Geophysical Research Abstracts, Vol. 8, 05598, 2006
SRef-ID: 1607-7962/gra/EGU06-A-05598

Environmental or biological records from bivalve shells (*Mytilus edulis*) of the Dutch Wadden Sea

D. Hippler (1), R. Witbaard (2) and A. Immenhauser (1,3)

(1) Faculty of Earth and Life Sciences, Free University Amsterdam, The Netherlands, (2) Netherlands Institute for Sea Research, The Netherlands, (3) Institute for Geology, Mineralogy and Geophysics, Ruhr-University Bochum, Germany (dorothee.hippler@falw.vu.nl, +31 20 5987365)

It is well known that skeletal hardparts of carbonate secreting organisms can provide a wealth of information about past environmental parameters. Consequently, the calcium-carbonate growth increments of mollusk shells represent high-resolution archives of the changing environmental conditions (seawater temperature, salinity etc.) the mollusk has experienced during its life time. However, it is becoming increasingly clear that shell composition is also controlled by biological factors. This implies that the environmental records are potentially obscured by ontogenetic factors. Biological factors become even more crucial when working with fossil carbonate materials. Here, it is essential to assess how well biological and/or environmental parameters are preserved in the shell geochemistry since the records may be altered subsequently by diagenetic processes.

For this purpose, the environmental and biological controls on various geochemical proxies (e.g. δ^{18}O, δ^{13}C, Sr/Ca, Mg/Ca) in the shells of modern *Mytilus edulis* are investigated. In particular, our study is focusing on the shell calcium-isotopic composition ($\delta^{44/40}$Ca) and its applicability as a new complementary temperature proxy. Field experiments with *M. edulis* are performed in the western Dutch Wadden Sea and are accompanied by *in situ* measurements of various seawater parameters. Over the last nine month, we have obtained a continuous time series of shell growth in a size range of *M. edulis* to get insight into biological and environmental controls of shell carbonate composition. By using the size range of mussels it is tried to see the effect of ontogeny (age-size relationship) on the chemical composition of the carbonate. The experimental set-up with continuous recording of environmental data can give a clue

when and which factor in the field is most important for shell growth. Furthermore, the results obtained from field experiments have the advantage that they incorporate natural environmental variability which is integrated within the shells. Seeing what this yields is particularly important in retrospective studies on basis of geological shell material since such shells will have lived in variable conditions as well. This is a contribution to EuroCLIMATE project 04 ECLIM FP08 CASIOPEIA.