

## Do Os isotopes track glacial-interglacial cycling? The strange case of the Benguela Upwelling System

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The possibility of using Os isotopes in hydrogenous marine sediments to track glacial-interglacial variations has been debated for nearly 20 years, with some studies showing excursions to less radiogenic values during glacial intervals [1-5] while others do not [6-7]. Several of these earlier studies may have been affected by factors such as basin isolation, detrital sediment input and low sedimentation rates, potentially biasing the measured Os isotopic compositions of the sediments relative to that of contemporaneous seawater. To clarify this issue, we have undertaken an Os isotopic study of organic-rich sediments from ODP Leg 175, Site 1084, located in the Benguela Upwelling System off the Namibian coast. As this is an open ocean site with a high sedimentation rate and minimal detrital input, the Os isotopic signature of the sediments should closely reflect that of ambient seawater.

Re-Os analyses of ~40 samples ranging in age up to 220 ka were performed, and the age model was constrained by new oxygen isotope analyses on benthic forams. Measured Re and Os concentrations were 58-155 ppb and 0.191-0.648 ppb, respectively. The <sup>187</sup>Os/<sup>188</sup>Os data yield a surprising, bimodal result. Unlike in most [1-5], but not all [7], previous studies, an excursion to less radiogenic values is not observed during the glacial interval MIS 2, with <sup>187</sup>Os/<sup>188</sup>Os remaining nearly constant at 1.042 ± 0.008 (1σ), a value close to that of modern seawater [8]. In contrast, during MIS 6, a marked decrease in <sup>187</sup>Os/<sup>188</sup>Os is observed, as has been reported elsewhere. In addition, a minor excursion to lower <sup>187</sup>Os/<sup>188</sup>Os occurred from 50 to 70 ka, temporally coincident with a similar excursion observed in the Cariaco basin that was previously assumed to be a local feature [4]. Possible explanations of these unexpected results are currently being explored.

[1] Oxburgh (1998) *EPSL* **159**, 181-191 [2] Dalai et al. (2005) *Chem. Geol.* **220**, 303-314 [3] Williams & Turekian (2004) *EPSL* **228**, 379-389 [4] Oxburgh et al. (2007) *EPSL* **263**, 246-258 [5] Burton et al. (2010) *EPSL* **295**, 58-68 [6] Dalai & Ravizza (2010) *GCA* **74**, 4332-4345 [7] Paquay & Ravizza (2012) *EPSL* **349-350**, 126-138. [8] Levasseur et al. (1998) *Science* **282**, 272-274.