GSA Connects 2022 meeting in Denver, Colorado

Paper No. 126-8
Presentation Time: 2:00 PM-6:00 PM

TINY MODIFICATION FEATURES ON FOSSIL BONES FROM VERTEBRATE MICROFOSSIL BONEBEDS IN THE UPPER CRETACEOUS (CAMPANIAN) JUDITH RIVER FORMATION, MONTANA

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Surface modifications preserved on fossil bone yield clues that relate to post-mortem processes that transpire prior to fossilization. Previous studies of surface modifications have tended to focus on larger specimens, and studies that have explored modifications on smaller-scale remains have generally tracked evidence of digestion, often using scanning electron microscopy. Here we document a variety of bone surface modifications on a large sample (n=7,500) of small vertebrate fossils that are in the millimeter to centimeter size range. The specimens represent two surface collections from vertebrate microfossil bonebeds in the Upper Cretaceous (Campanian) Judith River Formation of Montana. Both sites preserve thousands of resilient bioclasts that accumulated in freshwater aquatic basins (lakes, swamps) in a coastal plain setting bordering the Western Interior Seaway. Surfaces of bone specimens, including both identifiable elements and unidentifiable fragments, were studied using hand lenses and light microscopes. Evidence of weathering in these ancient aquatic depositional settings is highly variable, with some specimens characterized by pristine intact surfaces, while others exhibit advanced cracking and degradation. Variability in quality of preservation is consistent with time-averaging. Evidence of ancient breakage is pervasive on both cm-scale and tiny mm-scale elements (~40% of specimens show ancient breaks), and this breakage presumably reflects trampling (linear sets of trample marks are common, ~25% of specimens show this modification feature) and feeding, with puncture marks (sometimes double-arched) often developed on the edges of spiral breaks. With regard to evidence for feeding, we documented punctures (interior and edge), drag marks (solitary and clustered), and small gnaw marks on ~10 % of the sample. All of these traces are interpreted as tooth marks, with potential predators/scavengers ranging in size from large theropod dinosaurs (denticle drag marks are associated with several tooth drags), crocodiles, and champsosaurs to small minnow-sized fish and perhaps amphibians (necrophagy in this group is relatively unexplored). Some of the tiniest feeding traces show distinctive patterning, and the goal is to link these unusual modifications to specific trace-makers.

Session No. 126--Booth# 34

T166. Showcase of Undergraduate Research Posters by 2YC and 4YCU Geoscience Students (Posters)
Monday, 10 October 2022: 2:00 PM-6:00 PM

Exhibit Hall F (Colorado Convention Center)

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