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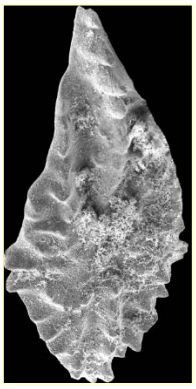
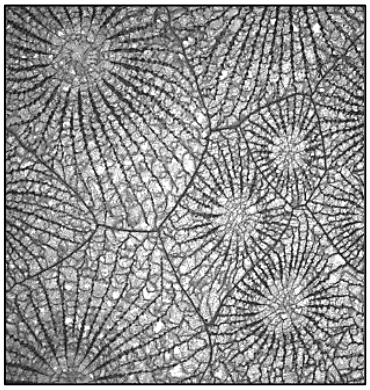


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SDS NEWSLETTER 32

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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Submissions have to be sent electronically, preferably as Word Documents (figures imbedded or as separate high-resolution jpg or pdf files), to the Editor or to Mrs. S. KLAUS, IGP, Münster (sklaus@uni-muenster.de). Submission deadline for **No. 33** is the **end of June 2018**.

Please ease the editing by strictly keeping the uniform style of references, as shown in the various sections.

The Newsletter contributions should be quoted as: **"SDS Newsletter, 32: p. x-y."**

Content:

Devonian Publications

Membership News

MESSAGE FROM THE CHAIRMAN

Dear SDS Members,

Welcome to the 2017 SDS Newsletter. This is our yearly compilation of everything Devonian. Please remember that all SDS members, both CM and TM, are expected to contribute news. It is often very important to see what research is going on in advance of publication. In addition, it's 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 two SDS members. These are Art BOUCOT from Oregon State University, USA and Elga MARK-KURIK from Tallinn University of Technology, Estonia. Both were notable for being productive throughout their research lives and always kept active in fieldwork. Some of you may remember Elga from the SDS fieldtrip to the ORS of Scotland in 2010. Always interested in everything and constantly entertaining us with anecdotes. Elga had always wanted to see the Scottish ORS fish localities, particularly the John o'Groats Fish Bed, and so despite advancing years, lack of a credit card, long coach journeys and funded by an Estonian pension still made it. Art we saw more often and was always most generous with his time and interest. I remember him in 2006 doing the Annual Address to the British Palaeontological Association entirely without notes.

The important SDS news this year is that we now have the results from the conodont collecting by Nacho and Ladislav together with Nadia IZOKH and Alexei KIM from the Zinzilban section in Uzbekistan. This was to redefine the Pragian/Emsian boundary in the Zinzilban GSSP section. There is a full report later in this newsletter. The unfortunate result is that despite multiple collecting there are simply not enough biostratigraphically useful conodonts at the appropriate level that are suitable for defining a GSSP. The SDS has always been proud to have GSSPs that are distant from the 'classic' areas and which are in countries where they are particularly valued. It has always been the view of the SDS that the GSSP should remain in Uzbekistan and in the Zinzilban section. However, we now compelled to consider other sections that contain conodont faunas at the appropriate stratigraphic level. In Valencia we agreed to take this year to consider options and when we meet again in Paris at the IPC we will have a broad discussion as to how best to proceed. It is important to note that the criteria for the definition of a GSSP have become increasingly strict. It is no longer possible to have a section with just a single conodont lineage. There need to be multiple palaeontological events that are tied to other parameters that include, at least, isotope and magnetic susceptibility curves. Any GSSP definition has to be voted through by the other Subcommission Chairs and given that most of them work on younger rocks they have high expectations. In addition, because the base Emsian GSSP is a re-definition they will be asking quite focused questions.

In June some of us attended the excellent ICOS 4 meeting in Valencia organised by Nacho, Theresa and colleagues. We must thanks them for their efforts, excellent efficiency and a series of fieldtrips that seemed to go everywhere in Europe. We had a day of Devonian talks followed by a well attended SDS business meeting.

Next year we meet in Paris at the 5th IPC in June. Note that the website is open and we have a Devonian session. We other important news is that Anna DA SILVA and colleagues were successful in their IGCP bid for a project on Palaeozoic astrochronology (IGCP-652: *Reading geologic time in Paleozoic sedimentary rocks: the need for an integrated stratigraphy*). So, we can now look forward to an increasing effort on rolling out a floating Devonian time scale calibrated to orbital cycles.

John MARSHALL

OBITUARIES

Aleksandr ('Sasha') Yazikov
(23.10.1961 – 23.09.2016)

Nadezdha IZOKH & the Novosibirsk Group

Fig. 1. Aleksandr ('Sasha') YAZIKOV, research scientist in the Trofimuk Institute of Petroleum Geology and Geophysics (IPGG) of the Siberian Branch of the Russian Academy of Science (SB RAS), and corresponding member of the Subcommission on Devonian Stratigraphy (SDS), passed away on 23rd September 2016.

Sasha graduated from the Novosibirsk State University in 1984 with highest grades and was immediately invited by the late, much lamented Dr. Yevgeniy ('Zhenya') Aleksandrovich YOLKIN to join his laboratory in the Institute of Geology and Geophysics of the Siberian Branch of the Academy Science of the USSR. Sasha developed into being one of the best students of renowned Siberian geologist-biostratigraphers Drs. Yevgeniy YOLKIN and Rimma Trofimovna GRATSIANOVA. The latter became Sasha's principal teacher during his brachiopod studies, freely passing on her vast knowledge of Devonian brachiopods and associated stratigraphy. She was the scientific advisor of Sasha's University graduation thesis: *Emsian Brachiopods of the Northwest Salair*. One of Sasha YAZIKOV'S first scientific papers was a revision of the brachiopod *Zdimir pseudobashkirica sibirica* w RZHONSNITSKAYA, with special reference to its variability. It is a form widely distributed in the Emsian of the Salair, the Urals and other regions (YAZIKOV 1990).

From the beginning of his scientific career, Sasha was engaged in joint field investigations with the late Yevgeny YOLKIN undertaking detailed lithologic description of brachiopod-bearing sections paying special attention to facial limitations of brachiopods. Later they used these data for palaeoecological analyses of various brachiopod taxa.

Sasha had special managerial skills. During the 1990s he organized a group of early career scientists to undertake a study of Palaeozoic faunas and associated geology of the Rudny Altai. The group included specialists in palaeontology, tectonics and geochemistry. After several field seasons they produced a monograph entitled *Key Devonian sections from the Rudny Altai, Salair and Kuznetsk Basin regions*" (2004). He was always a careful organizer of field trips, making sure that field personnel enjoyed optimal comfort during their fieldwork. Sasha was always careful and attentive to his colleagues. One of his main features was the thoroughness and unhurried manner in everything he undertook. All these characteristics were applied when he was the head of geological survey associated with archeological studies carried out in southwest Siberia during 1997–2010.

In 2010 Sasha returned to the laboratory of Palaeozoic palaeontology and stratigraphy in the IPGG and continued biostratigraphic studies of the Palaeozoic brachiopods. His research produced important data on brachiopods and biostratigraphy of Siberia and Central Asia. With a group of colleagues, including Nikolai K. BAKHAREV and Nadezhda G. IZOKH, they actively studied the Silurian, Devonian and Early Carboniferous of Central Siberia, Arctic Siberia (Nordvik Cape and lower reaches of the Lena River), Sakhalin, the Early Devonian of Central Asia (specifically in the Kitab State Geological Reserve, Uzbekistan). The principal results of these studies were published in several papers (YAZIKOV et al. 2013a, 2013b; YOLKIN et al. 2011; KIM et al. 2011; GRATSIANOVA et al. 2011; IZOKH & YAZIKOV 2017; etc). In 2011, Sasha, Nadezhda IZOKH, Olga OBUT and the late Nikolai BAKHAREV guided a Devonian-Early Carboniferous excursion in the Salair and Kuznetsk Basin. In 2014, Sasha defended his doctoral thesis on *Brachiopods and Middle Devonian biostratigraphy of the folded margins of the Kuznetsk Basin*.

Sasha's recent results include a revision of the phylogeny of *Protodouvillina* in the Salair

(GRATSIANOVA & YAZIKOV 1998). This, coupled with biostratigraphic data on conodonts and ammonoids, enabled him to refine the previously proposed regional brachiopod zonation for the Emsian through Eifelian and Givetian into early Frasnian (YAZIKOV 2014c, 2014d).

Fig. 2. Camouflaged Sasha YAZIKOV and Kolya BAKHAREV during the field trip along the Lena River in 2012.

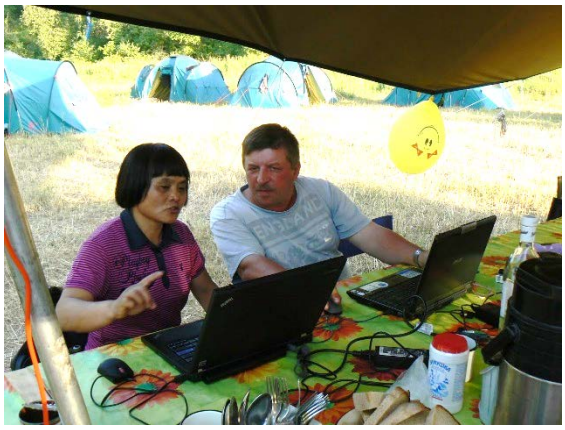

Fig. 3. Sasha YAZIKOV and the late CHEN ("Suzi") Xiuqin discussing Devonian brachiopods at the tent camp near Gur'evsk during the Field trip in the Kuznetsk Basin in 2011.

Fig. 4. Sasha during the SDS field trip in the Tafilalt of Southern Morocco in 2013.

Sasha was a very dedicated brachiopod worker, a generous and faithful friend, and devoted father and husband. He is remembered for his practicality, good cheer and quietly unshakable open-mindedness.

Publications of Aleksandr YAZIKOV

Monographs

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Dissertations

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YAZIKOV, A. YU. (2014d). Brachiopods and biostratigraphy of the Middle Devonian of the folded margins of the Kuznetsk Basin. – Dissertation Thesis, Novosibirsk: IPGG SB RAS, Volume 1 and 2, 231 pp., 148 figs. 19 pls. [in Russian, unpublished].

Journal contributions

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SDS REPORTS

MINUTES OF THE ANNUAL SDS BUSINESS MEETING

June 29, 2016, Valencia, Spain

SDS Secretary **Ladislav SLAVÌK**

Attendance

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

TMS: R. T. BECKER (Newsletter Editor), C. CORRADINI (Webmaster), D. J. OVER, J. I. VALENZUELA-RÍOS, N. G. IZOKH.

CMS: P. CARLS, Y. GATOVSKY, C. GIRARD, S. GOUWY, S. HARTENFELS, J.-C. LIAO, K. NARKIEWICZ, M. NARKIEWICZ, L. PONCIANO.

GUESTS: J.-F. LU, A. HUŠKOVÁ, T. KUMPAN, F. LÜDDECKE, P. NAVAS-PAREJO, S. RADZEVICIUS, C. RANDON, A. SPIRIDONOV, S. STICHLING, W. QIE, G. VOLDMAN, Y. WANG .

Total attendance: 29 people

The meeting began at 3:15 pm in the Sala d'actes.

1. Introductions and apologies for absence

SDS Chair JOHN MARSHALL called the main meeting to order. He started with the introduction of himself as the SDS Chair, Vice-Chair Carlton E. BRETT, Secretary Ladislav SLAVÍK, Newsletter Editor R. Thomas BECKER and SDS Webmaster Carlo CORRADINI.

Apologies were received from:

TMs: R. BROCKE**,** MA, X.

CMs: Z. S. ABOUSSALAM, G. C. BAIRD, A. BARTHOLOMEW, R. BROCKE, P. BUDIL, J. EBERT, J. FRÝDA, J. GARCÍA-ALCALDE, S. HELLING, J. HLADIL, O. IZOKH, U. JANSEN, W. T. KIRCHGASSER, H. MATYJA, M. MERGL, A. NAZIK, O. OBUT, M. DI PASQUO, D. PLAX, E. SCHINDLER, C. SPALLETTA, C. VER STRAETEN, T. UYENO, S. VODRÁŽKOVÁ, J. J. ZAMBITO.

