

Kinetics of the multilinear regression parameters between CP/PARAFAC components and mixing composition dissolved organic matter from wastewater treatment plants in coastal zone.

El Nahhal Ibrahim^{a*}, Redon Roland^a, Raynaud Michel^a, El-Nahhal Yasser^b, Mounier Stephane^a

^a Université de Toulon, Aix Marseille Univ, CNRS, IRD, MIO - CS 60584, 83041 TOULON CEDEX 9, France

^b Department of Environmental and Earth Sciences Faculty of Science, The Islamic University-Gaza Palestinian Territory, P.O Box 108

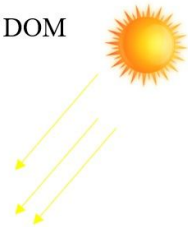
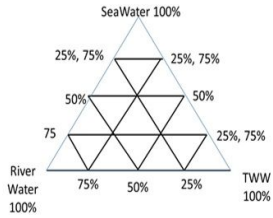
*Corresponding author : elnahhal.i@gmail.com (I.Y.EL-Nahhal)

Abstract : Living in the anthropocene age, anthropogenic activities have done major changes to our global system. Human activity (agriculture, industry, urbanization) puts pressures on coastal zone altering dissolved organic matter quality. The fluorescence signal of the anthropogenic dissolved organic matter in the coastal zone is not well characterized and evaluated in the literature. In the present study, Laboratory mixing experiments several sunlight irradiation experiments were conducted with several modes of filtration of three endmember mixing components (River water, Sea water, wastewater treatment plant effluent discharge) with the objective of finding a specific signal of fluorescence which could be a tracer of the anthropogenic dissolved organic matter through using the fluorescence spectroscopy excitation emission matrices (EEMs) coupled with the chemometric statistical technique of Parallel Factor analysis CP/PARAFAC. Three CP/PARAFAC components were found and multilinear regression of CP/PARAFAC components contribution depending on mixing composition were done and was excellent between C1 and C2 as a function of river water percent and sea water percent in solution and it was not good for C3. Kinetics of decreasing contribution versus irradiation time were investigated. Second order Kinetics were found for C1 and C2. Distinction between fluorescence signal of endmembers was undoable. Wastewater treatment plant endmember after photodegradation was highly predominant.

Graphical abstract :

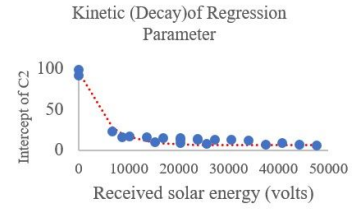
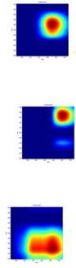
Is there any specific fluorescence signal of anthropogenic FDOM in Coastal zone after solar irradiation ?

3 endmember mixing of DOM



Multilinear regression:

$$C^*_i = A^{WW}_{i,0} + A^{WW}_{i,1} \cdot f_{SW} + A^{WW}_{i,2} \cdot f_{RW}$$



Wastewater treatment plant coefficient is predominant
-No special fluorescence signal for any of the three endmembers