

## TM R. Thomas BECKER and the Münster Group.



**Fig. 1.** The SDS – IGCP 596 post-symposium excursion in September 2015, at Loc. 1, Walheim-Friesenrath (former Teerstraßenbau AG Quarry), showing the bedding surface at the top of the Walheim Member of the Walheim Formation (previously “Givet Kalknollen Formation”), ca. lower/middle Taghanic Event Interval (see ABOUSSALAM & BECKER 2016).

Activities in the last year had a strong focus on the final editing of the two SDS – IGCP 596 volumes, one published by the Geological Society of London (BECKER, KÖNIGSHOF & BRETT, Eds., 2016), one within our institute journal, the *Münstersche Forschungen zur Geologie und Paläontologie* (BECKER, HARTENFELS, KÖNIGSHOF & HELLING, Eds., 2016). The first is a “must read” for all interested in Devonian global events. In our introduction chapter, Peter, Carl and I used the opportunity to introduce a **new, ranked terminology and definitions for global crises/events** of different magnitude. We hope that this will be adopted by others in the future. I am also proud on our joint reviews (with Sandra I. KAISER and Markus ARETZ) of the D/C boundary. I wonder whether our clear statement that the Hangenberg Crisis was of equal significance to the Kellwasser Crisis (“The Big No. Six”) will eventually make its way through the broad scientific community. The second volume is the only recent summary of important Devonian-Lower Carboniferous outcrops of the Rhenish Massif. As noted in the Preface, it includes both reviews and summaries of all previous research and many new data (Fig. 1), often obtained by B.Sc. and M.Sc. students of our Devonian Group at Münster; these are all quoted and referenced. Of course, we regard this volume as a second “must read” for many Devonian workers.



**Fig. 2.** The hardly explored Emsian, with a shallow-water lower Emsian limestone bar in the back, and upper Emsian brachiopod sandstones at the right slope, at Ayn Azza S of Meknes.

Field work both in the Rhenish Massif and in the Moroccan Meseta was linked with the joint DFG-CNRST Maroc project on the “Eovariscan evolution of the southern and northern Prototethys...”, jointly with Sarah, Sven, Stephan EICHHOLT, our good friends Ahmed EL HASSANI, Lahcen BAIDER, and others. Results have been presented at a meeting in Rabat (EL HASSANI et al. 2016), the Ghent Symposium (BECKER et al. 2016c), and at the Annual Meeting of the Paläontologische Gesellschaft (BECKER et al. 2016d). We are currently working on two longer joint papers on the timing and extinction of Meseta reefs and on the distinctive phases of Eovariscan tectonics. These were spread over ca. 70 Ma, from the basal Devonian to the higher Tournaisian, with two peak periods in the middle/upper Givetian and middle Famennian. A third planned manuscript will summarize the facies developments of the individual Meseta regions, with a set of new palaeogeographic maps. As mentioned in the 2015 report, the wealth of fine details will have to be monographed subsequently.

In spring 2016, a short field campaign in the northern to eastern parts of the Western Meseta, with Ahmed and Stephan HELLING, aimed at the closure of previous sampling gaps: at Ain-al-Aliliga S and in the Al Attamna region S of Rabat, in the Tiddas region, at Immouzer-du-Kandar S of Fes, at the Bou Ighial N of Azrou, at the Jebel Ben Arab NW of Azrou, at Anajdam S of Mirt, at Dechra Ait Abdallah NW of Mirt, and at Ziyar and the Jebel Tabainout W/NW of Khenifra. But we also covered completely new ground, such as Bled-a-Bessbas N of Ben Slimane (with Emsian goniatite limestone), at Ayn Azza in the Bou Alzaz region S of Meknes (Fig. 2), and at Chabet-el-Harcha SE of Rabat, an old research ground of Ahmed’s Ph.D. The improved

dating of Eovariscan breccia beds and conglomerates remained in the foreground (Fig. 3).



**Fig. 3.** The strongly polymict Eovariscan (probably middle Famennian) conglomerate at Chabet-el-Harcha with reworked Ordovician to Givetian clasts.

