

Interactive comment on “Sources and transport of dissolved iron and manganese along the continental margin of the Bay of Biscay” by A. Laës et al.

Anonymous Referee #1

Received and published: 9 November 2006

Review: Sources and transport of dissolved iron and manganese along the continental margin of the Bay of Biscay, by Laes et al.

Brief summary:

This paper is a rather brief communication reporting temperature, salinity, turbidity, dissolved iron and dissolved manganese observations from an across shelf section in the Bay of Biscay. The focus of the paper is clearly on the distribution of iron and manganese. Data are tabulated and section plots for the on-shelf and off-shelf distribution of the measured properties as well as a few vertical profiles are presented.

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Near seabed elevated metal concentrations are reported for on-shelf locations. An observed well mixed bottom boundary layer and accompanying turbidity data suggest these to be a result of resuspension followed by desorption. Tidal induced mixing is proposed as the most likely resuspension process.

Off-shelf and across the continental slope elevated metal concentrations are observed at mid-ocean depth (~700 m) and internal tide generated mixing is proposed here as one of the mechanisms that most likely leads to the resuspension of sediments.

In both situation, i.e. on-shelf and off-shelf, some contribution to elevated concentrations through pore water diffusion is considered.

Key comment:

The paper is essentially a data report. An interpretation of the observations made is presented by consulting the literature widely and possible physical mechanisms are presented. These include bottom boundary layer processes, internal tides, the general along slope circulation, and pore water diffusion. Some physical observations reported in the literature are referred to that have been made in the Bay previously.

The authors fail to present a comprehensive theoretical framework (that is e.g. a model) that would allow them to clearly pin-point to sources or quantify the impact of the various processes that potentially play a role in creating elevated metal concentration. Such a framework would substantially add to the scientific debate in better understanding the role of tidal mixing, internal tides, general oceanic circulation, pore water contribution, sediment composition, etc. in generating the observed elevated metal concentrations. There is really nothing of that nature presented in this paper.

I believe that paper would be of much greater value to the community if the authors could include a section that quantifies the iron/manganese sources in more detail and links the actual magnitude of physical forces (tidal, currents, etc) to observed sediment distributions, resuspension rates, desorption rates etc. in the Bay of Biscay.

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