

## Iron sources and cycling in the Peruvian oxygen minimum zone assessed using iron isotopes

I. RAPP<sup>1\*</sup>, M. SIEBER<sup>2</sup>, F. SCHOLZ<sup>1</sup>, M. HOPWOOD<sup>1</sup>, T. CONWAY<sup>3</sup>, R. C. XIE<sup>1</sup>, M. FRANK<sup>1</sup>, D. VANCE<sup>2</sup> AND E. P. ACHTERBERG<sup>1</sup>

<sup>1</sup>GEOMAR – Helmholtz Centre for Ocean Research Kiel, 24148 Kiel, Germany (\*correspondence: irapp@geomar.de)

<sup>2</sup>Institute of Geochemistry and Petrology, Department of Earth Sciences, ETH Zürich, 8092 Zurich, Switzerland

<sup>3</sup>College of Marine Science and School of Geosciences, University of South Florida, Florida, 33701, USA

Shelf sediments in the Peruvian oxygen minimum zone (OMZ) represent an important source of dissolved iron (dFe) to the overlying water column [1]. Although the process of Fe release from the sediments is well understood, its contribution to the overall marine Fe budget is poorly quantified. Fe isotopes ( $\delta^{56}\text{Fe}$ ) provide a useful tracer to assess the contribution of reductive benthic Fe inputs [2]. In addition to different  $\delta^{56}\text{Fe}$  signatures of the various input sources, Fe cycling processes in the water column result in further Fe isotope fractionation between dissolved and particulate phases [2,3]. Thus, Fe isotopes are also a potential tool to decipher processes involved in Fe cycling within the Peruvian OMZ. We therefore measured  $\delta^{56}\text{Fe}$  distributions for dFe (<0.2  $\mu\text{m}$ ) on eight water column profiles along the Peruvian coast

Our results show lowest  $\delta^{56}\text{Fe}$  down to -1.5‰ within the OMZ and close to the seafloor coinciding with elevated dFe concentrations. Dissolved Fe concentrations decreased and  $\delta^{56}\text{Fe}$  values increased with distance from the coast. These findings are in accordance with negative  $\delta^{56}\text{Fe}$  signatures resulting from reductive dissolution in sediments and indicate a preferential removal of lighter isotopes or mixing with heavier dFe from other sources.  $\delta^{56}\text{Fe}$  observations in pore waters will allow us to further constrain the sediment source contribution to the overall Fe budget in this region. Comparison with concentrations of Fe(II) and other trace metals, alongside biological and physical parameters collected during the same cruises will help to improve our understanding of Fe source and cycling processes in this region and their effect on Fe isotope fractionation.

[1] Noffke *et al.* (2012) *Limnol. Oceanogr.* **57**(3), 851–867.

[2] Chever *et al.* (2015) *Geochim. Cosmochim. Acta* **162**, 66–

82. [3] Radic *et al.* (2011) *Earth Planet. Sci. Lett.* **306**(1-2), 1–10.