

TM R. Thomas BECKER and the Münster Group

The last year saw the continuation of old research projects, the initiation of new ones, and many Devonian contributions to various meetings. Moroccan Field work in spring was conducted jointly with S. HARTENFELS, V. EBBIGHAUSEN AND J. BOCKWINKEL. It concentrated on new samples from the Lower Emsian of J. Ihrs in the western Tafilalt (see Document by BECKER & ABOUSSALAM in this Newsletter), on the less hypoxic development of the Chotec Event in the northern Tafilalt (Rheris Basin, section El Gara), on the *Pharciceras* Stufe to Famennian of Rich Haroun (central Tafilalt), and on the Amessoui Syncline of the southern Tafilalt, where an unique rhynchonellid coquina bed was discovered in the Famennian of Tizi Nersas. The rhynchonellids were given to Paul SARTENAER; their conodont age is not yet clear. A macrofossil-poor, Givetian-Frasnian section in debris flow facies at El Kachla (NE margin of Bou Maiz Syncline) proved to have very nice Frasnian conodonts below its thick Kellwasser succession. The military, unfortunately, did not allow us to re-sample Emsian-Eifelian strata of the Oued Kseir area of the easternmost Tafilalt (Tafilalt Basin), right at the border to Algeria.

The re-sampling of the important new D-C boundary section Lalla Mimouna North (northern Maider) yielded good new conodont faunas (not yet fully identified), some new Lower Tournaisian goniatites of the *Gattendorfia* Zone (LC I-A₂, see Fig. 1), and numerous brachiopods from a thin sandstone interval within the deeply weathered shales between the two pre-Hangenberg and post-Hangenberg crinoidal limestones. This brachiopod fauna (given to D. BRICE) comes from the regressive peak of the Hangenberg Event and will allow a correlation with the much thicker sections of the Tafilalt and southern Maider, with their thick equivalents of the Hangenberg Shale and Sandstone. The significance of the new section lies in its conodonts from just below the Hangenberg Extinction and from just above the regressive phase, below the onset of *Gattendorfia*. Preliminary results were presented at the London D/C Boundary Workshop. The important joint paper on all the other Moroccan D/C boundary sections (KAISER et al.), unfortunately, is still in preparation (but close to final submission to "Palaeo x 3").

Another highlight of last year's Moroccan trip were investigations at the contact between the Anti-Atlas Devonian (stable Gondwana margin) and allochthonous units within the southern High Atlas fault system (margin of Variscan or Hercynian Morocco). Good autochthonous Emsian to Givetian successions, with a nice development of the Kacak Event, occur in the Tinejdad area (N of the Maider),

whilst Viséan olistolites and tectonic mélanges include a wide array of Devonian lithologies close to Tinerhir in the West (Todra Valley region). We plan a detailed investigation of these outcrops. Fortunately, the DFG has just given its OK for our long planned joint project (with TM EL HASSANI and colleagues) on the comparison of the southern and northern margin of the Prototethys in the Middle Devonian to Tournaisian. It will run for three years and include a Ph.D. study on the detailed comparison of Moroccan and German Devonian reefs.

Together with Jürgen BOCKWINKEL and Volker EBBIGHAUSEN, the description and revision of Moroccan pharciceratid faunas continues. There has been considerable progress with a long manuscript on the famous, very rich Hassi Nebech faunas, which will include a range of new species and genera. The extensive joint paper on the Emsian and Eifelian goniatites of Oufrane (eastern Dra Valley) should be out very soon in the *Neues Jahrbuch für Geologie und Paläontologie*. Its electronic version (pre-print) has already been quoted by others. As much as time allows, it shall be followed soon by a revision of the widely misunderstood, supposed marker genus *Latanarcestes*. A manuscript on the last Givetian ammonoid faunas of the Tafilalt, jointly with Sarah ABOUSSALAM, is ca. half written. Another long Moroccan paper (HAHN et al. in press, *Geologica et Palaeontologica*) deals with the Carboniferous trilobites of the Anti Atlas. It includes from Kheneq Lakahal, S of Assa (western Dra Valley), a pre-Hangenberg Event species, *Pseudowaribole (Ps.) conifer*, in direct association with supposed basal Carboniferous brachiopods. The implications of this single specimen for the brachiopod stratigraphy at the D/C boundary could be far-reaching.

