Sediment pore water DOM characterization during anaerobic degradation (Amazon, Brazil)

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Dissolved organic matter (DOM) represents one of the largest active carbon pools, and also one of the most complex mixtures of organic molecules on Earth [1]. In addition, organic matter contained in lake sediments is a relevant carbon source for many degradation processes, including aerobic and anaerobic decomposition. The Amazon basin covers an area of $6 \cdot 10^6$ km^2 and transports up to 40 Tg of carbon to the Atlatic ocean every year (most of it as dissolved carbon) [2]. Although DOM plays an important role in the transfer of energy and matter in freshwater ecosystems, many studies have used merely bulk parameters, such as organic carbon and nitrogen mass balance, as an indicator of organic matter quality and lability [3].

Following a study of Amazon basin riverine SPE-DOM [4], we have used electrospray ionization FT-ICR mass spectrometry [5] to trace changes in SPE-DOM composition from sediment pore water of Amazon Lakes (Rio Negro, AM) during experimental anaerobic incubation. Rio Negro is characterized by a high level of dissolved humic substances. CH_4 production rates ranged between 1.0 and 5.6 nmol d^{-1} g_{dw}^{-1}, whereas CO_2 production ranged between 16.1 and 32.6 nmol d^{-1} g_{dw}^{-1}. Changes in SPE-DOM molecular composition during experimental anaerobic degradation were significant, and included loss of aliphatic CHNO and CHOS compounds whereas more unsaturated CHO compounds were formed. Molecular characterization of SPE-DOM might be valuable to determine the greenhouse gas formation potential of organic matter.

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