

Application of organic petrology and organic geochemistry in characterizing the pollution in recent sediments - an example from the Halifax Harbour, Nova Scotia

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Selected organic-rich recent sediments (depth: 0-15 cm from the top sediment surface) from Halifax Harbour were chosen to characterize various natural and anthropogenic organic components by using organic geochemical parameters which are normally used for the study of coal, petroleum source rock and crude oil.

The analyzed samples have more than 3% total organic carbon. More than 75% of this carbon is not derived from a natural source and can easily be traced back for its anthropogenic source which pollutes the recent shallow marine environment at the Halifax Harbour. Organic petrology (maceral composition, reflectance, and spectral fluorescence) and biomarker

geochemistry (triterpane, sterane and PAH's) revealed the presence of spilled crude oil (presently biodegraded), refinery products (diesel oil), dumped Nova Scotian bituminous coal, carbonization residues (fly ash and coke) from a power plant and coke oven plant, other factory dumped PAH's, and human fecal products. Both land plants (especially cellulose-rich barks, lignin-rich stems, charcoal, and pollens) and marine algae are the common constituents for natural carbon source. Abundant algal growth is possibly related to nutrient-rich (nitrogen compounds) human waste in the harbour water. Nonmarine plants which are being transported by rivers into the harbour, are converted to gelified huminite macerals.