

Degradation of organic matter in the surface sediments of the Ganga River estuary, India

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The cycling of organic matter (OM) in estuaries has implications for the delivery of carbon to the oceans and the atmosphere. A study has been initiated to understand the processes that cause transformation of OM in the surface sediments of the Ganga (Hooghly) River estuary. Rock-aval pyrolysis and measurements of $\delta^{13}\text{C}_{\text{org}}$ were carried out in the sediment samples that were collected in the estuarine stretch beginning from the freshwater regime at Kolkata up to the mouth of the river at Gangasagar.

The concentrations of total organic carbon (TOC), residual carbon (RC) and RC/TOC show significant negative correlation with oxygen index (OI). Furthermore, the samples with lower TOC, RC and RC/TOC are characterized by higher values of OI and hydrogen index (HI). It is also observed that higher OI and HI values are generally associated with lower $\delta^{13}\text{C}_{\text{org}}$ values. Together, these results and observations suggest that degradation of OM is an important process in the Ganga River estuary. This inference is consistent with the finding of Samanta *et al.* [1] that the degradation of organic carbon contributes significantly to the DIC in the Ganga River estuary. The negative covariation trend that is observed between RC/TOC and OI in this study is in contradiction of the positive correlation that was reported by Carrie *et al.* [2] for organic matter and compounds that are likely unaltered. We speculate that higher values of HI and OI are caused by progressive loss of labile OM (presumably S1) from the sediments that may be characterized by higher values of $\delta^{13}\text{C}_{\text{org}}$ compared to the non-labile fractions.

[1] S. Samanta *et al.* (2015) *GCA* **165**, 226-248. [2] J. Carrie *et al.* (2012) *Org. Geochem.* **46**, 38-53.