Environmental conditions in the early Late Pleistocene of the Nihewan Basin (Hebei, NE China): the Paleolithic Youfangbei Site

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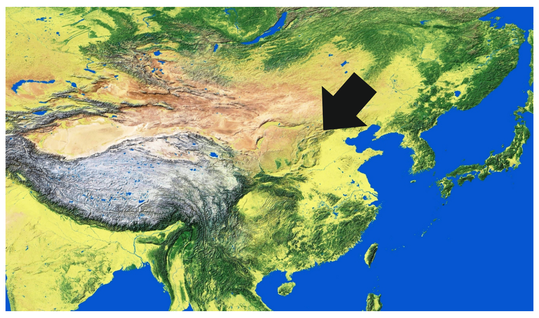
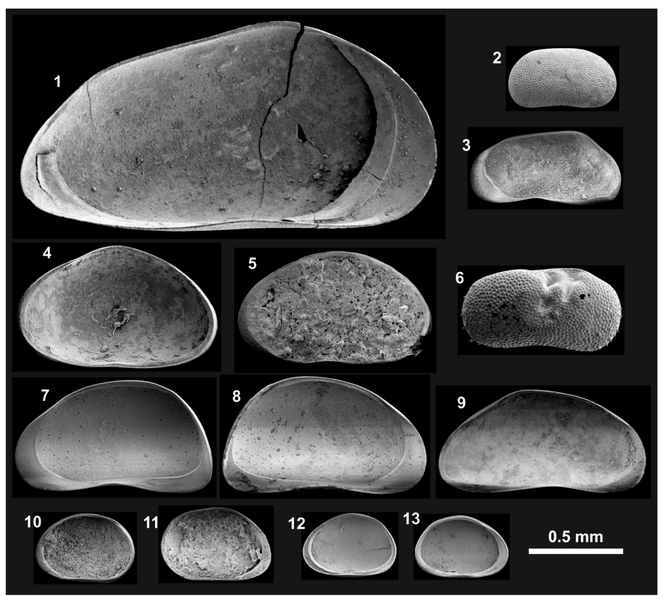
Summary: Ostracods, gastropods and bivalves from the Youfangbei excavation site show that sediments accumulated in a wetland setting where aquatic and terrestrial habitats were located close together. The sediments, including many artefacts, accumulated during the second half of Marine Isotope Stage (MIS) 5, between ca. 107-86 ka (Zhao et al., 2021). In contrast to only sporadic and mostly erosive runoff in the valley today, higher and possibly more evenly distributed precipitation existed in the Nihewan Basin region during the second half of MIS 5.



Location of the Nihewan Basin in NE Asia

Scenery at the excavation site. Main excavation trench in 2018 at the lower right of person.



Ostracod valves from Youfangbei: 1 *Trajancypris clavata*, 2 *Pseudocandona* sp. (juveline), 3 *Fabaeformiscandona fabaeformis*, 4-5 *Heterocypris salina*, 6 *Ilyocypris* sp., 7-8 *Candona candida*, 9 *Fabaeformiscandona hyalina*, 10-11 *Physocypria kraepelini*, 12-13 *Cyclocypris ovum*

Stone tools from Youfangbei: 1 used flake; 2,6 notch; 3 drill; 4 point; 5 steep edge scraper; 7 concave edge scraper; 8 double edges scraper; 9 straight edge scraper; 10 transverse scraper

Context and study area

The Nihewan Basin in NE Asia experienced a long history of archaeological and palaeontological research due to the abundance of artefacts mostly embedded in early Pleistocene deposits. In addition, many fossils of the Pleistocene megafauna were recovered from the exposed sediments (Deng et al., 2008). Middle and late Pleistocene deposits in the basin received less attention so far.

