

## **Dissolved Organic Carbon (DOC) and Dissolved Organic Nitrogen (DON) variability as a function of fresh water flux and productivity in the Northern Indian Ocean.**

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Dissolved Organic Carbon (DOC) being a major reservoir of carbon in world ocean has great potential for impact on the carbon cycle in the ocean. DOC accumulation in the surface water column reflects the integrated biological productivity over a long period of time. We find unusual DOC concentration gradients in the water column of the northern Indian Ocean basin, which is generally not observed in other oceanic basins. The Bay of Bengal receives huge amount of fresh water flux and sediment, whereas the Arabian Sea experiences very high biological productivity due to seasonally reversing monsoon systems. The Bay of Bengal receives almost three times higher DOC than the Arabian Sea despite being less productive. Since DON is related to DOC cycle, proportionally higher DON is observed in the northern Indian Ocean compared to other oceanic regions. The northern Bay of Bengal shows highest concentration of DOC with surface DOC and DON concentration ranging from 75-100  $\mu\text{M}$  and 6-8  $\mu\text{M}$  respectively. Enhanced DOC concentration in subsurface waters of the bay is due to the remineralisation of sinking organic matter along with huge flux of sediment from Ganga-Brahmaputra rivers having very high DOC and POC concentrations ( $\sim 363 \mu\text{M}$  and  $\sim 170 \mu\text{M}$  respectively). The fraction of oxygen consumed for DOC mineralisation can be evaluated by the relation between Apparent Oxygen Utilisation (AOU) and DOC. The oxygen consumption related to DOC remineralisation has been calculated to be  $\sim 18\%$  in the Bay of Bengal. The water column stratification in the surface Bay of Bengal is due to enormous fresh water flux, surface productivity and export of DOC from surface ocean and has implications to the controlling factors of latitudinal variation in DOC.