



Proxy incorporation by *Mytilus edulis*: a field survey and *in situ* calibration

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The chemical and isotopic compositions of aquatic biogenic carbonates are influenced by the chemical and isotopic composition of the marine environment in which the carbonate was synthesised. Decennia of biogeochemical research on bivalve shells resulted in a large and well documented proxy record. These proxy records were thought to have a high potential for the reconstruction of paleoclimatic trends in coastal and estuarine environments. However, today their use is subject to several problems, since it is clear now that proxy archives can be set by several environmental parameters. Additional problems are the influences of physiological processes on the proxy incorporation in biogenic carbonates. Understanding these processes is crucial for an unambiguous interpretation of the proxy records. While previous work consists largely of *in situ* studies it appears today that a proper understanding of the controls on proxy incorporation calls for calibration via *in vitro* research. We investigated, in a first phase, the influences of environmental parameters and physiology on the incorporation of proxies in the soft tissue, hemolymph and shell of the blue mussel *Mytilus edulis* *in situ* at a well documented wave breaker site close to the mouth of the Scheldt River.

In a second phase, *in vitro* culturing experiments under controlled laboratory conditions were carried out, using *M. edulis* specimens translocated from the wave breaker site. Experiments were carried out in thermostated rooms at 8°C and 16°C and at salinities of 18‰ and 28‰. During these experiments mussels were fed with the

nanoflagellate *Tetraselmis suecica* under high and low supply regimes. Stable isotope composition ($\delta^{13}\text{C}$ and $\delta^{18}\text{O}$) and trace elemental content (Mg, Sr, Ba) of soft tissue and shell were analysed.

By combining these in-situ and in-vitro approaches a multi-proxy model is generated for the reconstruction of SST and SSS. First results will be presented and discussed.