

ANNUAL REPORT ON GEOTRACES ACTIVITIES IN INDIA
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Significant studies are continuing under GOTRACES programme in India. Complete clean sampling system is working fine which was successfully used during sampling section GI03 during March – May, 2013. We are carrying out measurements of key parameters of GEOTRACES in these samples using FIS, Q- and MC-ICP-MS in the samples collected last year in GEOTRACES section GI03. We have undertaken a major GEOTRACES cruise onboard *Sagar Kanya* to cover significant part of the Indian Ocean including GI01 and GI02 during March – May 2014. The cruise started from Chennai and its first part terminated at Mauritius after sampling the Bay of Bengal and Indian Ocean. During second part it is moving from Mauritius towards Goa. In its route it has also sampled in hydrothermal regions. For the first time, we are measuring dissolved Fe, Al, Mn and Zn onboard using FIS. In addition, Mo and Si isotopes are being studied in the Bay of Bengal and the Arabian Sea and in several Indian estuaries. Few results are documented below:

Si isotopes in the Bay of Bengal: The dissolved Si concentration and $\delta^{30}\text{Si}$ have been measured in water column of the Bay of Bengal (BoB) along the 87°E transect (GI01 section of International GEOTRACES Program) to explore its biogeochemistry, particularly the role of internal cycling through particle–water interactions and lateral Si transport by water mixing to the bay. The dissolved Si concentration and $\delta^{30}\text{Si}$ in the water column of the BoB vary from ~ 0.6 to ~ 152.5 $\mu\text{mol/kg}$ and ~ 1.2 to ~ 3.6 ‰, respectively. The depth profiles of dissolved Si concentration show lower abundances in shallow waters (depth ~ 0 – 100 m) and an increase in deeper depths, while the pattern reverses in case of $\delta^{30}\text{Si}$. Apart from different water masses, the discharge from the Ganga–Brahmaputra river system, intrusion of high saline waters from the Arabian Sea and particle–water interactions seem to influence the observed $\delta^{30}\text{Si}$ in the water column of the Bay of Bengal.

Lighter Mo isotope in the Bay of Bengal: Dissolved Mo isotope composition in water columns of the Arabian Sea and the Bay of Bengal are analysed to assess the impact of (i) perennial oxygen minimum zone (OMZ) present in both the basins and (ii) large riverine particulate flux. $\delta^{98}\text{Mo}$ in the open ocean water of the Arabian Sea and the Bay of Bengal indicates conservative behavior with negligible variation with depth, averaging 2.41 ± 0.05 ‰ with no impact of water column suboxic condition on the Mo isotope composition. Notable exception is the northern Bay of Bengal in the proximity to the mouth of the Ganga (Hooghly) river, which displays quite different $\delta^{98}\text{Mo}$, from 0.9 ‰ at surface with salinity 32.4 to 1.9 ‰ at bottom with salinity 35, much lower than the open ocean value. The lighter Mo observed in the water column near river mouth could be due to its supply from release of lighter Mo from particulates due to change in oxidation state.

Publications

- Singh S. P., Singh S. K., Bhushan R., Dissolved Boron in the Tapi, Narmada and the Mandovi Estuaries, the Western Coast of India: Evidence for Conservative Behavior, *Estuaries and Coasts*, 2013
- Rahaman W., Goswami V., Singh S. K. and Rai V. K., Molybdenum isotopes in two Indian estuaries: Mixing characteristics and input to oceans, Under revision, *GCA*, 2014.

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