

***Interactive comment on* “Effect of mesoscale eddy on thermocline depth over the global ocean: deepen and uplift” by Xiaoyan Chen and Ge Chen**

Anonymous Referee #2

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In this manuscript the authors examine the “effect” of mesoscale eddies on thermocline depths over the global ocean by using altimeter sea surface height data and Argo profiling float data.

In mid-latitudes, both seasonal and permanent thermoclines are likely to be detected, but the authors did not distinguish these two in their analysis. Probably they mainly detected the permanent thermocline in cold seasons and the seasonal thermocline in warm seasons. The vertical shift of the permanent thermocline is the eddies’ structure itself, and not their “effect”. The anticyclonic and cyclonic eddies might have some effect on the formation of seasonal thermocline, but such detailed analysis has not been performed in this manuscript. What about higher latitudes, especially in the Southern Ocean and subarctic North Pacific where the ocean is stratified by salinity? These re-

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gions probably lack thermocline in cold seasons at all depths. A global analysis without considering such regional differences seems meaningless.

Due to poor analysis and numerous descriptions without scientific basis, I cannot recommend the publication of this manuscript in Ocean Science.

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