Ocean Sci. Discuss.,
https://doi.org/10.5194/os-2018-23-AC5, 2019

Ocean Science
Discussions

Interactive comment on "Mesoscale processes regulating the upper layer dynamics of Andaman waters during winter monsoon" *by* Salini Thaliyakkattil Chandran et al.

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Received and published: 11 January 2019

Reviewer 3

1) Oceanic circulation in upper ocean is not only geostrophic, identification of eddy through geostrophic current is not enough. It is better to follow Okubo-Weiss parameter method to identify eddies As per the reviewer's suggestion we adopted the Okubo-Weiss parameter method in the revised manuscript. 2) It is suggested to use OSCAR current observations rather than using geostrophic current Earlier studies argued that geostrophic current is dominated in the eddy region. Therefore we used geostrophic current observations. As per the reviewer's suggestion we used Okubo-Weiss parameter method to track the eddy.

3) It is known that equatorial westerly jet (Wyrtki jet) produces down welling kelvin wave which propagate as a coastal Kelvin and radiate Rossby wave which favors cyclonic eddies in the BoB including Andaman Sea. These mechanism is already reported by earlier study but here authors connected it with bio-geochemistry using in-situ should be reflected and discussed in detail. Author mentioned that they measured vertical velocity but throughout the manuscript it is not displayed. It is suggested use them in this study and may compare it with upwelling of isotherms etc.

We estimated vertical velocity from the OSCAR current 5 day average data. The eddy area is characterized with high positive vertical velocity and this supported the upwelling of isotherm and the existence of cold core eddy at 8ïĆřN.

4) Author mentioned vertical stability and vertical shear of currents favors the formation of eddies. It can control vertical mixing, however shear of horizontal current in horizontal plane supports the formation of eddies. This what discussed by Okubo-Weiss. Author should drop related sentences from the abstract about vertical shear and stratification.

we attempted Okubo-Weiss method and included in the revised manuscript. 5)It is mentioned that BoB upper ocean stratification restrict nutrient supply and later it is mentioned that eddy support up welling and nutrient supply, however it is not clear what is a role of waves and convective mixing? According to figure 8 higher chlorophyll is reported in north BoB, where stratification is more By adopting Okubo-Weiss method we identified only one cold core eddy present i.e. CE1. But high production pocket is observed at 13ïĆřN and 93ïĆřE. The reason for this high production is explained using Kelvin waves and convective mixing Gomes et al. (2000) found that production along the east coast of India is inhibited by stratification caused by river discharge and monsoonal cloud cover, physical processes such as ocean currents and eddies are able to erode stratification and upwell nutrients.

Please also note the supplement to this comment:
https://www.ocean-sci-discuss.net/os-2018-23/os-2018-23-AC5-supplement.pdf

Interactive comment on Ocean Sci. Discuss., https://doi.org/10.5194/os-2018-23, 2018.

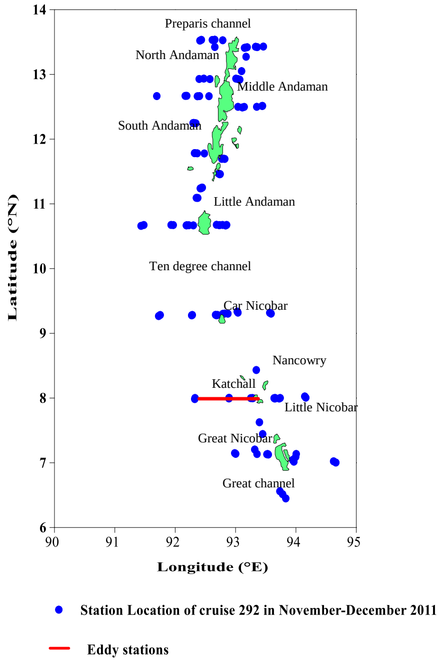

Fig. 1 Station Location

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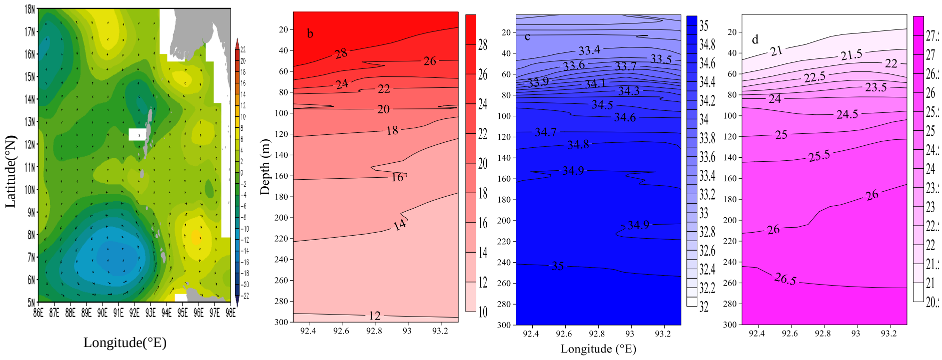

