Ocean Sci. Discuss.,
https://doi.org/10.5194/os-2018-142-RC3, 2019

Ocean Science
Discussions

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

Anonymous Referee #3

Received and published: 11 February 2019

After studying the work presented I have come to the conclusion that the work has a number of serious problems, outlined below, and therefore requires a major overhaul before it meets scientific publication standards.

Main points

1. Productivity The authors claim that the upwelling system is a key ecological region of high productivity. It cites Chl-a values "well above" a background level of 0.2 mg/mˆ3. Well, Figure 2 indicates that there are Chl-a levels > 0.5 mg/mˆ3 close to the shore, probable river-related, while offshore Chl-a values barely exceed 0.4 mg/mˆ3, which is just twofold the ambient-nothing level. How can the authors (or authors of previous papers) classify this as highly productive? Firstly, real highly productive upwelling systems have Ch-a levels well above 1 mg/mˆ3 and up to 10 mg/mˆ3. Based on

the observed chl-a value the study region can hardly be classified as highly productive. Secondly, productivity is typically related to carbon conversion rates in terms of primary productivity in units of gC m-2 yr-1 such as it is done for Large Marine Ecosystems. So, what is the productivity of the region? In the end, I is more likely than unlikely that the authors will come to the scientific conclusion that the study region has in fact an overall very low productivity.

2. Definition of events The event analysis is incomplete. For instance, the authors could first do a statistical analysis of the distribution of events in terms of histograms. From this, one could define an average event for further analysis. How are the thresholds for different parameters defined? How do the results change for different threshold values? The effectivity of any upwelling flow also depends on the duration of events, ie a weaker forcing can achieve similar results as shorter event if it persists over a longer time span. This important feature does not seem to be accounted for in this work at all.

3. Influence of downwelling winds The abstract gives the impression that the authors "observed" convergence in the bottom layer leading to mid-shelf upwelling. Instead, the authors just present one possible hypothesis that could explain the mid-shelf upwelling. This cannot be classified in the context of "observational evidence" and it is grossly misleading. The reported coincidence of events is not sufficient evidence and should removed from the text if it cannot be justified by other means such as a modelling study. Does the model provide additional evidence in support of the hypothesis? To me, the "band" of elevated CHL-a in Figure 12 rather looks like a curved filament typical of eddy genesis???

Other comments

Abstract, line 20: "well-known" Southeast Fraser Upwelling System => I talked to my colleagues about this, but they didn't know anything about this system. Perhaps "well-known" is an overstatement? Remove this.

Figure 4 – Show sections in Figure 1

Figure 5 – I exclusively see green strips in this figure. Change the value range, so that more typical values can be seen, or use a different presentation method such as a time series of average values with STD or box-and-whisker plots added.

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