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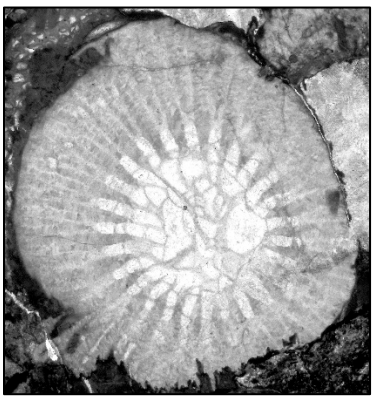

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SDS NEWSLETTER 31

Editorial

The SDS Newsletter is published annually by the International Subcommission on Devonian Stratigraphy of the IUGS Subcommission on Stratigraphy (ICS). It publishes reports and news from its membership, scientific discussions, Minutes of SDS Meetings, SDS reports to ICS, general IUGS information, information on past and future Devonian meetings and research projects, and reviews or summaries of new Devonian publications.

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Please ease the editing by strictly keeping the uniform style of references, as shown in the various sections.
The Newsletter should be quoted as: **"SDS Newsletter, 31: p. x-y."**

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MESSAGE FROM THE CHAIRMAN

Dear SDS Members,

Welcome to the 2016 SDS Newsletter. This is our sort-of yearly compilation of everything Devonian. All SDS members, both CM´s and TM´s, are expected to contribute news. It is often very important to see what research is going on before publication. In addition, it is an excellent place to post notice of research in regional journals that we might otherwise not see.

Sadly, we have received news of the loss of three SDS members since the last newsletter. These are our former long-term TM and CM Paul SARTENAER from Brussels and TM CHEN Xiu-quin ("Suzie") from NIGPAS (Nanjing, China), both leading experts for Devonian brachiopods. We have also lost Aleksandr YAZIKOV from Novosibirsk at a rather young age, still with so much to contribute; Aleksandr also worked on Devonian brachiopods. The Devonian brachiopod community was even more struck in 2016 since Gertrude BIERNAT from Poland also died in March 2016, at the age of 93. There are obituaries for Paul and "Suzie" in this Newsletter, also for Horst BLUMENSTENGEL from Germany, reknown for his decades of work on Devonian ostracodes.

The important SDS news this year (2015) was that Nacho VALENZUELA-RÍOS and Ladislav SLAVIK, together with Nadia IZOKH and Alexej KIM, managed to return to the Zinzilban section in Uzbekistan to recollect conodonts for redefining the Pragian/Emsian boundary. They were successful in the collecting and returned with many kilograms of samples. These are currently being processed and picked and we can anticipate preliminary findings at the ICOS meeting in Valencia in 2017. It is important to move this re-definition forward as we cannot formally propose any sub-stages to the IUGS until all our stages are formally established.

In September of 2015 many of us attended the splendid IGCP 596 closing meeting in Brussels. Enormous thanks to Bernard MOTTEQUIN, Cyrille PRESTIANNI and colleagues, who made everything happen. There were two field trips, pre-conference to the classic Belgian Devonian and Early Carboniferous sections organised by Julien DENAYER with Bernard and Cyrille. The post-conference field trip, which I attended was to classic and new sections in the Devonian and Early Carboniferous of the Rhenish Massif by Thomas BECKER, Sven HARTENFELS, Peter KÖNIGSHOF, Sören STICHLING, and Stephan HELLING, amongst others. Both trips were excellent, well organised and contributed enormously to the success of the meeting. Both field guides have been published.

Earlier in 2015, a number of SDS members attended STRATI 15 in Graz, Austria. There we had a day of largely Devonian and D-C boundary presentations. This was followed by a fieldtrip to the Carnic Alps organised by Carlo CORRADINI, Thomas SUTTNER and Monica PONDRELLI aided by Hans Peter SCHÖNLAUB. We visited the classic conodont sections that we have often seen referred to and saw some spectacular scenery and enjoyed a memorable night in an alpine hut.

This year (2016) was an International Geological Congress year and SDS was required to meet in Cape Town. As we realistically saw that few SDS members would make the meeting, we accepted the alternative of joining the IGCP closing meeting in Ghent, Belgium. Here we had an excellent Devonian session, a business meeting and social programme (dinner, jazz and castles) all ably organised by Thijs VANDENBROUCKE. There were also mid-conference short courses where we were able to savour an introduction to astrochronology and numerical stratigraphy both via the delights of R. A very useful day.

The Cape Town meeting was attended by Carl BRETT and Ladislav SLAVÍK and a report is included in this Newsletter. Thanks to both of them for attending; they have usefully increased our TM's for South Africa to 2.

Our final meeting for the year was the September joint D-C boundary working group organised in Montpelier by Markus ARETZ and with the support of the ICS. Here we made progress on the boundary definition and this is also reported in the Newsletter. Many thanks to Markus for moving this forward.

Looking forward to next year, we have the SDS business meeting at the ICOS conference on conodonts in Valencia, Spain. We intend to have a more general Devonian meeting rather than just conodonts.

John MARSHALL

OBITUARIES

PAUL SARTENAER

(1925 – 2015)

D. BRICE

Paul SARTENAER in his office in 1983
(photo supplied by his wife Masha HECKER)

In July 2015, the international scientific community lost a distinguished scientifist, who devoted sixty years of his life to the systematic study of the rhynchonellids and the spiriferids (Brachiopoda) at the Royal Institut of Natural Sciences of Belgium in Brussels. Paul SARTENAER´s research was oriented on the definition of taxa and their stratigraphic distribution in order to obtain correlations in the Devonian and Lower Carboniferous of many areas of the world. Paul was born in Brussels and he lived there with his family at the place Sainte Catherine, situated in the center of the city. As a student at the College Royal Marie-Thérèse de Herve, he followed his graduate studies in the "Ecoles spéciales des Mines du Génie civil, des Arts et Manufactures, d'Architecture et d'Electricité" at the Catholic University of Leuven, where he received his diploma of "Ingénieur civil des Mines" in 1948, before he got involved in the Resistance in 1944 (active service as a war volunteer). Subsequently, he obtained his license in geological and mineralogical sciences in 1950. He developed his scientific career at the Royal Institute of Natural Sciences of Belgium, where he was initially a "naturalist probation", then "naturalist", before becoming Assistant Director of laboratory (1958), Director (1965), Head of the Department of the Palaeozoic Invertebrates Section (1969), and then Head of the Department of Paleontology and Honorary Head of Department (1990).

All these functions were connected with intensive research. As early as 1955, he pointed out the confusion between two types of rhynchonellid brachiopods (*Nudirostra*, *Camarotoechia*) and specified their external and internal characters by serial sections of *Nudirostra*. He was among the first to apply this method in the brachiopod studies. In his laboratory, many researchers (including this author) began to learn this method. In 1956, he discovered erroneous interpretations of FORIR (1895-1901) and FORIR *et al.*, 1900) concerning rhynchonellid (*dumonti*, *omaliusi*, *triaequalis*) and a spiriferid species (*Cyrtiopsis murchisionanus*) of the lower Famennian of Belgium. During the same year, he created two biozones in the lower Famennian of Belgium, based on the distribution of two species of *Pugnoides* WELLER (including a new one). In 1957, he went ahead by publishing a sketch of the biozonation of Famennian deposits and demonstrated a global significance based on five species of Famennian rhynchonellids: two from Western Canada, two from the United States of America, and one from Belgium. He devoted a note to each species, stating their external and internal characters, and created for them in 1961 his first five new genera.

Paul´s originality as a scientist has to be emphasized. He was interested enough in the present biotic world to perform in 1959 a cork-jacket diving in the Gulf of Fos, in order to discover its underwater fauna. He published in 1963 the "Ecologie des Brachiopodes paléozoïques à la lumière de l'écologie actuelle" and "Nos yeux sous la mer", his considerations of our knowledge of underwater paleoecology. His interest in the stratigraphy of the Upper Devonian of Belgium induced him to demonstrate in 1974 the confusion resulting from the use of terms such as the Schistes de Matagne, Schistes de Barvaux etc., which lacked clear definitions. In 1970, he recalled that the limits of stages, such as the Frasnian and Famennian, were established based on fossils. In 1973, he, therefore, reminded that limits in the famous Senzeilles section, defined by Gosselet (1877), were based on the presence of the spiriferid *Cyrthia murchisoniana*, a species belonging since 1956 to the genus *Cyrtiopsis*, which is abundant in the lower

Famennian of Belgium. A similar example of his interest in global chronostratigraphy was given in 1985, when he summarized the global distribution of the types of rhynchonellids around the Givetien/Frasnian and Frasnian/Famennian boundaries, with a correlation to the conodont zones.

Paul was a long-term Titular Member and, after retirement, a Corresponding Member of the SDS (Subcommission on Devonian Stratigraphy). He was also a member of the International Working Group on the Devonian-Carboniferous boundary. Paul was polyglot, actively participated in meetings in many different countries. Since 1955 he followed his interest in stratigraphic terminology and the possible limits for series, stages and sub stages, in order to propose them for acception to the IUGS (International Union of Geological Sciences). Most proposed limits are generally based on pelagic fossils (with wide distribution), such as conodonts or goniatites, but never on brachiopods, which were considered as fossils with limited stratigraphic distribution because most lived in shallow seas (platforms). He did not really agree with this opinion and wanted to show the significance of brachiopods, especially of rhynchonellids, to establish limits in successions in many parts of the world lacking pelagic faunas. His speech concerning the Ardennes 'Strunien' (SDS Meeting in Rochester, 1997) during the discussion of the possible subdivision of the Famennian into several substages was remarkable. Whereas the deposits in the Avesnois did not attract much attention, he recalled his publications on the Belgian Etrœungt Limestone (SARTENAER 1964, 1965) and indicated that similar deposits existed in eighty-five sedimentary basins, twenty-five countries, and five continents, to conclude “qu’il ne se passe pas une semaine ou un mois sans que les couches d’Etrœungt ou le Strunien ne soit mentionnés dans une publication”.

After numerous visits of outcrops and exchanges with many palaeontologists (German, American, Australian, British, Canadian, French, Indian, Italian, and Russian or with specialists on faunas of Afghanistan, Iran, Morocco etc.), he created in 1970 fourteen new genera of rhynchonellids from the Silurian to the Carboniferous-Pennsylvanian, specifying also their geographical and stratigraphical distribution: upper Silurian - lower Devonian? (1 genus), Middle Siegenien - Eifelian (1), upper Eifelian – lower Givetien (1), lower-middle Givetien (2), upper-middle Givetien (1), lower Frasnian (2), Famennian (1), upper Famennian (3), lower Tournaisian (1), middle Pennsylvanian (1). His last 60 publications, since 1984, are almost exclusively devoted to rhynchonellid systematics. Since some colleagues criticized him to have multiplied the number of rhynchonellid genera, he analyzed in 1986 the causes of this trend and expressed the question: Shall we get closer to a more accurate picture of reality, or in man-made structures? He concluded that he definitively has to adhere to the first hypothesis. In 2005, he established the systematic revision of rhynchonellids from the upper Emsien - lower Eifelian of Europa, North Africa, and Asia (Altai SW) assigned to the genus *Uncinulus*, and created the family Nucinulidae, which included four new genera: *Lapinulus*, *Oligodesmmerhynchus*, *Palinulus* and *Cuninulus*, in which he retained many previously known species. He created four species of *Cuninulus*, which clarified the stratigraphy of the upper Emsien - lower Eifelian of the Dinant Basin, in the Eifel, the Cantabrian Mountains, the Dra plains of Morocco and Mauritania, and of the Holy Cross Mountains in Poland.

In sixty years of hard work, Paul defined more than 140 new taxa of rhynchonellid brachiopods: 94 genera - 2 Carboniferous, the others Devonian (36 Famennian, 25 Frasnian, 7 Givetian, 3 Eifelian, 3 Emsian, the others are present in two stages) - and 50 species. His purpose was to clarify the stratigraphy of the Devonian in Belgium and global correlations, enabling especially the dating of platform successions without pelagic faunas. Some of his publications, such as ERRERA et al. (1972), entitled "Le Calcaire de Givet et le Givétien à Givet", are especially remarkable and merit the attention of all scientists interested in the Givetien. They will find data on multiple aspects accompanied by a very well documented bibliography. He also devoted a part of his research to Devonian (4 Frasnian cyrtospiriferids, 2 common species of *Cyrtiopsis* from the lower Famennian of Belgium) and Lower Carboniferous spiriferids (3 taxa, Tournaisian of Belgium and from the Pennsylvanian). One should also note other important items, such as the discovery of the goniatite *Cheiloceras* in the lower Famennian of the Vesdre Massif (Belgium), and the presence of a plant levels in the central Alborz (Iran). In his bibliography (see BRICE 2016), the reader will notice that about 100 or more of his 150 publications are devoted to the rhynchonellides.

Acknowledgements

I am indebted to Dr. Maria HECKER, the wife of Paul SARTENAER, who sent me a selection of photos of her husband, and who provided valuable

information and additional data for this bibliography. May she find here the assertion of my very deep gratitude.

Reference

BRICE, D. (2015). Paul SARTENAER (1925 – 2015). – Annales de la Société Géologique du Nord, **22** (2e série): 7 pp. [with a publication list].

CHEN XIU-QIN

(1953 – 2016)

John A. TALENT

Xiuqin in her laboratory at the Nanjing Institute of Geology and Palaeontology (Photo: courtesy of Ulrich JANSEN)

CHEN Xiuqin, much loved by her colleagues at the Nanjing Institute of Geology and Palaeontology and by numerous international peers, was one of China's best known palaeontologists. She was known affectionately as 'Suzie' by many of her foreign colleagues.

Xiuqin was born in Zhengzhou, the largish capital of Henan province in central China, on the 4th October 1953. She retained close contacts with her mother, brothers, sisters and their offspring who live in or could congregate there on major occasions each year, especially the Chinese New Year in February. It was in Zhengzhou that she died of cancer after a long illness on the 28th January 2016.

Xiuqin bore the scars of her early life, on the edge of starvation for many years after her parents' small restaurant was appropriated by the government, leaving them without permanent employment and, literally, having to beg for scraps of work... Xiuqin's childhood took place during the many years of socioeconomic upheaval and denouement in China that followed the breakdown of Sino-Soviet relations, reorganization of the commune system, strengthening of the defence and internal security organs, and the growth of public apathy—with concurrent decrease in ideological fervour. Understandably, in this highly charged and dramatically changeable context, the day in and day out struggle for survival must have been paramount for families such as Xiuqin's. She never discussed the politics of those times. From an early age, her mind was firmly set on obtaining education, come what may.

During those years, there was never sufficient basic food for Xiuqin, her parents, or her siblings. Feeling the pangs of intense hunger every morning, she would dress quickly as soon as she awoke and rush to school to be away from the family's empty kitchen because it was easier to read her schoolbooks at school, trying to blot out her terrible hunger pains for the couple of hours before lessons commenced rather than feeling desperately miserable, cramped in a tiny home devoid of food, with a dearth of clothing, and lacking firewood or anything else to provide warmth. In the evenings, she would sit on a small stool under a street lamp to do her homework! She said that, as a consequence of being this way for many years (from birth to the end of secondary school), she was small and had frail bones...

Xiuqin did not experience adequate sustenance until she obtained entry to the Changchun College of Geology where she undertook a BSc in Geology between September 1974 and September 1977. When this occurred, she received a stipendium, which enabled her to eat adequately for the first time. Xiuqin acquired resilience from those early years of destitution—a resilience that would characterize her for the rest of her career as a passionate earth scientist specialised in palaeontology and stratigraphy. It seemed to her that, by a miracle, she had obtained entry to a 'Promised Land'...

In September 1977, Xiuqin became employed as a Researcher in Academia Sinica's Nanjing Institute of Geology and Palaeontology (NIGPAS) and undertook, concurrently, the equivalent of a PhD (September 1977 to August 1990). It was there that she became close to Academician WANG Yu,

arguably the foremost of Chinese workers on Palaeozoic brachiopods during the post-war decades. WANG Yu was mentor to a slew of other high-quality doctoral students, among them JIN Yu-gan, YU Chang-min, KONG Li, RONG Jia-yu and WANG Cheng-yuan, all well known globally to palaeontologists and stratigraphers concerned with the Middle and Late Palaeozoic.

During those years, under the guidance of WANG Yu and RONG Jia-yu, Xiuqin learned about laboratory preparation of fossils, including preparing elegant serial sections and making accurate taxonomic descriptions, and producing her first five publications. Her highly characteristic plates and text-figures of thin sections of brachiopods drew inspiration from working with WANG Yu and RONG Jia-yu. She became, in essence, a member of WANG Yu's extended family and made a point of regularly visiting him at his home and, after his death, his widow—until she too passed away.

On arrival in Guilin for a meeting of the Subcommission on Devonian Stratigraphy (SDS) in 1989, I was greeted on the steps of our hotel by two old friends, a student of Palaeozoic fish, WANG Shi-tao, and an energetic student of Devonian corals, YU Chang-min, both of whom I had had the pleasure of taking to the field with me in Australia for extended periods. I was greeted by Shi-tao with a rib-crushing bear-hug and the news that he was now famous for smoking and drinking—possibly World famous, he said! On that occasion, YU Chang-min ran one of the most pleasant and informative field meetings the SDS had ever mounted; it included examination of the spectacular latest Devonian–earliest Carboniferous sequence at Nanbiancun, and a day's travel by boat down the Li River for almost 100 km through its World-famous tower-karst limestones, mostly of Devonian age, that have inspired Chinese artists and poets for 1,000 years or more. He informed me that a young brachiopod worker by name of CHEN Xiuqin from the Nanjing Institute of Geology and Palaeontology had come to Guilin especially to meet me.

I thought no more of it until I retired to my room after dinner that night. Minutes later there was a tentative knock at my door. I opened it and a petite figure with a curtain of straight black hair, a horizontal fringe, and dressed mainly in white, slid past me, took up a position cross-legged in the middle of the room, delivered felicitations from WANG Yu and JIN Yugan, and proceeded to pour forth what seemed to be everything she knew about the Devonian stratigraphy of China, the various brachiopod faunas she had investigated, her plans for future research, her dream of receiving support to undertake a Doctor of Science in Beijing, and her desire to see many of the famed sequences of Devonian rocks around the World including those of the Broken River region of northernmost Queensland, and the Buchan area in eastern Victoria. When her sustained monologue had lasted well over an hour (perhaps nearer to two hours), I said I would try to help her do so. She then slipped out of the room like a will-o'-the-whisp and was gone.

In 1990, Xiuqin obtained entry to the Beijing University of Geosciences where for almost three years she undertook an intensive investigation of Late Silurian and Early Devonian brachiopods principally from the vicinity of Bateaobao and the Dong Ujimqin Banner in Nei Mongol (Inner Mongolia) for a Doctor of Science degree (it carries the honorific title of Professor). Because of the chain of major commitments that ensued, editing of the voluminous thesis was never completed—she intended to submit it to Palaeontographica. It was during this Beijing sojourn that she met and married her life partner, WU Jingpu, another gentle soul.

In October 1993, after returning to Nanjing to spend two years as a postdoctoral student, Xiuqin received a permanent appointment at NIGPAS. Vigorous field work during her many years in that institute—always with brachiopods as her prime focus, but occasionally involving bivalves, trilobites,

corals and crinoids—took her to many regions of China investigating the Ertang and Dale formations and the Carboniferous–Permian boundary in Guangxi, the Late Devonian brachiopods at Xichuan in Henan, the Devonian and Carboniferous of northern Xinjiang (as a participant in National Project 305), the Lochkovian brachiopods of the Luqu–Tewo area of the Western Qinling Mountains, and the Givetian brachiopods at Qujing (Yunnan).

Xiuqin's field and laboratory investigations on the brachiopods, corals and trilobites of Nei Mongol (1990–1995) included a modicum of laboratory work on Early Carboniferous brachiopods of northern Xinjiang. After completing her D.Sc, Xiuqin undertook investigations of the Devonian brachiopods of the Kunlun and Kalakunlun, Late Carboniferous brachiopods of Shanxi, Middle Devonian brachiopods from Debao (Guangxi), Late Devonian ones from southern Xinjiang, and then her protracted investigations (1996–2015) on the Late Devonian stratigraphy and brachiopods of northern Xinjiang.

In 1999, Xiuqin and a colleague from the regional geological survey contributed the field notes for the southern Xinjiang part of the International Geological Program (IGCP 421) excursion we led, with Fazl-i-Rabbi KHAN (University of Peshawar), from Kashi (= Kashgar) in southern Xinjiang, China, to Peshawar in Pakistan. This provided her with an opportunity to examine sections, especially at Kūragh, from which she had commenced monographing the late Givetian to early Famennian brachiopods of northernmost Pakistan with me. She made several presentations about her brachiopod work at the IGCP 421 conference in Peshawar that followed. In 2012, Xiuqin and Jingpu participated in the 34th International Geological Congress in Brisbane, following that with examination of the contemporary reef system on Lady Elliott Island at the southern end of the Great Barrier Reef complex, and the Early Devonian calcareous sequences at Buchan and Bindi in eastern Victoria.

During the last 19 years of her life, Xiuqin's interests expanded to geochemistry and community ecology (specifically of the Nei Mongol Early Devonian faunas), relationship of faunas to global-tectonic patterns, and global extinctions especially during the Upper Kellwasser Event (Late Devonian; Frasnian-Famennian boundary) as expressed in various sequences in South China, northernmost Pakistan and northwest Xinjiang.

It was always fun to be with Xiuqin and Jingpu in the cities of western China or in the field where Xiuqin was often racing from hilltop to hilltop examining rocks and fossils. She was hyperkinetic. Two major sampling initiatives by Xiuqin and various international colleagues, especially from Macquarie University, were undertaken in northwest Xinjiang in 2005 and 2007. The main thrust of intensive sampling (perhaps too intensively) was to provide tight bio-chronologic data from conodonts [by Ruth MAWSON] for underpinning Xiuqin's brachiopod work, and for discriminating the Upper Kellwasser Event and possible expressions of various hypothesised post-Frasnian global extinction events in the spectacular but essentially shallow-water contexts of the 'Hongguleleng Formation.' Several abstracts and an overview article on the Late Devonian stratigraphy of the Boulonguer-Yidimaodaongbo-Genaren area north of Hoxtolgay, authored mainly by participants in the 2005 venture, were published. More is to come, with Xiuqin as a posthumous author.

A feature of these expeditions was the meticulous attention paid by Xiuqin to ensure that all relevant government bodies were informed of our presence. They gave their 'blessing' to our activities and there were never any complications or even suspicions about our activities close to the border of northwestern China with adjacent nations. That this was necessary, especially in border areas, was not always appreciated by one or two of our foreign participants. Xiuqin was able to charm the local non-Han natives, particularly the Mongols and Uiygurs. A feast mounted by the Mongols of the Boulonguer area ended with our entire group being dressed in traditional Mongol finery and photographed.

Xiuqin made a point of including the most famous cultural monuments from China's deep past in her itineraries, cleverly interweaving them like punctuation among our principal field-work targets. Near Kashi it was a famed Uighur tomb complex (the Abakh Hoja Mazari) to the northeast of the city and, to its southeast, the world famous, uniquely colourful, Livestock Market (the Mal Bazaar). In Turpan, it was the Jiaohe ruins, one of the World's largest and best preserved ancient cities, and the enormous colourful brick Emin Minaret. In Ürümchi it was the spectacular desert-mummified bodies in the Xinjiang Museum, and in Dunhuang it was the Mogoa Caves, one of the greatest complexes of Buddhist art in the World. All such ventures were subordinate to our field activities, often programmed to take place while Xiuqin was darting from office to

office. On two occasions, she developed itineraries for excursions that focused on Xinjiang stratigraphy and palaeontology for international scientific meetings and generated field guidebooks for which I polished the English, but neither of them drew sufficient clientele to be mounted.

Xiuqin always sought out the best eating places, among them The Peking Duck Restaurant in Beijing and its branch in Kashi. Each time we travelled to and from Hoxtolgay in northern Xinjiang it was mandatory to stop at a superb restaurant in Quytun that Xiuqin ferreted out on our first expedition. She did this by noting the pattern of obviously satisfied diners in the streets and tracked them back to a common point where people were issuing from an enormous restaurant, wiping their mouths. It was a wonderful discovery. Equally spectacular was our breakfast place in the north of Hoxtolgay—discovered by Xiuqin by trial and error—and the kebabs being produced every afternoon and evening on a street corner in the north of the town. We never experienced a second-rate eating house in Nanjing. The high points were visiting the ancient pedestrians-only centre of Nanjing to dine with Jingpu and Xiuqin on vast numbers of dishes of the ancient cuisine of the Nanjing region in a contemplative environment, and just chatting in our favourite coffeehouse, the Yose Mite.

Xiuqin and Jingpu had numerous endearing little quirks. Instance their differences in favoured cuisine: Xiuqin, being from northern China, was passionate about noodles, Jingpu having originated in southern China was a connoisseur of rice-based dishes. On numerous occasions I witnessed Xiuqin querying what Jingpu may have ordered and then, to his horror, racing across to the principal counter and changing Jingpu's order from a rice dish to one with noodles…

By 2009, Xiuqin and Jingpu had joined the cavalcade of Chinese people determined to own apartments and cars and emancipate themselves to some extent from the enormous crush of bicycles that characterize Nanjing and so many other cities in China, especially at rush hours. When I flew into Nanjing in May of that year for a few days on my way to Ürümchi and Novosibirsk, I received the usual spellbinding reception by Xiuqin and Jingpu at the airport. They announced that they had bought an apartment in a newly constructed housing complex in an outer suburb of Nanjing, and that a new car, waiting outside, had become theirs a few hours earlier.

A day or two later, Jingpu was a couple of hours late for a *rendez-vous* at our favourite Nanjing restaurant and coffeehouse, the enormous Yose Mite—named, though this may not be immediately apparent, after the Yosemite National Park in the USA. A car loaded with ladies had collided with Jingpu and Xiuqin's new car at a major intersection. The half-dozen side panels, including doors of the former had fallen off laterally like so many deciduous wings, leaving the ladies sitting petrified in the skeletal car until the police arrived. The only damage to Jingpu and Xiuqin's car was a slight dent, smaller than a baseball cap—one that took no more than a few minutes at a panel-beater's shop to be sucked out by vacuum, making the car once more like new. I assured Jingpu, disturbed by the accident, that the damage done to the two cars demonstrated unequivocally that he was by far the better driver…

Xiuqin was a Titular Member of the IUGS Subcommission on Devonian Stratigraphy, and was a conscientious participant in the activities of UNESCO's International Geological Correlation Program, especially its project IGCP 421 on *North Gondwana mid-Palaeozoic biodiversity and bioevents in relation to crustal dynamics*.

Her last major research involvement was as a member of a team dedicated to improving knowledge of the vast number of supposedly new genera of brachiopods that had been proposed in the Regional Atlases of Palaeontology that appeared in the 1970s and early 1980s. Most of these volumes were commendable initiatives, but they had been compiled too rapidly by well-meaning people of the various regional geological survey parties—remote from the great libraries in Nanjing, Beijing, Wuhan, Shanghai and Guizhou. Fortunately, this major work, undertaken with NIGPAS colleagues, was completed during 2015 and was in press well before Xiuqin's demise.

Having not heard from Xiuqin for a few months, I wrote to her on the 23rd September 2015: *Now that our big work has been completed (and to which you contributed so much), have you been able to resume describing those northernmost Pakistan Devonian brachiopods? It is most important that you get well first! Your health is more important than any manuscript on brachiopods of any age from anywhere....*

Her response in an e-mail of the 19th October 2015 says it all.

"Dear John, I feel very sorry that I haven't answered your e-mail until today. At the end of July,

I was put in a hospital and am presently in the hospital. I haven't received my e-mails until today; more than 300 downloaded at once. I am now sending a simple e-mail to you. Later, when I recover more, I will send another one. I feel very sorry about the northernmost Pakistan brachiopod manuscript. After I recover my health, I will continue it. I hope to finish it in 2016. Sorry again! Thanks a lot to you and Ruth [MAWSON] for your kind help… John, please pardon my delay with our joint Pakistan manuscript." Cheers, Xiuqin.

There was to be no recovery. Xiuqin died from cancer in her beloved home-city Zhengzhou, far from most of her numerous palaeontologic friends in China and elsewhere in the World. I was not aware that she had been fighting cancer for several years prior to July 2015 until I received an e-mail on 6 February from ZHAN Renbin with this information. The Nanjing Institute of Geology and Palaeontology despatched a conflux of her colleagues to Zhengzhou to participate in her funeral.

Xiuqin was a workaholic, a rare person characterised by disarming naturalness and without any trace of self-aggrandisement. Her research had ranged widely, but far too many of her research results still needed a final polish before submission for publication. These included her Doctor of Science thesis and a monograph with me on the Devonian brachiopods of an incredibly beautiful but now politically inaccessible region, the Yarkhun-Mastuj-Chitral watershed of northernmost Pakistan. For our Macquarie University group and many others, she helped make field work in Xinjiang from the Pakistan border to Kashi (= Kashgar), Ürümchi, Turpan, Quytun, Karamay, Hoxtolgay and Utabulak a lot of fun, culturally and geologically. For me specifically, her life and death seemed like variations on a classical Greek tragedy…

Xiuqin's story was unadorned, unapologetic; her passion for her science had been inextinguishable, always suffused with idealism. Both her and her husband WU Jingpu were wonderful ambassadors for China, full of warmth and intelligence, buoyed by a genuinely egalitarian spirit.

All who worked with Xiuqin in the field or elsewhere or who co-authored manuscripts with her have lost a remarkably selfless, highly motivated and intellectually honest friend.

HORST BLUMENSTENGEL

(1935 – 2016)

H. GROOS-UFFENORDE & D. WEYER

Horst BLUMENSTENGEL at his birthday in 2005

Horst BLUMENSTENGEL unexpectedly passed away during a holiday trip on Tenerife Island due to a sudden heart attack. Horst was born in Limbach-Oberfrohna near Chemnitz in the German province (Freistaat) Saxony. There he finished school and studied geology at the Mining Academy in Freiberg (1953–1958). He graduated with a diploma thesis on Upper Devonian pelagic ostracods in Thuringia (published 1959) under the supervision of the internationally well-known professor of Palaeontology, Arno Hermann MÜLLER.

Since 1958, he lived in the town of Jena, employed as geologist and palaeontologist at the Thuringian Geological Survey. 1958-1978 Horst was head of the laboratory of micropalaeontology (1958–1986), working with Conodonta, Ostracoda, Foraminifera, Tentaculitida etc. of Cambrian to Carboniferous times, mainly from Thuringia, in 1968–1978 also from Mecklenburg in the North of the German Democratic Republic. Occasional

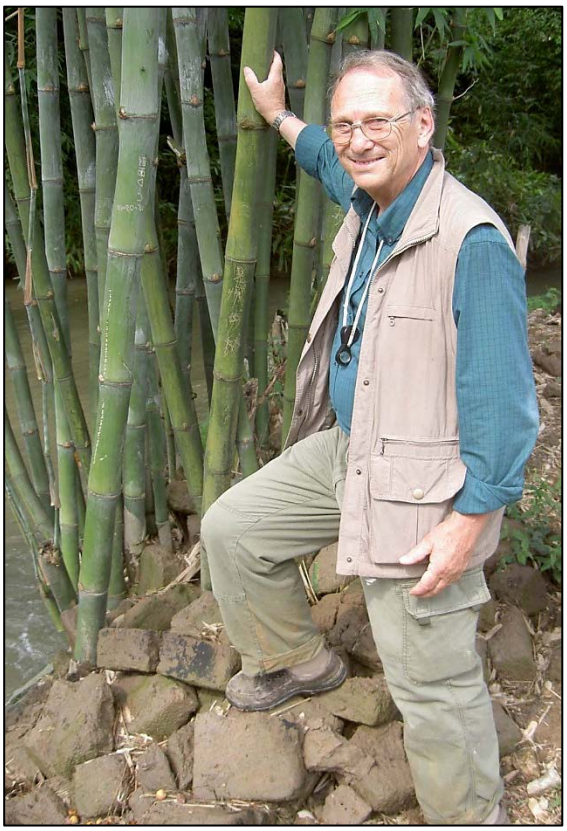
micropalaeontological dating of anonymous "top-secret" isolated samples from the Palaeozoic of Thuringia was done for the SDAG Wismut (uranium mining). In 1980, he began intensive palynological and sedimentological studies on the East German Tertiary.

In 1961, Horst married Barbara NENNINGER, librarian at the Friedrich-SCHILLER University in Jena, and later at the Geological Survey in Jena/Weimar,). Their children Klaus und Susanne were born in 1962 and 1964, and today there are several grandchildren and even grand-grandchildren.

Horst graduated in 1964 with a thesis on Upper Devonian benthic ostracods (published 1965), again under Professor Arno Hermann MÜLLER. His scientific life suffered seriously from the political restrictions and repressions during the "socialistic period" in Eastern Germany (no contact and reprint exchange with "western"colleagues, no travelling to "western countries", strongly restricted permissions to publish scientific results and even no permission to participate in East German congresses and conferences with international guests).

After the German reunification in 1990, Horst had to reorganize the Geological Survey of Thuringia in Jena as interim head. In 1991, he was glad to return to scientific studies, as a palynologist for Tertiary research at the Geological Survey of Sachsen-Anhalt in Halle. Here the German Society for Geosciences (DGG) honoured him in 2000 with the TEICHMÜLLER Prize, presented to him in honor of his contributions to the stratigraphy and genesis of Tertiary coals. In 1994-2005 he teached Applied Micropalaeontology to students of geosciences at the Friedrich SCHILLER University in Jena. After his retirement in 2000, Horst continued his Tertiary studies as in a full-time job, often based on different contracts. Besides his intensive work on Palynology (and occasionally also on Ostracoda) he was very happy to be able to travel privatly throughout the world as tourist and often to attend international congresses.

Horst BLUMENSTENGEL was an eminent worker on Palaeozoic ostracodes. His zonation with Late Devonian so-called Thuringian ecotype ostracodes (psychrosphaeric faunas) is interntionally accepted and used worldwide. He proposed a detailed subdivision of the last Famennian ammonoid *Wocklumeria*-Genozone into five ostracod zones, as precise as the clymeniid zones, much better than any conodont zonation. This was based on the Bohlen section near Saalfeld (Thuringia), but unfortunately, has not yet been reproduced as a biostratigraphical tool in any other region. Because of his micropalaeonological and biostratigraphical studies, Horst was an active member of several Subcommissons on Stratigraphy (Devonian, Carboniferous, Tertiary).



Horst BLUMENSTENGEL in China in 2006

Results and success of his palynological and sedimentological engagement in the Tertiary, dominating in the second half of his scientific career, will soon be acknowledged in a special memorial volume of the journal "Mauritiana" (Museum Mauritianum, Altenburg, 2017).

The International Devonian community lost an open-minded colleague with broad interests. All will miss his kindness, his diversified knowledge, his friendly cooperation, and his hart-warming humour.

Ostracod taxa named after Horst BLUMENSTENGEL

Acanthoscapha blumenstengeli KOZUR, 1985 (Upper Carboniferous)

Amphissites blumenstengeli GRÜNDEL, 1962 (Lower Carboniferous)

Antiaechmina blumenstengeli PŘIBYL, 1979 (Upper Ordovician)

Aurigerites blumenstengeli OLEMPSKA, 1979 (Upper Devonian)

Krausella blumenstengeli I. ZAGORA, 1967 (Lower Devonian)
Marginohealdia blumenstengeli BECKER, 1977 (Upper Devonian)
Rabienites blumenstengeli (TSCHIGOVA, 1977) (Upper Devonian)
Semibolbina blumenstengeli JORDAN, 1964 (Upper Silurian)
Fabalicypris blumenstengeli CRASQUIN in CRASQUIN, CARCIONE & MARTINI, 2008 (Middle Permian)

Palaeozoic publications of Horst BLUMENSTENGEL (in chronological order)

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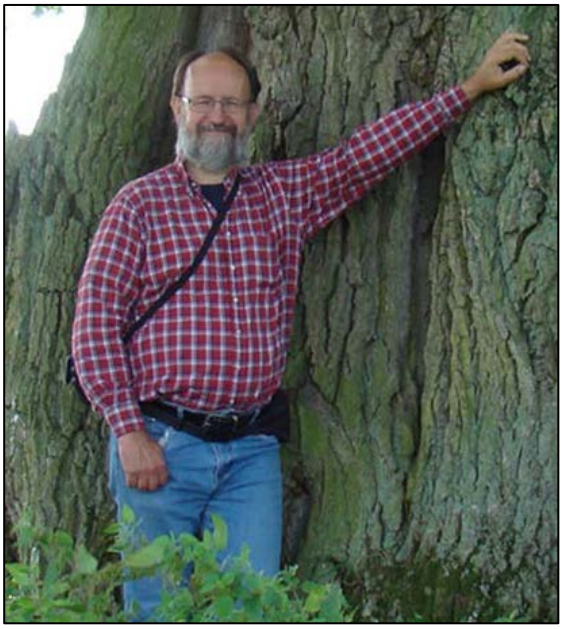
MICHAEL E. SCHUDACK

(1954 - 2016)

R. Thomas BECKER



In middle January of 2016, the international community of micropalaeontologists lost very unexpectedly and sadly Michael E. SCHUDACK, born on the 9th of August 1954 in Gelsenkirchen (Germany). Ich knew Michael since the time I started my studies of geology and palaeontology at the Ruhr-University Bochum, where he graduated with his Diplom in 1979. We shared the same Ph.D. supervisor, Prof. Hans MENSINK, although he finished his dissertation on Wealden charophytes, which received the Best Ph.D. Award of the RUB for 1985, when I had just started mine. Hans MENSINK had a focus in the Jurassic, including significant ammonoid work, but from a time he spent in Kabul, Afghanistan, he, and the second palaeontologist at Bochum, Arnfried DÜRKOOP, also continued their strong interests in the Devonian. Whilst Michael became one of the internationally leading charophyte specialists, MENSINK forced him as a side project for a brief time into the Devonian. His study of the

cyclicity in of one of the biggest and thickest Rhenish Givetian reefs, in the Hönne Valley (Asbeck Quarry), became a standard for subsequent work, especially of reef microfacies successions. The paper was published when Michael had already moved on (in 1988) to Berlin. Since it was written in German, it may not have received the attention of Devonian workers from abroad that it deserved.