Fig. 2 a) Sea Surface Height (cm- Aviso weekly) and geostrophic current (cm/s) and the eddy location b) Vertical temperature (°C), c) salinity and d) density (kg/m^3) distribution at the eddy location

Fig. 2. Fig. 2 a) Sea Surface Height (cm- Aviso weekly) and geostrophic current (cm/s) and the eddy location b) Vertical temperature (ïĆřC), c) salinity and d) density (kg/m3) distribution at the

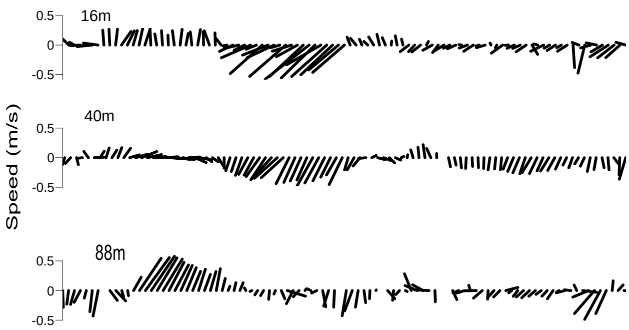

Fig. 3 Horizontal current (m/s) structure at different depth at 8°N

Fig. 3. Fig. 3 Horizontal current (m/s) structure at different depths along 8°N

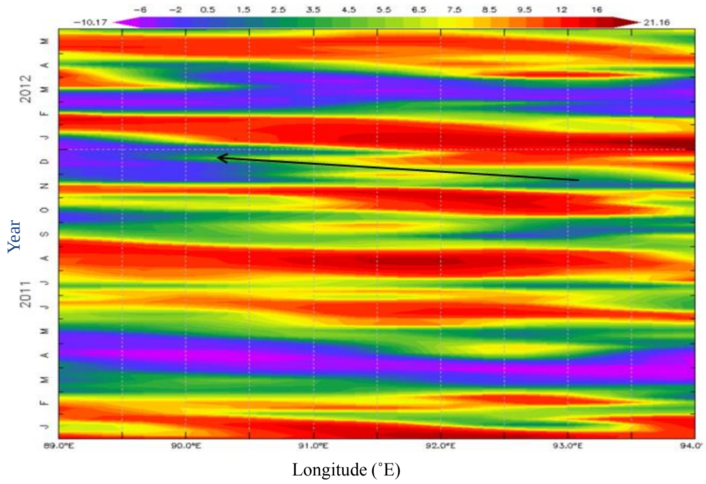

Fig. 4 Hovmuller diagram of SSHA(m) (Aviso monthly) along 8°N

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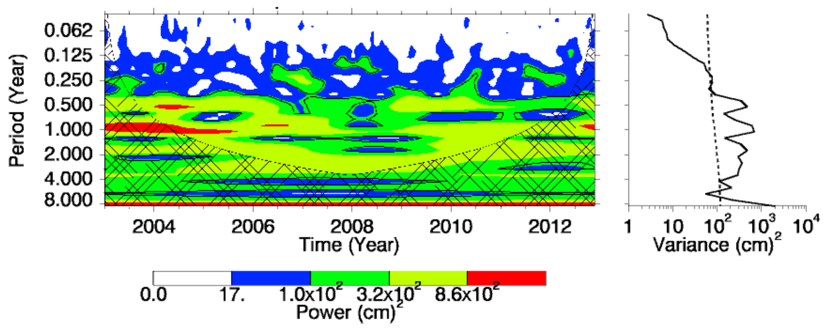

Fig. 5. Wavelet spectra of SSHA (m- Aviso monthly from 2003-2013) along 8°N

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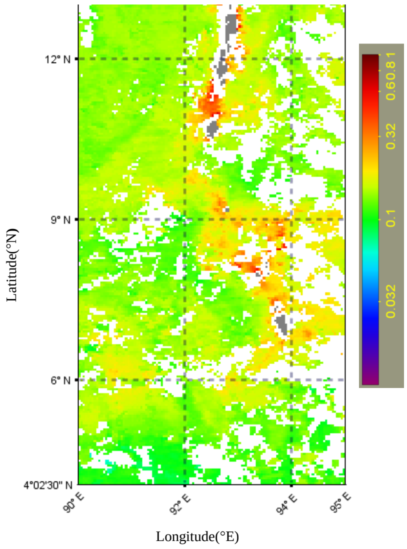

