

First of all, the authors would like to thank reviewer 1 for the input and all the ideas suggested. We think that the comments made helped to significantly improve the manuscript. In the manuscript, find the changes suggested by reviewer 1 depicted in red. Here, to be clear and precise with our answers, we used **R#-C#** and bold notation for reviewer 1 comments, and our answers appear as **R#-C#**.

**R1-C1: While I acknowledge the authors' characterization of the Mediterranean as a 'miniature ocean' and recognize the significance of publishing foraminifera datasets from this relatively understudied sea, I maintain skepticism regarding the reliability of the results as an ecological signal. This skepticism arises primarily due to the presence of benthic specimens in the sediment trap, which allows for the interpretation of results influenced by hydrodynamics. In essence, the results represent a mixed signal of both ecology and hydrodynamics. For instance, the increased occurrence of deep-dwelling specimens may be attributed to the preferential settling of heavier specimens and the winnowing of lighter ones at the trap site. Similarly, the resemblance of the assemblage to that of the eastward core top sample could be a result of sediment winnowing from the predominantly westward flowing LIW water mass (200 m to 400 m) at the intermediate trap collection depth.**

**R1-R1:** Authors appreciate the point raised by reviewer 1. We agree with reviewer 1 in that the presence of benthic foraminifera raises the question of the role played by the hydrodynamics in the materials collected by the trap. There are several lines of evidence that strongly suggest that the foraminifera flux seasonality collected by the trap is mainly driven by changes in the production and export of foraminifera in the upper water column. Firstly, the seasonal cycle of planktonic production and export collected by the trap is consistent with many other settings within the Mediterranean and the world's oceans (Avnaim-Katav et al., 2020; Bárcena et al., 2004; Rigual-Hernández et al., 2012), displaying maximum values during winter and spring, thereby coinciding with the productive period. Secondly, the composition of the sinking foraminifer assemblages collected by the trap is in good agreement with the composition of the living foraminifera populations dwelling in the overlying water masses (Mallo et al., 2017). The latter used BONGO nets to analyze the planktonic foraminifera population during spring in a pan-mediterranean approach and documented that *G. inflata* was also the dominant species at the moment of sampling (during spring) alongside with *O. universa*. Please note, that this latter argument was not stated in the submitted version of the manuscript, but it is now in the updated version of the manuscript, **chapter 5.5, lines 919-921**. Lastly, it should be noted that although our data indicates that the fluxes collected by the trap are mainly a controlled by pelagic sedimentation, there is clear evidence of influence of resuspended materials into the trap as suggested by the presence of benthic foraminifera. However, we acknowledge that benthic foraminifera are registered at low numbers during the whole record (on average 3.3%), and this is the reason why background influence of resuspended materials was indicated in the manuscript (**lines 474-475** of the first version of the manuscript). In terms of contribution to the annualized foraminifera flux, benthic foraminifera only represented 1.1% of the total flux. Of those 1.1%, 80% was collected during the month of April 2014.

However, we acknowledge that not all the arguments highlighted above were clearly explained in the first version of the manuscript and therefore, they will in the corrected version of the manuscript. Information about benthic foraminifera is now more complete at **chapters 4.1., 4.3 and 5.1., lines 358-360 , 402-404 and 514-525 respectively**. Note that more information about the benthics individuals was also requested by reviewer 1 and therefore appears

As an comparison, the Planier sediment trap, located in the axis of the Planier canyon in the Gulf of Lions and located 500 m above the seafloor registered 3.5% of benthic individuals with relative abundances ranging between 0.5-11% (unpublished data). In the Alboran Sea, the ALB5F sediment trap registered 2.9% of “benthic-neritic” (Bárcena et al., 2004). Our findings about benthic individuals are within the range of the previous work with which we compare our data. However, we acknowledge that the hydrodynamics are likely playing a role during the spring period.

Concerning the occurrence of deep dwellers, we acknowledge that the point raised by reviewer 1 is a possibility. In addition, as reviewer 2 suggested, we added a comparison with the work of Mallo et al., (2017). The latter used BONGO nets to analyze the planktonic foraminifera population during spring in a pan-mediterranean approach. The site located in the Sicilian Channel showed that, in surface waters, *G. inflata* dominated the assemblage, alongside with *O. universa*. Therefore, our most abundant species is in accordance with the most abundant from the surface record, which, in our opinion, rules out the resuspended origin of this taxa. The questions now transfers to the secondary taxa. *O. universa* seems to be particularly high alongside the Algerian coast (Azibeiro et al., 2023), however, the mechanisms behind its distribution in the Mediterranean remain poorly constrained (Mallo et al., 2017).

