EGUsphere, referee comment RC1
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Comment on egusphere-2022-821

Anonymous Referee #1

Referee comment on "Fortnightly variability of Chl *a* in the Indonesian seas" by Edward D. Zaron et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-821-RC1, 2022

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1. The authors try to convince the reader that harmonic analysis of Chl-a over the Indonesian seas may show spring-neap variability associated with tidal currents and baroclinic tides, which may provide evidence of strong tidal mixing in the region. They also show the semiannual and annual cycles. The logical structure of the presentation and the writing are very good; however, in my opinion, at this current stage, it is not ready for publication at the AGUSphere. They focus more on data gaps and processing and lack physical and dynamic mechanisms that can motivate the reader to understand the relationship between tidal harmonic and chlorophyll-a concentration and tidal mixing. There is only one line (line 125) in Section Results, "the potential relationship …". This should be more elaborate in the Introduction and Discussion sections.

2. Southeast Asia Seas/Indonesian seas are strongly influenced by monsoons which drive seasonal variability of the ocean dynamics and climate, seen in the SST, chlorophyll, rainfall, etc. (see, i.e., Aldrian and Susanto, 2003). They present semiannual and annual chl-a cycles. However, in the paper, no mention of or word on monsoon. Had they collaborated with local scientists may help in the results/interpretation of oceanic and atmospheric conditions of Indonesian seas. During the northwest monsoon (boreal winter; wet season), most regions will be covered by clouds and much more clouds/rainfall during La Nina. Hence, during the northwest monsoon from October to April (6 months), it is hardly seen a reliable daily map of chl-a. Hence, Figure 1 and their results may skew toward the southeast monsoon (dry season). Maybe they may have to divide the data availability based on monsoon seasons. Ray and Susanto (2019) show that atmospheric tides may be due to ocean tide (air-sea interaction) and vary with the monsoon. Susanto and Ray (2022) recently showed that tidal mixing in the Indonesian seas varies with the monsoon, ENSO and IOD.

3. Does their seasonal harmonic analysis show the seasonal chl-a due to tidal frequency at seasonal cycles, monsoon, or both? If both, can we separate them?

4. I am curious about high MSf amplitude in the northern coasts of the Lesser Sunda Island (LSI) and what mechanism generates these features. Is it due to monsoon or other dynamical processes? During the southeast monsoon, upwelling (high chl-a concentration)

occurs along the southern coasts of the LSI. Meanwhile, upwelling during the northwest monsoon occurs along the LSI's northern coasts, and downwelling during the southeast monsoon (i.e., Wirasatriya et al., 2021). Similarly, seasonal upwelling occurs in the Malacca Strait (i.e., Mandal et al., 2021).

5. They discuss the amplitude and phase of the Chl-a spring – neap tide. Please add a more physical and dynamic mechanism that relates the tide and the peak of Chl-a.

Minor:

- Ref. Capuano et al., 2022 cannot be accessed because it is in the submission process. I am not sure about the rule of EGUsphere.
- Link to the software repository does not work.

Some references below may be relevant to the topic which may be added in the citation:

Susanto, R. Dwi, and Richard D. Ray, Seasonal and interannual variability of tidal mixing signatures in Indonesian seas from high-resolution sea surface temperature, *Remote Sensing*, 2022, 14, https://doi.org/10.3390/rs14081934

Mandal, Samiran, Susanto, R. Dwi, and Balaji Ramakrishnan, Dynamical Factors Modulating Surface Chlorophyll-a Variability along South Java Coast, *Remote Sensing*, 2022, 14, 1745. https://doi.org/10.3390/rs14071745.

Mandal, S., N. Behera, P. C. Pandey, A. Gangopadhyay, and R. Dwi Susanto, Evidence of a Chlorophyll "Tongue" in the Malacca Strait from Satellite Observations, *J. Marine Research*, 2021, 233, November, https://doi.org/10.1016/j.jmarsys.2021.103610

Wirasatriya A., R. Dwi Susanto, Kunarso, A. R. Jalil, F. Ramdani, A. D. Puryajati, 2021. Northwest Monsoon Upwelling Within the Indonesian Seas. *International Journal of Remote Sensing*, 42:14, 5437-5458, DOI: 10.1080/01431161.2021.1918790 https://www.tandfonline.com/doi/full/10.1080/01431161.2021.1918790

Siswanto Eko, Takanori Horii, Iskhaq Iskandar, Jonson Lumban Gaol, Riza Yuliratno Setiawan, R. Dwi Susanto, Impacts of climate changes on the phytoplankton biomass of the Indonesian Maritime Continent, *Journal of Marine Systems*, 2020,103451, ISSN 0924-7963, https://doi.org/10.1016/j.jmarsys.2020.103451.

Ray, R. and R. D. Susanto, 2019: A fortnightly atmospheric 'tide' at Bali caused by oceanic tidal mixing in Lombok Strait, *Geoscience Research Letter*, 6:6, https://doi.org/10.1186/s40562-019-0135-1

Aldrian, E. and R. D. Susanto, 2003: Identification of three dominant rainfall regions within Indonesia and their relationship to sea surface temperature, *International Journal of Climatology*, 23, 12, 1435-1452, doi: 10.1002/joc.950.