sondern erstmals auch Funde aus Privatsammlungen, die unter anderem im Höbarth-Museum in Horn aufbewahrt werden. Weiters wurde Zahn- wie auch Knochenmaterial aus der Irpfelhöhle, Aufhausener Höhle, Villa Seckendorff, Oberrhein/Ketsch aus dem Löwentor Museum in Stuttgart sowie die fossilen Reste aus der Slouper Höhle ebenfalls aus dem Naturhistorischen Museum in Wien und das Material aus der Certova pec Cave in Slowenien vermessen. Zum Vergleich dient das Material der rezenten Tüpfelhyäne aus dem Naturhistorischen Museum in Wien. Mittels PCA (Principal component analsysis), NPMANOVA (Non-Parametric Multivariate Analysis Of Variance) und Diskriminierungsanalyse wurden die Ergebnisse statistisch ausgewertet.

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Morphometric Analysis of Intraspecific Variations in Jurassic Echinoids

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The main focus of this study deals with the construction of a basic dataset concerning the variation spectra of various Jurassic echinoids using three dimensional morphometric analyses. Most previous studies on morphometric variations among sea urchins have examined Recent irregular echinoids using two dimensional photometrical analyses. Two dimensional morphological examination is only possible using flattened irregular echinoids. To capture the complex morphological features of the rounded regular sea urchins, a three dimensional representation is essential. The basis of the present analyses are well preserved Jurassic echinoids originating from the paleontological collections in the Institute of Geoscience, Tübingen and the State Museum of Natural History in Stuttgart. The focus of this investigation is on the common regular echinoids of the genera *Plegiocidaris* Pommel which are present in large numbers and can be very well preserved. Futher investigations are being made on the cidaroid genera *Rhabdocidaris* Lammert and the irregular echinoids *Nucleolites* Lamarck and *Galerites* Lamarck.
The individual echinoids are scanned three dimensionally by µCT and laser scanners and morphologically interpreted, using landmark analyses. Expected results of this morphometrical studies include information on:
1) variations within populations including the analysis of phenotypic variations between adult individuals of a species as possible reactions to environmental parameters,
2) variations within the ontogenetic trajectories by comparing of juveniles and adults, as well as variations possible indicating sexual dimorphism; and
2) morphological variations through time slices which allow conclusions to be drawn with respect to the direction and rate of evolutionary change through time.

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Changing paleo-environments of the Lutetian to Priabonian beds of Adelholzen (Helvetic Unit, Bavaria, Germany)

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The Adelholzen Section is located southwest of Siegsdorf in southern Bavaria, Germany. The section covers almost the entire Lutetian and ranges into the Priabonian. It is part of the Helvetic (tectonic) Unit and represents the sedimentary processes that took place on the southern shelf to upper bathyal of the European platform at that time. Six lithologic units occur in the Adelholzen-Section: 1) marly, glauconitic sands with predominantly *Assilina,* 2) marly bioclastic sands with predominantly *Nummulites*, 3) glauconitic sands, 4) marls with *Discocyclina*, 5) marly brown sand. These units were combined as „Adelholzener Schichten" and can be allocated to the Kressenberg Formation. For the sixth unit, Stockletten, no formal name has been established. The total thickness of all units exposed is about 18 m.
The Adelholzen-Section is rich in planktic and benthic foraminifera. Planktic foraminifera form up to 80% of the total foraminiferal assemblages in the Stockletten, but also the basal nummulitic marls contain about 20% of planktic species. The ratio of planktic to benthic foraminifera is considered to be a good estimator also for paleo-water depth estimations at least during the Cenozoic. The percentage of planktic foraminifera in the assemblages points to depth ranges from 50 m (inner shelf) at the base of the section to a maximum of c. 600 m (upper bathyal) in the Stockletten. Nummulitids and macrofossil assemblages (oysters, spondylids, sea urchins, serpulids, crabs, bryozoans, shark teeth) however point

to shallower paleo-water depths, in particular for the basal and middle lithologic units. The succession shows two distinct increases in paleo-water depth (transgressive phases): a first step at the beginning of the *Discocyclina*-marl sedimentation and a second, more pronounced step at the base of the Stockletten.
The number of heterotrophic planktic and benthic foraminifera is largely coupled to primary surface productivity as these groups either feed directly on diatoms, coccolithophores or other algae (planktic foraminifera) or depend on the organic rain that reaches the seafloor (benthic foraminifera). Foraminiferal abundance is therefore a good estimator for paleo-productivity of ancient eco-systems. The rather parallel curves for planktic and benthic foraminiferal abundance are both pointing to at least two transgressive phases that resulted in increased nutrient mobilization and subsequent increased numbers of foraminifera. The second one coincides with the Mid-Eocene Climatic Optimum. The benthic foraminiferal assemblages are dominated by rather large planoconvex or lenticular species (*Cibicidoides, Gavelinella, Lenticulina* etc.), pointing to oxic conditions at the seafloor.
All samples from the section contain very rich calcareous nannoplankton with the dominance of small reticulofenestrids, *Reticulofenestra dictyoda* and *Cyclicargolithus floridanus*. Small reticulofenestrids generally dominate nannoplankton assemblages along continental margin. High amounts of *Reticulofenestra minuta* can be interpreted as indicator of warm, well stratified water column. Low percentages of *Coccolithus pelagicus* point to oligotrophic paleoenvironments and is in good agreement with the foraminiferal interpretations.

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Palaeoecology and Palaeoclimate of the Randecker Maar

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Maar lakes offer great opportunities to investigate climate and ecology of the past. Sediments build vast archives of former biogenic and paleoclimatic conditions during the time of sedimentation.
The Randecker Maar is located in the northern part of the Schwäbische Alb. It developed during the Miocene as a crater lake due to volcanic activity in the whole area of southwestern Germany. During excavations in 2009, the State Museum of Natural History Stuttgart recovered a 2.2 m profile of Late Early Miocene lake deposits (MN 5), which comprise well preserved sections of laminated sediments and a diverse palaeoflora.
Along with the analysis of the lamination of the sediments, the research on diatoms, palynology and makroflora gives an overall impression of the Randecker Maar during the Late Early Miocene. Here we present the latest results of our research on the Randecker Maar.
One main focus of the Randecker Maar research project is the analysis of the sediment layers. Since lamination is the result of alternating darker and light layers, we interpret them as varves. For a high-resolution analysis of these varve sediments 5 measurements were taken for each single varve. Each varve was then counted and their depths were measured. We assume that similar to other Maar Lakes (Meerfelder Maar, Lake Holzmaar), Randecker Maar sediments show the effect of orbital cycles as well and that varve chronology can tell us more about the conditions that prevailed during sedimentation.
The sediments that have been analysed so far, show that there are sections of high biogenic productivity with high portions of lime material. Diatoms are present with quite high diversity.
The assumption that climate during the Late Early Miocene was much warmer than today, is supported by the large amount of excellent preserved fossil plant material and pollen. We use various approaches like LMA (Leaf Margin Analysis) and CA (Coexistence Approach) that utilize macro- and micro fossils of plants.
A further excavation is expected to provide new material and information that allow for further insights into paleoecologic and paleoclimatic conditions of the Late Early Miocene in southwestern Germany.

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