RC1: 'Comment on egusphere-2024-3951', Anonymous Referee #1, 24 Feb 2025

General comments

Referee 1: The introduction provides a comprehensive background on the importance of phytoplankton monitoring in the region. However, it would benefit from a more detailed discussion of the limitations of satellite-based monitoring. Additionally, a clearer explanation of the advantages of hyperspectral imaging over traditional methods would also help.

Author's response: Improvement in the introduction regarding satellite limitations and hyperspectral advantages have been introduced

Author's changes in manuscript: Text included in lines 58-67 and 100-109

Referee 2: The manuscript mentions the calibration of the hyperspectral sensor and the calculation of remote sensing reflectance. However, it lacks detailed steps on how these processes were carried out. For example:

1. detailed steps or results of the noise reduction process;

Author's response: A more detailed explanation have been redacted

Author's changes in manuscript: At lines 192-194

2. more details on the geometric correction process;

Author's response: A more detailed explanation have been redacted

Author's changes in manuscript: At lines 190-191

3. a detailed assessment of data quality, e.g., noise levels before and after processing.

Author's response: A more detailed explanation have been redacted

Author's changes in manuscript: At lines 186-194

Referee 3: Do you have any UAV-matched satellite data or in-situ measurements? Including a comparison or validation with matched satellite or in-situ data would strengthen the findings.

Author's response: The potential comparison and/or validation process matching in situ reflectance data with satellite has been considered for us, but we had problems with the scarcity of data available for our monitored coastal area on the punctual day. We are working to obtain satellite data from different missions with a greater spatial and temporal resolution. Regarding comparison or validation with in situ data, please consider that all data we used in this study have been taken in situ.

Referee 4: The criteria for selecting sampling locations are well explained, but the presentation of these locations in the figures could be improved. For example, in Figure 1, it is unclear how (b) and (c) relate to (a), and the labelling of stations (e.g., TENCLO) does not clearly match across figures (e.g., Figures 3-5) and Table 1. It is better to ensure consistent labelling, which would help readers unfamiliar with the region better understand it.

Author's response: Thanks to this comment, all the figures and tables of the paper have been revised. Tables decimals have been unified. New Figures 3 and 4 with colours corrected

Author's changes in manuscript: New Figure 1 and the figure caption at lines 124-125. and Figure 5 Chlorophyll acronym corrected at lines 248-249.

Referee 5: The discussion could benefit from a more detailed comparison with existing studies. For example, there are many studies on the spectral properties of dinoflagellates and diatoms (through in-situ or satellite observation). Additionally, some paragraphs rely heavily on the same references, please consider selecting the most appropriate references.

Author's response: In the discussion section a more detailed comparison with other studies around the spectral signal has been introduced

Author's changes in manuscript: Text from line 360 to 372

Referee 6: **Specific comments**

1. Lines 38-58. As mentioned above, the references used in this section are not always appropriate. Consider revising to include more relevant studies or selecting the most appropriate references to support the points being made.

Author's response: References revised

Author's changes in manuscript: Changes at lines 42, 46, 47, 49, 56, and 104

2. Line 70. CDOM is not particulate matter. This should be revised.

Author's response: Revised and corrected

Author's changes in manuscript: Line 80

3. Line 140. The sentence could be revised for clarity.

Author's response: Revised and corrected

Author's changes in manuscript: Lines 155-157

4. Line 145. The sentence implies that Chl-a was measured in the microplankton range, which is likely not the case. Please revise.

Author's response: Revised and corrected to be clear that phytoplankton species composition analysis has been done under the microphytoplankton range

Author's changes in manuscript: Line 162

5. Line 173. Add a comma after "signal".

Author's response: Revised and corrected

6. Table 2. Ensure consistency in decimal places across temperature, salinity, and Chl-a values.

Author's response: Revised and corrected. All decimals unified

Author's changes in manuscript: Lines 231-234

7. Figure 5. Recommend changing "Chlo" to "Chl-a" to be consistent with the rest of the manuscript.

Author's response: Revised and corrected. New figure 5 with Chlo changed to Chl-a and figure label corrected

Author's changes in manuscript: Lines 249-248

8. Lines 382-385. These two sentences lack logical flow. The first sentence discusses non-biological particles, while the second shifts to phytoplankton.