When I moved in 1991 to Berlin to join the "Cephalopod Group" of Helmut KEUPP, I finished for several years in the same spacious office with Michael. He extended his research scope to Mesozoic ostracods (jointly with his wife Ulla SCHUDACK, a co-semester of me) and, more recently, to Cenozoic foraminifers. He became a member of the German and International Subcommissions on Jurassic Stratigraphy and worked for some years at Halle University, who awarded him a well-deserved honorary professorship in 2005, before returning to the Free University. Michael was too busy to return to the Devonian but it was always a stimulating pleasure to discuss our different research ideas, also after joint soccer games in front of the Free University Palaeontology Institute.

Michael was not only an exceptional micropalaeontolologist and university teacher, also a wonderful, friendly, and easy going person that is deeply missed by all that knew him. For other, partly more extensive obituaries see KEUPP (2016() and SAMES & CLOSAS (2016).

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SDS REPORTS

MINUTES OF THE ANNUAL SDS BUSINESS MEETING

September 22, 2015, Royal Belgian Institute of Natural Sciences, Brussels, Belgium

L. SLAVÍK & C. E. BRETT

(with additions by J. E. MARSHALL and R. T. BECKER)

Attendance: The Chairman (J. MARSHALL), Vice-Chairman (C. E. BRETT); Secretary (L. SLAVÍK);

TMs: R. T. BECKER, A. BLIECK, J.-G. CASIER, C. CORRADINI, N. IZOKH, U. JANSEN, M. C. PERRI, E. SCHINDLER, J.I. VALENZUELA-RÍOS;

CMs: P. BULTYNCK, D. BRICE, R. BROCKE, C. CRÔNIER, A.-C. DA SILVA, I. EVDOKIMOVA, Y. GATOVSKY, C. GIRARD, S. HARTENFELS, S. GOUWY, H. MATYJA, W. T. KIRCHGASSER, P. KOENIGSHOF, J.-C. LIAO, E. LUKŠEVIČS, B. MISTIAEN, K. NARKIEWICZ, M. NARKIEWICZ, S. NIKOLAEVA, L. PONCIANO, C. SPALLETTA, M. STREEL, T. SUTTNER, J. J. ZAMBITO;

GUESTS: O. BÁBEK, M. COEN-AUBERT, C. DERYCKE, H. DJOUDER, S. HELLIG, A. HUŠKOVÁ, T. KUMPAN, E. POTY, M. SARDAR ABADI, S. STICHLING, J. WATERS (a total of 47 people).

1. Introductions and apologies for absence

The meeting began at 18:00 in the Grand Auditorium of the Royal Belgian Institute of Natural History. JOHN MARSHALL started with the introduction of himself as the SDS Chair, Vice-Chair CARLTON E. BRETT, and Secretary L. SLAVÍK. JM also noted that that he was re-elected as Chair and agreed to continue both with C. E. BRETT as Vice Chair and L. SLAVÍK as Secretary, who also agreed to a second term. The CHAIRMAN read a list of apologies from those unable to attend:

TMs: MA XUEPING, J. D. OVER, G. RACKI;

CMs: Z. S. ABOUSSALAM, G. BAIRD, P. BUDIL, C. BURROW L. CHADIMOVÁ, J. FRÝDA, J. HLADIL, A. EL HASSANI , J. RICHARDSON, S. TURNER, T. UYENO, C. VER STRAETEN, WANG Chengyuan.

The CHAIRMAN then asked for approval of the last SDS Minutes from Mendoza 2014 (SDS Newsletter, **30**: 8-12). No corrections were noted; therefore, the Minutes were approven by the audience.

2. Chairman's Business

The CHAIRMAN was saddened to report the passing of the long-term, very active SDS Member PAUL SARTENAER of Belgium; Paul passed away in summer of 2015. Other deaths include Jochen HELMS and Ingrid ZAGORA, both noted German Devonian workers and members of the German Subcommission on Devonian Stratigraphy.

Obituaries will soon appear in the SDS Newsletter; the assembled group observed a moment of silence in rememberance of these individuals.

The CHAIRMAN then reported on the International Congress on Stratigraphy (STRATI 2015) that took place in Graz this summer and that was attended by numerous Devonian workers. A special Devonian session was held during the STRATI; the conveners were both the CHAIRMAN and the SECRETARY. After a day of talks, there was a brief SDS business meeting; Markus ARETZ, the leader of the D/C Task Group, discussed the status of the boundary revision. The CHAIRMAN, SECRETARY, and other SDS members also attended the post-meeting field excursion to the Carnic Alps, which was excellently organized by TM Carlo CORRADINI, CM THOMAS SUTTNER, and MONICA PONDRELLI.

3. ICS Matters

The CHAIRMAN reported on the ICS Business Meeting held at STRATI 2015. ICS Chairman Stan FINNEY has ruled that there should be no proposals for formal sub-stages until after the new Emsian and D/C boundaries could be agreed upon. He wants SDS to move forwards with the re-study of the Zinzilban section (current Pragian/Emsian GSSP) and had been able to obtain $6000 from NSF for such a further detailed investigation. Other ICS discussions centered on formalizing capitalization of series names, e.g., Lower, Middle, and Upper Devonian. The CHAIRMAN reported the results for the election of the ICS officers. Stan FINNEY will step down as chair of ICS as of summer 2016. The new ICS Chair will be David A.T. HARPER, Vice Chair: Brian T. HUBER, and Secretary-General: PHILIP GIBBARD.

4. Revision of GSSP's

4.1. Pragian-Emsian Boundary

The SECRETARY gave a brief presentation on the field work in the Kitab Sate Reserve in Uzbekistan that took place in August 2015. He explained the problems from the past and recapitulated the SDS statements agreed in 2008: The new base of the Emsian (GSSP) should stay in the Kitab State Geological Reserve and has to be shifted up to a level near the entry of a polygnathid morphotype or subspecies that corresponds to "*P. excavatus* 114", i.e. well above the "*kitabicus*" boundary. The latter should be used to define the future base of a new, formal upper Pragian substage. This would correspond to the ca. lower half of the Praha Formation (traditional Pragian) in the Prague Synform. Previous study in 2008 accomplished sampling and MS data; conodont samples were, however, not productive. The SECRETARY then reported on the new fieldwork that took place in August 2015. The participants were three senior researchers (TM Nadya IZOKH, TM Nacho VALENZUELA-RÍOS, TM Ladislav SLAVÍK, and a student of LS, Aneta HUŠKOVÁ. About 150 kg conodont samples were taken from the newly excavated interval. Sampling was done at a new site, which had previously been covered by a landslide, and in dark micritic facies representing deeper water environments. In June 2015, TM Nadya and CM Olga IZOKH took samples for C isotopes. The conodont samples were split into three parts, which were shipped to Valencia, Prague, and Novosibirsk, respectively. The recently obtained conodont material has been examined directly at the Geological Centre in Kitab. TM LADISLAV. SLAVÍK and TM Nacho VALENZUELA-RÍOS expressed thanks to TM Nadya IZOKH, who also acted as the indispensable coordinator and manager of the trip, and, to the Uzbek colleagues that have been extremely kind and helpful. Especially without the help of CM Utkir RACHMONOV, the Director of the Kitab State Geological Reserve, it would have been impossible to achieve any results. The team also profited very much from the help and discussions with Uzbek scientists and SDS members, notably with CM A. I. KIM and M. V. ERINA.

TM R. Thomas BECKER noted that there had been the promise of a new dacryoconarid defined boundary based on a new monograph concerning Bohemia; but this was never completed. The SECRETARY commented that there is unfortunately no progress in the Prague Synform concerning

dacryoconarids, as no active worker is available in the meantime. He referred to the note by CM A.I. KIM, who proposed a search for *D. praesulcata* in the Prague Synform and elsewhere, in order to improve the correlations with the Zinzilban section.

TM R. Thomas BECKER noted that in Morocco *P. excavatus* M114 comes in just above equivalents of the Bohemian *Atopus* bioevent; but no *P. kitabicus* has been found so far and that CM Christian KLUG and co-authors are preparing a new paper on the lower Emsian ammonoids from Uzbekistan (Kitab Reserve).

4.2. D-C Boundary

Earlier in the day, TM Carlo CORRADINI gave an overview of six possible locations for the D-C boundary with pros and cons for each. This is a move forward and partly based on a paper in print (in the SDS GeolSoc volume) by TM R. T. BECKER et al. Practicality is to be emphasized in whatever boundary is picked.

The point was raised that the boundary should be based upon phylogenetic lineages (as it had been an – unfortunately failed – objective in the past, with the *Siphonodella paesulcata- S. sulcata* boundary, but there are clearly problems with *S. sulcata* itself). Approximately 20 people are actively working on the D-C boundary. Markus ARETZ said that there does exist a good boundary criterion but there is no good section. CM Marek NARKIEWICZ said that the requirement for a multiproxy approach should be respected but a biostratigraphic criterion is fundamental.

The CHAIRMAN noted that while ICS was happy to have phylogenetically based boundaries, the new boundaries now ultimately need to be based on a multi-proxy approach. Given that the new boundaries will have to be approved by all members of the ICS it is critical to have multiple proxies such as MS and carbon isotopes aligned to give the best possible definition. For ICS the boundary should be defined on a biostratigraphic basis, but it needs to have supplemental information in order to be widely usable. TM R. Thomas BECKER proposed the Kowala quarry section in the Holy Cross Mountains as an option; Polish colleagues have resampled Kowala. TM Nacho VALENZUELA-RÍOS stressed that biostratigraphic criteria are the best thing and that the D-C boundary can be hardly correlated elsewhere solely based on any geochemical data sets. Multiproxy is nice but no real help to solve the basic definition.

CM Maurice STREEL emphasized that the new boundary should not be too far from previous definitions to avoid having to reevaluate many previous reports of units, such as the North American Bedford and Sappington, which have long been understood to be Devonian. So perhaps, the Carboniferous should start with the entry of *Protognathodus kockeli*.

TM R. Thomas BECKER stated that we need to find a way to put everything into levels that have wide utility; his order of preference for the boundary was: 1) the base of the Hangenberg Event (black shale): base of the *costatus-kockeli* Interregnum, and base of the LN spore zone. 2) the base of *Pr. kockeli* Zone, where nothing was happening with the spores. Ondra BÁBEK asked which of these levels does the community prefer? He also supported the base of *Pr. kockeli* for the boundary definition that also correspond to "Hangenberg Sandstone Event" and referred to the new findings by his Ph.D. student Tomáš KUMPAN (Brno).

TM Carlo CORRADINI stated that for the final analysis still more data are needed. It is important to get the D/C Boundary Task Group together to discuss just this topic.

5. Devonian Substages

The CHAIRMAN noted that although we cannot formalize the sub-stages yet, we can, in the meantime, informally lay out the subdivisions; mostly three-fold.

5.1. Lochkovian: This will have a three-fold division. TM Nacho VALENZUELA-RÍOS said, that a three-fold subdivision of the Lochkovian would be the best. He, the SECRETARY, and TM Carlo CORRADINI are currently working on that.

5.2. Pragian: The CHAIRMAN We cannot do a Pragian subdivision until the Emsian boundary is fixed. The SECRETARY noted that a prospective two-fold subdivision of the Pragian would be feasible (i.e., using the intra-Pragian *kitabicus* level).

5.3. Emsian: The same case as with the Pragian. No progress with subdivision is possible before the lower Emsian boundary is fixed.

5.4. Eifelian: TM R. Thomas BECKER has asked TM Carl E. BRETT to make a formal proposal for two Eifelian substages, with a boundary at the *costatus-australis* boundary. CB is working on this with CM Chuck VER STRAETEN and will try to come to a formal proposal soon.

5.5. Givetian: CM Pierre BULTYNCK had proposed a three-fold subdivision with Lower, Middle, and Upper substages. TM Nacho VALENZUELA-RÍOS and other members have informally approved this subdivision; these substages are already practically being used after SDS formally decided on its levels. TM R. Thomas BECKER said that more detailed data are needed especially around the *hermann*i Zone, which is used as the base of the upper Givetian and a stratotype section needs to be selected.

5.6. Frasnian: CM Bill T. KIRCHGASSER said that together with CM Gil KLAPPER they will publish a revision of the conodont zonation in New York by the end of 2015 (in the Journal of Paleontology) and that they consider to get rid of the MN zone terminology. They are working on problems with Genundewa and North Evans *Ancyrodella*; it might be an approximate boundary level for a substage.

5.7. Famennian: TM R. Thomas BECKER said that he had proposed jointly with CM Sven HARTENFELS the *Annulata* Event six years ago as the base of an upper substage. In 2003 SDS decided to follow STREEL et al. (1998) to subdivide the Famennian into four substages roughly following the German Nehdenian, Hembergian, Dasbergian and Wocklumian. Since the proposal for the upper substage; there had been little reaction from the membership, which is kind of strange. CM Maurice STREEL had suggested an alternative scheme. There is a need to consider these carefully and make a decision. The base of the uppermost substage is proposed at the entry of *Bispathodus ultimus*, close to the base of informal "Strunian Stage", but with respect to recent data from Thuringia (KONONOVA & WEYER 2013; see SDS Newsletter **29**: 40), the definition and subdivision of the index taxon needs a re-consideration.

6. SDS Membership

6.1. New officers

TM R. Thomas BECKER reported on the election of SDS officers and informed the meeting about the re-election of TM JOHN E. MARSHALL as the Chairman and of TM CARL E. BRETT as the Vice-Chair.

The CHAIRMAN noted that according to usual IGC procedures, titular members (TMs) are only allowed two consecutive four-year terms. However, using that rule we would lose many active TMs. We need to bend this a bit to be sensible. The CHAIRMAN and other executives will review the current list and determine who is active in Devonian and related research. Using this criterion, active members would be invited to stay on; others would be sent a letter thanking them for their contributions.

Alain BLIECK wishes to step down as a TM for France and to be replaced; he suggested CM Catherine CRONIER to be his successor.

6.2. New Corresponding members:

CATHERINE GIRARD (nominated by TM Carlo CORRADINI), Montpellier, France, Catherine.girard@univ-montp2.fr, conodont specialists.

STEPHAN HELLING (nominated by TM R. Thomas BECKER), Münster, Germany, stephanhelling@uni-muenster.de, trilobite specialist.

DMITRI PLAX (nominated by CM Katarzyna NARKIEWICZ), Minsk, Belarus, plax@bntu.by, general stratigraphy and fishes.

7. SDS Publications

The Geological Society of London Special Publications volume, being edited jointly by TM R. T. BECKER, P. KÖNIGSHOFF and TM C. E. BRETT, is nearly completed and ready for hard copy printing. Many papers are already published on-line; three more manuscripts (including new contributions by CM Sandra I. KAISER, TM R. Thomas BECKER, TM Uli JANSEN and co-authors are expected very soon). We have enough contributions to go forward with the printing in 2016.

TM R. T. BECKER had to put aside the editing of the SDS Newsletter 30 for the time being, in order to get ready for the post-meeting SDS/IGCP field trip to Rhenish Slate Mts. and to produce the voluminous guidebook for this excursion. He will try to get back to it in October.

8. SDS Meetings

2016

We may be obliged to have some presence in the IGC Capetown, South Africa meeting in August. There may be a Devonian field trip, but plans are still very tentative.

SDS will join with the IGCP 591 final meeting in Ghent, July 6-9, 2016. There will be a field trip to Wales and also joint meetings of the

Subcommissions on Cambrian, Ordovician and Silurian Stratigraphy.

2017

The SDS will meet in conjunction with the ICOS meeting in June 25-July 1, 2017,. Valencia, Spain; post conference field trips are planned in the Pyrenees, Prague Synform, and Carnic Alps. Meetings of other subcommissions (e.g., ISSS) are also planned to take place.

2019

The next meeting of STRATI will be probably in Italy (unspecified location) in 2019. From now on, the International Congress on Stratigraphy will take place every four years.

9. Financial Report

SDS will receive a total of $2100 from ICS; it provides some support for SDS officers to attend meetings. Part of the money will be used for the SDS Newsletter production.

10. Other Business

SECRETARY: There is a continuous need to correct and update addresses of all SDS members for the SDS Newsletter and for the SDS webpage.

The CHAIRMAN expressed thanks from members of the SDS to the organizers of the Final IGCP 596/SDS meeting in Brussels and highlighted this meeting as very successful, well attended and well organized.

TM R. Thomas BECKER noted that the post-meeting field excursion would leave from the museum the next morning at 8:30 AM.

The meeting was adjourned at 19:05.

MINUTES OF THE ANNUAL SDS BUSINESS MEETING

July 7, 2016, Het Pand, Ghent, Belgium

L. SLAVÍK & C. E. BRETT

(with additions by J. E. MARSHALL and R. T. BECKER)

Attendance: The Chairman (J. E. MARSHALL), Vice-Chairman (C. E. BRETT); SECRETARY (L. SLAVÍK);

TMS: R. T. BECKER (Newsletter Editor), C. CORRADINI (webmaster), U. JANSEN, E. SCHINDLER, J. I. VALENZUELA-RÍOS;

CMS: A.-C. DA SILVA, L. FERROVÁ, S. HARTENFELS, S. HELLING, J.-C. LIAO, M. MERGL, A. NAZIK, M. STREEL,

GUESTS: A. BANCROFT, J. BAS, Q. CHEN, A. DESROCHERS, D. DE VLEESCHOUWER, J. C. GUTIERREZ-MARCO, A. HUŠKOVÁ, P. MCLAUGHLIN, J. LU, T. MEIDLA, J. NAGEL-MYERS, D. PAS, D. RAY ,A. SÁ, N. SENIKOV, T. SÖTE, T. STEEMAN, S. STICHLING, D. STRUSZ, T. VANDENBROUCKE, J. VERNIERS, C. WAID, N. WALASEK, G. WITTON-MACLEAN, Ž. ŽIGAITÉ (a total of 41 people).

1. Introductions and apologies for absence

The meeting began at 4:45 pm in the former refectory of the historical convent at Het Pand, University of Ghent.

At the beginning, the International Subcommissions on Silurian and Devonian Stratigraphy met jointly for a brief time to consider issues of common interest because the two subcommission meetings were scheduled simultaneously.

At this session TM J. I. VALENZUELA-RÍOS introduced the upcoming meeting of ICOS (International Conodont Symposium). It will be held in June 2017 in Valencia, Spain. Monday through Friday, June 20 to 25th, will be a pre-meeting field trip to the Spanish Central Pyrenees. The technical meeting will be in Valencia, June 25-30th; this will include mid-meeting fieldtrips on Wednesday with options for Devonian or Triassic sections. The format of the meeting will be paper presentations and annual business meetings for both Silurian and Devonian subcommissions. Hopefully this format will be broadened to include topics other than conodont paleobiology and biostratigraphy. The organizers will try to keep registration fees as low as possible.

The post meeting excursion will have two parts. On July 1st the participants will move to Prague for a three-day field trip to the Prague Synform, Czech Republic, July 2nd-4th. It will be led by TM Ladislav SLAVÍK and other colleagues, with a focus on Silurian-Devonian biostratigraphy. Then the fieldtrip participants will move to Venice to join the second part of the trip led by TM Carlo CORRADINI and CM Thomas SUTTNER in the Carnic Alps (to include Cellon and Grüne Schneid; Ordovician to

Carboniferous), from July 6-8th, 2016. There are cheap flights from Prague to Venice and it is possible that this will be included to the total cost of the post-Symposium FT. The field trip will conclude at Venice Airport on July 9th.

There is already a promise of a published symposium book with abstracts, due April 1st (no joke, in Spain the 8th December is an "1st April fools day equivalent"). A website of the meeting will be set up soon by Carlos MARTÍNEZ PÉREZ.

Following a discussion the joint meeting concluded and ISSS members adjourned to another room.

2. Chairman's Business

SDS Chairman John MARSHALL called the main meeting to order. He started with the introduction of himself as the SDS Chair, Vice-Chair C. E. BRETT, Secretary L. SLAVÍK, Newsletter Editor R. T. BECKER, and SDS Web Master C. CORRADINI.

Apologies were received from:

TMs: A. BLIECK, J.-G. CASIER, N. IZOKH, J. OVER;

CMs: Z. S. ABOUSSALAM, G. BAIRD, P. BUDIL, S. GOUWY, L. CHADIMOVÁ, J. HLADIL, S. I. KAISER, D. PLAX, O. OBUT, J. TALENT, T. UYENO, C. VER STRAETEN, A. YAZIKOV, J. J. ZAMBITO.

The **Minutes** from the SDS meeting in Brussels 2015 (see this Newsletter) were approved.

The CHAIRMAN reported, with regret, the loss of several long-term former SDS members and other reknown Devonian researchers:

CHEN Xiuqin ("SUZIE"), from the Nanjing Institute of Geology and Palaeontology, a major Devonian brachiopod worker and TM (see obituary by CM John E. TALENT, this Newsletter).

Elzbieta TURNAU from Krakow, Poland. Elzbieta was a long time SDS Member and worked on Devonian palynology (see obituary in the SDS Newsletter **30**: 5-7).

Horst BLUMENSTENGEL, a long time member of the German SDS and ostracod worker from the Geological Survey at Jena (see obituary by D. WEYER in this Newsletter).

Gertrude BIERNAT, brachiopod worker from Poland.

H. Richard LANE, former director of Geology and Paleontology at NSF and an important Carboniferous conodont worker and strong supporter of stratigraphic palaeontology, also a member of the D/C Boundary Task Group (a volume in honor of him is in preparation in the journal *Stratigraphy*).

SDS observed a moment of silence for the passing of these individuals.

Note of appreciation: The CHAIRMAN expressed his sincere thanks to Bernard MOTTEQUIN and all others for their excellent job running the joint IGCP-SDS meeting in Brussels, September, 2015, and the two associated outstanding pre- and post-meeting field trips.

3. ICS Matters

The leadership of ICS is changing; Stan FINNEY is stepping down as chair and David HARPER will take over at the Cape Town, 35th IGC, with new Vice Chair Brian T. HUBER and Secretary-General Philip GIBBARD.

4. GSSP Revisions

4.1. Pragian-Emsian

A brief report on the Pragian-Emsian boundary was made by the SECRETARY. Four people, including himself, TM Nacho VALENZUELA-RÍOS, TM Nadya IZOKH, and Ladislav's student Aneta HUŠKOVÁ took part in sampling the GSSP section at Zinzilban Gorge. Ca 150 kg of samples were split into three parts and sent to the labs of Ladislav, Nacho and Nadya. All samples have been received and processing has commenced; Ladislav says this is underway but unfortunately not completed. Nacho has picked some conodonts; no word from Nadia as yet. The group is expecting preliminary results before the end of the year.

TM R. Thomas BECKER suggests again that the Khodzha-Kurgan Gorge in Kitab State Reserve would be a reserve GSSP section if the Zinzilban section fails to meet requirements. The SECRETARY, however, notes that this section is highly tectonized, with only a short uninterrupted interval. He visited the section in 2015 again but did not sample; it would not be adequate for a GSSP. TM R. T. BECKER also notes that CM C. KLUG has illustrated very well-preserved ammonoids from lateral mountainous sections near Zinzilban; perhaps these would be a better stratotype sections

The CHAIRMAN The problem with this is that it would set back the timing of the approval of stratotype even more as access to these new and ?better sections remains difficult. If this current re-investigation of the GSSP fails, then the SDS needs

to consider other sections. We do want the GSSP to remain in Uzbekistan but must make progress.

The SECRETARY: Also, the Kitab State Reserve is under more security now because of the military protected border area that was established there a few years ago.

The CHAIRMAN: It may turn out that this is not an accessible section anymore, so no good for consideration as a GSSP.

TM R. T. BECKER: I would welcome a two-page write up on the status of the Zinzilban project for the next SDS Newsletter. He also announced a new comprehensive paper on Pragian-Emsian conodonts from Morocco (ABOUSSALAM et al. 2015) in the Bulletin of Geosciences.

4.2. Devonian-Carboniferous Boundary

Announcement of the upcoming special meeting on September 21-22, 2016, in Montpellier, France organized by Task Group Leader Marcus ARETZ. ICS will cover costs of the meeting if people can get there. There will be one day of talks considering the merits of various boundary levels and aimed at picking a new section. A field portion will visit classic GSSP sections in the Montagne Noire. It is the goal to decide on the future boundary level in order to provide a focus for the work on potential GSSP sections.

SDS members were directed to the recent paper by TM Carlo CORRADINI et al. (2016, Geol. Mag.) that discusses the advantages and disadvantages of various positions for the boundary. TM R. Thomas BECKER notes that three papers on the D-C boundary will be in upcoming Special Publication of the Geological Society of London, including reviews by Jon LAKIN and co-authors on Gondwana glaciations, by CM S. I. KAISER on the Hangenberg Crisis, and by co-authors and him on D/C boundary stratigraphy.

5. Devonian Substages

CM Maurice STREEL distributed a handout on miospore zonation of D-C boundary sections and there was a brief discussion of the uppermost substage of the Famennian based on miospore biostratigraphy.

The CHAIRMAN: Again, Stan FINNEY, as ICS Chairman, has tabled no further discussion of substages until all needed redefinitions and other issues (e.g., Pragian-Emsian and D-C boundary) are resolved. Therefore, further discussion of the subdivision of seven stages was postponed to future meetings.

TM R. Thomas BECKER discussed the Famennian zonation: For the uppermost Famennian substage there is an unsolved problem with the *ultimus* Zone since the alleged oldest *B. ultimus ultimus* enter in Thuringia very early, overlapping with typical upper (not uppermost) Famennian ammonoids. Dieter WEYER agreed to come to Münster, probably in August, to work on this issue with CM Sven HARTENFELS and Thomas.

CM Sven HARTENFELS: A major study is underway on conodonts of the famous Oberrödinghausen Railway Cut section. There may be a new early *ultimus* morphotype that will help in refining this boundary.

TM R. Thomas BECKER: Unless we have not fixed the *ultimus* taxonomy and range it is not possible to use it as chronostratigraphic index taxon.

The CHAIRMAN: It is important to keep in perspective that the boundaries we propose will be reviewed by other subcommissions including representatives from the Mesozoic who will want to see many supplemental lines of evidence. For example, in the Cretaceous (Aptian/Albian boundary) as many as 29 datum levels are present around the proposed GSSP boundary, not a simple biostratigraphy. We must be careful how we define these boundaries as they will be scrutinized by all ICS voting members.

TM R. Thomas BECKER. We must first work to carefully refine the *ultimus* zonation and then work on other taxa and supplemental markers.

6. Membership

6.1. Proposed new CMs

SDS welcomed Atike NAZIK (Adana, Turkey), an ostracode worker, as a new CM (actually she was already proposed at the Brussels meeting, but somehow this was not included in the final minutes); anazik@cu.edu.tr

TM R. Thomas BECKER proposed David DE VLEESHOWER (currently Bremen, Germany), a Devonian cyclostratigrapher, as CM; seconded by TM Carl E. BRETT; ddevleeschouwer@marum.de

6.2. TM Membership

The CHAIRMAN reminded the membership that TMs need to be contributing reports to newsletters

and corresponding members are meant to correspond (as the title suggests!).

At the Brussels meeting we reviewed all members and considered their status. There are several TMs whose term of 8 years has expired and they will either be extended, or replaced and thanked for their service. There was a strict 8 year limit on TM status but this has been relaxed where TM's are active on particular problems or can't be replaced. But ICS insist on a rotating membership for all subcommissions.

Terms expired

Alain BLIECK (France), replaced by Cathrine CRONIER

Jean G. CASIER (Belgium), replaced by Anna-Christina DA SILVA

Ruth MAWSON (Australia), replaced by Kate TRINAJSTIC

Maria Cristina PERRI (Italy) replaced by Claudia SPALLETTA

Jed DAY (U.S.), thanked for his service; no need for replacement

Eberhard SCHINDLER (Germany), replaced by Rainer BROCKE

Vladimir TSYGANKO (Russia), replaced by Yury GATOVSKI

MA Xueping may stand in for CHEN Xiuqin (deceased)

Continuations

R. Thomas BECKER, Germany, ammonoids, conodonts, SDS Newsletter

Carl E. BRETT (Vice Chairman), Eastern U.S., sequence and cyclostratigraphy

Carlo CORRADINI, Italy, conodonts, webmaster

Nadya IZOKH, Siberia, Russia, conodonts

Ulrich JANSEN, Germany, brachiopods

Jeff OVER, U.S., conodonts

Grzegorz RACKI, Poland, brachiopods, event and sequence stratigraphy

Ladislav SLAVÍK (Secretary), Czechia, conodonts

Nacho VALENZUELA-RÍOS, Spain, conodonts

ZHU Huaicheng, Nanjing, China, palynology

The updated TM's list will be formally approved in the 35th IGC in Cape Town, South Africa

7. SDS Publications

TM R. Thomas BECKER reminded that the *Special Publication* of the *Geological Society of London* is just about ready to come out (all papers available online), and the editors have already sent in the introductory paper; it still requires a cover photo and short texts for the advertisement. Printing is expected in autumn. Contributors get at least 1/3 cost discount; the main volume will cost around $100.

The next major publication is the Belgian Field Guide from the 2015 pre-meeting trip which came out in March (DENAYER, J., MOTTEQUIN, B. & PRESTIANNI, C., Eds., *Strata*, vol. **17**).

The German field guide (2015 post-meeting trip) is awaiting one more chapter and will be a 250 page book scheduled to come out in September 2016. It will include more data and (color) figures than in the original field guide, at a price about ~30 Euros it will be a bargain.

Another volume is now underway for IGCP 596; this will be published as a special volume of Senckenberg's P-2 (*Palaeobiodiversity and Palaeoenvironment*), with Peter KOENIGSHOF, Bernard MOTTEQUIN and TM Ladíslav SLAVÍK as co-editors. Contributions are due by the end of July, 2016.

SDS Newsletter: The Editor wants all contributions in by the end of August. TMs and CMs should all make contributions; if there are local guidebooks or other publications please send details. Please update e-mail adressess.

8. Future SDS Meetings

2016

A) 35th International Geological Congress, Cape Town, South Africa, August 27th to September 4th. The SDS must have a representative there. Vice-Chairman C. E. BRETT and Secretary L. SLAVÍK plan to go. The CHAIRMAN asked if there were others planning to attend; no hands were raised. CB and LS will run a brief and informal meeting and will attempt to recruit a new member from South Africa.

B) Meeting on the D-C Boundary, Montpellier, France, September, 20-22th, 2016 (see details above).

2017

ICOS Meeting, Valencia, Spain June 25-30 2017 and pre- and post-meeting field trips (see details above).

2018

5thInternational Palaeontological congress: July 9-13th, 2018; Paris, France.

2019 STRATI in Milano, Italy.

2020 36th IGC in New Delhi, India.

9. Financial Report

Stan FINNEY received a grant from NSF; part of the money went to support of the Zinzilban fieldwork.

TM R. Thomas BECKER saved money by not yet finishing the SDS Newsletter in 2015.

SDS received $1800 this year for the newsletter and to support attendance at the Cape Town ICS meeting.

The D/C Boundary Task Group received $2000 for the meeting in Montpelier; if you can get there the rest is covered.

10. Any Other business

TM R. Thomas BECKER: TM G. RACKI mentioned recent problems when he attempted re-sampling at the Coumiac GSSP. Current state: The access from the (mostly used) eastern side is now blocked (fenced in) by new property owners. The Upper Kellwasser equivalents have been excavated to an extent that is now requires deep digging in order to receive more material. The auxiliary La Serre C section has been destroyed and the relevant part of the trench completely filled in. It is now lying in a fenced area, watched over by fierce dogs.

CM Eberhard SCHINDLER: No one realized this was private land; the farmer changed from goats to sheep; because sheep were falling into the pit he filled it in. Some subcommissions have bought sites to protect them.

TM R. Thomas BECKER: The German Stratigraphic Commission created a new German stratigraphic chart which will be made public at the Cape Town meeting.

The CHAIRMAN: Will it be on-line? (not yet).

The Meeting was adjourned slightly before 5:45 PM, so members could join the group going to the Ghent Jazz Festival.

ANNUAL REPORT TO ICS

John E. MARSHALL

1. TITLE OF CONSTITUENT BODY

Subcommission on Devonian Stratigraphy

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

SDS has continued in 2015 its work on the revision of problematical GSSPs (Emsian, Devonian-Carboniferous boundary). Discussions on GSSP revisions were held at the Annual Business Meeting during the IGCP/SDS joint meeting in Brussels (September 2015) in addition to the STRATI 2015 meeting. Other continued activities include multidisciplinary international correlation, the organisation of Devonian stratigraphic symposia, publication of the SDS Newsletter and of monographic books/journal volumes.

All listed objectives fit the directions of IUGS and ICS:

- Development of an internationally approved chronostratigraphical timescale for the Devonian with maximum time resolution.
- Promotion of new and modern stratigraphical techniques and their integration into Devonian multidisciplinary schemes.
- Application of GSSP decisions internationally and as a base for a better understanding of patterns and processes in Earth History, including Devonian major global environmental changes.

3a. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2015

- The joint SDS/Uzbekistan/RAS field expedition to Zinzilban George, Uzbekistan to resample and redefine the base Emsian GSSP using multiproxy criteria. This was supported by the ICS. The SDS members collected samples for conodonts and these have been divided and shipped to three separate laboratories.
- Annual Business Meeting, jointly with IGCP 596 in Brussels, Belgium (September 2015). Pre and Post-conference fieldtrips to Belgium and Germany.

- Organising a Symposium in July at STRATI 2015 on *Devonian Events, Correlation and Time*.
- Contributed to *Devonian-Carboniferous boundary* Symposium and technical discussions at STRATI 2015
- Editorial work for a volume on *Devonian Climate, Sea Level and Evolutionary Events* as a Special Publication of the Geological Society of London (No. 423), edited jointly by R. T. BECKER, P. KÖNIGSHOF & C. E. BRETT.
- Publication of SDS Newsletter 30.
- Update of SDS homepage (pdf files of former SDS Newsletters and new GSSP illustrations).
- Supporting the IGCP application *From a full understanding of Magnetic susceptibility to cyclostratigraphy: generating the next generation of Palaeozoic time scales*

3b. LIST OF MAJOR PUBLICATIONS OF SUBCOMMISSION WORK (books, special volumes, key scientific papers)

Geological Society of London Special Publication, 423: **Devonian climate, sea-level and evolutionary events** [most papers published online by October 2015].

3c. PROBLEMS ENCOUNTERED, IF APPROPRIATE

- The rarity of polygnathids at Zinzilban in the critical interval for a re-definition of the Emsian GSSP.
- Access to the base Emsian GSSP in Uzbekistan, caused by landslides.
- The still unpublished early siphonodellids from the uppermost Famennian and basal Tournaisian of Franconia/Thuringia.
- The decline of Devonian stratigraphy in other countries (e.g., Canada, Australia) by the lack of replacement of retiring specialists by new active researchers.

4a. OBJECTIVES AND WORK PLAN FOR NEXT YEAR (2016)

The major SDS objectives for 2016 onwards can be summarized as:

- Revision of the basal Emsian GSSP in Uzbekistan. Processing of conodonts, integration with isotope data and multi-spectral data to generate a multiproxy definition for the GSSP. Presentation of results at ICOS meeting, Valencia, 2017.
- Revision of the D/C boundary in the frame of the D/C Boundary Task Group (Chairman: M. ARETZ) and in close collaboration with the Carboniferous Subcommission.
- Complete publication of volumes on Devonian stratigraphy, partly in co-operation with IGCP 596.
- Publish Brussels meeting presentations in *Palaeobiodiversity* & *Palaeoenvironments*.
- Compilation and distribution of SDS Newsletter 31.
- Annual Business Meeting in conjunction with the 35th IGC in Cape Town, South Africa.
- Sponsoring a symposium at the IGCP 591 Closing Meeting in Ghent, Belgium

4b SPECIFIC GSSP FOCUS FOR 2016

- Active work on the redefinition and sub-division of the Emsian Stage. SDS members are collaboratively working on conodonts from Zinzilban, Uzbekistan and the Pyrenees, Spain in an attempt to find a resolution. Czech colleagues are actively pursuing the problem in the Barrandian Basin.
- Active participation in joint Devonian/Carboniferous Boundary Task Group with a focus on conodont revisions and pelagic-neritic correlations.

5. SUMMARY OF EXPENDITURES IN 2015

INCOME

Balance from 2014 0 $

EXPENSES 2015

SDS Newsletter 31 600 $

Support for SDS Officers to attend STRATI 2015 1500 $

Support/subvention from IUGS/ICS

2100 $

6. BUDGET REQUESTS AND ICS COMPONENT FOR 2014

$600 for 2016 SDS Newsletter

$3000 for Vice-Chair and Secretary to attend the IGC in Cape Town

APPENDICES

7. CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (2011-2015)

- Being a highly proactive subcommission with at least yearly meetings.

  2011 SDS Novosibirsk, Russia

  2012 34rd IGC Brisbane, Australia

  2013 SDS/IGCP 596 Morocco

  2014 4th IPC, Mendoza, Argentina

  2015 SDS/IGCP 596, Brussels, Belgium

  2015 STRATI 2015, Graz, Austria

- Sponsoring a regular series of publications in international journals and special publication series.
- Promoting and proposing the next level of stratigraphic subdivision: sub-stages
- Time sub-division within the Devonian Period is well organized and defined. This allows us to have highly successful IGCP Projects on Devonian environment, time, evolution, extinctions and sea-levels.

8. OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2016-2019)

- Redefine the base of the Emsian Stage and the new 'Zinzilbanian' (upper Pragian) sub-stage. To bring the technical work to completion for the ICOS meeting in Valencia in 2017.
- Redefinition of the Devonian/Carboniferous Boundary with the joint Task Group.
- Publish the definitions of the Givetian and Frasnian substages in *Lethaia*.
- Define and publish the Famennian substages.
- Annual meetings.

