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Biogeosciences Discussions

Interactive comment on "Eukaryotic community composition in the sea surface microlayer across an east-west transect in the Mediterranean Sea" *by* Birthe Zäncker et al.

Anonymous Referee #2

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Review of "Eukaryotic community composition in the sea surface microlayer across an east-west transect in the Mediterranean Sea"

This is an interesting work reporting original data on the abundance of eukaryotes and TEPs in a East-West transect in the Mediterranean. The data set seems of good quality, even though the depth of the discussion could be improved in some sections. I recommend the following modifications:

- Line 28. There are some reports on bacteria in the SML, also some recent work using 16S. I suggest this could be cited here.

- Lines 43-49. This paragraph is un-related with the rest of the introduction and the title

of the manuscript. It could be removed from the introduction.

- Line 53. It is not clear to me to which degree the organic matter in the SML is related to atmospheric inputs, it may be driven by partitioning of surfactant-like chemicals from underlying waters or exudates from microbes. In addition, later in the text it is said that the atmospheric influence is covered in another manuscript in preparation.

- Lines 63. I find it difficult to believe that such a control of this rate can be achieve, especially on a moving zodiac.

- Line 65. How was it collected?

- Volume of SML and ULW collected?

- Line 131. Is this the result of a spearman correlation? R=0.1 means R2=0.01. Even though $p<0.05$, I don't think this shows a high similarity. I think it needs an explanation of which data was used for this similarity measure.

- ASV is never defined in the manuscript, I guess it is "amplicon sequence variant", but a definition, and probably an explanation, is needed in methods or the first time it appears.

- Were differences between SML and ULW tested with a paired test?

- Generally, the EF could be correlated with environmental variables such as wind speed.

- Was DOC measured? This could influence the east-west differences, as well their composition.

- Line 153. Rewrite. . .

- Line 176. Couldn't diatoms and other phytoplankton groups be very affected by UV radiation?, ok, this is commented later, but then the enrichment of phytoplankton can be derived by physical processes (buoyancy and fractionation at surface due to surface

tension related issues), then this would be independent of radiation.

- Note that the SML is generally enriched in hydrophobic and surfactant-like chemicals as many anthropogenic compounds. This has been described for PAHs, alkanes, PCBs, Perfluoralkyl substance, etc in the Mediterranean and elsewhere. This could also have an influence on the east-west differences, as concentrations of POPs in biota are higher in oligotrophic regions due to a complex interplay of factors (Berrojalbiz et al. 2011, Morales et al. 2015, González-Gaya et al. 2019). For example, for bacteria, it has been shown that the SML is especially enriched in those taxa having the potential to degrade pollutants (Martinez-Varela et al. 2020). Even though, organic pollutants were probably not measured in this cruise, it could be another factor to take into account or comment shortly. Fungi are known as being very efficient degrading persistent pollutants.

- Line 231. Here and in other parts of the manuscripts. Bacteria was determined by bacterial counts (abundances), but this is a very limited information for this types of statements, as even bacterial abundance decrease, the abundance of some key taxa may increase.

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