ed teeth, placoid scales, and fin spines. Currently, there is a major controversy concerning the value of diagnostic characters for distinguishing palaeospinacid genera, because of very similar dental morphologies and the scarcity of articulated skeletal material, which is only known from the Lower Jurassic of Lyme Regis (England) and Holzmaden (southern Germany), from the Upper Jurassic of southern Germany, and the Late Cretaceous of England.

So far, two genera are considered valid within this family: *Paraorthacodus* being represented by one partial and *Synechodus* by several skeletal remains. All specimens from the Lower Jurassic bear two fin spines, whereas all other material known up to date lacks most postcranial portions.

A re-examination of all articulated selachians from the Upper Jurassic Lithographic Limestones of southern Germany yielded several complete palaeospinacid individuals displaying abundant dental, cranial, and postcranial characters. One new species of *Paraorthacodus* is represented by very well-preserved adult and juvenile individuals. In addition, skeletal remains of two different species of *Synechodus* including one new taxon are reported here. This new material proves to include key-taxa for solving taxonomic problems and reconstructing the phylogeny and biogeography of synechodontiform sharks. Important characters are the number of dorsal fins, the distribution of fin spines, and the position of paired and unpaired fins. Based on this material, it is possible to define apomorphic dental characters for distinguishing *Paraorthacodus* and *Synechodus*, and additionally, to transfer all Early Jurassic palaeospinacids possessing dorsal fin spines to a new genus.

Poster Session II

DOES *PROCOMPSOGNATHUS* HAVE A HEAD? SYSTEMATICS OF AN ENIGMATIC TRIASSIC TAXON

KNOLL, Fabien, SCHOCH, Rainer, Staatliches Museum für Naturkunde, Stuttgart, Germany

Procompsognathus triassicus is a taxon from the Stubensandstein of Pfaffenhofen, near Heilbronn (Baden-Württemberg, Germany), which has been the subject of persistent controversies. In order to provide clarification of the status of SMNS material ascribed to this enigmatic archosaur (SMNS 12591, 12591a, 12352, and 12352a), additional preparing as well as high-resolution X-ray CT analyses have been conducted. From a global morphological point of view, the type material, SMNS 12591, shows strong similarities with *Coelophysis*. A supertree analysis suggests that *Dilophosaurus*, *Liliensternus*, *Coelophysis*, and *Segisaurus* may be successively closer sister-taxa to *Procompsognathus*. SMNS 12591a shows a mosaic of characters difficult to decipher in terms of phylogenetic affinities, but it is tentatively suggested that it is from an early and very plesiomorphic tetanuran based on the presence of an assumed maxillary fenestra. SMNS 12352 likely pertains to a crocodylomorph in part due to the separation between the nasal and the antorbital fossa. SMNS 12352 has been attributed to *Saltoposuchus connectens* but there are some differences between SMNS 12352 and 12596 (regarding the outline of the antorbital fenestra and the depth of the maxilla at the level of the rostral part of the antorbital fenestra) that cast serious doubt on this identification. Finally, SMNS 12352a shows a definitive primitive *Bauplan* in being pentadactyl with no obvious differential development of the digit II. Yet, a long and powerful three-fingered hand arose in the earliest theropods whereas the hand of "thecodonts" is generally crocodile-like. Therefore, though it cannot be definitely attested so far, the pertaining of SMNS 12352a to a crocodylomorph is substantiated. The carnivorous guild that dwelled southern Germany prior to the Tr-J boundary events was remarkably diverse and strengthens the hypothesis according to which fundamental evolution within the clade Theropoda was under way well before the Tr-J boundary events.

Saturday 11:00

ORNITHOMIMIDS (THEROPODA: DINOSAURIA) FROM THE LATE CRETACEOUS OF ALBERTA, CANADA

KOBAYASHI, Yoshitsugu, Hokkaido Univ., Sapporo, Japan; MAKOVICKY, Peter, Field Museum of Natural History, Chicago, IL; CURRIE, Philip, Univ. of Alberta, Edmonton, AB

Ornithomimid dinosaurs are common in Upper Cretaceous sediments of North America, but most are fragmentary and crushed. In the 1990's, beautifully preserved skeletons of two ornithomimids (*Struthiomimus altus* (TMP 90.26.1) from the Horseshoe Canyon Formation and *Ornithomimus edmontonicus* (TMP 95.110.1) from the Dinosaur Park Formation) were discovered in Alberta, providing a better understanding of North American ornithomimids.

Comparisons of these two skeletons with other North American ornithomimid specimens clarify differences between *Struthiomimus* and *Ornithomimus*. These differences are mainly seen in the structures of skull (e.g., skull size relative to femur length, shapes of anterior ramus of the postorbital, dorsal ramus of the quadratojugal, and paraquadratic foramen), arm (e.g., robustness of humerus and relative length of metacarpals and manual unguals), and posterior caudal vertebrae. The unique features of *Struthiomimus* are a small skull relative to femur length and long manual unguals. *Ornithomimus* is diagnosed by an accessory process of the anterior ramus of the postorbital, bifurcated dorsal ramus of the quadratojugal, deep embayment along the posterior border of the quadratojugal for the paraquadratic foramen, and ridge and groove articulation between pre- and postzygapophyses of the posterior caudal vertebrae.

Dromiceiomimus, another ornithomimid genus from North America, was originally diagnosed by proportions of selected elements, but some previous studies suggested that those ratios are not statistically supported and that *Dromiceiomimus* is a junior synonym to *Ornithomimus*. A partial skull of *Dromiceiomimus brevitertius* (CMN 12228) shows *Ornithomimus* characters (shapes of anterior ramus of the postorbital, dorsal ramus of the quadratojugal and paraquadratic foramen), confirming that *Dromiceiomimus* is synonymous with *Ornithomimus*.

