

Author response to Reviewer 1

egusphere-2026-3979: Zooplankton, phytoplankton and pervasive anthropogenic particles along a zonal North Atlantic transect

Reviewer comment (RC):

A further comment from Reviewer 1, arising from discussions with a university-based zooplankton expert with specific knowledge of the tropical North Atlantic. The link to the manuscript was shared with that expert, who then queried the validity of the zooplankton abundance data, both for samples collected via the GOES cartridge and the tow-net.

“Identification of zooplankton is difficult. Fig 5C [of the MS] shows an organism identified [by the authors] as a pennate diatom; however, I think it is a small copepod. The red dot is the naupliar eye, and you can even see the segments of the prosome.”

“If that is an example of an ‘empty field’, the whole thing crumbles. I bet they also have a lot of small Oithona etc. that are super-transparent and get crushed on the filters. 5 mm field of view but, which magnification? For 5 mm field I think would be no more than 5x – seeing small zooplankton at that magnification would be very challenging.”

“About the net samples: how were they counted? There are no details at all. Also counted in a filter? Or formalin – fixed and counted on a microscope, classic style?”

These comments and queries raise serious doubts regarding a core finding of the MS, that until now had been accepted by Reviewer 1: that the zooplankton densities at the near-surface were exceptionally low. Unfortunately such problems cannot be resolved by MS revision, since the original samples were not retained. Instead, a major re-think of the sampling approach would seem necessary, preferably with involvement of additional expertise in plankton taxonomy and ecology.

Author comment (AC):

We thank Reviewer 1 for sharing these comments from an expert in plankton taxonomy. The 3 x images were inserted into the first copy of the manuscript as a place holder and example of particles that are routinely find. We also identified it as a copepod and the images have been changed with images from the east-west equatorial Atlantic run. We apologise for the confusion that this may have caused, the images should not have appeared in the first copy.

The images below replace the one on the first copy.

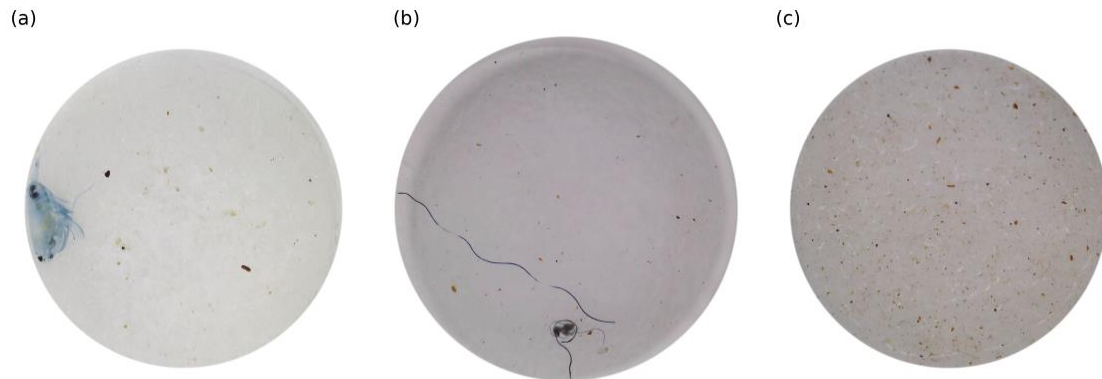


Figure 4. Representative filter fields (white background; faint grey circle marks the 5 mm field boundary). (a) the single blue copepod; (b) a single long blue plastic fibre and black fibre coil; (c) brown mineral grains together with black combustion carbon. Each panel is from a different station (a separate 0.5-litre filter sample), not a different hole of the same filter; each field shows the particle content of approximately 100 mL of filtered seawater. Material identifications shown here are optical and provisional, pending spectroscopic confirmation (Sect. 2.7).

Since the first draft, additional boats have been included in the data analysis and all of the images have been uploaded. The full image archive behind the study matches the revised manuscript which we will posted shortly. Every image in the archive can now be downloaded and checked directly, and it is stored at this address:

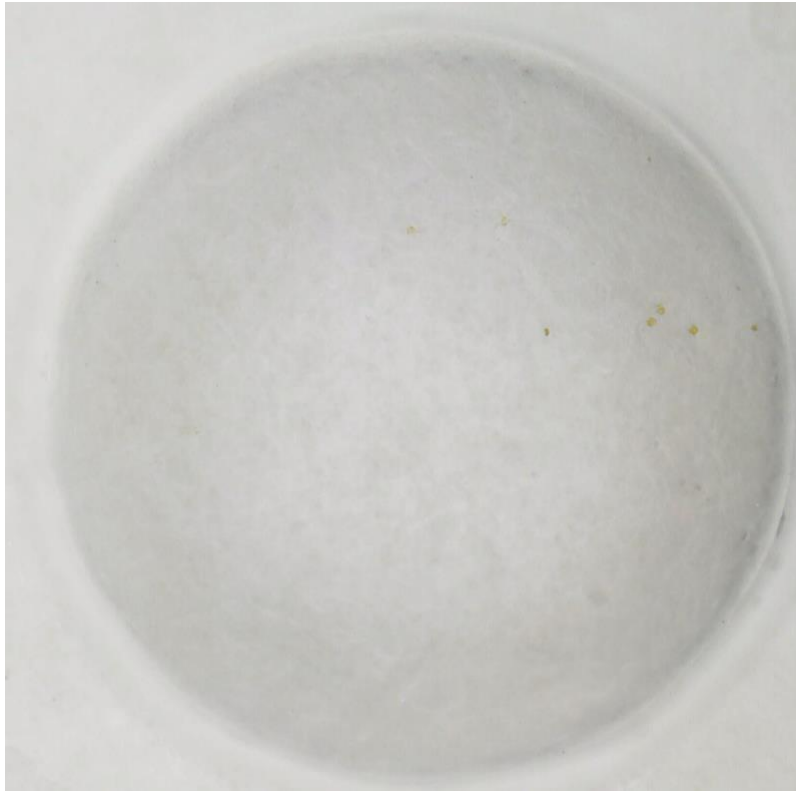
<https://zenodo.org/records/22049835>

We invite Reviewer 1 and the expert they consulted to download this full archive and carry out their own independent image analysis. It is possible that more advanced computing methods could find organisms that our own pipeline missed, and we would welcome that kind of additional check. This is the whole purpose of citizen science project, to find and locate additional data that would otherwise not be available, and to make it accessible for interrogation.

With the addition of extra samples we discovered two copepods in the surface water which would equate with approx. 15 per m³, but given the small volume collected this is not a statistically relevant number, but it is encouraging the we found some zooplankton.

We also want to point out a separate result that supports the reliability of our collection and image analysis method. On the return leg sailed by the vessel Emma, which crossed from west to east, eighteen microzooplankton, identified as radiolarians from 30 to 60µm, were detected

and counted directly from the collected images. This class was not reported for the main equatorial, winter crossing, so we present it here as an example that the method can detect microzooplankton when it is present, rather than as a like-for-like comparison between the two legs. We attach example images of these radiolarians alongside this response.



Trying to detect these organisms, manually from 18,000 particles is not an easy task, but the system was able to detect, learn and then quantify the numbers. Unfortunately no microzooplankton have yet been detected in the East-West equatorial run, but it does not mean to say that they aren't present in the photographs.

We hope this response, together with the corrected figure, the attached images and the newly available image archive, addresses the concerns raised by Reviewer 1 and their colleague. We remain glad to provide any further material, data or clarification that may be needed to resolve this matter fully.