In the Meseta we met up with Heiko HÜNEKE and his team from Greifswald, with whom we co-operate in the Anti-Atlas within their new DFG Project on “Devonian contourites from oceanic passages between Gondwana and Laurussia”. In the first part of the project, Heiko’s group concentrated on the high-resolution mapping and tracing of strongly condensed marker beds in the central and western Tafilalt. Sarah and I (with the kids peacefully back in the hotel) took the opportunity to conclude the conodont sampling of Frasnian sections (and accidentally met Christian KLUG, Dieter KORN, and a bunch of Zürich students at Jebel Amelane).

Other Tafilalt activities include the next manuscript on upper Givetian goniatites, led by our old friend Jürgen BOCKWINKEL (BOCKWINKEL et al. 2016 submitted). It concentrates on a well-preserved fauna from a single marker unit of Ouidane Chebbi. We were much surprised that it differs very strongly from the contemporaneous goniatite shale assemblages of the Tafilalt Basin and northern Maider. There are two new pharciceratid genera and several new species of established genera. We have to write at least four more papers on Anti-Atlas pharciceratids. So, Jürgen’s has to stay healthy (he just celebrated his 80<sup>th</sup> birthday).

For ongoing Famennian work in Morocco see Sven’s notes (HARTENFELS & BECKER 2016a, 2016b). Sarah and I continue to take some Emsian samples in order to obtain more material of supposedly new polygnathid taxa.

Sven, Felix LÜDDECKE and myself participated in the D/C Boundary Task Group Meeting in Montpellier, which was perfectly organized by Raimund FEIST, Markus ARETZ, and various others.

We presented new data concerning Drewer (BECKER et al. 2016e, within MÜFO volume), Oberrödinghausen (SACHER 2016), Lalla Mimouna, and the Borkewehr type-section of the Wocklum Limestone (BECKER et al. 2016f, within GeolSoc volume). The latter section could become a (new) GSSP candidate since the first three post-Hangenberg Sandstone beds carry *Protognathodus* faunas, with *Pr. kockeli* so far first retrieved from the 2<sup>nd</sup> limestone. Before and during the one day field trip we continued the sampling of the so somewhat neglected La Serre Trench C, which is lateral of the current GSSP section, but with different beds (CIFER 2016). We also processed huge conodont samples from the Royseux section of the Ardennes (Belgium), taken during the pre-conference field trip in September 2015. As expected, the conodont yield is sparse - but it includes various “siphonodelloids”. Importantly, there is a marked erosive unconformity low in Bed 104, the supposed basal bed of the Hastière Formation.

As far as time is left, other long-term projects are continued. These are the unique Famennian conodonts of western Xinjiang, jointly with WANG Zhihong (WANG et al. 2016, 2<sup>nd</sup> taxonomic paper half ready), lower Emsian ammonoids from Victoria (with Clem EARP), Emsian ostracod faunas of southern Morocco (with Helga GROOS-UFFENORDE, Claudia DOJEN, and Eberhard SCHINDLER), the Givetian stratigraphy of Kentucky (with Carl BRETT, Jay ZAMBITO, and Sarah), and my rich Canning Basin collection of ammonoids (HOLDERIED 2016).

In the Rhenish Massif, joint field work with Dierk JUCH, Günther DROSZDZEWSKI, and others continued along the Velbert Anticline. Excavations for a new motorway creates new interesting outcrops in the Hofermühle region that, unfortunately, won’t last long. The new, small-sized middle Famennian ammonoid fauna mentioned in the 2015 report still can be collected. It includes some new taxa that are even hard to place in an existing goniatite family. We expanded our research to the deeply neglected Neanderthal region, where the famous *Homo neanderthalensis* came from carstic caves in poorly studied Givetian reef limestone.

### CM Sven HARTENFELS

I am deeply involved with the joint supervision of a relatively large group of research students and, as a part of the editorial board, was strongly occupied with finishing the Devonian-Carboniferous IGCP 596 Guidebook (*Münstersche Forschungen zur Geologie und Paläontologie*, vol. 108).



In 2016, research concentrated on Famennian to Lower Carboniferous successions of the Rhenish Massif, southern France, and SE-Morocco. New results were presented at the IGCP 591 Meeting (Ghent, Belgium) in July and at the 87<sup>nd</sup> Annual Meeting of the Paläontologische Gesellschaft (Dresden, Germany) in September 2016. Furthermore, I participated in the International Workshop of the joint SDS/SCCS D/C Boundary Task Group, which was held in Montpellier (France, September 2016).

