Distributions of dissolved Zinc in the Indian Ocean

VENKATESH CHINNI[1] SUNIL KUMAR SINGH[2]

[1]Physical Research Laboratory, venkatesh@prl.res.in
[2]Physical Research Laboratory, sunil@prl.res.in

Zinc is considered as a key trace element for primary production in the seawater alongwith Iron. It is involved in several metabolic processes in the marine organisms. As a part of GEOTRACES-INDIA programme the Indian Ocean, a least explored ocean in terms of understanding processes controlling the trace elemental distributions, has been sampled during the cruises SK-304, SK-311 and SK-324 to understand their distributions and relation with respect to the major nutrients. DZn was measured using flow injection system by fluorometric method. Seawater was preconcentrated on AF Chelate 650 M IDA resin of column length 4 cm (approx. 200 µL of Resin) at a pH of 5.10 ± 0.05 to retain Zn.

Overall, Zn concentrations varied from 0.21 nM – 11.5 nM from surface to deep waters in the Indian Ocean. A strong linear correlation has been observed between Zinc and Silicate in all the stations. Contrasting slopes of Silicate and Zn is noticed in the Andaman Sea, Bay of Bengal and Arabian Sea. A slope of 0.058 has observed in the north-eastern Indian Ocean whereas a relatively lower slope of 0.049 is noticed in the north-western Indian Ocean. The Andaman Sea receives waters from Bay of Bengal through 10° prepares channel which homogenises the deeper waters of Andaman sea by rapid vertical mixing. This feature is also observed in the context of slopes of Si and Zn. Decoupling of Zn and Si in the oxygen minimum zone (having O_2 concentrations less than 50 µM) has been observed. Relative to Silicate, Zinc concentrations are lower particularly in the OMZ zone. This feature has been observed consistently with respect to the low oxygen waters in the other oceanic basins also. Zinc seems to be removed in the OMZ waters by consistent mechanism. The proposed mechanism for this removal could be the formation of Zinc sulphides in OMZ waters. Further studies are required to confirm this removal process in the oxygen deficient zones of the world oceans to better understand the processes controlling the distributions of Zinc in the oceanic waters.