Geophysical Research Abstracts, Vol. 8, 10038, 2006
SRef-ID: 1607-7962/gra/EGU06-A-10038
© European Geosciences Union 2006

# Sulfur isotope biogeochemistry of microbial sulfate reduction by deep biospheres off Peru (ODP Leg 201)

**M.E. Böttcher (1,2)**, T.G. Ferdelman (1), B.B. Jørgensen (1), R. Blake (3), A. Surkov (3), G.E. Claypool (4)

(1)Max Planck Institute for Marine Microbiology, D-28359 Bremen, FRG, (2) Leibniz Institute for Baltic Sea Research, D-18119 Warnemünde, FRG, (3) Yale University, Department of Geology, USA, (4) 8910 W 2nd Avenue, Lakewood CO 80226, USA

Fifty-seven interstitial water samples from six sites (Ocean Drilling Program Sites 1225 to 1229, and 1231) of the eastern equatorial Pacific Ocean and the Peru margin were analyzed for the stable sulfur isotopic composition (34S/32S) of dissolved sulfate along with major and minor ions. With the exception of Site 1231, sulfate from the interstitial fluids (delta34S values up to +89L' vs. the SF6-based Vienna-Canyon Diablo troilite standard [V-CDT]) is found at depth to be enriched in 34S with respect to modern sea-water sulfate (delta34S of +21L'), indicating that microbial sulfate reduction (MSR) took place to different extents at all investigated sites. Deeper sediments at Sites 1228 and 1229 are additionally influenced by diffusion of a sulfate-rich brine that has already undergone sulfate reduction. The intensity of MSR depends on the availability of substrate (organic matter), sedimentation conditions, and the active bacterial community structure. Formation of isotopically heavy diagenetic barite at the sulfate-methane transition zone is expected at Sites 1227 (one front), 1229 (two fronts), and probably Site 1228. At Site 1231, the constant sulfur isotopic composition of sulfate and concentrations of minor pore water ions indicate that suboxic (essentially iron and manganese oxide based) diagenesis dominates and no net MSR occurs.