

RESPONSE TO RC1'S COMMENTS

Manuscript Title: Internal tide signatures on surface chlorophyll concentration in the Brazilian Equatorial Margin

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Dear Reviewer,

We sincerely thank you for your valuable comments and suggestions. Below, we provide a point-by-point response and outline the changes implemented in the manuscript. We hope that the revised version addresses your concerns and is now suitable for publication in *Ocean Science*.

Sincerely,

Dr. Carina Regina de Macedo, Dr. Ariane Koch-Larrouy, Prof. José Carlos Bastos da Silva, Dr. Jorge Manuel Magalhães, Dr. Fernand Assene, Dr. Manh Duy Tran, Prof. Isabelle Dadou, Mr. Amine M'Hamdi, Dr. Trung Kien Tran, and Dr. Vincent Vantrepotte

Note: In the revised manuscript, all modifications are marked in red.

REVIEWER 1'S COMMENTS:

I appreciate the effort put forth by the authors in responding to reviewer comments and revising the manuscript. I think that the manuscript shows significant improvement from the previous version, and I am satisfied with their response to my suggestions. I have a few minor comments that the authors can consider.

Line-by-line comments and suggestions:

L6 – I'd recommend clarifying what the negative percentages mean in the abstract

Response: Following the reviewer's suggestion, we have clarified the meaning of the negative percentages in the abstract, as follows:

Lines 5-8: On the northwestern shelf, where the Amazon River plume prevails, CHL levels are higher during neap tides, resulting in a negative spring–neap tide CHL difference (GlobColour: –50%; MODIS-Aqua: –84%). Conversely, on the northeastern shelf, characterized by

low-turbidity waters, CHL levels are higher during spring tides, leading to a positive spring–neap tide CHL difference (GlobColour: +30%; MODIS-Aqua: +70%).

L148 – I appreciate this additional explanation. It is clear now how the weighted difference shown in the maps is calculated.

Response: Thank you for your positive feedback. We are glad that the additional explanation has clarified how the weighted difference shown in the maps is calculated.

L211 – I suggest to add an additional clarification sentence; i.e. something along the lines of “this suggests that the mode 1 and mode 2 tides contribute 11% and 23%”.

Response: As suggested by the reviewer, we have rewritten the text to clarify the contribution of each internal tide mode:

Lines 210-213: For illustrative case I, the mean spectral coherence values for mode-1 and mode-2 are 0.11 and 0.23, respectively, suggesting that mode-1 and mode-2 tides contribute approximately 11% and 23% of the observed signal. For case II, the corresponding values are 0.17 and 0.26, indicating contributions of about 17% and 26%, respectively.

L325-330 – Thanks for the explanation in the reviewer response comments regarding tidal aliasing effects. I suggest to add some of this additional detail here in the main manuscript.

Response: As suggested by the reviewer, we have added additional details to the manuscript as follows:

Lines 333-337: It is worth noting that satellite overpasses occur at approximately the same local time each day, which minimizes potential impacts on chlorophyll related to light-dependent processes. An additional robustness is that we compared spring–neap tidal cycle composites from GlobColour (an ensemble product derived from multiple sensors and therefore less prone to tidal aliasing) with those from MODIS-Aqua. Both products show very similar patterns, which strengthens our confidence that high-low tidal aliasing does not significantly bias our results.

L362 –Thank you for adding this explanation and for your response to my reviewer comment. I think it might be useful to reiterate the quantitative results in Table 1 again here, especially because they show quite a large difference between modes 1 and 2.

Response: Following the reviewer’s suggestion, we reiterate the quantitative results presented in Table 2 as follows:

Lines 367-370: The mean spectral coherence between spring-neap tidal cycle signal and the band-pass filter component is higher for mode-2 than mode-1, considering both GlobColour and MODIS-Aqua data (see Table 2). For example, when considering a 1-day delay, the spectral coherence is approximately 0.50 for mode-1 and 0.81 for mode-2, for both GlobColour and MODIS-Aqua datasets.

L400-405 – Might be helpful to add a sentence or two on why there are differences in Globcolour vs Modis-Aqua.

Response: We added the following sentence to address the differences between GlobColour and MODIS-Aqua:

Lines 413-418: Spring–neap tidal cycle composites derived from the merged GlobColour product appear to more effectively capture the spatial patterns of CHL modulated by internal tides (ITs), possibly due to their lower proportion of missing data compared to MODIS-Aqua. Conversely, MODIS-Aqua composites may better represent the relative amplitude of CHL concentration variations. The differences between GlobColour and MODIS-Aqua composites may be related to the use of merged versus single-sensor products and to methodological differences, including atmospheric correction procedures and chlorophyll retrieval algorithms.

Fig A2 caption – “Zoomed in version” instead of “ZOOM”?

Response: following the reviewer suggestion, the Fig. A2 caption now is: “Zoomed in version of Figures 7 and 9 highlighting the wave-like pattern in the horizontal structure of spring-neap tidal cycle CHL composites for (a) GlobColour, with a 1-day delay, and (b) MODIS-Aqua, with a 2-day delay. IT generation points, as identified by Assene et al. (2024), are indicated by black dots, while areas of high ISW occurrence, based on de Macedo et al. (2023), are marked with black stars. The numbered labels denote the first, second, and third positive peaks in the CHL composites”.

We take this opportunity to update the paper title from “*Tidal signatures on surface chlorophyll concentration in the Brazilian Equatorial Margin*” to “*Tidal signatures on surface chlorophyll a concentration in the Brazilian Equatorial Margin.*”