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Biogeosciences
Discussions

Interactive comment on "Downward fluxes of sinking particulate matter in the deep Ionian Sea (NESTOR site), Eastern Mediterranean: seasonal and interranual variability" *by* S. Stavrakakis et al.

Anonymous Referee #1

Received and published: 22 February 2013

Review of Stavrakakis et al., "Downward fluxes of sinking particulate matter in the deep Ionian Sea (Nestor site), Eastern Mediterranean: seasonal and interanual variability"

This manuscript presents a very interesting data set obtained with a mooring line with five pairs of sediment traps and currentmeters deployed for 4 years in the Ionian Sea. The major constituents of the downward particle fluxes are investigated, allowing to resolve the seasonal and interannual variability of the oceanographic conditions which control particle export, including organic carbon. Long-term monitoring efforts (and with an extraordinary success rate) as the one presented by Stavrakakis and co-authors are essential to improve our understanding of the flux of sinking particles to

depth, and thus the distribution of many chemical elements in the ocean. Overall, the data obtained is very interesting and of high quality, and the impact of this study merits publication in Biogeosciences. There are only a few aspects that the authors should address before publication.

- Check the wording of "interranual" through the manuscript

- Lines 7-8 of page 599 need to be supported by observations (refer to a specific figure) or the literature

- Line 15 pag. 599. Check temperature units

- Line 26-28 pag. 601. This has been already mentioned in pag. 600

- Section 5.1. Temporal variation of total mass fluxes show that fluxes recorded at the deepest trap essentially match those at the upper trap and are thus not related to "independent" events. This suggests that either the 3200 m trap is collecting less particles than supposed, or that the trap at 4300 collects particles from a wider/nearby area. How do you explain this in terms of intermediate and benthic nepheloid layers and the presence of the different water masses? Which major components contribute to this increased bottom fluxes and where they come from?

- Sections 5.2 and 5.3. It is not clear at which point the seasonality (and the interannual variability) is driven by winter-spring convective mixing, upwelling or aeolian transport. Please make clear. Which is the physical forcing mechanism of the upwelling observed May 2008, 2009 and 2010? How you explain that aeolian transport is seasonal? Can you provide chl-a time series to reinforce your interpretations?

- Line 12 pag. 607. I don't see the elevated total mass fluxes in August 2007 at the 700 m trap but a very small peak

- Line 10 pag. 612. Remove POC and use OC throughout the manuscript

- Section 5.5. OC flux vs. ballast mineral fluxes will definitely exhibit good correlations

because they all essentially follow variations of the total mass fluxes (as stated by the authors in pags. 600 and 601). I found the discussion related to the ballasting processes a bit speculative and with no direct of observation/evidences. Is chl-a time series giving additional information that help reinforcing your interpretations?

- Please expand the quite interesting (and a bit too straightforward) last paragraph of the paper and link with sections 5.1 and 5.2. Are lateral inputs at the 4300 trap (composed of mostly lithogenic and carbonate material) contributing to this power function? Can you compare this power function at the deepest basin of the Mediterranean with other found in continental slope areas of the Mediterranean Sea (see for instance Fig.14 of Heussner et al., 2006)?

Tables and Figures:

Table 1. In the caption, replace underline by bold. In addition, I would suggest to delete this table as most of the information is included in table 2. I don't think it is necessary to specify which time weighted mean of total mass flux has been used, it is obvious from the time weighted (and flux weighted) definition that only total mass fluxes from where major constituent data exists are be used.

Table 2. Specify in the caption if "Mean" corresponds to time weighted flux and flux weighted percentages.

Figure 2. Show in the figure which constituent corresponds to each time slot.

Figure 3. I would suggest using the same scale to better compare currents at each depth (then the interesting differences in current speeds between water depths will be more evident!).

Figure 4. Explain what shaded areas represent.

Figure 9. The figure caption does not match the figures in the manuscript, there is not any buoy plotted in figure 4, and if it refers to figure 1 it is not a cross.

Figure 11. The data is already shown in figure 4 so I would suggest to remove it.

Interactive comment on Biogeosciences Discuss., 10, 591, 2013.