

Ostracods (Crustacea) as palaeoenvironmental indicators in a geoarchaeological study: Landscape development around the Celtic Princely Seat on the Ipf-mountain (Western margin of the Nördlinger Ries Meteorite Crater, Germany)

Jessica Fischer¹, Renate Matzke-Karasz², Sonja Mailänder³, David Hauth⁴

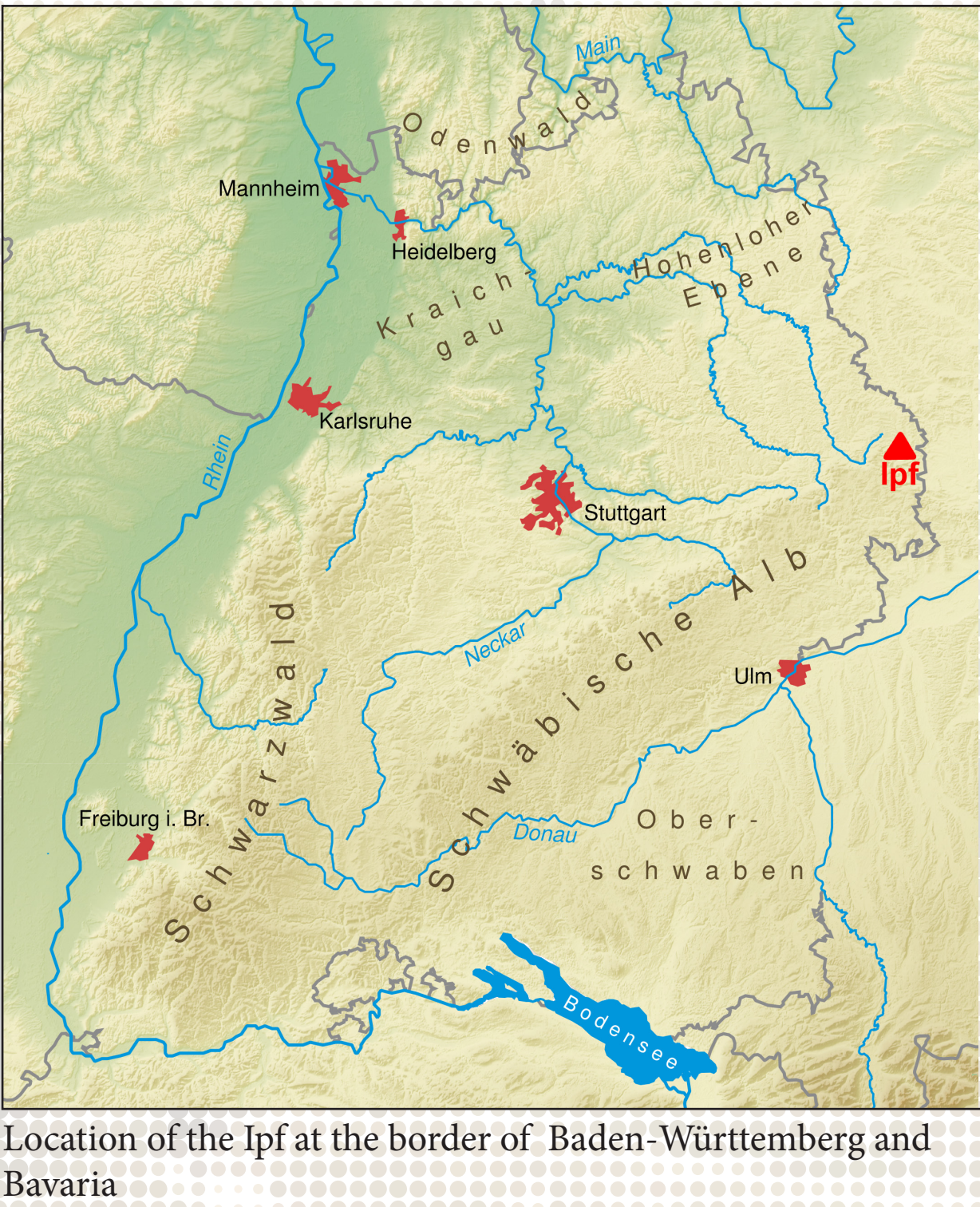
¹Stiftsbogen 61, 81375 München, Germany, ²Department of Environmental and Geosciences, Palaeontology, Ludwig-Maximilian-University Munich and Geo-Bio-Center (LMU), Richard-Wagner-Str. 10, 80333 München, Germany. ³Fleischhauerstr. 34, 70567 Stuttgart, Germany, ⁴Feuerhausstr. 17 82256 Fürstentfeldbruck, Germany

