one valve counting for a half individual). For a further investigation of the ecological composition the gastropods and bivalves of the Banjung Ante fauna were assigned to six different feeding guilds. The percentage of each feeding guild is illustrated in terms of species numbers and abundance (number of individuals).
In terms of abundance the fauna is dominated by grazers and detritivores that make up 69%. This group includes various cerithiid and rissoid species, as well as the genus *Bothropoma*. The abundance of small, herbivorous gastropods seems characteristic for seagrass associated assemblages with many of them grazing on the microalgae growing on seagrass blades. Also present is the snail *Smaragdia* that appears to feed exclusively on leafs of seagrasses.
In terms of species numbers carnivores s.s. are the most common; they make up 36%. Another group of parasitic and browsing carnivores makes up an additional 24% of the species numbers. The herbivores/detritivores make up only about 25% of the fauna in species numbers. Although chemosymbiontic lucinids make up only 2% of the abundance, their presence indicates dysoxic settings in the seafloor.
Currently we are assembling data for modern and fossil seagrass faunas in order to compare to the Banjung Ante fauna. The latter has a very similar abundance/diversity composition as modern seagrass faunas found so far. The Banjung Ante fauna has a very dissimilar composition of Holocene soft bottom and coral associated mollusc faunas from the region. We intend to find data about faunas related to macroalgae in order to test whether seagrass faunas can be characterized on gross diversity and abundance of guilds.

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Miocene brachyuran crabs from southern Chilean islands

Philipp Reuter[1)] & Sven N. Nielsen[2)]

Only very few works exist about the decapod fauna of the Miocene of Chile. Here we present new records based on material from southern Chilean islands. The reported decapod genera all belong to the infraorder Brachyura and come from Mocha Island (38°S), Chiloé Island (42°S) and Stokes Island (45°S). Mocha Island localities yielded specimens of *Metacarcinus* sp., *Rochinia* sp., *Trichopeltarion* sp., and possibly a new genus; the former two being the first records of the respective genera for Chile. For the already known decapod locality Cucao, on Chiloé Island, *Eriphia* sp. is added to the fauna. Specimens from Stokes Island are not sufficiently well determined yet. Chiloé and Stokes faunas are known to be of early Miocene age, while Mocha localities are supposed to be of an undetermined younger Miocene age. Specimens from Stokes Island constitute the southernmost record of Cenozoic Chilean decapod crabs. The biogeography of Miocene Chilean brachyurans will be reviewed and discussed.

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Where are all the fossil pennatulacean octocorals? The need for more research on modern sea pens

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Sea pens, or Pennatulacea, are highly specialised, unbranched, colonial anthozoan octocorals with a worldwide marine distribution. There are estimated to be around 200 extant sea pen species. They are largely composed of soft tissue, the only hard parts being the axial rod and sclerites, which are not present in all modern sea pens, but are the only material that can be used to compare fossil with recent sea pens. Since fossil sea pen axes are inconspicuous and not very well known, they are frequently overlooked or misidentified. Due to the meagre fossil record, which begins in the Late Cretaceous, or perhaps earlier, and due to the lack of research that has been done on modern sea pens, not much is known on the evolution and phylogenetic relationships within this octocoral group. To make conclusions on pennatulacean systematics and evolution, 20 modern sea pen species (23 specimens in total) were studied, representing 10 of the 14 valid pennatulacean families. Using field emission scanning electron microscopy (and x-ray computed tomography in part), photographs were made of the cross-section and microstructure of the axial rods, which are important systematic characteristics, considering that soft-part morphology cannot be applied on fossil specimens.
The cross-section and microstructure changes along the axial rod and during the life of a sea pen, which can make fossil species determination difficult. With this study of the hard-part morphology of recent pennatulaceans, conclusions on fossil sea pen specimens and on the overall systematics of recent and fossil pennatulaceans can be made. In addition, by comparing recent and fossil axial

rods, conclusions can be attempted on the ecology and morphology of fossil taxa. Therefore, the documentation of pennatulacean material has great potential for the analysis of the systematics and palaeobiology of this group.

