

Interactive comment on “Impact of open-ocean convection on particle fluxes and sediment dynamics in the deep margin of the Gulf of Lions” by M. Stabholz et al.

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This is a novel and interesting paper that warrants publication in BG. The paper deals with the open ocean vertical convection with the overarching goal to describe its effect on the water column and seabed. The authors presented a worthy and composite dataset including 20-month time-series of particulate fluxes and physical data, satellite data, geophysical data, sediment transport modeled data and seabed data. Quite an impressive dataset I have to say. Combining this heterogeneous information the authors concluded that convection processes exert first order control on the particulate fluxes in deep sea sediments. Considering that most of the previous studies focused

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their attention on shelf dense water cascading as primary forcing affecting the particulate transport, this study is somehow novel and well supported by the data presented. However, I have one major (and significant) comment on the data outline. The current format is a little unsatisfactory and I have the feeling that the authors struggled with structuring the data outline because of the heterogeneity of dataset. Up until the discussion the paper is well written and easy to follow. However, in the discussion, the authors jumped straight to the comparison with other studies although their own dataset was entirely undiscussed. I didn't find this approach very satisfactory as the reader should first know what kind of particulate fluxes the sediment traps have collected and what this comparison is about. Therefore, I think that a well structured discussion should at first focus on the physical dataset, starting from the time-series of temperature and current data. Once the physical part has been described, this should set the stage for the discussion on particulate fluxes at different depths bringing up the occurrence of lateral and vertical fluxes. In doing so, the dataset is well linked as a collected sequence of thoughts making sure that the reader understands the difference between seabed resuspension and sinking of marine phytodetritus. So at first, put more stress on when these fluxes occur, their intensity, and then subsequently link them to previous studies and the effect of the benthic communities. I think that all this information is already present in the paper, but it comes across as confusing and not properly laid out. In addition, as the outcome of this study is well supported by the data, I would suggest speculating/discussing rather more about the potential effect of resuspension of sediment vs export of marine phytodetritus. Lateral and horizontal fluxes have such a contrasting OM composition and it is likely that the effect on the deep sea communities is not just a matter of flux magnitude. For example, in the Bari canyon (southern Adriatic sea) the composition of suspended material collected via sediment traps (~35 m above the seabed, deployed at ~600 m) alternates periods characterized by significant lateral advection of aged OC (thousands of years old!!) from outer-shelf deposits with periods influenced by the export of modern marine phytodetritus from the upper water column (Tesi et al., 2008, Deep-Sea Research I). Contrasting 14C ages

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of particulate material were also observed in the Gulf of Lions as a result of resuspension and primary production (Tesi et al 2010, Progress in Oceanography). Therefore, given the different reactivity of these contrasting pools of organic carbon, the presented results can be further discussed in terms of labile vs reactive carbon and relative implications for deep sea sediments (biogeochemistry, ecology, etc).

Minor points: - Fig 4. Sensors of temperature should be also presented in the methods were the authors describe the mooring setting. Also, the depth of each sensor is hard to see (need a thicker line). - Please revise the English. There are some recurring typos throughout the manuscript (e.g. replace "particles fluxes" with "particle fluxes" or "particulate fluxes").

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