limited information on trophic interactions. Nevertheless, the carnivore component of the fauna is overall more stable, suggesting that environmental context may determine the coupling of turnovers.

Poster Session III (Friday, November 1, 2013, 4:15 - 6:15 PM)

ONTOGENETIC VARIABILITY IN UPPER CRETACEOUS THEROPOD TEETH

TORICES, Angelica, University of Alberta, Edmonton, AB, Canada, T6G 2E9; BRADLEY, Gavin, University of Alberta, Edmonton, AB, Canada; CURRIE, Philip, University of Alberta, Edmonton, AB, Canada

The ontogenetic, individual and positional variability of theropod teeth makes it difficult to estimate theropod diversity through the study of isolated specimens. Although the description of new taxa based solely on isolated teeth is no longer ubiquitous in paleontology, diagnostic tooth species have persisted since the latter half of the nineteenth century. A taxonomic classification that does not take into account dental differences among individuals of a species could result in an overestimation of the species present in the sample. Contrarily, it is also possible to underestimate species diversity if different species present identical morphologies.

Ontogenetic series are difficult enough to recognize even when there are complete skeletons, and this problem is greatly magnified when taxa are only known from isolated teeth. Some authors claim that theropod teeth show little ontogenetic variation, and that the teeth of young theropods are simply scaled-down versions of more mature individuals, although the juveniles have fewer but relatively larger denticles. However, other researchers suggest that denticle size and density depends on the height of the crown; larger teeth have larger denticles and therefore lower density of denticulation.

Ontogenetic variation in teeth was assessed for several Late Cretaceous theropods to determine whether or not current tooth-denticle ratio characters are correct and can be used to confidently distinguish Late Cretaceous taxa based on isolated teeth.

Juvenile and adult specimens of *Bambiraptor feinbergi*, *Daspletosaurus torosus*, *Gorgosaurus libratus*, *Saurornitholestes langstoni* (as an approximate corresponding adult for *Bambiraptor*) and *Velociraptor mongoliensis* were studied. The results suggest that although there is considerable variation in tooth size, the changes in denticle density are minimal in growth series of dromaeosaurids and tyrannosaurids; juvenile denticles are slightly smaller or the same size as they are in adult teeth. The number of denticles per millimeter seems to remain nearly constant through ontogeny and, therefore, may be characteristic of a taxon. Some differences, however, can be observed. In the case of *Daspletosaurus*, denticles are absent in the premaxillary teeth of juveniles, but are fully developed in adults, whereas in *Gorgosaurus*, denticles are present in all dental positions, at all life stages. These results comment on the validity of the practice of taxonomic classification of theropod dinosaurs, based solely on isolated teeth.

Poster Session IV (Saturday, November 2, 2013, 4:15 - 6:15 PM)

REDESCRIPTION OF THE INTERMEDIATE BILL MORPHOLOGY OF THE OLIGOMIOCENE FLAMINGO *HARRISONAVIS CROIZETI* BASED ON HIGH RESOLUTION X-RAY COMPUTED TOMOGRAPHY

TORRES, Christopher, UNC Wilmington, Wilmington, NC, United States, 28403; DE PIETRI, Vanesa, Natural History Museum Basel, Basel, Switzerland; LOUCHART, Antoine, Institut de Genomique Fonctionnelle de Lyon, Lyon, France; VAN TUINEN, Marcel, UNC Wilmington, Wilmington, NC, United States

Flamingos (Phoenicopteriformes) are a highly specialized lineage with a filter-feeding strategy entirely unique among modern birds. Though extant flamingo ecology and feeding behavior has been well-studied, the evolutionary history of this ecomorph remains poorly understood. No ancestral cranial or rostral fossil material has ever been formally described for crown clade flamingos (Phoenicopteridae). The most closely-related extinct taxon (Palaelodidae) has been described as possessing a straight, blunt bill, markedly different from that of modern flamingos. Thus, no intermediate form is known. *Harrisonavis* (‘*Phoenicopterus*’) *croizeti* has been described from the late Oligocene-early Miocene of the Auvergne region in central France and assigned to Phoenicopteridae based on, among other elements, a skull with clear affinities to the modern flamingo ecomorph. However, a thorough description is lacking and the original material has been lost. Here, new phoenicopterid cranial material is described from the Saint-Gérand-le-Puy area in central France which is tentatively assigned to *H. croizeti*, including a nearly complete cranium with articulated proximal upper rostrum, a distal rostral tip, and two pieces of mandibular material. High resolution X-ray computed tomography (CT) is used to describe the internal as well as external morphology, including a digitally reconstructed brain endocast which is compared with brain reconstructions from modern flamingos and palaelodids. CT data are used to create a three-dimensional reconstruction of the skull of *H. croizeti* to show that this taxon possessed a rostral ecomorph intermediate to those of the palaelodids and of modern flamingos. These data fill an important gap in understanding the evolution of this ecomorph and may inform the tempo and course of specialization in this unique lineage of birds.

Poster Session II (Thursday, October 31, 2013, 4:15 - 6:15 PM)

"WHAT ROCK IS THAT?" (AND OTHER COMMON 4TH GRADE QUESTIONS)- A FREE PROFESSIONAL DEVELOPMENT OPPORTUNITY FOR TEACHERS WITH NHMU

TOTH, Natalie, Natural History Museum of Utah, Salt Lake City, UT, United States, 84111; SEPPI, Jessica, Natural History Museum of Utah, Salt Lake City, UT, United States

Through our yearly interaction with students statewide, we, as scientists and outreach educators, observe a major disparity between the geology component of the 4th Grade Utah State Science Core Curriculum, and what teachers are conveying to their students in the classroom. This disparity resulted in consistently low scores in the geology portion of the State Core Test. To address this discrepancy, we created "What Rock Is That?" (and other common 4th grade questions)- a free professional development opportunity for classroom teachers throughout the state of Utah.