2. Approval of 2016 Minutes

The Chairman asked if there were comments on the minutes of last year's SDS meeting in Ghent. There were none and then the Minutes of 2016 meeting were approved; they had already been edited. In addition, JM acknowledged a brief report

from Vice Chair C. BRETT (CB) and Secretary L. SLAVÍK (LS) on the 35th IGC in South Africa; no other members attended but two new CMs were recruited.

3. Chair's Business

JM reported, with regret, the loss of former SDS members:

Art BOUCOT, Oregon State University, U.S.A.

Elga MARK-KURIK, Tallinn University of Technology, Estonia.

Alexander YAZIKOV, Trofimuk Institute of Petroleum Geology and Geophysics, SB RAS, Novosibirsk, Russia.

SDS observed a moment of silence for the passing of these esteemed colleagues.

Note of appreciation: JM expressed his sincere thanks to Thjis VANDENBROUCKE for running an excellent Final IGCP 591 meeting in Ghent, Belgium, July, 2016 and to Nacho VALENZUELA-RÍOS, Teresa LIAO and to all organizers for the present 4th ICOS Symposium.

4. ICS Matters

David HARPER has taken over as head of ICS at the Cape Town, 35th IGC with new Vice Chair: Brian T. HUBER and Secretary-General: Philip GIBBARD.

Former Chair Stan FINNEY has assumed responsibility as Secretary General of the IUGS.

There has been a call, mainly led by Cenozoic workers to consider a new formal rank: Subseries. Both, the proposal and the opposing statement have been published in *Episodes*, vol. **40**, (HEAD et al. 2017: *A case for formalizing subseries (subepochs) of the Cenozoic Era*; PEARSON et al. 2017: *Sub-series and sub-epochs are informal units and should continue to be omitted from the International Chronostratigraphic Chart*). JM suggested that this was primarily an issue with the large series in the Cenozoic; unless the Devonian Subcommission was to elevate stages to series rank to make them more comparable to the extremely short Silurian series.

5. Revision of the Pragian-Emsian boundary

5.1. Uzbekistan fieldwork progress report

A final report on the status of the Pragian-Emsian boundary working group was presented on powerpoint slides by the SECRETARY (LS). Samples from the 2015 sampling at Kitab Reserve, Zinzilban have now been studied independently in the labs of himself, TM Nadya IZOKH and TM Nacho VALENZUELA-RÍOS. Most samples have now been processed; the results are not promising.

As a review, LS noted the basic statements that have been approved in the SDS meeting in Kitab State reserve, Uzbekistan in 2008:

1. The present boundary placed at the entry of *P. kitabicus* is too low relative to the traditional Pragian of the Prague Synform and far away from the traditional base of the Emsian.

2. To search for the new boundary for the base of the Emsian that would be located in the same stratotype area – in the Zinzilban Gorge.

3. To keep the *kitabicus* boundary as an important stratigraphic marker with potential for future subdivision of the Pragian. The new sampling between the levels No. 39 and No. 41 was launched following up the SDS meeting in the Kitab State Reserve in 2008. The results of the sampling were published in the SDS Newsletter No. 26 in March 2011: only few polygnathids were obtained.

In 2015, almost the same team re-examined the section and re-sampled an interval higher in the section between the levels 42 and 43. In total 24 conodonts samples have been split into three parts and shipped to Novosibirsk, Prague and Valencia.

Almost all samples have been processed and picked. There were lots of spathognathodontid conodonts with a good preservation. Unfortunately, again all of us found only a few polygnathid elements, so arrived at practically the same results as in 2008. Polygnathids were found in six samples only, these polygnathid taxa are essentially the same as from the previous sampling campaign (2008): *P. excavatus*, *P. pannonicus*, i.e. still too old. Other taxa (also the same as from 2008 sampling) cannot be used for redefinition: *Criteriognathus miae* (abundant - even complete apparatuses, high variability), *Pandorinellina exigua exigua*, *Pand. exigua philippi*, and some coniform elements. Thus, the repeated conodont sampling failed to provide new data to help move on with definition of a new boundary. A new campaign in near future is unlikely. Now the questions arising: What to do next? Where to go from here? We can suggest eventually formalizing a substage boundary (Zinzilbanian) in the Kitab Reserve but should we try to stay in Zinzilban for redefined stage boundary?

5.2. Discussion on possible solutions

CM Peter CARLS: raised discussion on numbering of samples; different schemes had been used at different times (sample numbers vs. lateral

measurements). It has been clarified by TM Nacho VALENZUELA and TM Nadya IZOKH, who explained the new system of numbering: Previously, there was confusion over an older series of numbers from 1978; in 1987 section was re-measured and different system is used from now on.

TM R. Thomas BECKER (RTB) and CM Peter CARLS then discussed details on conodonts on a plate that had been shown by TM Nadya IZOKH: specimens at 140 m look like very young forms. The 134 m form is approaching *P. inversus*; but the basal cavity is strange.

JM asked: Is it the implication that you are at the wrong level?

TM Nacho VALENZUELA: The problem is that there is not enough material.

RTB: According to our experience up to the level above the *Atopus* Event in Morocco with *P. excavates, Lat.. bilatericrescens,* and *C. steinhornensis*, there are many polygnathids, but none show signs of inversion at the posterior end; specimens as advanced as those shown in the plate should be much younger.

JM: Noted that we always valued having a section in Zinzilban but we want to get this resolved and have worked on this for 10 years. Is this the "World's best section" for conodont zonation? He asked conodont workers to suggest if there are better sections. What about the section in the Prague Synform?

LS: The sections in the Prague Synform are relatively rich in biostratigraphic data, but conodonts at the critical level are scarce; this applies mostly to polygnathids. A lot of work should still be done to fill up the sections with desired conodont data.

JM: Should we move to other sites?

CM Peter CARLS: A section in Aragon (Spain) has a good succession of spiriferid brachiopods to tie with the traditional Emsian; although there are also good conodonts. However, there is a 100 m section of sandstones below and we don't know where those conodonts begin.

JM: What needs to happen now is to pick a meeting when people working on the Pragian-Emsian issues would come together and give a series of talks and discuss criteria for defining the boundary and various potential stratotype sections.

JM: We have to balance keeping a section and helping the people there with the need to establish a workable GSSP. ICS wants GSSP's with multi-proxies. If we took the present data on Zinzilban, the ICS (which includes Mesozoic and Cenozoic workers) would reject it. At the very least they would want a full lineage; they would not accept a single conodont-based boundary occurrence. As a strong suggestion: let's come back to this topic with a session at next year's meeting.

RTB: Just to note: TM Nacho VALENZUELA has shown us a steep section without vegetation in the Pyrenees that could provide a workable GSSP.

JM: Regardless we need to show progress on the GSSP redefinition.

TM Nacho VALENZUELA supports taking a year to re-think this and come back with a session focused on the Pragian-Emsian boundary problem.

JM: We can't make any decision now. Let's make an effort to organize a special discussion session next year.

TM Nadya IZOKH: Noted that there was geochemistry done at Zinzilban to provide multi-proxy data. She showed a new data slide with geochemical data indicating a marked excursion near the putative new boundary interval.

LS explained that oxygen isotopes from conodonts in the PS and in other peri-gondwanan sections indicate a slow rise from the base of the Pragian. However, this cannot be correlated in Zinzilban where the data are from whole-rock samples. We should also have oxygen isotopes from the conodont apatite from the Zinzilban section; then the correlation might be clear.

6. Information about progress in Devonian-Carboniferous Boundary redefinition

In September 21-22, 2016 a special meeting was held in Montpellier, France, organized by Marcus ARETZ. Participants visited the present D-C GSSP at La Serre Trench E, Montagne Noire, and decided (as expected) that it was inadequate. They made a list of possible boundary sections, discussed their merits and problems and also whether various levels could actually be found at particular sections. It was accepted that the ICS are strict about the criteria used to define GSSPs. Can these be met? The majority voted for the base of *Protognathodus kockeli* Zone and three other criteria; they then voted on particular potential levels for the boundary. But there is still not a full agreement. A goal in the next months is to get out papers in a special volume of *Palaeodiversity and Palaeoenvironments*, hopefully in 2018. A pdf will also be placed on the SDS website.

RTB: It was nice to see the GSSP section but he was against the vote because he felt there was agreement with CM Marcus ARETZ and CM Sandra KAISER that a better position would be at the base of the Hangenberg Shale. This would form a so-called natural boundary following the suggestion of O. H. WALLISER. With *P. kockeli* it will be difficult to find a section with a complete lineage. He proposed to clearly define *kockeli* now before proceeding with this.

TM Carlo CORADINI: He had discussed this with CM Sandra KAISER; if a more satisfactory biostratigraphic level could be found he was still open to it.

7. Devonian Substages

JM: Moving on from the D-C boundary he noted that substages were still on hold. Stan FINNEY had tabled that there should be no further discussion of substages until all needed redefinitions and other issues (e.g., Pragian-Emsian and D-C boundary) are resolved. He had hoped that under the new leadership of David HARPER the ban on substage work until all stages are completely defined might be lifted. But this is not clear. So for now these discussions are still on hold.

8. SDS Membership

SDS welcomed the following new CMs:

Dr. XUE Jinzhuang, PKU, China, specialist on Devonian fossil plants, proposed by TM MA Xueping and CM HOU Hongfei, seconded by LS.

Dr. ZONG Pu, Institute of Geology, Chinese Academy of Geological Sciences, specialist on Devonian brachiopods and ammonoids, proposed by TM MA Xueping and CM HOU Hongfei, seconded by LS.

Dr. Cameron PENN-CLARKE, a Devonian sequence stratigrapher/biostratigrapher from South Africa, proposed by CB and LS, seconded by JM.

Dr. Robert GESS, of Rhodes University, Grahamstown, South Africa, a Devonian, vertebrate specialist who recently completed a dissertation on the Bokkeveld Group, Proposed by CB and seconded by LS.

M.Sc. Aneta HUŠKOVÁ, Charles University Prague, Czech Republic, conodont worker, Proposed by LS, seconded by JM,

Dr. Ian TROTH, palynologist and stratigrapher working in South America, proposed by JM, seconded by CB.

DR. Tomáš KUMPAN, Masaryk University, Brno, Czech Republic, D-C boundary worker, sedimentologist and biostratigrapher, roposed by LS, seconded by JM.

Titular members (TMs) are selected/approved every four years. They should show a high activity.

9. SDS Devonian Publications

Papers from the 2015 Brussels Meeting on Devonian events, edited by Peter KOENIGSHOF, Bernard MOTTEQUIN and Ladislav SLAVÍK, are now nearly completed and will soon be published by Senckenberg's *Palaeobiodiversity and Palaeoenvironments* as a two volume series.

TM NachoValenzuela will make a proposal to CM Peter KOENIGSHOF tomorrow for a volume of papers related to the Valencia ICOS symposium. For those wishing to publish a paper in this volume, the deadline will be next summer (2018).

RTB noted that a volume of papers by Russian scientists once proposed at the Novosibirsk meeting (in 2011) appears to be a dead issue. He and PETER KOENIGSHOF had agreed to be editors, but few manuscripts were ever received. Therefore it will not happen.

However, Chinese colleagues are working on another volume. Contribution were meant to be due next month, but now postponed to October.

The German field guide (2015 Brussels IGCP post-meeting fieldtrip), a 242-page book (BECKER, R. T., HARTENFELS, S., KÖNIGSHOF, P. & HELLING, S., Eds., *Münstersche Forschungen zur Geologie und Paläontologie*, vol. **108**) is now out and includes more comprehensive data than in the original field guide; at a modest price (22 €) it is a bargain.

SDS Newsletter: RTB wants all contributions in by the end of August and wants to do editing quickly. This should also include a report on the definition of the base of the Emsian. Any documents that you wish to get out quickly can be put in the newsletter. TMs and CMs were reminded that should all make contributions.

JM: GTS 2012 is now up for revision. The plan is to put out a new timescale volume by 2020. We have been asked for a new contribution; maximum of four authors (JM, RTB, LS, and CM Anne-Christine DASILVA will include a new section on astrochronology). It will be an ICS publication.

10. Future Meetings

2018: International Palaeontological Congress (IPC): July 9-13, 2018; Paris, France.

2019: 3rd STRATI, Milano, Italy. Dates have not been announced yet, near the beginning of July?

