Biogeosciences Discuss., 6, S9–S12, 2009
www.biogeosciences-discuss.net/6/S9/2009/

Biogeosciences Discussions

Interactive comment on "Short scale variations in nutrients, ectoenzymatic activities and bottom-up effects on bacterial production and community structure during late summer-autumn transition in the open NW Mediterranean Sea" *by* F. Van Wambeke et al.

E. Vazquez-Dominguez (Referee)

evazquez@icm.csic.es

Received and published: 16 January 2009

This paper addresses the influence of different inorganic (i.e. N and P), organic (i.e. Glucose) nutrients and some interactions (i.e. NxPxG) on the function and community structure of heterotrophic bacterioplankton of different depths (mainly 5 and 80 m) on the NW Mediterranean Sea. Therefore, it is well within the scope of Biogeosciences discussions.

The manuscript present novel and interesting data of bacterial ectoenzymatic activity, bacterial production, and RNA and DNA community fingerprinting to understand the interaction between structure and function of heterotrophic bacterioplankton of the NW Mediterranean, and the influence of different nutrient additions in these community features. The idea is not really new because there are some previous works on the effect of nutrient amendments on the function and structure of heterotrophic bacterioplankton, as for example the references cited in the manuscript, but the fact that the authors use this approach to understand short scale variations is a really interesting novelty. After reading the manuscript, however, I find some difficulties into have a clear idea the short term scale effect on the structure and function of the heterotrophic bacteria in the microcosms, and how the findings are comparable to the short term changes that can be found in the samples withdrawn during the cruise.

Since my point of view, there are some small problems in the results to see clearly the effect of the nutrient amendment on the function and structure of heterotrophic bacterioplankton. Besides the problem of the lack of replicates, there is the lack of the NxP interaction. If this treatment was not preformed, you could not really say that the effect of the NxPxG interaction was related to G and not to the interaction of the other two inorganic nutrients (NxP). In addition, the ecotoenzymatic function is related as positive, negative, and cero effect during the cruise and in the microcosms. However, the community structure is represented as a three with a cluster approach. I think it could be much easier to see both results as a three to compare them visually (see for example Alonso-Saez et al. figure 6).

In the discussion you have to consider that Alonso-Sáez et al. (2005) didn’t found an agreement between carbon use and community structure in NW Mediterranean coastal waters and you find such a relation. I think that you have to discuss such contrasting findings. In addition, the authors have to consider that the nutrient deficit for certain groups could not really be a deficit for others. For example, Zohary et al. (2005) have found for the eastern Mediterranean that while P was the limit-

BGD

6, S9–S12, 2009

Interactive Comment

ing nutrient for heterotrophic bacterioplankton, N and P were simultaneously limiting for phytoplankton. Finally, the authors state that the bottle effect may lead to higher changes in the RNA and DNA fingerprinting than the effect of depth. Couldn’t be more interesting to add directly nutrients into the sea? (i.e. Krom et al. 2005)

The main points reached are: a) surface NW Mediterranean waters are limited mainly by P, which is in general agreement with other studies of the area, and b) deep bacterioplankton could be limited by the availability of fresh organic carbon. Then, the structure and function of heterotrophic bacterioplankton could be influenced by inorganic nutrients in surface waters and organic carbon in deep waters.

It is necessary a more conclusive discussion about the short term variability and the relation between what happens in the addition experiments and in the field.

The title is good but the discussion should be improved to match better the title

The abstract provides a concise and complete summary, except in the part that the authors are talking about the second half of the cruise. You didn’t mention in the same abstract a first half o the cruise.

References

Alonso-Sáez, L., Vázquez-Domínguez, E., Cardelús, C., Pinhassi, J., Sala, M.M., Lekunberri, I., Balagué, V., Vila-Costa, M., Unrein, F., Massana, R., Simó, R. and Gasol, J.M. (2008) Factors controling the seasonality of bacterial carbon flux in a coastal marine system. Ecosystems 11: 397-409. Krom, M.D., Woodward, E.M.S., Herut, B., Kress, N., Carbo, P., Mantoura, R.F.C., Spyres, G., Thingstad, T.F., Wassmann, P., Wexels-Riser, C., Kitidis, V., Law, C.S. and Zodiatis, G. (2005) Nutrient cycling in the south east Levantine basin of the eastern Mediterranean: Results from a phosphorus starved system. Deep Sea Research (II) 52: 2879-2896. Zohary, T. (2005) P-limited bacteria but N and P co-limited phytoplankton in the Eastern Mediterranean-a microcosm experiment. Deep Sea Research (II) 52: 3011-3023.

BGD

6, S9–S12, 2009

Interactive comment on Biogeosciences Discuss., 6, 687, 2009.