MEETING PROGRAM & ABSTRACTS

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SOCIETY OF
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ABSTRACTS OF PAPERS
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Poster Session I (Wednesday, November 5, 2014, 4:15 - 6:15 PM)

THE LATE TRIASSIC OF JAMESON LAND REVISITED: NEW VERTEBRATE FINDINGS AND THE FIRST PHYTOSAUR FROM GREENLAND

MATEUS, Octávio, Universidade Nova de Lisboa - FCT, Caparica, Portugal; CLEMMENSEN, Lars, Department of Geosciences and Natural Resource Management, Copenhagen, Denmark; KLEIN, Nicole, Staatliches Museum für Naturkunde, Stuttgart, Germany; WINGS, Oliver, Museum für Naturkunde Berlin, Berlin, Germany; FROBØSE, Nicolaij, Department of Geosciences and Natural Resource Management, Copenhagen, Denmark; MILÀN, Jesper, Østsjællands Museum, Faxe, Denmark; ADOLFSSEN, Jan Schulz, Geomuseum Faxe/Østsjællands Museum, Faxe, Denmark; ESTRUP, Eliza, GeoCenter Møns Klint, Møns Klint, Denmark

An expedition to Jameson Land (East Greenland) was conducted in July of 2012, involving twelve researchers and technicians from Denmark, Germany, and Portugal. The fieldwork focused on two sites: Lepidopteris Elv and Macknight Bjerg, both within the Norian-Rhaetian Malmros Klint and Ørsted Dal Members of the Fleming Fjord Formation.

One of the main findings include partial phytosaur skeletons at Lepidopteris Elv (middle Malmros Klint Mb, ~211-210 Ma, Norian), including well preserved cranial and postcranial elements. Disarticulated skull material includes the mandible, jugals, postorbital, angular and quadrate. Many axial and appendicular bones were collected. Considering size ranges and duplication of bones, the phytosaur material pertains to at least to four individuals and three size ranges. Most bones are adult size with an estimated body length of about 3.8 m, including three identical humeri of the same size (two left and one right side, between 255 and 264 mm) that provide evidence for at least two individuals.

Three complete dorsal neural arches and one centrum, all with unfused open neurocentral sutures, and an anterior part of a dentary about 63 mm long show the additional presence of an animal with 1-2 m body length. The third and smallest body size is deduced from a complete left scapula only 34 mm in length, corresponding to a body length of 45 to 55 cm. This totals four individuals. These are the first well documented phytosaurs in Greenland because bones of previous expeditions belong to temnospondyls.

The prosauropod *Plateosaurus* site found in the 1990s at Macknight Bjerg (top of Malmros Klint Mb) was excavated. The number of bones and their relative size indicate that more than one individual and body size is present.

A new basal Testudinata specimen, very fragmented due to solifluction, was also collected at Macknight Bjerg (Ørsted Dal Mb). The suture pattern of the carapace shows a basal condition and cf. *Proganochelys* was previously documented to the area.

Numerous theropod tracks were revisited and additional tracks were found: cheirotherid tracks at Lepidopteris Elv (Ørsted Dal Mb)and large sauropod and prosauropod tracks in outcrops near Macknight Bjerg.

A new locality, ″Burned Paper-Shale site″, at the base of the Rhaetian Kap Stewart Fm yielded numerous coprolites, shark remains, and temnospondyls. The faunal list is similar to fossil localities in Central Europe and may indicate the typical vertebrate assemblage in a stable Late Triassic terrestrial ecosystem.

Poster Session I (Wednesday, November 5, 2014, 4:15 - 6:15 PM)

THE OLDEST RECORD OF *PALEOPARADOXIA* FROM THE NORTHWEST PACIFIC AND ITS IMPLICATION ON THE EARLY EVOLUTION OF PALEOPARADOXIINAE (MAMMALIA, DESMOSTYLIA)

MATSUI, Kumiko, The University of Tokyo, Tokyo, Japan; KAWABE, Soichiro, Gifu Prefectural Museum, Gifu, Japan