Author's response: Revised and corrected trying to improve the flow of the writing changed both text and paragraph order

Author's changes in manuscript: Lines 413-418

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RC2: 'Comment on egusphere-2024-3951', Anonymous Referee #2, 13 Mar 2025

Referee 1: First, I found some parts in the methodology was not sufficiently detailed. For example, the 2.5 Data processing (should be named as Data Analyses at least) section has very limited information, inconsistent with the level of details in other subsections 2.1-2.4. It is unclear if the authors have conducted geometric corrections, radiometric corrections (and how), HCA and PCA analysis steps, etc. When I read Section 3 Results, I found it difficult to match with Section 2. Also, where is the results for the non-parametric K-S test?

Author's response: Regarding to the subtitle, we consider that both meaning "processing" and "analyses" are relevant, so we decide to use "Data processing and analyses"

Author's changes in manuscript: Line 182

Author's response: Regarding data processing (geometric corrections, radiometric corrections): A more detailed text has been added.

Author's changes in manuscript: Lines 186-194

Author's response: Regarding the non-parametric K-S test data have been added at a supplementary table referred as Table S2 in the results

Author's changes in manuscript: New texts in lines 274, 282-285, 288-289

Referee 2: Second, my main critique is about Section 3.1, which characterizes those sites but takes a few pages. While it is helpful to characterize those sites, it was done with lengthy statistical analyses and their visualizations that are not quite relevant to the main theme - hyperspectral analyses. It is unclear how it supports the main objective "the characterisation of the reflectance spectra of different phytoplankton assemblages, either harmful or non-harmful, dominated by a single species." However, if this subsection were removed, the results section would be so slim.

Author's response: Although the description of environmental condition is a bit extensive and somewhat irrelevant for the main objective, we consider an important aspect in the text, especially to determine if these conditions indirectly affect the spectral signal. Indeed, an apparent relation between the spectral signals and localities condition, especially regarding to the chlorophyl.

Author's changes in manuscript: None changes

Referee 3: Third, because the authors focused on a pilot study in this article, it is reasonable to expect a comprehensive blueprint on the path forward. I found Section 4.2 was relatively underdeveloped. Challenges and opportunities are better to be organized around a few general themes for deeper insights.

Author's response: Regarding to this point, you can see in the discussion 4.2 section, changes at text expressing the principal challenges and advantages that our equipment have experienced during the monitoring.

Author's changes in manuscript: Main text changes from lines 453 to 469

Referee 4: Lastly, the article suffers from the use of inaccurate phrases, grammatical errors, and labeling issues. For example,

At Line55, spatio-temporal resolution has contained the long revisit cycle.

Author's response: This text has been rephase and grammatical reviewed by a native British

Author's changes in manuscript: Line 54

At Line 82, it is unclear if geography (complex topography) would be a **direct** issue for phytoplankton.

Author's response: Although the reference to the complex topography (geography) was not related to phytoplankton, we have had changes to be clearer in the text

Author's changes in manuscript: Lines 92-93

In the legend of Fig 11, the label for low and high Chlo(s) were not distinguishable.

Author's response: We have reviewed and corrected the Chl-a label at both in the legend and inside the figure

Author's changes in manuscript: Lines 340-342

Line 344: the phrase 'a non-significant difference' sounds odd.

Author's response: This has been reviewed and corrected

Author's changes in manuscript: Lines 380-381

Line 350: what is "clusters together assemblage"?

Author's response: This expression refers that the HCA groups localities under same phytoplankton groups and genera dominance. The statement was reviewed and improved

Author's changes in manuscript: Line 385

Line 366: variability -> the variability.

Author's response: Reviewed and corrected

Author's changes in manuscript: Line 401