9. ORGANIZATION AND SUBCOMMISSION MEMBERSHIP

9a. NAMES AND ADDRESSES OF CURRENT OFFICERS AND VOTING MEMBERS

CHAIRMAN

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9b. LIST OF WORKING (TASK) GROUPS AND THEIR OFFICERS

There is a working group appointed to reinvestigate the D-C boundary. This has 10 members from the SDS and 10 from the SCS.

The Devonian members are:

R. Thomas BECKER, Germany, Chair of SDS: ammonoids; rbecker@uni-muenster.de
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The Carboniferous members are:

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YUAN Jin-Liang, China: trilobites; yuanjl403@sohu.com

9c. INTERFACES WITH OTHER INTERNATIONAL PROJECT

SDS is traditionally strongly tied with IGCP projects that have a Devonian focus. The main current project is IGCP 596 on "Climate change and biodiversity patterns in the Mid-Paleozoic", led by P. KÖNIGSHOF, T. SUTTNER, and others. We have a joint meeting in Brussels in September 2015.

BRIEF REPORT ON SDS ACTIVITIES AT THE 35th INTERNATIONAL GEOLOGICAL CONGRESS AUGUST

C. E. BRETT

TMs C. E. BRETT (Vice Chairnan) and Ladislav SLAVÍK (Secretary of SDS) attended the 35th International Geological Congress held in Cape Town, South Africa, during the week of Sunday August 29th to Friday September 3rd.

Four main goals of this meeting were accomplished as outlined below; in addition, we were able to schedule a useful one-day field trip.

a) Attend sessions related to late Proterozoic and Paleozoic stratigraphy

Both TMs attended some 30 relevant talks and made notes on issues relevant to SDS. Only two talks at the IGC focused specifically on the Devonian. L. SLAVÍK et al. presented a paper on the topic of improving the resolution in chronostratigraphy, using as examples the Lockovian-Pragian, to demonstrate a well defined case in which biostratigraphy and supplementary methods have produced good agreement and contrasting problems with the contentious Pragian-Emsian boundary. A second talk was given by Cameron PENN-CLARKE summarizing sequence stratigrapy and sedimentology of the Devonian Bokkeveld Group of South Africa; this was most informative (see below).

An additional talk, spun out from field and lab discussions with researchers from Cape Town University, on taphonomy and paleoecology of unusual echinoderm assemblages from the Middle

Devonian Voorstehoeck Formation, will be presented by C. E. BRETT at the Geological Society of America, Annual Meeting in Denver, Colorado in late September 2016.

b) Attend activities related to the International Commission on Stratigraphy

Both C. E. BRETT and L. SLAVÍK attended a meeting of ICS chaired by Stan FINNEY and attended by members of the re-constituted Precambrian, Ediacaran, Cambrian, Ordovician, Devonian, Carboniferous, Permian, Jurassic Cretaceous, Palaeogene, and Quaternary subcommissions. S. FINNEY reviewed progress of the possible revised bylaws for the International Stratigraphic Commission; most of these were minor tweaks to wording. The document is not quite finalized and he will send out copies of the amendments to all subcommission chairs when it is. He further reported on recent successful establishment of GSSPs and discussed the debated validity of the Anthropocene.

At the conclusion of this meeting S. FINNEY introduced David HARPER (Durham, UK), previous chairman of the Ordovician Subcommission, as the new chair of ICS. S. FINNEY will step down to assume responsibilities as Secretary General of IUGS. D. HARPER accepted and made just a few remarks before concluding the meeting. One innovation that he suggested was that chairmen of each subcommission should perhaps give a brief report every two months on activities of that subcommission.

There was no specific discussion of the Devonian subcommission or of sub-stages, although it is clear that other subdivisions follow; in particular sub-series are presently be debated. In informal discussion with Stan FINNEY it is clear that he is deferring to David HARPER. We will approach him on this issue.

c) Conduct SDS Meeting

Although an official meeting of SDS was announced, there were no attendees other than L. SLAVÍK and C. E. BRETT. However, the two officers met for about two hours to discuss issues relevant to SDS. The minutes of the previous meeting were reviewed and discussed with minor amendments suggested (see attached). In addition, L. SLAVÍK reviewed the issues and problems of the Pragian-Emsian boundary at Zinzilban. Both he and Nacho VALENZUELA-RÍOS have processed conodont samples, but the residues need to be picked during fall of 2016. Both workers should be able to present findings by the end of the year. If these do not provide an adequate framework of conodonts, then it may be necessary to consider alternatives. The classic Prague Synform sections and/or Spanish Central Pyrenees localities may need to be re-considered. Such a conception would, however, delay a re-definition, as more data are needed in respective areas. In the Prague Synform, the conodonts are rare and there is no ideal section that contains all necessary biostratigraphic markers complemented with multi-proxy studies. This is also the case of Pyrenees, where the conodonts are more abundant but data from other faunal groups and petro-chemo-physical proxies are not yet elaborated.

Informal meetings were held with Peter KOENIGSHOF, leader of IGCP 596, who intends to continue work in Iran and discussed the potential for a joint German-US project in comparative stratigraphy of the Lower-Middle Devonian in Morocco, US, and Germany. However, PK was unable to attend an SDS meeting.

d) Recruitment of new TMs.

As there has been no representative from South Africa, an important area of Devonian exposure, it was thought that the IGC meeting provided an opportunity to recruit new member(s). C. E. BRETT wrote to Dr. Rob GESS of Rhodes University, Grahamstown, South Africa, a Devonian vertebrate specialist. It was hoped that GESS could meet with CB at the Cape Town meeting. However, this was not possible to arrange. However, via e-mail Dr. GESS expressed keen interest in becoming a corresponding member of SDS because of his research on Devonian fishes, which is collaborative with TM Kate TRIJNASTIC. CB wishes to nominate GESS as a new CM.

A particularly useful aspect of the meeting was our introduction to the work of Mr. Cameron PENN-CLARKE. It is evident from extensive discussions that he is exceptionally knowledgeable of Devonian sections in South Africa and has devoted considerable effort to documenting their physical, bio and sequence stratigraphy and sedimentology of the Middle Devonian Bokkeveld. C. PENN-CLARKE intends to complete his dissertation in November and to continue work on the Bokkeveld as a pot-doc at Cape Town. We approached him to discuss the possibility of joining SDS as a corresponding member. He has a great deal to offer and cooperation

with him would provide a considerable data on Devonian stratigraphy in the Malvinokafric Realm. He would like to cooperate with biostratigraphers, notably palynologists, in trying to resolve issues of relative age dating of Devonian units. He indicated that he would be delighted to serve as a CM of SDS and we believe that he would be an excellent correspondent. C. PENN-CLARKE will send us copies of his dissertation when completed and we feel that he should be elected as a CM.

e) Field Trip in the Bokkeveld Group near Cape Town.

In addition, both officers participated in a semi-official field trip on the Devonian Bokkeveld Group in the Hex Riviere area of the Cape Fold belt. This trip was capably led by Dr. Wendy TAYLOR (paleontologist, University of Cape Town) and Cameron PENN-CLARKE, who is concluding a dissertation at Wittwatersrand University on the sequence stratigraphy, sedimentology, and paleontology of the Bokkeveld Group. The trip included two major stops in the Gamka and Voorstehoeck Formations with discussion of many issues of sedimentology, taphonomy and potential approaches to improving bio- and chemostratigraphy.

SDS DOCUMENTS

ADDITIONS TO THE *POLYGNATHUS* (s. l.) SPECIES LIST

R. Th. BECKER

The number of names available in *Polygnathus* s.l. has now surpassed 700.

Missing taxa of the two previous lists

-- *cornwallis* STEWART & SELWOOD, 1985 nom. nud. (middle Famennian)
-- *coronatus* HINDE, 1879 (upper Givetian/lower Frasnian) [a ramiform element]
-- *dushanensis* XIONG, 1983 (Famennian)
-- *immersus* HINDE, 1879 (upper Givetian/lower Frasnian) [a ramiform element]
-- *magnidentatus* LI, LU & YU, 1988 nom. nud. (uppermost Famennian)
-- *pinnatuloideus* HOLMES in BUTTS, 1926 (lower Famennian) [a subjective junior synonym of *pennatulus*, not a senior homonym of *pennatuloideus*, GLENISTER & KLAPPER 1966]
-- *radiatus* HINDE, 1979 (upper Givetian/lower Frasnian) [a ramiform element]
-- *xianghualingensis* SHEN, 1982 (upper Famennian)

New taxa since 2013

-- *abaimovae* BARANOV & BLODGETT, 2016 (lower Emsian)
-- *alkhovikovae* BARANOV, SLAVÍK & BLODGETT, 2014 (lower Emsian)
-- *aragonensis* MARTÍNEZ-PÉREZ & VALENZUELA-RÍOS, 2014 (lower Emsian)
-- *arthuri* BARANOV, SLAVÍK & BLODGETT, 2014 (lower Emsian)
-- *bardashevi* BARANOV, SLAVÍK & BLODGETT, 2014 (lower Emsian)
-- *beckeri* BARANOV & BLODGETT, 2016 (lower Emsian)
-- *bicristatus* MOSSONI, CARTA, CORRADINI & SPALLETTA, 2015 (lower Tournaisian)
-- *carlsi* MARTÍNEZ-PÉREZ & VALENZUELA-RÍOS, 2014 (lower Emsian)
-- *chatrudensis* HASHMIE, ROSTAMNEJAD, NIKBAKHT, GHORBANIE, REZAIE & GHOLAMALIAN, 2016 nom. nud. (middle/upper Frasnian)
-- *datnensis* BARANOV & BLODGETT, 2016 (lower Emsian)
-- *dogdensis* BARANOV & BLODGETT, 2016 (lower Emsian)
-- *dujieensis* QIE, ZHANG, DU, YANG, JI & LUO, 2014 (upper Tournaisian)
-- *fibula* (HARTENFELS & BECKER, 2016) [erected in *Neopolygnathus*] (upper/uppermost Famennian)
-- *hojedki* GHOLAMALIAN, HAIRAPETIAN, BARFEHEI, MANGELIAN & FARIDI, 2013 (upper Givetian/lower Frasnian)
-- *huijunae* (WANG, BECKER, ABOUSSALAM, HARTENFELS, JOACHIMSKI & GONG, 2016) [erected in *Neopolygnathus*] (lower Famennian)
-- *ivanowskyii* BARANOV, SLAVÍK & BLODGETT, 2014 (lower Emsian)
-- *jatalenti* HASHMIE, ROSTAMNEJAD, NIKBAKHT, GHORBANIE, REZAIE & GHOLAMALIAN, 2016 nom. nud. (lower/middle Frasnian)
-- *karsteni* BARANOV, SLAVÍK & BLODGETT, 2014 (lower Emsian)
-- *lezhoevi* BARANOV, SLAVÍK & BLODGETT, 2014 (lower Emsian)
-- *communis longanensis* QIE, ZHANG, DU, YANG, JI & LUO, 2014 [a *Neopolygnathus*] (upper Tournaisian)
-- *margaretae* (KONONOVA & WEYER, 2013) [erected in *Neopolygnathus*] (uppermost Famennian)
-- *michaelmurphyi* BARANOV, SLAVÍK & BLODGETT, 2014 (lower Emsian)
-- *novozemelicus* BARANOV & BLODGETT, 2016 (lower Emsian)
-- *nuragicus* MOSSONI, CARTA, CORRADINI & SPALLETTA, 2015 (lower Tournaisian)
-- *praeangustidiscus* (ZHURAVLEV, 2015) [erected in *Youngquistognathus*, which, is a subjective junior synonym of *Uyenognathus*; see ABOUSSALAM & BECKER 2007] (lower/middle Frasnian)
-- *pseudocommunis* WANG, BECKER, ABOUSSALAM, HARTENFELS, JOACHIMSKI & GONG, 2016 [erected as "*Polygnathus*", probably representing a new genus] (middle Famennian)
-- *radula* (ABOUSSALAM & BECKER in ABOUSSALAM et al., 2015) [erected in *Eolinguipolygnathus*] (lower Emsian)
-- *ramoni* MARTÍNEZ-PÉREZ & VALENZUELA-RÍOS, 2014 (lower Emsian)
-- *settedanabicus* BARANOV, SLAVÍK & BLODGETT, 2014 (lower Emsian)
-- *slastenovi* BARANOV & BLODGETT, 2016 (lower Emsian)
-- *tarabukini* BARANOV & BLODGETT, 2016 (lower Emsian)

-- *yakutensis* BARANOV, SLAVÍK & BLODGETT, 2014 (lower Emsian)

Corrections and comments

-- *acuta* (THOMAS, 1949) [established in *Polylophodonta*]
-- *basilicus* STAUFFER, 1938 [a subjective junior synonym of *Palmatolepis gracilis gracilis*, GLENISTER & KLAPPER 1966]
-- *burtensis* (DRUCE, 1969) [established in *Gnathodus* but transferred by NICOLL & DRUCE 1979 to *Polygnathus*]
-- *concentricus* ULRICH & BASSLER, 1926 [transferred by BRANSON & MEHL 1934 to *Polylophodonta*]
-- *confluens* ULRICH & BASSLER, 1926 [transferred by HASS 1956 to *Polylophodonta*]
-- *djalilovi* (BARDASHEVA, BARDASHEV, WEDDIGE & ZIEGLER, 2004) [established in *Ctenopolygnathus*, which, in a restricted and monophyletic sense (*angustidiscus-brevilaminus* Group), is restricted to the upper Givetian to upper Famennian]
-- *elongata* (DRUCE, 1969) [established in *Polylophodonta*]
-- *folium* ULRICH & BASSLER, 1926 [transferred by HUDDLE 1968 as a nom. dub. to *Palmatolepis*]
-- *gyratilineata* HOLMES, 1928 [not BRANSON & MEHL 1934; type-species of *Polylophodonta* BRANSON & MEHL, 1934]
-- *instabilis* (KUZ´MIN & MELNIKOVA, 1991) [established in *Polylophodonta*]
-- *irregularis* (THOMAS, 1949) [established as a questionable *Palmatolepis*; transferred by HELMS 1961 to *Polygnathus*]
-- *japonicus* HAYASHI, 1968 [transferred by GULLO & KOZUR 1991 to *Budurovignathus*, which is partly regarded as a junior subjective synonym of *Sephardiella*; see PLASENCIA et al. 2007]
-- *jianghuaensis* (JI, 1987) [established in *Polylophodonta*]
-- *lidiae* (BARDASHEVA, BARDASHEV, WEDIGGE & ZIEGLER, 2004) [established in *Eucostapolygnathus*, a subjective junior synonym of *Polygnathus*, see ABOUSSALAM et al. 2015]
-- *medicinelakensis* (JOHNSTON & CHATTERTON, 2001) [established in *Polylophodonta*]
-- *oviformis* (KONONOVA & KIM, 2005) [established in *Linguipolygnathus*]
-- *pergyratus* HOLMES in BUTTS, 1926 [transferred by BRANSON & MEHL 1934 to *Polylophodonta*, as a subjective synonym of *gyratilineata*; because of priority it would be the valid name of the *Polylophodonta* type-species]
-- *pseudostrigosus* DREESEN & DUSAR, 1975 [transferred by ZIEGLER & SANDBERG 1984 to *Alternognathus*]
-- *sudeticus* (DZIK, 1997) [established in *Neopolygnathus* but representing in fact a relative of *purus*]
-- *taljaschenkoae* (KONONOVA & KIM, 2005) (Eifelian) [established in *Ctenopolygnathus* but the species is unrelated to the younger *angustidiscus-brevilaminus* Group]
-- *transitus* (DZIK, 2006) [established in *Polynodosus*]
-- *trilobatus* HOLMES, 1928 [transferred by BRANSON & MEHL 1934 to *Polylophodonta*, as a subjective junior synonym of *concentrica*]
-- *triphyllata* (ZIEGLER, 1962) [not 1960; established as a questionable *Polylophodonta*]
-- *vetus* (VORONTZOVA, 1993) [established in *Polynodosus*]
-- *wyomingensis* KLAPPER, 1958 [not 1966]
-- *xianliensis* (XIONG in XIAN et al., 1980) [established in *Schmidtognathus*]

For a revised generic affiliation of many Emsian species see ABOUSSALAM et al. (2015).

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SPECIES LIST OF *PALMATOLEPIS*

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BECKER (2012, 2013) aimed to provide a complete as possible list of species of the "mega-genus" *Polygnathus*, with further updates in this issue. In the Upper Devonian, the genus *Palmatolepis* is even more important in biostratigraphy and, as shown by numerous publications of the last decade, new species/subspecies continue to be recognized. Apart from phylogenetic reconstructions, the full knowledge of palmatolepid taxa is essential for future refined analyses of palaeodiversity and palaeogeography. In this context it is surprising that there is no published species list for the genus, which we try to supply here. Currently we recognize 213 names, not including the also listed names for elements apart from the Pa that have been recognized in palmatolepid apparatus. These are relevant for multi-element taxonomy. Homonymy is less problematic than in polygnathids but we identified a few cases of un-replaced homonyms.

A large portion of names can be found in the Global Index Names database (at **gni.globalnames.org**) but this list gives no information on stratigraphical ages, nomenclatorical notes, or full references. We include the latter for all taxa that have not (yet) been quoted widely and for the quoted papers with taxonomic comments. Since many palmatolepids are widely used, non-specialists may think that they are well-established and fully understood. However, this is mostly not the case. So far, intraspecific variability, ontogenetic changes, including morphometry, and morphological trends in time or across different facies settings have sufficiently been documented only for some taxa.

The following list is compiled with a "neutral approach" that reports proposed synonymies and taxonomic changes with their references: These were sometimes controversial. We abstain from final judgements and propose only in a few cases new synonymies. However, we feel that there has been over-splitting in some species groups. Some currently suppressed species may have a future at the formal subspecies level when intraspecific variations of distinctive populations become better known. We also expect that the proposed subgenera will be used when apparatus reconstructions are confirmed and added.

Platform species/subspecies

In alphabetical order (LFR – MFR – UFR = lower, middle, upper Frasnian, LFA – MFA – UFA – UMFA = lower, middle, upper, uppermost Famennian)

-- *acaulis* (ULRICH & BASSLER, 1926) (LFA) [established as *Polygnathus*?; the fragmentary lectotype is a nom. dub., possibly the piece of a *perlobata perlobata*, HUDDLE 1968]
-- *serrata acuta* HELMS, 1963 (LFA – MFA)
-- *acutangularis* OVNATANOVA & KONONOVA, 2008 (UFR)
-- *adamantea* METZGER, 1994 (LFA)
-- *amana* MÜLLER & MÜLLER, 1957 (UFR)
-- *ampla* MÜLLER, 1956 (MFA) [widely regarded as a subspecies of *rugosa*, ZIEGLER 1962a; contra: DZIK 2006]
-- *amplificata* KLAPPER, KUZ´MIN & OVNATANOVA, 1996 (UFR)
-- *angularis* KLAPPER, UYENO, ARMSTRONG & TELFORD, 2004 (LFA)
-- *angulata* JOHNSTON & CHATTERTON, 2001 (LFA)
-- *glabra angusta* CAPKINOGLU, 1997 (LFA)
-- *angusta* KLAPPER, UYENO, ARMSTRONG & TELFORD, 2004a (LFA) [invalid homonym, replaced by *arta*]
-- *anzhelae* KHRUSTCHEVA & KUZ´MIN, 1996 (UFR)
-- *arcuata* SCHÜLKE, 1995 (LFA)
-- *aristovi* BARDASHEV & BARDASHEVA, 2012 (LFR - MFR)
-- *arta* KLAPPER, UYENO, ARMSTRONG & TELFORD, 2004b (LFA)
-- *asymmetrica* ULRICH & BASSLER, 1926 (UFR) [a species of *Ancyrognathus*, HUDDLE 1968]
-- *baheensis* XIONG in XIAN et al., 1980 (LFR) [homoeomorphic to *Klapperina*, possibly a gen. nov., ABOUSSALAM & BECKER 2007]
-- *barba* ZIEGLER & SANDBERG, 1990 (UFR) [close to *proversa*; therefore regarded by KLAPPER & FOSTER 1993 as a subjective junior synonym]
-- *basilicus* (STAUFFER, 1938) (LFA) [a subjective junior synonym of *gracilis gracilis*, GLENISTER & KLAPPER 1966]
-- *beckeri* KLAPPER, 2007a (UFR)
-- *bifurcata* ULRICH & BASSLER, 1926 (LFA) [a species of *Ancyrognathus*, HUDDLE 1968]
-- *klapperi biparapetus* STREL´CHENKO & KRUCHEK, 2013 (LFA)
-- *bohemica* KLAPPER & FOSTER, 1993 (MFR) [close to *punctata*, perhaps better a subspecies]
-- *boogardi* KLAPPER & FOSTER, 1993 (UFR)

-- *rhenana brevis* ZIEGLER & SANDBERG, 1990 (UFR) [now an independent species, KLAPPER 2007a]
-- *canadensis* ORCHARD, 1989 (LFA)
-- *gracilis carnica* HARTENFELS, 2011 (UFA)
-- *charlottae* MÜLLER, 1956 [often regarded as a variant and subjective junior synonym of *subrecta* = *winchelli*, GLENISTER & KLAPPER 1966]
-- *circularis* SZULCZEWSKI, 1971 (LFA)
-- *marginata clarki* ZIEGLER, 1962a (LFA) [first transferred as a subspecies to *delicatula* (ZIEGLER 1973) but then often regarded as an independent species, ZIEGLER & SANDBERG 1990; = *variabilis* in multi-element taxonomy, SCHÜLKE 1999; contra: DZIK 2006]
-- *coronata* MÜLLER, 1956 (UFR)
-- *crepida* SANNEMANN, 1955b (LFA)
-- *crista* JOHNSTON & CHATTERTON, 2001 (LFA)
-- *cruciformis* MÜLLER, 1956 (MFR) [regarded as a subjective junior synonym of *punctata*, KLAPPER & FOSTER 1993; a possible subspecies of *punctata*]
-- *curvatus* (HINDE, 1879) (FR) [established as a ? *Polygnathus*; a nom. dub., MÜLLER 1956]
-- *cymbula* HUDDLE, 1934 (LFA) [a subjective junior synonym of *perlobata perlobata*, GLENISTER & KLAPPER 1966]
-- *glabra daxinensis* XIONG in XIAN et al., 1980 (LFA)
-- *deflectens* MÜLLER, 1956 (UFA – UMFA) [type-species of *Palmatolepis (Deflectolepis)* MÜLLER, 1956; a subjective junior synonym of *gracilis gracilis*, GLENISTER & KLAPPER 1966, KLAPPER 1977]
-- *delicatalobata* OLIVIERI, 1969 (LFA) [obviously tectonically deformed; best a nom. dub.]
-- *delicatula* BRANSON & MEHL, 1934a (LFA)
-- ? *disparalvea* ORR & KLAPPER, 1968 (upper Givetian) [type-species of *Klapperina* LANE, MÜLLER & ZIEGLER, 1979]
-- *disparilis* ZIEGLER & KLAPPER in ZIEGLER et al., 1976 (upper Givetian) [transferred to *Klapperina*, LANE et al. 1979]
-- *disparata* ZIEGLER & KLAPPER, 1982 (upper Givetian) [transferred to *Klapperina*, ZIEGLER & SANDBERG 1990, transferred to *Laneina*, BARDASHEV & BARDASHEVA 2012]
-- *distorta* BRANSON & MEHL, 1934a (UFA – MFA) [often regarded as a subspecies of *glabra*, ZIEGLER 1977; contra: XIAN et al. 1980, JOHNSTON & CHATTERTON 2001, DZIK 2006]
-- *domanicensis* OVNATANOVA, 1969 (MFR)
-- *dongbiankouensis* ZHAO & ZUO, 1983 (LFR)
-- *donoghuei* (DZIK, 2006) (LFA – UFA) [established in *Tripodellus*]
-- *marginifera duplicata* SANDBERG & ZIEGLER, 1973 (MFA) [rarely regarded as a distinctive species, JOHNSTON & CHATTERTON 2001]
-- *ederi* ZIEGLER & SANDBERG, 1990 (UFR)
-- *elegans* HELMS, 1962 (MFA) [a nom. nud., = *quadrantinodosa inflexoidea*, GLENISTER & KLAPPER 1966]
-- *elegantula* WANG & ZIEGLER, 1993 (UFR)
-- *elenae* BARDASHEV & BARDASHEVA, 2012 (LFR - MFR)
-- *elongata* HOLMES, 1928 (MFA) [a nom. nud., ZIEGLER & HUDDLE, 1969; partly treated as a subspecies of *glabra*, HELMS 1959]
-- *delicatula elongata* OLIVIERI, 1968 (LFA) [a valid homonym based on distorted specimens, probably also a subjective junior synonym of *delicatula*, ZIEGLER 1973]
-- *eriensis* (HINDE, 1879) (FR) [established as a ? *Polygnathus*; a nom. dub., MÜLLER 1956]
-- *eureka* ZIEGLER & SANDBERG, 1990 (UFR)
-- *gracilis expansa* SANDBERG & ZIEGLER, 1979 (UFA – UMFA)
-- *gigas extensa* ZIEGLER & SANDBERG, 1990 (UFR) [very close to *subrecta/winchelli*, better a subjective junior synonym or only a subspecies]
-- *extralobata* ULRICH & BASSLER, 1926 (?MFA/UFA)
-- *feisti* KLAPPER, 2007a (UFR)
-- *firmus* KHALYMBADZHA & CHERNYSHEVA, 1978 (UFR) [according to ZIEGLER & SANDBERG 1990 a subjective junior synonym of *semichatovae*]
-- *flabelliformis* STAUFFER, 1938 (LFA) [lectotype incomplete, therefore a nom. dub., GLENISTER & KLAPPER 1966; see also discussion in KLAPPER & FOSTER 1993]
-- *folius* (ULRICH & BASSLER, 1926) (LFA) [established in *Polygnathus*; a nom. dub., HUDDLE 1968]
-- *foliacea* YOUNGQUIST, 1945 (UFR)
-- *clarki gablei* SCHÜLKE, 1995 (LFA)
-- *gatovskyi* BARDASHEV & BARDASHEVA, 20012 (LFR - MFR)
-- *gigas* MILLER & YOUNGQUIST, 1947 (UFR) [regarded as a late mature variant of *subrecta*/*winchelli*, KLAPPER & FOSTER 1986, 1993; contra: ZIEGLER & SANDBERG 1990, BULTYNCK et al. 1998]
-- *glaber* ULRICH & BASSLER, 1925 (UFA – MFA) [= *glabra*, nom. corr. in ZIEGLER 1959; type-species of *Panderolepis* HELMS, 1963]

-- *gonioclymeniae* MÜLLER, 1956 (UMFA) [widely regarded as a subspecies of *gracilis*, SANDBERG & ZIEGLER 1979; contra: DZIK 2006, KONONOVA & WEYER 2013]
-- *gracilis* BRANSON & MEHL, 1934a (LFA – UMFA) [type-species of *Palmatolepis (Deflectolepis)* MÜLLER, 1956 if regarded as a senior synonym of *deflectens*]
-- *marginifera granulosa* DREESEN, 1977 (MFA)
-- *rugosa grossi* ZIEGLER, 1960 (MFA) [later transferred as a subspecies to *perlobata*, ZIEGLER 1977]
-- *gutta* Kuz´min, 1998 (MFR)
-- *gyratus* KUZ´MIN & MELNIKOVA (1991) (UFR) [= *gyrata* nom. corr. in OVNATANOVA & KONONOVA 2008]
-- *hani* BAI, 1994 (UFR) [= ***hanae* nom. corr**. here, since the species was named after a female!]
-- *hassi* MÜLLER & MÜLLER, 1957 (MFR – UFR)
-- *helmsi* ZIEGLER, 1962a (MFA – OFA) [widely regarded as a subspecies of *perlobata*, SANDBERG & ZIEGLER 1973; contra: DREESEN & DUSAR 1975]
-- *subperlobata helmsi* OVNATANOVA, 1976 (LFA) [invalid homonym, replaced by *linguiloba*]
-- *housei* KLAPPER, 2007a (MFR)
-- *inequalis* HOLMES, 1928 (LFA) [a species of *Ancyrognathus*, ZIEGLER 1981]
-- *inflexa* MÜLLER, 1956 (MFA) [widely regarded as a subspecies of *quadrantinodosa*, ZIEGLER 1962a; contra: DREESEN & DUSAR 1975, JOHNSTON & CHATTERTON 2001]
-- *quadrantinodosa inflexoidea* ZIEGLER, 1962a (MFA) [sometimes regarded as a distinctive species, DREESEN & DUSAR 1975, DZIK 2006]
-- *initialis* DZIK, 2006 (LFA) [nom. dub.; based on an M element (!) but associated with Pa element of the *triangularis* Group]
-- *irregularis* THOMAS, 1949 (FA) [placed by HELMS 1961 in *Polygnathus*]
-- *jamieae* ZIEGLER & SANDBERG, 1990 (UFR)
-- *juntianensis* HAN, 1987 (UFR)
-- *kaledai* OVNATANOVA & KONONOVA, 2008 (UFR)
-- *kazachstanica* KUZ´MIN, 1992 (LFA)
-- *keyserlingi* KUZ´MIN, 1998 (MFR)
-- *khaensis* SAVAGE, 2013 (LFA)
-- *kireevae* OVNATANOVA, 1976 (MFR – UFR)
-- *kozhimensis* SAVAGE & YUDINA, 2001 (UFR)
-- *klapperi* SANDBERG & ZIEGLER, 1973 (LFA – MFA)
-- *klugi* KLAPPER, 2007a (UFR)
-- *kushnarevae* OVNATANOVA & KUZ´MIN in MENNER et al., 1992 (MFR)
-- *subperlobata lapoensis* SAVAGE, 2013 (LFA)
-- *glabra lepta* ZIEGLER & HUDDLE, 1969 (LFA – MFA) [= *falcata* in multi-element taxonomy, METZGER 1994]
-- *linguiformis* MÜLLER, 1956 (UFR)
-- *linguiloba* (DZIK, 2006) (LFA – MFA) [established in *Conditolepis*; very close to *lobicornis*]
-- *ljaschenkoae* OVNATANOVA, 1976 (MFR – UFR) [type-species of *Kielcelepis* DZIK, 2002]
-- *minuta loba* HELMS, 1963 [subsequently partly regarded as an independent species, METZGER 1994, Dzik 2006]
-- *lobicornis* SCHÜLKE, 1995 (LFA)
-- *lobulata* ULRICH & BASSLER, 1926 (LFA) [regarded by MÜLLER 1956 as a subjective junior synonym of *perlobata*]
-- *luscarensis* KLAPPER & FOSTER, 1993 (MFR – UFR)
-- *lyaiolensis* KHRUSTSCHEVA & KUZ´MIN, 1996 (UFR)
-- *gracilis manca* HELMS, 1963 (UFA) [rarely regarded as an independent species, DZIK 2006]
-- *manzuri* BARDASHEV, 2009 (UFR) [a subjective junior synonym of *amplificata*]
-- *marginatus* STAUFFER, 1938 (UFR) [= *marginata*, nom. corr. in ZIEGLER 1962, where it was used in the sense of *delicatula delicatula*; probably a subjective junior synonym of *subperlobata*]
-- *quadrantinodosa marginifera* ZIEGLER, 1960 [widely regarded as independent species, SANDBERG & ZIEGLER 1973; type-species of *Conditolepis* BOOGARD & KUHRY, 1979]
-- *marki* SAVAGE, 2013 (UFR)
-- *martenbergensis* MÜLLER, 1956 (MFR) [sometimes regarded as a variant and subjective junior synonym of *punctata*, ZIEGLER 1958; possibly useful as a subspecies]
-- *maxillaris* (ULRICH & BASSLER, 1926) (LFA) [established as a *Panderodella*; a fragment and nom. dub., HUDDLE 1968]
-- *maxima* MÜLLER, 1956 (UFA – OFA) [widely regarded as a subspecies of *perlobata*, HELMS 1963]
-- *maximovae* KUZ´MIN, 1998 (MFR) [probably a subjective junior synonym of *kushnarevae*]
-- *menneri* OVNATANOVA & KONONOVA, 2008 (UFR)
-- *minuta* BRANSON & MEHL, 1934a (LFA – MFA)
-- *mucronata* KLAPPER, KUZ´MIN & OVNATANOVA, 1996 (MFR - UFR)
-- *muelleri* KLAPPER & FOSTER, 1993 (UFR)

-- *mystica* KLAPPER, UYENO, ARMSTRONG & TELFORD, 2004 (LFR)
-- *nasuta* MÜLLER, 1956 (UFR) [regarded as a variant and subjective junior synonym of *gigas* = *winchelli* in ZIEGLER (1973), then partly as a subspecies of *rhenana*, ZIEGLER & SANDBERG 1990; contra: BULTYNCK et al. 1998, OVNATANOVA & KONONOVA 2008, SAVAGE 2013]
-- *nicolli* KLAPPER, 2007a (UFR)
-- *ningi* BAI, 1994 (LFA)
-- *marginifera nodosus* XIONG, 1983 (MFA)
-- *nodosa* KLAPPER, UYENO, ARMSTRONG & TELFORD, 2004 (UFR) [**homonym**, replacement in prep.]
-- *orbicularis* OVNATANOVA & KUZ´MIN, 1991 (MFR – UFR)
-- *orlovi* KHRUSTCHEVA & KUZ´MIN, 1996 (UFR)
-- *ormistoni* KLAPPER, KUZ´MIN & OVNATANOVa, 1996 (UFR)
-- *ovata* COOPER, 1935 (LFA) [according to MÜLLER 1956 a juvenile nom. dub.]
-- *ovata* JOHNSTON & CHATTERTON, 2001 (LFA) [**unreplaced homonym**]
-- *paradisparilis* UYENO & WENDTE, 2005 (LFR) [homoemorphic to *Klapperina*, possibly a gen. nov., ABOUSSALAM & BECKER 2007]
-- *gigas paragigas* ZIEGLER & SANDBERG, 1990 (UFR) [a distinctive species, BULTYNCK et al. 1998]
-- *pararhomboidea* JI & ZIEGLER, 1992 (LFA)
-- *parawolskae* JOHNSTON & CHATTERTON, 2001 (LFA)
-- *parva* KLAPPER, UYENO, ARMSTRONG & TELFORD, 2004 (LFA)
-- *pectenifera* HUDDLE, 1934 [regarded as subjective synonym of *glabra distorta*, ?ZIEGLER 1962a, GLENISTER & KLAPPER 1966]
-- *glabra pectinata* ZIEGLER, 1960 (UFA – MFA) [rarely regarded as a distinctive species, JOHNSTON & CHATTERTON 2001]
-- *peculiaris* ULRICH & BASSLER, 1926 (?MFA/UFA) [a nom. dub. based on fragments]
-- *perlobata* ULRICH & BASSLER, 1926 (LFA) [type-species of *Palmatolepis* ULRICH & BASSLER, 1926]
-- *petrae* BARDASHEV & BARDASHEVA, 2012 (LFR)
-- *plana* ZIEGLER & SANDBERG, 1990 (MFR – UFR)
-- *delicatula platys* ZIEGLER & SANDBERG, 1990 (LFA)
-- *playfordi* KLAPPER, 2007a
-- *poolei* SANDBERG & ZIEGLER, 1973 (LFA)
-- *delicatula postdelicatula* SCHÜLKE, 1995 (LFA)
-- *rugosa postera* ZIEGLER, 1960 (UFA) [later transferred as a subspecies to *perlobata*, HELMS 1963]
-- *quadrantinodosalobata praeterita* SCHÜLKE, 1995 (LFA) [a variant and subjective junior synonym of *ultima*, KLAPPER 2007b; = *abnormis* in multi-element taxonomy, SCHÜLKE 1999]
-- *praetriangularis* ZIEGLER & SANDBERG, 1988 (UFR – LFA) [regarded as a variant and subjective junior synonym of *ultima*, KLAPPER 2007b]
-- *glabra prima* ZIEGLER & HUDDLE, 1969 (LFA – MFA) [rarely regarded as a distinctive species, JOHNSTON & CHATTERTON 2001, DZIK 2006; possibly = *glabra unca* in multi-element taxonomy, SCHÜLKE 1999, OVER & RUPPEL 2011; contra: DZIK 2006]
-- *prominens* MÜLLER, 1956 (UFR) [close to *bogartensis*]
-- *delicatula protorhomboidea* SANDBERG & ZIEGLER, 1973 (LFA) [later regarded as an independent species, ZIEGLER & SANDBERG 1990]
-- *proversa* ZIEGLER, 1958 (MFR – UFR)
-- *punctatus* (HINDE, 1879) (MFR) [established in *Polygnathus*]
-- *pustulosa* HUDDLE, 1934 (LFA) [a subjective junior synonym of *perlobata perlobata*, GLENISTER & KLAPPER 1966]
-- *quadrantinodosa* BRANSON & MEHL, 1934a (MFA)
-- *quadrantinodosalobata* SANNEMANN, 1955a (LFA)
-- *quadrantinodosa quincea* IRVING & ORCHARD, 1991 (MFA)
-- *redana* IRVING & ORCHARD, 1991 (MFR - UFR) [very close to *proversa*; therefore regarded by KLAPPER & FOSTER 1993 as a subjective junior synonym]
-- *regularis* COOPER, 1931 (LFA)
-- *reimersi* BARDASHEV & BARDASHEVA, 2012 (LFR – MFR)
-- *rhenana* BISCHOFF, 1996 (UFR)
-- *rhomboidea* SANNEMANN, 1955a (LFA – MFA)
-- *termini robusta* SCHÜLKE, 1995 (LFA) [later regarded as independent species, SCHÜLKE 1999]
-- *rotunda* ZIEGLER & SANDBERG, 1990 (UFR) [= *bogartensis* in multi-element taxonomy, KLAPPER & FOSTER 1993]
-- *rotundilobata* KUZ´MIN, 1998 (MFR) [close to *triquetra*, better only a subspecies]
-- *rugosa* BRANSON & MEHL, 1934 (UFA)
-- *salibaevi* BARDASHEV, 2009 (UFR)
-- *sandbergi* JI & ZIEGLER, 1993 (LFA)

