Iron cycling in sediments from the Benguela upwelling system (BUS)

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The highly productive BUS located on the broad continental margin off Namibia forms a major source of dissolved reactive Fe to the open ocean [1]. To understand the sources and sinks of reactive Fe off Namibia we here present Fe concentration and isotope data (δ^{56}Fe) and (trace) element data for a sediment core transect from the anoxic shelf to the oxic abyssal plain (Meteor cruise M76-1). Results show overall high Fe/Al ratios (0.6 to 1.6) exceeding the average shale ratio (0.55) with highest enrichment seen on the shelf, and δ^{56}Fe values ranging from 0.25 to – 0.05 ‰. These data differ from those of the Peruvian margin [2] and restricted basins like the Arctic [3] and the Black Sea [4]. In the latter two settings reactive Fe increases with increasing water depth and becomes isotopically lighter (δ^{56}Fe as low as – 0.38‰) which documents the shuttling of light, shelf-derived Fe towards the basin [3,4]. By contrast, sediments from the oxygen minimum zone (OMZ) off Peru show depleted Fe within the OMZ and Fe enrichments with heavier δ^{56}Fe (up to 0.5‰) due to partial Fe(II) oxidation and precipitation below the OMZ [2]. Compared to the above systems, the overall smaller Fe isotope fractionation in BUS sediments may be due to the continuous re-supply of terrestrial Fe from eolian sources overprinting reductive Fe isotope fractionation.

[1] Noble et al. (2012) *Limn. Oceanogr.* **57,** 989-1010. [2] Scholz *et al.* (2014) *GCA* **127,** 368-380. [3] Meinhardt *et al.* (2016) *GCA* **188,** 125-146. [4] Severmann *et al.* (2008) *Geology* **36,** 487-480.