

From: Kevin Jones (Ph.D. Candidate)
To: Ed Cook, Climate Center Committee
April 30, 2009

Development of Procedures to Measure the Seawater Neodymium Isotope Signal in Authigenic Ferro-Manganese Sediments from the South African Margin

Kevin Jones (kjones@ldeo.columbia.edu), Steven L. Goldstein, Sidney R. Hemming

Abstract

I request funds to develop and test modifications to our procedures to extract the seawater neodymium (Nd) isotope signal from authigenic ferro-manganese (Fe-Mn) oxyhydroxide sediments. The Nd isotope composition of seawater, as measured by selective leaches of authigenic marine Fe-Mn sediments, is an important paleoceanographic tool because it records changes in ocean circulation through time. However, it is only useful to the extent to which these authigenic sediment leaches truly reflect seawater, rather than labile phases of terrigenous sediments. The procedures used at LDEO extract the marine Nd work well on some cores, and have led to some important publications. However on many cores the leached Nd contains non-marine components.

The South African margin is an excellent study region to compare seawater and leachates of authigenic sediments because the seawater Nd signal is known through direct measurements of three seawater depth profiles by our lab. Through comparison of Nd isotope ratios of leachates and the seawater profiles we have found that other (non-seawater) Nd bearing sediment phases are attacked during our selective leaching procedure. The funds sought through this proposal will be used to develop and test the effectiveness of other Fe-Mn sediment leaching procedures, some currently used in other labs. In addition to helping the LDEO isotope lab develop an improved leaching procedure, the funds sought through this proposal will also provide assistance to Kevin Jones for the completion of his doctoral dissertation.