



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.

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The main objective of our work was to examine the detailed distributions of iron and manganese along the transect and to identify the sources and the key processes controlling these distributions. We agree that our study does not provide quantitative estimate of the processes, and that the ultimate goal of such investigations should be to present a comprehensive theoretical framework. However, as pointed out in a recent paper: “Boundary-interior exchange: Reviewing the idea that internal-wave mixing enhances lateral dispersal near continental margins, McPhee-Shaw, (2006)”, process study documenting near-boundary mixing and then quantifying the associated offshore flux of boundary-layer water do not really exist. This is because most of the events are episodic in both space and time and are thus difficult to capture with traditional observ-

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ing techniques, but also because such a work will require a large collaborative effort between physical oceanographers and marine chemists. Even though growing rapidly, the number of good quality data set for trace metal in the ocean is still limited. This is mainly due to the difficulty to properly collect and analyse the samples. We think that our data set is of good quality and is of interest for the community involved in the iron biogeochemistry. The hypothesis put forward to explain the main features of the observed distributions may also help to design further investigations.

The following section was added as concluding remark.

“During our cruise, real-time data on the intensity and magnitude of the physical forces (internal wave breaking, along slope current, hydrological processes inducing resuspension) were not collected. Moreover the iron and manganese fluxes coming from the sediment were not measured. This has hampered quantitative discussion on the relative importance of the different sources and processes. As highlighted by McPhee-Shaw, (2006) there is a need for a physical oceanography coupled to biogeochemistry study to bring to light the dynamics causing dispersal of bottom boundary layer fluid into interior waters in order to quantify lateral transport of dissolved and particulate chemical constituents and to better understand feedbacks between supply of benthic iron and primary productivity on continental shelves. Our paper brings forward some hypothesis in the understanding of trace metal enrichment in the vicinity of a continental slope. Quantitative estimates will require further investigations concerning the sediment composition, the intensity of diagenesis and of resuspension processes, the nature of transport and the mixing of water masses ”

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