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Lowermost Emsian to lower Givetian ostracods from the Western Dra Valley (Morocco): First palaeoecological and event-stratigraphical data

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The Devonian of the Anti-Atlas in southwest Morocco is world-famous for its extensive outcrops that are rich in well-preserved faunas, but those of the Western Dra Valley are still under study and especially the lower Devonian ostracods are poorly known. We present first palaeoecological and event-stratigraphical results on ostracods of earliest Emsian to basal Givetian age from the sections Bou Tserfine, Rich Tamelougou and Hassi Mouf near Assa, which are well dated by conodonts. All ostracod associations indicate an offshore position below wave base. Palaeobiogeographically, most taxa belong the Palaeotethysian Province, but few North-American taxa are also present and corroborate migration paths between both areas via North Africa.

At present, some hundred ostracod individuals belonging to about 45 benthic taxa have been tentatively identified. Lower Emsian samples with ostracods are from sections Rich Tamelougou and Bou Tserfine. They yielded taxa such as *Polyzygia kroemmelbeini* and *Bollia azagora*, which are in these sections restricted to the Early Emsian although their global range is longer. But most of the ostracods are from the lower Upper Emsian *Hollardops* Limestone (basal Khebchia Fm) and the Eifelian *Pinacites* Limestone (lower Yeraifa Fm).

The *Hollardops* Limestone is a regionally distinctive limestone that has furnished frequently *Caudicriodus culicellus–Icriodus corniger ancestralis* conodont assemblages, which indicate early Late Emsian age. Only its basal bed is latest early Emsian as indicated by monospecific occurrences of the bilatericrescens conodont assemblage. The ostracod assemblages belong to the so-called "mixed faunas" with only few palaeocopes but rich in metacopes (some of them with small spines), indicating an offshore position probably in deeper and less agitated water below wave base. The *Pinacites* Limestone contains goniatites (e.g., *Pinacites*, *Fidelites*), and conodonts of the *costatus* Zone (Eifelian). The ostracod fauna is partly similar to those of the *Hollardops* Limestone and long ranging taxa such as *Ulrichia* ex gr. *acricula* and *Jenningsina planocostata* occur throughout the sections. But several taxa as e.g., *Bufina* aff. *bicornuta*, *Bufanchiste bufinoides*, *Polyzygia symmetrica* or *Favulella frankenfeldi* are despite their global ranges restricted here to the Eifelian.

Besides these, several spiny taxa such as *Semibolbina*, *Loquitzella*, *Berounella* or *Tricornina* occur, thus, reflecting slightly deeper and calmer water conditions than during the sedimentation of the *Hollardops* Limestone. So far, Givetian strata with ostracods have been found in the studied sections only at Hassi Mouf. The occurring taxa are long-ranging and globally widely distributed such as *Jenningsina planocostata* or *Praepilatina*, and the assemblages present low diversities.

As regards Devonian events and their effect on ostracods both the Kellwasser-Event and the Hangenberg-Event are studied thoroughly. However, the smaller-scale events such as the Daleje, Choteč or Kačák Event have not been studied in detail so far. Our study gives preliminary information on the influence of these events on benthic ostracods faunas in the W Dra Valley:

— At the Daleje-Event (approx. Early/Late Emsian boundary), eight of thirteen taxa survive; *Polyzygia vinea* disappears worldwide, whereas *P. kroemmelbeini* disappears locally.
— At the Chotec-Event (approx. Emsian/Eifelian boundary), thirteen of twenty-four taxa survive; Jenningsina thuringica disappears worldwide; *Bufina sotoi* and *Tricornina* ex gr. sp. A survive only in Morocco.
— At the Kajak-Event (approx. Eifelian/Givetian) only five from twenty-seven taxa survive; the five survivors are ubiquitous taxa, such as the long-ranging and globally widely distributed *Jenningsina planocostata*; even some long ranging taxa such as *Ulrichia* ex gr. *fragilis*, *U.* ex gr. *spinifera* and "*Cytherellina*" inconstans disappear locally.

Thus, the Kajak-Event seems to be the most effective one of the minor events as regards the ostracods of the Western Dra Valley.

Further studies have to include more material covering the event horizons in more detail. In addition, the results have to be compared with the studies on Devonian ostracods from other Moroccan and North African areas as described e.g., by Casier or by Becker.

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