The Pleistocene-Holocene Transition in Central Europe reflected by an ostracod succession from Plinz, Thuringia

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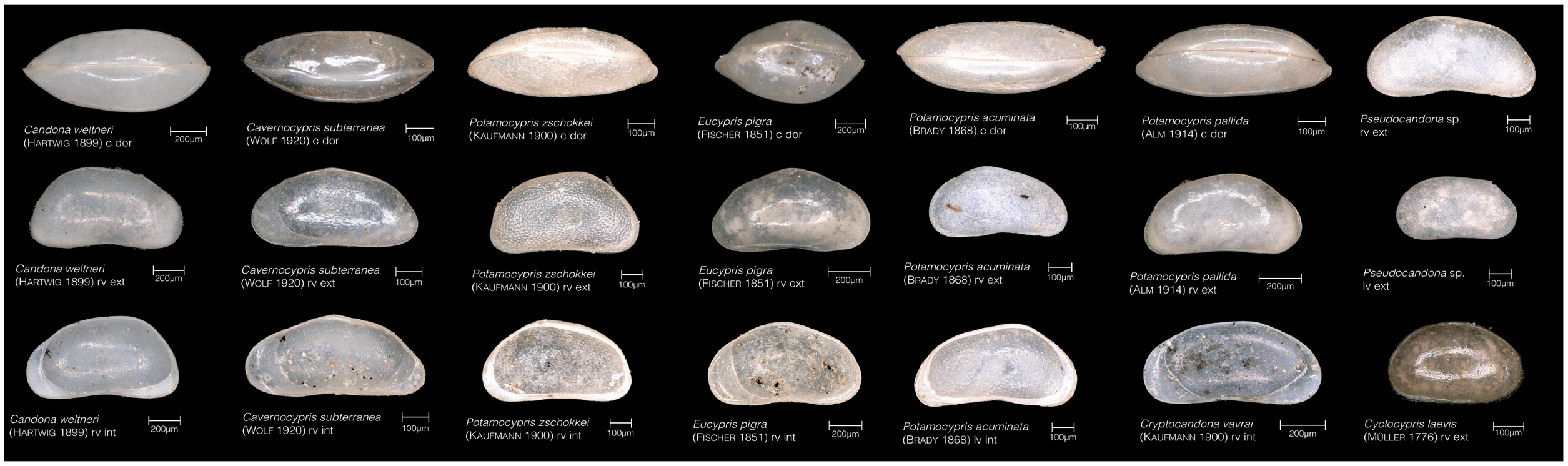
Results and Discussion

