representing the remains of more than 80 individuals. The complete skeleton is known for the species and this sample provides unique insights into intraspecific variation among basal crocodylians while informing on anatomical changes as they grow. The objective of this study is to document differences between the specimens and compare to modern species of crocodylians.

Morphological variability is present throughout the skeleton of *B. formidabilis*. The elements, sutural contacts, and foramina of the posterior skull demonstrate the most variability, some of which result in divergent character state codings in published matrices. Among the lower jaws, intraspecific differences are concentrated in and around the jaw joint. Variability in postcranial skeletal morphology is pronounced in the limb girdles but is present in the vertebral column as well.

Historically, determining numbers of fossil species has been open to interpretation of the author and operational species likely outnumber real species. As fossils are often found in isolation, two specimens of similar age from different localities, which demonstrate slight variation, are oftentimes assigned to different species. But studies of modern crocodylians indicate that considerable morphological variation may be present within a species (i.e., *Alligator mississippiensis*). It is likely that intraspecific variation in fossil species is proportional to that of their modern counterparts, and this variation complicates efforts in the recognition of fossil species.

Until now, intraspecific variation among basal crocodylians using an expansive, single site, single taxon sample has not been undertaken. This collection allows for the comparison of variation not only among individuals of the same life history stage but also over ontogeny. Insights from the fossils in this project, in concert with studies of modern species, will guide efforts in recognizing fossil diversity in named, and yet to be named, species.

Marine Reptile Diversity & Biology

PARANASAL SINUS SYSTEM EVOLUTION IN METRIORHYNCHOID CROCODYLOMORPHS

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During the Mesozoic, metriorhynchoid crocodylomorphs adapted to life in marine ecosystems, transitioning from semi-aquatic predators into fully pelagic forms (Metriorhynchidae). Until recently this transition has largely focused on the osteological changes, with the endocranial changes being poorly studied. This is especially true for the paranasal sinus system. In extant crocodylians the rostrum has numerous pneumatic diverticula originating from both the nasal cavity and nasopharyngeal ducts, that become more extensive (in terms of size and number of diverticula) during ontogeny. To investigate the evolution of this sinus system we digitally segmented μCT scans of skulls of two basal metriorhynchoids (*Pelagosaurus typus* and *Eoneustes gaudryi*), four derived pelagic metriorhynchids (*Metriorhynchus superciliosus*, *Cricosaurus araucanensis*, *Cricosaurus schroederi*, and *Torvoneustes coryphaeus*), and two adult and juvenile longirostrine crocodylians (*Gavialis gangeticus* and *Tomistoma schlegelii*) for comparison. We found metriorhynchoids to have exceptionally reduced paranasal sinus systems, solely comprising the antorbital sinus. In basal metriorhynchoids the paranasal sinus extent and morphology is most similar to juvenile longirostrine crocodylians, suggesting evidence of paedomorphosis in Metriorhynchoidea. The antorbital sinus is largely indistinguishable from the dorsal alveolar canal in basal metriorhynchoids, and we propose that they shared the same cavity. In Metriorhynchidae, the antorbital sinus has a conical morphology and extends posteriorly through the postnasal fenestra into the orbit, creating an accessory suborbital sinus. The function of the suborbital sinus is unknown, but its association with the dorsal pterygoideous muscle possibly allowed active ventilation of the paranasal sinus system indicating a respiratory function. Alternatively, expansion and contraction of the sinus through the postnasal fenestra could have enabled metriorhynchids to cope with water pressure changes when diving. The nasopharyngeal ducts in basal metriorhynchoids are similar to extant crocodylians, but in metriorhynchids they are dorsoventrally enlarged and bordered ventrally by thickened palatines. The larger transverse area of the ducts could have enabled stronger ventilation, especially if metriorhynchids had increased lung capacity. The nasal cavity posterior in most metriorhynchoids is dorsolaterally expanded, likely for housing the enlarged salt glands.

