

## The Pb isotope record of terrigenous input into the Tropical Atlantic

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We report high-precision Pb isotope data on two sediments cores from the Equatorial Atlantic (GeoB1523-1 and GeoB2910-1) and show a synchronicity of Pb isotopic variations with glacial-interglacial cycles over the past 200 ka. Pb isotope data were obtained on bulk sediments. Holocene and LGM samples were leached in order to deconvolve the detrital and carbonate signals. The 200-ka Pb isotope record of the bulk sediments display periodic fluctuations in both cores. Despite distinct Pb isotopic signatures in the East and West Atlantic, both Pb isotope records follow the  $\delta^{18}\text{O}$  record: interglacial periods are systematically more radiogenic than glacial periods. In Pb isotope space, the West Atlantic data form a unique Pb isotope array that is quite distinct from that of the East Atlantic where two trends are found. Leaching results show that in the West Atlantic, the carbonate fraction is less radiogenic than the residue and vice-versa in the East Atlantic. In both basins, however, the bulk sediment composition is shifted toward that of the residue, suggesting that the carbonates do not significantly contribute to the Pb budget of the bulk sediment. The Pb isotopic composition of the carbonates is different from that of ambient deep waters, as inferred from Fe-Mn crusts, and its significance remains to be determined.

We interpret the Pb isotopic differences between the East and West Atlantic as reflecting distinct terrigenous Pb sources. In the West, the terrigenous flux is overwhelmed by the Amazon discharge, while in the East, it is mostly derived from the Sahara-dust plume and nearby African terranes. The glacial-interglacial isotopic contrast along the Pb arrays is consistent with climate-dependent changes in the relative proportions of the contributing Pb source(s). The shift from radiogenic Pb during warm periods to unradiogenic Pb during cold periods suggests a strong coupling between the weathering style and its resulting products. The distinct Pb isotopic compositions of bulk sediments, residues and carbonates in the two cores show a complete decoupling of Pb sources in the two basins. The cyclicity of the bulk sediments Pb isotope records reflects variations in terrigenous fluxes into the Tropical Atlantic over the past ~200 ka and demonstrates a climate control on Pb inputs to the oceans.

## Molecular and carbon isotopic characterization of polycyclic aromatic hydrocarbon distribution in mussels and associated sediments from the Massena-Cornwall area, St. Lawrence River

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This paper documents the molecular and compound-specific carbon isotope composition of polycyclic aromatic hydrocarbons (PAH) in mussels (of *L.l. radiata* and *E. complanata*) and associated sediments collected from the Massena and Cornwall areas of the St. Lawrence River. Scuba sampling of mussels with shell length 6.0 and 10.0 cm were performed in seven sites from the Massena and Cornwall sides of the River. Upon collection, the organisms were rinsed clean of sediment using river water, wrapped in pre-fired (550°C) hexane-rinsed aluminum foil, placed in freezer storage bags, and immediately frozen on dry ice. In the laboratory, the mussels were thawed for 30 min, opened, sexed, and shucked individually into acid-washed glass jars. Individual mussels were freeze-dried and five specimens from the same site, species, and sex were pooled for analysis. This composite sample was ground for 1 min in a Bel-Art Micro-Mill with stainless steel blades and grinding chamber. PAH extraction of mussel samples was performed by saponification of ground freeze-dried tissue. For each sample, saponification of ~10 g of sample was performed in 200 ml of 6 N KOH in a warm water bath (~35°C) for 24 hr in a darkened fume hood. After 24 hr, any remaining residue, usually < 0.25 g, was centrifuged off and washed with 5 x 10 ml of dichloromethane to recover the neutral fraction associated with the undigested residue. The digested portion was solvent exchanged with 5 x 100 ml of dichloromethane to recover the neutral fraction. All dichloromethane extracts were combined into a total neutral fraction and concentrated in a rotary evaporator at 35°C, dried under a stream of nitrogen, and stored at -20°C. Fused KOH was added to deionized water to make a 1 liter 6 N solution which was solvent extracted with 3 x 100 ml of dichloromethane to ensure purity. Sediment analyses were performed following Stark et al. (2002).

In all the sites examined, both parental and alkylated PAH were noted, with 4 to 5-ring parental species predominating in both the mussels and sediments. All mollusc samples contained notable amounts of DBT, methyl-DBT, phenyl-Na, the  $m/z = 218$  amu compound, the  $m/z = 226$  compound, and alkylated 3 and 4-ring species.