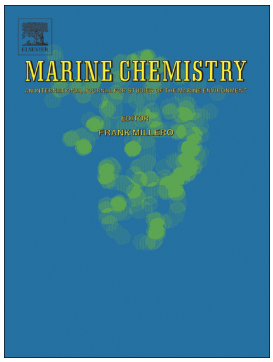

Depth distribution of Zr and Nb in seawater: The potential role of colloids or organic complexation to explain non-scavenging-type behavior

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PII: S0304-4203(16)30229-8
DOI: doi: 10.1016/j.marchem.2016.12.001
Reference: MARCHE 3412

To appear in: *Marine Chemistry*

Received date: 9 June 2016
Revised date: 15 November 2016
Accepted date: 1 December 2016

Please cite this article as: Sandra Poehle, Andrea Koschinsky , Depth distribution of Zr and Nb in seawater: The potential role of colloids or organic complexation to explain non-scavenging-type behavior. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Marche(2016), doi: 10.1016/j.marchem.2016.12.001

Depth distribution of Zr and Nb in seawater: the potential role of colloids or organic complexation to explain non-scavenging-type behavior

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Abstract

Dissolved zirconium (Zr) and niobium (Nb) are present in open-ocean seawater in low pmol/kg concentrations and studies for the Pacific Ocean reported an increase in concentration with depth although both metals are characterized as being particle-reactive.

We analyzed dissolved Zr and Nb in 194 Atlantic seawater samples (0.2 µm filtered) collected at 16 stations located in the (sub)tropical Atlantic during GEOTRACES cruise M81/1 (GA11) and 6 Pacific samples (0.2 µm and 0.015 µm filtered) collected from a hydrothermal plume and the background seawater during SO229. Measurements were done using our newly developed online-preconcentration method for the SeaFAST-system with subsequent analysis by inductively coupled plasma-mass spectrometry.

Our results showed an increase in dissolved Zr with depth with some distinct maxima at intermediate depths along a NE-SW transect (30°N to 12°S) in the Atlantic. Surface depletion was less pronounced along the Atlantic SE-NW transect (12°S to 8°N) and disappeared almost completely at the northernmost station at 8°N. Dissolved Nb was almost conservatively distributed except off West Africa where a surface depletion was observed. We