

Geochemical and isotopic investigation of particulate organic carbon in the Ganga (Hooghly) River estuary: Source composition or estuarine degradation?

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Understanding of sources and degradation of organic matter (OM) in the estuaries is important in the context of the global carbon cycle. The present study aims at the determination of sources of particulate organic carbon (POC) in the bed sediments of the Ganga (Hooghly) River estuary and assess the estuarine degradation of POC.

C_{org} concentrations and $\delta^{13}C_{POC}$ depict significant positive correlation with the Al/Si ratio. Such an observation is suggestive of the role of hydrodynamic sorting in regulating the distribution of organic carbon such that the organic carbon sourced from the phytoplankton OM is associated with the finer fractions of bed sediments. The sorting effect seems to have masked the signature of organic carbon degradation if any.

The predominance of higher chain n-alkanes in the POC of the pre-monsoon period is suggestive of a larger contribution of the terrestrial source, whereas C₁₉ n-alkanes dominance in the monsoon period indicates a significant phytoplankton source for OM. Compared to the pre-monsoon and monsoon periods, the post-monsoon samples have higher abundances of C₁₈ and C₁₆ n-alkanes and low values of CPI₂₅₋₃₃ and CPI₁₅₋₂₁. These observations together indicate a greater degree of bacterial degradation in the post-monsoon period.

The results of this study bring to light the seasonal variability in the sources and degradation of POC in the Hooghly River estuary and are consistent with our earlier finding that organic carbon degradation is an ongoing process in the estuary¹.

References

[1] S. Samanta *et al.* (2015): GCA **165**, 226-248.