During this Geology Workshop, teachers are provided the opportunity to come to a greater understanding of geologic processes by interacting with museum-quality geology and paleontology specimens. After working with these specimens, we provide teachers with the content and background information necessary to build upon the foundation of this hands-on experience.

By working alongside museum educators who use and model inquiry-based learning techniques throughout the duration of the workshop, teachers are able to construct knowledge about the Earth Sciences from the perspective of their students, an opportunity that helps them empathize greatly with the struggles and frustrations their own students may encounter. Additionally, this empathy allows teachers to hone their science process skills by addressing discrepant events as learning opportunities, rather than a barrier to achieving a deeper understanding of geology. We found that by approaching complex science topics, such as geology and paleontology, in this way, teachers are able to break down previous misconceptions, which then, in turn, allows for the construction of new knowledge with a solid foundation of accurate and engaging ideas.

Even though "What Rock Is That?" is still in its infancy (with the first workshop offered in July 2012), these 3-hour long Geology Workshops have successfully reached 7 school districts across Utah. Out of these 7 districts reached, 85% of teachers ‘strongly agree’ that the workshop has made them feel more comfortable teaching geology in their classrooms. Additionally, 93% of teachers ‘‘strongly agree' that the w
was presented in an easily accessible and understandable manner.

It is through "What Rock Is That?" that we are able to emphasize that authentic and experiential learning opportunities, rather than simple memorization of facts about rocks, minerals, and fossils, are necessary for students and teachers to come to a greater understanding of the Earth Sciences.

Poster Session IV (Saturday, November 2, 2013, 4:15 - 6:15 PM)

AN EXPANDED ANALYSIS OF DENTAL MICROWEAR IN CAVIOMORPH RODENTS

TOWNSEND, K.E. Beth, Midwestern University, Glendale, AZ, United States, 85308; CROFT, Darin, Case School of Medicine, Cleveland, OH, United States

Caviomorph rodents have been significant components of South American ecosystems for more than 30 million years. How such rodents partitioned dietary resources with other groups of mammals, such as endemic South American ungulates, remains a little-explored question. Our research goal is to investigate this topic by characterizing enamel microwear in extant caviomorph rodents and using those data to interpret diets of extinct caviomorphs. Our 2008 pilot study of enamel microwear in extant caviomorph rodents demonstrated a correspondence between microwear and broad dietary groups but was based on relatively small samples. We here report results of a much-expanded analysis that includes 42-50 wild caught individuals of eight of the 13 taxa examined in our prior study. These new results support some aspects of our earlier analysis but also reveal patterns not evident previously. For example, the grass-leaf consumers, *Hydrochoerus* and *Cavia*, have high scratch counts typical of other grazers (e.g., ungulates, murid, sciurid rodents). Similarly, the fruit-seed consumers, *Proechimys cuvieri* and *Thrichomys*, have high pit counts similar to other seed predators. In contrast to our previous study, *Dasyprocta*, a fruit-leaf consumer, has unexpectedly high scratch counts (particularly fine scratches) more similar to grass-leaf consumers than typical frugivores. Additionally, *Hydrochoerus* has more gouges than other grazers, almost identical to what is seen in seed predators. The etiology of these gouges is not clear and merits investigation. Microwear of the grass-leaf consumer, *Ctenomys*, includes many pits and few scratches. Thus, it is more typical of a hard object feeder (hard fruit consumer or seed predator) than a grass feeder. This discrepancy is likely related to the fossorial habits of *Ctenomys*, which digs with its incisors as well as its forelimbs. This chisel-tooth digging could result in soil in the oral cavity and thereby affect enamel microwear, potentially resulting in the highly pitted microwear of *Ctenomys*. This would parallel the pattern seen in ungulate “dirty browsers” such as *Camelus*, which also have highly pitted microwear. The correlation between dietary grit and highly pitted microwear in both *Ctenomys* and *Camelus* implies that the abundant scratches characteristic of grazers probably results from the consumption of opal phytoliths rather than exogenous dietary grit. The lack of scratches in *Ctenomys* may simply be due to overprinting of the grazing microwear signal by a dietary grit signal.

Poster Session I (Wednesday, October 30, 2013, 4:15 - 6:15 PM)

THERMOREGULATORY STATUS OF MOSASAURS FROM THE WESTERN INTERIOR SEAWAY OF KANSAS, USA

TREVETHAN, Ian, Fort Hays State University, Hays, KS, United States, 67601

During the Late Cretaceous, the central portion of the North American continent was occupied by the Western Interior Seaway. The fauna of the Western Interior Seaway was segregated into distinct habitats, based on physical, chemical, and geographic factors.

Mosasaurs (Squamata: Mosasauridae) were a diverse group of secondarily aquatic marine reptiles derived from varanid-like lizards that radiated into marine niches 98-65 Ma, during the latter half of the Cretaceous. Over 3000 specimens of mosasaurs have been described from the Late Cretaceous strata of the Western Interior Basin of North America. Although studies of mosasaur relationships, distribution, and diversity continue to add to the growing body of knowledge, little is known about other key aspects regarding the ecology of this family.