Work in the Rhenish Massif continued, too. During student trips, we completed conodont re-sampling of the Givetian to Lower Frasnian at the famous Blauer Bruch (Kellerwald) and Giebringhausen (W of Adorf) sections. A new co-operation has started with the Rheinkalk company, the biggest national lime producer. Thanks to very good relationships with M. OEHMEN, we have access to their huge Devonian reef quarries and can study and sample (for microfacies and conodonts) cores that penetrate the reefs but that start in post-reefal, conodont-rich cephalopod limestones. The main aim of various B.Sc. and M.Sc. studies, partly in co-operation with M. PIECHA, is to retrieve precise ages of the reefs and compare their palaeoecological trends and cycles. We now can demonstrate that last biostromes in the core of the Hagen-Balve Reef are overlain by nodular limestones of the MN 10 Zone (with dominant *Palmatolepis plana*). But in the Hagen area, the main reef growth ceased at the top of the Middle Givetian whilst in the Wülfrath area, to the West,

the whole reef could be Frasnian. These first results leave much to do.

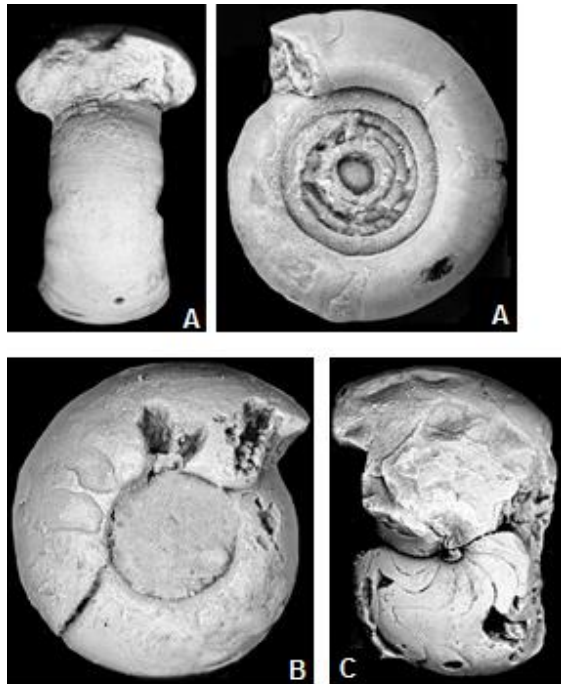


Fig. 1. Goniatites from the basal Tournaisian of Lalla Mimouna North. A. *Gattendorfia* aff. *jacquelinae*, B. *Gattendorfia* n. sp., C. *Imitoceras* sp.

Smaller international side projects include the first Frasnian ammonoids of Myanmar (see Document in this Newsletter by AUNG et al.), new Devonian ammonoids from Victoria (with Clem EARP), the *Annulata* Shale of Bulgaria, goniatites from around the Eifelian-Givetian boundary of New York (material sent by Alex BARTHOLOMEW and Thomas SCHRAMM), and the identification of additional specimens from Bolivia, sent by John MARSHALL. They look like tornoceratids but probably belong to the Eifelian homoemorphic group around "*T.*" *bolivianum* that is discussed in TROTH et al. (2010). Jed DAY and collaborators are currently dealing with the interesting brachiopods from right around the F-F boundary of Beringhauser Tunnel (see abstract of March GSA-NE Meeting).

Sarah ABOUSSALAM has completed all identifications of our new Montagne Noire conodonts from around the Middle-Upper Devonian boundary but the manuscript is not yet finished. New sampling at Giebringhausen extended the data base for contemporaneous faunas of the Rhenish Massiv and resulted in small revisions of the stratigraphy that was already presented at some meetings. The new samples kept producing strange, partly pathological (Fig. 2) specimens and new taxa. The new Blauer Bruch material will enable a detailed comparison of the eastern Sauerland and Kellerwald areas. The mentioned "western Prototethys" project will give

Sarah a job for the next three years, with a concentration of conodont and carbon isotope stratigraphy work on the Moroccan Meseta. Supposed Frasnian conodont samples brought from Myanmar to Münster by AUNG Aye-Ko turned out to be of Triassic age. Therefore, Sarah will make a short joint excursion into the Smithian-Spathian conodont world.

