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Biogeosciences Discussions

Interactive comment on "Short scale (6 h) temporal variation of sinking fluxes of planktonic and terrigeneous lipids at 200 m in the NW Mediterranean Sea" *by* L. Méjanelle and J. Dachs

Anonymous Referee #1

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General comments

The paper addresses the important issue of the short-term variability (hours to days) of mass and biomarker fluxes in the marine environment (Mediterranean Sea) and is therefore highly relevant within the scope of BG. The present ms is a resubmitted version of a paper which was submitted for publication in spring 2009 to BGD. It has been changed significantly in many parts as requested by the reviewers. It has been reorganized, mainly in the discussion section. The introduction has been somewhat extended and provides now more background information to the theme. The study site is also described in more detail in result section 3.1. with respect to the physical

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and biological environment. I suggest publication of this paper but after some revision considering the comments and suggestions given below.

In most parts the paper is now clearly written and well structured. However, it is still not fully clear to me which novel conclusions can be drawn from this impressive detailed biomarker study. As the authors argue, microscopic and detailed pigment studies (e.g. ratio of phaoepigments/chlorophyll) also reveal the contribution of certain planktonic groups/species to mass/organic carbon fluxes or the degradation status of the materials in the upper water column (page 7694). The importance of biomarker studies is not clearly demonstrated, as I mentioned in the first review on the initial paper. In this comment, I suggested to use only particular biomakers (preferentially those providing a complete or almost complete record, not the ones shown in Figure 2) and discuss those instead of using all data which might result in some confusion, at least for non-specialists. The fluxes of biomarkers clearly follow the fluxes of organic carbon and total mass (page 7693). So why biomarkers, what are the advantages? Which additional conclusions can be drawn from the biomarker investigations?

Specific comments

- one important issue is the day-night variability in mass and biomarker fluxes which is discussed at page 7692 (chapter 4.3.). It seems to me that elevated fluxes of some components occur during the night time. As I understand, the authors argue that no day-night periodicity is observable, at least when considering the biomarker data set which is partly incomplete. However, by including the entire data set for POC, this dial variability becomes obvious. So, if POC co-varies with most of the biomarkers for the reduced data set, I would conclude that it is also found for the biomarkers. If mass and organic carbon fluxes and some biomarker fluxes (e.g. steroid ketones) are largely controlled by the fluxes of copepod feces, one would assume higher fluxes during the night when they migrate upwards for filter feeding. However, some problems of timing might occur, as the pellets produced during the night have to sink down from the surface to 200m which might take a few hours. As a consequence, the increased

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pellet production at night might have a temporal offset in the trap recoveries. Please comment on that.

- for the description of the study area (now in results 3.1.), I suggest to make an extra chapter following the method section

- almost all figures are too small and contain a lot of information, which makes them difficult to read. The tables (e.g. Table 7) are almost unreadable too. Some figures are not fully explained, e.g. Fig. 1. What are the pink symbols, is the sampling site (red star) the time series site at DYFAMED?

- why is day-night grey-filling shown in Figures 5 and 6 but not given in Fig. 3, which is a very important figure? At page 7692 (lines 19-21), the authors state that the day-night variability is not seen in the fluxes of biomarkers, but the day-night periods have not been marked in Figure 3.

- as I mentioned above, some of the figures appear to contain to much information and are therefore too small and hard to read. From Figure 2, the upper two panels could be shown alone to describe the setting. It is not clear to me why these two panels are now combined with the incomplete record of alkanes. The upper two panels of Figure 2 would benefit from a combination with Figure 3, which also shows a bulk parameter (besides three biomarkers). Why first introduce special proxies (Fig. 2) and then the bulk (organic carbon) data?

- please refer more to the figures in the discussion section

- concerning trapping efficiencies (page 7693-7694), the authors mention some discrepancies (Schmidt et al., 2009). How much? Please give more detailed information

Technical corrections and comments

- page 7676 line 5: ? . . .over a timescale of 4 h ? (something is wrong here)

- page 7689, line 1: in addition, ...

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Interactive comment on Biogeosciences Discuss., 6, 7673, 2009.