Paleoparadoxia is an extinct marine mammal taxon belonging to Paleoparadoxiinae and has been found from the lowest through lower upper Miocene. The basal paleoparadoxiine *Archaeoparadoxia* was found from the lowest Miocene (23–20.8 Ma) in the Northeast Pacific and *Paleoparadoxia*, one of the derived paleoparadoxiines, had been reported from the lower Miocene (18–17 Ma) in the Northwest Pacific. Here we report new material of *Paleoparadoxia* found from Hokkaido, Japan, in the Northwest Pacific, which are considerably older than the previous records of this genus. The material consists of a proximal part of the scapula and a proximal end of the humerus from the left side, as well as a fragmentary rib, preserved in a float of calcareous fine sandstone. The specimen is referred to Desmostylia based on diagnostic characteristics such as a straight humeral body and an unexpanded deltoid ridge. We identified this new specimen as an adult *Paleoparadoxia* sp. based on such characteristics as the greater tubercle extending toward the proximal side above the head and the distinct lesser tubercle located on medial side projected medially, which we newly identified as characteristics diagnostic of the genus *Paleoparadoxia* based on comparisons of a wide range of desmostylid specimens.

The float contains diatoms, molluscan shells, and wood fragments. The lithology and associated fossil fauna of the float suggest that it was derived from the lower Miocene Sankebetsu Formation outcropping in the area where it was found. The published age estimate of the formation indicates that the age of the present specimen falls within a range between 23.8 ± 1.5 and 20.6 ± 1.0 Ma. This represents the oldest record of *Paleoparadoxia* presently known, also nearly matching the oldest record of Paleoparadoxiinae in the Northwest Pacific. This indicates that the currently-known oldest occurrences of basal and derived paleoparadoxiines (i.e., *Archaeoparadoxia* from the Northeast Pacific and *Paleoparadoxia* from the Northwest Pacific, respectively) overlap in age. Accordingly, it is likely that the geographic range of Paleoparadoxiinae had already expanded from the Northeast to Northwest Pacific in the early stage of evolution of this clade.

Poster Session II (Thursday, November 6, 2014, 4:15 - 6:15 PM)

FUNCTIONAL MORPHOLOGY OF THE PALATAL DENTITION IN THE REPTILIAN GROUP, CHORISTODERA

MATSUMOTO, Ryoko, Kanagawa Prefectural Museum of Natural History, Kanagawa, Japan; EVANS, Susan, Univ College London, London, United Kingdom

Within amniotes, palatal teeth and palatal rugae have an important role in holding food within the mouth as it is manipulated by the tongue and jaws. During feeding, the tongue and palate cooperate in gripping, intra-oral transport, and swallowing, thus modification of the palatal surface should reflect changes in feeding behavior and/or changes in the anatomy of the oral soft tissues. There is a general acceptance that a full palatal dentition is plesiomorphic for amniotes, and a review of palate structure across tetrapods shows a general trend toward reduction or loss of the dentition in derived members of most major lineages. The challenge is then to provide an explanation, in terms of diet and/or feeding strategy, for changes in this important gripping surface.

Freshwater choristoderes differ from most tetrapod groups in retaining a palatal dentition in even the most derived taxa. Detailed examination of several genera shows that the orientation of the palatal tooth crowns changes with their position on the palate, supporting the view that they are involved in intra-oral food transportation, presumably in combination with a fleshy tongue. Moreover, observed variation in palatal tooth shape and the width of palatal tooth batteries may provide additional clues about diet, and therefore about niche segregation where two or more species co-occur. A study of the extant fish (*Cichlasoma*) found a correspondence between palatal tooth morphology and diet: those with pointed teeth showed a greater preference for soft prey than those with more robust rounded teeth. Relating this to choristoderes, the European *Simoedosaurus lemoinei* has sharper palatal teeth than its North American counterpart, *S. dakotensis,* suggesting a preference for softer prey: a conclusion consistent with the more gracile teeth and narrower snout. Similarly, juveniles of C*hampsosaurus lindoei* have sharper palatal teeth than adults, indicative of a dietary shift during ontogeny from soft to harder prey, as in modern crocodiles.