Together with Christoph HARTKOPF-FRÖDER (Krefeld), partly with Hans-Georg HERBIG and Sarah ESTEBAN LOPEZ (both from Cologne), there is an ongoing revision of the Famennian to Lower Carboniferous Riescheid section of the Velbert Anticline (see HARTENFELS et al. 2016, MÜFO volume). Furthermore, I continue my studies on lower Famennian conodont faunas from just above the last, microbiolith limestone of the Wülfrath and Hofermühle reef complexes. Taxonomic work on Famennian polygnathids from the Wulankeshun section (Xinjiang, see WANG et al. 2016) has also progressed.



**Fig. 4.** The km-long *Gonioclymenia* trenches at Oum el Jerane (Amessoui Syncline), southern Tafilalt.

My conodont research in Morocco is still focused on the *Annulata* Events at Ziyar (Moroccan Meseta, Khenifra region) and El Khraouia (southern Tafilalt). There is also the study of Devonian/Carboniferous successions of the northern Maider (Lalla Mimouna and Jebel Rheris West, with Thomas and Sarah). The long review manuscript on the *Annulata* Events has been published in the GeolSoc volume (HARTENFELS & BECKER 2016a), the upper/uppermost Famennian conodont stratigraphy of the Tafilalt in a long paper on the *Gonioclymenia* and *Kallocklymenia* limestones (HARTENFELS & BECKER 2016b; see Fig. 4). The latter includes important revisions of *Bispathodus* species and a few new taxa/morphotypes, also of other genera, but the regionally diverse new

“siphonodelloids” were (again) left in open nomenclature.

Based on the completed M.Sc. Thesis of **Marius SACHER**, I continued the joint work on the famous Oberrödinghausen railway cut in the northern part of the Rhenish Massif. Currently, 80 of 224 possible carbonate layers below the Hangenberg Black Shale have been sampled for conodonts. Unfortunately, based on a delayed entry of *Bispathodus ultimus ultimus* (in relation to the first *Palmatolepis gracilis gonioclymeniae* and *Pseudopolygnathus marburgensis trigonicus*) the section is currently not useful as a future Upper/Uppermost Famennian boundary stratotype section. Marius’ thesis also includes microfacies analyses (see SACHER et al. 2016, Dresden abstract).

**Felix LÜDDECKE** finished in summer his B.Sc. Thesis, which deals with the conodont biofacies analysis of a lithologically monotonous, middle Famennian pelagic carbonate succession of the previously unstudied Upper Ballberg Quarry (see LÜDDECKE & HARTENFELS 2016, Dresden abstract). Together with Thomas, we submitted a manuscript to the forthcoming IGCP 596 issue of *Palaeobiodiversity and Palaeoenvironments*. The paper includes detailed comparisons with other middle Famennian quantitative conodont data and a new icriodid.

**Tim CIFER** finished his M.Sc. Thesis on conodont biostratigraphy, carbonate microfacies, and conodont biofacies around the Devonian/Carboniferous boundary of the somehow neglected La Serre Trench C (Montagne Noire, France). We are working towards a detailed correlation with the adjacent (current) GSSP trench but, as it is the nature of debris flows, many beds pinch out at short distance, with other debris units coming in. A close cooperation with the Montpellier group (Raimund FEIST and Catherine GIRARD, amongst others) was agreed during the Montpellier Workshop. We started to work on a manuscript for the planned D/C boundary volume announced by Markus ARETZ.

**Till SÖTE** is currently working on a joint manuscript for the same IGCP 596 issue of *Palaeobiodiversity and Palaeoenvironments*. It is based on his B.Sc. Thesis from 2015, which was presented at the Annual Meetings of the German SDS (in Franconia), of the Paläontologische Gesellschaft in Dresden (SÖTE et al. 2016), and at the IGCP 591 Meeting (Ghent, Belgium).

