

Interactive comment on “Dust deposition in an oligotrophic marine environment: impact on the carbon budget” by C. Guieu et al.

Anonymous Referee #3

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This manuscript reports a valuable effort to integrate the results of a mesocosm dust deposition experiment. However, as it stands, the work presents several problems. General comments a) Much of the data on which the manuscript is based are already reported in other papers (Ridame et al., 2014, Pulido-Villena et al., 2014), while the main potential added value of this manuscript, which is the attempt to derive a carbon budget, is based on many assumptions, some of them shaky, and/or not very reliable data (e. g., BR). b) The results of microcosm and mesocosm experiments are influenced by the initial conditions of the enclosed community (e.g., composition and seasonal/successional stage, phytoplankton biomass in relationship with nutrient concentrations, etc.). All the DUNE experiments were carried out in June-July; this aspect limits the scope of the conclusions and should be adequately addressed. c) The manuscript is difficult to follow, in part due to deficient organization (see other com-

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ments) and in part because much of the necessary information (characteristics of the study site, initial conditions, methodology, etc.) needs to be sought elsewhere. Specific comments a) What is the rationale for the expression $GCP=NPP+DPP$ (page 1720, line 25)? Please, explain. As mentioned by another referee, depending on the definition of GCP (and NPP), this expression may be wrong. Apart of the problem with the double consideration of autotrophic respiration (also mentioned by the referee), the carbon calculations of Table 2 include a large number of assumptions and extrapolations. This could be acceptable as a complement to other basic information, but not as the main message of the manuscript. b) A large part of the Results text in pages 1716 and 1717 should be placed in the Discussion section (e. g. comparisons with data from other authors, etc.). On the other hand, some information given in the Discussion (like the data shown in Figs. 3 and 4 and the details of the carbon balance calculations) could be better presented in the methods and Results sections. Other comments Unify abbreviations: DUST-Meso or DUST-mesocosms, not both. P. 1712, lines 13-15. Give here information on the depth of the mesocosms (it is given 3 pages later), P. 1713, line 24; improve the explanation of the method. P. 1715, lines 23-27. Given the differences in light conditions, the assumption that the NPP measurement at 5 m is representative of the NPP for the whole mesocosm water column should be used with some caution. P. 1716, line 11. Why the title “Orders of magnitude of the . . . “ rather than “Magnitude of the . . . “? P. 1716, line 18. What was the depth of the sediment traps? P. 1719. The first two paragraphs are difficult to read; please, clarify. I could not find the work Desboeufs et al. (2014).

Interactive comment on Biogeosciences Discuss., 11, 1707, 2014.

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