Biogeosciences Discuss., 9, C8268–C8272, 2013
www.biogeosciences-discuss.net/9/C8268/2013/

Biogeosciences Discussions

Interactive comment on "Downward fluxes of elemental carbon, metals and polycyclic aromatic hydrocarbons in settling particles from the deep Ionian Sea (NESTOR site), Eastern Mediterranean" *by* C. Theodosi et al.

L. Heimburger (Referee)

heimburger@get.obs-mip.fr

Received and published: 15 February 2013

Manuscript Number: STOTEN-D-12-01026

Title: Downward fluxes of elemental carbon, metals and polycyclic aromatic hydrocarbons in settling particles from the deep Ionian Sea (NESTOR site), Eastern Mediterranean

Authors : C. Theodosi, C. Parinos, A. Gogou, A. Kokotos, S. Stavrakakis, V. Lykousis, J. Hatzianestis, and N. Mihalopoulos

General comments:

In the manuscript, Theodosi and co-workers study the quality the vertical export flux in the EMed Sea using sample of 5 sediment traps moored between May'07 and March'08. The samples were analyzed for elemental carbon, PAH and metals. The manuscript is very well written by requires revisions. My main concern is that the authors do not explore their intensive dataset. Their data is not enough put in comparison with previous studies either (other than MED). For instance the authors published on trace metals in sediment traps of the Black Sea (Theodosi et al., 2013) which they do not compare with. Data on major and trace metal contraptions of trapped particles are scarce and worth comparison. The authors go not much beyond the ideas of a paper that I submitted to BGD (Heimbürger et al., 2010b). In this paper we presented amongst other arguments a strong correlation of all trace metal fluxes. Calculated metal fluxes are no independent variables and cannot be treated as such, as one of the reviewers pointed out correctly at the time. This is why the paper never made it to publication in BG. Please do not cite this discussion paper. If correlations are presented to trace a common metal source it must be in terms of concentrations. Please show a correlation matrix for the selection of your metals. There is to my knowledge only one other publication on metal concentrations of trapped particles in the MED and it should be compared with (Roussiez et al., 2012). Please make the effort to compare your dataset also with other regions. Perhaps the paper could even be divided in two: a EC, PAH paper and one on metals only. The way it is presented for now is confusing and especially the metal part comes a bit short in terms of data description, analysis and statistics.

Specific comments:

Introduction

Overall too exhaustive relative to the manuscript length P19167l15: dissolved or particulate? The manuscript is dealing with particles only. P19168l1: Cu is mentioned twice.

BGD

9, C8268–C8272, 2013

I don't understand

Materials and methods

P19169l25: is this acid attack strong enough for refractory metals? No aqua regia of HF? No CRM is available that comes close to trapped particles. What did you use? What are the recoveries?

Composition of settling particles

P19171l10: How does coating with soluble material decrease the EC concentration? If POC is remineralized with depth than the portion of refractory EC must increase.

Major and trace metals

Please describe metal concentrations in detail Did you check for possible contamination of the sample bottles of the automated sediment trap? How? P19172l3: trended? P19172l3: increment? P19173l19: DYFAMED is supposedly open ocean (Marty, 2002; Heimbürger et al., 2012) P19173l25: as said earlier you are not allowed to correlations on dependent variables, all element fluxes contain the mass flux variable P19174l7: add between

In the following, please proof read English, there are some occasional errors. Throughout the manuscript be clear if you describe element fluxes or concentrations. Table 1: show how rich the dataset actually is but is useless at the same time. Please organize better. I suggest putting the vertical depths as lines and the elements as variables. Better present as two tables: one on concentrations and one on fluxes. Here are some trace metals related work in the MED that I found helpful: Saharan dust in sediment traps (Ternon et al., 2010) and anthropogenic trace metals in MED surface sediments (Angelidis et al., 2011) and some of my own: atmospheric metal inputs box model including a literature review of atmospheric trace metal inputs to the MED (Heimbürger et al., 2011) and composition of MED aerosols (Heimbürger et al., 2010a).

References

BGD

9, C8268–C8272, 2013

Interactive Comment

Angelidis, M.O., Radakovitch, O., Veron, A., Aloupi, M., Heussner, S., Price, B., 2011. Anthropogenic metal contamination and sapropel imprints in deep Mediterranean sediments. Marine Pollution Bulletin, 62(5): 1041-1052.

Heimbürger, L.E., Cossa, D., Thibodeau, B., Khripounoff, A., Mas, V., Chiffoleau, J.-F., Schmidt, S., Migon, C., 2012. Natural and anthropogenic trace metals in sediments of the Ligurian Sea (Northwestern Mediterranean). Chemical Geology, 291(0): 141-151.

Heimbürger, L.E., Migon, C., Cossa, D., 2011. Impact of atmospheric deposition of anthropogenic and natural trace metals on Northwestern Mediterranean surface waters: A box model assessment. Environmental Pollution, 159(6): 1629-1634.

Heimbürger, L.E., Migon, C., Dufour, A., Chiffoleau, J.F., Cossa, D., 2010a. Trace metal concentrations in the North-western Mediterranean atmospheric aerosol between 1986 and 2008: Seasonal patterns and decadal trends. Science of The Total Environment, 408(13): 2629-2638.

Heimbürger, L.E., Migon, C., Losno, R., Miquel, J.-C., Leblond, N., Cossa, D., 2010b. Factors controlling the temporal variability of mass and trace metal downward flux at 1000 m depth at the DYFAMED site (Northwestern Mediterranean Sea). Biogeosciences Discuss., 7(2): 2549-2567.

Marty, J.-C., 2002. The DYFAMED time-series program (French-JGOFS). Deep Sea Research Part II: Topical Studies in Oceanography, 49(11): 1963-1964.

Roussiez, V., Heussner, S., Ludwig, W., Radakovitch, O., Durrieu de Madron, X., Guieu, C., Probst, J.-L., Monaco, A., Delsaut, N., 2012. Impact of oceanic floods on particulate metal inputs to coastal and deep-sea environments: A case study in the NW Mediterranean Sea. Continental Shelf Research, 45(0): 15-26.

Ternon, E., Guieu, C., Loÿe-Pilot, M.-D., Leblond, N., Bosc, E., Gasser, B., Miquel, J.-C., Martín, J., 2010. The impact of Saharan dust on the particulate export in the water column of the North Western Mediterranean Sea. Biogeosciences, 7: 809-826.

BGD

9, C8268–C8272, 2013

Theodosi, C., Stavrakakis, S., Koulaki, F., Stavrakaki, I., Moncheva, S., Papathanasiou, E., Sanchez-Vidal, A., Koçak, M., Mihalopoulos, N., 2013. The significance of atmospheric inputs of major and trace metals to the Black Sea. Journal of Marine Systems, 109–110(0): 94-102.

Interactive comment on Biogeosciences Discuss., 9, 19165, 2012.