Cenozoic fishes, we examined several thousand teeth and some vertebrae from the Noil Tobee locality housed in the Natural History Museum London, UK and the NBC Naturalis in Leiden, The Netherlands. Preliminary results of this revision are: (1) some but not all of the taxa identified by L.F. de Beaufort and W. Weiler could be confirmed; (2) the selachian fauna comprises a diverse assemblage of open-sea and pelagic taxa; (3) only a single incomplete and thus questionable hybodont tooth could be identified; (4) the enigmatic shark taxon *Ptychodus*, which is characteristic for the Late Cretaceous is represented by several species; (5) teeth of lamniform sharks are most common but identification of most specimens is compilcate due to their fragmentary nature; (6) teeth and tooth remains of *Carcharocles megalodon* are very common; (7) isolated tooth crowns of *Mitsukurina lineata* occur in high numbers; (8) remains of Hexanchiformes are rare; (9) other selachians include *Galeocerdo* and *Hemipristis*; (10) teeth of Cretaceous enchodontids are quite common in most samples; (11) teeth of *Lophius* occur prevalently; (12) several tooth plates of *Diodon* were recovered. The most important result of this study is that the fish fauna of Noil Tobee represents a mixture of fish assemblages of different age ranging from the Late Cretaceous to the Miocene contradicting previous interpretations. This age assumption is in good accordance with the tectonic model for the red clays of western Timor island.

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Fossil brittle stars from the Paratethys (Miocene, Europe) – state of the art

Andreas Kroh[1] & Ben Thuy[2]

The Paratethys was a large sea that formed during the Eocene and was separated from the Mediterranean by the rise of the alpidic mountain chains. This shallow epicontinetal sea is one of the best investigated fossil basins. Being easily accessible in abundant artificial and natural outcrops, its deposits were intensely studied by 19th and 20th century palaeontologists. Yet some taxonomic groups received considerably less attention than others. Brittle stars which are common in equivalent modern settings were largely ignored so far. In part this may be explained by their multi-element skeleton which tends to fall apart rapidly after death. Here we present the current state of knowledge on Cenozoic brittle star assemblages of the Paratethys. Articulated specimens are exceedingly rare, only few localities have delivered whole individuals. In most cases these specimens are embedded in silt and clay and appear to have been killed by obruption. Isolated ossicles are much more common, but tend to be restricted to a specific time slice during the Middle Miocene. In this interval tropical conditions prevailed, providing for abundant and diverse habitats ranging from soft bottoms to coral reefs. A survey of the ophiuroid species described from these deposits shows that most are in serious need of taxonomic re-assessment, often being placed indiscriminately in a few genera (mostly *Amphiura* and *Ophiura*). Detailed analysis of topotypic material, however, shows a rich diversity similar to analogous modern environments (e.g. the Caribbean).

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From bone to pixel – 3D reconstruction and visualization of *Erlikosaurus andrewsi*

Stephan Lautenschlager[1]

The study of anatomical and morphological features of fossils relies heavily on their preservation and completeness. This is especially true for complex and articulated structures, such as cranial elements. Although the vertebrate skull holds a multitude of informative characters, it is rarely fully preserved in fossil animals and prone to damage – not only through taphonomic and diagenetic processes, but also by preparation. Until recently, mechanical or chemical preparation was the only possibility to expose fossils encased in matrix, often at the cost of losing valuable information, or even impossible for fragile specimens. The advent and wider availability of non-destructive methods, such as computed tomographic (CT) scanning, has changed that.
Exemplified by the skull of the therizinosaur dinosaur *Erlikosaurus andrewsi* from the Late Cretaceous, we demonstrate the effectiveness of using CT generated data

sets to extract, reconstruct and visualize morphological information in fossil vertebrates. With the exception of isolated and crushed cranial remains, the holotype skull of *Erlikosaurus* represents the only articulated and largely complete skull of a therizinosaur. It is therefore not only of special importance in terms of therizinosaur anatomy and phylogeny, but also a unique specimen, which cannot be disarticulated or prepared further without the risk of permanent damage.

Although well preserved and nearly complete, not all cranial elements of the skull of *Erlikosaurus* are equally preserved or unaffected by deformation. The articulation of the respective elements further obscures aspects. However, corresponding elements of the left and the right side can be individually traced and segmented. Both elements are then mirrored and registered as a single object to combine all anatomical information, creating a composite, yet complete element, which shows the full extent of its morphology. In the same manner, it is possible to mirror larger cranial regions to reconstruct the complete skull. This method allows the detailed visualization, study and description of both the single elements, as well as the articulated skull. The latter can then further be used as a model for finite element analyses, morphometric studies or as a data set for rapid prototyping.

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Studentenpreisposter

Intergeneric competition in pycnodont fishes (Actinopterygii, Neopterygii) from the Late Jurassic of Lower Saxony

Martin Licht[1]

Pycnodontiform fishes (Actinopterygii, Neopterygii) are a monophyletic group of fishes, which lived predominantly during the Mesozoic. Their geological record spans about 175 million years, ranging from Late Triassic to Eocene. Some species of pycnodont fishes have a worldwide distribution, especially those living after the sea level rise of the Oxfordian and Kimmeridgian.

This work analyzes the influence of intergeneric competition and habitat on body length for the four pycnodont genera *Eomesodon*, *Gyrodus*, *Proscinetes*, and *Ocloedus*. 209 fossil prearticulars, which are deposited in the Museum of the Geoscience Centre of the University of Göttingen and in the Niedersächsisches Landesmuseum Hannover, were examined. All studied pycnodont dentitions were collected from localities in Lower Saxony, NW-Germany, namely Ahlem, Lindenerberg, Tönjesberg, Holzen, Duingen, Thüster Berg, and Lauenstein. These localities have a Late Jurassic and Early Cretaceous age. At this time the area of Lower Saxony was a shallow continental shelf with reefs. To reconstruct the standard length from the prearticular length, a method after Licht (2009) is used. Statistical tests were performed using R 2.13.0.

In modern reefs, reasons for intergeneric competition with influence on standard length are population density and overlapping distribution territories which lead to competition for nutrition resources. Competition among adults is largest because they require more energy and consequently larger territories. It is known that competition generally occurs between individuals of similar size and that body size is a determinant for dominance behaviour between related taxa.

A conspicuous observation for the Lower Saxony localites is the generally large size of *Gyrodus* that always exceeds the size of the congeneric *Eomesodon*. There seems to be a general trend for intergeneric competition, which could indicate that *Gyrodus* is more aggressive than *Eomesodon*, and thus might have been more dominant as seen in similar forms in modern coral fishes. Furthermore, this is reflected by the diversity patterns of pycnodontiforms in Lower Saxony. The data for the two small genera indicate that *Proscinetes* might have been more aggressive/dominant than *Ocloedus* as inferred from size distributions among the localities. This study indicates that individuals of small sized taxa interacted directly with each other. In contrast, small and large sized genera influenced each other only a little.

The habitat had a strong influence on the prearticular length/standard length of Lower Saxony pycnodonts. In Tönjesberg, the four genera are smaller than in close neighbouring locations (e.g. Lindenerberg and Ahlem). The Tönjesberg site might represent a retreat area for juvenile or subadult individuals similar to retreat areas known from modern reef fishes. This assumption is supported by the fact that in Tönjesberg the number of nutrition rivals and/or predators is low, whereas in other areas with a higher abundance of rivals and predator, they appear to have a high influence on the length.

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