-- *schindewolfi* MÜLLER, 1956 (LFA – UFA) [partly regarded as a subspecies of *perlobata*, ZIEGLER 1962a, partly as an independent species, METZGER 1994, JOHNSTON & CHATTERTON 2001, DZIK 2006, SAVAGE 2013]
-- *schleizia* HELMS, 1963 (LFA – UFA) [often regarded as subspecies of *minuta*, WOLSKA 1967; contra: Dzik 2006]
-- *schuelkei* (DZIK, 2006) (LFA) [established in *Klapperilepis*, holotype close to *lobicornis*]
-- *gigas semichatovae* OVNATANOVA, 1976 (UFR) [now widely regarded as an independent species, KLAPPER & LANE 1985]
-- *seminodosa* ZHAO & ZUO, 1983 (LFA)
-- *gracilis semisigmoidalis* HARTENFELS, 2011 (MFA – UFA)
-- *sepkoskii* BARDASHEV & BARDASHEVA, 2012 (LFR – MFR)
-- *serrata* (HINDE, 1879) (LFA) [established as a ? *Polygnathus*; a nom. dub., MÜLLER 1956, GLENISTER & KLAPPER 1966]
-- *deflectens sigmoidalis* ZIEGLER, 1962a (UFA – UMFA) [transferred as a subspecies to *gracilis*, SANDBERG & Ziegler 1979]
-- *perlobata sigmoidea* ZIEGLER, 1962a (MFA – OFA)
-- *sihongshanensis* WANG, 1989 (LFA)
-- *simpla* ZIEGLER & SANDBERG, 1990 (MFR – UFR) [very close to *ljaschenkoae*, therefore, regarded as a subjective junior synonym by KLAPPER & FOSTER 1993; contra: MOSSONI et al. 2012]
-- *simplex* COOPER, 1931 (UFA) [unrevised]
-- *marginifera sinensis* JI & ZIEGLER, 1993 (MFA)
-- *slavai* BARDASHEV & BARDASHEVA, 2012 (LFR)
-- *spathula* SCHÜLKE, 1995 (LFA)
-- *spinata* OVNATANOVA & KUZ´MIN, 1991 (MFR) [close to *punctata*]
-- *stoppeli* SANDBERG & ZIEGLER, 1973 (LFA – MFA)
-- *subcrassa* (ULRICH & BASSLER, 1926) (LFA) [established as a *Panderodella*; a fragment and nom. dub., HUDDLE 1968]
-- *subgracilis* BISCHOFF, 1956 (LFA) [partly regarded as a subspecies of *minuta*, ZIEGLER 1962a]
-- *subperlobata* BRANSON & MEHL, 1934 (LFA)
-- *subrecta* MILLER & YOUNGQUIST, 1947 (UFRA) [type-species of *Palmatolepis (Manticolepis)* MÜLLER, 1956; = *winchelli* in multi-element taxonomy, KLAPPER & FOSTER 1993]
-- *subsymmetrica* WANG & WANG, 1978 (UFA – UMFA)
-- *subtilis* KHALYMBADZHA & CHERNYSHEVA, 1978 (LFA)
-- *tenuipunctata* SANNEMANN, 1955b (LFA)
-- *termini* SANNEMANN, 1955b (LFA)
-- *thanisi* SAVAGE, SARDSURD & BUGGISCH, 2006 (UFR)
-- *timanensis* KLAPPER, KUZ´MIN & OVNATANOVA, 1996 (MFR - UFR)
-- *rugosa trachytera* ZIEGLER, 1960 (MFA) [rarely regarded as an independent species, DZIK 2006]
-- *transcostatus* ZHAO & ZUO, 1983 (LFA) (= ***transcostata* nom. corr**. here]
-- *transitans* MÜLLER, 1956 (LFR – MFR)
-- *triangularis* SANNEMANN, 1955a (LFA) [type-species of *Klapperilepis* DZIK, 2002]
-- *triquetra* KUZ´MIN, 1998 (MFR)
-- *truncatus* (ULRICH & BASSLER in BASSLER, 1925) (LFA) [established as the type-species of *Panderodella*; a nom. dub., e.g., CLARK & BECKER 1960, ZIEGLER 1962b, ETHINGTON & FURNISH 1962, RHODES & MÜLLER 1966, HUDDLE 1968; earlier claimed to be either an indeterminate *Polygnathus*, MÜLLER 1956, or a senior synonym of *glabra*, HASS 1959 - the latter, mostly rejected interpretation would imply that at least *Deflectolepis* (or even *Palmatolepis* itself) is a junior synonym of *Panderodella*]
-- *marginifera tuber* BUGGISCH, 1977 (MFA) [related to *extralobata*?]
-- *uyenoi* KLAPPER, 2007a (UFR) [close to *wildungensis*]
-- *ultima* ZIEGLER, 1958 (UFRA – LFA)
-- *unicornis* MILLER & YOUNGQUIST, 1947 (UFR) [sometimes regarded as a variant and subjective junior synonym of *gigas* = *winchelli*, ZIEGLER & SANDBERG 1990; contra GLENISTER & KLAPPER 1966]
-- *marginifera utahensis* ZIEGLER & SANDBERG, 1984 (MFA)
-- *weddigei* JI & ZIEGLER, 1993 (LFA)
-- *werneri* JI & ZIEGLER, 1993 (LFA)
-- *wildungensis* MÜLLER, 1956 (UFR) [sometimes regarded as a subjective junior synonym of *unicornis* (GLENISTER & KLAPPER 1966) or as variant and synonym of *nasuta*, ZIEGLER & SANDBERG 1990; contra: BULTYNCK et al. 1998]
-- *minuta wolskae* SZULCZEWSKI, 1971 (LFA) [partly regarded as an independent species, SCHÜLKE 1999, JOHNSTON & CHATTERTON 2001, DZIK 2006]
-- *wolskajae* OVNATANOVA, 1969 (LFA)
-- *subrecta youngquisti* SAVAGE, 1992 (UFR)

-- *ziegleri* CLARK & ETHINGTON, 1967 (LFR) [established as a ?*Palmatolepis*; a subjective senior synonym of *Nothognathella klapperi*, HUDDLE in HUDDLE & REPETSKI, eds, 1981]

Ramiform elements proposed to be junior or senior (in bold, with priority in multi-element systematics) synonyms of *Palmatolepis* species. In any case, and in order to avoid future homonymies, the listed species names should not be used as future new *Palmatolepis* species names!

Nothognathella ? ***abnormis*** BRANSON & MEHL, 1934 (senior synonym of ***praeterita***, SCHÜLKE 1999)

Bryantodus amalitus STAUFFER, 1938 (subjective junior synonym of *winchelli*, KLAPPER & FOSTER 1993]

Bryantodus argutus STAUFFER, 1938 (subjective junior synonym of *winchelli*, KLAPPER & FOSTER 1993]

Scutula bipennata SANEMANN, 1955a (junior synonym of *abnormis* and *quadrantinodosalobata*, SCHÜLKE 1999)

Nothognathella ***bogartensis*** STAUFFER, 1938 (senior synonym of ***rotunda***, KLAPPER & FOSTER 1993; type-species of *Lagovilepis* DZIK, 2002)

? Palmatodella delicatula ULRICH & BASSLER, 1926 (possible senior synonym of *minuta*, SCHÜLKE 1999; if this is true, *delicatula* BRANSON & MEHL, 1934 becomes a junior homonym]

Bryantodus dignatus STAUFFER, 1938 (subjective junior synonym of *winchelli*, KLAPPER & FOSTER 1993]

? *eriensis* STAUFFER, 1938 (possible subjective junior synonym of *winchelli*, KLAPPER & FOSTER 1993]

Nothognathella (?) ***falcata*** HELMS, 1959 (senior synonym of ***glabra lepta***, BOOGARD & KUHRY 1979]

Tripodellus flexuosus SANNEMANN, 1955a (type-species of the genus, junior synonym of *minuta*, DZIK 2006, which makes *Tripodellus* a junior synonym of the undivided genus *Palmtolepis*)

Bryantodus grahami STAUFFER, 1938 (subjective junior synonym of *winchelli*, KLAPPER & FOSTER 1993]

Falcodus guntharii ZIEGLER, 1958 (junior synonym of *rhenana*, SCHÜLKE 1999)

? *Ligonodinoides lewisensis* STAUFFER, 1938 (possible senior synonym of *rhenana*, SCHÜLKE 1999)

? *Ligonodinoides ohioensis* STAUFFER, 1938 (possible senior synonym of *rhenana*, SCHÜLKE 1999)

Bryantodus olentangiensis STAUFFER, 1938 (subjective junior synonym of *winchelli*, KLAPPER & FOSTER 1993]

Palmatodella orthogonica ZIEGLER, 1958 (junior synonym of *rhenana*, SCHÜLKE 1999)

Nothognathella palmotoformis DRUCE, 1976 (junior synonym of *unca* and *glabra prima*, SCHÜLKE 1999)

Bryantodus prosseri STAUFFER, 1938 (subjective junior synonym of *winchelli*, KLAPPER & FOSTER 1993]

? *Scutula sinepennata* ZIEGLER, 1958 (possible junior synonym of *rhenana*, SCHÜLKE 1999)

? Prioniodus smithi STAUFFER, 1938 (possible junior synonym of *minuta*, SCHÜLKE 1999)

? *Nothognathella sublaevis* SANNEMANN, 1955b (possible senior synonym of *unca* and *glabra prima*, SCHÜLKE 1999)

Palmatodella ***unca*** SANNEMANN, 1955b (senior synonym of ***glabra prima***, SCHÜLKE 1999; contra: DZIK 2006)

Falcodus variabilis SANNEMANN, 1955b (possible senior synonym of *clarki clarki*, SCHÜLKE 1999, but DZIK 2006 assumed it to be the senior synonym of *minuta wolskae*)

Scutula venusta SANNEMANN, 1955a (junior synonym of *abnormis* and *quadrantinodosalobata*, SCHÜLKE 1999)

? Ligonodinoides welleri STAUFFER, 1938 (possible senior synonym of *rhenana*, SCHÜLKE 1999)

Bryantodus wesleyianensis STAUFFER, 1938 (subjective junior synonym of *winchelli*, KLAPPER & FOSTER 1993]

Bryantodus ***winchelli*** STAUFFER, 1938 (senior synonym of ***subrecta***, KLAPPER & FOSTER 1993]

We welcome additions or corrections from the SDS Membership.

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PLEADING FOR A NEW DCB IN THE HISTORICAL GERMAN DEEP FACIES OF SAUERLAND NEAR STOCKUM

M. STREEL & D. KORN

The locality of Stockum was visited by the former D/C Working Group on Tuesday, August 10th, 1982. The decision to place the DCB at the *praesulcata/sulcata* level had been taken during a Working Group meeting held in Washington (USA) in 1979. It was recommended to search for a section best displaying this evolution lineage, as well as exhibiting adequate representation among other zonally significant groups (see PAPROTH & STREEL 1984).

Photo of the Stockum village and the trench area (circled in blue).

Therefore, the Stockum sections, lacking the *praesulcata/sulcata* faunas, were no longer considered as a possible candidate for a DCB stratotype. However, since the publications of ALBERTI et al. (1974) and CLAUSEN et al. (1994), the locality is known to exhibit a spectacular amount of various zonal fossil groups: ammonoids, trilobites, ostracodes, miospores, and a very detailed *Protognathodus* conodont fauna (see fig. enclosed).

The recent suggestion of CORRADINI et al. (2016) to place the DCB just after the Hangenberg Event at the entry of *Pr. kockeli* is easily met in the Stockum sections. Placing this limit on top of the last main Hangenberg Sandstone and Shale (HSS), lower than the Stockum Limestone, would help, as they say, indicate an approximate position of the DCB even in sections where *Pr. kockeli* is poorly present; i.e. in the Dinant - Namur basin (DENAYER et al. 2015).

Such a new DCB would be close to the end of the so-called "LN Übergang" microflora, the "*tener* effect" of PRESTIANI et al. (2016), which underlines a conspicuous change in the terrestrial vegetation occurring clearly later than the marine faunal extinction. Another advantage would be the close proximity of the former DCB and, therefore, the less disturbance of the existing continental and intercontinental correlation schemes, leaving for instance the glacial evidence entirely in the Devonian.

The 1994 trench II has disappeared. The hill is re-planted with trees and possibly inaccessible. But, the owner of the hill has told that he would agree to re-open the road section ("Wegböschung" road side and 1974 trench I).

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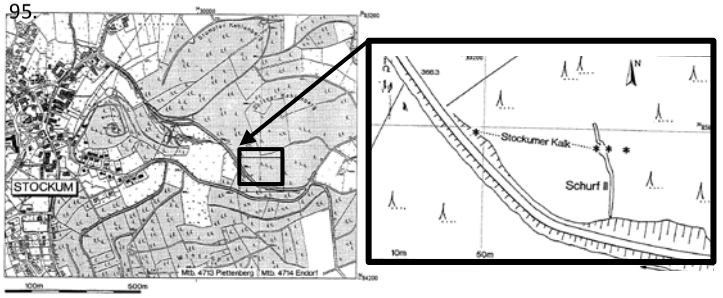
Pleading for a new D/C Boundary in the historical German deep facies of Sauerland near Stockum

Maurice Streel, Geology Department, University of Liège, Belgium,

From: Clausen, C.-D., Korn, D., Feist, R., Leuschner, K., Groos-Offenorde, H., Luppold, F.-W., Stoppel, D., Higgs, K. & Streel, M. (1994). Die Devon/Karbon-Grenze bei Stockum (Rheinisches Schiefergebirge). - Geol. Paläont. Westf., **29**: 71-95.



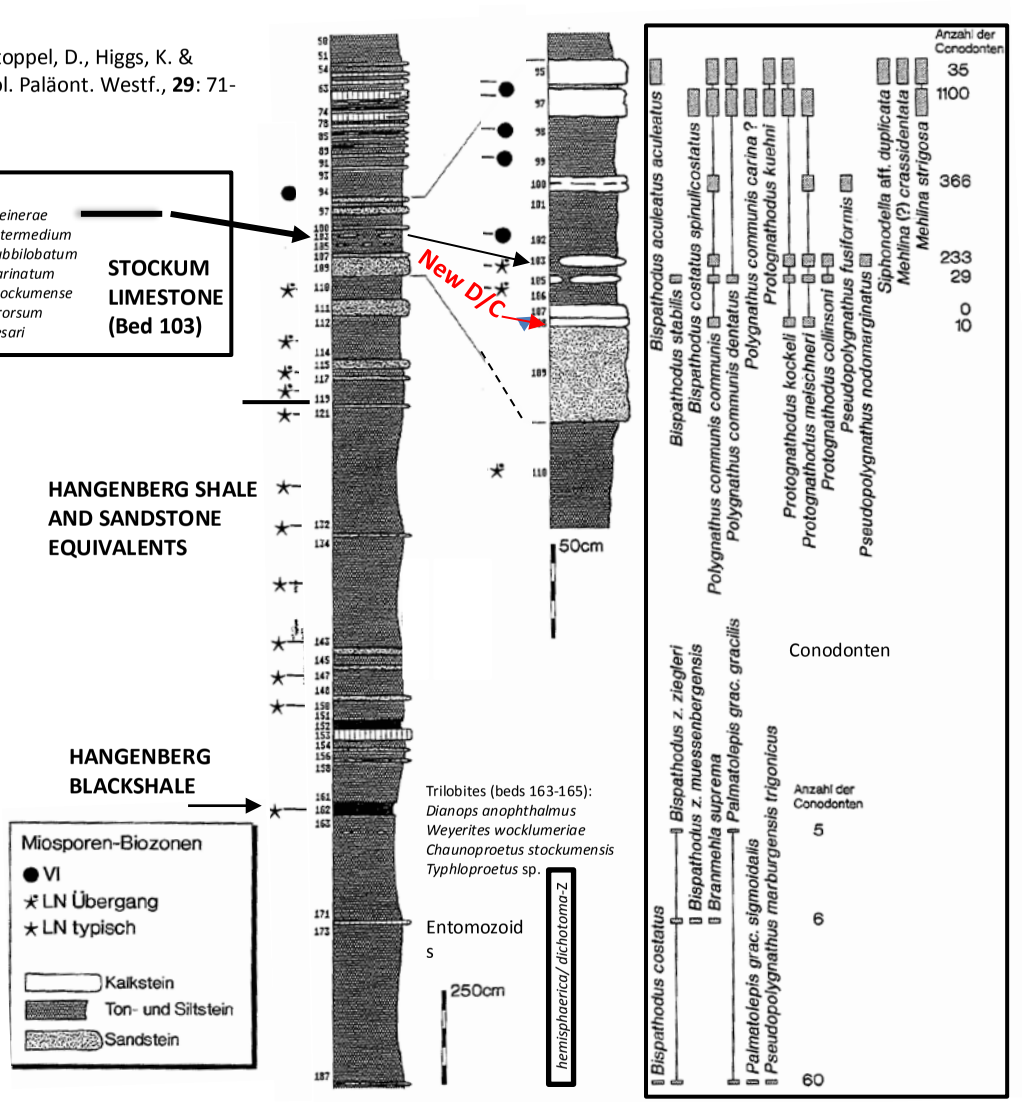
A 28 m thick Devonian-Carboniferous boundary sequence of clay, siltstones and sandstones with intercalated carbonates has been exposed in a new trench at the Spitzer Kahlenberg near Stockum. The section has been examined because of its content of ammonoids, trilobites, ostracodes, conodonts and miospores as well as the microfacies of the carbonates.

The Devonian-Carboniferous boundary apparently lies above the Stockum Limestone in which ammonoids, trilobites and conodonts with Carboniferous affinities (but without typical Carboniferous index forms such as *Gattendorfia subinvoluta, Semiproetus (Macrobole) drewerensis* and *Siphonodella sulcata*) can be collected. The miospore boundary LN/VI is approximately at the Stocklum Limestone.

In this section, for the first time, the Hangenberg Black Shale was discovered near Stockum, lying 15 m below the Stockum Limestone.

From: Alberti, H., Groos-Uffenorde, H., Streel, M., Uffenorde, H. & Walliser, O. H. (1974). The stratigraphical significance of the *Protognathodus* fauna from Stockum (Devonian/Carboniferous Boundary, Rhenish Schiefergebirge). - Newsl. Stratigr. **3** (4): 263-276.

The Stockum Limestone is the stratum typicum of the "*Imitoceras* fauna" described by H. SCHMIDT 1924 and of the *Protognathodus* fauna described by ZIEGLER 1969. New investigations have been made on the fossils from this limestone and from the sequences immediately above and below. *Gattendorfia subinvoluta* was not found in the Stockum Limestone. This species possibly appears immediately after the deposition of the Stockum Limestone. On the other hand it is not possible to distinguish the conodont and trilobite fauna of this limestone from that of the stratum typicum of *Gattendorfia subinvoluta.* Therefore, it would be more practicable to include the Stockum Limestone in the Lower Carboniferous. The associated ostracodes and spores also support such a solution.



UPDATING THE MIOSPORE/CONODONT CORRELATION IN THE UPPER AND UPPERMOST FAMENNIAN

M. STREEL

Proposals of boundaries for the subdivision of the Famennian stage into four substages were made at the SDS meeting at Bologna (see STREEL et al. 1998). Miospore implications were given by STREEL & LOBOZIAK (1998, 2000). More recent updatings of Famennian miospore-based biostratigraphy can be found in STREEL (2009) and HIGGS et al. (2013).

The recent emphasis on lithostratigraphic events as reliable markers (*Annulata* Event, Hangenberg Event) for substage or stage boundaries suggests a more accurate correlation with biostratigraphy. The Devonian part of the new conodont biozonation scheme across the Devonian/Carboniferous Boundary (DCB) proposed by CORRADINI et al. (2016) and their conodont species FAD (First Appearance Datum) is used here to compare with miospore species FAD characteristics of subzone bases (interval zones in HIGGS et al. 2013).

The miospore species LAD (Last Appearance Datum), which underline a new DCB as proposed by CORRADINI et al. (2016), is discussed in STREEL (1996) and explained in STREEL 2015 (extended abstract and poster). We recommend the Stockum trench (CLAUSEN et al. 1994) as a candidate for a new DCB reference section.

Compared to the former scheme of STREEL et al. (1998), we propose (see figure enclosed) a rather short narrowing of the Uppermost Famennian and a more conspicuous narrowing of the Upper Famennian. (We recall here that the miospore biostratigraphy of the Lower and Middle Famennian are poorly known in West European area, STREEL & LOBOZIAK 2000)

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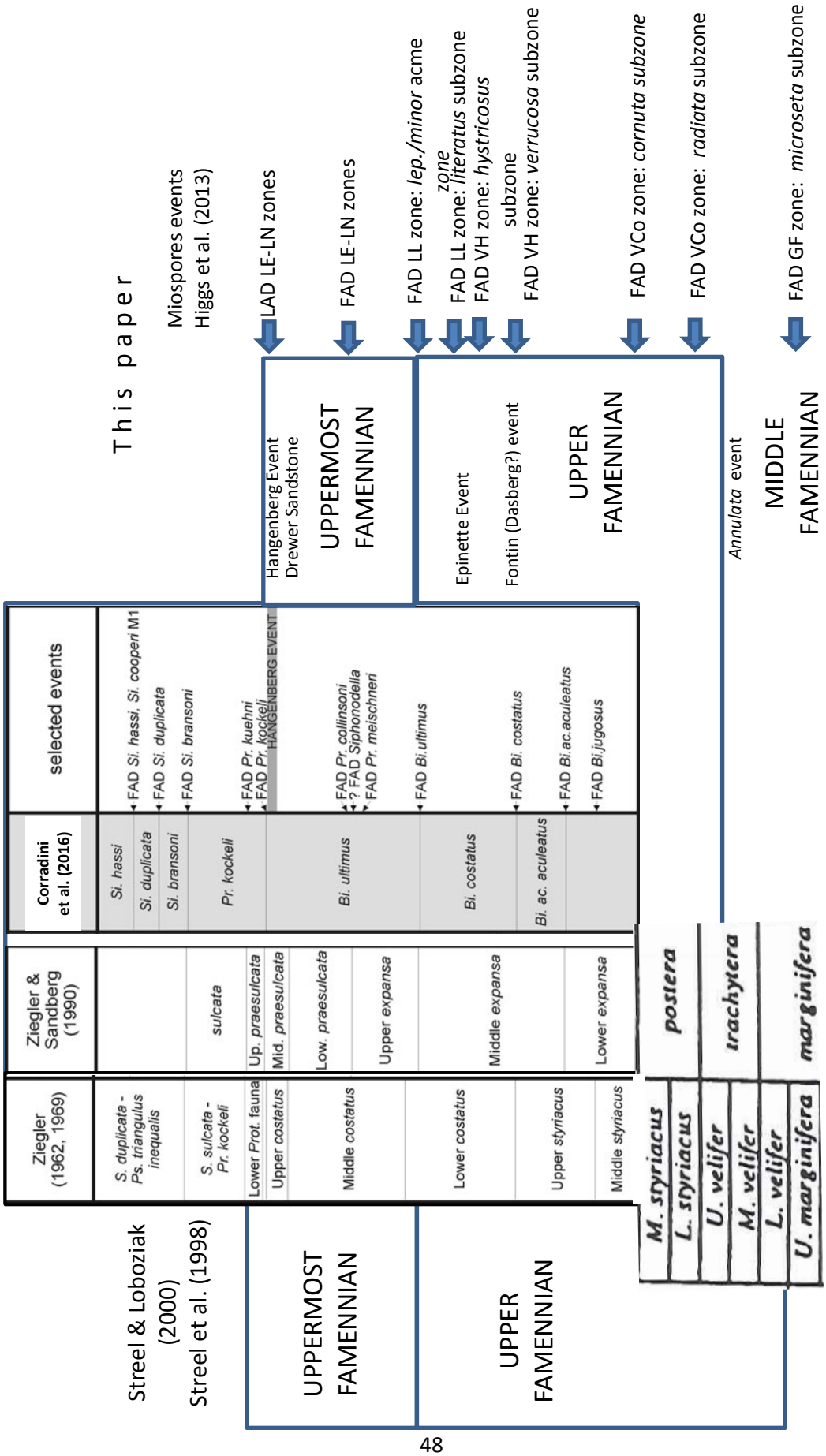


DEVONIAN MEETINGS

K. I. SATPAEV,
Institute of Geological Sciences

FIELD TRIP TO THE UPPER DEVONIAN-CARBONIFEROUS REEF BUILDUPS OF THE BOLSHOI KARATAU MOUNTAINS (SOUTH KARATAU)

August 15–21 2017

1st Circular

Dear Colleagues !

It is our privilege and pleasure to invite you to a field trip to the Upper Devonian-Carboniferous reef buildups of the Bolshoi Karatau Mountains (South Karatau) to be held on August 15–21 2017.

Institutional Organizers:

K. I. SATPAEV Institute of Geological Sciences

Committee of Geology and Subsoil Use of the Ministry for Investment and Development of the Republic of Kazakhstan

Khoja Akhmet Yassawi International Kazakh-Turkish University

Organizing Committee

Address

Republic of Kazakhstan, Almaty, ul. Kabanbai batyra 69/94, ug. ul. Valikhanova

Telephone/FAX: +7(727) 291-7379 (Almaty), mobile 87773253928, 87014854464. E-mail: musina.63@mail.ru

Prof. Dr. **M. Sh. OMIRSERIKOV**, Academician, Kazakh Academy of Natural Sciences, Corresponding Member of the National Academy of Sciences of Kazakhstan, Director of the K.I. SATPAEV Institute of Geological Sciences

B. K. NURABAEV, Chairman of the *Committee of Geology and Subsoil Use of the Ministry for Investment and Development of the Republic of Kazakhstan*

U. S. ABDIBEKOV, Principal Dean of the *Khoja Akhmet Yasawi International Kazakh-Turkish University*

Dr. **V. Ya. ZHAIMINA**, Senior Researchers, K.I. SATPAEV, Institute of Geological Sciences

Organizing group

Dr. **E. M. FAZYLOV,** Head of the Department of Regional Geology, Head of the Lithology and Engineering geology group of the K. I. SATPAEV Institute of Geological Sciences

Dr. **V. G. ZHEMCHUZHNIKOV**, Chief Geologist of the Aman Munai Exploration JSC

V. M. BUVTYSHKIN, Director of the Izdenis Ltd. Association of geological enterprises. Mapping expedition.

A. E. ZORIN, Chief Geologist of the Izdenis Ltd. Association of geological enterprises. Mapping expedition.

Dr. **S. K. KURBANIYAZOV**, Khoja Akhmet Yassawi International Kazakh-Turkish University

Dr. **S. MUSTAPAEVA,**- Lecturer at the National K.I. SATPAEV University Institute of Geological Sciences

E. S. MUSINA, Engineer at the Lithology and Engineering Geology Group of the K.I. Satpaev University Institute of Geological Sciences

Registration:

Please fill the registration form (below) and e-mail to musina.63@mail.ru before 1 March 2017.

The registration fee of USD 500 should be sent with the registration form payable to the account below. The fee pays for the guidebook, the excursion program, field lunches and round-trip transport from Turkestan to the excursion site. The return train

tickets from Almaty to Turkestan are included in the registration fee.

Bank account:

Bank "CenterCredit" Almaty
Account no. 600900601577
IBAN: KZ358560000000441586
SWIFT: KCJBKZKX
BIN (Business Identification number) 080140000780
Beneficiary Code 16
K. I. SATPAEV, Institute of Geological Sciences ul. Kabanbai batyra 69/94, ug. ul. Valikhanova; tel/fax 8(727) 2-91-56-79.

Please specify that the transaction is for "Excursion 2017 Bolshoi Karatau" and please notify the organizers (**Elmira MUSINA**) by e-mail musina.63@mail.ru of the transaction.

Main destinations of the Kazakhstan Trip

Almaty is the largest and the greenest city in Kazakhstan, with a population over 2 000 000. It used to be the capital of the country, until 1997 when it changed to Astana. Almaty takes pride in being the cultural centre of the republic. It has 270 cultural sites including theatres, concert halls, museums, art galleries, libraries, historical and architectural monuments, and churches of all denominations. The busy international airport receives flights from many destinations.

Turkestan is one of the oldest cities of Kazakhstan. Turkestan is a large industrial, educational and cultural centre, and a popular tourist destination. The sightseeing attractions include the 15th century Khanaka (Mausoleum) of Khodzha Akhmed YASAVI, well-known sufi and poet, the "Azret Sultan" memorial complex; burials of great Kazakh kings ESIM-KHAN, ABLAI-KHAN, ABULHIR-KHAN and others. There is a memorial to Kazybek BI - one of the authors of the "Zhety Zhargy", the first set of Kazakh laws, and other important contributors to the Kazakh State. Incidentally, railway station (1905) has the status of an architectural monument.

The famous underground mosque and the baths ("Vostochnye Bani") (1600-1700s) are located in the center of Turkestan.

The city is also famous for its four oriental vegetable and fruit markets. Camels are commonly used for transportation.

The climate in the city of Turkestan is moderately dry (desert-like) and strongly continental. Summers are very hot, with mean August temperatures of 33-35 °C (day), and 25-27°C (night). In summer, daily temperature fluctuations of 15-20 °C are common.

Important deadlines:

Registration: 1st March 2017
Scan or pdf of travel passport (needed to book railway tickets Almaty to Turkestan): 1 March 2017
Second circular: 1 April 2017

REGISTRATION

A FIELD TRIP TO THE UPPER DEVONIAN-CARBONIFEROUS REEF BUILDUPS OF THE BOLSHOI KARATAU MOUNTAINS (SOUTH KARATAU)

August 15–21 2017

Please fill in all the following information

1	Nationality and residence
2	Professional Affiliation and address
3	Surname and all given names as shown in passport
4	Passport no., date and place of issue, expiry date
5	Title
6	Occupation
7	Mailing address
8	Contact telephone:
9	e-mail:
10	Hotel reservation in Almaty - tick if needed
11	Proposed arrival date

Hotels

Price list for hotel registration in Almaty, in USD (breakfast not included)

City	Single	Double (double bed)	Twin (two beds)
Almaty	22-45	60-85	45-70
Turkestan	17-23	23-30	45-60

The 4th International Conodont Symposium
"Progress on Conodont Investigation"

jointly with:

The International Subcommission on Devonian Stratigraphy

The International Subcommission on Silurian Stratigraphy

Valencia, Spain; 25---30 June 2017

1st Circular

The Congress follows the decision of the Pander Society took in Mendoza, July 2013, to organise the next ICOS meeting in Europe. Subsequently, the International Subcommission on Devonian Stratigraphy (SDS) and the International Subcommission on Silurian Stratigraphy (ISSS) decided to hold their Annual Meetings in 2017 in Spain. Therefore, the congress will be open to all topics on conodonts and on the Devonian and Silurian. In addition, it will serve as the venue for the Pander Society and the SDS, ISSS Business Meetings.

Venue and Organisation

The Congress will take place on the campus Burjasot of the University of Valencia. It will be organised by the Botany and Geology Department (University of Valencia) in cooperation with the University of Cagliari, the Institute of Geology (Czech Academy of Sciences) and the Institute of Earth Sciences (University of Graz).

Valencia is the third largest city of Spain, located at the Mediterranean coast and is well connected by plane (with three local airports Valencia, Alicante and Castellón) and by high-speed trains with Madrid, Barcelona and Alicante. Several bus lines are also available from the main cities.

Chair:

José Ignacio VALENZUELA RÍOS, Professor at the University of Valencia, chair of the Spanish National Commitee for IGCP.

Organising Committee:

Jau-Chyn LIAO and Carlos MARTINEZ-PÉREZ (University of Valencia).
Carlo CORRADINI (University of Cagliari).
Ladislav SLAVÍK (Czech Academy of Sciences).
Thomas SUTTNER (University of Graz).

Provisional Programme

June 20-25	Pre-conference field trip in the Spanish Pyremnees
June 25	Ice-Breaker Party in the late afternoon in Valencia
June 26-30	Scientific sessions in Valencia
June 28	Mid-conference field trips in the Iberian Ranges
July 1-9	Post-conferrence field trip in the Barrandian and Carnic Alps

Fieldtrips

Four fieldtrips are planned to be organised.

Pre-conference Fieldtrip:

Upper Silurian-Lower Carboniferous Conodonts and Stratigraphy of the Central Pyrenees; **June 20-25** (5 nights):

June 20: Departure from Valencia to the Pyrenees. In the afternoon visit to Silurian- Devonian outcrops of the Benasque Valley. Overnight at Laspaúles (Huesca).

June 21: Lower Devonian of the Baliera Valley. Visit to the section Baliera 6 (Pragian/ Emsian boundary, both official and redefined). Visit to the Geopark "Conca de Tremp-Montsec". Overnight at Fonda Farré, Baró (Lérida).

June 22: ower-Upper Devonian sequences from the Villech rea. Lower Carboniferous in the vicinity of Bellver. Overnight at Fonda Farré, Baró (Lérida).

June 23: Several sections showing Silurian and Lower Devonian sequences in the Segre Valley. Overnight at Fonda Farré, Baró (Lérida).

June 24: Several Devonian sequences in the Noguera Pallaresa Valley. Overnight at Fonda Farré, Baró (Lérida).

June 25: Leave in the morning with a stop to see Silurian outcrops in the Noguera Pallaresa Valley. Arriving in Valencia on Eme for hotels check-in and ice-breaking party.

Approximate cost: **600 €**. The number of partipants is limited to 25.

Mid-conference Fieldtrips: Two simultaneous fieldtrips will be held on Wednesday, **June 28**:

1) Triassic Conodonts and Stratigraphy of the Iberian Range;

2) Devonian Conodonts and Stratigraphy of the Iberian Range.

The registration fee is **30 €**.

Post-conference Fieldtrip:

Silurian and Devonian Conodonts and Stratigraphy of the Prague Synform and Ordovician to Carboniferous Conodonts and StraEgraphy of the Carnic Alps, July 1-9 (8 nights).

July 1: Arrival in Prague. The flight Valencia---Prague is **NOT** included in the registration fee. All nights in Prague at Pension-hotel JaS.

July 2: Ludlow to Lower Devonian at Požáry section, including Přídolí GSSP. Emsian/ Eifelian strata – Choteč Event (Prastav Quarry).

July 3: Lower Devonian successions around the Vltava river (Pod Barrandovem section), the GSSP of the Lochkovian/Pragian boundary and the auxiliary stratotype (Kosoř-Černá rokle section). Several Silurian/Devonian sections will also be visited.

July 4: visit of several localities in the Koněprusy area with the famous Pragian skeletal (reef) complex. Silurian volcano-sedimentary succession in the Kosov Quarry near Beroun city. The excursion will end near the GSSP of the Silurian/Devonian boundary at Klonk.

July 5: Departure from Prague to Venice (fare included in the registration fee). Transfer to Passo del Cason di Lanza. Overnight at Cason di Lanza.

July 5: Visit of several sections from Katian to Emsian in Cason di Lanza area. Overnight at Cason di Lanza.

July 7: Travel from Lanza to Malga Pramosio, to visit Upper Devonian sections in Pramosio area. Lunch in Malga Pramosio. In the early afternoon transfer to the visitor centre of the Carnic Alps Geopark in Dellach. Night in Mauthen at Hotel Edelweiss.

July 8: Morning at Cellon secEon (Katin to Lochkovian). Then, if weather permits, two options are planned. One party will visit the Grüne Schneid section (D/C boundary). Along the path all the "transitional sequence" is exposed (Pragian to Frasnian), up to a few Famennian section in the Pal Grande Fm. This excursion is physical demanding (about 1000 m climbing on good paths, at place exposed). The rest of the group (everybody in case of bad weather) will visit Katian to Devonian sections in the Oberbuchach area. Night in Mauthen at Hotel Edelweiss.

July 9: Leave in the morning to Venice. The field trip will end at Venice International Airport around lunchtime.

The total fee is estimated with **1100€,** including one flight from Prague to Venice, local transports, lodging and full board excluding the transfer days. The number of participants is limited to 20.

Important dates

- Proposals for any scientific session and workshop on conodonts, Silurian and Devonian matters: **deadline December 1, 2016**.
- Pre-registration for the fieldtrips: **deadline December 15, 2016.**
- Early conference registration and payment: **deadline February 15, 2017.**
- Fieldtrip registraEon and payment: **deadline February 15, 2017**
- Abstract submission: **deadline February 28, 2017**

Registration rates

The registration fee includes the participation in the meeting, name badge, printed congress program, electronic abstract volume, ice-breaking party (Sunday, June 25), coffee-breaks and lunches (Monday, June 26 – Friday, June 30).

All fieldtrips fees include transportation, guides books, lodging and meals.

	Early Registration (until 15th February 2017)	Standard Registr. (from 16th February)	On site Registration
Regular participants	300 €	400 €	500 €
Students	180 €	200 €	250 €
Accompanying person	100 €	150 €	150 €

Pre-conference Fieldtrip: Spanish Pyrenees	600 €
Mid-conference Fieldtrip: Iberian Range	30 €
Post-conference Fieldtrip: Barrandian and the Carnic Alps	1100 €

More detailed information, including the conference dinner, the bank account and abstract submission instructions and template will be provided in the 2nd Circular. The Congress Homepage is coming soon.

Participants will be responsible for making their own accommodation arrangements. In the homepage a wide selection of hotels, B & Bs and youth hotels will be posted.

Contact for any request

Congress mail: 4ICOSVALENCIA2017@gmail.com

Postal address: **ICOS 2017**, Department of Botany and Geology; University of Valencia; c/ Dr. Moliner 50; E-46100 Burjasot; Spain.

Visa application

Participants who require a support letter for visa application, please directly contact:

4ICOSVALENCIA2017@gmail.com

The 4th International Conodont Symposium
"Progress on Conodont investigation"

Subcommission on Devonian Stratigraphy (ISDS)

Subcommission on Silurian Stratigraphy (ISSS)

Joint Meeting and Fieldtrips

Valencia, Spain; 25-30 June 2017

Registration Form

Please fill and return form until **December 15, 2016** (pre-registration) and **February 15, 2017** (early registration deadline) via email-attachment (either as PDF or word.doc-file) to conference e-mail address: 4ICOSVALENCIA2017@gmail.com

(please use large **X** to tick boxes: [**X**])

[ ] Ms. / [ ] Mr. Title(s):_____

Surname: .....First (and Middle names): .....