TM Jeff OVER and colleagues proposed to organize an SDS meeting in late July-early August 2019, with pre-meeting trips in the Lower-Middle Devonian of the Hudson Valley and eastern New York (3 days), 3-4 day meeting in Geneseo (note that there are two new hotels), a mid-meeting field trip in the Genesee Valley near Geneseo, and 3-4 day post-meeting field trips in western New York near Lake Erie. He hoped that the meeting would also include a workshop on Cyclostratigraphy and Astrochronology run by CM Anne-Christine DA SILVA.

TM Carlo CORRADINI noted that two meetings closely spaced in one year might pose a problem to some members.

2020: 36th IGC in New Delhi, India, but it is likely that only few members will attend.

JM asked if there were another potential meetings. CB suggested that given that there are two potentially conflicting meetings in summer 2019 and no satisfactory meeting in 2020, it might be best to postpone the New York SDS meeting until 2020. He asked TM Jeff OVER to consider that possibility and Jeff agreed to consider this and come up with the final plan by next year.

11. Financial Report

SDS received $1500 this year for the SDS Newsletter and to support attendance by SDS officers.

12. Any Other business

CM PETER CARLS noted that the duration of the Early Devonian is now estimated at 26.5 m.y. Well more than half of that time is in the Emsian. This seems overly long. CM Karsten WEDDIGE tried to apportion time to the lower and upper Emsian based upon relative thickness in Zinzilban. He concluded that the upper Emsian must be very long. But Peter CARLS is skeptical of this as are some others; he would prefer a roughly equal subdivision of these intervals but that did not happen. He would suggest that the upper Emsian should be something like 4-5 m.y. and lower about 3 m.y. He suggests going back to an approach similar to that once attempted by former SDS TM Ivo CHLUPÁČ, simply counting the number of cycles to determine duration.

JM and CB noted that this is precisely what CM Anne-Christine DASILVA is attempting, in a rigorous way, using magnetic susceptibility records and other proxies of climatic fluctuation and astrochronology. This will become an important focus in the future. LS mentioned that study of the Zlichovian part of the Emsian in the Prague Synform is now in progress in the same way.

The meeting adjourned at 4:45 PM so attendees could prepare for the ICOS banquet.

ANNUAL REPORT TO ICS

SDS Chairman John E. MARSHALL

1. TITLE OF CONSTITUENT BODY
Subcommission on Devonian Stratigraphy

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

In 2016 SDS has continued 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 591 meeting in Ghent (July 2016) in addition to the IGC in Cape Town. It was also strongly represented at the D-C boundary workshop in September 2016 (Montpellier, France). 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.

3. ORGANISATION - interface with other international projects / groups

Jointly sponsored the IGCP 591 closing meeting, Ghent, Belgium

Actively supporting *Reading geologic time in Paleozoic sedimentary rocks: the need for an*

integrated stratigraphy. This is an IGCP application on Palaeozoic astrochronology.

3a. NOMINATED OFFICERS FOR 2016-2020:

Chair: J.E.A. MARSHALL

Vice-Chair: C.E. BRETT

Secretary: L. SLAVÍK

4. EXTENT OF NATIONAL/REGIONAL/-GLOBAL SUPPORT FROM SOURCES OTHER THAN IUGS

University of Münster continue to support the staff costs of the SDS Newsletter production and the mailing. The IUGS support pays for the printing. The Newsletter has an ISSN and status as a publication.

We have a yearly meeting. SDS member support their own attendance at these.

5. CHIEF ACCOMPLISHMENTS IN 2016 (including any publications arising from ICS working groups)

- 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. SDS members are now analysing the collected samples for conodonts and made a preliminary report at Ghent and Cape Town in 2016. Final report to be at ICOS in 2017.
- Meeting, jointly with IGCP 591 in Ghent, Belgium (July 2016).
- Publication in 2016 of *Devonian Climate, Sea Level and Evolutionary Events* as *Geological Society of London Special Publication*, **423**, edited by R. T. BECKER, C. E. BRETT & P. KÖNIGSHOF.

6. SUMMARY OF EXPENDITURE IN 2016:

SDS Newsletter $600

Attendance of SDS Vice-Chair Brett at IGC Cape Town $600

Attendance of SDS Secretary Slavík at IGC Cape Town $400

Attendance of SDS Chair Marshall at D-C boundary workshop, Montpellier $200

7. SUMMARY OF INCOME IN 2016:

ICS $1800

8. BUDGET FROM ICS IN 2016

IUGC $1800

Potential funding sources external to IUGS

Continued support from SDS members

9. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR:

- Revision of the basal Emsian GSSP in Uzbekistan. Presentation of results at ICOS 4 meeting, Valencia, June 2017.
- Revision of the D/C boundary in the frame of the D/C Boundary Task Group (Chairman: M. ARETZ) in close collaboration with the Carboniferous Subcommission. Progress towards selection of candidate stratotypes following selection of boundary criteria in September 2016.
- Publication of Brussels SDS / IGCP 591 meeting presentations in *Palaeobiodiversity* & *Palaeoenvironments*.

10. OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2016-2020)

- Redefine the base of the Emsian Stage and the new 'Zinzilbanian' 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

BUDGET REQUEST FOR 2017

$1800

SDS Newsletter $600

Attendance of Vice Chair Brett at ICOS 4 $600

Attendance of Secretary Slavík at ICOS 4 $400

Attendance of Chair Marshall at ICOS 4 $200

APPENDIX [Names and Addresses of Current Officers and Voting Members)

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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 9 from the SCS.

The Devonian members are:

R. Thomas BECKER, Germany, Chair of SDS: ammonoids <rbecker@uni-muenster.de>

Denise BRICE, France: brachiopods <d.brice@isa-lille.fr>

Carlo CORRADINI, Italy: conodonts <corradin@unica.it>

Brooks ELWOOD, USA: magnetostratigraphy <ellwood@lsu.edu>

JI Qiang, China: conodonts <Jirod@cags.net.cn>

Sandra I. KAISER, Germany: conodonts, isotope stratigraphy <kaiser.smns@naturkundemuseum-bw.de>

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FINAL REPORT ON RESULTS FROM THE SDS FIELDWORK IN KITAB STATE GEOLOGICAL RESERVE, TIEN-SHAN MTS., UZBEKISTAN 2015

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Following long discussions and doubts concerning the basal Emsian GSSP, the SDS met in the Kitab Reserve (Uzbekistan) in 2008, i.e. roughly ten years after the official definition of the basal Emsian boundary (YOLKIN et al. 1997). After the fieldtrip and examination of the sections in the Kitab State Reserve and discussions during the indoor SDS meeting, the Devonian subcommission reached an agreement regarding the redefinition of the base of the Emsian. Following statement has resulted from the meeting: The current Emsian base (*kitabicus* boundary) is located at a very low position, within the traditional Pragian = the Praha Fm. (CARLS & VALENZUELA-RÍOS, 2007; CARLS et al. 2008) and it cannot be linked to the beginning of the Emsian in the traditional German sense (Ulmen Gruppe). After a discussion between the top specialists considering all contrasting opinions, the following main directions were agreed on: 1) To search for a new boundary for the base of the Emsian, which would be located in the Zinzilban Gorge, at a position close to the entry of the *excavatus* group and specially, the entry of a particular taxon within the *excavatus* group; this taxon bears semi-crossed ridges on the tongue and it has been cited at about 114 m above the GSSP in Zinzilban (YOLKIN et al. 1994: 148). 2) To keep the *kitabicus* boundary as a reference marker that could be a used for future subdivision of the Pragian (after the basal Emsian boundary is moved up).

Following these agreements, a sampling campaign was scheduled and the three of us (NGI, JIV-R and LS), with help of Peter CARLS, measured and sampled in detail the supposed interval that needed to be investigated in detail; this interval was about 12 m thick and started with the base of Bed 39/1 to the base of Bed 41/1 of the Zinzilban Gorge GSSP section (numbering according to YOLKIN *et al*., 2008). The total of 15 samples from this interval was divided into three parts (each sample) and processed and studied at our respective laboratories in Novosibirsk, Valencia and Prague. The results were published in the SDS newsletter No. 26 (IZOKH et al. 2011). The results were very disappointing. In fact, mostly spathognathodontids (mostly *Pandorinellina* and *Criteriognathus*) and coniform elements, but only few polygnathid specimens have been recovered from all of these samples. Such results were insufficient for any solution for the new position of the basal Emsian boundary. The polygnathids that have been identified belong to *Po. pannonicus* and *Po. excavatus*. *Po. pannonicus* enters in Zinzilban section in Bed 12/3 and has a discontinuous range up to Bed 21/7; then, the range is continuous from Bed 26/1 to Bed 40/6 (YOLKIN et al. 2008). In the same paper, the entry of *Pol. excavatus* was registered in Bed 40/3 and ranges up to Bed 45/17. According to these data, the finds of *Po. pannonicus* (sampling 2008) would correspond to its upper range. The record of *Po. excavatus* in Bed 40/1 also lowers the entry of the taxon by about 1 m.

The succession of stratigraphically important and extremely scarce polygnathids from sampling of 2008 showed that the interval chosen was still too low and that there is a need of new detailed sampling up to try to find the morphological sequence leading from *Po. excavatus* with interrupted ridges on tongue to *Po. excavatus* ssp. with semi-crossed ridges and relatively shallow basal cavity (= *Po. excavatus* 114 of CARLS & VALENZUELA-RÍOS, 2002). Moreover, by means of correlation of different measurements from 1978 to 2008 in Zinzilban Gorge section, this level shall be located around Bed 42/7.

The sampling carried out in the Zinzilban Gorge section in 2008 showed that this part of the section was not appropriate for placing the new basal Emsian GSSP, and that the redefined boundary shall be located even higher – i.e. probably within the set of beds between marker Beds 42 and 43.

The failure of the sampling campaign of 2008 was then discussed in subsequent SDS meetings that took place in couple of last years. Also several documents with valuable discussions have been submitted to the SDS and published in the SDS Newsletters (e.g., CARLS et al. 2009; VALENZUELA-RÍOS & CARLS, 2010, HLADIL et al. 2011, and KIM

et al. 2012) and some other papers on correlation (e.g., YOLKIN et al. 2011; HLADIL et al. 2011). The last SDS document listed (KIM et al.) brings very important data and correlation of dacrioconarids and other faunas, mentioning that *Nowakia (Turkestanella) acuaria* – a taxon whose range roughly corresponds to the Praha Fm. (= original Pragian) goes up to Norbonak beds in Zinzilban, and, a key dacryoconarid taxon *Nowakia (Dmitriella) praesulcata* is unfortunately missing in the Prague Synform.

In 2015 the SDS agreed on a new sampling campaign in the Zinzilban Gorge section with the focus on the interval between marker Beds 42 and 43 as it was recommended following the results from the last sampling attempt. The new campaign has been partly supported by the NSF grant (given to the that time ICS Chair Stan Finney) and almost the same team (consisted by Nacho VALENZUELA-RÍOS, Nadya IZOKH, Ladislav SLAVÍK and his student Aneta HUŠKOVÁ) 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 were granted a permission by the State Committee of Geology and Natural Resources of the Republic of Uzbekistan and in August 2015 made it to the Kitab State Reserve for the new fieldwork and sampling. The fieldwork was successful and 24 conodonts samples (of ca 150 kg total weight) were safely shipped to Europe (Valencia and Prague) and to Siberia (Novosibirsk).

A final report on the status of the Pragian-Emsian boundary working group was presented in the SDS meeting in Valencia (June 2017). Samples from the 2015 campaign at the Kitab Reserve, Zinzilban have been studied independently again in the three respective labs. Most samples have been processed and picked; unfortunately the results are not promising again. Polygnathids were found in six samples only: MZ 2015-42/1 (1 specimen), MZ 2015-42/5 (19 specimens); MZ 2015-42/16 (3 specimens), MZ 2015-42/18 (1 specimen), MZ 2015-42/21 (1 specimen), MZ 2015-42/24 (6 specimens). The polygnathid taxa are practically the same as from the previous sampling campaign (2008): *P. excavatus*, *P. pannonicus* i.e. still too old. On the other hand there are few polygnathid platform elements with very young morphology close to *P. inversus* with deep adcarinal throughs in the uppermost part of the sampled interval, i.e. in the last sample (MZ 2015-42/24). Accordingly we can observe only spotty finds with large gaps within the polygnathid lineages. Also it is evident that the critical interval with expected morphological transition from *Po. excavatus* did not provide any polygnathids and the the top of the sampling is already constraint with much younger forms. At the whole, the conodont material is, however, relatively rich. There are hundreds of high variable spathognathodontid elements with a good preservation; even complete apparatuses can be found. These belong mostly to *Criteriognathus miae*, *Pandorinellina exigua exigua* and *Pand. exigua philippi*. Apart from these, only few coniform elements belonging mostly to *Belodella* have been found. All these taxa, however, cannot be used for redefinition of the basal Emsian boundary. It is also remarkable that same as in 2008 sampling, no single remain of *Icriodus* has been obtained from the samples.

