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Conodont biofacies record of the Givetian transgressive levels in the Lublin and Łysogóry-Radom basins (SE Poland)

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The paleoecological studies of the Devonian conodonts have been continuing for the last half a century. Only recently, however, they tend to compare strictly contemporaneous assemblages (to exclude an effect of evolution), and are increasingly conducted not only on a generic but also on a species level. We applied such an analytical approach in a case of the Middle and Upper Givetian conodonts from the Mid-Devonian epicontinental basins in SE Poland. The Lublin Basin is characterized by a prevalence of nearshore marine facies with a considerable proportion of terrigenous and evaporitic sediments, whereas in the adjoining Łysogóry-Radom Basin open-shelf carbonate-shaly facies dominate. We analysed material from a basal part of the regional transgressive-regressive cycles T-4 and T-5 and their equivalents. These strata were dated as the *ansatus* and *norrisi* zones, respectively (NARKIEWICZ & NARKIEWICZ 1998, NARKIEWICZ & BULTYNCK 2007), and were referred to the eustatic transgressive events of the global T-R cycles IIa (Taghanic Event) and IIb.

The biofacies study comprised 23 samples from 7 boreholes, with no less than 20 specimens per sample, 730 platform (P₁) elements in total. The studied assemblages were dominated by genera *Polygnathus* and *Icriodus*. Their distribution in the host sediments generally confirms previous paleoecological models for the Mid-Devonian which interpret *Polygnathus* as a more open/deeper shelf form, and *Icriodus* as a more proximal and shallow-water.

The T-4 cycle in the Lublin Basin displays a characteristic vertical pattern of biofacies. It starts with the early transgressive phase typified by a polygnathid-icriodid (P-I) biofacies with a considerable proportion of icriodids and a maximum percentage of *P. ansatus*. Peak flooding is recorded as a transition to polygnathid biofacies with a significant drop in icriodids and a maximum abundance of *P. linguiformis*. The succeeding stage is associated with a return of P-I biofacies under conditions of incipient regression. The regressive trend led to an overall conodont retreat followed by a subordinate transgressive pulse associated with the icriodid biofacies.

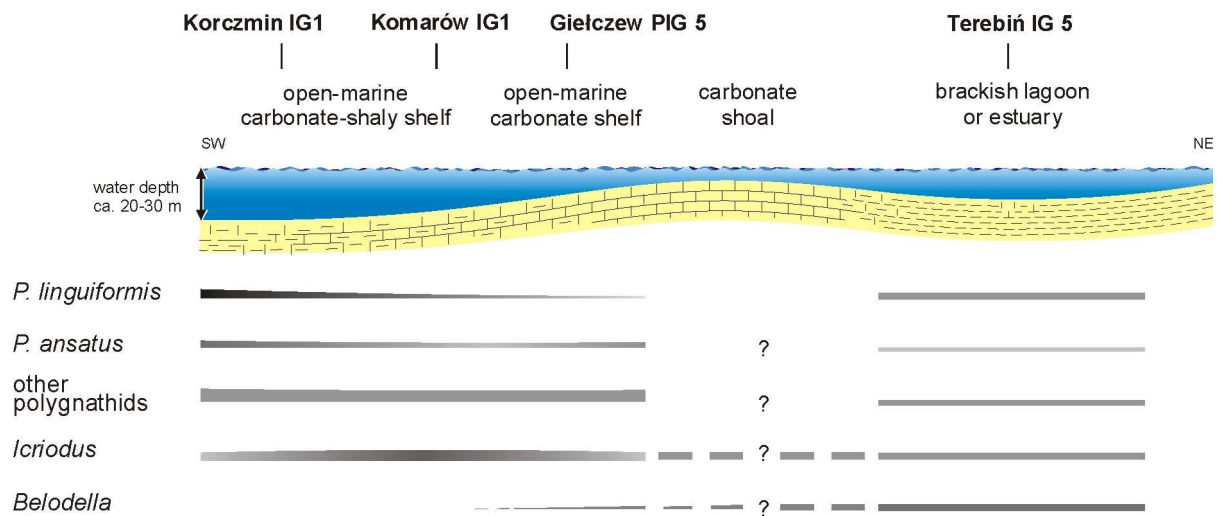
The lateral variation in conodont biofacies of the initial IIa and IIb transgressions is compared to depositional patterns in both basins (Fig. 1). In the early stage of the Taghanic transgression the basins are characterized by a development of the P-I biofacies which suggests generally uniform conditions for conodont faunas. *Belodella* seems to have preferred most shallow-water and/or nearshore conditions as it is associated with flanks of a carbonate shoal (Fig. 1A). Proportion of polygnathids to icriodids is comparable, nevertheless the former attain a maximum abundance in the open-shelf environment (Korczmin IG 1) while their minimum corresponds to a brackish lagoon or estuary with intermittent open-marine conditions (Terebiń IG 5). Among the polygnathids the most distal form is *P. linguiformis* which thus represents an opposite extreme of ecological requirements relative to the proximal *Belodella*.