Introduction

Archaeological excavations on and around the Ipf revealed traces of the Early Celts (ca. 7th to 4th century BC). Hence the area was considered being an adequate object to study early territory development and the correlation of periods of soil erosion and periods of settlement and anthropogenic influence.

A broad spectrum of disciplines has been gathered providing an interdisciplinary approach: a total of 114 sections have been investigated with sedimentological, pedological, archaeological, palynological and (micro-) palaeontological methods, also radio-carbon- and dendrochronological age determinations have been carried out.

A multi-faceted image of the history of this area is now arising, giving new insights into more than three thousand years of regional human interaction with, and use of, land surface¹.



Location of the profile GoBS1 & GoBS2 in the Goldbach valley

The Ostracod taxa have been identified and classified regarding their ecological preferences after the classification system suggested by Fuhrmann (2006)².

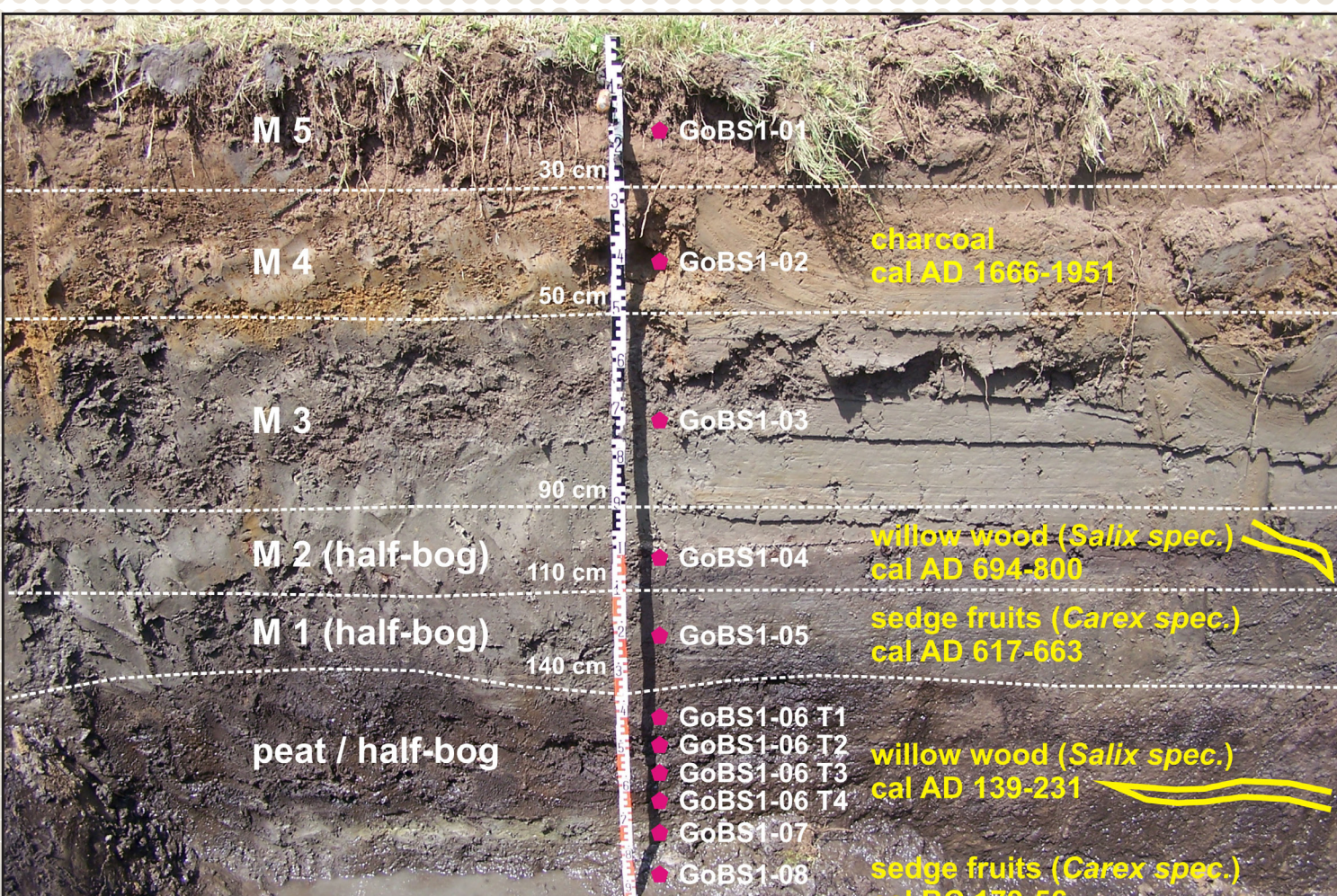
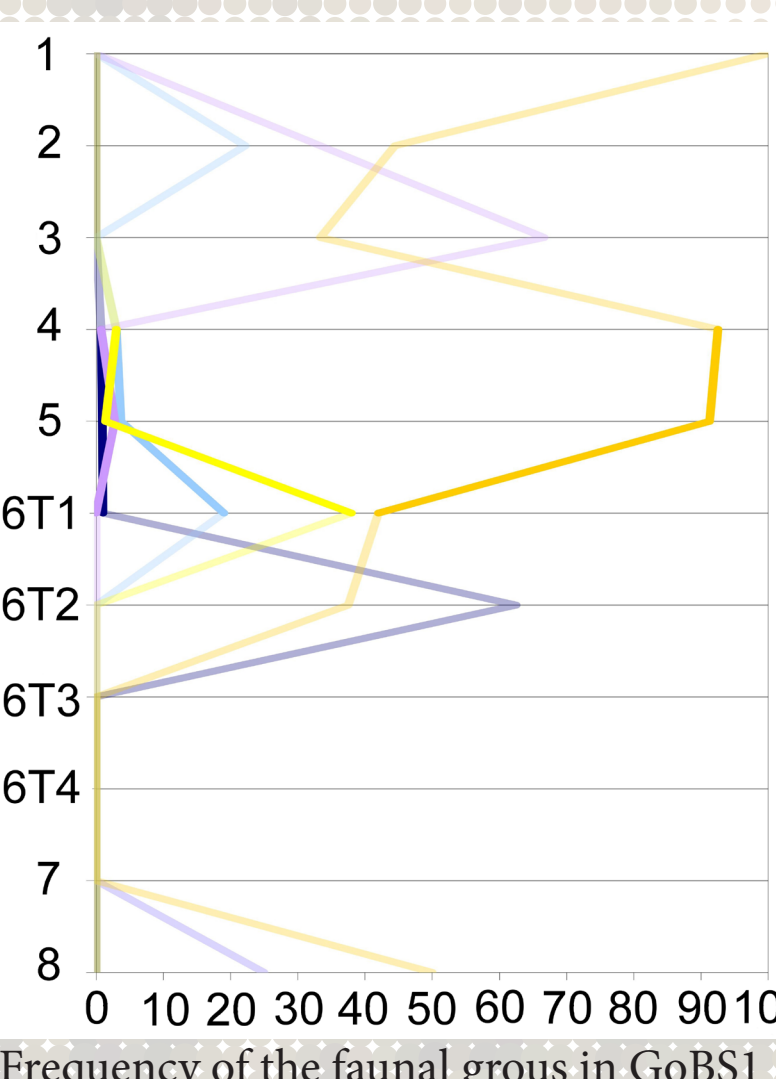
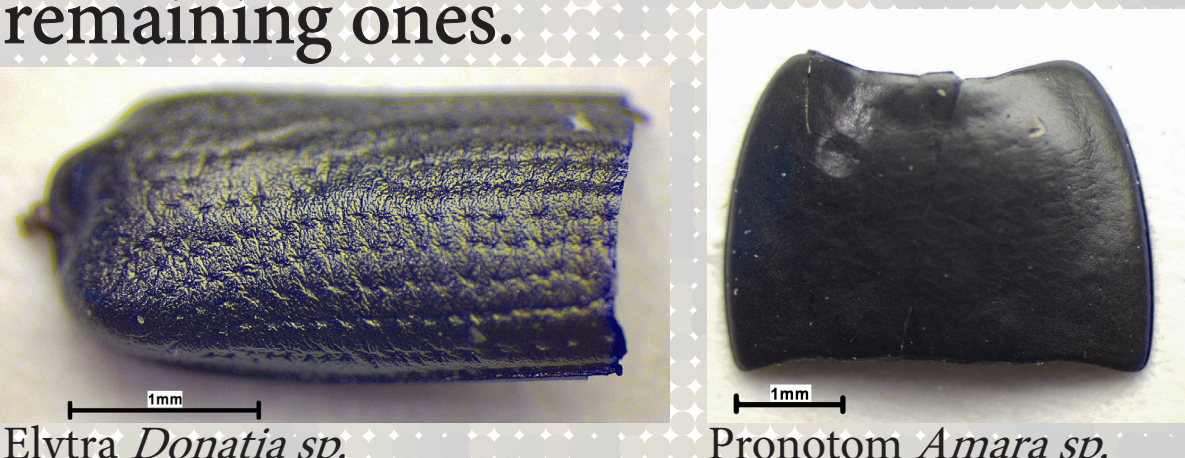
Ostracod faunas have been recovered from two sections (GoBS1 & GoBS2) taken in the small valley of the brook Goldbach (near Bopfingen, Baden-Württemberg).