Poster Session II (Thursday, November 6, 2014, 4:15 - 6:15 PM)

A MULTI-DIMENSIONAL LOOK AT MORPHOLOGICAL VARIATION IN ICHNOFAUNA: TRACKING CHANGES WITHIN AND BETWEEN ICHNOTAXA

MATTHEWS, Neffra, US Bureau of Land Management, Denver, CO, United States of America, 80227; POND, Stuart, University of Southampton, Southampton, United Kingdom; BREITHAUPT, Brent, BLM - Wyoming, Laramie, WY, United States of America

Categorizing fossil footprints according to ichnotaxa can be problematic due to a number of variables, including the diversity of trackmakers, dynamics of the biomechanical interaction of foot and substrate, variations in type and consistency of substrate, preservational dynamics, and subsequent erosional processes. In addition, traditional methods of data collection and comparison have largely been limited to 2D drawings and landmark analysis in which a limited number of tracks (occasionally only an isolated footprint) and track features are characterized, often making assignment of ichnotaxa problematic. However, increased availability of dense 3D point cloud data combined with low cost or open source point cloud registration and triangular meshes software supports quantitative comparison of 3D footprint data and provides an additional avenue for the assignment of ichnotaxa.

In order to improve understanding of variability among ichnotaxa, it is important to first understand the morphometric variability within a particular ichnotaxon, especially that preserved in a single trackway or by an individual track. 3D data sets and analysis software are used to quantify the variability of ichnites within a single locality, a single trackway, or within the preservational layers of a single footprint. Photogrammetry (deriving a 3D point cloud from a series of overlapping stereo photographs) has proven to be a highly accurate and cost-effective method for capturing data. These data sets can be created not only for individual tracks, but for entire trackways in a matter of hours. Over the past 15 years photogrammetric image sets have been captured of tracksites from around the world by a number of researchers. Now via cloud computing these datasets are shared and analyzed to determine within locality morphometric variations. Once locality morphometric variations are quantified, sets of footprints within ichnotaxa are examined from various localities and shed light on quantified variation and parameters for comparison between ichnotaxa. Dinosaur ichnotaxa at sites within the United States (e.g., Wyoming, Colorado, and Utah) were analyzed and compared with analogous sites within the United Kingdom (e.g., Isle of Wight and Isle of Skye) and Germany (Lower Saxony). Increasing our understanding of locality morphometric variations through the use of photogrammetry and 3D surface analysis software expands our understanding of ichnofaunal communities and their interrelationships around the world.

Symposium 3 (Friday, November 7, 2014, 8:00 AM)

INCORPORATION OF ABSOLUTE AND RELATIVE FOSSIL DATING INFORMATION IN BAYESIAN TIP-DATING ANALYSES USING THE R PACKAGE BEASTMASTERR: EXAMPLES FROM ASSASSIN SPIDERS, SALMONIDS, AND HOMINIDS

MATZKE, Nicholas, University of Tennessee, Knoxville, Knoxville, TN, United States of America, 37919; WRIGHT, April, The University of Texas at Austin, Austin, TX, United States of America; BAPST, David, South Dakota School of Mines, Rapid City, WY, United States of America

Until recently, Bayesian phylogenetic dating analyses (e.g., in the program BEAST) used fossils only to inform prior distributions on the dates of certain nodes (‘node-dating‘) in molecular phylogenies; the fossil data was effectively ‘thrown away‘ in subsequent analysis of the dated, molecules-only tree. However, recent advances allow simultaneous inference of dating and the phylogenetic position of dated fossils (‘tip-dating‘). Tip-dating has great potential to increase the use of hard-won paleontological data in phylogenetics: dated fossil tips represent direct observation of character states at particular times, and these inform the estimation of rates of character evolution, divergence times, and allow direct inclusion of fossils in phylogenetic comparative methods. Tip-dating raises numerous theoretical issues concerning priors and models, and exploration of these issues has been limited by the practical difficulty of implementing different models in BEAST. To aid this research, we present BEASTmasteR, an R package that can convert standard NEXUS files into BEAST XML files. BEASTmasteR also produces XML Bayesian hierarchical models encoding absolute or relative dating information, including: (1) fossil tips with uncertain dates (e.g., date-ranges based on stratigraphic bins, or distributions derived from radiometric dates); (2) relative dating information for tips (e.g., in some cases two fossils from the same deposit have