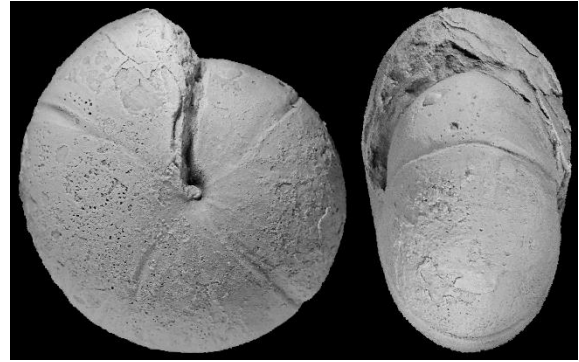


## TM R. Thomas BECKER and the Münster Group

2013 turned out to be a difficult time because of serious eye problems developed straight after the wonderful Morocco Field Symposium. This delayed the editing of the last newsletter and of many publications, which were close to completion. However, subsequently it became possible to complete a “monograph” on important and very interesting new Famennian and Tournaisian ammonoid faunas from Xinjiang, NW China, in cooperation with MA Xueping and led by his Ph.D. student ZHONG Pu. Apart from some new species, new regional records, and the palaeobiogeography, three aspects are especially important: 1. the recognition of global event levels in the successions, 2. the recognition of a probably global, specific time-interval (UD IV-C to V-B) with very large-sized taxa, 3. the discovery of the globally most diverse ammonoid assemblage in the Lower Hangenberg Event interval (age based on previous conodont and miospore dates). It is clear that more research is required in the region, which is done in parallel by our SDS friends from Nanjing, Australia, Austria, and North America. This October a Ph.D. student, WANG Zhihong, from a third Xinjiang research team (China University of Geosciences, Wuhan) will visit Münster to work on his conodont faunas. From here he will continue to Michael JOACHIMSKI at Erlangen for stable isotope work.

More Asian activities led to the involvement with a review of Malaysian Devonian-Carboniferous successions, led by Meor Amir HASSAN and colleagues. CM AUNG Aye-Ko send pictures of new Frasnian conodont faunas from Malaysia that require a detailed study. His search for Frasnian conodonts from the ammonoid-bearing area of Myanmar is still continuing.

The main focus lay on the joint DFG research project on the Eovariscan evolution of the northern and southern external Variscides with Sarah and Ahmed EL HASSANI. In this frame **Tobias FISCHER** compared in his M.Sc. Thesis the ontogenetic morphometry of Famennian Prionoceratidae from the Rhenish Massif, Franconia, Thuringia, the Moroccan Meseta, and Anti-Atlas. He found significant differences in taxa that were previously thought to be the same along the palaeolatitudinal and plate tectonic transect. This provides evidence that upper/uppermost Famennian Eovariscan movements in the western Prototethys were strong enough to restrict the faunal exchange and to cause isolation and regional speciations. In this context the comparison of Meseta and Anti-Atlas ammonoid faunas is especially interesting. Currently a focus lies on the new, rich faunas from the Frasnian of Boudouda and from the upper Famennian of Oued Aricha, both in the Benahmed region.



“False *Rectimitoceras lineare*” with minor shell constrictions and flank lips from the uppermost Famennian of the Maider (photo T. FISCHER).

Field work in spring 2014, together with Sven, Ahmed (partly) and Stephan EICHHOLT, included areas south of Rabat (Oued Cherrat Zone, its southern prolongation, and the adjacent Tournaisian), near Oulmes, of the Azrou to Mrirt region, and towards Fes (Immouzer-al-Kandar). The latter succession yielded unexpectedly first Upper Givetian and Upper Frasnian to lower Famennian goniatites. On the way back we started to sample the Lower/Middle Devonian of Jebel Ben Arab, which, unfortunately, is rather poor in macrofauna.

Together with Sarah and the family we spent a week in the Tinerhir and Tafilalt/Maider regions to continue sampling of allochthonous complexes, of the well-developed Kacak Event at Oued Ferkla, of the Frasnian of the Tafilalt, and of the Famennian just south of the important Lalla Mimouna D/C boundary section. But it was damned hot in the middle of April, reaching 40°C at lunchtime. One day I tried to collect trilobites at Bou Tchrafine at six in the evening - despite strong wind it was still 38°C in the evening sun.