Finally, concerning the LIW influence as a possible explanation for the resemblance of our assemblages with the eastern core-tops, the authors agree. Once again, reviewer 2 provided a useful input, which is to use the Incarbona et al., (2019) box-core samples to have a better constrained chronology. These samples were also retrieved in the Sicily Channel and appeared to show more similarities with our assemblage. Specially, again, concerning *G. inflata* as the main taxa. So now, *G. inflata* is the dominant taxa in the surface, intermediate depth (our assemblage) and the seabed sediment. However, this samples showed a high proportion of *G. ruber* (white). In turn, this species appears in a much reduced proportion in our samples (see next comment for the shell weight discussion).

**R1-C2: More specifically, it has been shown that planktonic foraminifera calcify in accordance with their habitat depth, with species dwelling at deeper levels producing heavier shells compared to those inhabiting surface waters (Zarkogiannis et al., 2022). For instance, *G. truncatulinoidea* typically generates among the heaviest shells (see previous), as does *G. inflata* when compared to *G. ruber* and *G. bulloides* (Feldmeijer et., 2013). Consequently, certain current speeds may favor the settling of specific species specimens while others are dispersed elsewhere, potentially explaining the observed counts. In the**

central Mediterranean, *G. bulloides* is more prevalent in sediments (and thus resuspended sediment) than *G. ruber*, contributing to a simultaneous peak in benthic foraminifera counts. Hydrodynamics may therefore account for discrepancies in cases where specific environmental drivers cannot be identified for certain species, leading to the invocation of other environmental controls in the text to explain the observed patterns. Indeed hydrodynamics in the area are particularly strong especially in spring (Gasparini et al., 2004), while sediment resuspension in the wider area is found to peak in spring (Grifoll et al., 2019) as well. Data from Copernicus also indicate increased flow speeds at 400m during spring of 2014.

R1-R2: Authors agree that generally, the deep-dwelling species such as *G. truncatulinoides* and *G. inflata* are among the heaviest planktonic foraminifera species. Particularly compared to surface dwellers (Beer et al., 2010; B ejard et al., 2023). However, we find unlikely that differences in foraminifera shell weights could be responsible for the differences between the sediment trap and surface sediments. Firstly, and as mentioned in the previous comment, *G. inflata* is the most abundant species in both the surface BONGO nets, in our sediment trap, and in the seabed sediment (with <sup>210</sup>Pb chronology as a support, see Incarbona et al., (2019)). The abundances between these datasets are similar, highlighting a dominance of this species in the modern central Mediterranean Sea. Secondly, under the winnowing theory, *G. bulloides*, a lighter species very abundant in the sediment, should travel very far with strong currents and be very abundant in the surface waters, however, it is under represented in our sediment trap and even absent from surface BONGO nets collected during spring (Mallo et al., 2017). Thirdly, *G. ruber*, which is lighter than the deep-dwelling species, but heavier than some surface dwellers such as *G. bulloides* (Beer et al., 2010; Weinkauff et al., 2016). Interestingly, *G. bulloides* is almost twice more abundant in our samples than *G. ruber*, under the winnowing theory, the opposite trend should be expected. Finally, it could be argued that *G. truncatulinoides*, as the heaviest species, should dominate the sediment trap samples, however, it is less abundant than *G. inflata*, which dominates the seabed sediment. In a winnowing theory, *G. truncatulinoides* should show a higher abundance in the seabed.

Finally, we also analyzed the data suggested by reviewer 1, from Copernicus, that states that the flow speed increased during spring 2014. The data we retrieved from 400m deep (mean Mediterranean sea water velocity) showed that the flow increase happened during February 2014. The flow speed for April 2014 is rather low. Both the monthly and daily data showed that the peak of current flow developed during winter. Which on the other hand also contradicts previous work such as Gasparini et al., (2004).

