^{226}Ra in pore waters of sediments from the Peruvian shelf (12°S)

P. REICHERT[1*], J. SCHOLTEN[2], V. LIEBETRAU[3], J. FIETZKE[3] AND A. EISENHAUER[3]

[1]Collaborative Research Center 754 (SFB754): Climate-Biogeochemistry Interactions in the Tropical Ocean, Kiel, Germany (preichert@geomar.de)

[2]Institute of Geosciences, Coastal and Continental Shelf Research, University Kiel, Germany (js@gpi.uni-kiel.de)

[3]GEOMAR Helmholtz Centre for Ocean Research Kiel (vliebetrau@geomar.de; jfietzke@geomar.de; aeisenhauer@geomar.de)

The naturally occurring radium (Ra) isotopes (^{223}Ra, $T_{½}$= 11.4 days; ^{224}Ra, $T_{½}$= 3.66 days; ^{228}Ra, $T_{½}$= 5.75 years; ^{226}Ra, $T_{½}$= 1600 years) are constantly produced by the decay of thorium (Th) present in all marine sediments. From the sediment pore waters Ra is transported through advective and diffusive processes into the water column. Ra behaves conservatively in sea water making it an ideal tracer to study ocean mixing processes, continental boundary exchange processes and submarine groundwater discharge.

Despite these widespread applications there is still little understanding of the processes controlling the release of Ra from the sediments. Here we present results of a ^{226}Ra pore water study which is based on five sediment cores recovered from the oxygen minimum zone of the Peruvian shelf in water depths between 80m and 1000m.

Sediment cores were cut into 1-3cm slices and pore water was separated from the sediments by pore water squeezing. The isotope ^{226}Ra was measured in ~ 25ml of pore water using MC-ICP-MS. Furthermore we determined the concentrations of ^{230}Th (total and excess) and of ^{226}Ra in the sediments. The ^{226}Ra activities in pore waters range between 0.3dpm/kg near the sediment surface and 3.4dpm/kg in the deepest part of the sediment core. These measured concentrations are higher than those found in bottom waters (^{226}Ra = 0.13-0.21 dpm/kg). The increasing ^{226}Ra activities with sediment depths result from the diffusive loss of ^{226}Ra from sediments. Highest ^{226}Ra concentrations were observed in sedimentary pore waters in the deep sea due to their higher ^{230}Th content.

In the presentation we will further discuss the influence of ^{230}Th concentrations (total and excess), sedimentation rates and oxygen content in bottom waters on the ^{226}Ra flux from the sediments.