Together with other invertebrate microfossils and plant remains, ostracod specimens were picked from sediment samples taken from each petrologically differentiated horizon.

Spring fauna	Rheocrenic spring
Rhithron fauna	Helo-/limnocrenic spring
Stagnant water fauna	Warmer waters
	Cooler waters

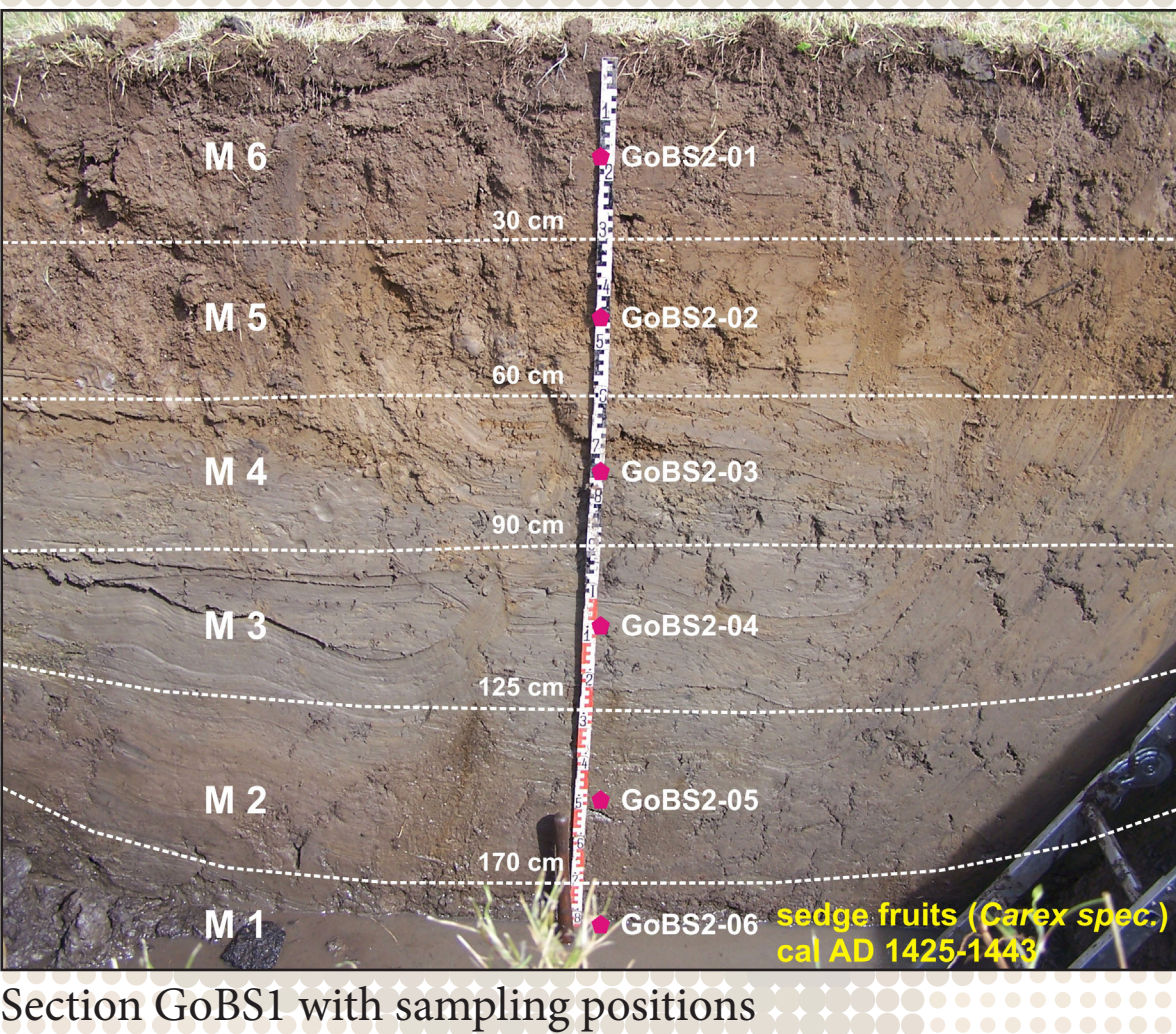
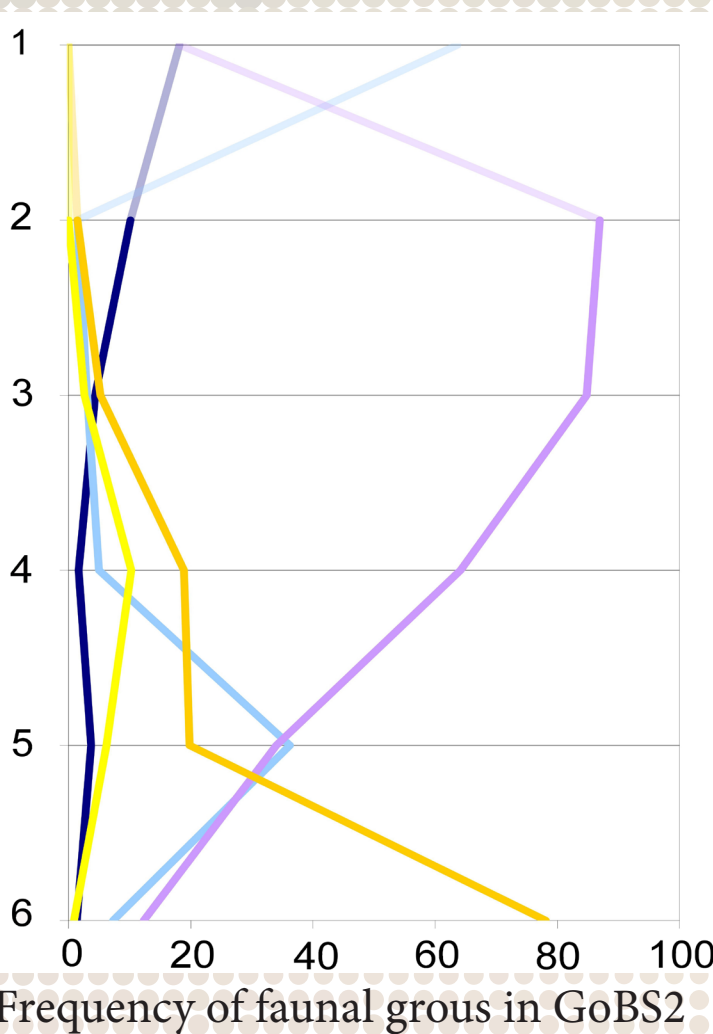
Results & Discussion

