Symposium B – Poster

Phyletischer Gradualismus bei Beloceratiden (Agoniatitida, Gephuroceratacea) des tiefen Oberdevon?

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Die Fossilüberlieferung ist meist zu unvollständig, um Phyletischen Gradualismus bei Makrofossilgruppen zu belegen. Die Anzahl gut dokumentierter Fallbeispiele, vor allem des Paläozoikums, ist gering. Devonische Ammonoideen sind aufgrund ihrer fossil gut erhaltungsfähigen Gehäuse, welche oft die Phylogenie ontogenetisch rekapitulieren, ihrer weiten Verbreitung und Häufigkeit in Außenschelf-Sedimenten und ihrer hohen biostratigraphischen Präzision grundsätzlich ein entsprechendgeeignetes Forschungsobjekt. Jedoch gibt es auch bei ihnen nur wenige Gruppen mit klaren Entwicklungstrends und relativ kontinuierlichen Faunenabfolgen über längere Zeiträume hinweg. Dies trifft für die Beloceratidae des mittleren und oberen Frasniums zu, deren graduelle extreme Suturkomplikation und Änderungen von Gehäuseparametern parallel in zeitgleichen und weit getrennten Gebieten analysiert werden kann.

Untersucht wurden zunächst Beloceratiden-Sequenzen aus dem Canning Basin von NW-Australiens, wo reichhaltige Ammonoideen-Faunen zwischen 1989 und 1996 in der Aussenhang-Fazies (Virgin Hills Formation) der tektonisch fast unverstellten großen Riffkomplexe gesammelt wurden (z.B. Becker et al. 1993; Becker & House 1997, 2009). Die ältesten untersuchten Formen fallen in das höhere Oberdevon I-G (*Mesobeloceras housei*), die jüngsten (*Beloceras* sp.) in das höchste Frasnium (tiefe MN 13b-Conodontenzone) bzw. aus Äquivalenten des oberen Kellwasser-Horizontes Europas. Die *Mesobeloceras*-Sequenz ist nur episodisch erhalten, während Vertreter von *Beloceras* in neun sukzessiven Zonen/Subzonen verschiedener Fundpunkte vorkommen. Umfangreiche Conodonten-Daten sichern die Datierung aller Faunen zusätzlich ab. Die exakte morphometrische Analyse umfasst Änderungen der relativen Nabelweite (Nw/Dm), dass Verhältnis von Windungsbreite- und höhe (Wb/Wh), das Verhältnis von Nabelweite und Windungshöhe (Nw/Wh) und die Anzahl von Ventral- und externen Umbilicalloben bzw. ihr Verhältnis bei spezifischen Durchmessern bzw. Wh-Werten. Die bisherigen Daten bestätigen eine stetige Abnahme der Nabelweite innerhalb von *Mesobeloceras* und *Beloceras*, jedoch bleibt bei wenigen Exemplaren des Oberdevon I-J ein relativ weiter Nabel erhalten. Die adulte Zahl der Externloben steigt von 3.5 im I-G2a, auf 4.5 im I-G2b, auf 6-7 im I-H, auf 7.5 im I-I2 und auf 8 vom I-J an, gefolgt von einer Stagnation dieser Entwicklung bis zum Aussterben der Linie am Ende des Frasniums. Gleichzeitig erhöht sich symmetrisch die Zahl der externen U-Loben. Eine zusätzliche Einschaltung kleiner U-Loben charakterisiert das seltene *Idiobeloceras* des hohen Oberfrasniums bzw. einen plötzlichen morphometrischen Wechsel in einer abzweigenden Seitenlinie. Eine weitere Seitenlinie wird durch eine seltene Form mit aufgesetztem, scharfen Hohlkiel vertreten.

Fortlaufende Untersuchungen werden zeigen, ob die morphometrische Entwicklung zeitgleicher marokkanischer Populationen identisch verlief, oder ob die weite geographische Trennung innerhalb der Prototethys den genetischen Austausch einschränkte. Gleichzeitig wird es möglich sein, isolierte Beloceratidenfunde des Iran, des Rheinischen Schiefergebirges, Belgiens und S-Frankreich in die Gesamtentwicklung einzupassen.

