

Variations in dissolved and particulate carbohydrate species across the river-lake interface in southwest Lake Michigan

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Water samples were collected from stations across the river-lake interface from the Milwaukee River to open Lake Michigan during 2013 for the measurements of carbohydrate species, including monosaccharides (MCHO), polysaccharides, both HCl-hydrolyzable (HCl-PCHO) and HCl-resistant polysaccharides (HR-PCHO), and particulate carbohydrates (Par-CHO), to examine their seasonal and spatial variations. Concentrations of all carbohydrate species decreased from river to open-lake stations, showing significant riverine sources to Lake Michigan. At open-lake stations, subsurface maximum and bottom elevated concentrations of PCHO and Par-CHO were observed during certain sampling periods, suggesting the influence of biological production on subsurface layer and the contribution of sediment resuspension or benthic processes to PCHO in bottom waters. HR-PCHO predominated in surface water PCHO in open-lake waters during spring and in river waters during September, indicating in-situ production of HR-PCHO. Dissolved organic carbon (DOC) co-varied with total dissolved carbohydrate (TCHO) in river and coastal waters, but poorly correlated in open-lake waters, showing different source terms and transport mechanisms for DOC and TCHO across the river-lake interface.