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

Anonymous Referee #2

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The manuscript by Guieu et al. titled "Dust deposition in an oligotrophic marine environment: impact on the carbon budget" aims at linking two datasets presented in companion papers by Ridame et al. (2014), for primary production, and by Pulido-Villena et al. (2014), for bacterial respiration, to determine changes in carbon budget following dust additions in samples from the Mediterranean sea.

Although carbon budgets are of great scientific interest, the manuscript in its present form contains many flaws:

(1) This manuscript does not bring new data to the ones described in the two main companion papers. Only POC export data may be original to this manuscript although Ridame et al. (2014, companion paper) discuss those results, and Bressac et al. (2014, part of the special issue) present POC export data and discuss the results in a paper

dedicated to POC export. The authors end up presenting results for POC export, NPP and BR (pages1716 – 1717) that belong to the companion papers;

(2) The carbon balance is only described in the discussion. Because the main goal of this paper is to report a carbon balance, it is fundamental to detail the calculation, provide results and discuss findings in the appropriate sections of the manuscript. The carbon balance calculation should be detailed in the methods section instead of the discussion and the terms involved should be fully explained. The results from the carbon mass balance should be reported in the result section, not in the discussion. There are also parts of the results section that belong to the discussion.

(3) The important DOC measurements cannot be used (Page 1715, lines 5 to 10: "Samples were taken for DOC but we decided to not use the results as unexpected high concentrations and/or variability (either among the 3 depths in a same mesocosm or at the same depth in the triplicate mesocosm were found for many samples, randomly. Unfortunately, the same was observed for filtered samples either transferred in combusted glass ampoules (P and Q experiments) or in acid-washed HDPE bottles (R experiments)");

(4) The carbon budget relies on too many assumptions, extrapolations and estimations instead of measurements (e.g. page 1720, line 11: "estimates of unmeasured parameters");

(5) The authors recognize that important data are not reliable (e.g. Page 1714, Line 5, "We are aware, however, that absolutes values of BR or net CO2 fluxes must be taken with caution").

The reader is thus left questioning the validity of the carbon budget and as a reviewer I wonder how useful will be this paper for potential readers: will it be cited? Because of the major flaws listed above, I cannot recommend this manuscript for publication. Nevertheless, I recognize that establishing a carbon budget is a difficult but much needed endeavor and appreciate the authors' effort to overtake this challenge. My suggestion

would be to include the carbon budget as part of the discussion in one of the companion paper.

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