The depositional environments of the *norrisi* Zone (transgression IIb) are comparable to the earlier ones but the associated conodont assemblages are different. To a large degree this is due to an evolutionary factor, including disappearance of some forms and introduction of other, mainly in the *hermanni* Zone. The transition from a shallow-water carbonate platform to an open shelf (Fig. 1) is paralleled by a change from the icriodid to P-I biofacies. The shallowest environments were inhabited by *Pandorinellina insita* (appearing in the *norrisi* Zone) and *I. subterminus*. Among the icriodids the species diversity is comparable to that in the *ansatus* Zone. Nevertheless, among the forms typical for deeper-water facies the extinct *I. arkonensis* and *I. platyobliquimarginatus* were replaced by *I. expansus* and *I. cedarensis*. Similarly, the most abundant polygnathid species in the *ansatus* Zone, *P. linguiformis* and *P. ansatus* were replaced by narrow-platform species like *P. webbi* and *P. dubius*.

References

- NARKIEWICZ, K. & BULTYNCK, P. (2007): Conodont biostratigraphy of shallow marine Givetian deposits from the Radom-Lublin area, SE Poland. - *Geological Quarterly*, 51: 419-442.
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ansatus Zone (Middle Givetian)



norrisi Zone (Late Givetian)

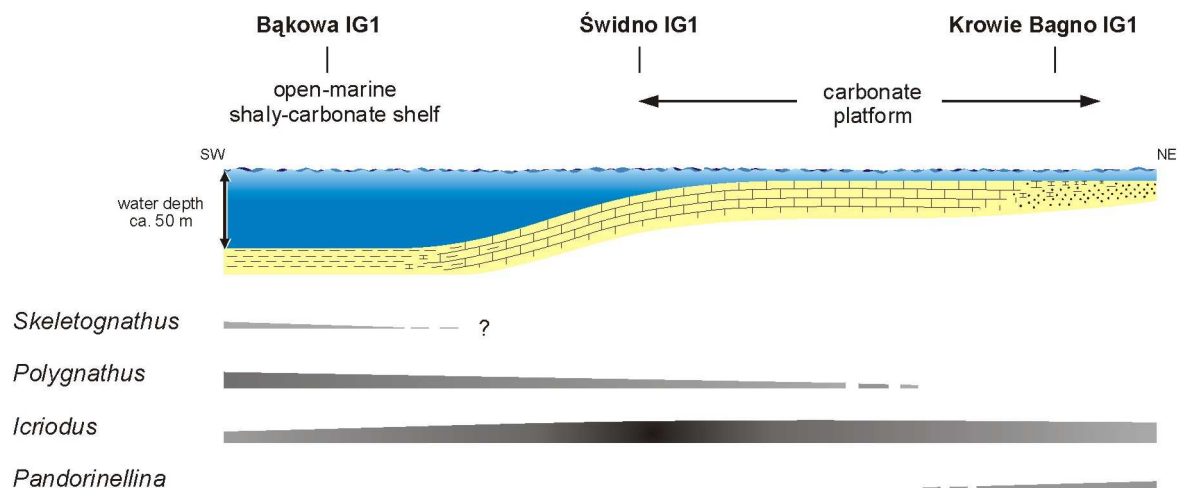


Fig. 1: Patterns of conodont taxa distribution in depositional environments of the Givetian Lublin and Łysogóry-Radom basins of the *ansatus* Zone (IIa transgression) and *norrisi* Zone (IIb transgression).