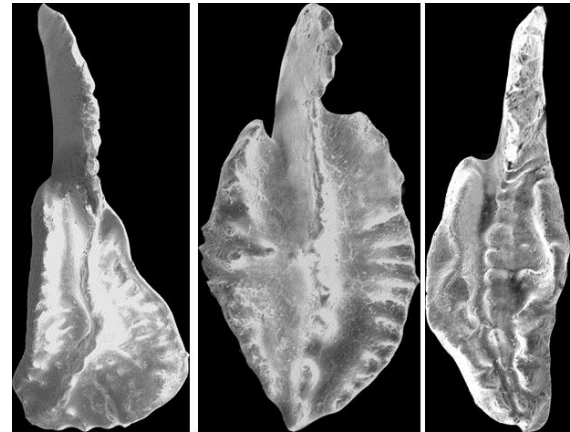


Fig. 2. Enigmatic, possibly pathological conodonts from the latest Givetian of Giebringhausen. **Sven HARTENFELS** successfully completed and defended his Ph.D. in summer 2010. He is currently editing his voluminous monograph on microfacies and conodonts around the *Annulata* and Dasberg Events. It should be out still this spring/early summer and will have dozens of nice thin section and conodont plates (see abstract under Devonian Publications). He has started to sample additional Famennian sections of the Tafilalt (El Gara) and Sauerland, extending work to the Lower and Uppermost Famennian. A major future task will be to establish the precise number of sedimentary cycles within clearly fixed Famennian conodont zones of distant regions. Joint efforts with Harald TRAGELEHN concerning a voluminous monograph on microfacies and conodonts of Franconia (especially of the Köstenhof = Schübelhammer section) are continuing.

Claudia DOJEN was working in the last year mostly for the Geomuseum Münster. Her research focused on Devonian ostracodes (Emsian to basal Givetian) of the Western Dra Valley (Morocco) and their palaeoecological, biogeographical and event stratigraphical interpretation. First results, with a focus on events, have been presented at the IPC3 in London. A joint paper with Helga GROSS-UFFENORDE on Moroccan ostracodes is in progress; the results will be presented at the 7th European Ostracodologist's Meeting 2011 in Graz (Austria). From May 2011 on, Claudia will start a new position at the Landesmuseum Kärnten (Austria). The Münster Devonian Group is both sad to lose an important team member and glad that Claudia eventually found a permanent job. We hope that her

new duties will leave some time for ostracode studies.

Several **B.Sc.** and **M.Sc. students** worked on Devonian topics. Marlene NOVAK investigated in her B.Sc. thesis the microfacies and palaeoecology of the youngest biostromal limestones at the famous Beul just E of the Hönne Valley (core of the Remscheid-Altena Anticline, Nordsauerland). Conodonts (only polygnathids), identified by Sarah, prove a topmost Givetian to early Middle Frasnian age for coral-bearing limestones. Sören STICHLING investigated in his B.Sc. the upper reefal to post-reefal interval in an adjacent, cored well. Conodonts confirmed the Middle Frasnian range of reefs. Above black Kellwasser limestones and the F-F boundary were located. The B.Sc. thesis of Tobias FISCHER dealt with the palaeopathology of Uppermost Famennian ammonoids of the Tafilalt and Maider Basins. The comparison with a previous Lower Tournaisian study of the same region enables to clarify the impact of the Hangenberg Mass Extinction on the predation on ammonoids. Current new B.Sc. projects include a revision of the famous Ballberg section near Hövel (Famennian) and a study on the first Middle Givetian chaetetid sponges of southern Morocco.

Stephan EICHHOLT is about to complete his one year M.Sc. on the ontogenetic morphometry, taxonomy, and phylogeny of beloceratids of the Canning Basin. The surprisingly complex results were presented at the Annual Meeting of the Paläontologische Gesellschaft in Munich. Stephan HELING will soon finish his M.Sc. on various rare trilobites (mostly proetids and phacopids) of the Dra Valley. He also presented results at Munich and will give a talk at the 2nd German meeting of trilobite researchers, in mid-February at the Senckenberg Museum, Frankfurt. The lower Eifelian of the Assa region (Bou Tserfine) appears to contain a new proetid genus. Hendrik NOWAK started a M.Sc. on the palaeoecology and stratigraphy of the Wülfrath Reef. First he examined cores, which will be compared in summer with quarry examinations. Jointly with Hans KERP, as the main M.Sc. supervisor, Stephan HÖTZEL compared the microfacies and palynofacies patterns in the Middle Devonian of the Sötenich Syncline (Eifel Mts.).

Publications 2010

- ABOUSSALAM, Z.S. & BECKER, R.T. (2010): The global Taghanic Biocrisis (Givetian) in the eastern Anti-Atlas, Morocco. - *Palaeogeography, Palaeoclimatology, Palaeoecology*, 29 pp., doi:10.1016/j.palaeo.2010.10.015.
- BECKER, R. T. & MAPES, R. H. (2010). Latest Devonian ammonoids from Oklahoma and their biogeographic significance. - *Acta Geologica Polonica*, 60 (2): 139-163.
- BECKER, R.T., DE BAETS, K. & NIKOLAEVA, S. (2010): New Ammonoid Records From The Lower Emsian

Of The Kitab Reserve (Uzbekistan) – Preliminary Results. – *SDS Newsletter*, 25: 20-28.

- DOJEN, C., ABOUSSALAM, Z.S. BECKER, R.T. (2010): Palaeoecological and biogeographical interpretation of Devonian ostracodes (Emsian to basal Givetian) of the Western Dra Valley, Morocco (sections Bou Tserfine, Rich Tamelougou and Hassi Mouf). - *SDS Newsletter*, 25: 37-39.
- TROTH, I., MARSHALL, J. E. A., RACEY, A. R. & BECKER, R. T. (2010): Mid Devonian sea-level change at high palaeolatitude: testing the global sea-level curve. – doi:10.1016/j.palaeo.2010.10.008, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 18 pp.