Thus, the repeated conodont sampling failed to provide new data to help move on with definition of a new boundary and practically arrived at the same results as in 2008. A new campaign in near future is unlikely. Now the questions arising: What to do next? The potential of the *kitabicus* boundary for future subdivision of the Pragian stage is very high, however, this may happen only once the new base of the Emsian is formalized.

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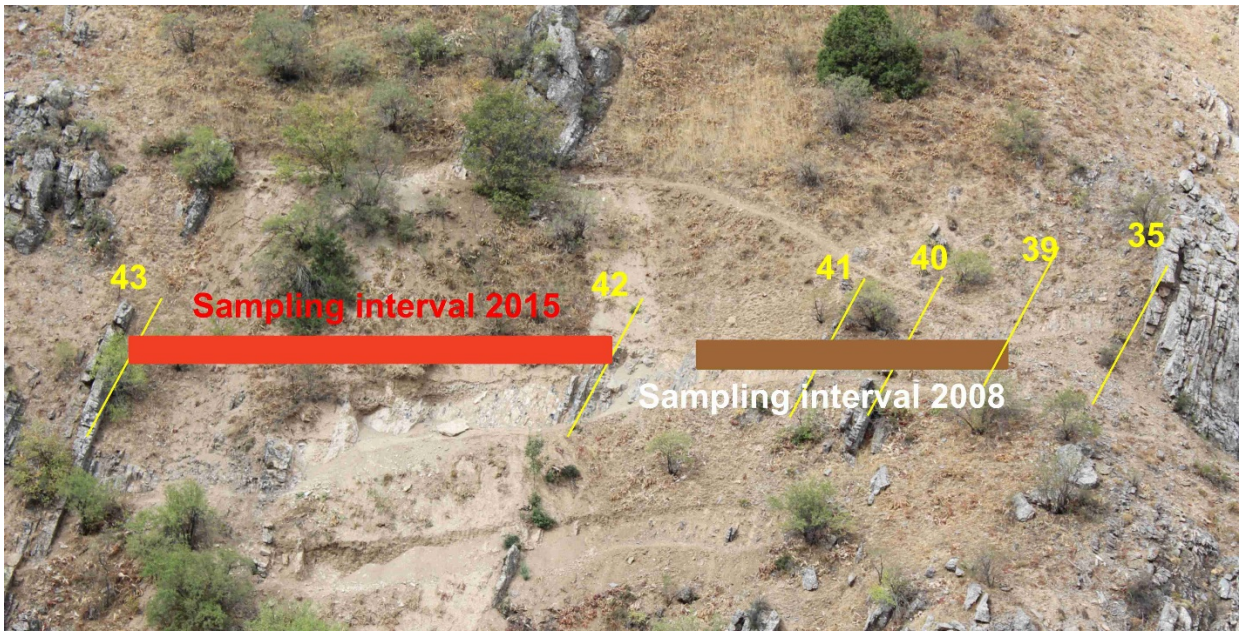

Fig. 1. The sampled intervals at Zinzilban during campaigns in 2008 and 2015.

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SDS DOCUMENTS

DEVONIAN EVENT SUCCESSION AND SEA LEVEL CHANGE IN SOUTH CHINA - WITH EARLY AND MIDDLE DEVONIAN CARBON AND OXYGEN ISOTOPIC DATA

MA, X.-P., WANG, H.-H. & ZHANG M.-Q.

1. Introduction

In the Devonian of South China, the best-known events, as in other regions of the world, are the Frasnian–Famennian mass extinction event (Upper Kellwasser Event) and the Devonian–Carboniferous boundary Event (Hangenberg Event). These two events have been demonstrated to be associated with biotic turn-overs (e.g., HOU et al. 1985; YU 1988; TAN et al. 1987; BAI et al. 1994; COEN et al. 1996; Ma et al. 2002, 2016; Qie et al. 2015). Whereas some other events do not seem to be related to a biotic turn-over, e.g., the Punctata Event (MA et al. 2006, 2008). MA et al. (2014) documented a number of events in terms of their lithologic and biotic aspects. This document is a comprehensive review of events in terms of their possible sea level/sedimentological, geochemical, and biotic changes (Fig. 1). In most cases, Chinese event names are used to avoid mistakes with the same global name but at different stratigraphic levels that may be demonstrated in later studies.

2. Sea-level fluctuations

2.1. Lianhuashan transgression

The Lianhuashan Fm., unconformably overlying the Cambrian, is the first Devonian unit in the platform areas of South China, with fish, ostracodes, bivalves, and lingulide brachiopods, representing an initial transgressive, intertidal environment. However, its exact age cannot be determined due to lack of index fossils. In light of its overlying Pragian Nagaoling Fm., the Lianhuashan Fm. is generally considered to be of Lochkovian age.

In the marginal areas of the South China plate, continuous carbonate sedimentation may span the Silurian–Devonian boundary, e.g., in the Alengchu section of Lijiang, western Yunnan Province. In the basal Devonian Shanjiang Fm. (YU & LIAO 1978 and own data), an intermediate $\delta^{13}C_{carb}$ positive excursion exists (Fig. 2: Basal-Shanjiang carbon positive excursion), which is smaller in scale than that revealed by BUGGISCH & JOACHIMSKI (2006).

2.2. Hengxian sea level rise

This is represented by some carbonate deposits of the Hengxian Mbr (calcareous and/or silty dolostones), which are the earliest carbonate deposits on the platform of the South China plate. Again its exact age cannot be determined.

2.3. Gaoling sea level rise

Conodonts first appear in the Gaoling Mbr limestone of the Nagaoling Fm. in the platform region of the South China plate. These are "*Polygnathus*" *trilinearis* and two endemic *Eognathodus* species discovered from the Gaoling Mbr (LU et al. 2017 and references therein). It can be roughly correlated with the *Gondwania kindlei* Zone judging from its position in the whole Pragian sequence.

In the plate marginal area, in the Alengchu section, the Pragian saw substantial $\delta^{13}C_{carb}$ positive-negative

In the plate marginal area, in the Alengchu section, the Pragian saw substantial $\delta^{13}C_{carb}$ positive-negative excursions (Upper-Shanjiang carbon isotopic anomalies), with the most positive $\delta^{13}C_{carb}$ values in the Early and Middle Devonian in South China (Fig. 2).

2.4. Xiayiling lowstand

The Xiayiling Mbr (definition of BAI et al. 1994) is primarily a fine sandstone and siltstone unit that is coarser compared with the underlying and overlying strata. It is interpreted to represent deposits in a regressive phase.

2.5. Yujiang transgression

This is best represented by the start of the deposition of the Yujiang Fm. (definition of BAI et al. 1994), which is well-known for its Yujiang fauna, i.e., "*tonkinensis* spiriferide fauna" or the *Rostrospirifer tonkinensis-Dicoelostrophia* Assemblage. The Yujiang Fm. has been approximately correlated with the Lower Emsian (from the base to the conodont *Eocostapolygnathus gronbergi* Zone), i.e. the interval before the appearance of primitive ammonoids (e.g., HOU et al. 2017), based on previous conodont work (e.g., WANG 1989; BAI et al. 1994). Recently LU et al. (2017) reported the conodont *Eocostapolygnathus nothoperbonus* from the Daliancun Mbr (upper part of the Yujiang Fm.).

The base of the Yujiang Fm., i.e., the start of the Yujiang transgression and the emergence of the "*tonkinensis* spiriferide fauna" in the Liujing section cannot be determined in terms of the conodont zonation.

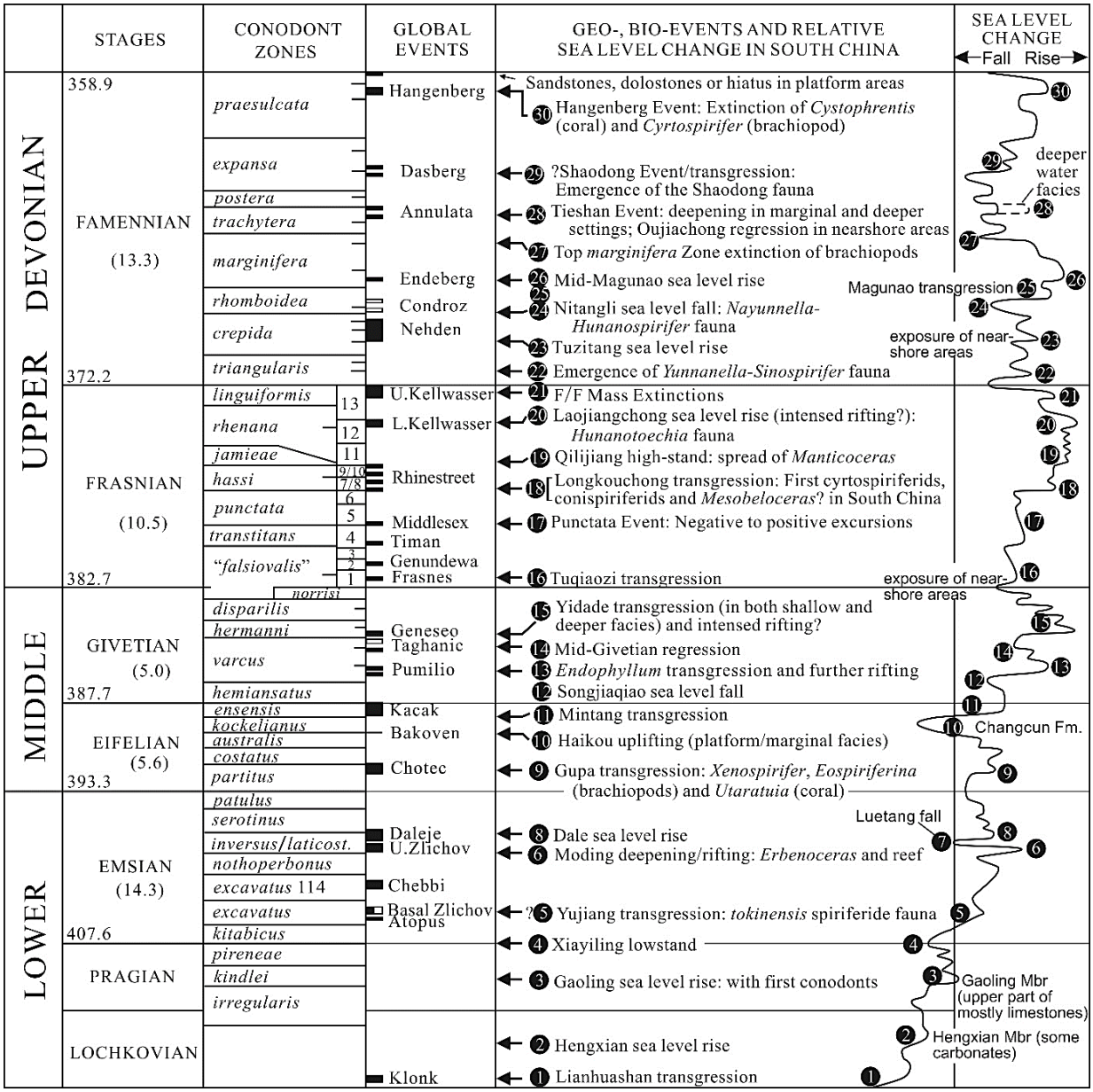

Fig. 1. Generalized event succession and sea level change in South China. Conodont zonation and global events modified from HOUSE (2002) and BECKER et al. (2012).

