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Hydrodynamically controlled anagenetic evolution of Famennian goniatites from Poland

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This paper reports on the evolution of ammonoids belonging to the family Tornoceratidae from the Devonian of Janczyce in the Holy Cross Mountains, Poland. Steady and gradual changes in conch morphology of the goniatite lineage *Phoenixites frechi-Tornoceras subacutum-T. sublentiforme* occurred in concert with water shallowing during the deposition of the Lower Famennian cephalopod limestone. Biometric analysis of ammonoid conch and facies analysis of the cephalopod limestones have been applied to assess the possible relationship between shell geometry and environmental changes. Results show that ratios of whorl width / diameter as well as whorl width / whorl height decreased, while distance from the venter to the greatest whorl width / diameter increased with time, thereby reducing hydrodynamic drag of the shells, probably in response to increasing water turbulence. The interpretation presented here is in agreement with similar cases from the literature. However, this kind of environmentally controlled evolution has hitherto been recognized only in Jurassic and Cretaceous ammonoids. Conch morphology may be considered as an indicator of palaeobathymetry.

Key words: Ammonoidea, hydrodynamics, evolution, environmental changes, Devonian, Poland.

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