Geophysical Research Abstracts, Vol. 9, 06361, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-06361

Sediments hosting gas hydrates – oases for metazoan meiofauna?

S. Sommer, E. Gutzmann, J. Schnell, O. Pfannkuche
Leibniz Institute of Marine Sciences, IFM –GEOMAR, Germany
ssommer@ifm-geomar.de / Fax: +49 431-6002911 / Phone: +49 431-6002119

The effect of methane seepage from sediments hosting shallow gas hydrates on standing stocks, distribution patterns and $^{13/12}$C/$^{15/14}$N isotopic composition of meiobenthic organisms, with particular respect to nematoda and rotifera, was studied at about 800 m water depth at Hydrate Ridge, Cascadia subduction zone, off Oregon. The presence of shallow gas hydrates, buried only a few tens of centimetres below the sediment surface was indicated by extensive bacterial mats of chemosynthetic *Beggiatoa* sp. and clam fields of the bivalve mollusk *Calyptogena* sp. Mean abundances of meiobenthic organisms integrated over the upper 10 cm of the sediment were highest (1294 ind10cm^{-2}) at clam fields, closely followed by control sediments least affected by gas hydrates (1199 ind10cm^{-2}) and lowest in sediments covered with bacterial mats (762 ind10cm^{-2}). Average meiobenthic biomass was highest at the clam field site (262.2 μgC 10cm^{-2}), 210.4 μgC 10cm^{-2} at the control siteand very low in sediments covered with bacterial mats (61.4 μgC 10cm^{-2}). The dominant taxa of meiobenthic organisms at the investigated sites were nematodes and, unexpectedly, rotifera that are almost unknown from the deep marine habitat. In terms of abundance, it is a rotifera dominated meiobenthic community in gas hydrate influenced sediments whereas a nematode dominated community prevails in control sediments. The spatial distribution of nematodes and rotifers is likely to be determined by competition and/or predation, and by the high adaptive capability of rotifers to highly sulphidic and anoxic conditions. The stable C isotopic composition of nematodes clearly indicates the contribution of chemosynthetically produced organic carbon to their nutrition at the hydrate sites. However, estimates of the nematode population carbon turnover in relation to the bulk organic carbon supply indicate that in contrast to nematode communities in other cold seep environments the meiobenthos in the studied gas hydrate

containing sediments do not benefit from the excess availability of organic carbon via the chemoautotrophic food web. The tolerance to withstand severely deleterious environmental conditions caused by reduced oxygen availability and extremely high sulphide fluxes might be exhausted in nematodes and other meiobenthic organisms except rotifers.