1. Taxa: Light Microscope Images of the Ostracods Found in the Plinz Profile



2. Sediments and Distributions of Taxa

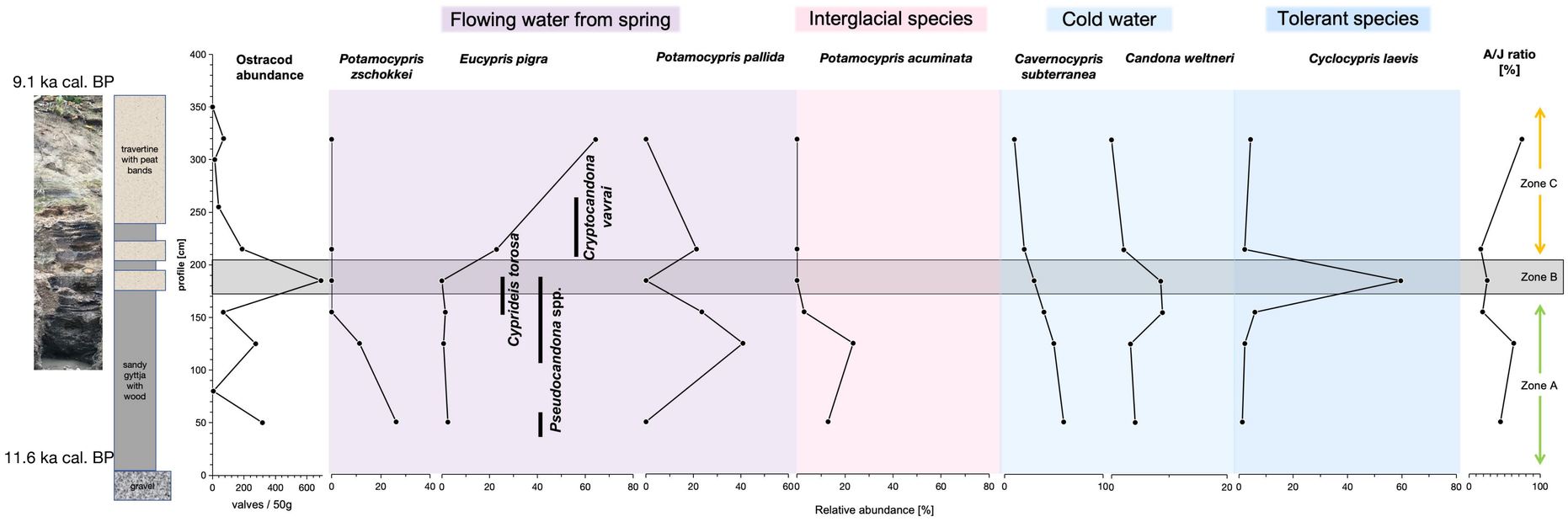


FIG. 1. Distribution of Selected Ostracod Species in the Plinz Profile. On the left, an image of the stratigraphic section (refer to Fig. 1) illustrates the sedimentary layers, while on the right, a detailed representation of the ratio between adult and juvenile valves is provided reflecting taphonomic conditions across different strata.

- **Stratigraphic Profile:** The sedimentary profile transitions from gravel at the base to sandy gyttja with wood, followed by travertine with peat bands. It reflects changes from higher-energy to more stable, groundwater-influenced environments.
- **Ostracod Abundance:** High abundance of ostracod valves in the lower and middle sections of the profile (Zone A and B), with a peak around 150 cm, indicating more favorable conditions for ostracods and their preservation during these phases. The abundance decreases in the upper part of the profile (Zone C), reflecting a change in environmental conditions, possibly related to stronger currents as indicated by the dominance of *Eucypris pigra*.
- **Adult to Juvenile Valve Ratio:** The ratio shows significant fluctuations between Zone A and Zone C, with a higher ratio in Zone C, suggesting higher turbulence within the water body.

3. Mutual Ostracod Temperature Range (MOTR)

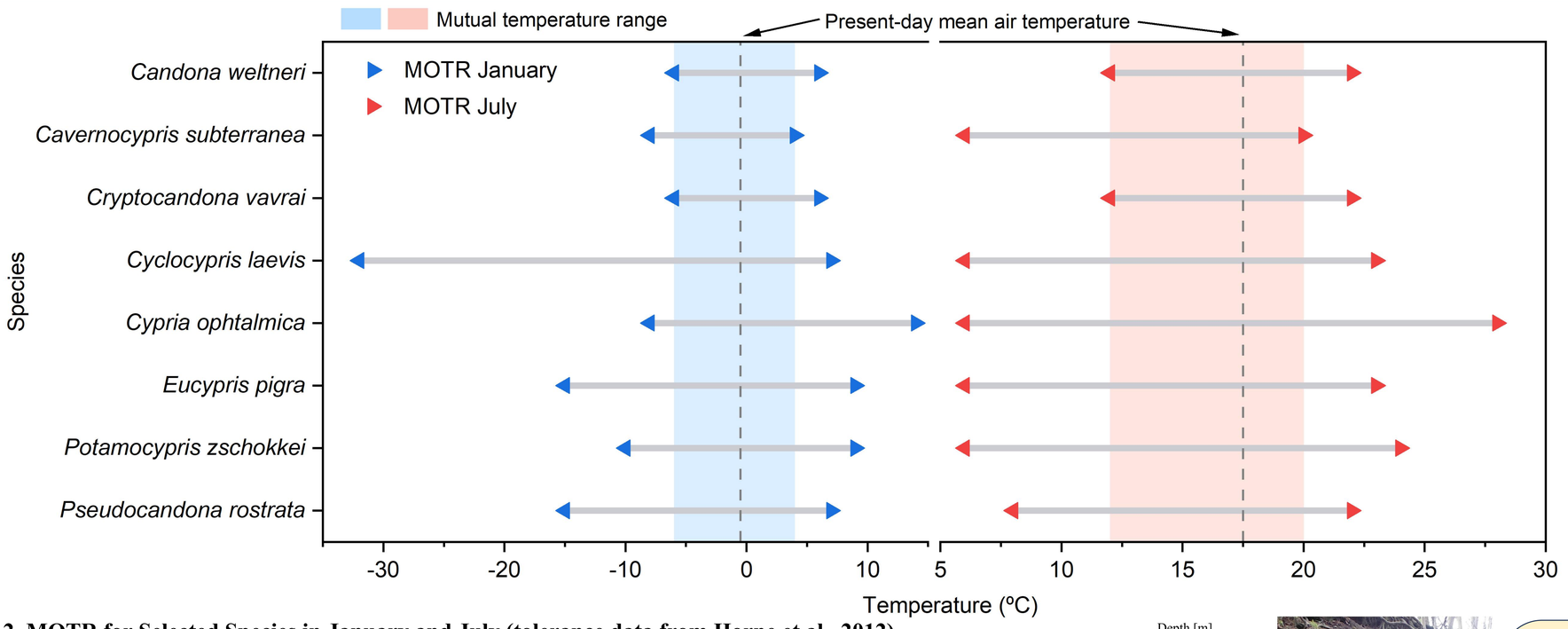
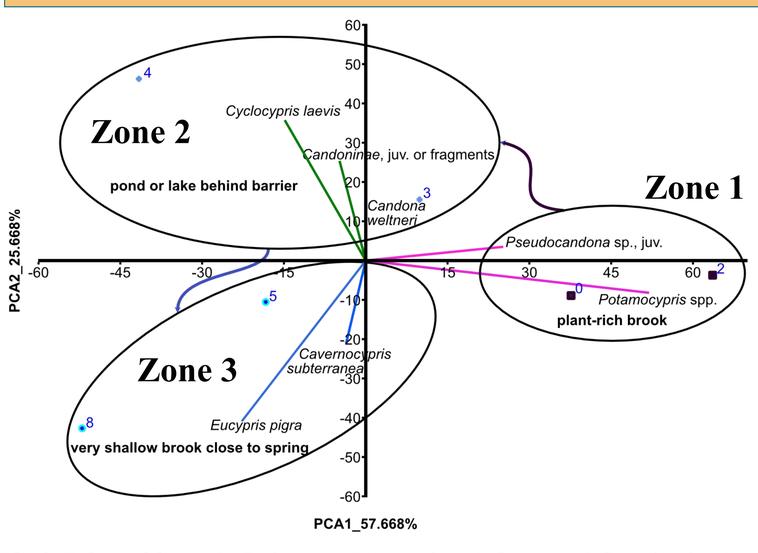


