

## Characterization of Whole Porewater Dissolved Organic Matter by $^1\text{H}$ NMR

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We present the development of a novel approach to characterize dissolved organic matter (DOM) in whole porewater samples from marine sediments using solution state nuclear magnetic resonance (NMR) techniques. DOM is a key intermediate in microbial remineralization of organic matter, but only a small percentage of this complex pool has been fully characterized. Structural analysis of DOM has historically required sample preconcentration typically by ultrafiltration or solid phase extraction, which at present do not allow isolation of the total DOM pool.

Solution state NMR may offer a novel and powerful approach to the analysis of whole porewater DOM containing the entire seawater matrix. We have tailored and applied advanced water suppression methods [1] to whole DOM samples collected from estuarine and continental margin sediments. We aim to explore the utility of such NMR techniques to investigate the composition of DOM as a function of sediment depth. A secondary goal is to utilize homo- and heteronuclear multidimensional techniques for the structural elucidation of organic matter species.

The key challenges met by this approach are the analysis of high salinity, conductive samples without excess line broadening and loss of resolution. Water suppression methods, which are effective in non-saline aqueous media, must be adapted for high-salt samples. We present the results of these methodological developments and discuss our approach towards our goal of linking the chemical identity of DOM to organic matter remineralization.

[1] Lam & Simpson (2008) *Analyst* **133**, 263-269.