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To the GEOTRACES Project Office coordinators,

I intend to write a proposal to NSF this February to apply for funding to analyze neodymium (Nd) isotopes and the rare earth elements (REEs) for the GEOTRACES Pacific cruise leg (Peru to Tahiti). If successful, I hope to be able to participate on the cruise in sample collection either myself or have a graduate (Ph.D) student on board.

Neodymium isotopes are listed as one of the key parameters to be made on each GEOTRACES cruise¹. This isotopic system is thought to be a “quasi-conservative” tracer for circulation, with great potential for understanding long-term changes in global circulation². The Pacific Ocean is perhaps the least-well constrained basin in terms of Nd isotopes, which has hindered attempts to understand the Nd circulation tracer to a level that can be robustly modeled³. Being one of the lanthanide series, Nd isotopic data are generally improved and better understood in relation to a complete REE data set. These two analyses thus go hand-in-hand, and will provide more information for the final interpretations of the data. For example, the biogeochemistry of the REEs will aid tremendously in understanding how the Nd isotopic signatures are imparted or modified in water masses⁴. Moreover, sampling for REEs may be done at all the stations whereas the large volumes required for Nd isotopes can only be sampled less frequently.

I have collected and made successful analyses of both Nd isotopes and REEs on two major ocean cruises (Gulf of Alaska in 2007 on the R/V Thompson; Caribbean in 2009 on the R/V Meteor). The Nd isotopes have all now been analyzed, as have all the REEs and publications are being prepared currently. I have also participated in both GEOTRACES intercalibration studies, and our data are consistent with the other labs.

I realize that several groups are interested in analyzing both Nd isotopes and the REEs. I think it would be prudent and more efficient for everybody involved to coordinate proposal efforts, if there is some way to accomplish this. Nevertheless, I am interested in participating in the workshop to plan implementation of this cruise leg.

Thank you very much for your consideration.
Sincerely,

A handwritten signature in black ink, appearing to read 'Brian Haley', with a stylized, cursive script.

Brian Haley

1. GEOTRACES Planning Group (2006) *GEOTRACES Science Plan*. Baltimore, Maryland: Scientific Committee on Oceanic Research.
2. e.g., Frank, M. (2002) Radiogenic isotopes: tracers of past ocean circulation and erosional input. *Rev. Geophys.* 40, A1–A38.
3. Siddall, M., Khatiwala, S., Van de Flierdt, T., Jones, K., Goldstein, S. L., Hemming, S. R., and Anderson, R. F. (2008) Towards explaining the Nd paradox using reversible scavenging and the Transport Matrix Method, *Earth Planet. Sci. Lett.*, 274, 448–461.; Jones, K.M., Khatiwala, S.P., Goldstein, S.L., Hemming, S.R. and vande Flierdt, T. (2008) Modeling the distribution of Nd isotopes in the coceans using an ocean general circulation model. *Earth Planet. Sci. Lett.*, 272, 610-619, doi:10.1016/j.epsl.2008.05.027.
4. e.g., Elderfield H. (1988) the oceanic chemistry of rare-earth elements. *Philos. Trans. R. Soc. London* 325, 105–126; Byrne R. H. and Sholkovitz E. R. (1996) Marine chemistry and geochemistry of the lanthanides. In *The Handbook on the Physics and Chemistry of the Rare Earths* (eds. K. A. Gschneidner, Jr. and L. (Eyring), pp. 497–593. Elsevier, Amsterdam, the Netherlands.