Institution: .....

Address: .....

Postal (zip) code: .....

Country: .....City: .....

Cell Phone: ..... e-mail: .....

I need an invitation letter for visa support [ ] YES [ ] NO.

I will give an [ ] oral [ ] poster presentation entitled: (please provide tentative title)

.....

Early registration conference fees (*please tick box*):

[ ] regular participant: 300 Euros

[ ] student: 180 Euros

[ ] accompanying person: 100 Euros

[ ] Conference Dinner (details to be announced in 2nd circular)

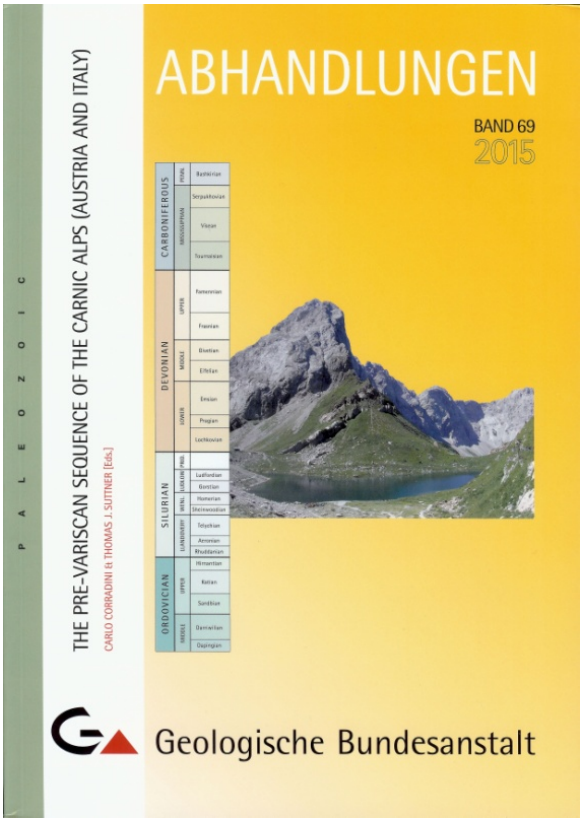
**please tick*: I prefer vegetarian food or special diet (gluten sensitive...) [ ] YES [ ] NO

Fieldtrips registration fees (*please tick box*):

[ ] Spanish Pyrenean Pre-conference Fieldtrip: June 20 - 25. Estimated cost is 600 Euros. [ ] Iberian Middle-conference Fieldtrip: June 28. Estimated cost is 30 Euros.

[ ] Prague Synform and Carnic Alps Post-conference Fieldtrip: July 1 - 9. Estimated cost is 1,100 Euros. The flight from Valencia to Prague is **NOT** included.

DEVONIAN PUBLICATIONS



THE PRE-VARISCAN SEQUENCE OF THE CARNIC ALPS (AUSTRIA AND ITALY).

CORRADINI C. & SUTTNER T. J. (Eds., 2015). Abhandlungen der Geologisches Bundesantsalt, **69**, 158 pp., ISBN 978-3-85316-081-7, 30 €.

The pre-Variscan sequence of the Carnic Alps is one of the most complete and better known in the world. Several workers investigated the area since the XIX century and produced a huge amount of papers dealing with different topics in geological sciences (geology, palaeontology, stratigraphy, structural geology, etc.).

However, the different parts of this sequence were mainly denominated with informal names, that derivate either from facies or historical terms. Furthermore, being the region across the state border between Italy and Austria, different terminologies have been adopted on both sides of the mountain chain, which result in different subdivisions of the sequence and a high number of names indicating similar -if not the same- lithological units. Also, in a few cases, the same name was used to indicate different units. Moreover, almost none of these units was formalized according to the ICS rules.

A joint research project was carried during the last seven years: more than forty researchers from various European countries (mainly Austria and Italy) were involved in business meetings, three field workshops, and the (re)study of a huge amount of old and new data, in order to achieve a common but unified terminology.

As result the pre-Variscan sequence of the Carnic Alps is now subdivided in 36 formations, lithologically well characterized, with well-defined boundaries and designated stratotypes. Twenty-one formations deal with the Devonian, reflecting a huge diversification of the sedimentary basin within this period.

The volume on the revised lithostratigraphy was published by the Geological Survey of Austria. It includes a rough characterization of each formation with illustrations of the type section, formation boundaries and typical macrofacies.

The volume is available at the Austrian Geological Survey. Hard copies cost 30 €.

The full volume and all the contributions separately, can be downloaded for free at https://www.geologie.ac.at/produkte-shop/textpublikationen/zeitschriften/abhandlungen_der_geologischen_bundesanstalt/

(click on "details" on the right of the image of the cover)

(**C. CORRADINI**)

I would also like to draw the attention of the Devonian People to the volume “The pre-Variscan sequence of the Carnic Alps (Austria and Italy)”, that was presented during the Second International Congress on Stratigraphy held in Graz (Austria) 19-23 July, 2015. The volume, printed as number 69 of the Abhandlungen der Geologische Bunsesanstalt (Vienna, Austria), edited by Carlo CORRADINI and Thomas SUTTNER, is the first result of the project ‘Formal Lithostratigraphic Units in the Pre-Variscan sequence of the Carnic Alps’ coordinated by Carlo CORRADINI (Cagliari, Italy) and Thomas SUTTNER (Graz, Austria). The project had the goal to formally define the world-wide known fossilifeorus rocks of the sequence of the lower Palaezoic of the Carnic Alps. This sequence was an object of studies since the 19th century by geologists of the two sides of the chain, and therefore the units have been named in different ways, and never formalized. The

participants of the project were mainly Austrian and Italian students but it was open to the collaboration of researchers from other parts of the world, whose studies focused on the Palaeozoic of the Carnic Alps (see list of authors below). The printed volume is the result of six in-door workshops –most of which wonderfully organized by colleagues of the Museum of Natural History of Udine, and of various field workshop and joint field work along the recent years. The volume is not intended as a mere finish line; the contributors hope it will constitute a starting point for further studies and collaboration. Thirty-six units covering a time span between Ordovician and Late

Carboniferous units have been formalized; the dating of most of the units has been made by means of conodont biostratigraphy. Now finally we have only one name for the same thing or near, even if what is a name? *Rosa pristina nomen est* (rose came before its name), so that *Lapis calcarius pristinus nomen est!* It is noteworthy that the volume was printed during 2015, the year of the centennial of the start of the First World War between Austria and Italy. The rocky objects of the volume crop out along the border Austria/Italy, in the place that was one of the battle area of the war. Along circa 10 km of a narrow strip across the border about 5000 soldiers lost their lives in only two years. We are happy to have signed a full stop at the never declared, more or less pacifistic lithostratigraphic war between Austria and Italy, thanks to Carlo and Thomas.

List of volume authors:

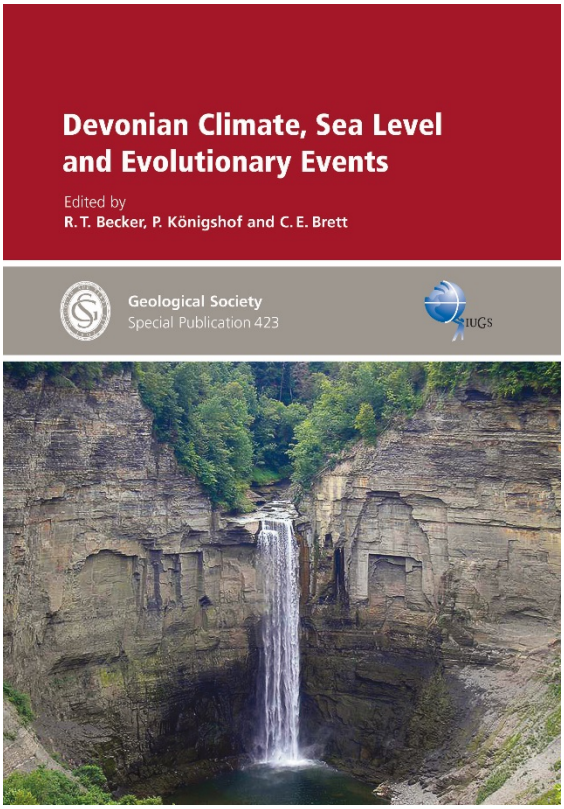
Klaus BANDEL (Germany), Carlo CORRADINI (Italy), Maria CORRIGA (Italy), Anne-Christine DA SILVA (Belgium), Claudia DOJEN (Austria), Enzo FARABEGOLI (Italy), Adriano FERRARI (Italy), Annalisa FERRETTI (Italy), Helmut HEINISCH (Germany), Bernhard HUBMANN (Austria), Heiko HÜNEKE (Germany), Erika KIDO (Austria), Alexander MÖRTL (Austria), Angelo MOSSONI (Italy), Damien PAS (Belgium), Maria Cristina PERRI (Italy), Werner E. PILLER (Austria), SUSANNE M. L. POHLER (Germany), Monica Pondrelli (Italy), Hans-Peter SCHÖNLAUB (Austria), Paolo SERVENTI (Italy), Luca SIMONETTO (Italy), Claudia SPALLETTA (Italy), Thomas J. SUTTNER (Austria), Corrado VENTURINI (Italy), Gian Battista VAI (Italy).

(C. SPALLETTA)

DEVONIAN CLIMATE, SEA LEVEL AND EVOLUTIONARY EVENTS

(A joint SDS and IGCP 569 Publication)

BECKER, R. T., KÖNIGSHOF, P. & BRETT, C. E. (Eds., 2016). – Geological Society, London, Special Publication, **423**, 1-481, ISBN 978-1-86239-734-7, N 0305-8719; list price 130.00 £, Geol. Soc. Fellows 65.00 £, members of other societies 78.00 £.



Content

genera, subgenera and species of brachiopods, including ***Sartenaerirhynchus*** n. gen..

BROCKE, R., FATKA, O., LINDEMANN, R. H., SCHINDLER, E. & VER STRAETEN, C. A. Palynology, dacryoconarids and the lower Eifelian (Middle Devonian) Basal Chotecˇ Event: case studies from the Prague and Appalachian basins, p. 123-169.

KÖNIGSHOF, P., DA SILVA, A. C., SUTTNER, T. J., KIDO, E., WATERS, J., CARMICHAEL, S. K., JANSEN, U., PAS, D. & SPASSOV, S. Shallow-water facies setting around the Kacˇa´k Event: a multidisciplinary approach, p. 171-199.

NARKIEWICZ, K., NARKIEWICZ, M. & BULTYNCK, P. Conodont biofacies of the Taghanic transgressive interval (middle Givetian): Polish record and global comparisons, p. 201-222.

ZAMBITO, J. J. IV, JOACHIMSKI, M. M., BRETT, C. E., BAIRD, G. C. & ABOUSSALAM, Z. S. A carbonate carbon isotope record for the late Givetian (Middle Devonian) Global Taghanic Biocrisis in the type region (northern Appalachian Basin), p. 223-233.

MOTTEQUIN, B. & POTY, E. Kellwasser horizons, sea-level changes and brachiopod–coral crises during the late Frasnian in the Namur–Dinant Basin (southern Belgium): a synopsis, p. 235-250.

MCNAMARA, K. J. & FEIST, R. The effect of environmental changes on the evolution and extinction of Late Devonian trilobites from the northern Canning Basin, Western Australia, p. 251-271 [with two new species: *Telopeltis intermedia* and *Otarion fugitivum*].

HAIRAPETIAN, V., ROELOFS, B. P. A., TRINAJSTIC, K. M. & TURNER, S. Famennian survivor turiniid thelodonts of North and East Gondwana, p. 273-289 [with *Arianalepis megacostata* n. gen. n. sp.].

HARTENFELS, S. & BECKER, R. T. The global *Annulata* Events: review and new data from the Rheris Basin (northern Tafilalt) of SE Morocco, p. 291-354 [with four new ammonoid species of *Gundolficeras*, *Posttornoceras*, *Platyclymenia*, and *Stenoclymenia*].

BECKER, R. T., KAISER, S. I. & ARETZ, M. Review of chrono-, litho- and biostratigraphy across the global Hangenberg Crisis and Devonian–Carboniferous Boundary, p. 355-386 [with *Siphonodella (Siphonodella) jii* nom. nov.].

KAISER, S. I., ARETZ, M. & BECKER, R. T. The global Hangenberg Crisis (Devonian-Carboniferous transition): review of a first-order mass extinction, p. 387-437.

LAKIN, J. A., MARSHALL, J. E. A., TROTH, I. & HARDING, I. C. Greenhouse to icehouse: a biostratigraphic review of latest Devonian–Mississippian glaciations and their global effects, p. 439-464.

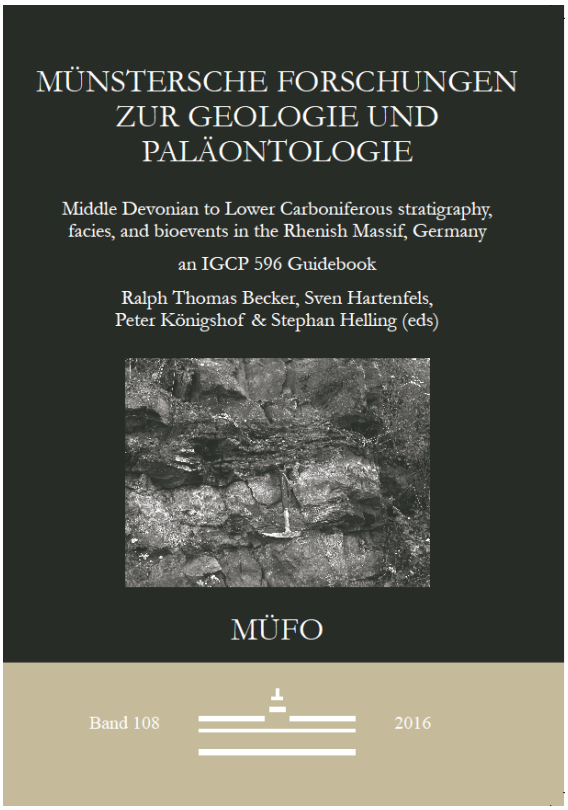
Index, 465-481.

Of course, this volume is "**A must for all Devonian workers**".

MIDDLE DEVONIAN TO LOWER CARBONIFEROUS STRATIGRAPHY, FACIES, AND BIOEVENTS IN THE RHENISH MASSIF, GERMANY

An IGCP 596 Guidebook

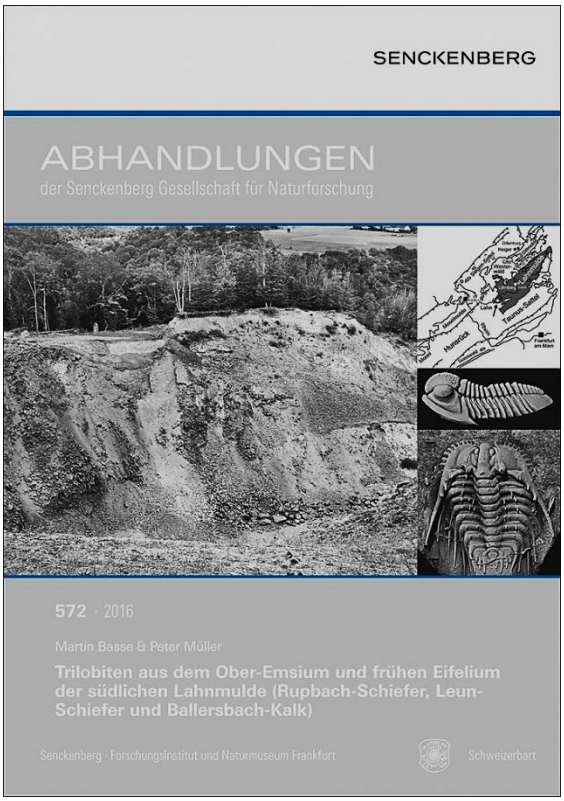
BECKER, R. T., HARTENFELS, S., KÖNIGSHOF, P. & HELLING, S. (Eds., 2016). - Münstersche Forschungen zur Geologie und Paläontologie, **108**: I-III, 1-242, ISBN 978-3-00-054896-3, ISSN 0368-9654; 22 €.



Content

Please email any orders to shartenf@uni-muenster.de (only a restricted number of copies is available for the free sell).

TRILOBITEN AUS DEM OBER-EMSIUM UND FRÜHEN EIFELIUM DER SÜDLICHEN LAHNMULDE (RUPBACH-SCHIEFER, LEUN-SCHIEFER UND BALLERSBACH-KALK)



BASSE, M. & MÜLLER, P. (2016). – Abhandlungen der Senckenberg Gesellschaft für Naturforschung, **572**: 1-329, ISBN 978–3–510–61407–3, 64,80 €.

This extra-ordinary new monograph presents an extensive documentation of upper Emsian to Eifelian trilobites from the southern Rhenish Massif (Lahn Syncline). It includes important comparisons with contemporaneous faunas of other European regions and of Morocco. The taxonomic chapter covers 37 species of 30 genera/subgenera. New are: *Scabriscutellum (Rheiscutellum)* n. subgen., *Aulacopleura (Paraaulacopleura) lemkei* n. sp., *Cyphaspides (Cyphaspides) malbertii* n. sp., *C. (C.) weugi* n. sp., *Cyphaspis kweberi* n. sdp., *Diademoproetus habenichti* n. sp., *Rhenocynproetus vanvierseni* n. sp., *Tropidocoryphe werneri* n. sp., *Harpes* n. sp. L, *Acastoides poschmanni* n. sp., *Destombesina schumacherorum* n.sp., *Psychopyge angeles* n. sp., *Pelitlina? corbachoi* n. sp., *Barrandeops (Lahnops) steinmeyeri* n. subgen. n. sp., *Perunaspis* n. sp. L., and *Koneprusia martini* n. sp. Unfortunately, there is only a relatively short (1.5 pages) English summary.

GÖTTINGER ARBEITEN ZUR GEOLOGIE UND PALÄONTOLOGIE

Now online available from:

http://www.geobiologie.uni-goettingen.de/research/contributions_to_geociences/index.shtml

Devonian monographs (in chronological order – going backwards)**:**

SCHÖNE, Bernd R. (1997). Der *otomari*-Event und seine Auswirkungen auf die Fazies des Rhenoherzynischen Schelfs (Devon, Rheinisches Schiefergebirge). – Vol. **70**, 140 pp.

SCHUBERT, Michael (1996). Die dysaerobe Biofazies der Wissenbacher Schiefer (Rheinisches Schiefergebirge, Harz, Devon). – Vol. **68**, 131 pp.

SCHÜLKE, Immo (1995). Evolutive Prozesse bei *Palmatolepis* in der frühen Famenne-Stufe (Conodonta, Ober-Devon). – Vol. **67**, 108 pp.

HERING, Gerd (1995). Milankovitch-Zyklen in mitteldevonischen Schelf-Carbonaten des Rheinischen Schiefergebirges. – Vol. **65**, 63 pp.

EBERT, Jacqueline (1994). Crinoiden-Stielglieder aus der Ems- und Eifel-Stufe des Sauerlandes (Rheinisches Schiefergebirge). – Vol. **64**, 85 pp.

EBERT, Joachim (1993). Globale Events im Grenz-Bereich Mittel-/Ober-Devon. – Vol. **59**, 106 pp.

Helga **GROOS-UFFENORDE,** HANS **JAHNKE** & Eberhard **SCHINDLER** (eds, 1993). **WALLISER**, O. H. – Festschrift. – Vol. **58**, VI + 161 pp.

REUTER, Anselm (1993). Analyse eines regradierenden Deltas im Mittel-Devon des Rheinischen Schiefergebirges. – Vol. **57**, 88 pp.

TÖNEBÖHN, Reinhard (1991). Bildungsbedingungen epikontinentaler Cephalopodenkalke (Devon, SE-Marokko). – Vol. **47**, 114 pp.

SCHINDLER, Eberhard (1990). Die Kellwasser-Krise (hohe Frasne-Stufe, Ober-Devon). – Vol. **46**, 115 pp.

LOTTMANN, Jan (1990). Die *pumilio*-Events (Mittel-Devon). – Vol. **44**, 98 pp.

ROUSHAN,Firouz (1986). Sedimentologische und dynamische Aspekte der Fazies und Paläogeographie im Bereich der Wiedenest-Formation (Mittel-Devon, Rheinisches Schiefergebirge). - Vol. **31**, 101 pp.

MICHELS, Dietmar (1986). Ökologie und Fazies des jüngsten Ober-Devon von Velbert (Rheinisches Schiefergebirge). – Vol. **29**, 86 pp.

MADER, Hernann (1986). Schuppen und Zähne von Acanthodiern und Elasmobranchiern aus dem Unter-Devon Spaniens (Pisces). – Vol. **28**, 59 pp.

REUTER, Antje (1985). Komgrößenabhängigkeit von K-Ar Datierungen und Illit-Kristallinität anchizonaler Metapelite und assoziierter Metatuffe aus dem östlichen Rheinischen Schiefergebirge. - Vol. **27**, 91 pp.

HENN, Albrecht H. (1985). Biostratigraphie und Fazies des hohen Unter-Devon bis tiefen Ober-Devon der Provinz Palencia, Kantabrisches Gebirge, N-Spanien. – Vol. **26**, 100 pp.

SAUERLAND, Ulrike (1983). Dacryoconariden und Homocteniden der Givet- und Adorf-Stufe aus dem Rheinischen Schiefergebirge (Tentaculitoidea, Devon). – Vol. **25**, 86 pp.

VIETH, Jutta (1980). Thelodontier-, Acanthodier- und Elasmobranchier-Schuppen aus dem Unter-Devon der Kanadischen Arktis (Agnatha, Pisces). – Vol. **23**, 69 pp.

LIESCHE, Stefan (1980). Die tektonische Gesteinsdeformation im Gebiet des Latroper Sattels und der Wittgensteiner Mulde im östlichen Rheinischen Schiefergebirge. – Vol. **21**, 89 pp.

ÇINAR, Cemil (1978). Marine Flachwasserfazies in den Honseler Schichten (Givet-Stufe, Lüdenscheider Mulde, Rechtsrheinisches Schiefergebirge). – Vol. **20**, 77 pp.

LANGENSTRASSEN, Frank (1972): Fazies und Stratigraphie der Eifel-Stufe im östlichen Sauerland (Rheinisches Schiefergebirge, Bl. Schmallenberg und Girkhausen). – Vol. **12**, 106 pp.

EDER, Wolfgang (1971). Riff-nahe detritische Kalke bei Balve im Rheinischen Schiefergebirge (Mittel-Devon, Garbecker Kalk). – Vol. **10**, 66 pp.

JAHNKE, Hans (1971). Fauna und Alter der Erbslochgrauwacke (Brachiopoden und Trilobiten, Unter-Devon, Rheinisches Schiefergebirge und Harz). - Vol. **9**, 105 pp.

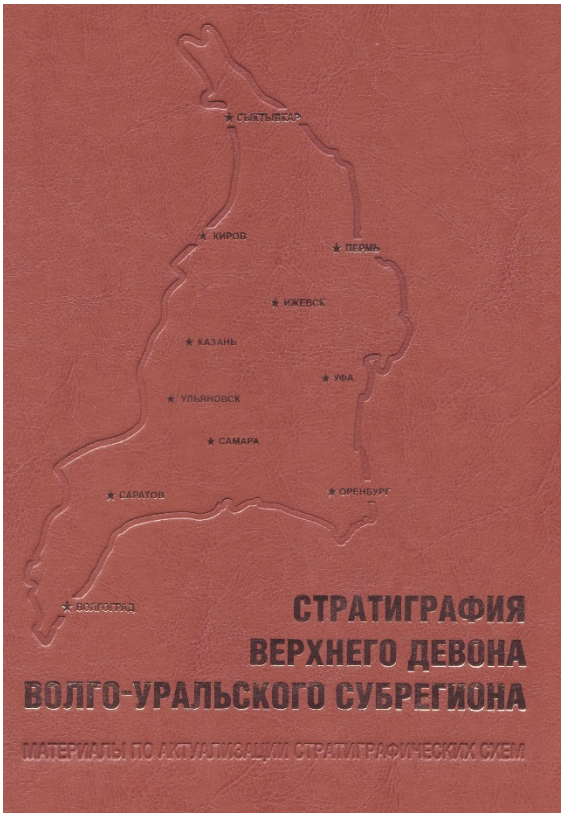
GEIßLER, Horst (1969). Zur Stratigraphie und Fazies der Finnentroper Schichten sowie zur Ökologie ihrer Fauna (Mittlere Givet-Stufe, nordöstliches Sauerland, Rheinisches Schiefergebirge). – Vol. **4**, 67 pp.

GROOS, Helga (1969). Mitteldevonische Ostracoden zwischen Ruhr und Sieg (Rechtsrheinisches Schiefergebirge). – Vol. **1**, 110 pp.

STRATIGRAFIA VERKHNEGO DEVONA VOLGO-URALISKOGO SUBREGIONA (MATERIALY PO AKTUALIZATSKII STRATIGRAFICHESKIKH SKHEM)

FORTUNATOVA, N. K., ZAJCEVA, E. L., BUSUEVA, M. A., SREC-TENETA-GURIJ, A. G. BARANOVA, A. V., KONONOVA, L. I., RAKHIMOVA, E. V., MIHEEVA, A. I., OLENEVA, N. V. & MUSIN, I. A. (2016). – Ministerstvo Prirodnynh Resursov i Zkologii rf Federalinoe Agenstvo po Neoropol´zovaniu, Federalinoe Gosudarstvennoe Biudzketnoe Uchrezhdenie, „Vserossijskij Nauchno-Issledovatel´skij Heologicheslij Neftianoj Institut“ (VNIGNI), 174 p, Moskva, ISBN 978-5-90041-33-2 (only in Russian).

The volume was presented by our Russian colleagues at the D/C Boundary Workshop in Montpellier. It includes the description of numerous boreholes across the Devonian-Carboniferous boundary (partly starting in the Middle Devonian) of the Volgo-Ural subregion, with detailed data on conodonts, spres, brachiopods, foraminiferes, ostracods, lithology, and geophysical stratigraphy.



IGCP 591, THE EARLY TO MIDDLE PALEOZOIC REVOLUTION, CLOSING MEETING, GHENT UNIVERSITY, BELGIUM, 6-9 JULY 2016, ABSTRACTS

GURDEBEKE, P., DE WEIRDT, J., VANDENBROUCKE, T. R. A. & CRAMER, B. D. (2016). - 134 pp. [not formally published].

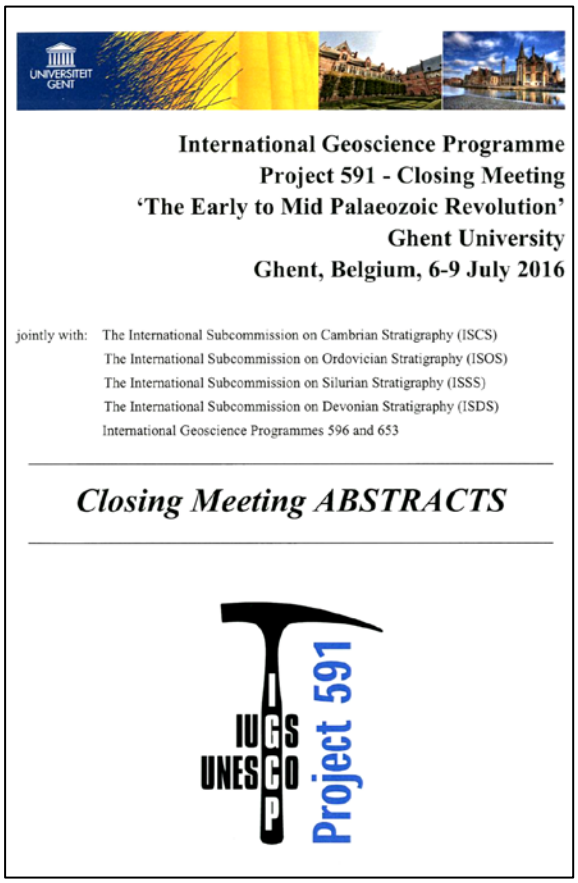
Devonian Content

DE VLEESCHOUWER, D., DA SILVA, A. C., DAY, J. E., SINNESAEL, M., WHALEN, M. & CLAYES, P. A global cyclostratigraphic framework constrains the timing and pacing of environmental changes over the Late Devonian mass extinction (Frasnian – Famennian), p. 14 (keynote).

LENTON, T. M., DAHL, T. W., DAINES, S. J., MILLS, B., OZAKI, K., SALTZMAN, M. R. & PORADA, P. A mid-Paleozoic oxygenation event driven by the earliest land plants, p. 18 (keynote).

BECKER, R. T., ABOUSSALAM, Z. S., EL HASSANI, A. & HARTENFELS, S. The distribution of pelagic facies in the western Moroccan Meseta as a key for palaeogeographic reconstructions in the Prototethys, p. 24-25 (oral).

BLIECK, A. The Great Eodevonian Biodiversification Event: The case of heterostracan vertebrates, p. 26 (oral).



BRETT, C. E., MCLAUGHLIN, P. I., EMSBO, P., THOMKA, J. R. & ZAMBITO, J. J. Mid-Paleozoic environmental stasis and volatility: driver of biotic macroevolution, p. 28 (oral).

COCKS, L. R. M. & TORSVIK, T. H. Developments and problems in Middle Palaeozoic palaeogeography. p. 33 (oral).

DA SILVA, A.C., HLADIL, J., CHADIMOVA, L., SLAVÍK, L., HILGENS, F. J. & DEKKERS, M. J. Millenial to million year cyclicities from the Lower Devonian., p. 35 (oral).

JANSEN, U. The Good, the Bad and the Ugly: Rhenish Lower Devonian brachiopods as biostratigraphic, palaeobiogeographic and palaeoecological indicators, p. 48 (oral).

LU, J. F., VALENZUELA-RÍOS, J. I. & CHEN, X. Q. Conodont biostratigraphy of the *Zdimir* bed at Nalai, Guiangxi, South China., p. 55 (oral).

SCHINDLER, E., BROCKE, R., BRETT, C. E., ELLWOOD, B. B., HARTKOPF-FRÖDER, C., RIEGEL, W. & TOMKIN, J. H. Comparison of palynofacies, magnetic susceptibility and cyclicity of the Mid Devonian Müllertchen Section (Eifel area, Germany), p. 70 (oral).

SLAVÍK, L., JOACHIMSKI, M. M., DA SILVA, A. C., BÁBEK, O. & HLADIL, J. The Pragian in the Prague Synform: Questions, Durations and Global Correlation, p. 74 (oral).

STOCKER, C. P., LANE, P. D., SIVETER, D. J., WALLIS, J., OJI, T., VANDENBROUCKE, T. R. A., TANAKA, G., KOMATSU, T., ZALASIEWICZ, J. & WILLIAMS, M. Palaeobiogeographical significance oft he Silurian and Devonian trilobite faunas of Japan, p. 78 (oral).

VALENZUELA-RÍOS, J. I. & LIAO, J.-C. Lower and middle Lochkovian (Lower Devonian) conodonts from the Segre Valley (Spanish Central Pyrenees), p. 86 (oral).

VALENZUELA-RÍOS, J. I., LIAO, J.-C., GOUWY, S. & MARTÍNEZ-PEREZ, C. The Devonian of the Noguera Ribagorzana and Segre Valleys (Spanish Central Pyrenees), p. 87 (oral).

HELLING, S. & BECKER, R. T. The many faces of *Geratos* GOLDFUSS, 1853 (Proetida) – a highly diverse Devonian trilobite genus with new data from southeastern Morocco, p. 107 (poster).

HUSKOVÁ, A. & SLAVÍK, L. Spathognathodontid conodonts of the Silurian/Devonian boundary (Prague Synform): Preliminary results, p. 110 (poster).

MERGL, M. Brachiopods of the Basal Chotec Event (Devonian) in the Prastav quarry parastratotype (Prague Basin, Bohemia), p. 113 (poster).

MERGL, M., FERROVÁ, L. & FRÝDA, J. Armoured tests of Early Devonian *Conularia* and *Mesoconularia* (Conulariida) from the Chýnice and Suchomasty limestones (Prague Basin, Czech Republic), p. 114 (poster).

NAGEL-MYERS, J. Quantifying morphological changes in a Middle Devonian bivalve lineage, p. 116 (poster).

NAZIK, A., GROOS-UFFENORDE, H., OLEMPSKA, E., YALCIN, M. N., WILDE, V., SCHINDLER, E., KÖNIGSHOF, P. & SEKER, E. Contribution of the Silurian-Devonian Ostracods to the Palaeogeographical Assignment of the Western Pontides, Central and Eastern Taurides, Turkey, p. 118-119 (poster).

NOLCOVÁ, L. Silicified epibionts on brachiopods of Lochkovian age from Bohemia; p. 122 (poster).

PAS, D., DA SILVA, A. C., DEVLEESCHOUWER, X., DE VLEESCHOUWER, D., CORNET, P., LABAYA, C. & BOULVAIN, F. Insights into a million-year scale Rhenohercynian carbonate platzorm evolution through a multi-disciplinary approach: example of a Givetian carbonate record from Belgium, p. 123 (poster).

RICHTER, J., HARTENFELS, S., ABOUSSALAM, Z. S., BECKER, R. T. & EL HASSANI, A. Biostratigraphy of the isolated Devonian (Emsian to Famennian) at Immouzer du Kandar (south of Fes, Moroccan Meseta), p. 127 (poster).

SÖTE, T., HARTENFELS, S. & BECKER, R. T. Conodont stratigraphy and microfacies near the Devonian-Carboniferous boundary at Forststeinbruch Reigern (Hachen, northern Rhenish Massif), p. 129 (poster).

STICHLING, S., BECKER, R. T., HARTENFELS, S. & ABOUSSALAM, Z. S. New daqta on the extinction oft he Hagen-Balve reef complex (based on bore hole HON_1101), p. 130-131 (poster).

Outside the Devonian contributions a presentation by EMSBO et al. was especially intriguing, since it also offered new ideas that also could explain explain various aspects of Devonian black shale event:

EMSBO, P., MCLAUGHLIN, P. I., MANNING, A. H., PREMO, W. R., NEYMARK, L. A., BRETT, C. E., VANDENBROUCKE, T. R. A., BRUNTON, F. R., BARRICK, J. E., BRIET, G. N., MUNNECKE, A., EMMONS, M. & DU BRAY, E. A. Brines, Metals, and Bugs: The Fate of the Palaeozoic World, p. 15 (keynote).

MEMBERSHIP NEWS

CM Gordon BAIRD

2014-2015 have been consumed with non-science duties, but my research goals, summarized in the last SDS Newsletter, are unchanged. Since my position as Department Chair has ended, there should be more time for science in the coming years.

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 Mrirt, at Dechra Ait Abdallah NW of Mrirt, and at Ziyyar 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 accidently 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 fried 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 80th 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 LÜDECKE 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 2nd 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 Hastiére 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, 2nd 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 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 87nd 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, micriobialithic limestones 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 Ziyyar (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 *Kalloclymenia* 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 LÜDECKE & 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-occuring) 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 accociations. This gives a warning not to over-interprete 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 Frasnes 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. Unfortuntely, 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. I 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 Moroccon *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.

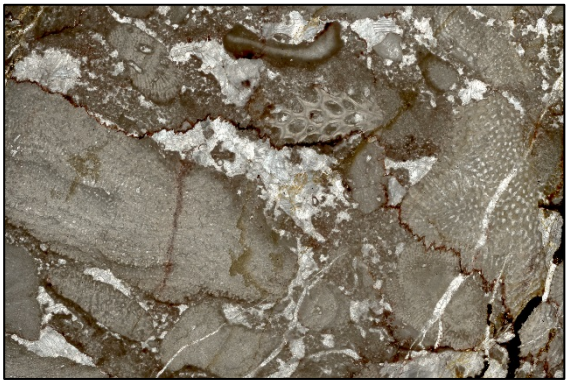


Fig. 6. Example of Hönne Valley reef facies (Borehole HON_1101, 94.80-94.98 m): stromatoporid rudstone with fragmented branching tabulate corals and filling of pore space by peloids and coarse sparite.

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. In 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 cyrtoconic, 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

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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.

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LÜDECKE, 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.

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[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, 87th Annual Conference of the Paläontologische Gesellschaft e.V., Dresden, September 11-15, 2016, Programme, Abstracts, Field trip guides: 30-31; Dresden (Saxoprint GmbH).

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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, 87th Annual Conference of the Paläontologische Gesellschaft e.V., Dresden, September 11-15, 2016, Programme, Abstracts, Field trip guides: 133; Dresden (Saxoprint GmbH).

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Devonian Theses

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CIFER, T. (2016). Conodont biostratigraphy, carbonate microfacies, and conodont biofacies around the Devonian/Carboniferous boundary at La Serre Trench C (Montagne Noire, France). – M.Sc. Thesis, 90 pp., 3 tabs.

ELLERKAMP, M.-P. (2016). Die Schneckenfauna aus dem Riffkalk von Hofermühle (Givetium, Velberter Sattel, Rheinisches Schiefergebirge). – B.Sc. Thesis, 100 pp.

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TM Alain BLIECK

I continue to work on early vertebrates, and in particular on Early Devonian heterostracans, with a series of papers in progress:

- "The Great Eodevonian Biodiversification Event" (the case of heterostracan vertebrates);
- Early Devonian heterostracans of G. D. HOLLER (Luxembourg);
- A redescription of *Tesseraspis mosaica* KARATAJUTA-TALIMAA, 1983 (Vertebrata: Pteraspidomorphi: Heterostraci), with new tesseraspid material from the Lochkovian (Lower Devonian) of Severnaya Zemlya, Russia;
- The heterostracan fauna of a new horizon of the Fraenkelryggen Formation (Early Devonian) of Spitsbergen;
- Heterostracan pteraspidomorphs from the subsurface Upper Silurian and Lower Devonian of SE Poland.

Other subjects of interest will be treated in collaboration with other paleontologists.

