

## **Dissolved Organic Iodine: Role in the Marine Geochemistry of Iodine**

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The first systematic study on the distribution of iodate, iodide and dissolved organic iodine (DOI) in an estuarine environment was conducted in the James River/Southern Chesapeake Bay of Virginia. Samples of surface water were collected along the James River estuary (June, 1996), in the Southern Chesapeake Bay (June, 1996 and May, 1995), to which the James River drains into, and in the adjoining Atlantic at the mouth of the Bay (May, 1995) for the determination of iodate, iodide and DOI. In the riverine end member in the James River (salinity or  $S = <0.1$ ), the concentration of total dissolved iodine was  $0.121 \mu\text{M}$ , of which 0%, 56% and 44% were iodate, iodide and DOI respectively. Thus, DOI can be a major species of dissolved iodine in river waters. At higher salinities, DOI, iodide and iodate were successively the dominant form of total dissolved iodine at  $0.1 < S < 20$  in the James River estuary,  $20 < S < 30$  in the Southern Chesapeake Bay and  $S > 30$  at the Bay mouth respectively. The contribution of DOI to total dissolved iodine increased approximately linearly with decreasing salinity from 10% at the Bay mouth to 80% in the headwaters of the James River. The contribution from iodide increased with increasing salinity and reached a maximum of 63% at  $S=25$ . At  $S > 25$ , the contribution of iodide dropped with further increase in salinity to 44% at the Bay mouth. Iodate was absent at  $S < 15$ . At  $S > 15$ , its contribution increased with increasing salinity to 45% at the Bay mouth. Total dissolved iodine was linearly related to salinity in the James River estuary/Southern Chesapeake Bay in June, 1996 and the Southern Chesapeake Bay/Bay mouth in May, 1995. However, while total dissolved iodine behaved conservatively, ( $[\text{IO}_3^-] + [\text{I}^-]$ ), or total inorganic iodine, was removed during estuarine mixing probably as a result of a conversion of inorganic iodine to DOI. Iodate was removed in both the James River estuary and the Southern Chesapeake Bay while DOI was produced in both cases. Iodide was removed in the James River estuary and produced in the Southern Chesapeake Bay. Thus, in the James River estuary, iodate and iodide were converted to DOI. In the Southern Chesapeake Bay, iodate was converted to DOI and iodide.