**Philip HERBERS** conducted in 2016 a highly intriguing statistical conodont study based on two

large (> 10 kg), very conodont-rich Famennian samples from Franconia. His task was to use (theoretical: by splitting into ten 1 kg samples) re-sampling to find out how variable conodont faunas from one bed can be in terms of alpha diversity, conodont biofacies, and abundance structure (evenness), and how frequent and reliable (re-occurring) index taxa are in sub-samples. We plan a presentation at the 2017 ICOS Symposium.

**Anna SAUPE** continued her work on Famennian agglutinating foraminifers, now in the frame of a M.Sc. Project. She will compare assemblages from the Rhenish Massif, Thuringia, the Montagne Noire, and Morocco, again with a focus on the palaeoecological impact of black shale events. First results were very successfully (with a poster award) presented at the Dresden Meeting of the Paläontologische Gesellschaft (SAUPE et al. 2016).

### CM Zhor Sarah ABOUSSALAM

Much work was devoted in late 2015 and 2016 to finalize the joint DFG-CNRST Maroc research project, which has been very positively evaluated. There was still a wealth of old and new conodont samples from the Moroccan Meseta. Often, remaining limestone residues were processed once more (fourth to fifth runs) in order to increase the total yield and in the search of additional marker taxa, especially in the case of reworking units with strongly mixed assemblages. In cases of breccia sequences, beds with reworked Frasnian faunas may be intercalated between mixed Givetian-Famennian associations. This gives a warning not to over-interpret isolated spot samples. Conodont and microfacies results have been presented as co-author at several meetings (see above), one joint manuscript has been completed (ABOUSSALAM et al. 2016 in print), several others are in the making.

The new contourite project of Heiko HÜNEKE led to new field work in the Tafilalt in spring 2016 (Fig. 5). I agreed to identify and date their samples, which certainly will add to our large, mostly still unpublished Frasnian data set for the region.

The many years of re-sampling and revision of the famous Blauer Bruch section (Kellerwald), jointly with Thomas, has finally ended. The positions of the Taghanic and Frasnian Events could be refined and the assemblages include a range of unusual/new forms. I also identified additional faunas from the Padberg Limestone type-section, in the frame of the co-operation with G. RACKI and colleagues, in the search of global event signatures

around the lower/middle Frasnian boundary (especially of the Timan Event).



**Fig. 5.** Field work with Heiko HÜNEKE and the Greifswald Group in March 2016: the extremely condensed Givetian-Frasnian at El Kachla, south-central Tafilalt Platform (quarried, dark Upper Kellwasser beds in the foreground).

New Givetian-Frasnian conodont data from the Rhenish Massif made it into our MÜFO volume; they are spread in four contributions (see section on Devonian Publications). I also co-supervised several B.Sc./M.Sc. students (Julia RICHTER, Felix WEINERT, Maro-Pascal ELLERKAMP) and provided conodont data of Emsian to Frasnian strata or faunas. Work on conodonts from the Hofermühle, Neanderthal and Wülfrath reef complexes is ongoing.

Carl BRETT and Jay ZAMBITO sent new Givetian conodont samples from Kentucky, in order to straighten the regional stratigraphy and the timing of sea-level changes and the position of the Taghanic Event in that region. Unfortunately, the outcome was poor, but there are some better data from a first sampling back in 2008. The co-operation with both resulted in a joint contribution (ZAMBITO et al. 2015) on isotope stratigraphy around the Taghanic Events in the New York type region (GeolSoc volume). The positive isotope excursion of the Upper Crisis Interval is now also recognizable in the Kellerwald.

### CM Stephan HELLING

Stephan is continuing his work on Moroccan trilobite faunas but from early summer on a one year teaching position took away a great deal of his time, especially since he had to prepare all lectures for the first time. In addition, he was deeply involved to edit our MÜFO volume on the Rhenish Massif. In March he accompanied Thomas to the Moroccan Meseta, where he managed to find good additional Pragian material at Ain-Al-Aliga (Oued Cherrat Valley region, see HELLING & BECKER 2015, 2015 SDS



report, HELLING 2016). The full description of that fauna and of the Pragian assemblage from Taourirt n'Khellil ("Ait Issa") will soon be completed (in two separate papers). At the Ghent Meeting in summer 2016, progress on Moroccan *Gerastos* was reported (HELLING & BECKER 2016) but with an emphasis on principle taxonomic problems.