Fig. 6 chl a (mg/m^3- weekly MODIS Aqua) pattern during the insitu observation

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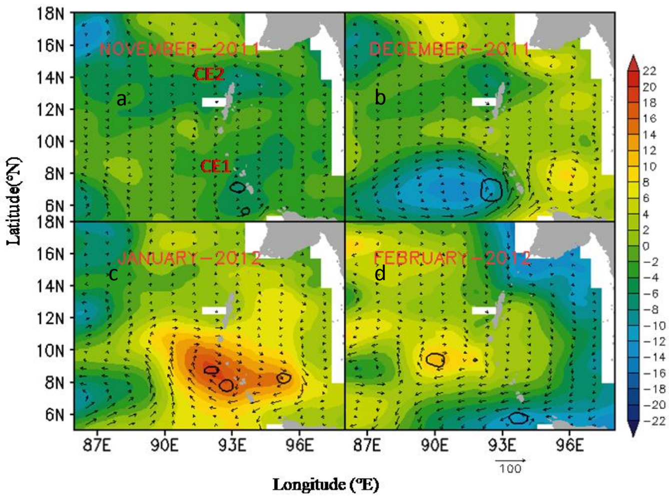

Fig. 7 Merged map of SSHA (m), Geostrophic current (cm/s) and Okubo-Weiss paremeter (Black contour of -2x10-11/s2) from Aviso during a) November b) December c) January d) February

Fig. 7. Fig. 7 Merged map of SSHA (m), Geostrophic current (cm/s) and Okubo-Weiss paremeter (Black contour of -2x10-11/s2) from Aviso during a) November b) December c) January d) February

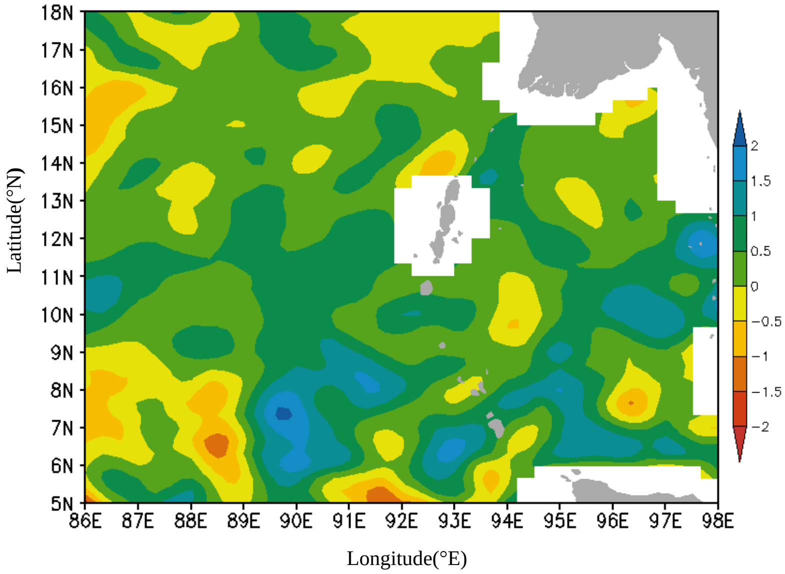

Fig.8 Vertical velocity (x 10^{-5}) at 50m depth from OSCAR in Andaman waters during the eddy period

Fig. 8. Fig.8 Vertical velocity (x 10-5) at 50m depth from OSCAR in Andaman waters during the eddy period

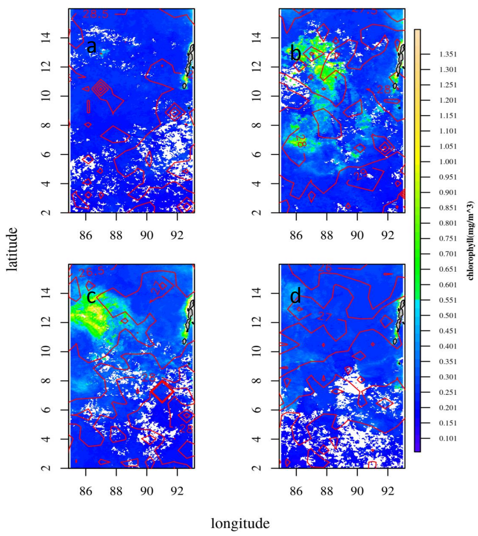

Fig.9 Overlap map of SST (°C-monthly MODIS Aqua) and Chl a (mg/m^3- monthly MODIS Aqua) during a) November, b) December, c) January, d) February

Fig. 9. Fig.9 Overlap map of SST (ïĆřC-monthly MODIS Aqua) and Chl a (mg/m3- monthly MODIS Aqua) during a) November, b) December, c) January, d) February