2.6. Moding deepening/initial rifting

The Moding Fm. is characterized by gray thick-bedded dolomitic limestone, with chert bands/nodules and dacryoconarid tentaculitides (*Nowakia barrandei, N. elegans*) and ammonoids (*Erbenoceras elegantulum*) in the middle and upper parts (KUANG et al. 1989). The lithology and biota apparently suggest a deepening event, probably a result of rifting activity of the South China plate, during which time the *Erbenoceras* ammonoid fauna became widely distributed in most parts of Guangxi (MA et al. 2014, p. 22). Previously this event was correlated with the Chebbi Event (MA et al. 2014). On the basis of the conodont *Eo. nothoperbonus* from the upper part of the Yujiang Fm. (LU et al. 2017), the Moding Fm. should be correlated with the *Eo. nothoperbonus* Zone through the *Po. inversus* Zone, which is reinforced by the finding of Po. inversus in the upper part of the Ertang Fm. by LU et al. (email communication with QIE, W. K. on 2017-08-29) that is an equivalent of the Moding and

Luomai formations. In this connection, the Moding deepening event should probably be comparable to the Upper Zlichov Event. Geochemical data of limestones from the Changputang section of southeastern Yunnan province shows that a possible distinct δ^{13}Ccarb negative anomaly is present during this time (Fig. 2), although further analyses are needed because of few data points.

2.7. Luetang sea level fall

The Luetang Fm. and its lateral equivalent (Guanqiao Fm.) are characterized by a thick sequence of alternating gray shales, medium-thick bedded dolostone, and dolomitic limestone with rare fossils (YU & YIN 1978; BAI et al. 1994), which should represent an interval of sustained low sea level and restricted environments (with occasional sea level rise episodes) (MA et al. 2014).

2.8. Dale sea level rise

The Dale Fm. is a thick suite of limestone sequence (MA et al. 2014, fig. 2), probably representing deposits in a sea level highstand environment. The Luetang and Dale Formation boundary should be correlated with the Daleje Event judging from new conodont data of the Ertang Fm. (see data in "Moding deepening"). The three litho-members of the Dale Fm. respectively bear, in ascending order, the *Trigonospirifer trigonata*, the *Otospirifer shipaiensis*, and the *Euryspirifer paradoxus* brachiopod fauna (HOU & XIAN 1975).

2.9. Gupa transgression

This is represented by the start of the deposition of the Gupa Fm., which has been correlated with the Choteč Event (MA et al. 2014, fig. 2), during which the brachiopods *Xenospirifer fongi*, *Eospiriferina lachrymosa*, *Athyrisina squamosa*, and *Yingtangella sulcatilis* and the coral *Utaratuia* became widely distributed in South China.

2.10. Haikou uplifting

This has long been recognized in South China, e.g., the Haikou Movement of HOU (1978), late Eifelian regression of WU (in ZHONG et al. 1992, pp. 286–288), Haikou uplifting (MA et al. 2009). Representatives include the Changcun Fm. in the Dale section, which is characterized by gray (calcareous) shale with mud cracks and rare mollusks and brachiopods (BAI et al. 1994) and the Tunshang Mbr in the Dushan section, which is characterized by sandstones with intercalations of marlstone and marly limestone. The uplifting probably began in the *Tortodus kock. kockelianus* Zone and ended with the beginning of the Mintang transgression.

2.11. Mintang transgression

This is represented by the start of the deposition of the Mintang Fm. (dark gray platy, i.e., thin-bedded, limestones yielding abundant dacryoconarid tentacultides in the lower part), with Foba Shale and Limestone at the base, which bears the conodont *Po. xylus ensensis* and the brachiopod

Stringocephalus gubiensis and silicified fauna (BAI et al. 1994). It is correlated with the Kacak Event.

The sea level rise continued into the early Givetian, with diversification of *Stringocephalus* and other terebratulide brachiopods in the Jipao Mbr (Dushan section of Guizhou), Jide (=Donggangling) Fm. (Xiangzhou County of Guangxi) and other equivalent strata.

2.12. Songjiaqiao sea level fall

It is represented by the Songjiaqiao Mbr (mainly sandstones) in the Dushan section and the Jinbaoshi Fm. (upper part, characterized by alternating sandstones with large-scale cross bedding and (reefal) limestone breccias) in the Longmenshan section. WANG (1994) named this sea regression as the Dushan uplifting. In Guangxi, this sea level fall has not been clearly recognized.

2.13. *Endophyllum* transgression

This is characterized by the widespread of the coral *Endophyllum* in South China probably in the upper part of the Lower *Po. varcus* Zone, which was named the *Endophyllum* transgression (LIAO & MA 2011). It can be correlated with the lower Pumilio Event. Subsequent deposition of very thick suite of massive limestone near the base of the Middle *Po. varcus* Zone in the carbonate platform (e.g., the Qiziqiao Fm. in central Hunan, the "Gubi" Fm. in the Caiziyan section, and the Qujing Fm. in the Panxi section) probably represents further rifting of the South China plate and can be probably correlated with the Upper *Pumilio* Event.

2.14. Mid-Givetian regression

A Mid-Givetian regression was widespread in South China, an opinion which has long been known to many workers (see MA et al. 2014 and references therein), with formation of widespread dolostones, which occurred in the Upper *Po. varcus* Zone (LI et al. 2009).

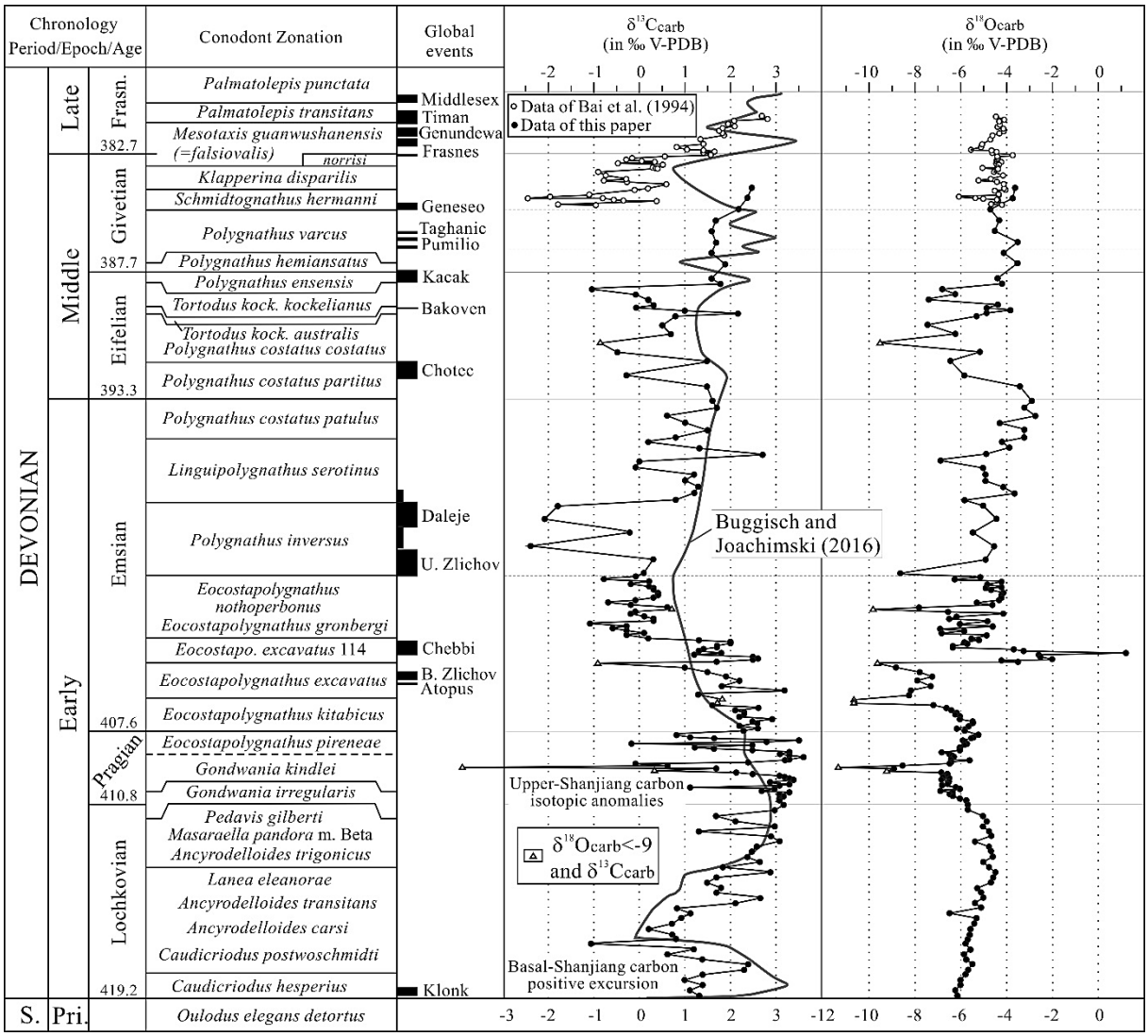

Fig. 2. Stable carbon and oxygen isotopes of carbonates and conodont apatite of the Lower and Middle Devonian of South China. Conodont zonation and global events are modified from BECKER et al. (2012, 2013).

2.15. Yidade transgression/intensified rifting

This corresponds to a deepening event in the start of the *Schmidtognathus hermanni* Zone in South China, exemplified in a number of sections from both deeper and shallow water facies, e.g., the start of the deposition of the Yidade Fm. in the Panxi section of Yunnan province. The change from carbonate platform deposits to deeper "basinal" deposits in a number places (e.g., in the Dabakou section of Hunan province; see MA et al. 2014, fig. 4) also suggests an intensified rifting activity. This has been correlated with the Geneseo Event (MA et al. 2014).

Towards the end of the Givetian, a regression apparently occurred in the platform areas (MA & ZONG 2010), resulting in a hiatus or eroded surface in the upper part of the Givetian through the lower Frasnian in a number of localities near Guilin (LI 2005) and central Hunan (MA & ZONG 2010, fig. 5a). However, in the deeper water rift area, sea level might relatively rise or did not change much, as evidenced by the start of deposition of the Liujiang Fm. towards the end of the Givetian in the Zhaisha section of Luzhai County, Guangxi (ZHONG et al. 1992) and in the Shetianqiao section of Hunan (MA et al. 2004). The differentiation in sea level change may reflect regional tectonic activity that resulted in the subsidence in the rift areas and the uplift in the platform areas.

2.16. Tuqiaozi transgression

This is represented by the start of the deposition of the Tuqiaozi Fm. (definition of HOU et al. 1988) in the Longmenshan section, which is slightly above the base of the Frasnian and therefore probably

corresponds to the Frasnes Event. In the Dushan section, a thin-bedded black shale interval (starved sedimentation of Upper Devonian Sequence 1 of DU et al. 1994) may also be consistent with this event.

2.17. *Punctata* Event

See MA et al. (2008) for details of negative to positive variations of carbon isotopes.

2.18. Longkouchong transgression

This is represented by the start of the deposition of the Longkouchong Fm. in central Hunan with emergence and widespread of cyrtospiriferid and conispiriferid brachiopods in South China, which is correlated with the start of the *Pa. hassi* Zone (MA et al. 2006). This transgression may corresponds to the Rhinestreet Event (MA et al. 2014).

2.19. Qilijiang high-stand

Following the Longkouchong transgression is the widespread deposition of massive (reefal) limestones and/or reefs in the carbonate platform, represented by the Qilijiang Fm. in central Hunan. Along with sea level high-stand (*semichatovae* transgression) is the spread of the ammonoid *Manticoceras* in South China, e.g., in the Nandong section of Guangxi (BAI et al. 1994, p. 73) and in the Shetianqiao section of Hunan associated with conodont *Pa*. cf. *semichatovae* (MA et al. 2004).

2.20. Laojiangchong sea level rise (intensified rifting?)

This is represented by the start of the deposition of the Laojiangchong Fm. (predominantly marlstone and shale, bearing the *Hunanotoechia* brachiopod fauna) in central Hunan. This sharp lithologic change from the Qilijiang Fm. to the Laojiangchong Fm. in the platform facies has been correlated with the Lower Kellwasser Event (MA et al. 2014, fig. 5), possibly related to a renewed rifting process in South China.

In the following Frasnian time occurred an extensive regression in Hunan, resulting in the deposition of upper Frasnian massive sandstones in near-shore areas, such as in the Leimingqiao section of Hunan (MA & ZONG 2010, fig. 2).

