

**Did Mammoth end up a Lilliput?****Natasja den Ouden<sup>1,2</sup>, Lars W. van den Hoek Ostende<sup>1</sup> and Jelle W. F. Reumer<sup>2,3</sup>**<sup>1</sup>*Netherlands Centre of Biodiversity/Naturalis, Leiden, the Netherlands*<sup>2</sup>*Natural History Museum Rotterdam, Rotterdam, the Netherlands*<sup>3</sup>*Department of Geosciences, Utrecht University, Utrecht, the Netherlands*

It has been suggested that the woolly mammoth *Mammuthus primigenius* dwindled in size towards its extinction (Vartanyan *et al.* 1993, 2008). Missing in the discussion is an overview of the variation of the woolly mammoth through time. Particularly in a species which displays a respectable amount of variation and sexual dimorphism, such a baseline needs to be established before we can draw any conclusions. The North Sea is one of the largest resources for mammoth material in the world and provides an extraordinary opportunity to study the size and morphology of the mammoths from through time from one area. The results of both morphological and radiocarbon analyses provide a baseline variation study, allowing a comparison to those of other localities. Preliminary results show that the variation in the woolly mammoth is larger than is generally presumed. New material uncovered since the study of Maglio (1973) has considerably broadened the range of morphological features found within the species. Also, we tentatively suggest that the Lilliput effect might not be as pronounced as suggested.

**Upper Viséan (Mississippian) rugose corals of the microbial-sponge-bryozoan-coral bioherm from Kongul Yayla (Taurides, S. Turkey).****Julien Denayer***Service de Paléontologie animale et humaine, Département de Géologie, Université de Liège, Belgium*

Unexpectedly, an Upper Viséan bioherm discovered in the central Taurides (South Turkey) has yielded a rich and diversified rugose coral association with a European affinity. Among them, numerous *Siphonodendron pauciradiale*, *Litboströtion araneum*, *L. vorticale*, *L. maccoyanum*, *Palaeosmilia murchisoni*, *Axophyllum* aff. *pseudokirsopianum*, *Espiella* sp. are dominant with small solitary undisseminated rugose corals. The rugose corals are associated with lithisid and chaetetid sponges as well as fistuliporid and fenestellid bryozoans, and michelinid and favositid tabulate corals. These skeletal elements are involved with microbialite structures in a bioherm overlaid by bioclastic shale and limestone. *S. pauciradiale* and *L. maccoyanum* are the guide taxa for the RC7 coral biozone and give the Asbian age (Warnantian, Upper Viséan) for the reef and overlying beds. The Kongul Yayla reef shares many features with age-equivalent buildups from British Isles, south France, south Spain and north Africa, particularly with Cracooan-type reefs known (among other localities) from England and Morocco.

**A cladistic test of echinoderm homologies, phylogenetic trees and character polarities****\*Léa Devaere<sup>1</sup> and Sébastien Clausen<sup>1,2</sup>**<sup>1</sup>*FRE CNRS 3298 'Géosystèmes' – Université Lille 1, France*<sup>2</sup>*UMR CNRS 7207 'Centre de recherche sur la paléobiodiversité et les paléoenvironnements' – Muséum National d'Histoire Naturelle, Paris, France*

Despite echinoderms being one of the most important and extensively studied invertebrate constituents of Palaeozoic ecosystems, their phylogenetic relationships are still highly debated. Their very incomplete Cambrian fossil record and their high disparity makes the reconstruction of their initial radiation difficult to understand. As a result, numerous models of homologies and related phylogenies have been proposed. Two major models (the Extraxial-Axial Theory and the 'Carpoids as basal' model) are evaluated herein through cladistic analysis. For the first time, 90 morphological traits in 38 basal echinoderm taxa have been successively coded according to each model and each matrix processed using PAUP 4.0. Different taxa (echinoderms or hemichordates) have been selected for rooting in order to assess the effect of outgroup selection on the resulting phylogenies, and the self-consistency of each model appraised by comparing the topology of the obtained trees with *a priori* phylogenetic hypotheses. This study allows comparison of how the two phylogenetic models perform in terms of (i) character interpretation, (ii) tree-topologies, and (iii) statistical support.

**Benthic foraminiferal response during early Eocene hyperthermals at DSDP Site 401 (Bay of Biscay, NE Atlantic)****Simon D'haenens<sup>1</sup>, André Bornemann<sup>2</sup>, Ursula Röhl<sup>3</sup>, Peter Stassen<sup>1</sup> and Robert P. Speijer<sup>1</sup>**<sup>1</sup>*Department of Earth and Environmental Sciences, K. U. Leuven, Leuven, Belgium*<sup>2</sup>*Institut für Geophysik und Geologie, Universität Leipzig, Leipzig, Germany*<sup>3</sup>*Center for Marine Environmental Sciences (MARUM), Universität Bremen, Bremen, Germany*

The early Palaeogene "hothouse" (60-50 Ma) was a climatically dynamic period with transient intervals of extreme global warming, also known as hyperthermals. The most prominent and best-documented hyperthermal is the Palaeocene-Eocene Thermal Maximum (PETM; ~55.5 Ma), which left a major mark on the biogeosphere evolution. In early Eocene deposits worldwide, additional smaller hyperthermals have been detected using stable isotope records. The biotic aspects, however, remain largely unexplored. Studying these early Eocene hyperthermals helps to assess whether or not they display similar biotic patterns as the PETM, as has been suggested by several authors.

Lower Eocene deep-sea sediments from DSDP Site 401 show a well-developed cyclicity in Biozone NP11; several marly levels stand out in the greyish-brown calcareous chalks. The <sup>13</sup>C and <sup>18</sup>O records on bulk material and benthic foraminifera clearly show the iconic isotopic excursion of the PETM and at least four additional negative excursions in Biozone NP11. Some, but not all, of these isotopic excursions correlate with strong short-term benthic foraminiferal assemblage changes and small long-term shifts in species composition. These benthic foraminiferal changes seem to confirm the idea that the biotic patterns of early Eocene hyperthermals display many similarities with the PETM.