

## Response to the reviewers

According to the 3 reviewers, we see several blocks of critics; we will make here a grouped answer accordingly. Several sections and figures have been added to fitful the requested changes.

Main points addressed by the reviewers:

- Show the significance of dust deposition in the Med Sea (intensity of the flux, regional vs global importance, wet vs dry etc. and their importance regarding in particular new nutrients). One table, one figure and data from the literature have been added to illustrate those different points that indeed were missing. Regarding nutrients, we have reported different previous studies but have not detailed again the data (only main findings are reported, the paper is already getting very big); for this particular aspect, an additional section was made concerning stratification/diffusion importance in the Med Sea. The added sections (including one figure and one table) is: [L117-L137]
- Develop a lot the methodological aspects that have been detailed in a previous paper but this is indeed a good opportunity for putting emphasis on the new and successful methods that have been developed. We have thus illustrated the several aspects, added several figures to explain in details the main features of our approach both regarding production of dust analogs for the wet and dry deposition and mesocosm strategy. (Consequently, the length of the paper has changed a lot). The added section are : [L243-L278] and [L286-L387] and [L400-L408] and [L439-L441]
- Concerning the suggestion to add more data to this presentation paper, we cannot really do this as all the other data are included in submitted (or on the edge to be submitted) papers. For ex. the carbon balance will be the main output of a paper by Guieu et al. 2013b
- There are remarks about the turbulence/stratification and this point that was already shortly discussed in the previous version was more detailed. Figure 9b is giving the delta temperature between surface and 10 m for the 3 experiments in a first approximation of the thermal stratification (Longhurst., 1995); those data are then discussed showing in particular that stratification was more marked during DUNE-Q and that could explain the low export of lithogenic particles observed then. For this particular aspect, an additional section was made concerning stratification/diffusion importance in the Med Sea. The added sections are : [L154-161] and [L505-508]

- The section describing the main output has been significantly rewritten, in particular following the reviewers suggestions concerning the carbon budget (the way it was formulated was not correct leading to a misunderstanding; the corrected paragraph is **[The carbon budget indicates that the net heterotrophy character remained (or was even increased) after the dust addition despite the significant stimulation of autotrophs. This indicates that the atmospheric input has not a simple fertilization effect as one could have concluded from studies where the carbon budget was not possible to quantify. Our numbers indeed indicate that the system is a net CO<sub>2</sub> source after dust deposition]** and the final section about the modeling was also ewritten [L672-L691])
- As a consequence of the important changes made, the abstract of the paper was also rewritten.
- Concerning all the other points (details, technical points, typo, style etc.) they were all taken into account throughout the text.