

Session 1 – Climate variability and warmer climates

Size matters: geographical variability of valve size of *Cyprideis torosa* and its taxonomic and ecologic implications**Wrozyzna, Claudia^{1*}; Mischke, Steffen²; Höhle, Marlene³; Gross, Martin⁴ & Piller, Werner E.⁵**¹ University of Greifswald, Institute of Geography and Geology, Greifswald, Germany² Institute of Earth Sciences, University of Iceland, Reykjavík, Iceland³ University of Leipzig, Institute of Geophysics and Geology, Leipzig, Germany⁴ Universalmuseum Joanneum, Department for Geology & Palaeontology, Graz, Austria⁵ University of Graz, Institute of Earth Sciences, NAWI Graz Geocenter, Graz, Austria* Corresponding author: claudia.wrozyzna@uni-greifswald.de

Quaternary palaeoclimatic reconstructions from biological proxies (remains of organisms) strongly depend on the biological knowledge and understanding of the variables to which the organisms are sensitive and how they respond to changes in these variables. Coupled autecological-actualistic approaches are usually used to identify species-environmental relationships. However, these approaches often rely on geographically restricted areas covering only a part of the geographical range of the species resulting in uncertainties in palaeoenvironmental reconstructions.

With their ubiquitous distribution in almost all types of aquatic habitats, ostracods became popular proxies for palaeoclimatic and -ecological research. Beside changes in species assemblage composition, ostracods are also known to reflect environmental changes in their valve morphology (i.e., size, ornamentation, shape). This study investigates large-scale (31–51° latitude, and 12–96° longitude) variability of valve size of Holocene and Recent *Cyprideis torosa* (Fig. 1.), a species well known for its high tolerance against salinity and typically occurring in marginal marine areas. Our results show that *C. torosa* provides two large-scale patterns in body size with (1) differentiation of distinct size classes (i.e., morphotypes) at ~42°N and, (2) a continuous increase in valve size with latitude, which corresponds to the macroecological pattern referred as Bergmann trend. While latitude explains the overall size variability of *C. torosa* sensu lato (i.e., undifferentiated for morphotypes), salinity-size correlations are restricted to the morphotype scale. Existing explanations of Bergmann trends (e.g., latitude-temperature relationships) insufficiently resolve the observed size cline of *C. torosa*. Since these models apply for intraspecific size patterns, the observed size-latitude relationship of *C. torosa* may result from interspecific divergence (i.e., size-ordered spatial sorting) while environmental influence is of minor importance. Our results highlight the importance of considering phylogenetic relationships of ostracods before attempting to relate environmental variables to morphological traits such as size.

References

Wouters, K. 2017. On the modern distribution of the euryhaline species *Cyprideis torosa* (Jones, 1850) (Crustacea, Ostracoda). J Micropalaeontol 36, 21–30.

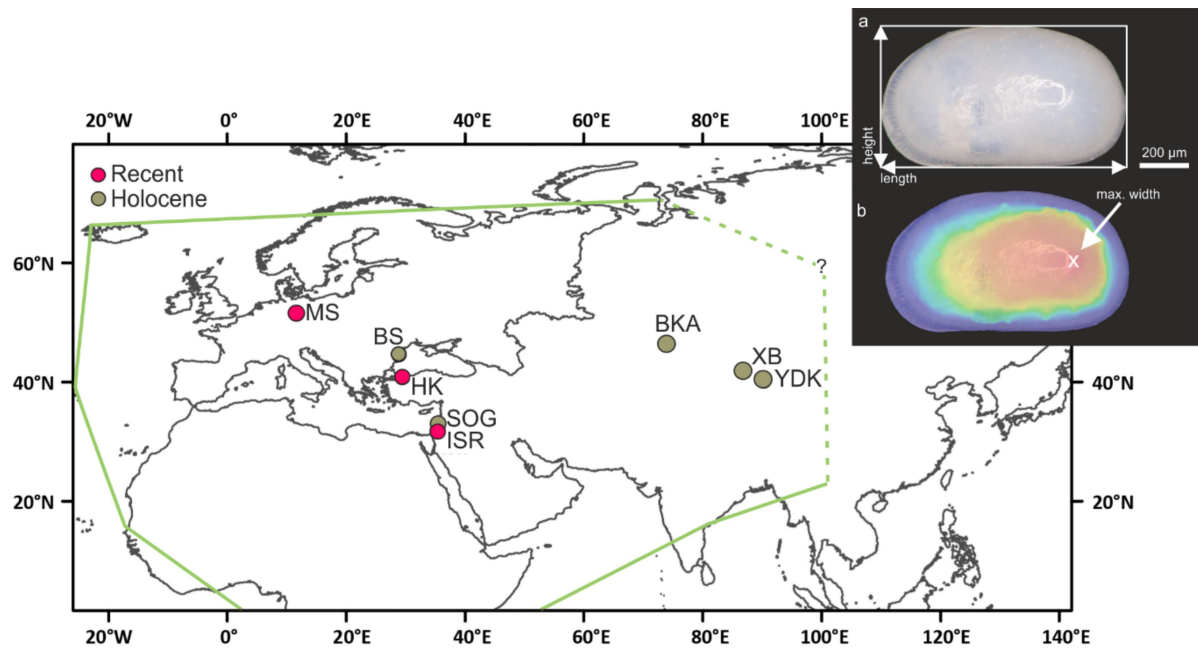


Fig. 1: Map of the Eurasian realm, showing the localities (YDK = Tarim Basin, China; XB = Lake Bosten, China; BKA = Lake Balkhash, Kazakhstan; ISR = Dead Sea, Israel; SOG = Sea of Galilee, Israel; BS = Danube Delta, Romania; HK = Hersek lagoon, Turkey; MS = Mansfeld Lakes, Germany) of investigated *Cyprideis* valves and the geographical range of *C. torosa* according to Wouters (2017) (green line). Inset displays measured size traits on *Cyprideis* valves. Length and height were measured as maximum extension of the valve outline (a). Valve width was obtained as maximum height of focus stacked photographs (b). Displayed are female left valves, measurements were, however, identical for male left and right valves.