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Close to their extinction horsetails became giants

Ronny Rößler[1], Frederik Spindler[2], Zhuo Feng[1] & T. Zierold[1]

In this contribution we describe an exceptional large horsetail fossil from the Petrified Forest of Chemnitz, Germany, which permits insights into both the spatial arrangement of the complex branching system and the anatomical details: This in consequence will shed light into the calamitaleans' complex architecture just before they became extinct. Our results demonstrate that Permian horsetails clearly show a three-dimensional branching pattern and survived short episodes of dryness by shedding their leafy branches. Given the exceptional well preserved fossil specimen we suggest that the Permian horsetails evolved to multi-forked trees adapted also to dry episodes and showing high growth plasticity. These adaptations enabled a successful competition of the horsetail trees with the upcoming gymnosperms and underline their persistence in single habitats.
Since this new and more complete knowledge about the variation of the internal organization throughout the entire plant will considerably change the existing view of calamitalean sphenopsids exhibited in many textbooks, we would like to present a life reconstruction drawing. For the first time large-sized coprolites have been discovered from the pith cavity of a living calamite. We suggest that ancient detritivorous myriapods may have targeted on this calamite tree in the Early Permian.

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µCT Analyse der Ethmoidalregion bei Cainotheriidae (Artiodactyla, Mammalia)

Irina Ruf[1] & Annika S. Czubak[1]

Interne Schädelstrukturen wie die Turbinalia (Riechmuscheln) der Ethmoidalregion sind innerhalb der Cainotheriidae bislang kaum bekannt. Dabei liefert dieser Merkmalskomplex wichtige morphologische Informationen im Rahmen phylogenetischer und paläobiologischer Fragestellungen. Erstmals wurde die Ethmoidalregion der oligozänen Cainotherien *Caenomeryx filholi* aus Gaimersheim (Deutschland) und *Cainotherium commune* aus dem Phosphorites du Quercy (Frankreich) mittels hoch auflösender Computertomografie (µCT) zerstörungsfrei untersucht und mit rezenten Vertretern der Artiodactyla verglichen.
Caenomeryx und *Cainotherium* ähneln sich sehr in Bezug auf Anzahl und Anordnung ihrer Turbinalia, wobei proportionale Unterschiede auftreten. Beide Arten besitzen ein reduziertes Nasoturbinale, das mit einer pneumatisierten Crista des Nasale assoziiert ist, sowie ein recht einfach gestaltetes, bilamellares Maxilloturbinale. Die prominente Crista semicircularis besitzt einen deutlichen Processus uncinatus. Der Recessus frontoturbinalis enthält zwei Frontoturbinalia; im Recessus ethmoturbinalis befinden sich drei Ethmoturbinalia sowie ein Interturbinale zwischen dem ersten und zweiten Ethmoturbinale. Darüber hinaus zeichnet sich die Ethmoidalregion von *Caenomeryx* und *Cainotherium* durch eine ausgeprägte Pneumatisierung der Deckknochen aus. Es existiert ein ausgesprochen prominenter Sinus maxillaris, der mit der deutlich ausgeprägten Crista semicircularis korrespondiert, ein Sinus praesphenoidalis und ein unregelmäßig geformter Sinus frontalis.
Ein zweiblättriges Maxilloturbinale tritt auch bei allen bislang untersuchten rezenten Artiodactyla auf (z.B. bei Suidae, Camelidae, Tragulidae, Cervidae, Bovidae) und stellt somit ein Grundplanmerkmal der ganzen Ordnung dar. In Bezug auf Anzahl und Morphologie der Fronto- und Ethmoturbinalia sowie des Interturbinale unterscheiden sich die untersuchten Cainotherien jedoch evident von den rezenten Taxa. Alle bislang untersuchten rezenten Vertreter der Artiodactyla besitzen eine wesentlich größere Anzahl an Turbinalia, die häufig