Resolving the variability of dissolved organic matter fluorescence in a temperate estuary and its catchment using PARAFAC analysis

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ABSTRACT: Excitation emission matrix fluorescence spectroscopy combined with PARAFAC analysis provides a fast and effective method of characterizing the fluorescent fraction of dissolved organic matter (DOM). Fluorescence measurements can be used as a tracer for quantitative and qualitative changes occurring in the DOM pool as a whole. An earlier study found that the fluorescence signal could be modeled by five fractions. This study presents an analysis on a considerably larger data set (>1,200 samples) resulting from a 1-yr sampling program in Horsens Estuary, Denmark. Eight fluorescent fractions were identified. Four biogenic terrestrial, two anthropogenic, and two protein-like fractions were identified. Analysis of covariation between the components identified source-specific fractions and the presence of common factors controlling the composition of terrestrial DOM exported from different catchments.