2.21. Frasnian/Famennian Mass Extinctions

This is the most thoroughly studied Devonian event in China. MA et al. (2016) summarized this event in terms of biologic, sedimentological, and geochemical aspects, which are not repeated herein.

2.22. Emergence of *Yunnanella-Sinospirifer* fauna

Famennian sea level change pattern and faunal succession may be clearly manifested in central Hunan (e.g., in the Xikuangshan section). Following the maximum sea level fall at the F–F boundary, an early Famennian marine transgression probably started at the Middle *Pa. triangularis* Zone, with emergence of an entirely different brachiopod fauna from that of the Frasnian: *Yunnanella-Sinospirifer* fauna (*Yunnanellina-Sinospirifer* Assemblage Zone of MA & ZONG 2010). However, this early Famennian transgression was apparently restricted in area and did not extend to the whole previous Frasnian marine area, which is evidenced by the absence of the *Yunnanella-Sinospirifer* fauna-bearing deposits in central Hunan, e.g., in the Qiziqiao and Leimingqiao sections (Compare figs. 5b and 6a of MA & ZONG 2010).

2.23. Tuzitang sea level rise

MA et al. (2014) correlated this sea level rise with the Nehden Event.

2.24. Nitangli sea level fall

MA et al. (2014) correlated this sea level fall with the Conroz Event.

2.25. Magunao transgression

This is represented by the deposition of the Magunao Mbr, which is characterized by “nodular” and thin- to thick-bedded limestones (MA et al. 2014, fig. 6). It is interpreted as forming under a marine transgressive setting.

2.26. Mid-Magunao sea level rise

Approximately in the middle of the Magunao Mbr (close to the base of the *Pa. marginifera* Zone), a thin-bedded limestone interval may suggest a sea level rise. This Mid-Magunao deepening is probably correlated with the Endeberg Event (MA et al. 2014).

2.27. Top *marginifera* Zone extinction of brachiopods

This refers to the major extinctions of brachiopods at the onset of the Oujiachong Fm. and equivalents, which is close to the top of the *Pa. marginifera* Zone (CHEN & MA 2004). The extinction mainly involved a number of taxa of the *Nayunnella* (=*Yunnanella*)-*Hunanospirifer* Assemblage of MA & ZONG (2010), which was probably caused by the Oujiachong regression in the platform facies of South China.

2.28. Tieshan Event

It was named by YIN (2008) in the Tieshan section (platform marginal facies) of Guilin, Guangxi, which is probably a deepening event and corresponds with the global Annulata Event (MA et al. 2014, fig. 7). However, in shallow water facies areas, a sea level fall (Oujiachong regression) apparently occurred that is represented by the Oujiachong Fm. (primarily sandstones, siltstones, and shales with plant fossils) in central Hunan. This lowstand of sea level probably spans the Uppermost *Pa. marginifera* Zone to the Lower *Pa. gracilis expansa* Zone.

2.29. Shaodong Event/transgression

This is characterized by a renewed marine transgression that resulted in deposition of the Shaodong Fm., which has been called the Shaodong Event (HOU 2008) and the Shaodong transgression (MA et al. 2009). Lithological transition between the lower Oujiachong and the upper Shaodong formations is gradual, implying the gradual marine transgression of the Shaodong Event. Along with this marine transgression was the emergence of the Shaodong brachiopod fauna (MA & SUN 2008), including *Trifidorostellum longhuiense*, cyrtospiriferids, *Acanthoplecta mesoloba*, *Plicochonetes ornatus*, *Yanguania dushanensis*, *Hunanoproductus*. MA et al. (2014) questionably correlated this event with the Dasberg Event.

2.30. Hangenberg Event

This is the second best-known Devonian event that is related with a faunal turnover in the shallow water facies of South China (MA et al. 2014): the pre-event coral *Cystophrentis* and cyrtospiriferid brachiopod fauna were replaced by the post-event *Pseudouralinia* (=*Uralinia*) and *Spirifer-Unispirifer* fauna, respectively. In deeper water ("basinal") and platform marginal areas, the Changshun Shale (equivalent of the Hangenberg Black Shale) is generally present, occasionally with the last cymaclymeniid ammonoid *Postclymenia* (*Post.* cf. *evoluta*) such as in the Jiarantang section of Guizhou province (ZHANG et al. in preparation).

3. Acknowledgments

A number of colleagues and students are thanked for their help in the fieldwork during the past few years, including WEI Fan (Yunnan University), ZONG Pu (Chinese Academy of Geological Sciences), LÜ Dan (Research Institute of Petroleum Exploration and Development), and ZHANG Yubo (Peking University). This work was supported by National Natural Science Foundation of China (Grant 41290260).

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DEVONIAN MEETINGS

We are pleased to invite you to participate in the ***XVII Argentine Symposium of Paleobotany and Palynology*** (SAPP 2018), ***TOWARDS NEW CHALLENGES***. This prestigious scientific event brings together the most recognized specialists both locally and worldwide, and its importance is reflected in the significant number of participants who have attended each one, which has risen in the last two symposia, 150 in Corrientes 2012 to 180 in La Plata 2015.

In this edition it will be held for the first time in the city of Paraná, Entre Ríos province, between July 30 and August 5, co-organized by the Latin American Association of Paleobotany and Palynology and the *Universidad Autónoma de Entre Ríos*, declared of Institutional Interest (CS Res. N° 121/17).

We thank you for the diffusion of this invitation and we hope to have your valuable contribution.

http://fcyt.uader.edu.ar/web/sapp2018

THE 5th INTERNATIONAL PALAEONTOLOGICAL CONGRESS

July 9th-13th, 2018, FRANCE

The IPC is organised every four years under the auspices of the International Palaeontolo- gical Association (www.ipa-assoc.org). After Sydney (Australia) in 2002, Beijing (China) in 2006, London (United Kingdom) in 2010 and Mendoza (Argentina) in 2014, it will convene in Paris (France) in 2018.

INVITATION

On behalf of the Organising Committee, we are particularly pleased to invite you to France for the Fifth edition of the International Palaeontological Congress, the IPC5.

Under the auspices of the International Palaeontological Association (IPA) and with the participation of the whole French Palaeontological community, "the Fossil week" will be organized in 2018 in Paris, July 9th-13th.

This event is a unique opportunity for our community to present its new results and discuss all aspects of our discipline.

We propose here some possible symposia and sessions. Of course, the list is provisional and it is still completely open. We are waiting for your proposals.

Fieldtrips are planned before and after the congress throughout France, Belgium and Italy. They will give you the opportunity to discover our palaeontological, geological and gastronomic heritages.

We hope to welcome many of you in France in 2018.

View of the Seine River and the Notre-Dame Cathedral

VENUE

The meeting will take place in the Pierre & Marie Curie University and in the National Museum of Natural History, both located in the 5th arrondissement, in the center of Paris, along the left bank of the Seine River. This district is commonly known as the *Quartier Latin* because it is where the first great Parisian university, the Sorbonne, was founded, and because Latin was the language of scholars at the time. The 5th arrondissement was also the core of Lutetia, the antique city of Paris, as revealed in a number of archaeological sites.

The most famous building of the 5th arrondissement is probably the Pantheon, where graves of influential French personalities are clustered, but there are many other noteworthy sights, such as the magnificent Val-de-Grâce Church, the intriguing St-Etienne-du-Mont Church, the Cluny Museum, the Roman Arènes de Lutèce and the city's botanical garden, the Jardin des Plantes, surrounding buildings of the National Museum of Natural History. This institution housed one of the largest collections of natural objects of the world with more than 68 million specimens.

The opening plenary session will take place in "La Maison de la Mutualité". During its 80 years of existence, this building has hosted many historical events and welcomed prominent personalities: it is where Charlie Chaplin recorded the music for some of his movies; among world-class singers, Edith Piaf, Jacques Brel and Léo Ferré performed there.

The Fossil Week Meeting will take place from the 9th to the 13th July of 2018. This will allow conve- ners to extend their stay to enjoy the festivities relating to the French National Day, July 14th. The weather is pleasant during summer time, with an average of 25°C (77°F).

Paris has daily connections with more than 526 cities in more than 136 countries via its international airports, namely Paris - Charles-de-Gaulle (23 km northwards; commuting time 45-60 minutes by city train) and Paris - Orly (14 km southwards, commuting time 30-40 min by city train).

With seven train stations in Paris itself, the city is at the heart of an exceptionally comprehensive and high-performance rail network. On a daily basis, 425 high-speed trains connect various destinations across Europe with the French capital.

French regions (Alsace, Burgundy, Brittany, Champagne, etc.) can be reached in a few hours from Paris, thanks to this well-developed transportation network and its central position in France.

Paris is equipped with top-class infrastructures and, in particular, a dense and versatile transportation network, in which the subway, bus, tramways, taxis, "vélib" (the city's bike sharing scheme), and now the "autolib", are interlinked.

Participants who require a support letter for visa application are invited to contact the organizing committee (congress-ipc5-contact@mnhn.fr). This letter does not imply any financial obligation on the part of the Congress organizers.

ACCOMODATION

With more than 2,000 hotels, Paris provides visitors with stylish options at all price ranges. Bed & Breakfasts, youth hostels and furnished apartment rentals complete the wide accommodation offer. Conference participants have to make their own accommodation arrangements.

RESTAURATION

Paris, known as the Capital of Gastronomy, invites travellers from all over the world to have a feast! The art of French cooking owes its success to the mastery of classic basics updated by today's chefs. The city has the second highest number of Michelin-recommended restaurants in the world. Besides notorious haute-cuisine temples, Paris is replete with informal cafés, eccentric wine bars, vintage bistros, and the new bistronomiques, serving affordable modern cuisine in a casual setting. Finding baguettes of unrivalled crispness is no challenge here. All sorts of world cuisines are also well repre-sented.

ORGANIZATION

The organizing structure is the CR2P (Centre of Research on Palaeobiodiversity and Palaeoenviron- ments - paleo.mnhn.fr). This laboratory is composed of lecturers and professors from the MNHN (National Museum of Natural History) and the UPMC (Pierre & Marie Curie University – Paris 6) and of researchers from the CNRS (National Scientific Research Center). Altogether, the CR2P includes 41 tenured scientists, 27 postdocs and PhD students, and 27 engineers, technicians and adminis- trative staff. This makes it one of the largest research laboratories in the world exclusively devoted to Palaeontology. The French Geological Society (SGF) will support the congress organization.

PRESENTATIONS AND LANGUAGE OF THE CONGRESS

Detailed instructions for duration of regular talks and for preparation of posters and talks will be given in the second circular. English will be the official language of the meeting and excursions.

Abstracts: collected abstracts will be published on-line and made available on memory sticks to all participants. It is also planned to publish symposium proceedings in reputable journals.

SYMPOSIA

The Plenary opening session ceremony will take place at the Mutualité; it will include some invited talks. The scientific sessions will be organized in parallel on Pierre & Marie Curie University Campus and in the Jardin des Plantes amphitheatres. All these places are separated by less than 500 m.

Some scientific sessions have already been proposed by the French palaeontologists:

- African Vertebrate Palaeontology
- Angiosperms, from the beginning to their diversification
- Back to the sea: from Late Palaeozoic to Cenozoic, the marine tetrapod adventure
- Biodiversity changes through times: crisis and radiations
- Biomineralisation and life
- Bird evolution
- Data, dispersals and interchanges through time: a land mammal perspective
- Databases in palaeontology: sharing knowledge for leveraging research options
- Early Life: origin, triggers and diversification
- Evolution of Indo-Pakistan biotas from the break-up of Gondwanaland
- Evolution of trees and forests
- Fossil 2D/3D imagery: approaches, advances, management
- Fossils & Recent, Molecules & Morphology: dialogs between the approaches
- Fossils and stratigraphy: an old but still dynamic symbiosis
- Intimate interactions
- Konservat-Lagerstätten
- Macroecology and the fossil record
- Microorganism evolution and interaction with biogeochemical cycles and climate
- Neogene environments
- Palaeontology and geological heritage
- Palaeozoic seas: from deep to shallow
- Practical micropalaeontology (including palynology)
- Timetrees
- XXIst Century palaeohistology of mineralized tissue.