More than 10 ostracod valves were found only in three horizons (GoBS1-6T1,-5,-4) of this section. Reconstruction of palaeoenvironment based on the ostracod fauna could thus be carried out only for these three levels, while plant remains and insects were used for the remaining ones.

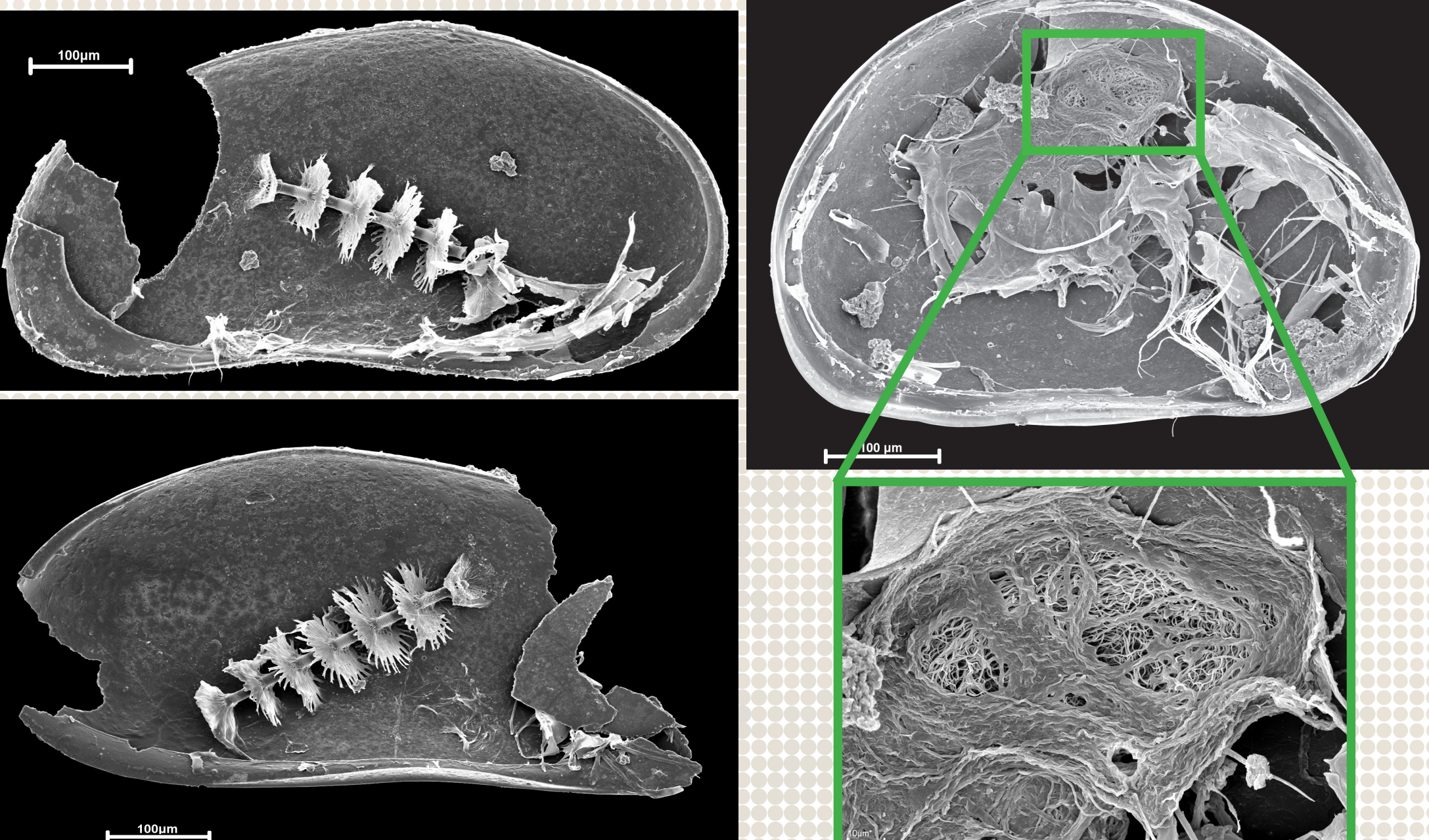


An open, stagnant or slowly running water existed at this locality at the end of the late La Tène era. Adjacent to this waterbody, sedgeland grew beside alders and willows (GoBS1-08). Subsequently these areas silted up and became a dammed and saturated marshland (GoBS1-07). From the late Roman Age to the Early Middle Ages the area abounded in water again. A spring-fed stagnant and marshy water body (i.a. *Cyclocypris ovum*, *C. laevis*, *Pseudocandona rostrata*, *Scottia pseudobrowniana*) developed with a forest sprouting on its banks composed of plants tolerating dampness, like alders, hazels, oaks and willows (GoBS1-06T4 – 06T1). Probably at the end of 6th century A.D. the banks thinned out and sedgelands spread again (GoBS1-05). At the same time a higher rate of minerals and the existence of numerous plant species of ruderal and neglected grassland points to soil erosion in consequence of agricultural use. Following a short appearance of willow shrubs in the 8th century AD, sedimentation of further colluvia made the area become arid until today (GoBS1-04 – 02).

