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Elli Pitta, Christina Zeri, Maria Tzortziou, George Mousdis, Michael Scoullos

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Elli Pitta[a,d], Christina Zeri[a*], Maria Tzortziou[b], George Mousdis[c], Michael Scoullos[d]

[a]Institute of Oceanography , Hellenic Centre of Marine Research, 19013 Anavyssos, Greece

[b]Department of Earth and Atmospheric Sciences, The City College of New York, City University of New York, New York, New York

[c]Institute of Theoretical and Physical Chemistry, National Hellenic Research Foundation, Vass. Konstantinou 48, 11635, Athens, Greece

[d]Laboratory of Environmental Chemistry, Dept of Chemistry, University of Athens, Panepistimioupolis, 15784, Zografou, Greece

[*]Corresponding author. chris@hcmr.gr

Abstract

The Dardanelles Straits – North Aegean Sea mixing zone is the area where the less saline waters of Black Sea origin supply organic material to the oligotrophic Mediterranean Sea. The objective of this work was to assess the seasonal dynamics of dissolved organic matter (DOM) in this region based on the optical properties (absorbance and fluorescence). By combining excitation-emission fluorescence with parallel factor analysis (EEM-PARAFAC), four fluorescent components were identified corresponding to three humic – like components and one amino acid – like. The latter was dominant during all seasons. Chromophoric DOM (CDOM) and dissolved organic carbon (DOC) were found to be strongly coupled only in early spring when conservative conditions prevailed and the two water masses present (Black Sea Waters-BSW and Levantine Waters –LW) could be identified by their absorption coefficients (a_{300}) and spectral slopes $S_{275-295}$. In summer and autumn the relationships collapsed. During summer two features appear to dominate the dynamics of CDOM: i) photodegradation that acts as an important sink for both the absorbing DOM and the terrestrially derived fluorescent humic substances and ii) the release of marine humic like fluorescent substances from bacterial transformation of DOM. Autumn results revealed a source of fluorescent CDOM of high molecular weight, which was independent of water mass sources and related to particle and sedimentary processes. The removal of the amino acid-like fluorescence during autumn provided evidence that although DOC was found to accumulate under low inorganic nutrient conditions, dissolved organic nitrogenous compounds could serve as bacterial substrate.

Keywords

Chromophoric Dissolved Organic Matter (CDOM); Parafac model; spectral slope; fluorescence indices; carbon specific absorbance; Mediterranean Sea