New and very rare odontopleurids were discovered by M. SCHLÖSSER (LWL Museum für Naturkunde, Münster) in the upper Givetian of Hofermühle. These shall be described jointly. Another new research topic are the globally youngest phacopids of the Ardennes, based on a new collection from the basal Hastiere Limestone (Bed 104, but from below the unconformity) of Royseux. They are crucial for a deeper understanding of Hangenberg (trilobite) Extinctions in the shallow-water realm.

### Other research students

**Sören STICHLING** continued his Ph.D. Project, supported by the Rheinkalk GmbH (Lhoist Group), on the Hönne Valley Reef Complex (northern Sauerland), which includes huge, active quarries. As a first part, he concentrated on the previously poorly studied upper reef interval and the stepwise reef extinction. First results, based on an outcrop at the famous Beul, were published in the MÜFO volume (BECKER et al. 2016e). More recent data (e.g., Fig. 6) are based on the detailed logging and microfacies analysis of boreholes, which were presented at the Ghent and Dresden Meetings (STICHLING et al. 2016a, 2016b). The Ph.D. Project was also outlined at the Annual Meeting of the German SDS in Franconia.



**Fig. 6.** Example of Hönne Valley reef facies (Borehole HON\_1101, 94.80-94.98 m): stromatoporid rudstone with fragmented branching tabulate corals and filling of pore space by peloids and coarse sparite.

**Stephan EICHHOLT** published early in 2016 a major part of his Ph.D. Project on the palaeoecology and facies developments of Givetian-Frasnian reefs in the Moroccan Meseta (EICHHOLT & BECKER 2016). The similarities with Rhenish reefs are intriguing, without any evident of a palaeoecological separation/zonation along a palaeolatitudinal gradient of at least 3.000 km distance – and at the southern margin of the subtropical zone. This suggests a very low climatic gradient in the Givetian and is not compatible with szenarios of an even wider "Variscan Sea". Due to a new full-time position in environmental geology, progress on a second manuscript on the Oulmes to Azrou reefs was slow.

**Maro Pascal ELLERKAMP** documented in his B.Sc. Thesis a new upper Givetian gastropod fauna from the Hofermühle Reef in the NW Rhenish Massif. The rich material was collected over many years and prepared by M. SCHLÖSSER (Münster) and generously made available for study. Unexpectedly, the assemblages are very similar to pre-Taghanic middle Givetian gastropod faunas from similar reefal settings. A joint publication is planned.



**Fig. 7.** An array of *Euryzone* specimens from the Hofermühle South Quarry (leg. M. SCHLÖSSER).

**Lara HOLDERIED** used in her B.Sc. Thesis ontogenetic morphometry to follow a supposed chronomorphocline of paratornoceratid goniatites from the lower/middle Famennian of the Canning Basin. It turned out that the group is much more complex in terms of diversity and disparity than anticipated, which resulted in a very voluminous study that significantly exceeded the frame of a normal B.Sc.

**Lukas AFHÜPPE** had to enter in his B.Sc. Project largely unexplored scientific ground, the Devonian cyrtconic, gyroconic or slightly torticonic nautiloids of the eastern Anti-Atlas. The material of mostly rare taxa was collected over the last 20 years very randomly. He recognized 10

species (half of them new) of nine genera of the Tainoceratina and Oncocerida. There will be joint publications with a student from Zürich (Alexander POHLE), supervised by C. KLUG, who happened to work on similar forms in parallel.

As noted above, our Devonian Group has a focus on the Velbert Anticline in the NW Rhenish Massif. Within the MÜFO Volume there is the description of a new and important Frasnian-Famennian Boundary section (Rohdenhaus North Quarry, Rheinkalk GmbH, Lhoist Group; BECKER et al. 2016g). It shows that the Upper Kellwasser Transgression drowned directly the last Rhenish reefal (mikrobialithic) platform. In the frame of a B.Sc. Thesis, **Felix WEINERT** investigated the F-F Boundary microfacies and stable isotope stratigraphy. He found the well-known positive Kellwasser spikes of carbonate carbon, which enables new comparisons with the previously studied pelagic sections of the Rhenish Massif.