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Journal papers

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ELLIOTT, D. K., SCHULTZE, H.-P. & BLIECK, A. (2015). A new pteraspid (Agnatha: Heterostraci) from the Lower Devonian Drake Bay Formation, Prince of Wales Island, Nunavut, Arctic Canada, and comments on environmental preferences of pteraspids. – Journal of Vertebrate Paleontology, **35** (6): e1005098, 10 p., DOI:10.1080/02724634.2015.1005098 (published online 29 Oct.2015).

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BLIECK, A.,MEILLIEZ, F., AUGUSTE, P. & DESCHODT, L. (Eds., 2015). Annales de la Société Géologique du Nord, 22 (2é série): 148 pp.

Abstracts

CARIDROIT, M., RANDON, C., MUSAVU-MOUSSAVOU, B., with support of BLIECK, A., CLAUSEN, S., CRÓNIER, C., DANELIAN, T., LOCATELLI, E., NETTER, R., SERVAIS, T. & VACHARD, D. (2015). In honor of Nutthawut WONGANAN, a friend, a geologist, a radiolarist who left us too early. - In: 14th Interrad Meeting (22-26 March 2015, Antalya, Turkey), Poster.

BLIECK, A. (2015). An Early Devonian peak of biodiversity: the case of heterostracan vertebrates. - In: MOTTEQUIN, B., DENAYER, J., KÖNIGSHOF, P., PRESTIANNI, C. & OLIVE, S. (Eds.), IGCP 596 – SDS Symposium : Climate change and biodiversity patterns in the Mid-Palaeozoic (Sept. 20-22, 2015, Brussels), Strata, Série 1 : communications, **16**: 16-17.]

BLIECK, A. (2016). Un pic de biodiversité a 415 millions d´années á les vertébrés en Nord de France et Sud-Belgique. - In: DELFOLIE, G. & MEILLIEZ, F. (Organ.), le Février des Sciences: Géosciences, recherche, enseignement et applications entre la Manche et le Rhin (Médiathéque d´Agglomération de Cambrai & Société Géologique du Nord, Cambrai, 17 février 2016), poster.

BLIECK, A. (2016). Le "Great Eodevonian Biodiversification Event" (GEBE): le cas des hétérostracés (vertébrés). - In: Congrés 2016 de l´Association Paléontologique Franaise (Elbeuf, 30 mars – 2 avril 2016): Résumés, Bulletin de l´Société des Etude des Sciences Naturelles, Elbeuf, 2016: 12; S.E.S.N.E édit., Elbeuf.

CUVELIER, J., BLIECK, A., OUDOIRE, T. & VACHARD, D. (2016). Les collections publiques lilloises de géologie, minéralogie et paléontologie: 10 catalogues publiés aprés 17 ans d´inventaire, et ce n´est pas fini. - In: Congrés 2016 de l´Association Paléontologique Franaise (Elbeuf, 30 mars – 2 avril 2016): Résumés, Bulletin de l´Société des Etude des Sciences Naturelles, Elbeuf, 2016: 38; S.E.S.N.E édit., Elbeuf.

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TM Carlton E. BRETT

During 2015 I continued to work on Devonian projects in eastern North America, although a good deal of time was devoted to other project areas. However, I continue to pursue a series of projects with my colleagues, Gordon BAIRD (SUNY College at Fredonia), Alex BARTHOLOMEW (SUNY College at New Paltz), and Jay ZAMBITO (Wisconsin Geological Survey):

A) Integrated Stratigraphy of the Middle Devonian (Givetian) in Kentucky

Blasting for highway widening produced a series of roadcuts in central Kentucky, which provided important new sections of the Middle Devonian (Givetian) Boyle and Portwood formations. Jay ZAMBITO (Wisconsin Geological Survey) and I measured these and other significant exposures of Middle Devonian in the vicinity of Irvine, KY, and sampled them for C isotopic and other geochemical analysis. These sections reveal a series of distinctive depositional sequences, each with sharply erosive bases (the lower resting with distinctly angular unconformity on rocks of mid Silurian to Late Ordovician age). The lower sequences are distinctly siliciclastic-rich, contain typical Hamilton brachiopod associations (e.g., *Tropidoleptus*,

Athyris, Mediospirifer), and may tie with the Marcellus-Skaneateles formations of the Appalachian Basin succession. These are characterized by phosphate-rich lag deposits that should yield good conodont assemblages. We are testing this hypothesis using a combination of isotope chemostratigraphy and biostratigraphy, in collaboration with Thomas BECKER and Sarah ABOUSSALAM. Samples are currently being processed in Jay's Wisconsin lab. If the samples prove to provide a relatively complete conodont succession through the upper Givetian Portwood Formation, this interval might be considered as a possible stratotype or auxilliary of the upper Givetian substage.

B) Revised New York State Devonian Correlation Chart

I continue to collaborate with Charles VER STRAETEN, New York State Museum, Gordon BAIRD (SUNY College Fredonia), Alex Bartholomew (SUNY New Paltz), Jay ZAMBITO (Wisconsin Geological Survey), and several other New York stratigraphers on the revision of the New York State Devonian Stratigraphic Correlation Chart, which is intended to comprise a series digital charts and a book discussing the details of Devonian stratigraphy. One important spinoff of this project was the realization that the frequency and intensity of physical and biotic fluctuations varies substantially from one stage to another, a phenomenon that I term "volatility". This has led to another research topic discussed next.

C) Volatility of Devonian Stages

I am investigating the relative volatility in the Silurian and Devonian interval. New absolute dates for the stages have led to surprising and counterintuitive results. Certain intervals (e.g., the late Eifelian and Givetian) exhibit numerous events and sea level oscillation. In contrast other intervals, most notably the Emsian, formerly predicted to be relatively short based on relatively few physical and biotic events, have turned out to be quite lengthy. This suggests a genuinely bimodal distribution of frequency of events that I term "volatility". A series of other features appear to be correlated with these two opposed phases. Most notably, the low volatility intervals appear to be times of relatively high sea level and warm climates with weakly developed and/or lengthy depositional sequences, as opposed to small scale rhythmic bedding that may reflect precessional scale climatic oscillations. The high volatility intervals appear to be associated with icehouse times and show numerous well-defined depositional sequences and a tendency toward red and green lithofacies. This is leading to a more general predictive model that will help to shed light on critical processes in Earth and life history.

I also worked with former University of Cincinnati PhD student Andrew ZAFFOS (presently on post-doctoral research at the University of Wisconsin) on a review paper on niche stability in the Middle Devonian Hamilton Group based in part upon doctoral research he did in collaboration with me. Overall, the results indicate a strong tendency toward niche conservatism, despite local and regional fluctuations, on time scales of hundreds of thousands to a few million years. This result is consistent with a model of habitat tracking by most taxa, which permitted maintenance of niche conservancy and may explain patterns of shared stability, such as "coordinated stasis". The paper will appear in a book on *Hierarchical Models in Evolutionary Theory* edited by Niles ELDREDGE and others.

Finally, a highlight of the year was the joint Devonian Subcommission meeting and final meeting of IGCP 596 in Brussels and the associated pre- and post-meeting field trips. Both the pre-meeting trip in the classic Devonian sections of Belgium and the post-meeting expedition in the Middle and upper Devonian in the Rhenisch area of Germany were hugely successful and informative. I was most intrigued by aspects of cyclic sedimentation in the Givetian.

Publications

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CM Rainer BROCKE

Devonian activities in 2015 were mainly related to lab work (palynology) and data compilation of the studies from the Turkish-German cooperation project in the central and southern Taurids of Turkey (ended in 2014). New results were presented at the STRATI 2015 Meeting in Graz (SCHINDLER et al.)

Studies on the Choteč Event (in cooperation mainly with colleagues from the USA and the Czech Republic) have been completed and published online in the GSL Special Publication, in 2015. Results have also been shown at the 50th Annual Meeting of the Northeastern Section of GSA (LINDEMANN et al.).

Studies on the Lower Devonian Hunsrückschiefer are in progress and have been introduced at the IGCP 596-SDS Symposium in Brussel (BROCKE et al.).

Further studies in the Rheinisches Schiefergebirge (e.g. Eifel) are in progress.

The year 2015 (and completed in 2016) was also busy with the compilation of the new German Stratigraphic Table 2016 (Stratigraphische Tabelle Deutschland 2016, STD), which is the revised version of the STD 2002. This chart will also include new contributions from the Devonian in Germany and will be introduced during the International Geological Congress in Cape Town (August/September 2016).

Publications

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TM Carlo CORRADINI

My research is mainly devoted to conodont biostratigraphy in several North Gondwana regions (the Carnic Alps, Sardinia, Montagne Noire, Iran, etc.), from Silurian to Lower Carboniferous, specially focusing on the Silurian/Devonian and Devonian/Carboniferous boundaries. The latter are mainly related with the International Task Group on the redefinition of the Devonian/Carboniferous Boundary (led by M. ARETZ, Toulouse).

A paper on conodont distribution across the D/C boundary, with the proposal of a new conodont biozonation across the boundary and implication for its redefinition was published (CORRADINI et al., 2016b), as well as one on a new DCB section in Sardinia (MOSSONI et al., 2015). In the Montagne Noire, the Puech de la Suque section was restudied (with C. GIRARD and R. FEIST).

A manuscript on a new Famennian global zonation has been submitted to the Bulletin of Geosciences (SPALLETTA, PERRI, OVER & CORRADINI).

In the Carnic Alps, a huge project on formal lithostratigraphic units of the pre-Variscan sequence of the Carnic Alps, coordinated by T. SUTTNER (Graz) and myself, concluded after several years of work. All the formation of the "Pre-Variscan" sequence are now well defined and formalized according to the stratigraphic code, and named univocally on both sides of the Italian-Austrian border. A volume was published in the Abhandlungen der Geologisches Bundesantsalt series (CORRADINI & SUTTNER, Eds., 2015). Within this project, several sections and outcrops from Silurian to Lower Carboniferous were studied in various areas of the Carnic Alps (with L. SIMONETTO, M. PONDRELLI, M.G. CORRIGA, C. SPALLETTA, H.P. SCHÖNLAUB, A. MOSSONI, T. SUTTNER, E. KIDO and others).

Other projects in progress on the Devonian of the Carnic Alps deal with:

- Conodonts from several upper Silurian and Lower Devonian sections (with M. G. CORRIGA): beside several new sections, some classical localities have been sampled, such as Costone Lambertenghi/Seekopf Sockel, Rauchkofel Boden, Seewarte, and Cellon. Two papers have been published on the famous Cellon section: one on the updated conodont stratigraphy of the Silurian part of the section (CORRADINI et al., 2015), the second on the lower Lockovian part (CORRIGA et al., 2016). A manuscript on the updated stratigraphy of the Rauchkofel Boden section, exposing rocks from Katian to Pragian, will be submitted soon.
- The Kacak event, studied in some sections in the central part of the Carnic Alps (with T. SUTTNER, E. KIDO and others). Research deals with conodonts, microfacies, isotopes, magneto-susceptibility, gamma rays, and other fossil groups.
- The geology and stratigraphy of selected key areas (with several co-authors). Two papers have been published: one on the depositional evolution of Mt. Pizzul area from Late Ordovician to early Carboniferous (PONDRELLI et al., 2015a), the second on the stratigraphy of La Valute area (CORRADINI et al. 2016a). Manuscripts on the Lake Wolayer and the central part of the Carnic Alps are in progress.

In the Montagne Noire, research deals both with conodont stratigraphy across the S/D boundary (with M. G. CORRIGA and R. FEIST) and the stratigraphy and facies in the Famennian and lowermost Tournaisian (with C. GIRARD, R. FEIST and others).

In Iran research is carried out in cooperation with A. BAHRAMI (Isfahan) and deals with conodonts and the stratigraphy of sections from the Middle Devonian to Lower Carboniferous in different parts of the country.

Maria G. CORRIGA is working on upper Silurian and Lower Devonian conodont taxonomy and stratigraphy. She is investigating various sections in several North Gondwana regions: Sardinia, the Carnic Alps, Montagne Noire, Spanish Pyrenees (with J. I. VALENZUELA-RÍOS), and Morocco. See above for details. In February 2014 she was awarded with the Hinde Medal by the PANDER Society.

Devonian publications (2015-2016)

CORRADINI, C. & SUTTNER, T. J. (Eds., 2015). The Pre-Variscan sequence of the Carnic Alps (Austria and Italy). - Abhandlungen der Geologisches Bundesantsalt, **69**: 158 pp.

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CORRADINI, C., PONDRELLI, M., SIMONETTO, L., CORRIGA, M. G., SPALLETTA, C., SUTTNER ,T. J., KIDO, E., MOSSONI ,A. & SERVENTI, P. (2016a). Stratigraphy of the La Valute area (Mt. Zermula massif, Carnic Alps, Italy). - Bollettino della Società Paleontologica Italiana, **55** (1), 55-78. DOI: 10.4435/BSPI.2016.06.

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CORRIGA, M. G., CORRADINI, C., SCHÖNLAUB, H.-P. & PONDRELLI, M. (2016). Lower Lochkovian (Lower Devonian) conodonts from Cellon section (Carnic Alps, Austria). - Bulletin of Geosciences, **91** (2): 261-270, DOI 10.3140/bull.geosci.1594.

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PONDRELLI, M., PAS, D., SPALLETTA, C., SCHÖNLAUB, H. P., FARABEGOLI, E., CORRADINI, C., SUTTNER, T. J., CORRIGA, M. G., PERRI, M. C., DA SILVA, A.-C., POHLER, S. M. L., SIMONETTO, L., DOJEN, C., MOSSONI, A., KIDO, E. & HÜNEKE, H. (2015e). Freikofel Formation. - In: CORRADINI, C. & SUTTNER, T. J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologisches Bundesantsalt, **69**: 121-124.

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SPALLETTA, C., PONDRELLI, M., CORRADINI, C., CORRIGA, M. G., PERRI, M. C., SCHÖNLAUB, H.-P., SIMONETTO, L. & MOSSONI, A. (2015b). Findenig Formation. - In: CORRADINI, C. & SUTTNER, T. J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologisches Bundesantsalt, **69**: 129-132.

SPALLETTA, C., SCHÖNLAUB, H.-P., PONDRELLI. M. & CORRADINI. C. (2015c). Valentin Formation. - In: CORRADINI, C. & SUTTNER, T. J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologisches Bundesantsalt, **69**: 133-136.

SUTTNER, T. J., BANDEL, K., CORRADINI, C., CORRIGA, M. G., KIDO, E., POHLER, S. M. L., PONDRELLI, M., SCHÖNLAUB, H.-P., SIMONETTO, L. & VAI, G. B. (2015). Seekopf Formation. - In: CORRADINI, C. & SUTTNER, T. J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologisches Bundesantsalt, **69**: 69-72.

Devonian Abstracts (2015-2016)

ARETZ, M. & CORRADINI, C. (2015). The redefinition of the Devonian-Carboniferous Boundary: recent developments. - In: PILLER, W. E. (Ed.), Strati 2015, Abstracts, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **17**: 14.

ARETZ. M., CORRADINI. C. & THE WORKING GROUP (2015). The redefinition of the Devonian-Carboniferous Boundary: recent developments. – In: XVIII International Congress on the Carboniferous and Permian, Abstract Book**.**

CORRADINI. C., & SUTTNER. T. J. (2015). Lithostratigraphy of the Pre-Variscan sequence of the Carnic Alps (Austria-Italy). - In: PILLER, W. E. (Ed.), Strati 2015, Abstracts**,** Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **17**: 65.

CORRADINI, C., ARETZ, M. & THE WORKING GROUP (2015f). The redefinition of the Devonian-Carboniferous Boundary: recent developments. - In: MOTTEQUIN, B., DENAYER, J., KÖNIGSHOF, P., PRESTIANNI, C. & OLIVE, S. (Eds.), IGCP 596-SDS Symposium, Climate change and Biodiversity patterns in the Mid-Palaeozoic, Abstracts, Strata, Traveaux de Geologie sedmentaire et Paleontologie, Série 1: communications, **16**: 37.

CORRADINI, C., SPALLETTA, C., MOSSONI, A., MATYJA, H., KAISER, S. I. & OVER, D. J. (2015g). Review of conodonts across the Devonian/Carboniferous boundary: implication for the redefinition of the boundary and a proposal for an updated conodont zonation. - In: PILLER, W. E. (Ed.), Strati 2015, Abstracts, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **17**: 64.

GIRARD, C., CHARRUAULT, A.-L., CORRADINI, C., CORNÉE, J.-J., WEYER, D., BARTZSCH, K. & FEIST, R. (2015). Paleoenvironmental trends in two Famennian sections of "Galatian" superterranes: Col des Tribes (Montagne Noire, France) and Buschteich (Thuringia, Germany). - In: MOTTEQUIN B., DENAYER J., KÖNIGSHOF P., PRESTIANNI C. & OLIVE S. (Eds), IGCP 596-SDS Symposium, Climate change and Biodiversity patterns in the Mid-Palaeozoic, Abstracts, Strata, Traveaux de Geologie sedmentaire et Paleontologie, Série 1: communications, **16**: 55-56.

PONDRELLI, M., CORRADINI, C., SPALLETTA, C., SUTTNER, T. J., SCHÖNLAUB,H.-P., PAS, D., KIDO, E., CORRIGA, M. G., MOSSONI, A., SIMONETTO, L., POHLER, S. M. L., PERRI, M. C., FARABEGOLI, E., DA SILVA, A.-C., DOJEN, C. &HÜNEKE H. (2015g). Upper Lochkovian to lower Famennian evolution of the Carnic Alps:

perspectives from the 'transitional facies'. - In: PILLER, W. E. (Ed.), Strati 2015, Abstracts, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **17**: 305.

SCHÖNLAUB, H.-P., CORRADINI, C., CORRIGA, M. G. & FERRETTI, A. (2016). Updated conodont biostratigraphy of the Rauchkofel Boden Section (Katian-Pragian), Carnic Alps, Austria. - In: GURDEBEKE, P, DE WEIRDT, J., VANDENBROUCKE, T. R. A. & CRAMER, B. D. (Eds.), IGCP 591, The early to middle Palaeozoic revolution, closing meeting, Gent, Belgium, 6-9 July, 2016, Abstracts: 71.

SPALLETTA, C., PERRI, M. C., CORRADINI, C. & OVER, D. J. (2015d). Proposal for a revised Famennian (Upper Devonian) standard conodont zonation. - In: PILLER, W. E. (Ed.), Strati 2015, Abstracts, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **17**: 357

SPALLETTA, C., PERRI, M. C., CORRADINI, C. & OVER, D. J. (2015e). Proposal for a revised Famennian (Upper Devonian) standard conodont zonation. - In: MOTTEQUIN, B., DENAYER, J., KÖNIGSHOF, P., PRESTIANNI, C. & OLIVE, S. (Eds.), IGCP 596-SDS Symposium, Climate change and Biodiversity patterns in the Mid-Palaeozoic, Strata, Traveaux de Geologie sedmentaire et Paleontologie, Série 1: communications, **16**: 135-136.

CM Anna-Christine DA SILVA

My research focused in 2015-2016 mostly on the Devonian of Belgium, China, and the Czech Republic. We have applied a multi-proxy approach in order to get a better understanding of the paleoenvironments of these Devonian successions, through sedimentology, magnetic measurements, geochemistry (elemental and carbon and oxygen isotopes) and cyclostratigraphy. This year, we focused on improving the Lower Devonian time scale (Lochkovian and Pragian) through cyclostratigraphy, and a paper with a new age model is under revision in EPSL.

With D. DE VLEESCHOUWER we have also sampled the Frasnian Famennian section at Sinsin for magnetic susceptibility and geochemistry (C & O isotopes and elemental geochemistry).

In summer, in collaboration with C. E. BRETT, G. BAIRD, J. D. OVER, C. VER STRAETEN, and A. BARTHOLOMEW, we have sampled two sections in the New York Appalachian Basin (Emsian and Eifelian) for cyclostratigraphy.

Devonian Publications (2015 to early 2016)

Jounal papers and book chapters

PAS, D., DA SILVA, A.-C., DEVLEESCHOUWER, X., DE VLEESCHOUWER, D., CORNET, P., LABAYE, C. & BOULVAIN, F. (2016). Insights into a million-year scale carbonate platform evolution through a pluri-disciplinary approach: example of a Givetian carbonate records from Belgium. - Geological Magazine.

PETRA, T., OLLE, H., KÖNIGSHOF, P., SUTTNER, T. J., KIDO, E., DA SILVA, A.-C. & PAS, D. (2016). Middle Devonian jawed polychaete fauna from the type Eifel area, western Germany, and its biogeographical and evolutionary affinities. - Papers in Palaeontology, **2** (2): 293-310 .

DA SILVA, A.-C., WHALEN, M. T., HLADIL, J., CHADIMOVA, L., CHEN, D., SPASSOV, S., BOULVAIN, F. & DEVLEESCHOUWER, X. (2015). Magnetic susceptibility application – a window onto ancient environments and climatic variations: Foreword. – In*:* DA SILVA, A.-C., WHALEN, M. T., HLADIL, J., CHADIMOVA, L., CHEN, D., SPASSOV, S., BOULVAIN, F., DEVLEESCHOUWER, X. (Eds.), Geological Society, London, Special Publications, **414**: 1-13

DE VLEESCHOUWER, D., BOULVAIN, F., DA SILVA, A.-C., PAS, D., LABAYE, C. & CLAEYS, P. (2015). Astronomical interpretation of the magnetic signal signal of the Givetian sections in the DinantSynclinorium (La Couvinoise, Monts de Baileux, Fromelennes-Flohimont and La Thure). - In*:* DA SILVA, A.-C., WHALEN, M. T., HLADIL, J., CHADIMOVA, L., CHEN, D., SPASSOV, S., BOULVAIN, F., DEVLEESCHOUWER, X. (Eds.), Geological Society, London, Special Publications, **414**: 245-256

WHALEN, M. T., ŚLIWIŃSKI, M. G., PAYNE, J. H., DAY, J. E., CHEN, D. & DA SILVA, A.-C. (2015). Chemostratigraphy of the late Devonian Frasnian-Famennian transition in western Canada and Southern China: implications for carbon and nutrient cycling and mass extinction. - In*:* DA SILVA, A.-C., WHALEN, M. T., HLADIL, J., CHADIMOVA, L., CHEN, D., SPASSOV, S., BOULVAIN, F. & DEVLEESCHOUWER, X. (Eds.), Geological Society, London, Special Publications, **414**: 37-72.

PAS, D., DA SILVA, A.-C., DEVLEESCHOUWER, X., DE VLEESCHOUWER, D., LABAYE, C., CORNET, P., MICHEL, J. & BOULVAIN, F. (2015). Sedimentary development and magnetic susceptibility evolution of the Frasnian in Western Belgium (Dinant Synclinorium, La Thure section). - In: DA SILVA, A.-C., WHALEN, M. T., HLADIL, J., CHADIMOVA, L., CHEN, D., SPASSOV, S., BOULVAIN, F. & DEVLEESCHOUWER, X. (Eds.), Geological Society, London, Special Publications, **414**: 15-36

PONDRELLI, M., PAS, D., SPALLETTA, C., SCHÖNLAUB, H.-P., FARABEGOLI, E., CORRADINI, C., SUTTNER, T. J, CORRIGA, M. G., PERRI, M. C., DA SILVA, A.C., POHLER, S. M. L., SIMONETTO, L., DOJEN, C. MOSSONI, A., KIDO, E. & HÜNEKE, H. (2015). Freikofel Formation. - In: CORRADINI, C. & SUTTNER, T. J. (Eds.), The Pre-Variscan Sequence of the Carnic Alps (Austria And Italy), Abhandlungen der Geologischen Bundesanstalt, **69**, 121-124.

Abstracts

DE VLEESCHOUWER, D., DA SILVA, A.-C., J. E. DAY, WHALEN, M. T. & CLAEYS, P. (2016). A global cyclostratigraphic framework constrains the timing and pacing of environmental changes over the Late Devonian (Frasnian – Famennian) mass extinction. - EGU, Geophysical Research Abstracts, **18**: EGU2016-8193-1

CHOW, N., FERGUSON, I. J. GEORGE, A. D. & DA SILVA, A.-C. (2015). Characterization of facies architecture in a Frasnian syntectonic carbonate platform, Canning Basin, northwestern Australia, using geostatistical and magnetic methods. - Bathurst Meeting, Abstract book: 38-39.

PONDRELLI, M. CORRADINI, C., SPALLETTA, C., SUTTNER, T. J., SCHÖNLAUB, H. P., PAS, D., KIDO, E., CORRIGA, M. G., MOSSONI, A., SIMONETTO, L., POHLER, S. M. L., PERRI, M. C., FARABEGOLI, E., DA SILVA, A.-C., DOJEN, C. & HÜNEKE, H. (2015). Upper Lochkovian to lower Famennian evolution of the Carnic Alps: perspectives from the 'transitional facies'. In: PILLER, W. E. (Ed.), STRATI 2015, Abstracts, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **17**: 305.

DA SILVA, A.-C., CHADIMOVÁ, L., HLADIL, J., SLAVÍK, L., HILGEN, F. J. & DEKKERS, M. J. (2015): Unravelling orbital climatic cycles from Devonian magnetic susceptibility signal – The quest for a better age model for the Lochkovian and Pragian stages (Czech Republic). - In: MOTTEQUIN, B., DENAYER, J., KÖNIGSHOF, P., PRESTIANNI, C. & OLIVE, S. (Eds), IGCP 596-SDS Symposium, Climate change and Biodiversity patterns in the Mid-Palaeozoic, Abstracts, Strata, Traveaux de Geologie sedmentaire et Paleontologie, Série 1: communications, **16**: 39.

DJOUDER, H., BOULVAIN, F., DA SILVA, A.-C. & LÜNING, S. (2015). The Siluro – Devonian Successions – In: The Tassili N'ajjer Outcrops (SE Algeria): Sedimentology And Stratigraphy.

DA SILVA, A.-C., CHADIMOVA, L., HLADIL, J., HILGEN, F. J. & DEKKERS, M. (2015). Cyclostratigraphy and environmental magnetism approach on the Lochkovian and Pragian from the Praha region, Czech Republic. - International Association of Sedimentologists Meeting, 22-25th June 2015, Krakow, Abstract book.

DA SILVA, A.C. YANS, J. & BOULVAIN, F. (2015). Severe and rapid sea level changes affecting Devonian mud mounds from Belgium. - International Association of Sedimentologists Meeting, 22-25th June 2015, Krakow, Abstract book.

DJOUDER, H., BOULVAIN, F., DA SILVA, A.-C., MUSIAL, G., MURAT, B. & LÜNING, S. (2015). Silurian – Devonian of the Oriental Algerian Sahara: implication of new field data from Tassili n'Ajjer outcrops and Berkine Basin (SE, Algeria) for shale gas exploration. - EPC'2015, The Thirteenth Tunisian Petroleum Exploration & Production Conference.

DA SILVA, A.-C., CHADIMOVA, L., HLADIL, J., SLAVIK, L., HILGEN, F. J. & DEKKERS, M. J. (2015). Unravelling Orbital Climatic Cycles from Devonian Magnetic Susceptibility Signal – The Quest for a Better Age Model for the Lochkovian and Pragian Stages (Czech Republic). - AGU 2015 Fall meeting, Abstract GP43D-08.

CM David DE VLEESCHOUWER

Since October 2014, I am working full-time on Cenozoic astrochronology and paleoclimatology. However, this does not prevent me from working on selected side projects on Devonian cyclostratigraphy. For example, in 2015, I visited the Emsian - Eifelian GSSP section (Wetteldorf Richtschnitt, Germany), with the aim to construct a

cyclostratigraphic framework for this section. Indeed, such a framework could help to correlate time-equivalent sections with the GSSP section. Therefore, we collected 4-cm spaced elemental data of an 8.65 m thick interval, using a Bruker Tracer handheld XRF. We complemented our data with previously-published magnetic susceptibility (MS) data (ELLWOOD et al., 2006). The results and interpretations were presented at the American Geophysical Union Annual Meeting in San Francisco in December 2015 and a manuscript is in preparation. Another side project consists of the construction of a global cyclostratigraphic framework for the late Frasnian to early Famennian climatic and environmental change. The backbone of this relative time scale consists of previously published cyclostratigraphies for western Canada and Poland. We elaborate this Euramerican base by integrating new multi-proxy data from the Iowa basin (USA) and Belgium (XRF, magnetic susceptibility and carbon isotope records). These proxy records reveal a clear imprint of astronomical climate forcing, which is in agreement with biostratigraphic constraints. Next, we expand this well-established cyclostratigraphic framework towards the Paleo-Tethys Ocean, using magnetic susceptibility and carbon isotope records from the Fuhe section in South China. The resulting global cyclostratigraphic framework implies an important refinement of the late Frasnian to early Famennian stratigraphy, but also allows for an evaluation of the role of astronomical forcing in perturbing the global carbon cycle and pacing anoxic conditions throughout the Late Devonian mass extinction event. These findings were presented at the EGU General Assemblee in April 2016, as well as during the IGCP 591 Closing Meeting in Ghent in July 2016.

Publications

MAKARONA, C., DE VLEESCHOUWER, D., LINNEMAN, U., KÖNIGSHOF, P. & CLAEYS, P. (2015). The Emsian – Eifelian (Lower – Middle Devonian) boundary occurs in a 100-kyr eccentricity maximum: A potentially useful secondary marker for the GSSP section (Wetteldorf Richtschnitt, Germany). - AGU Fall Meeting 2015, San Francisco. Thursday, 17 December 2015, 15:10 - 15:25, Moscone South: 300. http://abstractsearch.agu.org/meetings/2015/FM/GP43D-07.html

DE VLEESCHOUWER, D., DA SILVA, A.-C., DAY, J., WHALEN, M. & CLAEYS, P. (2016). A global cyclostratigraphic framework constrains the timing and pacing of environmental changes over the Late Devonian (Frasnian – Famennian) mass extinction. - EGU General Assemblee 2016, Vienna. Wednesday, 20 April 2016, 08:30-08:45, Room 1.85. http://meetingorganizer.copernicus.org/EGU2016/EGU2016-8193-1.pdf.

DE VLEESCHOUWER, D., DA SILVA, A.-C., DAY, J., SINNESAEL, M., WHALEN, M. & CLAEYS, P. (2016). A global cyclostratigraphic framework constrains the timing and pacing of environmental changes over the Late Devonian (Frasnian – Famennian) mass extinction. – In. IGCP 591, The Early To Middle Paleozoic Revolution, Closing Meeting, Ghent University, Belgium, 6-9 July 2016, Abstracts: 14.

PAS, D., DA SILVA, A.C., DEVLEESCHOUWER, X., DE VLEESCHOUWER, D., CORNET, P., LABAYE, C. & BOULVAIN, F. (2016). Insights into a million-year scale Rhenohercynian carbonate platform evolution through a multi-disciplinary approach: example of a Givetian carbonate record from Belgium. - Geological Magazine.

WHALEN, M. T., DE VLEESCHOUWER, D., PAYNE, J. H., DAY, J. E., OVER, J. D. & CLAEYS P. (2016). Pattern and timing of the Late Devonian biotic crisis in western Canada: Insights from carbon isotopes and astronomical calibration of magnetic susceptibility data. - SEPM Special Publications.

DE VLEESCHOUWER, D., LEATHER, D. & CLAEYS, P. (2015). Ripple marks indicate Mid-Devonian paleo-wind directions in the Orcadian Basin (Orkney Isles, Scotland). - Palaeogeography, Palaeoclimatology, Palaeoecology, **426**: 68-74.

NARKIEWICZ, M., GRABOWSKI, J., NARKIEWICZ, K., NIEDŹWIEDZKI, G., RETALLACK, G. J., SZREK, P. & DE VLEESCHOUWER D. (2015). Palaeoenvironments of the Eifelian dolomites with earliest tetrapod trackways (Holy Cross Mountains, Poland). - Palaeogeography, Palaeoclimatology, Palaeoecology, **420**: 173-192.

GRABOWSKI, J., NARKIEWICZ, M. & DE VLEESCHOUWER D. (2015). Forcing factors of the magnetic susceptibility signal in lagoonal and subtidal depositional cycles from the Zachelmie section (Eifelian, Holy Cross Mountains, Poland). - Geological Society, London, Special Publications, **414**: 225-244.

DEVLEESCHOUWER, X., RIQUIER, L., BÁBEK, O., DE VLEESCHOUWER, D., PETITCLERC, E., STERCKX, S. & SPASSOV, S. (2015). Magnetization carriers of grey to red deep-water limestones in the GSSP of the Givetian-Frasnian boundary (Puech de la Suque, France): signals influenced by moderate diagenetic overprinting. - Geological Society, London, Special Publications, **414**: 157-180.

PAS, D., DA SILVA, A.-C., DEVLEESCHOUWER, X., DE VLEESCHOUWER, D., LABAYE, C., CORNET, P., MICHEL, J. & BOULVAIN, F. (2014). Sedimentary development and magnetic susceptibility evolution of the Frasnian in Western Belgium (Dinant Synclinorium, La Thure section). - Geological Society, London, Special Publications, **414**: 15-36

DE VLEESCHOUWER, D., CRUCIFIX, M., BOUNCEUR, N. & CLAEYS, P. (2014). The impact of astronomical forcing on the Late Devonian greenhouse climate. - Global and Planetary Change, **120**: 65-85

DE VLEESCHOUWER, D. & PARNELL, A. (2014). Reducing time scale uncertainty for the Devonian by integrating astrochronology and Bayesian statistics. – Geology, **42**: 491-494.

DA SILVA, A.-C., DE VLEESCHOUWER, D., BOULVAIN, F., CLAEYS, P., FAGEL, N., HUMBLET, M., MABILLE, C., MICHEL, J., SARDAR ABADI, M., PAS, D. & DEKKERS, M. J. (2013). Magnetic susceptibility as a high-resolution correlation tool and as a climatic proxy in Paleozoic rocks - Merits and pitfalls: Examples from the Devonian in Belgium. - Marine and Petroleum Geology, **46**: 173-189.

DE VLEESCHOUWER, D., RAKOCIŃSKI, M., RACKI, G., BOND, D. P. G., SOBIEŃ, K. & CLAEYS, P. (2013). The astronomical rhythm of Late-Devonian climate change (Kowala section, Holy Cross Mountains, Poland). - Earth and Planetary Science Letters, **365**: 25-37.

PAS, D., DA SILVA, A.-C., SUTTNER, T. J., KIDO, E., BULTYNCK, P., PONDRELLI, M., CORRADINI, C., DE VLEESCHOUWER, D., DOJEN, C. & BOULVAIN. F. (2013). Insight into the development of a carbonate platform through a multi-disciplinary approach: a case study from the Upper Devonian slope deposits of Mount Freikofel (Carnic Alps, Austria/Italy). - International Journal of Earth Sciences, **103**: 519-538.

DE VLEESCHOUWER, D., WHALEN M. T., DAY, J. E. & CLAEYS, P. (2012). Cyclostratigraphic calibration of the Frasnian (Late Devonian) time scale (western Alberta, Canada). - Geological Society of America Bulletin, **124** (5-6): 928-942.

DE VLEESCHOUWER, D., DA SILVA, A.-C. BOULVAIN, F. CRUCIFIX, M. & CLAEYS, P. (2012). Precessional and half-precessional climate forcing of Mid-Devonian monsoon-like dynamics. - Climate of the Past, **8**: 337-351.

My Ph.D. Thesis is available at:
http://daviddevleeschouwer.webs.com/phdthesis.m

CM Ahmed EL HASSANI

My interest during 2016 was focused on the working group on the Moroccan Meseta, the Paleozoic buttonholes of the Middle and High Atlas, and the southern part of the external Hercynides. Understanding the palaeogeography, stratigraphy and sedimentary syntectonic evolution of the Moroccan Hercynides is necessary to reconstruct the various stages of its development and to put the western Moroccan Meseta in its proper geodynamic setting.

These investigations were part of a DFG-CNRST research program, that was focused on the Western Meseta, on Eovariscan intervals (i.e. from the Emsian to Tournaisien), when the Rheic ocean was mostly subducted under the Avalonia plate, and prior to Viséan, which is characterized by the final Variscan collision between Gondwana and Laurussia.

The Western Meseta is a mosaic of relatively complex terrains, composed of blocks with partly allochthonous units, each with a particular history for its faunas and its facies, and of course synsedimentary tectonic events. A tectonic regime with global expansion, at least for the Western Meseta, generates a tilted block structure bounded by major faults, resulting in uplift, erosion, redesign and re-deposition in adjacent basins, often with gravitational nappes or olistoliths. The "Famennian Revolution" mentioned by PIQUÉ (1975) for the configuration of the region suffers from very inaccurate stratigraphic data for paleogeographic reconstructions of the various blocks. Therefore, our program aims to revise the dating of more than 30 geological successions, primarily by conodonts and, to a lesser extent, by ammonoids and brachiopods.

This year (2016) we had to finalize some of our results by revisiting especially the eastern part of the Central Morocco massif, the Azrou-Khenifra Basin, where we investigated the following sections :

Imouzzer du Kandar, Azrou, Mrirt, Anajdam, Jebel Ben Arab, Ziar, Sidi Amar, and Sidi Haroun (one of the western parts of Oulmès area). With the whole team, we presented our results at various meeting:

Abstracts

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.

BECKER, R. T., ABOUSSALAM, Z. S., EL HASSANI, A. & HARTENFELS, S. (2016). The distribution of Devonian pelagic facies in the western Moroccan Meseta as a key for palaeogeographic reconstructions in the Prototethys. - International Geoscience Programme Project 591 - Closing Meeting "The Early to Mid palaeozoic Revolution",, At Ghent University, Ghent, Belgium, Volume: Closing Meeting Abstracts: 24-25.

RICHTER, J., HARTENFELS, S., ABOUSSALAM, Z. S., BECKER, R. T. & EL HASSANI, A. (2016). Biostratigraphy of the isolated Devonian (Emsian to Famennian) at Immouzer du Kandar (south of Fes, Moroccan Meseta). - International Geoscience Programme Project 591 - Closing Meeting "The Early to Mid palaeozoic Revolution",, At Ghent University, Ghent, Belgium, Volume: Closing Meeting Abstracts: 127.

