



The Lower Devonian marginal-marine ecosystems of the Holy Cross Mountains, Poland – new discoveries and observations

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Despite of more than 100 years of study, the Lower Devonian deposits of the Holy Cross Mountains (central Poland) are still not well understood from the biostratigraphical, environmental and also paleontological point of views. During field works and excavations conducted in 2011 numerous fossils (body and trace fossils) were discovered in a few Lower Devonian outcrops of the region. The siliciclastic sequence of the Lower Devonian of the southern part of the Holy Cross Mountains, is renowned for abundant vertebrate fossils, including mainly the jawless fish and placoderm remains. During the first detailed taphonomic study of the vertebrate assemblage from the so-called “Placoderm Sandstones” cropping out at the Podłazie near Daleszyce, abundant vertebrate remains have been collected (more than 600 specimens). Their analysis (that is in progress) will be the first description of so rich and numerous vertebrates association from the Central Europe that contains placoderms, sharks, acathodians and sarcopterygians. The degree of fragmentation of the bones and disarticulation of the skeletons suggest that the carcasses were reworked and transported before burial. Sedimentological data suggest deposition in a shallow marine environment. Numerous invertebrate ichnofossils (*Phycodes* isp., *Skolithos* isp., *Diplichnites* isp., *Monomorphichnus* isp., *Lockeia* cf. *siliquaria*, *Corophioides* isp. and *Teichinus* isp.) particularly well preserved were ascertained in another Lower Devonian site near Iwaniska. Moreover a very interesting assemblage of trace fossils corresponding to traces of feeding fishes were discovered. They are very similar to those found in much younger deposits (e.g. from the Eocene of Turkey). Its interpretation found them as made by placoderms is taken into consideration recently, because of its fitting to whole morphology of small coccosteids. They are also important that they could be the first imprints of soft body of the placoderm as a life animal according to good preservation of particular specimens. The occurrence of characteristic trace fossils is taken as strong evidence of marine influences of the studied section, where sedimentological features are not so clear, with exceptions of very few surfaces covered with symmetrical wave marks. The distribution of the most common trace fossils recognized in the field allowed for different interpretation than was proposed in the past which set up the river influence in the Lower Devonian of the eastern part of the Holy Cross Mountains, but it is not confirmed by mentioned above invertebrate ichnofossils. Instead of this the development of *Skolithos* and *Cruziana* ichnofacies in Iwaniska profile, indicate high energy conditions in foreshore zone, respectively. All the Lower Devonian sites with trace fossils and vertebrate bonebeds from the Holy Cross Mountains are associated with sandy deposits and have been formed in a sea-coastal zone during rather rapid sedimentation episodes, but differ in fossil abundance and degree of preservation.