**Julia RICHTER** is working on the last parts of her M.Sc. Project on the microfacies and conodont stratigraphy of the Emsian to middle Givetian and upper Famennian at Immouzer-du-Kandar S of Fes. Results were presented on a poster at the Ghent Symposium (RICHTER et al. 2016). We are still somewhat baffled about the strange, intercalated middle Famennian unit with abundant brachiopods and reworked dacitic pebbles, since this type of volcanism is so far unknown in the Moroccan Palaeozoic.

## Publications

### Journal papers

EICHHOLT, S. & BECKER, R. T. (2016). Middle Devonian reef facies and development in the Oued Cherrat Zone and adjacent regions (Moroccan Meseta). – *Facies*, **62** (7), 29 pp., doi 10.1007/s10347-015-0459-7.

WANG, Z.-H., BECKER, R. T., ABOUSSALAM, Z.S., HARTENFELS, S., JOACHIMSKI, M. M. & GONG, Y. M. (2016). Conodont and carbon isotope stratigraphy near the Frasnian/Famennian (Devonian) boundary at Wulankeshun, Junggar Basin, NW China. – *Palaeogeography, Palaeoecology, Palaeoclimatology*, **448**: 279-297, doi.org/10.1016/j.palaeo.2015.12.029.

HARTENFELS, S. & BECKER, R. T. (2016 online). Age and correlation of the transgressive *Gonioclymenia* Limestone (Famennian, Tafilalt, eastern Anti-Atlas, Morocco). – *Geological Magazine*, 44 pp.,

doi:10.1017/S0016756816000893.

ABOUSSALAM, Z. S., BECKER, R. T., EL HASSANI, A., EICHHOLT, S. & BAIDDER, L. (2016 in press). Late Lower Carboniferous conodonts from a supposed Middle Devonian reef limestone of the Marrakech region (Morocco). – *Stratigraphy* (volume in honor and memory of H. Richard LANE).

LÜDDECKE, F., HARTENFELS, S. & BECKER, R. T. (2016 submitted). Conodont biofacies of a monotonous middle Famennian pelagic carbonate succession (Upper Ballberg Quarry, northern Rhenish Massif). – *Palaeodiversity and Palaeoenvironments*.

BOCKWINKEL, J., BECKER, R. T. & ABOUSSALAM, Z. S. (2016 submitted). Ammonoids from the Late Givetian *Taouzites* Bed of Ouidane Chedbbi (eastern Tafilalt, SE Morocco). – *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen*.

### Editorials

BECKER, R. T., KÖNIGSHOF, P. & BRETT, C. E. (Eds., 2016). *Devonian Climate, Sea Level and Evolutionary Events*, Geological Society, London, Special Publications, **423**: 481 pp.

BECKER, R. T., HARTENFELS, S., KÖNIGSHOF, P. & HELLING, S. (Eds., 2016). *Middle Devonian to Lower Carboniferous stratigraphy, facies, and bioevents in the Rhenish Massif, Germany – an IGCP 596 Guidebook*. – *Münstersche Forschungen zur Geologie und Paläontologie*, **108**: 1-242.

[For publications of members of the Münster Group within these volumes (four papers in the *GeolSoc* volume, 12 papers in MÜFO 108) and in the Ghent Abstracts volume (five abstracts) see the section Devonian Publications]

### Popular science

HARTENFELS, S., HARTKOPF-FRÖDER, C. & BECKER, R. T. (2016). Ein neuer Blick auf das bedeutende Devon-Karbon-Profil bei Wuppertal, Riescheid. – *Archäologie im Rheinland*, **2015**: 52-53.

### Abstracts

BECKER, R. T., ABOUSSALAM, Z. S. & HARTENFELS, S. (2016). Eovariscan tectonic movements as a trigger of the global Kellwasser Crisis? A critical review. – In: NIEBUHR, B., WILMSEN, M., KUNZMANN, L. & STEFEN, C. (Eds.), *Fossils: Key to evolution, stratigraphy and palaeoenvironments*, 87<sup>th</sup> Annual Conference of the Paläontologische Gesellschaft e.V., Dresden,

