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Peculiar Diagenetic Processes and Preservation: Nearshore Marginal Marine Taphonomy in the Upper Lance Formation, Elk Basin, Wyoming

The nature and distribution of sediments occurring in Campanian-Maastrichtian stratal successions in Elk Basin, Wyoming provide information about transportation, deposition, and diagenetic processes operating during the Late Cretaceous within the western interior foreland basin. Sediment shape and texture suggest influence due to regional tectonic adjustment, perhaps coeval with the onset of the Elkhorn Volcanics. Tectono-taphonomic sedimentary features suggest potential foreland basin response to allostratigraphic events in lower portions of marginal marine to non-marine sediments of the Meeteetse - Lance Formations. Lance Formation sheet sandstone units located in Elk Basin, Wyoming are comprised of sedimentologically graded beds that fine upwards. Traditional sedimentologic analysis of clasts suggest deposition in a nearshore, marginal marine floodplain, such as a salt marsh, with low topography and anastomosing low gradient stream beds. EDS analysis of the sediments suggests paleoenvironmental trends operating in sediments that preserve dinosaur skin casts and molds in the Lower Lance Formation. The top of the second Lance Formation sheet sandstone in Elk Basin, Wyoming preferentially contains desiccation features and occurrences of articulated dinosaurs, along with small vertebrate fossils and invertebrate ichnofossils. Disarticulated dinosaur bone occurs preferentially in the bases of the first and third sandstone units in the Meeteetse Formation. Small channel (less than one meter in diameter) conglomerate lag deposits preferentially containing disarticulated dinosaur bone clasts are found in the lowest Meeteetse Formation sandstone. Disarticulated vertebrate bone contained within lag deposits and other units deposited hydraulically suggests transport mechanisms that moved bone away from the initial site of carcass deposition. Tectono-taphonomic deposits suggest carcass reworking and hydraulic response to foreland basin adjustments to changes in regional base-level, resulting in the reworking of sediments and faunal inclusions.