Cadmium isotope distribution along a northeast-southwest transect in the tropical Atlantic Ocean

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The vertical distribution of cadmium concentrations ([Cd]) and isotopic compositions (expressed as $\varepsilon^{112/110}$Cd) in the upper ocean is governed by biogeochemical cycling, with isotopically heavy Cd in Cd-depleted surface waters and lower $\varepsilon^{112/110}$Cd values at mid depths [1]. In contrast, the distributions of [Cd] and $\varepsilon^{112/110}$Cd in the deep ocean are mainly controlled by the large-scale ocean circulation [1] [2].

Here we present new Cd concentration and isotope data obtained from the GEOTRACES GA11 cruise (M81/1) along a northeast-southwest transect across the tropical Atlantic Ocean. Preliminary results show higher [Cd] in the deep eastern basin below 2000 m than in the western basin (350 *vs.* 300 pmol kg^{-1}), most likely reflecting larger proportions of Antarctic Bottom Water (AABW) in the eastern basin. Between 500 and 1000 m, a doubling in [Cd] from 28°N to 3°N reflects an increased influence of Antarctic Intermediate Water (AAIW) in the south, in agreement with recent Atlantic GEOTRACES Cd data [3]. Comparison of our new data with those from the southwest Atlantic GA02 transect [2] indicates a decrease in [Cd] between 2000 and 3500 m from 2°S to 7°N in the deep western basin, reflecting the southward flow of low-Cd North Atlantic Deep Water (NADW).

Regardless of the Cd concentration variations, $\varepsilon^{112/110}$Cd values in both basins are homogenous and typical of NADW between 1000 and 3500 m. Below 3500 m, bottom waters maintain $\varepsilon^{112/110}$Cd values typical of AABW. Taken together, $\varepsilon^{112/110}$Cd reliably trace major water masses in the deep Atlantic, while [Cd] is more sensitive to the mixing proportions of the deep water masses.

[1] Abouchami et al. (2014) *Geochim. Cosmochim. Acta*, **127**, 348-367. [2] Xie et al. (2014) *Ocean Sciences Meeting*. [3] Conway and John (2015) *Geochim. Cosmochim. Acta*, **148 (1)**, 269-283.