Symposium K – Vortrag/oral presentation

Cambrian trace fossils from the north-eastern Africa – Middle East segment of Perigondwana

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The Cambrian depositional history in the today north-eastern Africa and the Middle East part of Perigondwana is characterized by short-time discontinuous flooding of the Panafrican basement and subsequent regression. Whereas in the central-northern (Libya, Egypt) and north-eastern Africa (Egypt, Sinai) segment of Perigondwana this evolution is indicated by siliciclastic marginal-marine successions, related suites of the palaeolatitudinal lower situated Middle East (Jordan, Turkey), in contrast, yield carbonate sediments, too. So, the fossil content especially of the siliciclastics portions is valuable for comparative investigation of palaeoecological and palaeogeographical aspects and for a stratigraphic frame of the related depositional processes.

For the first time trace fossils others than simple *Tigillites* (*Skolithos*) or non-identifiable „bioglyphs" are reported here from central-northern Africa (Al Qarqaf Arch, Libya). From the Cambrian Hasawnah Fm. first findings of *Rusophycus*- and *Cruziana*-type trilobite traces indicate an age not older that higher early Cambrian for these marginal-marine sediments following a basal conglomerate which overlays the Proterozoic (Cadomian consolidated) basement. The sedimentary succession represents the transition from probably fluvial to deltaic, to tidally influenced, and finally to short-time shallow subtidal deposition, related to sandbars. The mentioned trace fossil assemblage is rather scarce in diversity and indicates short marine impulses within rather proximal position than a major transgression event.

Farther north-east (Eastern Desert of Egypt and Sinai Peninsula) findings of *Cruziana aegyptica* point to a similar higher early to early middle Cambrian age. Probably, the Libyan traces do also belong to this ichno-genus (taxonomic investigation in progress). Numerous simple trace fossils („worm-like") typically occur together with *C. aegyptica*. The Egyptian strata, also similar in their depositional facies, may be correlated with the fossiliferous levels of the Libyan Hasawnah Fm. In contrast, traces reported from different Egyptian assemblages and places

(including *C. salomonis* and others) seem to be slightly younger.

In the Middle East region (Jordan, Turkey) the Cambrian intermezzo yields not only marginal-marine siliciclastics, but also datable fossiliferous carbonate suites. Extensive investigation of the ichno-fauna of the siliciclastic Hanneh Mbr. (Jordan) led to recognition of distinct assemblages related to special palaeoecological conditions. Both, the above mentioned *C. salomonis* and *C. aegyptica* are related to interbar and intertidal/tidal flat environments, whereas other assemblages (including *Planolites, Arenicolites, Diplocraterion, Diplichnites, Rosselia* and others) occur in subtidal shelf, sandbar and prodeltaic deposits. As in Egypt, both ichno-genera, *C. salomonis* and *C. aegyptica*, do not occur together on same slabs or in same localities. Related trilobite body fossils (*Enixus (Palaeolenus) ex. antiquus* and *Kingaspis campbelli* vs. *Redlichiops blanckenhorni, Tayanaspis (Realaspis) orientalis* and *Myopsolenites palmeri*) may support a slightly different biostratigraphic age of these ichno-levels near the series 2-3 boundary as already assumed from the Egyptian traces.

The *C. aegyptica* level (?basal series 3) seems to represent the maximum flooding of this segment of Perigondwana by the Cambrian sea and an usual correlation level.

Symposium C – Poster

Preliminary classification of corals sampled by Ernst Haeckel in the Indian Ocean and their significance for reconstruction and evaluation of the recent environmental development

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Ernst Haeckel (*16.02.1834 Potsdam †09.08.1919 Jena), the founder of the conception of ecology, sampled corals from tropical reefs during his scientific sea-expeditions to Sri Lanka (1881) and to Java-Sumatra (1900). His niece Ingeborg Haeckel (*08.01.1903 Sonthofen †07.11.1994 Murnau am Staffelsee) gave 17 of these objects to Schloßmuseum Murnau (district Garmisch-Partenkirchen, Bavaria, Germany). Five original inscriptions - concerning location and date - on labels signed by Ernst Haeckel strongly indicate the geographical provenance and the datum of sampling of the corals.