- September 11-15, 2016, Programme, Abstracts, Field trip guides: 30-31; Dresden (Saxoprint GmbH).
- EL HASSANI, A., BECKER, R. T., ABOUSSALAM, Z. S. & BAIDDER, L. (2016). Evolution hercynienne de la Meseta marocaine occidentale: Biogéographie, stratigraphie, développement de faciès et interprétation géodynamique. - Journées géologiques du Maroc, Rabat 10-12 mai 2016, Abstract.
- HELLING, S. (2016). Trilobiten (Asteropyginae, Odontochilinae & Homalonotinae) aus dem Pragium von Ain-Al-Aliliga (westliche Meseta, NW Marokko). - 3. Trilobitentagung, 08. Bis 09.10.2016 am Museum für Naturkunde Berlin, Abstracts at: [www.trilobiten.net/06listvortrag.htm](http://www.trilobiten.net/06listvortrag.htm).
- LÜDDECKE, F. & HARTENFELS, S. (2016). Conodont biofacies and carbonate microfacies of the middle Famennian at Ballberg (Upper Quarry, northern Rhenish Massif). - In: NIEBUHR, B., WILMSEN, M., KUNZMANN, L. & STEFEN, C. (Eds.), Fossils: Key to evolution, stratigraphy and palaeoenvironments, 87<sup>th</sup> Annual Conference of the Paläontologische Gesellschaft e.V., Dresden, September 11-15, 2016, Programme, Abstracts, Field trip guides: 98; Dresden (Saxoprint GmbH).
- SACHER, M., HARTENFELS, S. & BECKER R. T. (2016). Middle Famennian to Lower Tournaisian conodont stratigraphy at Oberrödinghausen (northern Rhenish Massif) – A progress report. - In: NIEBUHR, B., WILMSEN, M., KUNZMANN, L. & STEFEN, C. (Eds.), Fossils: Key to evolution, stratigraphy and palaeoenvironments, 87<sup>th</sup> Annual Conference of the Paläontologische Gesellschaft e.V., Dresden, September 11-15, 2016, Programme, Abstracts, Field trip guides: 133; Dresden (Saxoprint GmbH).
- SAUPE, A., HARTENFELS, S. & BECKER, R. T. (2016). Agglutinating foraminifers around the *Annulata* Events and Dasberg Crisis (Famennian, Upper Devonian) – Palaeoecology and palaeodiversity. In: NIEBUHR, B., WILMSEN, M., KUNZMANN, L. & STEFEN, C. (Eds.), Fossils: Key to evolution, stratigraphy and palaeoenvironments, 87<sup>th</sup> Annual Conference of the Paläontologische Gesellschaft e.V., Dresden, September 11-15, 2016, Programme, Abstracts, Field trip guides:134; Dresden (Saxoprint GmbH).
- SÖTE, T., HARTENFELS, S. & BECKER, R. T. (2016). Stratigraphy and microfacies near the Devonian-Carboniferous boundary at Forststeinbruch Reigern (Hachen, northern Rhenish Massif). - In: NIEBUHR, B., WILMSEN, M., KUNZMANN, L. & STEFEN, C. (Eds.), Fossils: Key to evolution, stratigraphy and palaeoenvironments, 87<sup>th</sup> Annual Conference of the Paläontologische Gesellschaft e.V., Dresden, September 11-15, 2016, Programme, Abstracts, Field trip guides:146; Dresden (Saxoprint GmbH).
- STICHLING, S., BECKER, R. T., ABOUSSALAM, Z. S. & HARTENFELS, S. (2016). Microfacies analysis and stratigraphy of drill core Hon\_1101 (Devonian Hagen-Balve Reef Complex). - In: NIEBUHR, B., WILMSEN, M., KUNZMANN, L. & STEFEN, C. (Eds.), Fossils: Key to evolution, stratigraphy and palaeoenvironments, 87<sup>th</sup> Annual Conference of the Paläontologische Gesellschaft e.V., Dresden, September 11-15, 2016, Programme, Abstracts, Field trip guides: 148-149; Dresden (Saxoprint GmbH).
- ### Devonian Theses
- AFHÜPPE, L. (2016). Devonische Nautiloidea aus dem Tafilalt (Süd-Marokko) – Morphologie, Taxonomie und Paläobiogeographie. – B.Sc. Thesis, 32 pp., 11 pls.
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