

## Barium excess as remineralization proxy in the Southern Ocean - Indian sector (SWINGS-GS02)

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The mesopelagic remineralization is a process that impacts the efficiency of the biological carbon pump in this region and needs to be better constrained, especially in the Southern Ocean which is an important area for carbon sequestration.

Excess particulate barium ( $Ba_{xs}$ ) corresponds to the biogenic Ba fraction estimated from total particulate Ba after the deduction of lithogenic Ba.  $Ba_{xs}$  is a useful indicator of the carbon remineralization processes and a tool to estimate remineralization fluxes.

In this study, we present water column profiles of  $Ba_{xs}$  along the GEOTRACES GS02 Section that took place in January-March 2021 in the Indian sector of the Southern Ocean. Several regions were investigated along the transect, from the South African margin, through the subantarctic islands (Marion-Prince Edward, Crozet, Kerguelen, Heard & Mc Donald) and the Fawn Trough.

Along the transect,  $Ba_{xs}$  values are generally low in surface waters and increase with depth to reach a value of approximately 200 pmol L<sup>-1</sup>. However, at certain locations,  $Ba_{xs}$  increase above that background value and reach a maximum of more than 600 pmol L<sup>-1</sup> in the mesopelagic zone (200–1000 m). For example, at the African margin, high  $Ba_{xs}$  values are observed near the margin then the values decrease away toward the open ocean. Similar trends are observed around the Marion-Prince Edward islands and the Kerguelen plateau. The North Antarctic Circumpolar Current Front (NACCF) and Subantarctic Front (SAF) also exhibit relatively high  $Ba_{xs}$  values in the mesopelagic zone. In these areas, high  $Ba_{xs}$  values (>200 pmol L<sup>-1</sup>) indicate remineralization. Nearly all vertical  $Ba_{xs}$  profiles displaying that the increases of  $Ba_{xs}$  are followed by a decline at greater depths,