Materials and methods

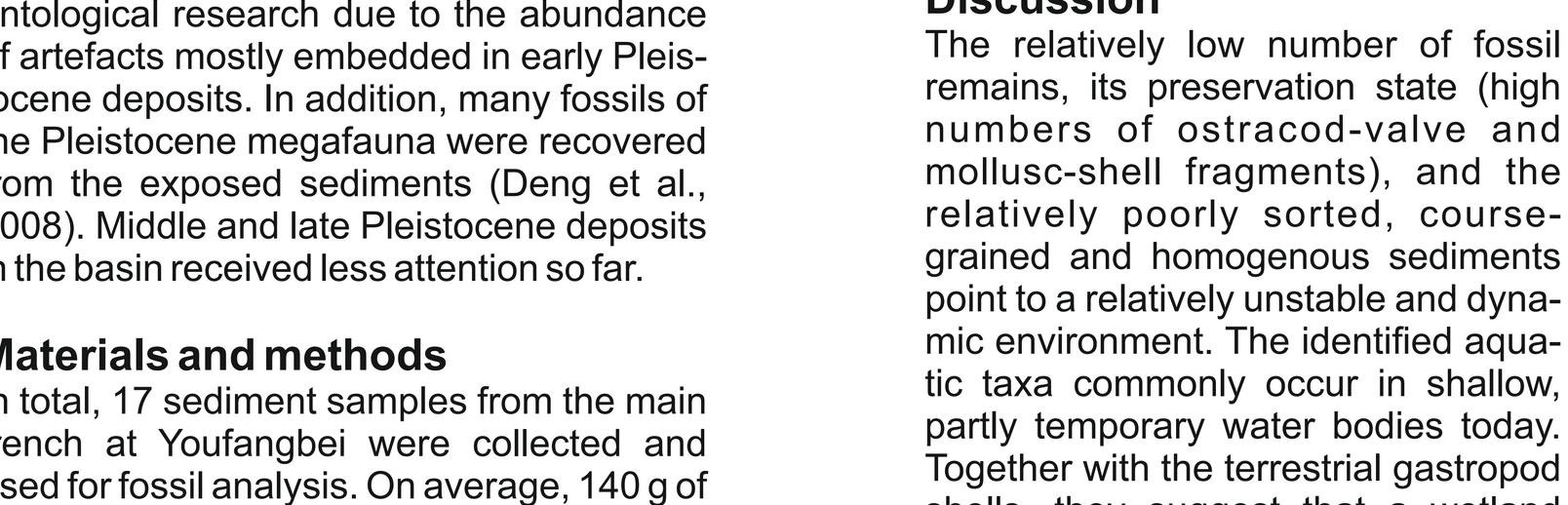
In total, 17 sediment samples from the main trench at Youfangbei were collected and used for fossil analysis. On average, 140 g of dry material was processed with 3% H_2O_2, and sieved through 100, 250 and 1000 µm sieves.

Discussion

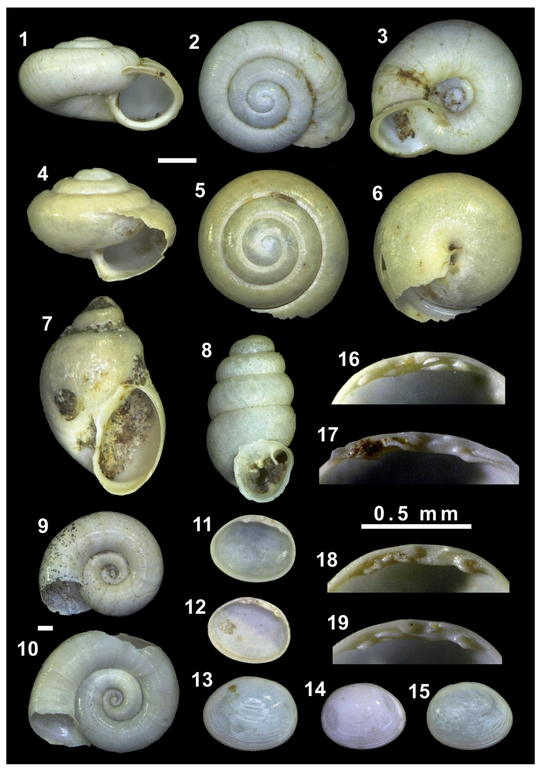
The relatively low number of fossil remains, its preservation state (high numbers of ostracod-valve and mollusc-shell fragments), and the relatively poorly sorted, course-grained and homogenous sediments point to a relatively unstable and dynamic environment. The identified aquatic taxa commonly occur in shallow, partly temporary water bodies today. Together with the terrestrial gastropod shells, they suggest that a wetland existed at the excavation site in MIS 5.

Results

In total, 863 ostracod valves representing 11 taxa, 220 gastropod shells, five bivalve shells and many mollusc fragments were recovered from the Youfangbei site.



Left: Ostracod distribution in the excavated stratigraphic sequence. **Right:** Sedimentary characteristics, presence of bones, and molluscs in the section (mica: 3 abundant, 2 few, 1 very few; ang – angularity of granules: 3 very angular, 2 angular, 1 sub-angular; axis$_{max}$ – longest axis of largest particle in mm)



Molluscs from Youfangbei: 1-3 land snail 1, frontal, apical and umbilical views; 4-6 land snail 2, frontal, apical and umbilical views; 7 lymnaeid aquatic snail 1; 8 pupilloid land snail; 9-10 *Gyraulus* sp., umbilical views; 11-19 *Pisidium* cf. *pseudosphaerium* (16-19 hinge teeth of shells; separate scales of 0.5-mm length for 1-8, 9-11, and 16-19, respectively)

References

Deng, C., Zhu, R., Zhang, R., Ao, H., Pan, Y., 2008. Timing of the Nihewan Formation and faunas. Quaternary Research 69, 77-90.

Zhao, H., Tan, P., Sun, X., Mischke, S., 2021. Discovery and investigation of the Paleolithic locality of Youfangbei, Nihewan Basin, Hebei Province. Quaternary Sciences 41, 164-177.

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