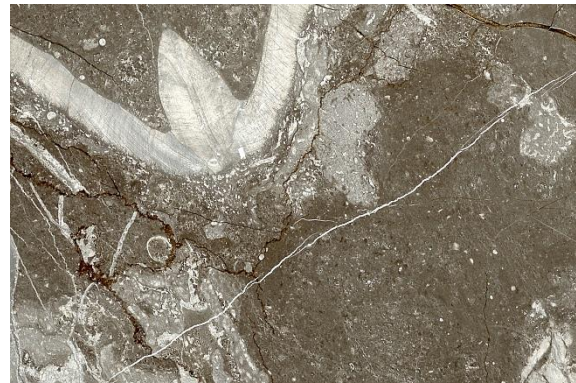
The continuing collaboration with Jürgen BOCKWINKEL on Upper Givetian ammonoids concentrated on material from the northern Maider, where pharciceratids and tornoceratids occur in a brachiopod-rich goniatite shale, that is very different from the goniatite shales of Hassi Nebech that were published in 2013. There is more to do on pharciceratid faunas of the eastern Tafilalt, of the Dra Valley, or from the German iron ores. Raimund FEIST sent some interesting Frasnian and Famennian faunas from southern Algeria, which includes a new lower Famennian genus. At the Götting annual meeting of the Paläontologische Gesellschaft, the new evidence from Morocco for a significant (global) carbonate crisis associated with the global Hangenberg Event was summarized.

Concerning research students working in Morocco, **Klaus SCHWERMANN** described in his M.Sc. project the distribution of sharks in time and space in the Devonian of Morocco. Screening all of our conodont samples, he found new, rare taxa and

added new records. **Sören STICHLING** finished his investigation of the stratigraphy and facies history of two sections at the northern margin of the Maider, which end with biostromal, coral-rich beds of the Middle Givetian. He found the largest Middle Devonian conodont we have ever seen, a 3.7 mm long *Linguipolygnathus*. But the specimen got lost in the SEM – for heaven's sake. We still have to re-locate the precise original bed. Sören was very good to document all the various fossil groups. **Marie-Kristin RYTINA** finished her study on the allochthonous Devonian blocks SE of Tinerhir. **Dustin WARD** used all our thickness data for well-defined lithostratigraphic units of the Tafilalt/Maider to produce new GIS-based isopache sheets for the region. His series of maps clearly show the gaps in our data sets. He also documented in detail the autochthonous Oued Ferkla section at the northern margin of stable Gondwana (Tinejdad region, see preliminary data in last year's field guide). **Sebastian POMMERER** started a B.Sc. Thesis on the palaeopathology of Givetian ammonoids from the eastern Dra Valley (Tata region).

In the Rhenish Massive field work continued in collaboration with Dirk JUCH and Günter DROZDZEWSKI in the Velbert region, with a focus on reef dating and facies developments. There are strong differences between the Hofermühle and Wülfrath Reefs, where results of the M.Sc. of H. NOWAK form the base of a manuscript that is close to completion. In the same complex, **Timo GEHRLING** investigated the Frasnian-Famennian transition, with a well-developed, black Upper Kellwasser level and subsequent erosion, in a core of the Silberg Quarry. The subsequent lower Famennian is also developed in black shale facies. Unfortunately, for our Devonian team, he decided to continue his studies in Bristol. **Julia RICHTER** and **Matthias KRUSE** (Bonn University) conducted geological mapping projects in the Devonian of the Hönne Valley, northern Sauerland. Two new B. Sc. students in our group, **Nadine VERKERK** and **Anna SAUPE**, look into the impact of Famennian black shale events on foraminifere assemblages of the Rhenish Massive and Saxothuringia.

**Stephan EICHHOLT** continued his Ph.D. on the comparison of Givetian/Frasnian reef facies on the southern (mostly Moroccan Meseta) and northern (Rhenish Massive) shelf of the Prototethys. He presented results concerning the Oued Cherrat Zone at the Göttingen meeting and these were turned into a manuscript that is almost finished. A second paper on the reef development of the Oulmes region will follow quickly afterwards.



Proof for a Givetian age: a *Stringocephalus* cross-section from back-reef limestones at Ain Khira (Oued Cherrat Zone, Moroccan Meseta).

**Stephan HELLING** continues his studies for a Ph.D. on Devonian trilobites from Morocco. Work on *Gerastos* (Proetida) is still ongoing, as is the description of biogeographically important small faunas from Taourirt n'Khellil (SE of Tinerhir, Götting presentation) and of a different allochthonous block further to the east. Another paper to be finished deals with the new Middle Frasnian proetids and phacopids of the central Tafilalt.