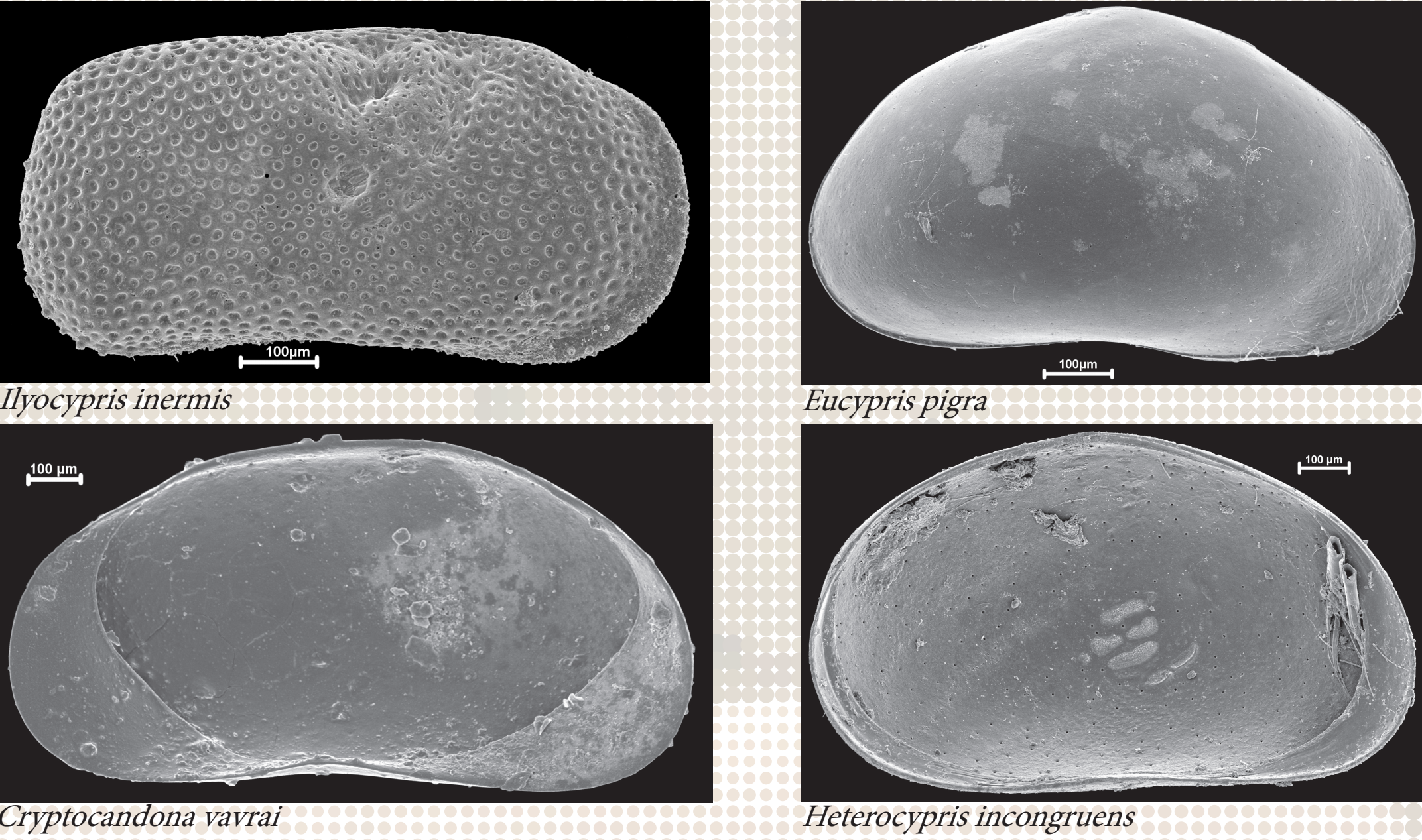
Every horizon of section GoBS2 revealed ostracods, molluscs and plant remains. A stagnant shallow marshy or boggy water body (*P. rostrata*, *Candona cf. neglecta*) with little freshwater influence (*S. pseudobrowniana*, *Ilyocypris inermis*), such as a back water of a brook, seems to have gradually changed into a pure spring brook or running water with spring influence (*Potamocypris zschokkei*, *P. fallax*) (GoBS2-06 – 02). In horizon GoBS2-01 hardly any ostracods were found; instead, several mollusc species indicate an open landscape.



Preserved soft parts were found



Some examples of the 19 ostracod taxa from the Goldbach material:



Conclusion

In GOBS1, the used proxies show that an open standing water silted up and the area became arid until today. Ostracods here support a predominance of standing water in the middle of the section. In GOBS2, ostracods suggest a shift from a marshy water to a pure spring brook over the time covered by the section, which is in conformity with other proxies.

