

Interactive comment on “Factors controlling the temporal variability of mass and trace metal downward flux at 1000 m depth at the DYFAMED site (Northwestern Mediterranean Sea)” by L.-E. Heimbürger et al.

M. Rutgers van der Loeff (Referee)

mloeff@awi.de

Received and published: 2 July 2010

General comments:

This is a very straightforward short paper describing mass and trace metal fluxes collected at DYFAMED in the period 2003-2005. The authors show that trace metal fluxes are very well correlated with each other and with total mass flux. Better than would be expected if these fluxes were controlled by their different supply rates to the ocean surface. The authors conclude that at this site all fluxes are controlled by the seasonal

C1656

variability of biogenic carbon production and flux. This is an interesting contribution to the discussion on the role of ballast materials and organic carbon production in the vertical flux.

As the authors explain their observations by a controlling role of the organic flux, it is surprising that the paper does not give data and correlations with the fluxes of POC, CaCO₃ and biogenic silica, which are most probably also available for these periods. We do not even know the composition of the mass flux: Is this primarily organic or does the ballast material constitute a significant amount?

specific comments:

The authors exclude in their analysis (Fig. 2, data file) a high-current period of the sediment trap record. On page 2554 they argue that high currents may affect trap fluxes both qualitatively and quantitatively, but in the figure legend they mention that they will calibrate the fluxes with ²³⁰Th. Such corrections will not change the TM/mass flux ratios. If the excluded periods have a poorer correlation between TM and mass flux (which is not stated), this would point at a qualitative bias of trapping, which would be an important finding. It is correct that the high-flux period is highlighted, but I think the data should be shown nevertheless.

Page 2552 line 5-11. The information derived from the sedimentary record is not fundamentally different from the information derived from sediment traps: it is a question of time scales.

Page 2555 line 10. The website does not appear to be a permanent one.

Page 2558 line 13-16. The function of this sentence at this position is not clear.

Page 2559 line 5. The paper shows indeed that the actual fluxes at a given time, the TM dynamics, depend on the climatic/meteorological conditions that control the organic flux. But the the average flux over longer periods and the accumulated flux in the sediments is ultimately controlled by the inorganic inputs to the surface water.

C1657

Legend Fig. 2 mentions correlation coefficients between TM and mass flux, but correlation data are not shown in Table 2 or in the figure.

Interactive comment on Biogeosciences Discuss., 7, 2549, 2010.

C1658