Publications 2011 and in press

- AUNG, A.K., BECKER, R.T. & GYI, K.K. (2011): First record of Frasnian (Upper Devonian) sediments and ammonoids from Myanmar. – *SDS Newsletter*, 26.
- BECKER, R.T. & ABOUSSALAM, Z.S. (2011). Emsian chronostratigraphy – preliminary new data and a review of the Tafilalt (SE Morocco). – *SDS Newsletter*, 26.
- EBBIGHAUSEN, V., BECKER, R.T. & BOCKWINKEL, J. (2011): Emsian and Eifelian Ammonoids from Oufrane, eastern Dra Valley (Anti-Atlas, Morocco) – Taxonomy, Stratigraphy and Correlation. – *Neues Jahrbuch für Geologie und Paläontologie*. 259 (3): 313-379, doi: 10.1127/0077-7749/2011/0121.
- HAHN, G., MÜLLER, P. & BECKER, R.T. (2011): Unterkarbonische Trilobiten aus dem Anti-Atlas (Marokko). – *Geologica et Palaeontologica*, 43.
- KAISER, S.I., BECKER, R.T., STEUBER, T. & ABOUSSALAM, Z.S. (2011 in press): Climate-controlled mass extinctions, facies, and sea-level changes around the Devonian-Carboniferous boundary in the eastern Anti-Atlas (SE Morocco). - *Palaeogeography, Palaeoclimatology, Palaeoecology*.

Abstracts 2010

- ABOUSSALAM, Z.S. & BECKER, R.T. (2010): Middle/Upper Devonian boundary conodont faunas from Giebringhausen (Rhenish Massif, Germany). – International Palaeontological Congress, London 2010, June 28 – July 3, p. 61.
- BECKER, R.T. (2010): The chance of evolutionary success – the case of the oldest (Tournaisian) ceratitoid ammonoids (Prodromitidae, Tornoceratina). – 8th International Symposium, Cephalopods – Present and Past, August 30 – September 3, 2010, University of Burgundy & CNRS, Dijon – France, Abstract Volume: 25-26.
- BECKER, R.T. & HARTENFELS, S. (2010): Der Faunenwechsel bei Ammonoideen des mittleren Fameniums (Oberdevon III/IV) – Folge einer globalen trophischen Krise in Außenschelfen? - *Zitteliana, Reihe B*, 29: 20-21.
- BECKER, R.T., ABOUSSALAM, Z.S., HARTENFELS, S. & EL HASSANI, A. (2010): An update of Middle/Upper Devonian global events in southern Morocco. - International Palaeontological Congress, London 2010, June 28 – July 3, p. 85.
- DOJEN, C., ABOUSSALAM, Z.S. & BECKER, R.T. (2010): Effects of Lower/Middle Devonian events on ostracodes from Morocco. - International Palaeontological Congress, London 2010, June 28 – July 3, p. 149.
- EICHHOLT, S. & BECKER, R.T. (2010): Phyletischer Gradualismus bei Beloceratiden (Agoniatitida,

- Gephuroceratacea) des tiefen Oberdevon? - Zitteliana, Reihe B, **29**: 31.
- HELLING, S., HÜBERS, M. & BECKER, R.T. (2010): Neue, seltene *Gerastos*-Funde (Trilobita, Proetida) aus dem Unter- und Mittel-Devon Süd-Marokkos. - Zitteliana, Reihe B, **29**: 46.
- HÜBERS, M. & BECKER, R.T. (2010): Empirical relationships between shell expansion and septal spacing in Devonian ammonoids. - 8th International Symposium, Cephalopods – Present and Past, August 30 – September 3, 2010, University of Burgundy & CNRS, Dijon – France, Abstract Volume: 48.
- HUMBERG, B. & BECKER, R.T. (2010): Morphometry and palaeopathology of Orthoceratida from the Middle and Upper Devonian of the Dra Valley (SW Morocco). - 8th International Symposium, Cephalopods – Present and Past, August 30 – September 3, 2010, University of Burgundy & CNRS, Dijon – France, Abstract Volume: 128.
- KIRCHGASSER, W.T., BAIRD, G.C., OVER, J.D., BRETT, C.E. & BECKER, R.T. (2010): Konzentrat Lagerstätte of the goniatite *Naplesites* marking a global transgression event (Upper Devonian *Mesobeloceras* Genozone) in the Rhinestreet Shale, Western New York. - International Palaeontological Congress, London 2010, June 28 – July 3, p. 231.