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Biogeosciences Discussions

Interactive comment on "Short term changes in zooplankton community during the summer-autumn transition in the open NW Mediterranean Sea: species composition, abundance and diversity" *by* V. Raybaud et al.

V. Raybaud et al.

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We wish to thank reviewer #1 for helpful comments, which improved our manuscript.

P2241 line 10. I presume WPII zooplankton sampling are performed with 200-0m more than 0-200m.

We have changed 0-200m to 200-0m in the revised paper.

P2242. As the authors said, the computation of species diversity indices requires a taxonomic identification at species level. Its true, at the population level? However, i am not certain that the condition is applied for the BIONESS sample where all the

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copepod species and development stages are not sampled even if the identification is done until the species. An intercalibration between WP2 and BIONESS would be usefull (in the future).

We agree with referee #1 that species diversity computed only with BIONESS net doesn't represent the diversity of the whole copepods population; it's the reason why we have called this "large copepods diversity". Although BIONESS net did not sample small copepods and copepodits, species diversity indices computed with this net give interesting results about the temporal evolution of large copepod in relation to with LSW intrusions. There is no explicit intercalibration between WP-II and BIONESS nets in this study. However, the differences between total copepods number sampled with WP-II and BIONESS (Fig 4 and 5) give us an idea about the ratio of large copepods in the community (20 to 50 % of adults). An explicit and complete intercalibration between WP-II and BIONESS net could be the subject of a future study.

P2245 line 13. The thermocline deepening was accompanied by a strong cooling of the mixed-layer water and suggests the beginning of autumnal de-stratification. The situation is not typical of autumn but exist for spring and summer strong wind events.

We agree with referee #1 that strong wind events have also been recorded in the Ligurian Sea during spring and summer. However, when the water column is highly stratified, the wind strength necessary to break this stratification is very important. During the summer-autumn transition, the de-stratification is due to the combination of two phenomena: the heat flux decreases and strong wind event occurred. The sentence p2245 line 13 has been changed to include that: "The thermocline deepening was accompanied by a strong cooling of the mixed-layer water (due to heat flux decrease) and suggests the beginning of autumnal de-stratification"

P2245 line 14. The authors declare that LSW water has a coastal origin and crossed the Ligurian front along isopycnals by a barocline instability. What are the arguments that you are using to justify that assumption. I am not strongly convinced by the coastal

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origin of the LSW1 waters. The copepod species associated with LSW1 are they typical of coastal surface water? Is it not a confusion between coastal waters and low salinity Ligurian current waters, from Atlantic origin, which extended between the coast and the Front? (Sea Sournia, et al., 1990; Goffart A, Hecq JH, Prieur L 1995. Contrôle du phytoplancton du bassin ligure par le front liguro-provençal (secteur corse). Oceanol Acta 18:329-342). Moreover, a comparison of copepod composition in LSW1 waters with Mediterranean typical coastal waters and Ligurian waters (from the literature) would be instructive to conclude.

The ligurian front circulates around the Ligurian Sea, but the hydrological characteristics are different between the Corsica sector and Provencal one. Indeed, the Corsica sector is more influenced by Atlantic Water (AW) entering the Mediterranean Sea by the strait of Gibraltar than the Provençal sector. Andersen et al. (2008) presents a complete study of the hydrological environment during DYNAPROC 2 cruise. Their study also explains the coastal origin of the LSW intrusions. The minimum of salinity at the TSS during LSW intrusions is equal to the minimum of salinity observed at the two first coastal stations of the transect. Moreover, the phytoplankton study during the cruise (Lasternas et al., 2008) confirms the presence of a coastal dinoflagellate genus during LSW intrusions: Scrippsiella sp. Concerning the zooplankton study, a comparison of copepods composition in LSW-1 with Mediterranean typical coastal waters was not possible because we did not find any coastal marker taxa (for example Euterpina acutifrons).

P2246 line 3. The bimodal distribution of phytoplankton on the Fig 2d is observed only on the first sampling and not clearly generalised at the beginning of the cruise. What is the method used to determine the phytoplankton identification and especially the senescent diatoms. By HPLC, some pigments, taxonomic indicator can be included in faecal pellets as well as in senescent cells.

During the cruise, the phytoplankton was studied in two ways: HPLC (Marty et al., 2008) and Utermöhl method (Lasternas et al., 2008). Counts were done with an in-

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verted light microscope (Zeiss© Axiovert 35), at 200x and 400x magnification. "The physiological state (senescent) of the diatoms at the beginning of the cruise was inferred from the aspect of diatom cells under the microscope." This sentence was added in the revised version

P2246 line 13. The biomass are expressed in g m-2. It is not specified if it in dry or wet weight? Please precise the sample net used for biomass.

The biomass is in dry weight. We added it in text and in figure caption.

P2247 line 8. Copepodites represent more than 48% of copepods. The Oithona small copepodites are they sampled by WP2 net ?

Small copepodits of Oithona spp. were sampled with WP-II net.

P2247 line 20. copepod dimension 200-500 μm and not um.

This typological mistake has been corrected.

P2248 table 1, 2, 3. May I suggest a quick definition of Z value for table 1, 2, 3. In the Wilcoxon-Mann-Whitney test, if Z value is higher than the critical value 1.64, so, the samples are not significantly different at the threshold 5%; if Z value is higher than 2.33 the samples are not significantly different at the threshold 1%. This sentence has been added in the section "data analysis" in the revised paper.

P2248 line 15. Why the short term variations can be attributed to horizontal patchiness?

Appendicularians, Pteropods, Ostracods, Hyperiids and Chaetognaths present one short peak of abundance during the cruise. Each peak consists of a single point and they do not occur at the same time. A peak constituted with a single point is not significant and we can't considerate it either than horizontal patchiness.

Reference:

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Interactive Comment

Andersen, V., Prieur, L., and Goutx, M.: Hydrology, biology and biogeochemistry during autumn transition period (Sept. 14-0ct. 17), at a central point in the Ligurian sea, NW Mediterranean: overview of the DYNAPROC2 (DYNAmics of the rapid PROCesses) study, Biogeosciences Discuss., to be submitted, 2008

Lasternas, S., Tunin-Ley, A., Ibañez, F., Andersen, V., Pizay, M.-D., and Lemée, R.: Daily vertical abundance and diversity of microphytoplankton in NW Mediterranean Sea during the summer to autumn transition (DYNAPROC II cruise; Sep-Oct 2004), Biogeosciences Discuss., to be submitted, 2008.

Marty, J.C., Garcia, N., Raimbault, P.: Phytoplankton dynamics and primary production under late summer conditions in the NW Mediterranean Sea, Deep-Sea Res. Pt. I, 55, 1131-1149, 2008.

Interactive comment on Biogeosciences Discuss., 5, 2237, 2008.