Dissolved Stable Barium and Silicon Isotopes in the Congo River Plume

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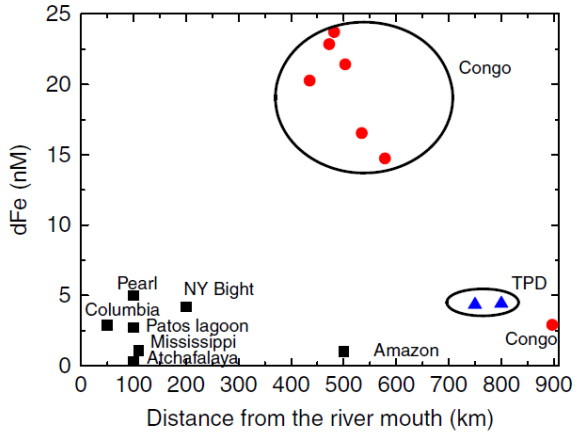
Stable Ba isotopes have recently been suggested as a new tracer to investigate the biogeochemistry of Ba in marine environments. They provide information on non-conservative Ba behavior and barite cycling including both formation and dissolution of particles during lateral and vertical transport. Stable Si isotopes have been largely used as a tracer of nutrient utilization, water mixing and continental inputs. Combining Ba isotopes and Si isotopes can shed light on different biogeochemical and physical processes in complex marine systems.

Previous studies have shown that the influence of the Congo River margin on surface Fe concentrations is evident over 1000 km from the Congo outflow (Vieira et al., 2020). A recent study on Nd/Hf isotopes and rare earth elements (REE) also found that they can be traced for more than 1000 km from the Congo mouth (Rahlf et al., submitted). The aim of this project is to combine stable silicon and barium isotopes to resolve various estuarine processes in the Congo River Plume including water mass mixing, nutrient utilization, and particle adsorption-desorption, as well as to trace additional continental sources of nutrients, waters and metals. The samples were taken along full water column sections during RV Meteor cruise M121 (GEOTRACES cruise GA08) in 2015.



Comparison of dFe concentrations vs. distance from the river mouth in global riverine systems. (Fig. 3, Vieira et al., 2020)

Reference:
Vieira, L.H., et al. Unprecedented Fe delivery from the Congo River margin to the South Atlantic Gyre. Nat Commun 11, 556 (2020).
Rahlf, P., et al. Dissolved neodymium and hafnium isotopes and rare earth elements in the Congo River Plume: Tracing and quantifying continental inputs into the southeast Atlantic. Submitted.