Geophysical Research Abstracts,
Vol. 10, EGU2008-A-06940, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-06940
EGU General Assembly 2008

Methane flux budget of the Batumi Seep area offshore Georgia, Black Sea

A. Reitz, M. Haeckel, I. Klaucke

Leibniz Institute of Marine Science (IFM-GEOMAR), Wischhofstr. 1-3, D-24148 Kiel, Germany (areitz@ifm-geomar.de)

The Batumi Seep area was geo-chemically and geo-acoustically intensively investigated during three cruises to the Black Sea, P317/4 with RV Poseidon (2004), TTR-15 with RV Prof. Logachev (2005), and M72/3 with RV Meteor (2007) performed within the framework of the GEOTECHNOLOGIEN project METRO, to assess the methane turnover in the surface sediments. The seep area is characterized by active gas bubble emission and the occurrence of near-surface gas hydrates as well as authigenic carbonates. The emanated gas is dominated by methane gas which is evident by (i) geo-chemical and stable isotope analyses of gas and pore fluids indicating a microbial origin of the methane and a shallow source of the fluids, (ii) pore fluid profiles that do not show evidence for significant upward fluid advection, and (iii) rapid consumption of sulphate within the uppermost 5-20 cm by anaerobic oxidation of methane (AOM). At each core location, the diffusive flux of methane needed to reproduce the observed sulphate flux was constrained with a 1-D transport-reaction model. The obtained methane fluxes were spatially integrated using appropriate interpolation and gridding algorithms (ArcView GIS). The hydro-acoustic backscatter intensities mapped in the Batumi Seep area (Klauke et al. 2006, Marine Geology 231, 51-67) correlate well with the 2-D statistical analyses. A first-order approach, assuming the one to one chemical reaction between sulphate and methane reveals a methane flux of about $6.4*10^5$ mol per year for the Batumi Seep area (ca. 0.5 km^2).