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Interactive comment on "Remote sensing of upwelling off Australia's north-east coast" *by* Mochamad Furqon Azis Ismail et al.

Anonymous Referee #2

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Review: General Comments This study analyses climatologies of satellite estimates of chl-a and SST (both indicators of upwelling) and two potential driving forces of this: the wind-driven surface Ekman transport, and the current-driven bottom Ekman transport. The study focusses on the difference between the seasonality of upwelling in the norther and southern halves of the Southeast Queensland Marine Coastal Zone, which is immediately south of Fraser Island, a large sand island extending across the shelf. The East Australian Current flows along the edge of the shelf. I'm sorry but I do not find the conclusions of the study to follow logically from the analysis that is presented. The paper concludes with "The role of cyclonic frontal eddies in raising Chl-a and cooling shelf water is not addressed in this study. Yet, a recent study by Ribbe et al. (2018) observed frontal cyclonic eddies off SEQMCZ during austral autumn and

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winter that are characterised by elevated Chl-a and cold SST. I have not yet read Ribbe et al (2018) but I suspect it makes the present paper obsolete. The paper also has many lesser deficiencies these are insignificant in the light of the major problems. I therefore recommend that the paper be rejected.

Specific Comments

1) Figure 2 shows maps of the a) spring+summer b) autumn+winter and c) autumn+winter-(spring+summer) chl-a for the study region. The positive values in the difference field (map c) are interpreted by the authors as an autumn+winter 'bloom' in the mid shelf. But referring back to maps a) and b), it seems clear to me that map c) is better interpreted as being due to a spring-summer mid-shelf chl-a deficit. So the question is not "why is there a autumn-winter midshelf bloom?" but "why is chl-a so low in the midshelf in spring-summer?". With reference to Fig. 1, the answer to this second question seems fairly clear: the Fraser Gyre, on average, advects low-chl EAC water cyclonically onto the shelf, giving the observed pattern.

2) Figure 3 shows maps of the a) spring+summer and b) autumn+winter SST anomaly. The autumn+winter map is essentially featureless. Again, this does not point to there being any midshelf bloom in that time of the year that needs to be explained. So if the SST data does not support the argument, it might as well be omitted.

3) Figure 12 shows some chl-a images for June 10, 11 and 12. The same data, with geostrophic velocities overlain, are available at http://oceancurrent.imos.org.au/product.php?product=oceancolour&region=Brisbane2&date=20070612040000&rtype=DF . Altimetry is not particularly reliable over the shelf but the maps do suggest that a cyclonic eddy was over the shelf at this time, as also suggested by the details of the chl-a imagery. So I think a 2-D model involving eddies is more likely to be relevant than the proposed (Gibbs 1998) model involving convergence of BBL and downwelling. I assume that this is what Ribbe et al (2018) reports on.

Ribbe, J., Toaspern, L., Wolff, J.-O., and Ismail, M. F. A.: Frontal Eddies along a Western Boundary Current, Continental Shelf Research, 165, 51-59, 2018.

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