In a preliminary analysis, the families and some species of the Scleractinian and Non-Scleractinian* corals are as follows:

Fungiidae (Dana, 1846): *Fungia* sp. [Inv. Nr. 4846/524, 4846/526, 4846/534];

Acroporidae (Verrill, 1902): *Acropora* sp. [Inv. Nr. 4846/525, 4846/529, 4846/577, 4846/578, 4846/582];

Tubiporidae* (Ehrenberg, 1828): *Tubipora musica* LINNAEUS, 1758 [Inv. Nr. 4846/527];

Dendrophylliidae (Gray, 1847): *Dendrophyllia* sp. [Inv. Nr. 4846/528];

Pectiniidae (Vaughan & Wells, 1943): *?Pectinia* sp. [Inv. Nr. 4846/530];

Mussidae (Ortmann, 1890): *Lobophyllia* sp. [Inv. Nr. 4846/531, 4846/581];

Faviidae (Gregory, 1900): *Favites* cf. *halicora* (Ehrenberg, 1834) [Inv. Nr. 4846/533],

Platygyra daedalea (Ellis & Solander, 1786) [Inv. Nr. 4846/579]; *Favia* sp. [Inv. Nr. 4846/580];

Trachyphylliidae (Verrill, 1901): cf. *Trachyphyllia geoffroyi* Audouin, 1826 [Inv. Nr. 4846/532];

In physical science corals serve as environmental archivs: Geochemical data fixed during the biomineralization processes forming the lime-sceleton are used as palaeoenvironmental proxies, concerning the point-related trends of sea surface water temperature and salinity. The corals sampled by Ernst Haeckel therefore contain subrecent signals produced by the environmental development at the western and eastern margins of the Indian Ocean. Depending on the different growth rates of the corals, geochemical signatures were fixed shortly before or during the starting phase of the global use of petroleum and natural gas for mobility and industrial production (1859). Together with coeval proxies, the data may help to better reconstruct and evaluate the effects of environmental development influenced by anthropogenic activity. Habitus and size as well as the microstructure of recent species influenced by the effects of the present environmental deterioration (e.g. rise of sea surface water temperature and acidity) can be compared with equivalent reference species from Ernst Haeckel's collection.

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Symposium C – Poster

The stratigraphy of Langer Köchel (S-Bavaria, FRG): a deepening upward sequence at the Grünten Ramp of the Helvetic Carbonate Platform

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The study area - the hump Langer Köchel - is located in the district of Garmisch-Partenkirchen in the moorland of Murnau-Eschenlohe. The Helvetic units establishing Langer Köchel as well as their palaeogeographic and palaeoenvironmental context are reviewed. They are part of the Helvetic fold-thrust-belt present at the external margin of the Northern Calcareous Alps. The Helvetic depositional area occupied a part of the northern shelf of the Mesozoic Tethys, where the prominent element of the Helvetic Carbonate Platform developed from late Jurassic to early Cretaceous under tropical-subtropical conditions. According to currently favoured models, the platform demised and drowned after ca. 31 Ma because of climate change: the greenhouse mode was brought about by flood-basalt extrusions in Large Igneous Provinces, gas hydrate dissociation and enhanced production of oceanic crust.

The change in conditions of sediment deposition related to the progressive drowning of the Helvetic Carbonate Platform during the late early to late Cretaceous is well preserved in deepening-upward sequences in proximal as well as in distal positions. The latter occurred at the Grünten Ramp: the distal, outer shelf part of the Helvetic Carbonate Platform. Corresponding deposits are present at Langer Köchel:

The Drusberg Member (late Barremian) (<5m thickness)

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