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Biogeosciences Discussions

Interactive comment on "A one-month study of the zooplankton community at a fixed station in the Ligurian Sea: the potential impact of the species composition on the mineralization of organic matter" *by* L. Mousseau et al.

L. Mousseau et al.

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We must apologize for a mistake in the published manuscript : the original abstract was mixed with the introduction . Thus, the part named "Abstract" in the manuscript was in fact the "Introduction" and no abstract was available.

We are grateful to the referees for their helpful remarks. The Referees made serious comments on the manuscript, some of which were of real interest to improve the manuscript, others being less valuable in the scope of this paper. This manuscript belongs to a special issue concerning a multidisciplinary cruise. At this step, we wanted to make available the set of data concerning zooplankton as these data could be use-

ful to others. Within this scope, we did not attempt to represent the functioning of the ecosystem which in the aim of an other manuscript. We have revised the introduction in this sense.

General comments

The manuscript will be completely revised to account for all remarks. We will homogenize the figures for their axes, and for the sampling dates as well as the units when necessary. The language of the text will be improved.

As suggested by referees, the Introduction (improperly named Abstract) has to be more accurate according to the data set analyzed. We agree with the referees that the objectives stated in the Introduction of the manuscript are too broad regarding the discussion. We will focus mainly on the six-weeks time series data in terms of physiological rates. In order to estimate the contribution of zooplankton to the budgets in carbon or nitrogen in the upper layer of the sea, it is useful to know if the different fluxes of chemical elements are dependent on the taxonomic composition. We give in this manuscript the ratios of fluxes. Respiratory quotient (ratio of CO2 flux to O2 flux) appears to be independent of the species. A geochemist who is expecting a single number to estimate zooplankton role in the carbon budget can use the average value. On the other side, metabolic quotient (ration of O2 flux to NH4 flux) appears to be dependent on the species : Meganyctiphanes, Thysanopoda, Cavolinia show higher values than the other species. The use of an average value to estimate excretion flux from respiration measurements will be questionable.

We should consider that the two episodes of low salinity are indices or clues to a change in water mass which might explain the changes in the abundance and proportions of the pelagic species we have observed. The changes in salinity attracted the attention of physicists because it was unexpected in an area of the Ligurian sea which was considered far from coastal influence. The thin layer of low salinity appears to slip under the pycnocline into the observation area and retract. Yet, the salinity change is

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not so important for marine species (38,30 to 38,20) compared to changes which might be induced by a river plume or which exist in an estuary.

Referee #1

- WP-2 instead of WPII : If the name is from the working party 2 of the UNESCO and is originally written WP-2, both writings are found in the literature. But, to follow the referee's recommendation, we will change it in our manuscript.

- Subheadings : We feel that the subheadings help the reader to follow the different stage of acquiring and analyzing the data. For this, we find them essential.

- The estimated respiratory quotient on given species were used when available. Yet, some species, even present in the specific quantitative samples were not used for physiological experiments. It was the case for appendicalarians and Nematoscelis, megalops and we used respiratory quotients from the literature (p1004, line 17-18). We certainly have to clarify this part of the method.

- We will review our data in the point of view of diel cycle linking to lunar cycles. But we are not convinced that the data could answer properly this questions because the sampling strategies was not developed for this.

Referee #2

- Even if we know that small organisms may make the bulk of the zooplankton community, we have made the choice to work only, at this first step, on the meso- or macrozooplankton. We shall explain more precisely this choice in the text, and therefore, discuss our results within this view. Yet, this approach was briefly explained p1006, line 5-11 and we have to put it in Methods.

- We are aware of the bottle effects involved in these kinds of incubations. The incubated volumes were chosen to obtain a significant difference between control and experimental bottles and to keep the organisms alive until the end of the experiment. We shall discuss more specifically how these effects could have thus affect the metabolic

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rates estimated and how we consider our data set to be valuable.

- The biomass nets were not pooled, the value is a mean of two samples. That's why we could not add SD to the graph.

Referee#3

- The suggestion of representing respiration and excretion rates in weight specific units will be adopted to avoid redundant figures. It will also help to document the specific ratios.

- We have to specify and clarify in which context and with what assumptions we estimated the ingestion rates. As we work with species diversity, we agree with the referee that our estimates results from different processes and that we have to counterbalance our conclusions.

- References will be updated and we apologized for all the mistakes still present for the submission.

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