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Marine and brackish Oligocene Ostracoda from the Southern Upper Rhine Graben (Central Europe): palaeoecological, palaeogeographical and taxonomic implications

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The Southern Upper Rhine Graben, characterized by its more or less isolated dead end situation since the Priabonian, provides an interesting field for micropalaeontological investigations. About 200 samples from the two boreholes Allschwil-2 (southeast of Basel, Switzerland) and DP-202 (north of Mulhouse, France) as well as three local outcrops from the Paleogene of the Southern Upper Rhine Graben were investigated for microfossils. There are three zones particularly rich in Ostracoda and/or Foraminifera.

(1) The Early Rupelian "Zone Fossilifère", representing the first Oligocene marine transgression into the Upper Rhine Graben and corresponding to the sequence Ru1 (BERGER et al. 2005a, b). The mass occurrence of several species of the brackish to marine-brackish genus *Hemicyprideis* (KEEN 1993) and the less abundant species *Cytheromorpha zinndorfi*, *Grinioneis triebeli*, *Hazelina indigena* and *Haplocytheridea* cf. *pechelbronnensis* confirm the marine influence. In the upper part of the "Zone Fossilifère" many (juvenile and adult) tubercle-bearing specimens of the genus *Hemicyprideis* indicate the increase of freshwater influx.

(2) The Middle Rupelian second Oligocene marine transgression (corresponding to sequence Ru2-3; BERGER et al. 2005 a, b) starts with the fully marine "Marnes à Foraminifères" (lowermost "Série Grise"). Associated with a very rich Foraminifera fauna are the ostracods *Henryhowella asperrima* and *Cytherella transversa*. Together with the benthic foraminifer *Sphaeroidina bulloides* they indicate deeper water. In the following anoxic densely laminated "Schistes à Poissons" and marine to shallow

marine “Couches à Mélettes” ostracods are missing or very rare. Though many reworked Cretaceous and Eocene planktonic Foraminifera occur in the “Série Grise”, no reworking of ostracods could be detected so far.

(3) The ostracod assemblages of the Late Rupelian “Marnes à Cyrènes” (uppermost “Série Grise”) indicates the transition from coastal-marine (e.g., *Cytheridea sandbergeri*, *Pterygocythereis ceratoptera* s.l., *Loxoconcha nystiana* s.l.) to brackish-estuarine conditions (genera *Hemicyprideis*, *Cyamocytheridea*). The occurrence of tubercle-bearing (juvenile and adult) specimens of the species *Hemicyprideis helvetica* in the uppermost “Marnes à Cyrènes” confirms the decreasing trend of salinity (PICOT 2002).

Finally a preliminary evaluation of the taxonomic status of several species including *Hemicyprideis helvetica* and *H. basiliensis* is presented and interpreted in palaeoecological terms, representing ecotypes instead of independent species.

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