#### CM Sven HARTENFELS

is deeply involved with the supervision of research students and took part in the Malaysian IGCP 596 meeting in autumn 2013. He joined the Morocco field work in spring 2014, with a focus on the Famennian successions of the Azrou and Ziyar areas. New results on the *Annulata* Event in the latter succession will be presented at the IPC in Mendoza in early October. He finished his conodont and microfacies parts for joint papers with Thomas on the *Goniclymenia* Limestone of the central/southern Tafilalt and on the *Annulata* Events in the Rheris Basin of the northern Tafilalt (see 2013 abstract; contribution for the Geol. Soc. volume of SDS). The palaeobiogeographical relationships of Famennian conodonts from the allochthonous



Field lunch 2013, at El Atrous. Lahcen BAIDER distributes the delicious berber “pizza”.

Tinerhir Devonian were outlined in a contribution to the Göttingen meeting.

Field work in the Rhenish Massive was done in cooperation with various colleagues from Czechia and Poland, who concentrate on modern stratigraphic techniques around Famennian black shale events. In this context conodont and microfacies studies of the famous Ballberg and Oberrödinghausen sections continued. Together with Thomas, there is also an ongoing revision of the well exposed but rather neglected type section for the Wocklum Limestone SE of Balve (Borkewehr). More to the west, a revision of the Riescheid section, jointly with Christoph HARTKOPF-FRÖDER (Krefeld), required the tedious cleaning of the section. In the Velbert region, there are new lower Famennian conodont faunas from just above the last, microbialithic limestones of the Wülfrath and Hofermühle reef complexes. Not to be forgotten – Sven won the faculty teaching price for 2013, which gives him funds to attend the Mendoza IPC.

#### **CM Sarah Z. ABOUSSALAM**

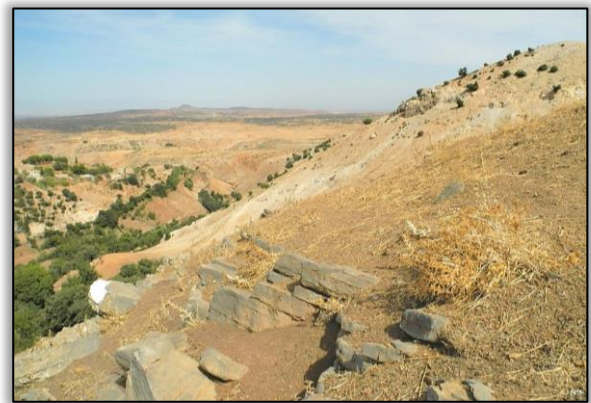
Sarah worked busily on the wealth of new conodont samples from the Emsian to Tournaisian of the Moroccan Meseta, the Anti-Atlas, and Rhenish Massive. Apart from many surprisingly different ages than previously assumed, this led to considerable refinements for the extinction of reefs, both in Morocco and Germany, and for the dating of Eovariscan reworking events. It is now clear that in the Meseta major reworking could take place throughout the Devonian, with peaks high in the Givetian and in the middle/upper Famennian. A first Lochkovian reworking event was recognized in the “Skoura succession” north of Ouarzazate, just above upper Silurian black shales. There are also many new data for the allochthonous Devonian of the Tinerhir-Tinejdad region at the suture between Variscan Morocco and stable Gondwana. A manuscript on the dating of reef growth and extinctions in the Meseta is planned for the Geol. Soc. volume. A supposed Upper Devonian succession of neritic limestones at Boudouda (Benahmed region) yielded fragmented, very small conodonts of various age, which all seemed to be reworked. In fact, the beds also contain good Viséan foraminiferes, which will be described jointly with Jiri KALVODA and Thomas.



Not so bad: The “2013 SDS / Tafilalt Headquarter” - after all the tired geologists eventually went to bed.

In the eastern Rhenish Massive final samples from the Blauer Bruch allowed a precise re-location of the Taghanic and Frasnian Events. This resulted in a joint presentation (given by Thomas) at the annual meeting of the German SDS in spring 2014 in the Kellerwald. Incredibly rich, diverse but partly deformed Frasnian conodonts were recovered from the various sections and boreholes of the Velbert Anticline (Wülfrath and Hofermühle reefs).

Continuing work on Anti-Atlas sections resulted in a long “monograph” together with Thomas and Pierre BULTYNCK on the Pragian to basal Eifelian conodont stratigraphy of the Tafilalt, Maider and Dra Valley regions. It includes significant data for the current Emsian revision and substage discussion but polygnathids, unfortunately, show regionally a rather episodic occurrence. Parallel polygnathid and icriodid zonations will be proposed; they give a good correlation with Spain and other regions.



The supposed Famennian “griotte” at Bou Khedra (SW of Azrou) produced Emsian conodonts.

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