However, as a conclusion of the previous two comments, we agree with reviewer 2 that, during spring, the current speed increase. Then we also agree the hydrodynamics might be playing a role and affect the distribution of taxa such as *G. bulloides* and *G. truncatulinoides*. Therefore, we added a new discussion chapter: **chapter 5.3**, named **“Influence of the hydrodynamic conditions on the planktonic foraminifera assemblage”**. It consists mainly of a discussion around the impact of hydrodynamics with all the bibliographic input

provided by reviewer 2. In the end chapter we disclose the possibility of the winnowing impact during spring and overall, during higher current settings. In that regard, the **introduction** and **conclusion** have also been updated accordingly. **Lines 43-45 and 1058-1060**, respectively.

**R1-C3: MARGO site areas should be checked for sedimentation rates, as regions with high sedimentation will likely experience reduced hydrodynamics, facilitating the settling of lighter, surface-dwelling specimens. Additionally, for any inferences regarding ecosystem shifts in the Mediterranean, the sediment traps in other locations should be compared with nearby sedimentary material. Certainly, a pan-Mediterranean comparison should evaluate whether the data from the current study from the Sicily strait (area of high velocities) should be considered or disregarded.**

**R1-R3:** Authors agree with the suggestion that the sedimentation rates should be checked as they could provide useful information about the hydrodynamic context. Unfortunately, 9 of the retrieved core-tops appear as “unpublished”, while the publications belonging to the remaining material do not provide the sedimentation rate (Thunell, 1978). Therefore, to provide a more complete picture of the seabed sediment assemblages, now the MARGO sites are not the only seabed sediment used, now the Incarbona et al., (2019) also appear in the manuscript. In the latter work, sites 342 and 407, located in the Sicily Channel slightly eastward of the C01 sediment trap, were analyzed and compared with water samples collected in the close vicinity of the C01 sediment trap. Additionally, and as mentioned earlier, the chronology is based on  $^{210}\text{Pb}$ . In these samples, *G. inflata* also dominates the assemblages, followed by *G. ruber* and a similar proportion of *G. bulloides* as the one found in our samples. The MARGO samples are still discussed in **chapter 5.5**, but in much a reduced way.

Concerning the pan-mediterranean comparison, we did not include samples covering the whole Mediterranean basin because the novelty of our work is mainly the planktonic foraminifera data from the C01 sediment trap. In that regard, we wanted, firstly, to put this assemblage in perspective with other mooring lines (**chapter 5.4**) and then compare it with the seabed sediment in the central Mediterranean to possibly identify assemblages changes during recent times. There are various reasons why we limited our sediment comparison within the Sicily Channel. The distance between the C01 sediment trap and the seabed sediment is around 243km to the westernmost core-top (MARGO 3727) and 213km to the easternmost core-top (MARGO 3724), which in turn shows that the area covered is considerable. Also, we only included core-tops located in a 2.5 degrees distance in order to only display potentially comparable seabed assemblages to the sediment trap. Finally, the concept of pan-mediterranean approach was not intended in our original version of the manuscript. Rather a “put into perspective” strategy.

However, as the comparison with the seabed sediment raised questions, we re-designed **chapter 5.5**. We now discuss the similarities and differences between the C01 sediment trap and the different seabed sediment datasets (MARGO and sites 342 and 407). We

discuss the possibility of the retrieval device (i.e. core-top, box-core) impact on the sediment preservation. We now also discuss the similarities between our assemblages and the surface ones (Mallo et al., 2017). We also acknowledge the lack of sedimentation rates and the winnowing and the sediment resuspension as a possible explanation of the recent assemblages for the MARGO database, **lines 1012-1014**. The sum of the reasons we display within our comparison allow us to document a change in the planktonic foraminifera population during the Holocene, and. Although we propose the Incarbona et al., (2019) chronology, we cannot state with precision the exact timing of the latter. Note that the **introduction** and **conclusions** have been modified accordingly. **Lines 53-58 and 1066-1073**.

**R1-C4: Furthermore, in a future submission please change planktic to planktonic. The correct adjective form of plankton in Greek is planktonic. The adjectives of Greek nouns ending in -on get the suffix -ic in the end like plankton – planktonic, bion – bionic, lacon – laconic (preserved also in French words like Napoleon – Napoleonic). This is different to nouns ending in -os, which lose the ending -os to the previous consonant by replacing it with -ic, like bentos – benthic, cosmos – cosmic or chronos – chronic.**

**R1-R4:** Authors agree and understand the linguistic justification behind this comment. The term “planktic” has been replaced by “**planktonic**” in the whole manuscript. Note that not all the planktonic terms have been depicted in red, just a couple of examples.

## References

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