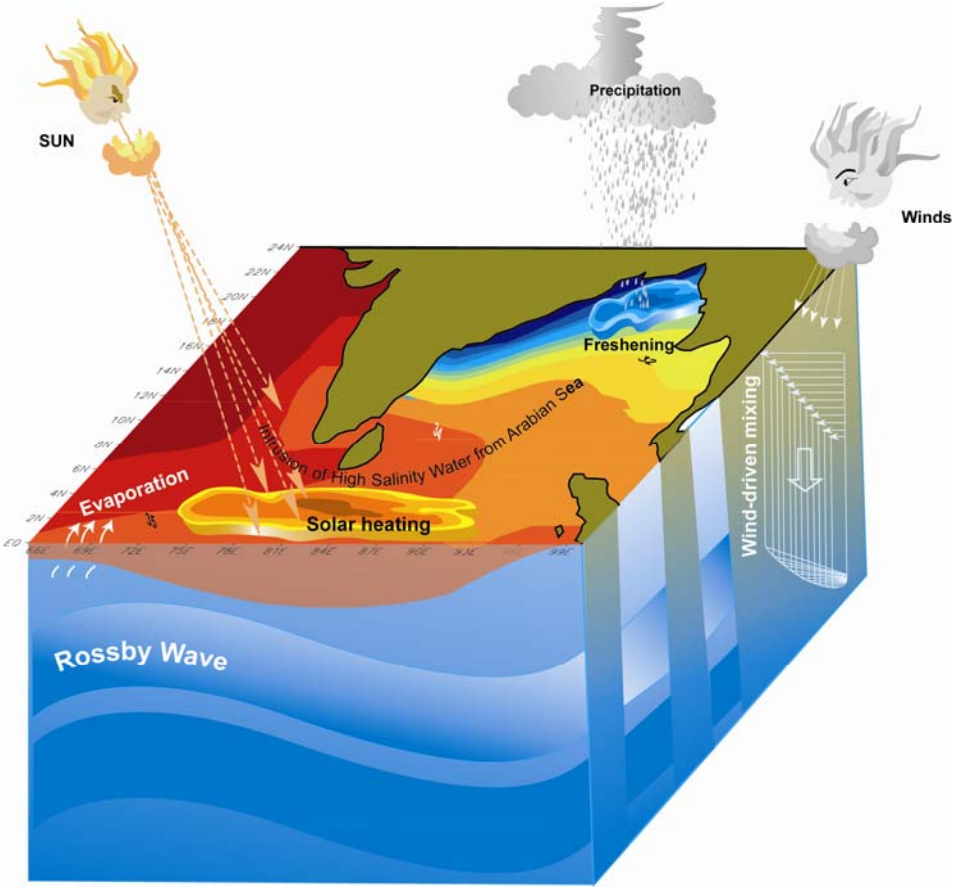
We wish to thank the reviewer for the constructive criticism. In the light of the comments, we modified the manuscript and point-wise modification is detailed below.

Reviewer's comment:

I would like the authors to refer some references regarding to the mixed layer depth regulation mechanism and add schematics in Appendix, in order for readers to get the point the authors address in this paper.

With some such detailed explanation of bio-physical mechanism this paper may gain the pivotal position in the Bay of Bengal observational studies for the past years.

Response: As suggested we have prepared schematic diagram depicting various processes that regulate mixed layer depth in the Bay of Bengal added in Appendix 9.



Appendix 9. Schematic representation of local and remote forcing that influence the depth of the mixed layer. Colour shading is the climatological monthly mean salinity for August from WOA05 [*Antonov et al.*, 2006] showing the intrusion of high salinity waters from the Arabian Sea. The local forcing that affect the MLD are the precipitation and river runoff, solar heating, and wind-mixing. The remote forcing are the intrusion of high salinity waters from the Arabian Sea and propagation of Rossby waves.

As suggested we have also added references relating to mixed layer depth regulation in the new section “Summary and discussion” as listed below:

Thus the winds, though strong in the northern Bay, were unable to break the stratification and initiate deep wind-mixing as inferred from static stability parameter. A similar result was arrived at by Shenoi et al. (2002) based on kinetic energy and by Vinayachandran et al. (2002) in the context of barrier layer formation (sees also Thadathil et al., 2007). Using modeling Han et al. (2001) also obtained a thin mixed layer in the region where precipitation exceeded evaporation.
The deep mixed layer in the south was driven by two processes, the advection of high salinity waters from Arabian Sea into the Bay of Bengal and the westward propagation of Rossbay waves from the eastern boundary. Narvekar and Prasanna Kumar (2006) obtained a similar conclusion while examining the MLD variability in the central Bay of Bengal during summer monsoon. In the present study the band of deep MLD extending from southwestern Bay into the central Bay was associated with the advection of Arabian Sea high salinity waters, while the deep MLD in the central and eastern part of the Bay was associated with propagation of Rossby wave of annual periodicity. The shallow mixed layer seen off southern part of the peninsular India was due to the monsoon driven upwelling, while that east of Sri Lanka was due to the upward Ekman pumping and associated Sri Lanka dome (Vinayachandran and Yamagata, 1998).