



Different fractions of fluorescent organic molecules in the Baltic Sea surface layer

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Sea surface films are created by organic matter from sea and land sources and they dissipate due to loss of material at the sea surface, including microbial degradation, chemical and photo chemical processes, and loss due to absorption and adsorption onto particulates. However the surface microlayer is almost ubiquitous and cover most of the surface of the ocean, even under conditions of high turbulence. A unique structure of the energy levels of the organic molecules results in a unique spectral distribution of the light intensity absorbed and emitted by the molecules. Hence, their absorption and fluorescence spectra may allow the identification of the sources of organic matter.

Several absorption ($E2:E3$, S, SR) and fluorescence (fluorescence intensities at peaks: A, C, M, T, the ratio $(M+T)/(A+C)$, HIX) indices help in describing the changes in molecular size and weight as well as in composition of organic matter.

Investigations, presented herein, included the open and coastal regions of the Baltic Sea. The fluorescence and absorption measurements of the samples collected from a surface microlayer (SML) during three research cruises in the Baltic Sea were carried out for raw and filtrated samples. The results allowed to assess (i) decreasing of two terrestrial components (A and C) contribution with increasing salinity and increasing of in-situ produced components (M and T) with salinity, (ii) component T revealed the biggest relative changes with the changes of salinity, (iii) the ratio $E2:E3$ points to discrete changes in molecular weight/size, effected by photobleaching, while (iv) HIX index reflects the humification/condensation processes and (v) the filtration process reveal the more surface structures in the coastal zone, with the less saline waters, less than 7.

Surface active molecules (surfactants) may affect the penetration depth of solar radiation or gas exchange hence research on the influence of surfactants on the sea surface properties become an important task, especially in coastal waters and in vicinity of the river mouths or in less urbanized and more natural and pristine region, like Arctic.