

IRON ANALYSIS BY ISOTOPE DILUTION ICP-MS

William M. Landing (FSU, Oceanography)

Introduction

In 2004, analyses of trace elements (primarily iron) in seawater, rainwater, and aerosol solubility solutions were conducted by the technique of isotope dilution using the Finnigan Element ICP-MS in the Geochemistry division at the NHMFL.

Results and Discussion

Samples from the 2003 CLIVAR Repeat Hydrography A16N section were analyzed in order to compare the land-based analysis of dissolved iron by isotope dilution ICPMS with ship-board flow-injection analysis. This intercomparison will continue into 2005, but the initial comparisons showed that the ship-board FIA method generally agreed very well with the ICPMS analyses.

Samples of aerosol leachate were also analyzed to develop an instrument method to quantify a suite of soluble trace elements. Some aerosol leach samples were also analyzed for silicon to investigate whether soluble aerosol silicon could be a significant factor in the global ocean silicon budget.

Some seawater samples were analyzed for dissolved Fe, Ni, Cu, Zn, Cd, and Pb by a multiple-tracer isotope dilution method. The preliminary data show that this newer method has great potential to enable analysis of seawater samples for all 6 elements in a single extraction and analysis.

Conclusions

The results from our preliminary attempts to develop new analytical methods for the ICPMS are very promising. It is clear that additional developmental work must be done to fine-tune the methods. Results were presented at 4 national meetings, and submitted for publication (see references below)

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