

***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.***

**Anonymous Referee #2**

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**1. GENERAL COMMENTS**

The authors investigate the factors limiting bacterial production in vertical profiles in the NW Mediterranean Sea and relate this to nutrient concentrations and ectoenzymatic activities. They hypothesize that differences in the composition of the bacterial community are related to the type of nutrient limitation. In experimental bioassays, the authors found a predominant P limitation in the surface layer, depleted of inorganic nutrients,

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whereas at 80m, organic carbon was generally limiting bacterial growth. Changes in nutrient concentrations induced changes in bacterial composition and activity.

The paper reports about nutrient limitation, a topic that is very suitable to be published in Biogeosciences. The authors address properly the questions formulated and the methodology used is the most appropriate and is accurately described. The results are sound and support the conclusions obtained which although not totally innovative (previous bioassays to assess bacterial nutrient limitation have been carried out in the NW Mediterranean) are supported by in situ data of ectoenzymatic activity, nutrients and community composition. All sections of the manuscript are well structured and clear and only the title could be improved. The title does not fully reflect the conclusions since little is discussed on short-term variations in the paper and that part of the title could be removed. Additionally, the title is too specific and long. My suggestion would be: "Bottom up effects on bacterioplankton growth and composition during summer-autumn transition in the open NW Mediterranean Sea".

## 2. SPECIFIC COMMENTS

Quality of figures is often poor in my copy. I suspect this is due to file format and for example, in fig 5 and 6, X-axes are incomplete. Also, same symbols in Fig 4 for total and attached bacteria.

Fig 2 shows mean vertical distributions of the main parameters along the water column. The main players in the story are bacteria so profiles of bacterial abundance should be shown here. Data are available since the authors used it for correlations and regression. Bacterial abundance profiles will strongly help the reader to draw a general picture of the studied ecosystem.

The incubation experiments were carried out under close to in situ light and water was not prefiltered, phytoplankton was also present in the bottles. It would be interesting to know about the evolution of phytoplankton during this 24h. If phytoplankton grows, competition with bacteria for inorganic nutrients can be expected; if phytoplankton died

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due to confinement, this could provide an uncharacterized source of both inorganic and organic nutrients for bacterioplankton. If the authors followed phytoplankton abundance or chlorophyll concentration, it would be desirable to include a paragraph with their observations and possible influence of those in their results.

P690 L2. Recent papers have observed consumption of dissolved organic matter by other organisms, such as phytoplankton (Vila-Costa et al. 2006, Science 314: 652-654), therefore I suggest replacing only by main.

The symbol for mole is mol, so the term mole should be replaced along the ms in text and figs.

Only attached bacteria were retained in 0.8 um filters? What percentage of free living bacteria could be found on the filter?

There is a broad spectrum of substrates to investigate lipase activity in the literature. Why did the authors choose MUF-palmitate?

I suggest the authors to make the exercise of compiling a unique dendrogram to check if all amendments cluster together independently of the date of the experiment.

Enrichment generally decrease the number of bacteria OTUS, probably due to the response of a taxa to the enrichment. It would be interesting to identify which bacteria respond to the enrichments but I wonder if this is possible with SSCP.

### 3. TECHNICAL CORRECTIONS

For coherence, write Vmax instead of Vm along text and figures

Fig 4c abundance

P690 L24 Alkaline phosphatase

P701 L13 differences

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