

## ***Interactive comment on “Deep silicon maxima in the stratified oligotrophic Mediterranean Sea” by Y. Crombet et al.***

### **Anonymous Referee #1**

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#### General comment:

The paper reports two cruise experimental results on some biogeochemical observations over a vast oligotrophic gradient covering the entire Mediterranean Sea that were carried out almost a decade apart. The results include distribution of nutrients, particulate carbon and silicon, total chlorophyll-a and fucoxanthin pigments, which are used to document the dissolved and particulate silicon cycle and assess diatoms contribution to phytoplankton community as well as their potential role in N<sub>2</sub> fixation during the stratified period. However, the statement it is presented now is devoid of hard evidences and the results are not very well presented. Some presentations are confused. On the basis of the above considerations, the manuscript appears to me to be suitable for

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publication in Biogeosciences after minor to major revisions on the presentation and explanations of the results.

#### Detailed comments:

1. The authors explain vertical distributions of some biological parameters (such as BSi, Chl a, Fuco) and discuss the potential formation mechanisms, but they don't mention the basic hydrological conditions, for example how about the light distribution, which are very important for the distributions of DSM, DCM . . . . . ?
2. As for orthosilicic acid (H<sub>4</sub>SiO<sub>4</sub>), seawater was filtered onto 0.2 μm polycarbonate filters, and for particulate biogenic and lithogenic silica (BSi and LSi) analyses, seawater was filtered onto 47mm 0.6 μm pore size polycarbonate filters. How about the middle part between 0.2 μm to 0.6 μm pore size? They are not important for the study of the availability of dissolved Si and siliceous phytoplankton distribution patterns?
3. Some confused presentation: in 1999 during late summer-early autumn (4 September to 4 October); during fall 1999; during summer, from May to September;
4. Are the water samples of nitrate and phosphate filtered?
5. POC was determined using the wet oxydation procedure for the PROSOPE samples, and on an elemental CHN analyser Perkin Elmer 2400 for the BOUM samples. The results from these two different methods are consistent?
6. Please explain in detail why the maximum of Fuco did not match BSi increase?
7. The western basin of the MS is ever indicated to be station 27 to 17. How about the eastern basin for the two cruises and the western basin for the PROSOPE cruise?

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8. Please indicate all the important names mentioned in the manuscript. For example, I am not familiar with the MS and don't know where the Tunisian continental shelf is?
9. If the P deficit is more intense than the N deficit, why assess the Si deficiency only based on the Si:N ratio?
10. How to assess the oligotrophic degree in the MS? Why the authors mentioned that late summer/fall is the highest oligotrophic degree, monthly results are compared?

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