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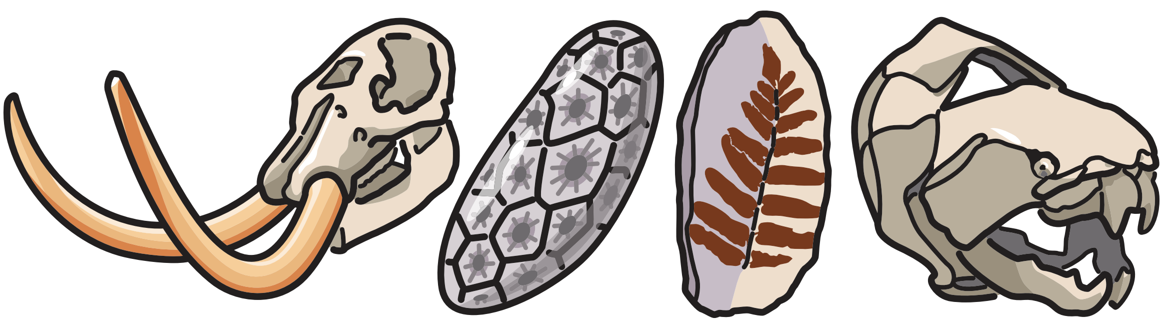

12th NORTH AMERICAN PALEONTOLOGICAL CONVENTION

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PROGRAM with ABSTRACTS

1600 m. Numerous montane species, including nearly 56% of sciurids and 26% of cricetids, are poorly represented within this intersection, suggesting that their preservation in the fossil record would be rare. In contrast, only 10% of Ecuador is covered by unconsolidated sediments, with estuarine deposits dominating the western coastal plains and fluvial systems in the eastern lowland rainforest. 70% of Ecuador rodent species have geographic ranges that overlap with unconsolidated sediments, most of which occur at elevations less than 500 m. Nearly half of Ecuador's cricetids are poorly represented within this range. Montane species represent nearly a third of native rodents in both regions, but are significantly less likely to be preserved in the fossil record due to taphonomic and erosive properties associated with high-elevation sedimentary deposits. Our findings have implications for interpretations of past biogeographic patterns and diversity gradients. By quantifying differences in mountain-proximal and mountain-distal diversity, composition, and preservation patterns, we contribute to a greater understanding of the fossil record of small mammals in regions with complex topography.

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VERTEBRATE TEETH AROSE AS SENSORY ORGANS

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The origin of vertebrate teeth has been an enigmatic problem in paleontology. While antecedents of teeth, known as odontodes, are first seen in the dermal exoskeleton of jawless vertebrates, an understanding of their function remains obscure. Multiple untested hypotheses on the original function of odontodes exist, from providing predator protection or being a structural support to sensory capability. However, to date there has been no fossil or developmental evidence to support any hypothesis. To test the timing, structure, and function of odontode origin we synchrotron scanned the earliest mineralizing vertebrates and diverse cuticles of fossil and living invertebrates. We show that the putative oldest vertebrate odontodes from the Late Cambrian, *Anatolepis*, are sensory sensilla belonging to an aglaspidid invertebrate. Middle Ordovician fossils now represent the oldest known vertebrate mineralized materials. These definitive Ordovician vertebrates such as *Eriptychius*, exhibit remarkably large dentin tubules convergent to invertebrate sensory structures suggestive of sensory function similar to that documented in teeth. Developmental study of diverse extant fishes reveals extensive pulp cavity sensory innervation of modern external odontodes. Together these data support the hypothesis that odontodes arose as sensory structures in the exoskeleton of earliest jawless vertebrates by the middle Ordovician.

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REDEFINING AND CONTEXTUALZING PALEOZOIC ECHINODERM DIVERSITY DYNAMICS

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Within the Paleozoic, the Ordovician Period holds some of the greatest shifts in biodiversity, encompassing both a major radiation event and a mass extinction, as well as global changes in ecology with the explosion of niche differentiation across environments. The Great Ordovician Biodiversification Event (GOBE), occurring in the Middle Ordovician, was a large radiation of lower-level taxonomic groups (i.e., families, genera, and species), occurring across various phyla with differences in the timing and magnitude of diversification across these groups. The Late Ordovician Mass Extinction (LOME) was two-pulsed: first, a major glaciation in the Southern Hemisphere lowered sea levels globally, followed by a subsequent warming. These events led to the second most disastrous extinction in Earth's history, leading to the extinction of ~85% of marine genera. An active area of paleobiological research is determining what abiotic and biotic factors drove changes in biodiversity across large geologic events. Fossil echinoderms are an excellent model system to test hypotheses of biodiversity change, as they are globally distributed, temporally expansive, and the group is responsive to climate changes. However, our current understanding of Paleozoic echinoderm biodiversity patterns is not well constrained, as many studies focused on crinoids because they are highly speciose and their occurrences are well documented. Crinoids alone cannot capture the entire clade's biodiversification patterns throughout the Paleozoic. To expand our understanding of echinoderm evolutionary dynamics, we investigated the biodiversity patterns of all major clades of Echinodermata, represented by 367 genera with a global distribution. We collected the temporal ranges and geographic occurrences for genera from both the primary literature and online fossil databases, such as the Paleobiology Database, and we calculated rates of genus diversity, origination, and extinction at a resolution of 1 Ma. Our

