

TURNOVER IN THE AMMONOID SUPERFAMILY DESMOCERATOIDEA DUE TO OCEAN ANOXIC EVENT 2: COMPARISON OF BAYESIAN AND PARSIMONY-BASED PHYLOGENETIC METHODS

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The Cenomanian-Turonian (C-T) interval of the Late Cretaceous was a time of environmental perturbation within marine ecosystems, associated with Ocean Anoxic Event 2 (OAE2). OAE2 is characterized by a high amount of organic carbon sequestration, deposition of black shales, and expansion of the oxygen minimum zone. Sea surface temperatures were over 30°C around certain parts of the equator, making OAE2 the hottest time interval within the past 120 million years. Previous research has demonstrated that this event varied by region in its intensity. A significant number of marine taxa went extinct during this period, including ammonoids and foraminifera. One ammonoid superfamily that survived this extinction event is the cosmopolitan Desmoceratoidea. Until now, the effects of OAE2 on this superfamily were not well understood. I used both parsimony-based and Bayesian phylogenetic approaches to assess turnover through the C-T interval in this superfamily. In doing so, I developed the first quantitative species-level phylogenetic dataset for Desmoceratoidea, including 39 characters coded for 58 species. Parsimony-based analyses show that most genera do not form monophyletic clades. Some genera, such as *Damesites*, *Puzosia*, and *Lewesiceras*, have species scattered throughout the tree. Other genera overlap and show many morphological similarities, like *Beudanticeras* and *Desmoceras*. The parsimony-based analyses could not provide adequate resolution to assess turnover dynamics during the C-T interval. A Bayesian phylogenetic analysis was conducted using a reversible jump MCMC implementation in RevBayes. While the maximum clade credibility tree also shows some taxonomic jumbling, it aligns better with the known stratigraphic occurrences of the species. Estimated speciation rates were higher than extinction rates before and during OAE2. The C/T turnover event eliminated the puzosiid/desmoceratid clade while the pachydiscid clade diversified. This study provides insight from a cosmopolitan ammonoid clade's perspective into a critical interval in Earth history.

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