FIG. 2. MOTR for Selected Species in January and July (tolerance data from Horne et al., 2012).

- **Temperature Tolerance of Species:** Species like *Candona weltneri* and *Cavernocypris subterranea* exhibit a narrow tolerance for lower temperatures, indicating their adaptation to cold environments. In contrast, *Cyclocypris laevis* demonstrates a broader temperature tolerance, surviving across a wider range of climate.
- **Comparison with Present-Day Temperature:** The current mean air temperatures align with the temperature ranges of most species, suggesting that palaeo-temperatures of the Plinz profile have been similar to modern climate conditions. The number of species, however, is not big enough to allow a more detailed reconstruction
- **Reference for MOTR method:**

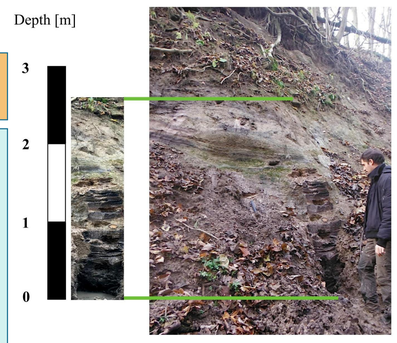
Horne, D. J., Curry, B. B., & Mesquita-Joanes, F. (2012). Mutual climatic range methods for Quaternary ostracods. In Developments in Quaternary Sciences (Vol. 17, pp. 65-84). Elsevier.

4. Principle Component Analysis



- Zone 1: Samples 0 and 2: This zone represents a plant-rich brook with abundant water flow and dense vegetation. The water in this zone was oligotrophic and biodiversity high.
- Zone 2: Samples 3 and 4: According to ostracod distribution, this zone corresponds to a pond or lake behind a barrier, characterized by standing water, stable conditions, and water more rich in nutrients.
- Zone 3: Samples 5 and 8: This zone represents a very shallow brook close to a spring, where the water is shallow and the current fast. Water temperature was likely cooler due to its proximity to the spring.

FIG. 3. PCA of Sample Points and Associated Ostracod Species in the Plinz Profile, Deduced Environments are Indicated.



Key Points: This study investigates the transition between the Pleistocene and Holocene in Central Europe, with a focus on palaeoclimatic changes in Thuringia, Germany, using ostracod successions as ecological indicators. The transition period (~11,600 to 9,100 years cal. BP) represents a key phase of environmental transformation of the Postglacial period into the Holocene.

Sampling site: Altenberga Valley, South of Jena, Germany

Conclusion

- Eleven ostracod species were identified and associated with three faunal zones, each reflecting distinct climatic and environmental conditions.
- Zone A represents cooler, marshy conditions during the very Early Holocene, marking the region's recovery from glaciation; Zone B shows warmer, more humid conditions in the early Holocene, indicating a period of climate stability and local formation of a pond or little lake; Zone C reflects a return to cooler, drier climates and corresponds to a time of increased climatic variability, consistent with the Preboreal oscillation.