Ostracod valves can be used as supportive and elucidative palaeoenvironmental indicators, helping to unveil small scale changes (both, horizontally and vertically) in a developing Holocene landscape.

At the same time, in concert with other proxies, ostracods are a useful tool for investigations of anthropogenic influences on palaeoenvironments.

References & Support

1. Fuhrmann, R., 2006: Die rezente Ostrakodenfauna Mitteledeutschland (Vorläufige Mitteilung). Mauritia 19 (3), 427-438.

2. Mailänder, S., J. Eberle & W. D. Blümel, 2010: Kolluvien, Auelehne und (An)moore im Umfeld des frühkeltischen Fürstensitzes auf dem Ipf – Ein Beitrag zur Geoarchäologie und Landschaftsgeschichte am Westrand des Nördlinger Rieses. In: Krause, D. L. (Ed.) „Fürstensitze“ und Zentralorte der frühen Kelten. Abschlusskolloquium des DFG-Schwerpunktprogramms 1171 in Stuttgart, 12.-15. Oktober 2009. Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg 120/2, Stuttgart, 267-290.

The project was partly financed by DFG Priority Programme 1171 (“Frühe Zentralisierungs- und Urbanisierungsprozesse – Zur Genese und Entwicklung frühkeltischer Fürstensitze und ihres territorialen Umlandes”) as well as by the foundation of the Kreissparkasse Ostalb.