



Degradation-induced signature on the molecular size distribution of pore water dissolved organic matter under oxic and anoxic conditions

Morgane Derrien and Jin Hur

Department of Environment and Energy, Sejong University, Seoul, Korea, Republic Of (mderrien@gmail.com)

One of the main processes driving the changes in amount, composition and properties of the organic matter in the water column is the biodegradation. In sediments, processes of degradation of organic matter lead to a release of the dissolved organic matter into the pore water by hydrolysis and depolymerization of particulate organic matter (Schmidt et al. 2017). Hence, the pore waters represent a reactive zone between the sediment and surface water closely linked to the biogeochemistry of the substrate and still poorly characterized under diagenetic processes. In this study, we examined the DOM alterations in pore water during controlled degradation experiments in two different conditions e.g., aerobic versus anaerobic for ideal mixing of two end members via fluorescence and absorbance spectroscopy and size exclusion chromatography. Briefly, two end-members (e.g., soil and algae), which represent the most common and contrasted sources in the aquatic environment, were mixed in different ratios and then incubated under two different conditions i.e. oxic and anoxic in the dark at 25°C for 60 days. Pore water samples were collected on day 0, and 60, with day 0 corresponding to the day where the samples were inoculated.

The results allow us, first, to understand (i) which molecules or groups of molecules are the most affected by the biodegradation processes and the associated mechanisms, and then, to state on (ii) the potential effect of the absence and/or occurrence of oxygen on the molecular distribution during degradation, and finally to conclude (iii) the prevalent effect on the molecular distribution along degradation processes: the ratio of end-member or the oxygen occurrence.

Schmidt, F., Koch, B.P., Goldhammer, T., Elvert, M., Witt, M., Lin, Y.-S., Wendt, J., Zabel, M., Heuer, V.B. and Hinrichs, K.-U. (2017) Unraveling signatures of biogeochemical processes and the depositional setting in the molecular composition of pore water DOM across different marine environments. *Geochimica et Cosmochimica Acta* 207, 57-80.