TAPHONOMY OF DISARTICULATED CRINOIDS FROM THE UPPER PENNSYLVANIAN BARNSDALL FORMATION, NORTHEASTERN OKLAHOMA

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Isolated ossicles representing completely disarticulated individuals constitute a major portion of the crinoid fossil record. Despite this, individual plates are often under-utilized in studies of crinoid taphonomy and paleoecology. As part of an ongoing investigation into the genesis of a Lagerstätte deposit in the Upper Pennsylvanian Barnsdall Formation of Oklahoma, taphonomic properties of isolated ossicles recovered from the same horizon as the articulated crinoids, as well as from overlying and underlying horizons, were assessed in order to recognize subtle changes in taphofacies and/or biofacies reflecting shifts in deposition or environmental variables not readily apparent by evaluation of lithology or articulated specimens. Ossicles were recovered from a matrix of very poorly indurated mudstone by immersion of bulk lithologic samples in a solvent, followed by sieving at 3.0mm, 2.0mm, 1.0mm, and 0.5mm. All crinoid material was inspected for physical indications of taphonomic processes including breakage, abrasion, corrosion, and encrustation. Separate radial plates were identified to genus, and disarticulation among genera was assessed by comparing the number of individuals represented solely by isolated plates (the number of radial plates divided by five) to articulated specimens. Results to date suggest that certain crinoid genera were more prone to total disarticulation than others, and this may impact paleoecological interpretations and community reconstructions. Horizons with articulated crinoids contain both an assemblage of fairly complete individuals representing one or more rapid burial events and a background, time-averaged assemblage of disarticulated individuals showing signs of considerable seafloor exposure during a time of sediment starvation. The decrease in average size and number of crinoid plates above the Lagerstätte horizons appears to be ecological rather than taphonomic in nature; that is, it reflects a faunal shift rather than hydraulic size sorting. Taphonomic analysis of isolated crinoid ossicles shows great potential for revealing critical but subtle patterns, particularly in otherwise monotonous sections, and may hold the key to unraveling the nature of depositional events in the Barnsdall Formation and other stratigraphically condensed units.