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ACCEPTED MANUSCRIPT

Identification of organic compounds in ocean basement fluids

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ABSTRACT We have analyzed the dissolved organic carbon, OC, in ocean basement fluids using Fourier Transform-Ion Cyclotron Resonance-Mass Spectrometry (FT-ICR-MS). The compounds identified at the two sites, near the Juan de Fuca and Mid-Atlantic Ridges (North Pond), differ substantially from each other and from seawater. Compared to Juan de Fuca, North Pond organics had a lower average molecular weight (349 vs. 372 g/mol), 50% more identifiable compounds (2181 vs. 1482), and demonstrably lower average nominal oxidation state of carbon (-0.70 vs. -0.57). The North Pond fluids were also found to have many more N- and S-bearing compounds. Based on our data, the marine subsurface can alter the types of dissolved OC, DOC, compounds in seawater.

1. Introduction

Submarine hydrothermal systems are known to contribute significantly to global element fluxes (Kelley et al., 2002). Their impact on global OC cycles, however, is less

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