

General comments

The reviewed paper is a very good contribution that should be published, not only because it is well written, but because it very appropriately addresses the topic of the Amphidomataceae bloom, particularly since it is an offshore event in the Atlantic Ocean and has a large geographic coverage. There are many contributions on harmful blooms in coastal waters. The study not only includes field observations, but also considers the use of satellite images, oceanographic and molecular aspects and various technologies that enrich the scientific content.

This is a contribution that should be published, and with minor modifications.

Author reply: We appreciate the positive and constructive comments on our work. Below we have responded the specific comments.

Specific comments

I am struck by the title of the contribution, since it does not appear Amphidomataceae (Azadinium, Amphiadoma) and neither does the fact that the bloom in question occurs in South America, the Argentine sea shelf. Given the scarce contributions on these topics, i.e. non-coastal blooms, and in a geographic sector in which fewer scientific contributions are published, this is a fact that calls attention. It is suggested to evaluate the feasibility of changing the title considering Amphidomataceae and the geographical area in which the study was carried out.

Author reply: We have discussed the title of the paper and have certainly considered specifying 'Amphidomataceae,' 'Azaspiracids,' and the study area: the underexplored 'Patagonian Shelf in the SW Atlantic Ocean.' However, in this case, we are targeting a broader audience from the fields of physical and biological oceanography, regardless of the toxic species responsible for the bloom or the specific sea in which the event occurred. We believe the originality lies in the occurrence of a HAB with a unique nature, in terms of its magnitude, composition, toxicity, and location in ocean waters far from the coast, where mesoscale circulation plays a key role in its development and retention. Following the Reviewer's suggestion, we have incorporated the Patagonian Shelf in the title as follows: "Extraordinary bloom of toxin-producing phytoplankton enhanced by strong retention in offshore waters of the Patagonian Shelf"

Another aspect of a specific nature, but which depends both on the editorial policy of the journal in which the article is intended to be published, and on the authors' own interests, refers to the information on all the taxonomic aspects related to the Azadinium and Amphidoma taxa that are included as an appendix (Appendix A). Although it is not something substantial, I have the impression that these aspects should be considered as an independent publication, leaving in it only that which refers to the multispecies Amphidomataceae bloom.

Author reply: Many thanks for your appreciation of our effort in describing the taxonomic aspects of the dinoflagellates. We believe that presenting these detailed results not only confirms that the same bloom was captured, but also strengthens the characterization of the natural multispecificity of Amphidomataceae blooms. These dinoflagellates are small-sized cells whose taxonomy is complex and requires various methodological approaches and species-specific identification expertise. If we

were to transfer all the taxonomic information from the appendix to another publication, this one would lose valuable data that confirms we sampled the same bloom at both stations.

In the discussion, in the point 4.2., in the final part, when the authors contrast the platforms and oceanographic conditions on the Atlantic and Pacific coasts of the southern tip of South America, the information provided in the text is too limited, both from a topographic and oceanographic point of view, and aspects such as the platform characteristics, which is noticeably smaller in size, on the Pacific coast and the marked differences between the Humboldt and Malvinas currents, and the processes associated with phytoplanktonic blooms, should be included, beyond the fact that both currents originate from the Antarctic circumpolar current. These differences have implications for stability, retention, accumulation and oceanographic conditions in general, and a discussion on how these conditions can determine marked differences in the expressions of *Amphidomataceae* blooms on both coasts of South America, such as the records of abundance, and that these blooms occur at such notable distances from the coast, in the case of the Atlantic coast.

Author reply: Following the Reviewer suggestion, we have briefly expanded on both Patagonian Shelves (Chilean in the Pacific and Argentinean in the Atlantic) in the revised version of the manuscript. As we discussed in Ramirez et al., 2022, <https://doi.org/10.1016/j.hal.2022.102317>, and Guinder et al., 2024, https://doi.org/10.1007/978-3-031-71190-9_3, *Amphidomataceae* is the most recently described toxin-producing group of dinoflagellates in the Argentine Sea, and similarly in Chile and Peru. Unfortunately, this group has not yet been exhaustively explored in either shelf, with even less research conducted on the Chilean shelf-break or upwelling frontal systems. In response to Reviewer #1's suggestion, we have added the reference Iriarte et al., 2023, which is a short review of the most common HABs in the Chilean coastal area – specifically fjords and channels. Here, *Amphidomataceae* have not yet been described as causative agents of blooms.

Other corrections

With regard to figure 2, the text (since line 261) is missing the inclusion of maximum values? or ranges of Chl-a concentrations and surface temperatures, since the figure 2 do not provide details regarding these aspects. And in the same figure, although a, b, c, and d are indicated in the legend, this detail should be included in each box of the figure.

Author reply: We agree with the reviewer that although Figure 2 has the colorbar with labels and units, both for Chl-a (in $\mu\text{g L}^{-1}$) and for SST (in $^{\circ}\text{C}$), maximum values and ranges are missing in the text. We have added this information in the revised version of the manuscript.

Thanks for noticing that the letters of the panels are missing. We have added them as well.

Although in general the contribution is well presented and ordered as corresponds to scientific texts, there are minor errors, particularly in the scientific names of *Azadinium* species, e.g. lines 342, 484 and 489

Author reply: All checked and corrected.

On the other hand, in line 536 it says Hernández-Carrazco, it should say Hernández-Carrasco.,

Author reply: Checked and corrected.