MID-CONGRESS EXCURSIONS

- Survey of the MNHN Collections (only through early request).
- Field trip to underground quarries at Meudon
- Guided geological walks inside Paris
- One-day visit at IPANEMA, SOLEIL synchrotron, Saint Aubin, Paris Region
- The Cenozoic of the Southern Paris Basin
- Visit of the "Centre de Recherche pour la Conservation des Collections" (MNHN

FIELD EXCURSIONS

France is unique for the outstanding richness and importance of its fossil localities, all easily acces- sible, with all periods of the Phanerozoic geological time represented. Some of the earliest geolo- gical maps were produced here by Cuvier and Brongniart, and many stratotypes (Cenomanian, Givetian, Lutetian, Turonian, etc.) are located here.

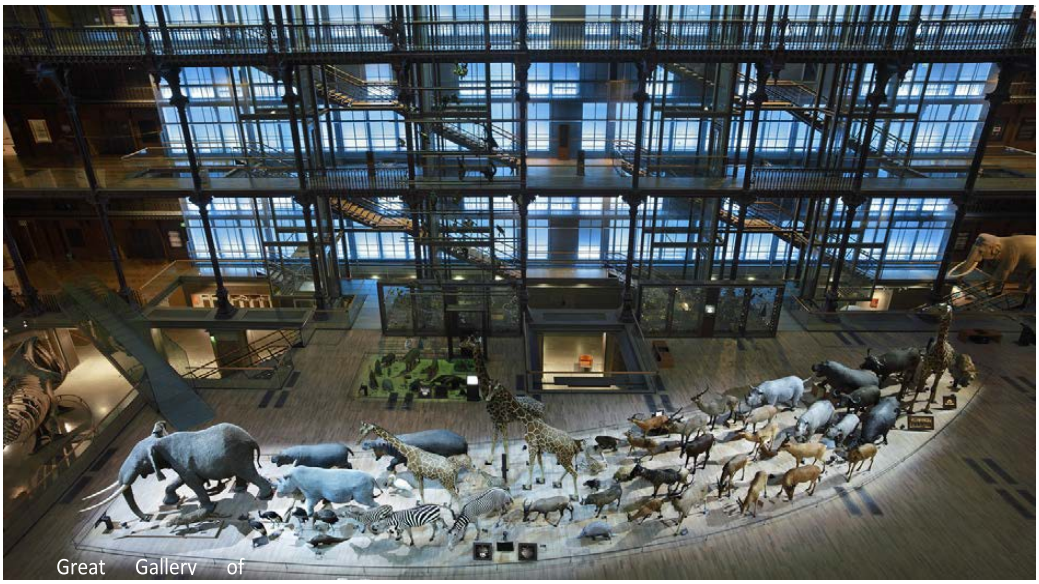
Participants will enjoy a unique experience in palaeontological journeys that will be exquisitely combined with gastronomical, artistic or historical adventures!

We propose here pre- and post-congress fieldtrips:

•Anjou noir, Anjou blanc, Anjou rouge: paleontology and geology of the Loire Valley
4 days
•Excavations at the Early Cretaceous Dinosaur Bonebed of Angeac-Charente
5 days
•Geology, wine and culture: Jura, Bourgogne and Champagne
6 days
•Jurassic from Normandy
2 days
•Jurassic from Northern Burgundy to Lyon area: fossils, wine and patrimonial aspects
4 days
•Le Regourdou (Dordogne) : "the cave of the Neandertal Man who saw the bear"
2 days
•Luberon & Haute-Provence palaeontological sites (Southeast France)
5 days
•Mid-Late Palaeozoic of western Europe : the Belgian Classics
3 days
•Montceau-les-Mines Lagerstätte (Carboniferous) and Autunian Stratotype (Permian)
2 days
•Permian and Mesozoic environments in southern France
5 days
•The end-Permian mass extinction and the Early Triassic biotic recovery in the Dolomites (Southern Alps, Italy)
4 days
•The Late Jurassic dinosaur trackways from Jura
5 days

SOCIAL PROGRAM

IPC5 "cocktail dinatoire" will be organized on Tuesday 10th evening in **the Great Gallery of Evolution in the National Museum of Natural History**. The Gala diner will take place on Thursday 12th evening.



Great Gallery of

REGISTRATION

The registration fees will include the Tuesday evening cocktail, the coffee breaks and the conference documents. The Gala Diner is optional; additional information and price will be in the second cir- cular.

Refund of registrations fees will be subject to conditions. Details will be given in the next circular.

	Full registration	Students
September 1st to December 31st, 2017	**360 €**	**200 €**
From January 1st to March 31st, 2018	**460 €**	**290 €**
From April 1st, 2018 to June 30th, 2018	**560 €**	**380 €**

TRAVEL GRANTS

The organising Committee is looking for corporate and governmental sponsorships in order to get travel grants for students. Additional information to apply will be in the next circular.

Our delegates are advised to take out their **own private medical and personal insurance for the duration of the Congress and field excursions.**

IMPORTANT DATES

- Second circular: Spring 2017
- Call for symposium topics before May 31st, 2017
- Opening of registration: September 1st, 2017

contact : congress-ipc5-contact@mnhn.fr

ORGANIZERS

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Ronan Allain and Patrick De Wever
Scientific chairs
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Palaeontologists from other institutions in France (Universities of Bordeaux, Brest, Burgundy, Lille, Lyon, Montpellier, Nantes, Poitiers, Rennes, Toulouse and the regional Natural History Museums) are involved with the organization of both fieldtrips and symposia.

DEVONIAN PUBLICATIONS

GSA ANNUAL MEETING, DENVER, COLORADO, 2016 – Interesting Devonian Abstracts

For a compilation of contributions that at least partly dealt with the Devonian you can go to: https://gsa.confex.com/gsa/2016AM/webprogram/start.html#srch=words/Devonian. For there you can proceed to the individual abstracts.

The list below includes only (in alphabetical order) presentations that addressed Devonian stratigraphy, events, palaeogeography, and important fossil groups. All are part of the *Geological Society of America, Abstracts and Program*, **48** (7).

BEARD, J. A., BUSH, A. M., FERNANDES, A. M., GETTY, P. R. & HREN, M. T. Stratigraphic revision and facies analyses of the Frasnian-Famennian boundary interval (Upper Devonian) in New York and Pennsylvania. – Paper No. 344-15.

BROUSSARD, D., DAESCHLER, T. & TROP, J. M. Faunal variation of Late Devonian tetrapod assemblages from Catskill Formation sites in north-central Pennsylvania. – Paper No. 162-10.

CARMICHAEL, S. K., WATERS, J. A., PASCHALL, O. C., KÖNIGSHOF, P. & JOACHIMSKI, M. M. Sustained oceanic anoxia in the Late Devonian Pho Han Formation, Cat Ba Island, Vietnam. – Paper No. 240-14.

COHEN, P. & KELLY, A. Organic-walled microfossil assemblage variation through the Late Devonian Kellwasser Events in New York State. – Paper No. 137-6.

CUSHAN, K. E. & BARTHOLOMEW, A. Middle Devonian plant specimens from the Plattekill Fm., Shokan, NY. – Paper No. 162-46.

EGENHOFF, S., AHLBERG, P., MALETZ, J. & PAXTON, S. T. Event deposition in shales – Woodford Shale, Oklahoma, USA, and Bjorkasholmen Formation, Sweden. – Paper No. 125-2.

FREDERICK, P. A. JR., SWEET, D. E. & ROHR, D. M. Facies analysis and age relationships of Late Devonian – Middle Pennsylvanian carbonates of the southern Alexander Terrane, SE Alaska. – Paper No. 82-13.

GRANHOLM, J. W. JR., CARMICHAEL, S. K. & WATERS, J. A. Detection of anoxia at the Devonian-Carboniferous boundary in the Namur-Dinant Basin, Belgium. – Paper No. 76-32.

HAGADORN, J. W., BULLECKS, J., SOAR, L. K., LAHEY, B. L., OVER, D. J., WISTORT, Z. P. & HOLM-DENOMA, C. S. Colorado mass extinction: weird facies and cool fossils from the end-Devonian Dyer Formation. – Paper No. 137-7.

HEDHLI, M., GRASBY, S. E., BEAUCHAMP, B., ARDAKANI, O. H. & SANEI, H. Latest Devonian demise of carbonate factories caused by basin-to-shelf anoxia in western Laurentia. – Paper No. 311-1.

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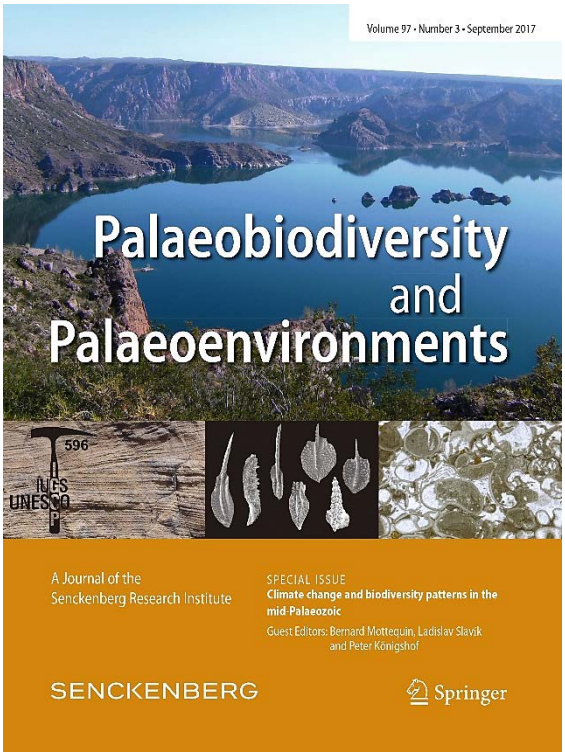

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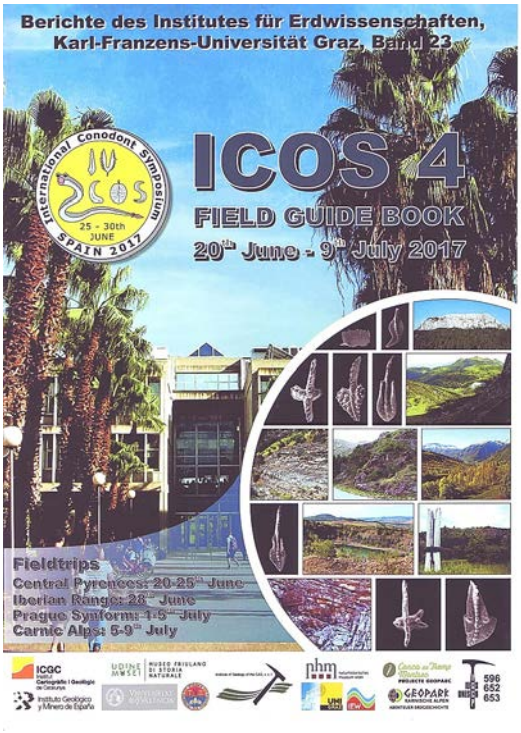

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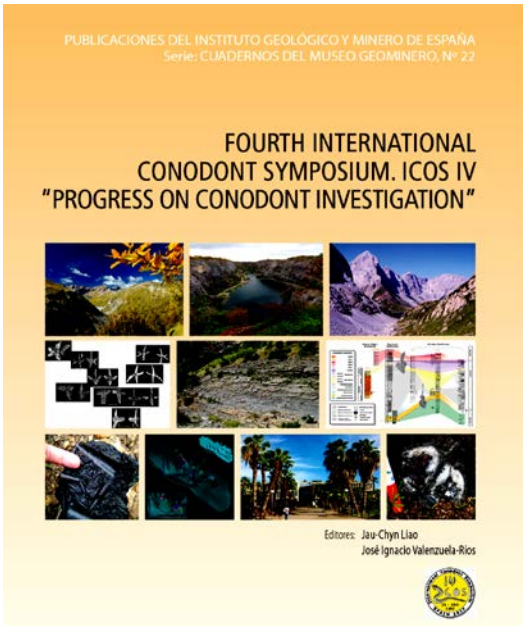

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MEMBERSHIP NEWS

CM Gordon C. BAIRD

I have been working with Dr. Joseph HANNIBAL (Cleveland Natural History Museum) in the mapping of highest Devonian strata in the state of Ohio in order to determine the physical relationship of the enigmatic red Bedford interval to adjacent units. The key questions surrounding this deposit is whether it is an offshore marine or terrestrial unit, and whether it is in some way linked to a glacial or non-glacial phase of the end-Devonian story.

