Rare Earth elements scavenging in the North Atlantic (GEOVIDE cruise)

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Dissolved and particulate concentrations of the fourteen Rare Earth Elements (REE) have been measured in the North Atlantic along the GEOTRACES GA01 section. Sampling have been done during the GEOVIDE cruise (May/June 2014, R/V Pourquoi Pas?), which departed from Portugal, to Greenland and ended on New-Foundland shelf. REEs are useful to understand physical and chemical processes affecting the interactions between the dissolved and the particulate phases, major processes regulating the cycles of the elements.

In addition to dissolved REEs concentrations (dREE) and particulate concentrations (pREE), other proxies (POC, PIC, $CaCO_3$, bSi, Fe and Mn) acquired at same depth for the same stations during GEOVIDE were used to calculate the suspended particle mass (SPM) in the upper 200 m [1]. SPM have then be used to calculate REE partition coefficients (Kd) between the dissolved and the particulate phase, illustrating the intensity of scavenging by particles.

Preliminary results shows that i) dissolved and particulate concentrations are strongly influenced by lithogenic inputs from the margins, up to 1000 km off the shelf, influence more pronounced for the light REEs (LREE) than for the heavy REEs (HREE) ii) calculated SPM vary from 40 $\mu g.L^{-1}$ to 800 $\mu g.L^{-1}$, which is higher than the values used in models describing the biogeochemistry of this area iii) resulting Kds are higher than the simulated ones [2][3] and vary with depth iv) Kds are influenced by the particle compositions, higher values being found close to the margins. These Kds are precious parameters for the REE modeling. They will allow better simulations of the REE concentrations and residence times, thus a better understanding of their geochemical cycles.

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