Trace element records in aragonitic bivalve shells as environmental proxies

K. MARKULIN[1]*, M. PEHARDA[1], R. MERTZ-KRAUS[2], AND B.R. SCHÖNE[2]

[1]Institute of Oceanography and Fisheries, Šetalište Ivana Meštrovića 63, 21000 Split, Croatia (*correspondence: markulin@izor.hr, melita@izor.hr)

[2]Institute of Geosciences, Johannes Gutenberg University, Johann-Joachim-Becher-Weg 21, 55128 Mainz, Germany (mertzre@uni-mainz.de, schoeneb@uni-mainz.de)

Investigation of the geochemical composition of bivalve shells can provide information on changes in the marine environment occurring during the organism's lifespan. Three target bivalve species, locally abundant in the Adriatic Sea, were chosen, namely *Glycymeris pilosa*, *Callista chione*, and *Venus verrucosa*. Of these, *G. pilosa* has the longest lifespan, extending over more than 50 years, and thereby presents a potential decadal archive of environmental variability. The other two species, *C. chione* and *V. verrucosa*, are commercially important. Samples were collected alive by SCUBA diving in the North Adriatic Sea, near Barbariga, Istria. Growth increments in these shells are annual and clearly visible in shell cross-sections enabling correct temporal positioning of geochemical data obtained from different shell parts.

In this study we applied laser ablation–inductively coupled plasma–mass spectrometry (LA–ICP–MS) in line scan mode to determine the trace element composition along the major growth axis in the hinge area of the shell. High resolution profiles of Na/Ca, Mg/Ca, Sr/Ca, and Ba/Ca were measured in three ontogenetically young (<12 years) specimens of each species, and three older specimens of *G. pilosa* (>50 years). Obtained data was placed in a precise temporal context, and interannual and seasonal changes were studied. Patterns were relatively synchronous between studied individuals, suggesting their potential to record marine environmental variability.

Acknowledgments

Research has been supported by the Croatian Science Foundation under the project SCOOL (IP-2014-09-5747).