Manuscript Review: *In situ* observation of pelagic *Sargassum* distribution and aggregation state across the entire North Atlantic from 2011 to 2020

Recommendation:

Need Revision

Comments to Author:

Manuscript reference number: 74305v1 Title: *In situ* observation of pelagic *Sargassum* distribution and aggregation state across the entire North Atlantic from 2011 to 2020. Authors: Deborah S. Goodwin, Amy N.S. Siuda, Jeffrey M. Schell.

Overview and general recommendation: This study presents the results of field observations about the dynamics occurring in Spatio-temporal scales of pelagic *Sargassum* across the entire North Atlantic from 2011 to 2020 to describe the regional distribution, presence, and aggregation state of this floating algae. The highest presence of pelagic *Sargassum* was found in the Western Atlantic. Fragments and clumps were the most common aggregation state in field observations. The authors studied the patterns of megafauna associated with pelagic *Sargassum* in situ and they found that it varied by taxonomic group. The authors comment that remote sensing is not yet able to detect small-scale aggregate pelagic *Sargassum* in the open sea, giving value to in situ observations. Finally, according to field observations shown, the authors comment that the Sargasso Sea seems to be operating independently and does not exchange large amounts of pelagic *Sargassum* with the equatorial Atlantic.

The present study provides novel insights with a new sampling effort where 6790 hourly observations of pelagic *Sargassum* were recorded onboard Sea Education Association´SSV Corwith Cramer, including observations from 61 oceanographic research cruises, 38 6-week duration semester voyages, and 23 short programs. Valuable information on in situ observations throughout the North Atlantic region is provided, as well as a report on the aggregation status of pelagic *Sargassum* and associated megafauna. Valuable observational information is provided since 2011 when the massive arrival of pelagic *Sargassum* started to enter in the Caribbean Sea.

I do believe that the results presented in this study have value to the scientific community that strives to understand the timing and distribution of *Sargassum* blooms throughout the North Atlantic, Caribbean Sea, and the Gulf of Mexico. This is a valuable dataset that should be shared.

I believe the authors used clear and professional English language throughout the manuscript. Most literature is well referenced and relevant. Most figures are relevant, well-labeled, and described. The goal of the present study is well defined, relevant and meaningful. The research fills an identified knowledge gap. The conclusions of the present study are well stated, linked to original research, and limited to supporting results.

However, before acceptance, I have some suggestions to improve the quality of the manuscript. I encourage the authors to consider and address each of my comments and recommendations in their responses.

I recommend restructuring the data analysis, results, and discussion sections according to the following suggestions:

1- In the data analysis section, it is stated that a Fisher's test was performed however in the results section the result of the test is not provided to allow evidencing the comparison of megafauna associated with pelagic *Sargassum*.

2- In general, I recommend the use of more statistical tests to strengthen the comparisons made in the results and to support the explanations given in the discussion section. I recommend some Chi-square tests or some variant of ANOVA transforming the data from discrete variable (counts) to continuous.

3- In the discussion section on lines 415-418 are put statistical test results that are not mentioned in the data analysis section (i.e., R-squared values all < 0.103 and p-values all > 0.400). In my opinion, the result of this test should go in the results section and not in the discussion section. Additionally, the name of this statistical test that you used should be placed in the data analysis section and for what purpose you use it.

4- Please indicate the program where you performed all statistical analyses and its version.

5- In Figure 5 there is a comparison of field observation data with remote sensing data (from the site https://optics.marine.usf.edu). However, there is no mention in the methods section of where the remote sensing data is taken from. I suggest placing the source of the data you are comparing in the methods section.

6- I suggest discussing your results with the paper by Torres-Conde (2022) "Is simultaneous arrival of pelagic *Sargassum* and *Physalia physalis* a new threat to the Atlantic coasts?". In this paper, pelagic *Sargassum* sightings until 2022 are placed throughout the Atlantic Ocean. These authors found similar results: “In the western Atlantic Ocean more pelagic *Sargassum* sightings have been found than in the eastern Atlantic Ocean”. Additionally, the results of Torres-Conde (2022) also agree with the results of the present study in that the remote sensing data provided by the site https://optics.marine.usf.edu did not detect some pelagic *Sargassum* arrival events observed in situ. I believe that the comparison of the results of this study with those obtained by the work of Torres-Conde (2022) can strengthen the validation of the conclusions of this study.

Other suggestions:

1- Change the font of the letters in Figure 2. It can't read well what it says.

2- Be consistent in placing the doi in the references. Examples: Bartlett, D., Elmer, F., 2021. The impact of Sargassum inundations on the Turks and Caicos Islands. Phycol. 1, 83-104. doi:10.3390/phycology1020007.

Brooks, M.T., Coles, V.J., Hood, R.R., Gower, J.F.R., 2018. Factors controlling the seasonal
459 distribution of pelagic Sargassum. Mar. Ecol. Prog. Ser. 599, 1-18.
460 https://doi.org/10.3354/meps12646.

3- Place bibliographic reference of the data taken from https://optics.marine.usf.edu.

Example: SaWS., 2022. Satellite-based *Sargassum* Watch System. Optical Oceanography Laboratory. University of South Florida. Data retrieved on April 20, 2022 from: https://optics.marine.usf.edu/projects/SaWS/pdf/Sargassum_outlook_2021_bulletin11_USF.pdf.