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Spectroscopic characterization of aquatic dissolved organic matter from two rivers of Hungary

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Dissolved organic matter (DOM) is one of the largest pools of organic carbon in aquatic ecosystems, therefore its dynamics have a great influence on carbon cycling on local to global scales. Terrestrial ecosystems are the primary source of freshwater dissolved organic matter, leaching of rainwater through soils carries these compounds to rivers and lakes. In the biogeochemical cycle, the DOM is considered as a material serves carbon and energy for biota and controls levels of dissolved oxygen, nutrients, numerous trace metals, and acidity. Addition to physico-chemical and biological factors of the water, the composition and chemical nature of DOM are highly depend on the sources of organic matter (allochthonous versus autochthonous).
Optical measurements of absorbance and fluorescence are frequently used to evaluate DOM composition and quality. Common parameters and indices derived from optical data include the absorbance in UV/Vis or fluorescence intensity at a specific wavelength, absorbance ratios of different wavelengths or carbon-normalization of optical properties.
In this study, different spectroscopic properties were measured from two river samples of Danube river and Kemence creek. We used UV-Vis spectroscopy to determine E4/E6, E2/E3 ratios and SUVA254 of the DOM samples for assessing the amount of aromatic compounds and the degree of polymerization; ATR FT-IR spectroscopy was practised to identify the functional groups of organic matter isolated from the two selected water samples; and with help of fluorescence spectroscopy and fluorescence indices, such as humification index (HIX), fluorescence index (FI) and biological index (BIX), we can determine the relative degree of humification and autotrophic productivity of fluorescent DOM, respectively.

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