In 2016 also, in cooperation with Thomas BECKER and SARAH Aboussalam, we participated in a new project on contourites, generated by the University of Greifswald in Germany under the direction of Heiko HUENEKE.

In another way my interest was also focused on the Moroccan geological patrimony (especially Paleozoic) and tried to involve all communities to protect it. I can also add that in Morocco, there is a growing awareness around the development of the paleontological and geological natural heritage and its contribution to both economic and social development. To clarify this issue, I presented in an international meeting at Fez University some examples of this heritage to relate this geological wealth and to attract public attention in general and administration in particular, to safeguard this natural heritage. More details here:

EL HASSANI A. (2016). Patrimoine géologique marocain et développement durable. - Bulletin Académie Hassan II des Sciences, Maroc, **18**: 11-36.

TM Nadezhda G. IZOKH and the NOVOSIBIRSK GROUP

During the year 2016 our team continued the study of Devonian and Lower Carboniferous stratigraphy of the Salair and Kuznetsk Basin (south of the West Siberia), Russian Arctic region, and the Kitab State Geological Research. The research group from the Trofimuk Institute of Petroleum Geology and Geophysics SB RAS includes:

TM Dr. Nadezhda G. IZOKH – conodonts,

CM Dr. Olga T. OBUT – radiolarians,

CM Aleksandr Yu. YAZIKOV – brachiopods,

Dr. Vladimir G. KHROMYKH – stromatoporoids,

Dr. Nikolay V. SENNIKOV– graptolites,

Dr. Evgeny S. SOBOLEV – ammonoids,

Olga A. RODINA– fish remains,

Tanyana A. SHCHERBANENKO – brachiopods.

The groups also includes **CM Dr. O.P. IZOKH** from the SOBOLEV Institute of Geology and Mineralogy SB RAS.

Main results obtained in 2016 concern the study of the Middle Devonian fauna (conodonts, brachiopods and ammonoids) of the Yuryung-Tumus Peninsula, (Nordvik Bay, Laptev Sea, Arctic Siberia).

TM Dr. Nadezhda G. IZOKH analyzed the distribution of conodonts in Eifelian (Middle Devonian) strata of the Yuryung-Tumus Peninsula (Arctic Siberia) (Fig. 1). The conodont association (Fig. 2) is represented by *Polygnathus linguiformis klapperi* CLAUSEN, LEUTERITZ & ZIEGLER and *Icriodus stelcki* CHATTERTON that characterize the *kockelianus* Zone of the upper part of Eifelian. The Mentioned conodont association is widely distributed on the north of the Siberian Platform (from Norilsk region to Nordvik Bay) and is the evidence for a marine basin on the shelf of the Siberian Platform during the Middle Devonian.

CM Aleksandr Yu. YAZIKOV, together with **Tatyana A. SHCHERBANENKO,** investigated diverse collection of Middle Devonian brachiopods from the Yuryung-Tumus Peninsula (Arctic Siberia). The predominant species within the brachiopod

assemblage is *Desquamatia* (*Independatrypa*) *pesterevskensis* RZHONITSKAYA, which amounts to 44% of the specimens. Upwards, the section continues with the Eifelian *Isospinatrypa subspinosa subspinosa* (LAZUTKIN in RZON.) and *Echinocoelia* cf. *denayensis* JOHNSON, typical Givetian species *Emanuella pachyrincha* (VERNEUIL), *Eumetabolotoechia limitaris* (VANUXEM), *Gypidula* cf. *subbrevirostris* TYAZHEVA, as well as a number of species of wider stratigraphic range (Fig. 3). Another species, *Leiorhynchus taimyricus*, characteristic for the Yukta Formation, was previously described by D. V. NALIVKIN (NALIVKIN, 1936).

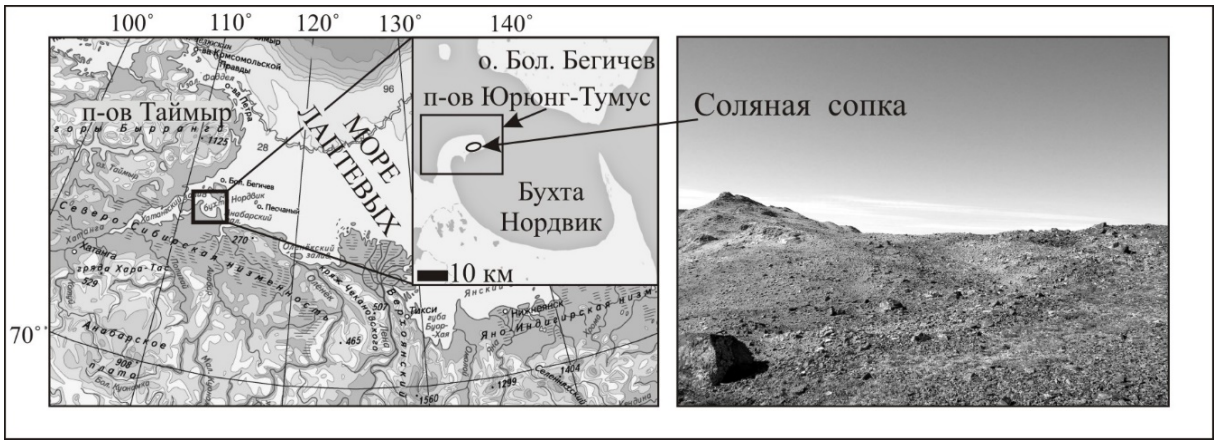
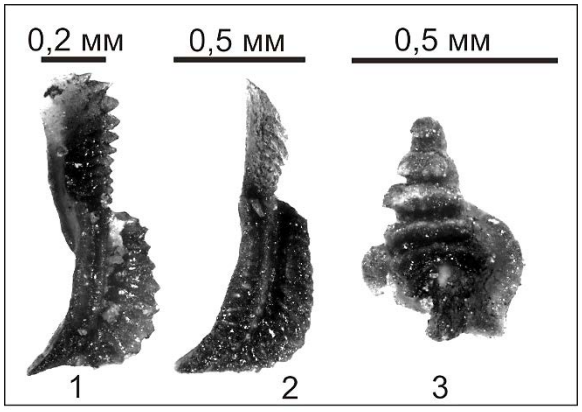


Fig. 1. Location of studied sequences of the Yukta Formation (Yuryung-Tumus peninsula, Laptev Sea, Arctic Russia).

Fig. 2. Middle Devonian conodonts from the Yukta Formation (Yuryung-Tumus peninsula, Laptev Sea, Arctic Russia). 1, 2 - *Polygnathus linguiformis klapperi* CLAUSEN, LEUTERITZ ET ZIEGLER, 3 - *Icriodus stelcki* CHATTERTON.



CM Dr. Olga T. OBUT, in collaboration with **TM Dr. Nadezhda G. IZOKH,** continued the study of Late Devonian - Early Carboniferous siliceous and carbonate sequences from the southern Char belt, East Kazakhstan. The age control of the radiolarian associations is supported by the presence of conodonts. New rock material was obtained during summer field trip.

Dr. EVGENY S. SOBOLEV studied the Middle Devonian ammonoids, nautiloidsn and gastropods of the Yuryung-Tumus Peninsula, (Nordvik Bay, Laptev Sea, Arctic Siberia). Cephalopods in his collection are represented by *Parodiceras* sp. aff. *P. magnosellaris* (HOLZAPFEL), *Alpenoceras* cf. *cruglovi* KUZMIN, *Hindeoceras* sp. aff. *H. canadense* (WHITEAVES), and- *Lobobactrites* sp.. Gastropods include *Naticopsis* sp., *Euomphalus* sp., and *Loxonema* sp. (Fig. 4)

CM Dr. Olga P. IZOKH continued isotope-geochemical studies in the Devonian of the Salair and Kitab State Geological Research.

Published abstracts

SHCHERBANENKO, T. A., IZOKH, N. G., SOBOLEV, E. S., YAZIKOV, A. Y., SENNIKOV, N. V., MARINOV, V. A., IGOLNIKOV, A. E. & SYURIN, A. A. (2016). New biostratigraphic data about the age of the Middle Devonian Yukta Fm, Salyanaya Sopka of the Yuryung-Tumus Peninsula (Nordvik Bay). - In: Proceedings of LXII Session, Paleontological Society of the Russian Academy of Sciences (April 4-8, 2016, St. Petersburg), St. Petersburg: 198-200; Publishing House of VSEGEI [in Russian].

SHCHERBANENKO, T. A., YAZIKOV, A. Y., IZOKH, N. G., SOBOLEV, E. S. & SENNIKOV, N. V. (2016). Faunal characteristics of the Middle Devonian Yukta Formation on the Yuryung-Tumus Peninsula (Nordvik Bay, coast of the Laptev sea).

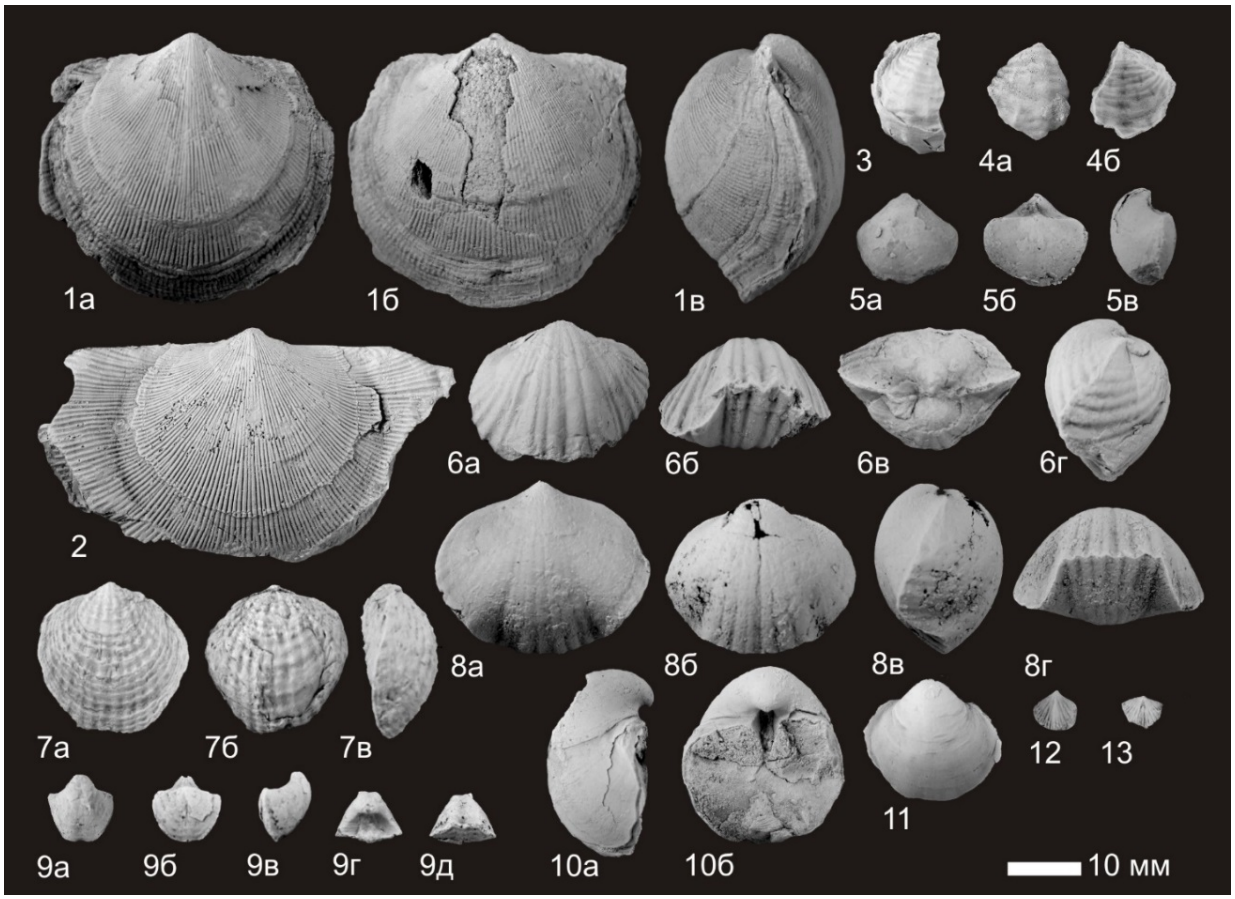


Fig. 3. Brachiopods of the Yukta Formation. 1, 2 - *Desquamatia (Independatrypa) elegantula* RZON., 1a – pedicle valve, 1bб – brachial valve, 1в – lateral view, 2 – pedicle valve with frill; 3, 4 - *Spinulicosta* sp., 3 – pedicle valve, 4a – pedicle valve, 4б – brachial valve; 5 - *Emanuella pachyrincha* (VERNEUIL), 5a - pedicle valve, 5б - brachial valve, 5в – lateral view; 6 - *Eumetabolotoechia limitaris* (VANUXEM), 6a - ventral valve, 6б – anterior, 6в – posterior, 6г - lateral view; 7 - *Isospinatrypa subspinosa* (LAZUTKIN in RZHONSNITSKAYA), 7a - pedicle valve, 7б - pedicle valve, 7в – lateral view; 8 - *Leiorhynchus castanae* JOHNSON, 8a - pedicle valve, 8б – brachial valve, 8в – lateral view, 8г – anterior; 9 - *Echinocoelia* cf. *williamsi* JOHNSON: 9a - pedicle valve, 9б – brachial valve, 9в – lateral view, 9г – posterior, 9д - anterior; 10, 11 - *Gypidula* cf. *subbrevirostris* TYAZHEVA, 10a – lateral view, 10б – area, 11 – pedicle valve; 12, 13 - *Carinatina* sp., 12 - brachial valve; 13 – pedicle valve.

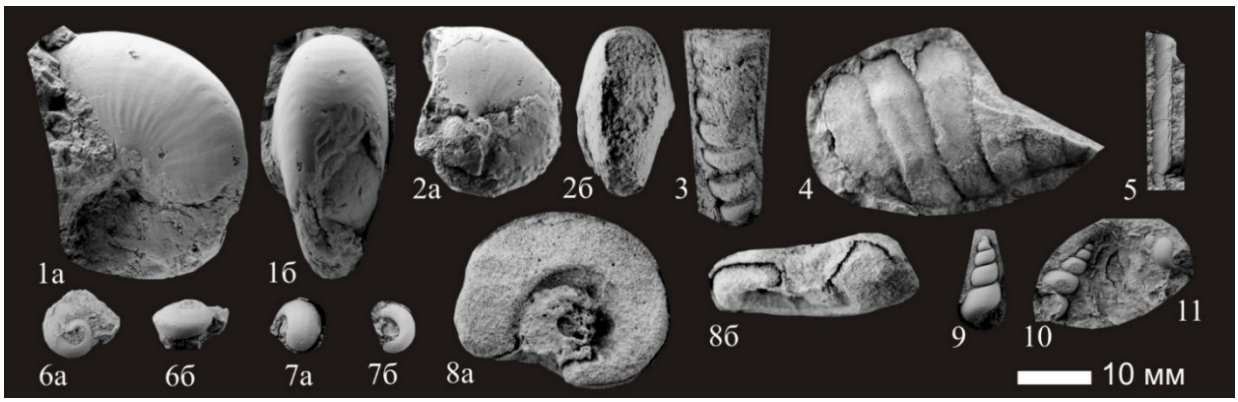


Fig. 4. Ammonoids: 1, 2 - *Parodiceras* sp. aff. *P. magnosellaris* (HOLZAPFEL), 1a – lateral view; 1б – ventral view; 2a - lateral view; 2б – ventral view; nautiloids: 3 - *Alpenoceras* cf. *cruglovi* KUZMIN, siphon view; 4 - *Hindeoceras* sp. aff. *H. canadense* (WHITEAVES), lateral view; nautiloids: 5 - *Lobobactrites* sp., lateral view; gastropds: 6 - *Naticopsis* sp., a – upper view; б – lateral view; 7 - *Bellerophon* sp., a – dorsal view; б – umbo view; 8 - *Euomphalus* sp., a – umbo view; б – shell opening view; 9-11 - *Loxonema* sp., 9-11 - lateral view.

- In: Interekspo Geo-Siberia-2016: XII International conference "Subsurface management. Mining. New trends and techniques for prospecting, exploration and exploitation of mineral resources, Geoecology" (Novosibirsk, April 18-22, 2016), **1**: 185-190; Novosibirsk, SGGA [in Russian, with English abstract].

TM Ulrich JANSEN

In 2015–2016, studies of uppermost Silurian to Middle Devonian brachiopods and stratigraphy of the Rhenish Massif (Germany) were intensified, with the intention to publish a monograph in the near future. During research stays at the National Museum in Prague (BARRANDE collection), the Dr.-Bohuslav-HORÁK Museum in Rokycány/Czech Republic (HAVLÍČEK collection), the universities of Leuven (ASSELBERGHS collection) and Liège/Belgium (DEWALQUE collection, with some of DE KONINCK's originals); and the Muséum des Sciences naturelles in Brussels (BÉCLARD, MAILLIEUX, VANDERCAMMEN and GODEFROID collections), numerous specimens from the Barrandian and the Ardennes could be studied for comparison.

In a summarizing overview published as contribution to the current Devonian volume of the Geological Society of London Special Publications (No. **423**), the faunal succession has been described and interpreted against the background of sedimentary sequences and facies development. The predominant rhenotypic ('Rhenish') facies is redefined as a neritic-siliciclastic facies type of the Devonian and subdivided into eurhenotypic, pararhenotypic and allorhenotypic subfacies, based on sedimentary features and specific brachiopod assemblages reflecting different shallow-marine palaeoenvironments under more or less terrigenous influence. The Rhenish successions are subdivided biostratigraphically on the basis of brachiopods, correlated on a supraregional scale and calibrated in terms of the global chronostratigraphy. A series of faunal turnovers are attributed to regional events in the context of short or more extended phases of palaeoenvironmental change presumably caused mainly by eustatic sea-level fluctuations in combination with varying crustal subsidence and sedimentation rates. The work appeared online, but will soon be published as printed version. As well, results of this project were presented on various occasions: 6th International Brachiopod Congress in Nanjing, IGCP 596-SDS Meeting in Brussels, STRATI 2015 Congress in Graz and IGCP 591 Closing Meeting (including SDS symposium) in Ghent this year.

As part of the same volume of the Geological Society Special Publications, brachiopod research contributed to a multidisciplinary study of strata in neritic (allorhenotypic) facies documenting the Kačak Event in the Eifel region (Rhenish Massif), and the brachiopods provided useful data for stratigraphic correlation (KÖNIGSHOF et al. 2015).

From time to time, single finds of ammonoids can be made in the rhenotypic Lower Devonian of the Rhenish Massif. Each of these very rare finds may provide important data for neritic–pelagic correlation. Recently, a single specimen of *Teicherticeras* from a lower Emsian locality – the first one of its genus from the Eifel! – could be traced in the archives of the Senckenberg Institute. The same locality yielded brachiopods, such as the stratigraphically significant *Arduspirifer latestriatus prolatestriatus*, and trilobites. A manuscript has been finished in cooperation with colleagues from the University of Erlangen (with Christof ÜBELACKER and Kenneth DE BAETS, submitted).

Alessandra KUNZMANN, a student of AXEL MUNNECKE (University of Erlangen), is currently doing her master thesis in my section at Senckenberg. She studies a rich fauna from a locality in the Wiltz Formation (upper Emsian, Eifel), analyses its composition statistically, in order to reconstruct the palaeoecology and palaeoenvironment. A focus is placed on the brachiopods, which represent the most abundant group.

Together with my former internship student **Susan ANDERKO**, some new and already known representatives of the spiriferid genus *Paraspirifer* have been studied and analyzed with regard to their phylogenetic relationships. A manuscript is almost finished.

In a project led by Senckenberg geochronology colleagues in Dresden (U. LINNEMANN, K. MENDE et al.), who conducted provenance analyses of sedimentary rocks from allochthonous units in the eastern Rhenish Massif (Germany), e.g. the Lindener Mark, brachiopods from the sampled rocks were studied. Palaeobiogeographic data from the brachiopods are fully consistent with the results from the provenance analyses (manuscript shortly before submission).

Finally, I joined an international and interdisciplinary working group studying 276 m of Devonian strata of the Zefreh Section (microfacies, geochemistry, conodonts, brachiopods) in Central Iran, which covers the Givetian/Frasnian boundary. The brachiopod data, in combination with the conodonts, allowed to (almost) pinpoint this boundary in a carbonate-ramp setting with general shallowing-upward trend. The manuscript has been submitted to be included in the forthcoming Devonian volume in Palaeodiversity and Palaeoenvironments (KÖNIGSHOF et al., submitted).

Publications 2015-2016

CHEN X. & JANSEN, U. (2015). The distribution of the Lower Devonian brachiopod genus *Paraspirifer* WEDEKIND, 1926 and its palaeobiogeographic implications. — In: HUANG, B. & SHEN, S. (Eds.), The Brachiopod World, Abstracts for IBC 7, Nanjing, China, 2015, Permophiles, Newsletter of the Subcommission on Permian Stratigraphy, **61**, suppl. 1: 20.

JANSEN, U. (2015a). Pridolian to Eifelian brachiopod faunas, biofacies and events of the Rhenish Massif (Germany). — In: HUANG, B. & SHEN, S. (Eds.), The Brachiopod World, Abstracts for IBC 7, Nanjing, China, 2015, Permophiles, Newsletter of the Subcommission on Permian Stratigraphy, **61**, suppl. 1: 47–49.

JANSEN, U. (2015b). The Pridolian to Eifelian succession of the Rhenish Massif (Rheinisches Schiefergebirge, Germany): brachiopod faunas, events and correlation. — Berichte des Institutes für Erdwissenschaften, Karl Franzens-Universität Graz, **21**: 184.

JANSEN, U. (2015c). Brachiopod diversity, biofacies and events in the Rhenish Lower Devonian (Germany). — In: MOTTEQUIN, B., DENAYER, J., KÖNIGSHOF, P., PRESTIANNI, C. & OLIVE, S. (Eds.), IGCP 596 – SDS Symposium, Climate change and Biodiversity patterns in the Mid-Palaeozoic, September 20–22, 2015, Brussels, Belgium, Abstracts, STRATA, 2015, Série 1, **16**: 71–72.

JANSEN, U. (2016a). Brachiopod faunas, facies and biostratigraphy of the Pridolian to lower Eifelian succession in the Rhenish Massif (Rheinisches Schiefergebirge, Germany). — In: BECKER, R. T., KÖNIGSHOF, P. & BRETT, C. E. (Eds.), Devonian Climate, Sea Level and Evolutionary Events. — Geological Society, London, Special Publications, **423**: 45-122, http://doi.org/10.1144/SP423.11

JANSEN, U. (2016b). The Good, the Bad and the Ugly: Rhenish Lower Devonian brachiopods as biostratigraphic, palaeobiogeographic and palaeoecologic indicators. In: GURDEBEKE, P., DE WEIRDT, J., VANDENBROUCKE, T. R. A. & CRAMER, B. D. (Eds.): IGCP 591. The Early to Middle Paleozoic Revolution. Closing Meeting, Ghent University, Belgium, 6–9 July 2016, Abstracts: 48; Ghent.

KÖNIGSHOF, P., DA SILVA, A.-C., SUTTNER, T. J., KIDO, E., WATERS, J., CARMICHAEL, S. K., JANSEN, U., PAS, D. & SPASSOV, S. (2015). Shallow-water facies setting around the Kačák Event: a multidisciplinary approach. — In: BECKER, R. T., KÖNIGSHOF, P. & BRETT, C. E. (Eds.), Devonian Climate, Sea Level and Evolutionary Events, Geological Society, London, Special Publications, **423**: 171-199, http://doi.org/10.1144/SP423.11.

SCHINDLER, E., YALÇIN, M. N., BOZDOĞAN, N., BROCKE, R., GROOS-UFFENORDE, H., JANSEN, U., NAZIK, A., ÖZKAN, R., SANCAY, R. H., SAYDAM-DEMIRAY, G., WEDDIGE, K., WEHRMANN, A., WILDE,V. & YILMAZ, İ. (2015). Biostratigraphy and correlation of Devonian successions in the Taurides (Turkey). – Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **21**: 340.

ÜBELACKER, C., JANSEN, U. & DE BAETS, K. (2016 online). First record oft he Early Devonian ammonoid Teicherticeras from the Eifel (Germany): biogeographic and biostratigraphic importance. – Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, **262** (21), doi:10.1127/njgpa/2016/0613.

CM Semen A. KRUCHEK, CM Dmitri PLAX and the Belarusian Devonian Group

Devonian deposits in the territory of Belarus are investigated by the Devonian Group and the most important publications are summarized below. The research results were presented for the report on the Project IGCP N 596 (2012-2015) and the Belarusian - Polish Project «Biostratigraphy, palaeoecology and sedimentology of the unique transgressive event in the Middle Devonian of Belarus: regional aspects and global significance (2013-2015)».

Publications

STREL'CHENKO, T. V. & KRUCHEK, S. A. (2013). Lower Famennian Conodont-Based Stratigraphy of the Pripyat Trough. – Stratigraphy and Geological Correlation, **21** (2): 150-170. Pleiades Publishing. Ltd. [Original Russian text published in Stratigrafiya. Geologicheskaya Korrelyatsiya, **21** (2): 22-42].

Three conodont assamblages characterizing the standard *triangularis, crepida*, and *rhomboidea* zones can be defined in lower Famennian sections of the Pripyat Trough. The defined local conodont units include the *Icriodus iowaensis, Palmatolepis wolskae – Palmatolepis circularis, Palmatolepis klapperi – Polygnathus semicostatus, Icriodus divergentus*, and *Palmatolepis subperlobata helsmi* beds. The defined conodont assemblages are correlated with their coeval standard counterparts of the East European Platform. New conodont species and subspecies are described: *Palmatolepis klapperi biparapetus, Polygnathus barskovi, Po. chegodaevi, Po. semeni, Po. inaequilateralis, Polynodosus nodocostatus productus, Icriodus divergentus, I. pushkini.*

PLAX, D. P. & KRUCHEK, S. A. (2014). Stratigraphy of Middle Devonian deposits of the western part of the Pripyat Trough (according to results of the study of ichthyofauna). – Lithosphere, **1** (40): 24-42.

The paper presents the results of the palaeoichthyological study of the core from the Pinsk-10 and Pinsk-26 boreholes, drilled in the territory of the western part of the Pripyat Trough within the Turov and Starobin Centroclines. References with data on vertebrates of the Middle Devonian within the investigated area are given. According to the vertebrate assemblages (guide taxa of agnathans and other fishes), a stratigraphic subdivision of Middle Devonian deposits is executed. Apart from that, the correlation of deposits with the synchronous sediments developed in the adjacent territories of Ukraine, Russia and the Baltic States is carried out, based on vertebrates. The paper replenishes the previously known composition of the stratigraphic vertebrate assemblages of the Middle Devonian in this area and provides both their full list and stratigraphic distribution. The Stratigraphic Chart of the Devonian deposits of Belarus (2010) has been taken as a stratigraphic basis of the division of the Middle Devonian deposits in the studied area.

PLAX, D. P. (2014). First findings of the redeposited Devonian ichthyofauna in the Quaternary deposits of Belarus. - Lithosphere, **2** (41): 19-26.

The paper presents some data on the findings of redeposited skeletal elements of Devonian vertebrates found for the first time in the Quaternary deposits of Belarus, and gives their short description. A conclusion is drawn about the relative age of the rocks enclosing these remains and about their type of redeposition.

KRUCHEK, S. A., PLAX, D. P. & OBUKHOVSKAYA, V. Yu. (2014). Silurian deposits of the Ostrovets area in the northwestern part of the Belarusian Anteclise). – Lithosphere, **2** (41): 27-39 (in Russian, with English Summary).

The results of palaeontological and stratigraphic investigations of the Palaeozoic deposits of the Ostrovets area (building site of the Belarusian nuclear power plant) located in the northwestern part of the Belarusian Anteclise are presented. Rock samples from some boreholes (Ostrovets 1, Ostrovets 7ц, Ostrovets 73, Ostrovets 195, and others) were studied. The remains of vertebrates (thelodont scales), as well as of conodonts, scolecodonts, microphytofossils (acritarchs), and some other fossil organisms were found. The study of these organic remains allowed the authors to prove that their enclosing rocks are Lower Silurian (Llandoverian and Wenlockian), but not Middle Devonian (Narva) in age, as these have been shown in geological maps of the Prequarternary deposits and interpreted in geological profiles and boreholes, as well as in previous scientific publications and technical reports. The Upper Silurian (Ludlowian) deposits were determined to be absent there, too. The obtained palaeontological data were used to distinguish the Ostrovets Formation in the Ostrovets 1 borehole section, which is a new subdivision of the Silurian deposits of Belarus. The Lower Silurian deposits of the investigated area are correlated with the synchronous rocks of the Podlasie-Brest Depression and the Baltic region. The palaeontological results are used to re-interpret the age of these rocks from recent year's borehole sections and to specify the boundaries of the distribution of Silurian and Devonian deposits within the northwestern part of the Belarusian Anteclise (in the geological maps of the Prequaternary deposits, when a large-scale (1:50 000) geological survey will be carried out).

PLAX, D. P. (2015). Stratigraphic ichthyofauna assemblages of the Devonian deposits in the east

and southeast of Belarus. - Lithosphere, **1** (42): 20-44.

The paper presents the results of the palaeoichthyological study of the core from fifteen boreholes drilled in the territory of the eastern part of the Pripyat Trough, Bobruysk Buried Ridge, Zhlobin Saddle, and the northwestern slope of the Voronezh Anteclise. Some references with data of the Devonian ichthyofauna within the investigated area are cited to complete the information. The vertebrate assemblages and guide taxa of agnathans and other fishes were used for the stratigraphic division of the Devonian deposits. Apart from that, data of vertebrates were used to correlate these deposits with the synchronous sediments developed both in the territory of Belarus and abroad, namely, in the adjacent territories of Ukraine, Russia, and the Baltic States. The paper supplements the previously known composition of the stratigraphic vertebrate assemblages of the Lower, Middle and Upper Devonian in this area and provides their full list and stratigraphic distribution, and considers their facies restrictions.

PLAX, D. P. (2015). Ichthyofauna from the Lower Devonian (Lochkovian) deposits of the southwestern part of Belarus. - Lithosphere, **2** (43): 19-36.

The paper presents the results of the palaeoichthyological study of the core samples from the Tomashovka 11 borehole drilled in the late sixties of the last century in the territory of Belarus, within the northwestern part of the Volyn Monocline. Some historical evidence of Lower Devonian (Lochkovian) fish occurrences within the southwestern part of Belarus are cited. To complete the information, the author presents a table summarizing the information of the stratigraphic distribution of all reliably known Lower Devonian fish representatives from the studied area, which is based on the literature and personal data of the author. The taphonomic characteristics of the ichthyofauna remains is briefly reviewed. The Lochkovian deposits are correlated with the synchronous sediments of the Western Ukraine, the Baltic States, and the Timan-Pechora region that have received the most palaeontological studies. The ichthyofauna data supplement the information of its taxonomic composition in the territory of Belarus.

ZAIKA, YU. V., BLODGETT, R. B. & BARANOV, V. V. (2015). Tabulata and Heliolitoidea corals from the Soda Greek Limestone (Farawell Terrane), West-Central Alaska. – In: SULLIVAN, R. M. & LUCAS, S.G. (Eds.), Fossil Record 4, New Mexico Museum of Natural History and Science Bulletin, **68**: 327-331.

This paper reports the primary results of a study of Lower Devonian (Pragian) Tabulata and Heliolitoidea corals from the Soda Greek Limestone, west-central Alaska. It contributes further paleontological evidence for resolving issues associated with Alaskan accreted terranes. The study shows a striking similarity of the Soda Greek Tabulata and Heliolitoidea with coral associations from several parts of Asia. At the same time there is little in common between the Soda Greek and cratonal North-American Lower Devonian coral associations, thus indicating Asian Lower Devonian palaeozoogeographical ties of the Farewell terrane.

TOLSTOSHEYEV, V. I., KRUCHEK, S. A., KUDRJAVETS, I. D. & LEVYJ, M. G. (2015). Geological Structure of the Frasnian Stage of the Upper Devonian in the North-Pripyat Shoulder and its adjacent structures. – Lithosphere, **2** (43): 76-99 (in Russian, with English Summary).

A comprehensive study and generalization of abundant and geophysical data on the Frasnian deposits of the North-Pripyat and its structures enabled the authors to provide a detailed description of the regional geology. Frasnian successions of several hundreds of boreholes were studied to both separate stratigraphic divisions and the stage as a whole. The location, dip and extensions of fractures have been reliably marked in seismic profiles. The obtained data were used to complete for the first time structure and palaeogeological maps of Frasnian deposit in the Pre-Famennian surface, which specifies the boundaries of separate tectonic blocks of the North-Pripyat Shoulder and its adjacent structures.

PLAX, D. P., KRUCHEK, S. A., OBUKHOVSKAYA, V. Yu. (2016). New local stratigraphic units of the Upper Silurian and Middle Devonian of the northwestern part of the Belarusian Anteclise. - Lithosphere, **1** (44): 3-25 (in Russian, with English Summary).

The paper introduces the stratigraphic division of a typical section of the Davtyuny 3к borehole drilled within the northwestern part of the Belarusian Anteclise. It describes two new formations in the borehole section: Vileyka and Boloshinka. The first is represented by clayey, marl and carbonate deposits of the Gorstian stage of the Ludlow series of the Upper Silurian. The second is composed of Eifelian carbonate and clayey sediments. Holostratotypes and

bedding conditions of the two formations are presented alongside with their detailed lithological description, palaeontological and geophysical characteristics, and their distribution. These new data should be taken into account to update the Stratigraphic schemes of the Silurian and Devonian deposits of Belarus (2010), and when geological maps of Prequaternary deposits of the territory of the republic are reissued.

PLAX, D. P. (2016). Significance of palaeoichthyological studies for clarification of boundaries of modern distribution of the Devonian deposits on the territory of Belarus. – Vestnik of Brest University, Series 5, Chemistry, Biology, Earth Sciences, **2016** (1): 130-136 (in Belarusian, with English summary).

The paper presents examples for the use of palaeoichthyological studies to clarify boundaries and the distribution of Devonian deposits in Belarus. As a result, it became possible to identify some inaccuracies on the geological maps of Belarus of 1983 and 2002, in the northern part of Belarus within the Latvian Saddle, in the Ostrovets area that is located in the northwestern part of the Belarusian Anteclise, and in the far south-west of the country (within the Volyn Monocline). The obtained data are the base for future revisions of the distribution of Devonian deposits on Prequaternary geological maps of Belarus. They should to be taken into account when the geological survey, exploration and other geological works are carried out in the named regions.

TOLSTOSHEYEV, V. I., KRUCHEK, S. A., KUDRJAVETS, I. D. & SACHENKO, T. F. (2016). Peculiar features of the Geological Structure of the Lower Famennian deposits of the Upper Devonian North-Pripyat Shoulder (Pripyat Trough). – Lithosphere, **1** (44): 51-63 (in Russian, with English Summary).

The results of biostratigraphic studies and a comprehensive generalization of geophysical data available for the Upper Devonian in the adjacent northern area of the border steps of the Pripyat Graben were used to investigate their geological structure in detail. The research permitted a detailed subdivision of Lower Famennian sections in boreholes. The distribution of Lower Famennian deposits within the shoulder tectonic blocks was outlined, and a map of their strata thickness was compiled for the first time. An analysis of the geophysical data allowed the authors to compile a structural map of the surface of the Lower Famennian deposits.

Abstracts

OBUKHOVSKAYA, V. Yu., PLAX D. P., KRUCHEK, S. A. (2014). Palaeontological markers in the section of the Middle Devonian of the territory of Belarus. – In: SANKO, A. F. et al. (Eds.), Geology and Useful minerals of the Quaternary deposits, Proceedings of the VIII University geological readings (Minsk, April, 3-4, 2014), Minsk: «Tsifrovaya pechat», vol. **II**: 28-29 (in Russian).

OBUKHOVSKAYA, T. G., KRUCHEK, S. A., OBUKHOVSKAYA, V. Yu., PLAX D. P. (2014). Substage subdivision of the Givetian Stage of the Middle Devonian in Belarus. – In: SANKO, A. F. et al. (Eds.), Geology and Useful minerals of the Quaternary deposits, Proceedings of the VIII University geological readings (Minsk, April, 3-4, 2014), Minsk: «Tsifrovaya pechat», vol. **II**: 29-31 (in Russian).

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TM John E. A. MARSHALL and the Southampton Group

In 2015 there were quite a few meetings that I attended both for the SDS and palynology. We had the excellent STRATI 2015 meeting in Graz Austria where there was a day of Devonian talks including an 'unofficial' business meeting. I then was able to go on the Carnic Alps fieldtrip organised by Carlo CORRADINI. Not a single clastic bed was seen but certainly saw and better understood how these sections contribute to conodont zonation.

In September we had back to back meetings. The first was the CIMP palynology meeting in Bergen where I presented on Devonian isotope stratigraphy in Sauda Arabia and Emma REEVES on Tournaisian megaspores. This was followed by the IGCP meeting in Brussels where we had a session of TW:eed project talks including Southampton students Emma REEVES (Tournaisian palynology) and Dave CARPENTER (Tournaisian charcoal). I then was then able to go on the fieldtrip into Germany led by Thomas BECKER and colleagues where I was able to visit for the first time many of the classic sections.

In October I attended the GSA meeting in Baltimore and with Olga TELN'OVA and Tim ASTIN gave a Frasnian/Famennian presentation covering both East Greenland and the Timan. I also attended the Devonian glacial sediments of Maryland that gave me an opportunity to see these famous localities.

The year finished at the PalAss annual meeting in Cardiff.

The end of 2015 and 2016 were rather busy as our vertebrate palaeontologist left and I had to manage the MRes VP course and undergraduate Vertebrate Palaeontology course for the remainder of the year.