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Late Cenozoic Mammalian Macroecology & Macroevolution

PALEOENVIRONMENT AND CHRONOLOGY OF THE LATE MIDDLE MIOCENE (SERRAVALLIAN) MAMMAL SITE OF QUEBRADA HONDA, SOUTHERN BOLIVIA

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Quebrada Honda (QH) is among the best-characterized middle Miocene terrestrial vertebrate sites of South America, with >40 spp. (mainly mammals) documented. Our work clarifies its paleoenvironmental and geochronological context. The studied section (~180 m) can be divided into: (1) a lower unit of reddish mudstone and minor sandstone with basal alluvial gravels; (2) an intermediate unit of mudstone with intercalated beds of soil carbonate; and (3) an upper unit of reddish mudstone with local sandstone and conglomerate channels. Most vertebrate fossils derive from near the base of unit 1. Paleosols and ichnofossils from this unit suggest deposition in a seasonal, sub-humid to semi-arid savanna with MAP of ~100 cm, an interpretation supported by ecological diversity analysis of QH mammals. Paleosol MAP variation is consistent with changes over time scales $>10^2$–10^3 years, and well-preserved, several m-thick sedimentary cycles likely reflect ~20 ka cycles in MAP due to precessional orbital forcing (Milankovitch Cycles). We generated three local paleomagnetic sections for the QH basin (based on 60 samples) and seven high-precision Ar^{40}–Ar^{39}dates for intercalated tuffs, including the first from the Rio Rosario (RR) and Huayllajara (HU) local areas. Our global GPTS correlation indicates that the most fossiliferous intervals at QH are coeval with the Monkey Beds at La Venta, Colombia (Chron C5AA; >13.03 Ma). Fossils at HU derive from strata lithostratigraphically similar to units 2 and 3 of the QH local area; tuff ages and paleomagnetic zones from both areas are concordant with correlation to the younger part of Chron C5A (12.74–12.049 Ma). Phytolith assemblages can be divided into two types using PCA: one with moderately abundant palms and other forest indicators and warm-adapted, presumably open-habitat PACMAD grasses, and the other typically dominated by closed-habitat grasses (e.g., bamboos). Assemblages rich in palm and open-habitat grass morphotypes are associated with laminated sandy layers, primarily in the middle of unit 1, suggestive of more open, riparian vegetation. In contrast, assemblages of mainly closed-habitat grass phytoliths are from mudstones associated with soil carbonate, primarily in unit 2, potentially representing more terra firme plant communities. A chi-squared comparison of vertebrates of the QH and RR local areas reveals no major taxonomic differences, but turtle and rodent abundances suggest RR samples a less mesic microhabitat.

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Symposium: Dietary Reconstruction

AN INITIAL INVESTIGATION OF NICHE PARTITIONING AMONG HISPANIOLA'S RECENT RODENT RADIATION USING STABLE ISOTOPES

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The island of Hispaniola has one extant endemic rodent: Cuvier's hutia (*Plagiodontia aedium*). At least 10 additional caviomorph rodent species lived on the island until the Holocene, and some persisted until just several hundred years ago. These taxa have only been cursorily described (based solely on cranial features) and little is known about their foraging adaptations. We use a suite of carbon ($\delta^{13}C$), nitrogen ($\delta^{15}N$), and oxygen ($\delta^{18}O$) isotopes in incisor enamel and bone collagen to conduct an initial investigation of niche partitioning among endemic rodent taxa as well as introduced *Rattus* from two fossil deposits in the Tiburon Peninsula of southwest Haiti (Trou Jean Paul and Trouing Jérémie 5). These preliminary isotope data support both dietary or spatial niche partitioning among taxa and support what we know about extant taxa. Enamel $\delta^{13}C$ and $\delta^{18}O$ values suggest varying reliance on foliage, fruit, and potentially grasses, and that some species lived in the forest understory, while others likely frequented canopy and more open habitats. Collagen $\delta^{13}C$ and $\delta^{15}N$ values provide further evidence for niche partitioning among taxa. Six species, including extant *P. aedium*, form a cluster of lower $\delta^{13}C$ and $\delta^{15}N$ values, while three taxa, including *Rattus*, have higher $\delta^{13}C$ and $\delta^{15}N$ values. The combination of intermediate enamel $\delta^{13}C$ and $\delta^{18}O$ values and low collagen $\delta^{13}C$ and $\delta^{15}N$ values for extant *P. aedium* align with observations of a scansorial and generalist herbivore lifestyle for living individuals. Likewise, high $\delta^{13}C$, $\delta^{18}O$, and $\delta^{15}N$ values for *Rattus* are consistent with some trophic omnivory and use of open habitats. A previously undescribed species of *Isolobodon* has higher enamel $\delta^{13}C$ than any other taxon, which likely reflects moderate reliance on a C_4 food, such as grass seeds. Conversely, low $\delta^{13}C$, $\delta^{18}O$, and $\delta^{15}N$ values for *Plagiodontia spelaeum*, and possibly *Isolobodon portoricensis*, suggest terrestrial foraging under a relatively