

Rare Earth Elements in the Coral and Solomon Seas (Pandora-GEOTRACES)

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When flowing through the Coral and Solomon Seas, water masses entering in contact with the coasts undergo dynamical transformations as well as nutrient and trace element enrichments. This eventually impacts the productivity of the Equatorial Pacific Cold Tongue and therefore its climatic role. Trace elements and their isotopes injected from these “boundary processes” also provide key information on mixing processes. The main objectives of the PANDORA cruise (July-Aug 2012, R/V Atalante; GP12 GEOTRACES section www.geotraces.org) were 1) to assess surface and subsurface circulation in the Solomon Sea and in the straits connecting that sea with the equatorial circulation; 2) to evaluate water mass transformations and mixing; 3) to better document land-ocean processes. To this extent, Rare Earth Elements (REE) and Nd isotopes are pertinent tracers of water mass transformations and possible land-ocean inputs.

Here, we present the first dissolved REE profiles in the North Caledonian and North Vanuatu Jets (at the entrance of the Coral Sea), which we compare to the dissolved REE data measured at the exits of the Solomon Sea. In order to better identify potential Eu anomalies in the REE normalized patterns, we developed a multi-spike isotopic dilution method. Replicates are reproducible within 1%. First data in the north of the Coral Sea show nutrient like profiles, with Nd, Eu and Yb concentrations similar to that found in the literature (concentrations at mid-depth are 10, 0.56 and 5.3 pmol/l respectively). Dissolved REE concentrations and patterns will be shown and discussed with regards to the dynamic and land-ocean processes characterizing this area.