

Earth Sciences

Colloquium Series

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An ichnological framework for distinguishing freshwater and brackish-water strata

Date: Friday, March 27

Time: 1:30 pm

Location: BGS 0153



Environmental interpretations based solely on sedimentological criteria are often unreliable. Trace fossils provide a direct means of environmental discrimination because they record *in situ* animal responses to key ecological stresses, including salinity, oxygenation, substrate conditions, and food availability. Previous studies show that freshwater and brackish-water deposits host distinct trace-fossil assemblages, even where their physical sedimentary attributes are comparable. Subaqueous freshwater environments are characterized by extremely low-diversity, shallow-tier trace-fossil suites and a near absence of deep-tier or architecturally complex burrow systems. In contrast, persistently brackish-water settings support low-diversity but relatively high-density infaunal assemblages dominated by trophic generalists capable of exploiting both surface and subsurface resources through shallow- and deeper-tier burrowing strategies.

This presentation synthesizes neoichnological data from modern estuaries and bays with examples from the stratigraphic record to formalize an ichnofacies model for persistently brackish-water environments: the ***Teichichnus* Ichnofacies**. Brackish-water successions are shown to exhibit a recurring and predictable suite of trace fossils characterized by reduced ichnodiversity, small trace size, dominance of facies-crossing deposit- and interface-feeding structures (e.g., *Planolites*, *Teichichnus*, *Arenicolites*, *Cylindrichnus*, and diminutive *Thalassinoides*), heterogeneous spatial distribution, and locally elevated bioturbation intensity resulting from opportunistic colonization. By framing brackish-water trace-fossil assemblages within a formal ichnofacies framework, this work provides a robust, process-based tool for distinguishing freshwater from brackish-water deposits and addresses a long-standing gap in facies analysis of marginal-marine systems.

Coffee and Timbits will be served.