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TOWARDS BETTER UNDERSTANDING OF AMMONOID TAPHOFACIES ON PELAGIC CARBONATE PLATFORMS

Adam TOMAŠOVÝCH[1, 2] **& Ján SCHLÖGL**[3]

[1]*University of Chicago, Department of Geophysical Sciences; Chicago, IL 60637*
[2]*Slovak Academy of Sciences, Geological Institute; Dúbravská cesta 9, 840 05 Bratislava, Slovakia; e-mail: tomasovych@uchicago.edu*
[3]*Comenius University, Faculty of Natural Sciences, Department of Geology and Paleontology; Mlynská Dolina – G, 842 15 Bratislava, Slovakia; e-mail: schlogl@nic.fns.uniba.sk*

Ammonoids frequently form conspicuous shell concentrations in sediments formed on pelagic carbonate platforms during the Jurassic. Such concentrations are of special interest because pelagic carbonate platforms generally preserve deposits affected by extensive syndepositional aragonite dissolution and sediment starvation, and such processes rather inhibit the formation of shell-rich accumulations. We find that ammonoid density in Upper Jurassic concentrations of the Dursztyn Limestone Formation (1) correlates positively with volumetric abundance of primary cement, (2) correlates negatively with the proportion of ammonoid shells affected by Fe-staining and syndepositional dissolution, and (3) correlates positively with proportions of ammonoid embryonic stages and early juveniles (Tomašových & Schlögl 2008). These concentrations are generally formed by mixture of well-preserved (ammonoid shells that were calcitized during late diagenesis) and moldic shells. The spatial association of dissolved aragonite shells and precipitated calcite at millimeter to centimeter scales in shell-rich deposits and the higher proportion of moldic shells in shell-poor than in shell-rich beds demonstrate that dissolution and cementation processes acted simultaneously in the semi-consolidated mixed layer. High abundance of ammonoid shells probably buffered dissolution in shell-rich deposits, indicating positive feedback between high abundance of ammonoid shells and low rate of shell destruction, with dissolved carbonate ions from aragonite input reducing rate of ammonoid dissolution and providing a local source for carbonate cement (e.g. Palmer & Wilson 2004, Wheeley *et al*. 2008). Although ammonoid concentrations show signs of episodic but short-term reworking, high proportions of internal bioerosion indicate that such shell concentrations were not rapidly buried but were rather exposed to taphonomic agents in the taphonomically active zone.

Significantly negative effects of taphonomic alteration on ammonoid shell packing density, spatial variations in shell-bed thickness, and the nonrandom relationship between density of large-sized (adult) ammonoids and abundance of ammonitellas and juveniles indicate that variations in abundance of ammonoids are simultaneously related to an increase in production and to a decrease in destruction rates. We suggest that (1) ammonoid concentrations represent long-term peaks in ammonoid production, with aragonite dissolution buffering the pore-water chemistry, and (2) the increase in ammonoid production rates is related to intervals with high fecundity coupled with high juvenile mortality. Ammonoid concentrations thus provide unique insights into the relative roles of production rates, destruction rates, and sedimentation rates in the genesis of shell concentrations, and indicate that ammonoid concentrations on pelagic carbonate platforms do not correspond to sediment starvation.

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