In 2016 we attended the opening of the TW:eed project exhibition grand opening at the National Museum of Scotland in Edinburgh. This exhibition had 62,000 visitors, a record for a NMS temporary exhibition and has now gone on a tour of Scottish museums. In April together with Emma REEVES I

returned to the Burnmouth section at low spring tide to recollect levels in the Tournaisian for palynology.

In May I attended the Palaeozoic Exploration of the North Sea meeting in London and took part in 2 posters on the exposed Devonian palaeo-oilfield in western Orkney and the Devonian source rocks in Canning Land, East Greenland. I also gave a review talk on the Devonian in the sub-surface of the North Sea.

In July I was at the IGCP meeting in Ghent. Here we had a short Devonian session and a SDS business meeting. This was uniquely attended (albeit briefly) by the SDS Chair, Vice-Chair, Secretary, Webmaster and Newsletter editor.

In July/August I then went on fieldwork in Svalbard sponsored by a National Geographic grant to Chris BERRY (Mid Devonian plants). Other expedition members were F.-J. LINDEMANN from the Oslo Museum (vertebrates), Charlie WELLMAN (Early Devonian spores) and Neil DAVIES (Cambridge) who was investigating the impact of Devonian forests on fluvial systems. We found 3 new Devonian forests and relocated the important Plantekløfte fossil plant locality.

In September I attended the D-C boundary workshop in Montpellier organised by Markus ARETZ and colleagues. We now are making progress on this boundary redefinition. It was also an opportunity to visit the GSSP's for the D-C boundary and Frasnian-Famennian.

The following Devonian relevant papers were published this year. This includes our paper in *Geology* on Devonian palaeo-equatorial lycopod forests from Svalbard which received much attention from the press. Not all of it help as you can see from this link to the Cosmos News robot talking through a bizarre commentary.

https://www.youtube.com/watch?v=N-STb75zE2k

and both the Sun (3 column cm) and the Daily Mail- both rags that helped us achieve Brexit

http://www.dailymail.co.uk/sciencetech/article-3325616/Fossilised-FOREST-Norway-380-million-year-old-trees-large-leafy-triggered-climate-change-helped-animals-flourish.html

We were also on prestigious CBC radio science programme - *Quirks and Quarks*.

I was particularly pleased to see the Falkland Island palynology published in the GSL SP 423.

Publications

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LAKIN, J. A., MARSHALL, J. E. A., TROTH, I. & HARDING, I. C. (2016). Greenhouse to icehouse: a biostratigraphic review of latest Devonian–Mississippian glaciations and their global effects. - In: BECKER, R. T., KÖNIGSHOF, P. & BRETT, C. E. (Eds.), Devonian Climate, Sea Level and Evolutionary Events, Geological Society, London, Special Publication, **423**: 439-464, doi.org/10.1144/SP423.12.

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CM Hanna MATYJA

During the last several years my research projects focused mainly on the redefinition of the Devonian/Carboniferous Boundary in relation with the International Task Group, led by Marcus ARETZ (Toulouse). Preliminary results have been published (SPALETTA & al. 2011; CORRADINI & al. 2013) and presented during the 3rd International Conodont Symposium (ICOS) in Mendoza (CORRADINI & al. 2013, abstract) and during the 2nd International Congress on Stratigraphy in Graz (CORRADINI & al. 2015, abstract). The key paper (by CORRADINI,

SPALETTA, MOSSONI, MATYJA & OVER) will be published in 2016 in the *Geological Magazine*. It presents an updated biozonation scheme across the D/C boundary based on the first appearance of some conodonts, and suggests the new criterion for the definition of the base of the Carboniferous system.

The next important topic around the Devonian/Carboniferous boundary is the study of a reference section for the relatively shallow carbonate ramp environment within the Pomeranian Basin (NW Poland). A multi-proxy investigation of the uppermost Famennian – lowermost Tournaisian interval has been performed in detail using biostratigraphy, sedimentology, magnetic susceptibility, and geochemistry. The sedimentary succession and specific phenomena recognized close to the Devonian/Carboniferous boundary, such as fluctuations in water column euxinia, wildfire evidence, relative sea-level changes, and perturbations of the carbon cycle reflected by positive carbon excursions, display a pattern partly similar to that observed in many areas in Europe during the Hangenberg Event, although the Hangenberg Black Horizon is not developed here. The manuscript was finished by the end of 2013 and the results were published in 2015 (online in 2014) in the *Geological Magazine* (MATYJA & al. 2015). The results have also been presented during the IGCP 596-SDS Symposium in Brussels (MATYJA & al. 2015, abstract).

Co-operation with Tatiana WORONCOWA-MARCINOWSKA, Katarzyna SOBIEŃ, Paweł BRAŃSKI, and Paweł FILIPIAK on the nature of the Hangenberg Event in other Polish sections located in different facies realms (Kowala Quarry in the Holy Cross Mts and Dzikowiec in the Sudety Mts) has been continued (to be finished in 2016).

Publications and abstracts 2011-2015 (in chronological order)

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MATYJA, H. (2011d). Stratigraphy and some remarks on Givetian and Frasnian facies (Stratygrafia i uwagi o wykształceniu facjalnym serii węglanowych żywetu i dolnej części franu). - In: MATYJA, H. (Ed.), Deep Boreholes of the Polish Geological Institute (Profile Głębokich Otworów Wiertniczych Państwowego Instytutu Geologicznego): Bydgoszcz IG 1, zeszyt 131: 57-69 [in Polish].

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MATYJA, H., PACZEŚNA, J. & PAJCHLOWA, M. (2012). Detailed stratigraphical-lithological section – Devonian (Szczegółowy profil litologiczno-stratygraficzny-dewon). - In: MATYJA, H. (Ed.), Deep Boreholes of the Polish Geological Institute (Profile Głębokich Otworów Wiertniczych Państwowego Instytutu

Geologicznego): Tuchola IG 1, zeszyt 135: 42-51 [in Polish].

CORRADINI, C., SPALETTA, C., KAISER, S. I. & MATYJA, H. (2013). Overview of conodonts across the Devonian/Carboniferous boundary. Asociación Paleontológica Argentina Publicatión Especial No 13. – In: ALBANESI, G. L. & ORTEGA, G. (Eds.), Conodonts from the Andes. Proceedings of the 3rd International Conodont Symposium and Regional Field meeting of the IGCP project 591: 13-16.

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MATYJA, H., SOBIEŃ, K., MARYNOWSKI, L., STEMPIEŃ-SAŁEK, M. & MAŁKOWSKI, K. (2015). The expression of the Hangenberg Event (latest Devonian) in a relatively shallow-marine succession (Pomeranian Basin, Poland): the results of a multi-proxy investigation. - Geological Magazine, **152** (3): 400-428, doi: 10.1017/S001675681400034X.

MATYJA, H. (2015). An integrated multiproxy stratigraphic analysis as a tool for recognition of the Devonian/Carboniferous boundary in a relatively shallow carbonate ramp environment: some Polish examples. – In: STRATI 2015, 2nd International Congress on Stratigraphy, July 19-23, 2015, Graz, Austria, Berichte des Institutes fur Erdwissenschaften Karl-Franzens-Universitat Graz, **21** 242.

CORRADINI, C., SPALLETTA, C., MOSSONI, A., MATYJA, H., KAISER, S. I. & OVER D. J. (2015). Review of conodonts across the Devonian/Carboniferous boundary: implication for the redefinition of the boundary and a proposal for an updated conodont zonation. In: STRATI 2015, 2nd International Congress on Stratigraphy, July 19-23, 2015, Graz, Austria, Berichte des Institutes fur Erdwissenschaften Karl-Franzens-Universitat Graz, **21**: 64.

MATYJA, H., SOBIEŃ, K., MARYNOWSKI, L., STEMPIEŃ-SAŁEK, M. & MAŁKOWSK, K. (2015). The expression of the Hangenberg Event (latest Devonian) in a relatively shallow-marine succession (Pomeranian Basin, Poland): the results of a multi-proxy investigation. – In: IGCP 596-SDS Symposium, Brussels, September 2015), Strata, serie 1, **16**: 94

CM Atike NAZIK

I am grateful to have been elected as a CM during the SDS Business Meeting in Mendoza. I am working on Devonian ostracods from NW Anatolia and the Taurides in Turkey with colleagues from Turkey and Senckenberg groups since 2006. I also have research collaborations with Dr. Helga GROOS-UFFENORDE (Göttingen) and Dr. Ewa OLEMPSKA (Polish Academy of Sciences, Poland). I look forward collaborations with other SDS members.

My Ph.D student **Emine Şeker** is working on "Ostracod analysis of the Devonian sequence from Eastern Taurides (Feke/Adana and Sarız/Kayseri), Biodiversity, Paleoecology, Paleogeography.

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Publications

NAZIK, A. & ŞEKER, E. (2015). Ostracoda carapace morphology and environmental interpretation: Devonian and Miocene ostracodes. - 16th Workchop on Paleontology-Stratigraphy, Rize/Türkiye, 25-28 October 2015: 101-108 (in Turkish with English abstract).

NAZIK, A., GROOS-UFFENORDE, H., ŞEKER, E., YALÇIN, M. N., WILDE, V. & SCHINDLER E. (2015). Orta-Doğu Toroslar ve KB Anadolu Devoniyen Ostrakodlarının Biyostratigrafisi, Paleoekolojisi ve Paleobiyocağrafyası. - İstanbul Üniversitesi'nde Jeoloji'nin 100. Yılı, 21-23 Ekim 2015: 39-40 (in Turkish).

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Magazine, **152** (2): 298–315, doi:10.1017/S0016756814000296.

NAZIK, A., ÇAPKINOĞLU, Ş., OLEMPSKA, E., ÖZGÜL, N. & ŞEKER, E. (2015). Ludlow (Silurian) and Givetian (Devonian) Ostrakods and Conodonts from the Istanbul Zone (Kartal and Tuzla Peninsula), NW Anatolia. - In: PERRIER, V. & MEIDLA, T. (Eds), 8th European Ostracodologists' Meeting, Tartu, Estonia, 22-30 July 2015, Abstracts: 55.

NAZIK, A. & GROOS-UFFENORDE, H. (2016). Notes on beyrichiacean ostracodes from the Early Devonian of NW Turkey and their palaeobiogeographical relations. - Turkish Journal of Earth Sciences, **25**: 201-226.

TM Maria Cristina PERRI

My research on the Devonian is still focused mainly on the identification and evaluation of global environmental changes responsible for faunal diversity in space and time in the various Devonian events, especially around the Frasnian–Famennian (Fr–Fm) and Famennian–Tournaisian boundaries.

Portions of the carbonate sequence spanning the Fr–Fm boundary of two stratigraphic sections in the Carnic Alps (Italy and Austria) have been analysed. Both lack a black shale interval connected with the Upper Kelwasser Event. That interval is expressed sedimentologically in the Carnic Alps in shallow-water, bioturbated carbonate facies. Detailed sedimentologic, palaeontologic and geochemical analyses have been undertaken through the Carnic Alps sections in order to develop a complete database on what occurred across the Frasnian–Famennian boundary. The research, close to publication, is in collaboration with Enzo FARABEGOLI, Claudia SPALLETTA (both of Bologna), Monica PONDRELLI (Pescara), Michael M. JOACHIMSKI (Erlangen), and Anita ANDREW (Sydney).

A revision of the Famennian standard conodont zonation, has been proposed by Claudia SPALLETTA and others (including me), with the aim to define each biozone by the first appearance datum (FAD) of species that are widely distributed and largely known by Famennian conodont researchers. This eliminates a few zones designated on last appearance data (LADs), presented in the classic zonation of ZIEGLER & SANDBERG (1990). The same zonal markers as in ZIEGLER & SANDBERG (1990) are primarily used for maintaining the stability of about 50 years of studies. SPALLETTA et al. (in review) propose to utilize as criterion for the definition of the Famennian base (and the *Palmatolepis subperlobata* Zone base) the FAD of *Palmatolepis subperlobata*, first occurring immediately above the extinction of the characteristic upper Frasnian conodont species in coincidence with the *Palmatolepis ultima* flood. The *Palmatolepis subperlobata* Zone is followed by a new *Pamatolepis triangularis* Zone, whose lower limit is marked by the FAD of *Pamatolepis triangularis*, as taxonomically revised by KLAPPER et al. (2004).

The Austrian-Italian project for the formal definition and consistent nomenclature of pre-Variscan lithostratigraphic units of the Carnic Alps is concluded in the *Abhandlungen der Geologischen Bundesanstalt in Wien* (vol. **69**). My contribution concerned the Devonian–Early Carboniferous conodont biostratigraphy for the dating of units.

As chief of the PANDER Society, embracing all people interested in conodonts, I draw your attention to the ICOS-4 meeting in Spain during the summer of 2017. The venue will be Valencia, with field trips to the Spanish Pyrenees, the Prague Basin, and the Carnic Alps.

Publications: Because my publications have been in collaboration with other SDS members, who have already listed them in their reports, I refrain from repeating them.

TM Eberhard SCHINDLER

Research went on mainly related to continuing activities:

After the Turkish–German cooperation project on "Devonian Cycles and Global Events in the Northern Gondwanan Taurides" (DECENT) ended in 2014, analyses of data continued (and will further go on). Results have been presented e.g. at the STRATI 2015 Meeting in Graz (SCHINDLER, YALÇIN et al.) – several papers are still in preparation.

Our paper on the Choteč Event submitted in 2014 is now available online (BROCKE et al. 2015); the results have also been reported at the 50th Annual Meeting of the Northeastern Section of GSA (LINDEMANN et al. 2015).

Work on the Eifel area continued.

Contribution to the upcoming German Stratigraphic Table 2016 (Stratigraphische Tabelle Deutschland 2016, STD) started together with a

bunch of German colleagues. The table, which is a revision of the STD 2002, shall be presented at the forthcoming International Geological Congress in Cape Town (August/September 2016).

Non-Devonian activities: Appearing at the '(not too) far horizon' is already the move of the entire interior of the palaeontological/geological department at Senckenberg – this will keep the 'Senckenbergians' busy for the next two/three years.

Publications 2015 (in chronological order)

LINDEMANN, R. H., VER STRAETEN, C. A., SCHINDLER, E., BROCKE, R. & FATKA, O. (2015). Lower Eifelian (Middle Devonian) dacryoconarid biostratigraphy and biogeography, Central and Northern Appalchian Basin. – Geological Society of America, Abstracts with Programs, **47** (3): 107.

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SCHINDLER, E., YALÇIN, M. N., BOZDOĞAN, N., BROCKE, R., GROOS-UFFENORDE, H., JANSEN, U., NAZIK, A., ÖZKAN, R., SANCAY, R. H., SAYDAM-DEMIRAY, G., WEDDIGE, K., WEHRMANN, A., WILDE,V. & YILMAZ, İ. (2015). Biostratigraphy and correlation of Devonian successions in the Taurides (Turkey). – Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **21**: 340.

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NAZİK, A., GROOS-UFFENORDE, H., ŞEKER, E., YALÇIN, M.N., WİLDE, V. & SCHİNDLER, E. (2015). Biostratigraphy, Palaeoecology and Paleaobiogeography of Devonian Ostracodes from Central-Eastern Taurides and from NW Anatolia. – 100th Anniversary Symposium of the Geology at Istanbul University, 21-23 October 2015, Istanbul, Türkiye, Book of Abstracts: 40.

SCHINDLER, E., UHL, D. & AMLER, M.R.W. (2015). The collections of Marburg University (GeoArchive Marburg) are now located at the Senckenberg Research Institute and Natural History Museum Frankfurt. – SDS Newsletter, **30**: 13-14.

SCHINDLER, E., GEREKE, M., PIECHA, M., LUPPOLD, F.W. & STOPPEL, D. (2015). The Kellwasser type locality in the Harz Mountains, Germany. – Subcommission on Devonian Stratigraphy, SDS Newsletter, **30**: 20-27.

TM Ladislav SLAVÍK

Since my last report, various Devonian activities in 2015 can be listed below:

The most important activities in 2015 were in connection with our Devonian Czech-Spanish project "Hi-res correlation and dating of Mid-Palaeozoic sedimentary sequences of Peri-Gondwana using integrated biostratigraphy and chemo-physical methods" that was accomplished by the end of the year.

Early in 2015, together with Nacho VALENZUELA-RÍOS and other co-authors we finished a manuscript concerning correlation of middle and upper Lochkovian based on peri-Gondwanan areas (VALENZUELA-RÍOS et al. 2015).

Later on a manuscript on results from Pyrenean sections (Segre II near Seu d'Urgell and Compte 1 near Baro and Sort) was finished. We have provided data from magnetic susceptibility and Dynamic Time Warping method using processed MS data and made gamma spectrometric logging. The paper is a contribution to the interpretation of major changes in the Early Devonian palaeoenvironment.

In June, my student Aneta HUŠKOVÁ successfully accomplished her BSc thesis on biostratigraphic revision of the Silurian/Devonian boundary in the Prague Synform.

In summer, both of us took part in STRATI in Graz and IGCP 596/SDS meeting in Brussels and presented data from our joint work in the Pyrenees. We also joint both wonderfully organized post meeting field excursions to the Carnic Alps (after STRATI, organized by Carlo CORRADINI, Thomas SUTTNER and Monica PONDRELLI) and also to Germany (Rhenish massiv, after Brussels meeting,

also excellently organized by Münster group and colleagues from Senckenberg).

Early in August we agreed to follow the decision of the SDS to make a progress on the Basal Emsian GSSP redefinition. Therefore we started a complicated procedure to obtain all necessary documents and visa to Uzbekistan. Due to the enormous help and effort of our Uzbek colleagues, our team of Devonian Subcommission researchers (Nacho VALENZUELA-RÍOS, Nadya IZOKH, Ladislav SLAVÍK and student Aneta HUŠKOVÁ) made it to the Kitab State Reserve for the new fieldwork and sampling. We were granted a permission by the State Committee of Geology and Natural Resources of the Uzbekistan Republic. The fieldwork was successful, in August, we took about 150 kg samples that were safely shipped to Europe (Valencia and Prague) and to Siberia (Novosibirsk). Uzbek colleagues from the "Zapovednik" have been extremely co-operative and helpful to the SDS specialists, in this place we would like to express thanks to Utkir RACHMONOV, the Director of the Kitab State Geological Reserve who was very considerate; without his very significant support no achievement would have been possible. He mastered all the bureaucratic and logistic requirements connected with the SDS visit and fieldwork and even helped directly in the field providing all resources (vehicles, guides, drivers) from the Reserve. Our samples are in process and we hope to report the first results next year.

During 2015, we continued works on the on-going project: "Sequence stratigraphy of Devonian bioevents – sea level changes at the transition from greenhouse to icehouse world" supported by Czech Science Foundation. The team is being headed by Ondřej BÁBEK (Olomouc), who has already presented first results from this project in various meetings, including the one in Brussels. In autumn 2015 we (Jindra HLADIL, Aneta HUŠKOVÁ and me) jointly sampled several both well and less known early Devonian locations in the Prague Synform for biostratigraphy.

My scientific activities during the entire year 2015 were heavily influenced by the „Periodic evaluation process" that all institutes of the Czech Academy of Sciences have to undergo and that screens all our activities in 5-year periods. For the heads of departments this process steals months of time dedicated mostly to bureaucratic work.

Publications

Journal papers

VALENZUELA-RÍOS, J. I., SLAVÍK, L., LIAO, J.-C., CALVO, H., HUŠKOVÁ, A. & CHADIMOVÁ, L. (2015). The middle and upper Lochkovian (Lower Devonian) conodont successions in key peri-Gondwana localities (Spanish Central Pyrenees and Prague Synform) and their relevance for global correlations. - Terra Nova, **27**: 409–415, doi: 10.1111/ter.12172.

SLAVÍK, L. (2015). The Pragian GSSP at Velká Chuchle in the Prague Synform (Lower Devonian). - In SUTTNER, T. J., KIDO, E., KÖNIGSHOF, P., WATERS, J. A., DAVIS, L., MESSNER, F. (Eds.), Planet Earth - In Deep Time. Palaeozoic Series: Devonian & Carboniferous: 74-75; Schweizerbart, Stuttgart.

Abstracts

SLAVÍK, L., VALENZUELA-RÍOS, J. I, HLADIL, J., CHADIMOVÁ, L., LIAO, J.-C., HUŠKOVÁ, A., CALVO, H. & HRSTKA, T. (2015). The sedimentary record and petrophysical logs from the Spanish Central Pyrenees: Implications for paleoclimate change in the Early Devonian. – In: GULLI, E. & PILLER, W.E. (Eds.), STRATI 2015, 2nd International Congress on Stratigraphy, July 19-23 2015, Graz, Austria, Abstracts, Berichte des Institutes fur Erdwissenschaften Karl-Franzens-Universitat Graz, **21**: 350.

DA SILVA, A.-C., CHADIMOVÁ, L., HLADIL, J., SLAVÍK, L., HILGEN, F. J. & DEKKERS, M. J. (2015). Unravelling orbital climatic cycles from Devonian magnetic susceptibility signal – The quest for a better age model for the Lochkovian and Pragian stages (Czech Republic). In: MOTTEQUIN, B., DENAYER, J., KONIGSHOF, P., PRESTIANNI, C. & OLIVE, S. (Eds.), IGCP 596 - SDS Symposium Climate Change and Biodiversity Patterns in the Mid-Palaeozoic, September 20 – 22, 2015, Brussels, Belgium, Abstracts, Strata, Travaux de Geologie sedimentaire et Paleontologie, Serie 1, communications, **16** (1): 39.

HUŠKOVÁ, A., SUTTNER, T. J., SLAVÍK, L., VALENZUELA-RÍOS, J. I., LIAO, J.-C., GATOVSKY, Y. A., ARIUNCHIMEG, Y., KIDO, E., GONCHIGDORJ, S., WATERS, J. A., CARMICHAEL, S. K. & BATCHELOR, C. (2015). Late Devonian conodonts of western Mongolia: preliminary results. - In: MOTTEQUIN, B., DENAYER, J., KONIGSHOF, P., PRESTIANNI, C. & OLIVE, S.

(Eds.), IGCP 596 - SDS Symposium Climate Change and Biodiversity Patterns in the Mid-Palaeozoic, September 20 – 22, 2015, Brussels, Belgium, Abstracts, Strata, Travaux de Geologie sedimentaire et Paleontologie, Serie 1, communications, **16** (1): 75.

SLAVÍK, L., HLADIL, J., CHADIMOVÁ, L., VALENZUELA-RÍOS, J. I., HUŠKOVÁ, A. & LIAO, J.-C. (2015). Cooling or warming in the Pragian? The sedimentary records and petrophysical logs from the key peri-Gondwanan sections. – In: MOTTEQUIN, B., DENAYER, J., KONIGSHOF, P., PRESTIANNI, C. & OLIVE, S. (Eds.), IGCP 596 - SDS Symposium Climate Change and Biodiversity Patterns in the Mid-Palaeozoic, September 20 – 22, 2015, Brussels, Belgium, Abstracts, Strata, Travaux de Geologie sedimentaire et Paleontologie, Serie 1, communications, **16** (1): 130-131.

SPROSON, A. D., SELBY, D., HLADIL, J., SLAVIK, L., EBERT, J. & ZHAO, W. (2015). Evidence for glaciation or an exogenic system shift across the Silurian-Devonian boundary: Insights from osmium isotopes. – In: PEARCE, C. R. (Ed.), Geochemistry Group Research in Progress meeting 2015, Delegate Information Pack, Abstracts, The Geochemistry Group of the Mineralogical Society and the Geological Society, Southampton, UK: 47; GGRiP 2015, Southampton.

POUKAROVA, H., HRON, K., BÁBEK, O., FAMERA, M., SIMÍCEK, D., SLAVIK, L., HLADIL, J. & WEINER, T. (2015). Quantitative compositional analysis of the Lochkovian–Pragian boundary event at "Na Chlumu Quarry" (Prague Synform, Czech Republic). – In: 31st IAS Meeting of Sedimentology held in Krakow on 22nd–25th of June 2015, Polish Geological Society, Krakow, Abstracts: 428.

CM Claudia SPALLETTA

In 2015 I continued research on Devonian conodont biostratigraphy, mainly focused on the Frasnian/Famennian and the Devonian/Carboniferous boundaries, with some short "excursion" to the Middle Devonian (see CORRADINI et al. 2016).

I also decided to restyle the Famennian part of the Late Devonian Standard Conodont Zonation, with the collaboration of Carlo CORRADINI, Jeff OVER and M. Cristina PERRI. The new global Famennian conodont zonation was presented during the STRATI in Graz (Austria) and at the IGCP 596–SDS joint Meeting in Brussels (Belgium) (see list of abstracts). The paper with the new zonation has been submitted for publication to the Bulletin of Geosciences.

The studies on the Devonian/Carboniferous Boundary are conducted within the frame of the International Task Group on the redefinition of the Devonian/Carboniferous Boundary. A paper co-authored with Carlo CORRADINI, Hannah MATYJA, Angelo MOSSINI, and Jeff OVER on a review of the conodont genera across the D/C boundary is in press. A "new" section on the Carnic Alps was sampled during the summer field-work.

A manuscript on the Frasnian/Famennian Boundary in the Carnic Alps is in progress.

Publications

Jounal papers

For many other joint contributions on the Pre-Variscan sequence of the Carnic Alps, published in the *Abhandlungen der Geologischen Bundesanstalt*, **69**, please see the publication list of Carlo CORRADINI in this Newsletter.

POHLER, S. M. L., CORRADINI, C., KIDO, E., PONDRELLI, M., SCHÖNLAUB, H.-P., SIMONETTO, L., SPALLETTA, C. & SUTTNER, T.J. (2015). Spinotti Formation. - In: CORRADINI, C. & SUTTNER, T. J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologischen Bundesanstalt, **69**: 96–100.

KIDO, E., POHLER, S. M. L., PONDRELLI, M., SCHÖNLAUB, H. P., SIMONETTO, L., SPALLETTA, C., SUTTNER, T. J. (2015). Kellergrat Formation. - In: CORRADINI, C. & SUTTNER, T. J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologischen Bundesanstalt, **69**: 101–104.

SPALLETTA, C., FERRARI, A., KIDO, E., PERRI, M. C., POHLER, S. M. L., PONDRELLI, M., SCHÖNLAUB, H.-P., SUTTNER, T. J., VAI, G. B. (2015). Creta di Collina Formation. - In: CORRADINI, C. & SUTTNER, T.J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologischen Bundesanstalt, **69**: 105–108.

SPALLETTA, C., SCHÖNLAUB, H.-P., PERRI, M. C., VENTURINI, C. & PONDRELLI, M. (2015). Zollner Formation. - In: CORRADINI, C. & SUTTNER, T. J. (Eds.), The Pre-Variscan sequence of the

Carnic Alps (Austria and Italy), Abhandlungen der Geologischen Bundesanstalt, **69**: 141–144.

SPALLETTA, C., SCHÖNLAUB, H.-P., PONDRELLI, M., CORRADINI, C. & SIMONETTO, L. (2015). Plotta Formation. - In: CORRADINI, C. & SUTTNER, T. J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologischen Bundesanstalt, **69**: 145–147.

SCHÖNLAUB, H.P., SPALLETTA, C., VENTURINI, C. (2015). Kirchbach Formation. - In: CORRADINI, C. & SUTTNER, T. J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologischen Bundesanstalt, **69**: 148–150.

SPALLETTA, C., VENTURINI, C., SCHÖNLAUB, H.P., PONDRELLI, M. (2015). Hochwipfel Formation. - In: CORRADINI, C. & SUTTNER, T. J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologischen Bundesanstalt, **69**: 151–154.

VENTURINI, C. & SPALLETTA, C. (2015). Dimon Formation. - In: CORRADINI, C. & SUTTNER, T. J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologischen Bundesanstalt, **69**: 155–158.

CORRADINI, C., SPALLETTA, C., MOSSONI, A., MATYJA H. & OVER, D .J. (2016). Conodonts across the Devonian/Carboniferous boundary: a review and implication for the redefinition of the boundary and a proposal for an updated conodont zonation. - Geological Magazine: 15 pp., doi:10.1017/S001675681600039X

CORRADINI, C., PONDRELLI, M., SIMONETTO L., CORRIGA M. G., SPALLETTA, C., SUTTNER, T. J., KIDO, E., MOSSONI, A., SERVENTI P. (2016). Stratigraphy of the La Valute area (Mt. Zermula massif, Carnic Alps, Italy). - Bollettino della Società Paleontologica Italiana, **55** (1): 55-78.

Abstracts

CORRADINI, C.; SPALLETTA, C.; MOSSONI, A.; MATYJA, H.; KAISER, S. I. & OVER, D. J. (2015). Review of conodonts across the Devonian/Carboniferous boundary: implication for the redefinition of the boundary and a proposal for an updated conodont zonation. In: STRATI 2015, Graz, 19 – 23 July 2015, Abstracts, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **21**: 64.

SPALLETTA, C., PERRI, M. C., CORRADINI, C. E OVER, D. J. (2015). Proposal for a revised Famennian (Upper Devonian) standard conodont zonation. STRATI 2015 Graz, 19 – 23 July 2015, Abstracts, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **21**: 357.

PONDRELLI, M., CORRADINI, C., SPALLETTA, C., SUTTNER, T. J., SCHÖNLAUB, H.-P., PAS, D., KIDO, E., CORRIGA, M. G., MOSSONI, A., SIMONETTO, L., POHLER, S. M. L., PERRI, M. C., FARABEGOLI, E., DA SILVA, A.-C., DOJEN, C. & HÜNEKE, H. (2015). Upper Lochkovian to lower Famennian evolution of the Carnic Alps: perspectives from the 'transitional facies'. In: STRATI 2015, Graz, 19 – 23 July 2015, Abstracts, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **21**: 305.

FARABEGOLI, E.; JOACHIMSKI, M.M.; PERRI, M.C.; PONDRELLI, M.; SPALLETTA, C. 2015. Physical and biological events across the Frasnian–Famennian boundary in oxic carbonate successions in the Carnic Alps (Italy–Austria). In: MOTTEQUIN, B., DENAYER, J., KÖNIGSHOF, P., PRESTIANNI, C. & OLIVE, S. (Eds.), IGCP 596 – SDS Symposium (September 20-22, 2015, Brussels), Climate change and Biodiversity patterns in the Mid-Palaeozoic, Abstracts, Strata, Communications, **16**: 50.

SPALLETTA, C., PERRI, M. C., CORRADINI, C. & OVER D. J. (2015). Proposed revision of the Famennian (Upper Devonian) standard conodont zonation. - In: MOTTEQUIN, B., DENAYER, J., KÖNIGSHOF, P., PRESTIANNI, C. & OLIVE, S. (Eds.), IGCP 596 – SDS Symposium (September 20-22, 2015, Brussels), Climate change and Biodiversity patterns in the Mid-Palaeozoic, Abstracts, Strata, Communications, **16**: 135-136.

CM Maurice STREEL

All publications of M. STREEL and co-authors can be download using the following link:

http://orbi.ulg.ac.be/simple-earch?query=%28%28uid%3Au011081%29%29&amp]

CM Thomas J. SUTTNER

In 2015, our project on the Kacak Event (FWF P23775-B17) ended on 31st May. Still several manuscripts related to conodont biostratigraphy, coral biodiversity and geochemistry are in

preparation. In order to continue research, we started to work out a successor project proposal for the Austrian Science Fund, which shall deal with Devonian rugose coral biodiversity informatics linked with oxygen isotope data from conodont apatite.

IGCP 596 too had its final year and a very successful final meeting in Brussels. For an extended term of one more year (without the UNESCO grant) is applied. That was a good chance for us to submit another proposal to the Austrian National Committee which granted a 2 years lasting IGCP 596 subproject on conodont biostratigraphy and occurrence data of Mid-Paleozoic corals in Mongolia and Europe in July 2015 (Project leader: Erika KIDO). First action within the frame of that project was the invitation of our Mongolian colleagues to the Brussels meeting followed by a conodont workshop in Graz. After all the support we have received from them during our stays in Mongolia, it was a good opportunity to bring them to Europe in return for further scientific exchange and for practicing the technique of conodont extraction. During the workshop, Erika and me held a short course on conodont biostratigraphy and gave an introduction in biodiversity informatics (in order to progress with the entry of Mongolian literature into the Paleobiology Database).

Carnic Alps workshop: Gladly, the group concluded the basic work on the revision of the pre-Variscan lithostratigraphic units of the Carnic Alps which resulted in a 158 pages' thick book published in the *Abhandlungen der Geologischen Bundesanstalt*, vol. **69** (https://www.geologie.ac.at/produkte-shop/detail/?id=1729&seo=band_69).

Thanks to all members of the Carnic Alps team, a first step is done!

Another publication which is available since December 2015 (official publication year: 2016; therefore, not listed below) is the IGCP 596 book entitled: Planet Earth – In Deep Time, Palaeozoic Series: Devonian & Carboniferous. It represents a good piece of public outreach for IGCP 596 and received attention by the UNESCO (http://www.unesco.org/new/en/natural-sciences/about-us/single-view/news/planet_earth_in_deep_time_understanding_past_climate_change).

Publications

Jounal papers and book chapters

For further contributions in the *Abhandlungen der Geologischen Bundesanstalt*, **69**, see the reports in this Newsletter by Carlo CORRADINI and Claudia SPALLETTA.

BANDEL, K., HUBMANN, B., KIDO, E., POHLER, S. M. L., SCHÖNLAUB, H.-P., SIMONETTO, L. & SUTTNER, T. J. (2015). Hohe Warte Formation. – In: CORRADINI, C. & SUTTNER T.J. (Eds.) The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologischen Bundesanstalt, **69**: 85–88.

CORRADINI, C., PONDRELLI, M., SUTTNER, T. J. & SCHÖNLAUB, H.-P., with contributions from CORRIGA, M. G., FERRETTI, A., KIDO, E., SIMONETTO, L. & SPALLETTA, C. (2015). The Pre-Variscan sequence of the Carnic Alps. – In: RICHOZ, S. (Ed.), Field trips in the Eastern and Southern Alps (Austria, Italy), STRATI 2015, Berichte der geologischen Bundesanstalt, **111**: 5–40.

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POHLER, S. M. L., BANDEL, K., KIDO, E., PONDRELLI, M., SCHÖNLAUB, H.-P., SIMONETTO, L. & SUTTNER, T. J. (2015). Seewarte Formation. – In: CORRADINI, C. & SUTTNER T. J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologischen Bundesanstalt, **69**: 89–91.

POHLER, S. M. L., BANDEL, K., KIDO, E., PONDRELLI, M., SCHÖNLAUB, H.-P., SIMONETTO, L. & SUTTNER, T. J. (2015). Lambertenghi Formation. – In: CORRADINI, C. & SUTTNER T. J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologischen Bundesanstalt, **69**: 92–95.

POHLER, S. M. L., BANDEL, K., KIDO, E., PONDRELLI, M., SUTTNER, T. J., SCHÖNLAUB, H.-P. & MÖRTL, A. (2015). Polinik Formation. – In: CORRADINI, C. & SUTTNER T. J. (Eds.), The Pre-Variscan sequence of the Carnic Alps (Austria and Italy), Abhandlungen der Geologischen Bundesanstalt, **69**: 81–84.

Abstracts

BATCHELOR C., CARMICHAEL S. K., WATERS J., COLEMAN D., KIDO E. & SUTTNER T. J. (2015). Constraining the ages of Late Devonian Extinction events in the Central Asian Orogenic Belt (COAB): U-Pb zircon ages and igneous petrology. – In: IGCP 596–SDS Symposium, 20-22 September 2015, Brussels, Belgium, STRATA, 2015, série 1, **16**: 12–13.

CORRADINI, C. & SUTTNER, T. J. (2015). Lithostratigraphy of the Pre-Variscan sequence of the Carnic Alps (Austria-Italy). – In: GÜLLI, E. & PILLER, W. E. (Eds.), STRATI 2015, 19-23 July 2015, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **21**: 65.

HUŠKOVÁ A., SUTTNER T. J., SLAVÍK L., VALENZUELA-RÍOS J .I., LIAO J.-C., GATOVSKY Y. A., ARIUNCHIMEG Y., KIDO E., GONCHIGDORJ S., WATERS J.A., CARMICHAEL S. K. & BATCHELOR C. (2015). Late Devonian conodonts of western Mongolia: preliminary results. – In: IGCP 596–SDS Symposium, 20-22 September 2015, Brussels, Belgium, STRATA, 2015, série 1, **16**: 70.

KIDO, E. & SUTTNER, T. J. (2015). Multidisciplinary approach for the identification of Middle Devonian biotic crisis in the Carnic Alps: results of the Project FWF P23775-B17. – In: GÜLLI, E. & PILLER, W. E. (Eds.), STRATI 2015, 19-23 July 2015, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **21**: 199.

PONDRELLI, M., CORRADINI, C., SPALLETTA, C., SUTTNER, T.J., SCHÖNLAUB, H.P., PAS, D., KIDO, E., CORRIGA, M.G., MOSSONI, A., SIMONETTO, L., POHLER, S., PERRI, M.C., FARABEGOLI, E., DA SILVA, A.-C., DOJEN, C. & HÜNEKE, H. (2015). Upper Lochkovian to lower Famennian evolution of the Carnic Alps: perspectives from the 'transitional facies'. – In: GÜLLI, E. & PILLER, W. E. (Eds.), STRATI 2015, 19-23 July 2015, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **21**: 305.

WATERS J., SUTTNER T., KIDO E. & CARMICHAEL S. K. (2015). Echinoderm ecosystem rebound and diversification after the Frasnian–Famennian extinction: data from the Central Asian Orogenic belt. – In: IGCP 596–SDS Symposium, 20-22 September 2015, Brussels, Belgium, STRATA, 2015, série 1, **16**: 149–150.

Editorial

CORRADINI, C. & SUTTNER, T. J. (Eds., 2015). The Pre-Variscan sequence of the Carnic Alps (Austria and Italy). – Abhandlungen der Geologischen Bundesanstalt, **69**: 1–158.

Workshop co-organized

KIDO, E., SUTTNER, T. & PILLER, W. E. (2015). Conodont Workshop in Graz, 25 September-1 October 2015.