Distribution of ^{230}Th and ^{232}Th along the Bonus GoodHope section in the SouthEast Atlantic Ocean

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Dissolved concentrations of ^{230}Th and ^{232}Th have been measured in seawater on 5 profiles along the Bonus GoodHope (GEOTRACES/IPY) section in the SouthEast Atlantic Ocean.

Most dissolved ^{232}Th concentrations range from 5 to 98 pg•kg^{-1}. There is a genral increase of the ^{232}Th concentration from the surface to the deep waters. A strong ^{232}Th gradient exists between the stations located off the African continents (where stong ^{232}Th inputs occur) and the stations located in the middle of the section. A distinctly high ^{232}Th concentration of 283 pg•kg^{-1} is found at the bottom of the station closest to the African coast, likely linked to an input from the sediment.

Dissolved ^{230}Th concentrations range from 0.7 to 36.4 fg•kg^{-1}. The ^{230}Th data of the Bonus GoodHope section compare well with the ^{230}Th data of ANT III section obtained near the Polar Front [1]. There is a general increase of the ^{230}Th concentration with depth. In the Cape basin, concentrations increase linearly, with a lower scavenging rate north of the subtropical front than south of it. At the Polar front level, a distinctly low ^{230}Th concentration is found in the deepest sample (9 fg•kg^{-1} at 4300 m against 15 fg•kg^{-1} at 3048 m) suggesting occurrence of boundary scavenging. South of the Polar Front, upwelling of deep waters create non linear profiles.

Particulate samples collected with in situ pumps are under process for the determination of ^{230}Th and ^{232}Th.

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Dissimilatory Sulfate Reduction in Hypersaline Environments: What is regulating sulfate uptake?

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Microbes in engineerd systems such as wastewater treatment facilities and mine tailings are often subjected to extremes of salinities. Little is known; however, about the activity and survival mechanisms of sulfate reducers in such extreme environments. Hypersaline pans, a prototype for engineered systems, are used here to understand sulfate uptake and regulatory mechanisms among sulfate reducers.

Thermodynamic and kinetic parameters for dissimilatory sulfate redution (DSR) were quantified in five hypersaline coastal saltpans located in South Africa. Compared to normal marine environments, salinity and sulfate concentration at the studied saltpans was higher by up to 10 and 20 times, respectively. Determined apparent activation energies (28 – 62 kJ/mol) and Q_{10} values (2.0 – 2.3) for DSR suggest no gross physiological adaptations in bacteria, such as changes in membrane structure, to temperature.

Sulfate uptake affinity, quantified in terms of apparent half-saturation concentration (K_s); however, indicates adaptation with respect to high ionic status of the saltpans. The K_s values (64 – 780 mM) for sulfate reduction determined for the first time from hypersaline environments are two to three orders of magnitude larger than those determined for normal marine ecosystems. This indicates that in hypersaline environments there exists a third transport mechanism, which attenuates even the low-affinity system observed among marine sulfate reducers. We propose that the observed extremely low-affinity, high accumulation system is a consequence of increased regulation of sulfate uptake and accumulation because of adaptation mechanisms employed by halophiles to survive under extremes of salinity.

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