Wednesday 10:15

ENAMEL MICROSTRUCTURE IN *CORYPHODON* AND THE POSSIBLE CORRELATION OF BODY SIZE AND SCHMELZMUSTER

KOENIGSWALD, Wighart, Univ. of Bonn, Bonn, Germany; ROSE, Kenneth, Johns Hopkins Univ., Baltimore, MD; GINGERICH, Philip, Univ. of Michigan, Ann Arbor, MI

Most small mammals (e.g., Lipotyphla, Chiroptera, Apatotheria, and small primates) have only radial enamel. In this body size group, Glires are a remarkable exception, having a modified schmelzmuster in their ever-growing incisors. During the Paleocene and Eocene, most placental lineages independently evolved transversely oriented Hunter Schreger-bands (HSB) as body size increased: e.g., Primates [*Plesiadapis*], Perissodactyla [*Hyracotherium*], Artiodactyla [*Diacodexis*], and Notoungulata [*Colbertia*]. Prism decussation of the HSB protects the enamel from cracking. In the lower Eocene the pantodont *Coryphodon* is by far the largest herbivore, surpassing contemporary *Hyracotherium* and *Diacodexis* by more than two orders of magnitude. The dentition of *Coryphodon* differs from that of the small herbivores in two ways: (1) the molars have better developed high cutting edges; and (2) the enamel microstructure is modified in a very specific way. There is intensive decussation of prisms, but no transverse HSB. It is striking that extant African rhinos and elephants have modified enamel too, showing the 3D-enamel and a vertical arrangement of HSB. This is in contrast to the smaller herbivorous zebras and antelopes. Similar modifications in enamel microstructure have been observed in the giant South American ungulates *Pyrotherium* and *Astrapotherium*, and in the North American brontotheres, chalicotheres, and *Uintatherium*. Most herbivores of smaller body size have transverse HSB.

Certainly body size and enamel microstructure are only weakly correlated, but three size classes may be differentiated: (1) small mammals with radial enamel; (2) mid-sized mammals with transverse HSB; and (3) giants with strongly modified prism decussation. This seems to apply generally to placental mammals, whereas marsupials developed HSB only occasionally.

Friday 9:00

RECONSIDERATION OF TECTONICS-REGIONAL CLIMATE FORCING OF MIOCENE FAUNAL DIVERSITIES IN THE WESTERN UNITED STATES

KOHN, Matthew, Univ. of South Carolina, Columbia, SC; FREMD, Theodore, National Park Service, Kimberly, OR

Reconsideration of the temporal patterns in mammal alpha diversities confirms a correlation we suggested earlier with respect to regional tectonics and climate change. In this study we: 1) consider faunal diversity patterns in four provinces: Great Plains, Pacific Northwest, Mojave, and Rockies, 2) screen for taphonomic and area biases to better characterize alpha-diversities, 3) include ungulates, carnivores and rodents to investigate different correlations with climate parameters, and 4) consider global climate and tectonic drivers of regional climate.

Ungulate diversity increases much more abruptly at ~17.5 Ma than previously recognized (<1 Myr, and possibly not resolvable chronologically); diversity then gradually decreases between 15 and 11.25 Ma and remains static thereafter in the Pacific Northwest. Carnivore diversity essentially tracks herbivore diversity, but with a 0.5 Myr time lag at 17.5 Ma. Rodent diversity remains low until 15.6 Ma, then increases 3-fold by 14.7 Ma and remains high until the present.

At 17.5 Ma, abrupt, widespread extensional tectonism increased topographic diversity and best explains near-coincident increases in ungulate and carnivore diversities. The other trends mainly reflect global influences on regional climate. Atmospheric and ocean circulation patterns shifted to quasi-modern conditions, initiating ~15 Ma with narrowing of Tethys, and strengthening at 11 and 8 Ma with growth of the Tibetan Plateau. These changes yielded a new, progressively intensifying climate regime in western North America—drier conditions overall, greater precipitation seasonality, and warmer winters along the west coast. Correlations between modern faunal diversities and climate show that these changes should yield decreased diversities in large mammals (ungulates) and carnivores, but increased diversities of small mammals (rodents), as observed. Miocene extensional tectonics and plateau formation were main driving forces for faunal diversification, both directly through the generation of topography (17.5 Ma), and indirectly through climate and climate seasonality intermediaries (15-8 Ma).

Poster Session III

NEW MAMMALIAN FAUNA FROM THE EARLY PLIOCENE OF MONGOLIA

KONDRASHOV, Peter, Northwest Missouri State Univ., Maryville, MO; AGADZHANYAN, Alexandre, Paleontological Institute RAS, Moscow, Russia

Significant mammalian specimens were obtained from the Chono-Khariakh locality in northwestern Mongolia during an expedition of the Russian Academy of Sciences in 1997. The fossil-bearing horizons correspond to the upper Khirgis-Nur member, long thought to be of middle-late Pliocene in age, but recently redefined as early Pliocene. Most bones were found in the sand-argillaceous horizon, overlain with a large amount of pebbles. The following mammals were identified: *Sinotherium lagrelii* Ringstrom, 1922; *Gazella* sp.; *Vulpes* sp. nov.; Mustelidae gen. indet.; *Trogontherium cuvieri* Fischer von Waldheim, 1809; *Aratomys multifidus* Zazhigin, 1977; *Trischizolagus* sp.; *Ochotona* ex gr. *O. gigas*