Paleozoic biodiversification patterns do not follow previously published analyses on echinoderms. Biodiversity trends uncovered in this study join a growing body of literature that suggests the LOME was a 3-pulsed mass extinction event. To infer the abiotic drivers of our recovered diversity patterns and evolutionary rates during the Ordovician, we performed least square regression analyses using the calculated biodiversification rates of a subset of 227 Ordovician genera and compiled stable isotope data. We found varying levels of correlation between environmental proxies and echinoderm biodiversity, indicating further work is needed to better quantify what abiotic drivers were responsible for recovered evolutionary patterns calculated from the fossil record.

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ANOTHER DECADE OF SCIENTIFIC CONTRIBUTIONS FROM THE CINCINNATI DRY DREDGERS: 2014–2024

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Dating back to their founding in 1942, the Dry Dredgers of greater Cincinnati, Ohio have a rich history of collaboration between professional and amateur paleontologists. In this overview, we highlight numerous examples of public outreach, donated specimens, co-authored publications, collaborative field work, conference participation, and ongoing research from 2014 to 2024. Central to this success are the long-standing relationships that the group has cultivated with paleontologists at the University of Cincinnati (UC), the Cincinnati Museum Center (CMC), and other regional institutions. These connections facilitate an exchange of information, allowing researchers to quickly learn about important discoveries made by amateur collectors, leading to donations, publications, and recognition. In return, the Dry Dredgers gain access to expertise in stratigraphy and fossil identification. Recent examples of published Dry Dredger research include: investigation into the preservation of “micromorph” faunas from phosphate-rich beds; discovery of rare and unusual taxa such as a new *Glyptocrinus* species, anomalous corals from the Kope Formation of Kentucky, as well as a new cyclocystoid from the Lower Silurian Brassfield Formation near Fairborn, Ohio; extensive collection and study of Silurian echinoderm assemblages from southern Indiana, especially the *Holocystites* fauna of the Wenlock-age Massie Formation; and ongoing work to clarify and correlate the Ordovician-Silurian strata of the Cincinnati Arch in a sequence stratigraphic context. Furthermore, the organization has made notable contributions to the CMC’s new *Ancient Worlds Hiding in Plain Sight* permanent exhibit, which showcases the Upper Ordovician fossils of the Cincinnati Arch as well as later Paleozoic faunas of Ohio. Individual Dry Dredgers members have donated specimens, volunteered their time, and provided expertise to help develop the exhibit, which also features paleontological artwork by two Dry Dredgers members: Bruce Gibson and Kyle Hartshorn.

CORALLINE ALGAE RESPONSE TO THE PALEOCENE-EOCENE THERMAL MAXIMUM IN NORTH-EASTERN INDIA AND SOUTHERN TIBET

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Coralline algae are important calcifying plants in modern oceans, producing carbonate sediment, providing food and shelter for many organisms, and cementing reef structures. Due to their high-Mg calcite skeletons, corallines may be vulnerable to ocean acidification, although their current response remains equivocal. Lab studies show negative effects of acidification on coralline physiology although the nature and magnitude of effects varies between species, making it difficult to extrapolate to a regional scale. Hyperthermals occurred throughout Earth’s history and provide an opportunity to examine the impacts of acidification and warming over evolutionary timescales. The Paleocene-Eocene Thermal Maximum (PETM), the largest Cenozoic hyperthermal, is considered the best analogue for modern climate change, resulting in 5–8 degrees C warming and widespread acidification over ~10 kyr. Paleoecological studies of PETM sediments reveal important biotic effects in many marine groups, but corallines have not been studied as extensively. I studied thin sections from the upper Paleocene-lower Eocene Lakadong Limestone in the east Janita Hills, Meghalaya, India, and the Jialazi Formation in southern Tibet, using point counts to quantify coralline abundance. I used carbon isotopes to locate the negative carbon isotope excursion that marks the onset of the PETM. Before the PETM, coralline abundance is low due to unsuitable environmental conditions. Surprisingly, coralline abundance increases to >20% during the early PETM, suggesting initial warming and acidification were not detrimental to coralline health. Subsequently, a drastic decrease in abundance during the PETM coincides with increased siliciclastic sedimentation. In the post-PETM corallines did not return to the carbonate platform as quickly as larger benthic foraminifera and other calcifiers. This may indicate a short-term response to PETM-induced acidification, however a lack of extinction or significant taxonomic turnover suggests corallines did not exhibit an evolutionary response to PETM environmental changes.

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