

Multi-proxy records of Late Triassic aragonitic megalodontoid bivalve shells: implications for western Tethys paleoclimate

al-Fudhaili, Najat; López Correa, Matthias; Ziegler, Martin; Nützel, Alexander; Kaskes, Pim; Claeys, Philippe; De Winter, Niels

Published in:
World Congress of Malacology 2022 - Abstract Book

Publication date:
2022

Document Version:
Final published version

[Link to publication](#)

Citation for published version (APA):
al-Fudhaili, N., López Correa, M., Ziegler, M., Nützel, A., Kaskes, P., Claeys, P., & De Winter, N. (2022). Multi-proxy records of Late Triassic aragonitic megalodontoid bivalve shells: implications for western Tethys paleoclimate. In *World Congress of Malacology 2022 - Abstract Book* (pp. 217-217). Bavarian State collection of Zoology.

Copyright

No part of this publication may be reproduced or transmitted in any form, without the prior written permission of the author(s) or other rights holders to whom publication rights have been transferred, unless permitted by a license attached to the publication (a Creative Commons license or other), or unless exceptions to copyright law apply.

Take down policy

If you believe that this document infringes your copyright or other rights, please contact openaccess@vub.be, with details of the nature of the infringement. We will investigate the claim and if justified, we will take the appropriate steps.

Multi-proxy records of Late Triassic aragonitic megalodontoid bivalve shells: implications for western Tethys paleoclimate

Najat Al Fudhaili¹, Matthias López Correa^{1,2}, Martin Ziegler³, Alexander Nützel⁴, Pim Kaskes⁵, Philippe Claeys⁵ & Niels de Winter^{3,5}

Email: najat_issa@outlook.com

Bivalves are sensitive to changes in their environment, which are recorded by their incremental shell accretion, growth rate changes, variations in trace element patterns and stable isotope ratios. Three megalodontoid bivalve specimens, two of *Cornucardia hornigi* and one of an undefined species, have been collected from the Late Triassic St. Cassian Formation (Dolomites, Northern Italy), that examines one of the best warm tropical faunal records for the Early Mesozoic. The exceptional preservation of their aragonitic crossed lamellar layer suggests that these specimens are reliable archives for paleoenvironmental reconstructions using a combined sclerochronological and geochemical approach. The aim of this study is to shed light on the effective environmental factors on the bivalve chemical composition, and the absolute temperatures of the ambient conditions during the Late Triassic. We do this by performing a multi-proxy approach using trace element records, clumped isotope (Δ_{47}) thermometry and stable isotopes. Each specimen reveals a set of alternating fine bands that reach >200 growth increments of regular width (with an average of ~35 μm) developed within major dark and light bundles. High-resolution $\delta^{18}\text{O}$ records reveal strong seasonality, with an inferred temperature amplitude of 8°C. Seasonal cycle records of one to two years were used to assign the spatial resolution of the clumped isotope measurements intended to capture the maximum and the minimum temperature. Non-destructive micro-X-ray fluorescence (μXRF) analysis has been used to obtain reproducible high-resolution trace element profiles and element abundance 25 μm maps (e.g. Mg, Sr, Fe and Mn). The aragonitic shells' preservation has been evaluated using the micro X-ray fluorescence (μXRF) heatmap. Variations on the multi-proxy reflect the influence of different environmental factors, e.g. salinity or monsoonal circulation with seasonal river inputs on seawater $\delta^{18}\text{O}$ and its temperature. Which both control the $\delta^{18}\text{O}$ fluctuations in the shell aragonite, while metabolism and physiology are presumed to be reflected in the Sr/Ca-signal. A crucial outcome will be absolute temperature values from the clumped isotopes, that would allow the $\delta^{18}\text{O}_{\text{seawater}}$ of the western Tethys Late Triassic tropical shallow waters to be reconstructed.

¹ GeoZentrum Nordbayern, Friedrich-Alexander-Universität Erlangen-Nürnberg, Loewenichstraße 28, 91054 Erlangen, Germany

² Consiglio Nazionale delle Ricerche, Istituto di Scienze Marine, Via Gobetti 101, 40129 Bologna, Italy

³ Department of Earth Sciences, Utrecht University, Princetonlaan 8a, 3584 CB Utrecht, the Netherlands

⁴ SNSB-Bayerische Staatssammlung für Paläontologie und Geologie, Richard-Wagner-Strasse 10, 80333 München, Germany

⁵ AMGC research group, Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium