Experimental diagenesis: Exploring the impact of differential fluid temperature and chemistry on biogenic aragonite

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Aragonitic shells of the molluscan bivalve *Arctica islandica* are widely used as climate archives. The shell of *A. islandica* yields information on environmental change and climate dynamics with life spans of individual specimen reaching up to three centuries (Schöne *et al* 2005[1]). Nevertheless, the assessment of fossil shells of *Arctica islandica* – and generally of any aragonitic endo- or exoskeleton – is limited due to post-depositional/post-mortem diagenetic overprint. The present study aims at a better understanding and quantification of diagenetic overprint of fossil shell material using *A. islandica* as a test organism.

The approach followed here was to expose pristine shell material to fluids representing meteoric, marine and burial aquatic environments under different experimental temperatures and durations. Before and after artificial alteration, shell material is characterized using different optical (thin section and cathodoluminescence microscopy, SEM) and geochemical ($\delta^{13}C$, $\delta^{18}O$, main and trace elements) techniques. Comparison of data obtained from recent unaltered and artifically altered as well as the direct comparison with naturally altered, fossil shell material sheds light on patterns, processes and threshold limits.

[1] Schöne, Bernd R. *et al*, *Palaeogeography, Palaeoclimatology, Palaeoecology* 228.1 (2005): 130-148."Climate records from a bivalved Methuselah (Arctica islandica, Mollusca; Iceland)."