At present, I am also working in conjunction with Carlton BRETT and museum staff at the Paleontological Research Institute in Ithaca, NY, in building and organizing a large, curated, stratigraphic collection of rock specimens and associated fossils that we have assembled over a 45 – year period. 1400 samples from the Lower and Middle Devonian of New York State and adjacent areas has now been added to the museum holdings, which will be rendered digitally accessible globally in the near future.

Publications

ZAMBITO, J. J. IV, JOACHIMSKI, M. M., BRETT, C. E., BAIRD, G. C. & ABOUSSALAM, Z. S. (2016). A carbon isotope record for the Late Givetian (Middle Devonian) Global Taghanic Biocrisis in the type region (northern Appalachian Basin). - In: BECKER, R. T. & KÖNIGSHOF, P. (Eds.), Devonian Climate, Sea level and Evolutionary Events, Geological Society Special Publication, **423**: 223 – 234.

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TM R. Thomas BECKER, CMs Sven HARTENFELS, Zhor Sarah ABOUSSALAM, Stephan HELLING, and the Münster Group

Field work in Morocco was conducted jointly with Heiko HÜNEKE, Oliver MAYER and his student group from Greifswald and with Moroccan counterparts Ahmed EL HASSANI and Lahssen BAIDDER, in the frame of their current DFG project on Devonian contourites. In spring 2017 we concentrated on the poorly studied Palaeozoic outcrop belt at the foot of the High Atlas and to the N/NE of Ouarzazate (Skoura region). There, the variably thick Lower Devonian is in Anti-Atlas type pelagic facies, followed by more neritic Middle/Upper Devonian preserved only in massive Eovariscan breccia beds. Especially interesting was the discovery of a *Mimagoniatite*s marker unit (Fig. 1) at the top of the lower Emsian. We failed to reach the Devonian succession east of the high Tizi n´Tichka Pass (on the way to Marrakech) because we climbed up the wrong steep mountain, where the widely visible Silurian black shales are unexpectedly capped by a thrust fault and post-Devonian limestones. Subsequently, we re-sampled sections in the Jebilet and Rehamna, with a focus on the Silurian-Devonian transition and Eovarican reworking.

Fig. 1. *Mimagoniatites* in a marker unit at the top of the lower Emsian at Taliouine, N of Ouarzazate (March 2017).

In other Moroccan matters, joint work with Jürgen BOCKWINKEL (Leverkusen) on upper Givetian pharciceratid faunas from the Anti-Atlas continued. As a result, a detailed study on the *Taouzites* Bed of Ouidane Chebbi, including conodont data, has been published (BOCKWINKEL et al. 2017). We have started another manuscript that will concentrate on the oldest pharciceratid faunas of the Tafilalt, from around the proposed middle/upper Givetian boundary level. At a slow pace, other Moroccan ammonoid faunas are studied. These will play an important role in the forthcoming field trip to the Devonian/Lower Carboniferous of the Tafilalt/Maider in conjunction with the **10th International Cephalopod Symposium**, which Ahmed and I (with many others) will organize in spring 2018 in Fes.

In March 2017, the Münster Group, jointly with the Palaeobotany Group (Hans KERP and students), organized the **Annual Meeting of the Paläontologische Gesellschaft**, more than 50 years

after the society last visited the city. A meeting report can be found in the newsletter GMit (BECKER & KERP 2017). Before and after the scientific sessions there were one-day field trips to the Hönne Valley and to the eastern Rhenish Massif, with a focus on the Frasnian-Famennian (Beringhauser Tunnel, Winsenberg Road Section) and Devonian-Carboniferous boundaries (Drewer). The distributed field guides were identical to the chapters in the Rhenish Massif Guidebook published last year in our institute journal (see SDS Newsletter **31**).

Ongoing/continuing research in the Rhenish Massif concentrates on the Velbert Anticline, where large active quarries and motorway constructions open new outcrops. But it is also surprising how many old quarries have never been properly studied. We concentrate on reef faunas, extinctions, the post-reefal facies, ammonoid and conodont faunas. There is a close cooperation with the Krefeld Survey (Geologischer Dienst) and Rheinkalk/Lhoist Group. A range of experienced and highly motivated amateur collectors are very cooperative and frequently show their findings. Excavations for buildings open also some interesting outcrops in the northern Rhenish Massif (Hagen to Iserlohn areas). In the eastern Rhenish Massif, the joint work with Greg RACKI and co-authors on the lower/middle Frasnian boundary (Padberg section) has not yet been completed; a joint publication is in progress. We also agreed to work in future together with David DE VLEESCHOUWER (Bremen) and Peter KÖNIGSHOF (Frankfurt a.M.) on Famennian cyclostratigraphy, in the frame of the current IGCP 652 on "Reading geological time in Paleozoic sedimentary rocks".

After the D-C Boundary Workshop in Montpellier in autumn 2016 we increased our efforts to revise and refine the stratigraphy of various important sections, from Lalla Mimouna in the Anti-Atlas, the La Serre Trench C in the Montagne Noire (CIFER et al. 2017a, 2017b), the Royseux section in the Ardennes with the globally youngest rich phacopids (new conodont and microfacies work, BECKER & HARTENFELS 2017) and neritic succession of Klein-Steinkothen (western Velbert Anticline, with Hans-Georg HERBIG, Cologne), to the palynomorph-rich shales of Riescheid (Sven and Christoph HARTKOPF-FRÖDER, Krefeld), the classical sections of Oese, Oberrödinghausen, and Drewer, the mostly neglected Reigern Quarry near Hachen (SÖTE et al. 2017), and the type-locality of the Wocklum Limestone and of *Protognathodus kockeli* near Wocklum (BECKER & HARTENFELS 2017; HARTENFELS et al. 2017). Close cooperation with Agnes PISARZOWSKA and her group from Poland led to a revised understanding of clastic sedimentation during the peak of the global Hangenberg Regression in the Rhenish Massif (KOLTONIK et al. submitted). An attempt is planned to combine the dispersed many data from at least four different research groups concerning the Kule section near the Uzbekhistan-Tadzhikistan boundary in one joint publication but this will certainly need some time. More immanent is the publication of the first ammonoids from the Hangenberg Black Shale of a section in South China, jointly with MA Xueping and his co-authors (ZHANG et al. 2017 in prep.).

Other joint work concerning Chinese Devonian successions is continuing but progress has been slow. This applies to the second taxonomic part on Famennian conodonts from Xinjiang, jointly with WANG Zhihong, or to Frasnian goniatites from Hunan (with MA Xueping). The rich Devonian ammonoid collections from the Canning Basin have become the subject of student projects (see below). Some new lower Emsian ammonoids from Victoria hopefully will eventually be published in 2018. This, and a begun revision of *Teicherticeras*, will form the base for the first chapter (on the Mimosphinctacea) of the revised Devonian ammonoid Treatise.

A summer highlight of 2017 was the ICOS 4 symposium and the well-organized and "stimulating" (in various ways) field trips to the Devonian of the Pyrenees and Celtiberia, Well done, Nacho, Teresa, Carlo, Peter etc. Especially delighting was the recovery of many new *Falcitornoceras* specimens from the basal Famennian. A few conodont samples are hopefully useful to check the suitability of Theresa´s Pyrenees sections in the search of a future upper Givetian GSSP.

CM Sven HARTENFELS

As a part of the congress committee, I was deeply involved with the organization of the 88th Annual Conference of the Paläontologische Gesellschaft and, as a part of the editorial board, strongly occupied with the editing of the congress abstract volume (*Münstersche Forschungen zur Geologie und Paläontologie*, vol. **109**). The annual conference took place in Münster, March 26th to 30th, and two Devonian excursions were successfully guided. Together with Sören STICHLING, we introduced the evolution of the Hönne Valley Reef Complex and the subsequent Upper Devonian strata of the northern Sauerland and, together with Thomas, mass

extinction events in the Upper Devonian of the eastern Sauerland.

Research concentrated in the last year on Famennian to Lower Carboniferous successions of the Rhenish Massif, Thuringia, Montagne Noire, and SE Morocco. I continued to collaborate with Christoph HARTKOPF-FRÖDER (Krefeld), Hans-Georg HERBIG, and Sarah ESTEBAN LOPEZ (both Cologne) on the revision of the Famennian to Lower Carboniferous Riescheid section of the Velbert Anticline. Together with Thomas and Tomáš KUMPAN (Brno), I re-sampled the so far insufficiently studied type section of the Wocklum Limestone and of important uppermost Famennian index clymenids, the Borkewehr near Wocklum (northern Rhenish Massif; BECKER & HARTENFELS 2017; HARTENFELS et al. 2017). The conodont samples provide sparse to moderately rich faunas, which enable the location of zonal boundaries and, most importantly, the evolutionary succession of species within the genus *Protognathodus*. Current data suggest that the phylogenetic change from advanced *Pr. collinsoni* to *Pr. kockeli* is recognizable in the first few transgressive limestones immediately after the siliciclastics of the glacio-eustatic Hangenberg Regression. Therefore, it conforms to the recently decided criteria for the future Devonian/Carboniferous GSSP level. Thin-sections of each conodont-bearing layer were investigated for microfacies analyses and give no hints for reworking processes. These new results were presented at the 4th International Conodont Symposium (ICOS IV) held at the end of June in Valencia, Spain.

Fig. 2. Top of the Wocklum Limestone and sharp base of Hangenberg Black Shale in the classical D/C section of the Oberrödinghausen Railway Cut.

In co-operation with Peter KÖNIGSHOF (Frankfurt am Main), David De VLEESCHOUWER (Bremen), and Thomas, I started to re-investigate the Effenberg Quarry (see HARTENFELS 2011, *Münstersche Forschungen zur Geologie und Paläontologie*, vol. **105**) in the frame of the new IGCP 652 project. Based on the completed M.Sc. thesis of Marius SACHER in 2016, I also continued work on the cyclic Oberrödinghausen Railway Cut (including both *Annulata* Black Shales as well as the Dasberg and Hangenberg Black Shales; Fig. 2).

During the last year, my Moroccan conodont work was mainly devoted to the biostratigraphy of El Khraouia (eastern end of Amessoui Syncline, southern Tafilalt) and the ongoing study of Devonian/Carboniferous successions of the northern Maider (Lalla Mimouna and Jebel Rheris West). There is also a wide range of Famennian samples from the Moroccan Meseta (provided by Sarah and Thomas). This includes a special focus on the Ziyyar section in the Khenifra region, which includes the *Annulata* Events.

Jointly with Thomas, many B.Sc. and M.Sc. students have been supervised, some of which (see below) presented their research results at national and international meetings (e.g. HERBERS et al. 2017). During a trip to southern France with Felix LÜDDECKE, we spent two days in the field with Raimund FEIST and Jean-Jacques CORNÉE (both Montpellier), in order to advance work on the La Serre trench C, which is situated 200 m east of the present GSSP trench E'. In contrast to the stratotype section, the Hangenberg Black Shale is well-developed below the regressive oolithic sequence; nevertheless, sedimentological evidence and conodont faunas allow a fine-scaled lateral correlation. There is a co-operation with Tim CIFER (Ljubljana), Carlo CORRADINI (Cagliari), Catherine GIRARD, Raimund FEIST, Jean-Jacques CORNÉE (all Montpellier), and Sandra I. KAISER (Stuttgart). First results were presented at the 4th International Conodont Symposium (ICOS IV; CIFER et al. 2017b).

CM Zhor Sarah ABOUSSALAM

Sarah continued her wide range of Devonian conodont studies. In the focus were final samples from the Moroccan Meseta in order to progress with publications on the reef drowning and extinction (ABOUSSALAM et al. 2017 in prep.) and on the timing of Eovariscan reworking. The revision of the age of a supposed Devonian reef limestone in the Haouz region S of Marrakech (ABOUSSALAM et al. 2017 in press) should already have been published but there is a continuing delay with the volume in "Stratigraphy" in honor of the late Rich LANE. In

2016/2017 some new samples were collected in order to provide more precision for the age of reworked clasts in Famennian breccias of the Jebilet (Fig. 3), Rehamna, Khenifra, and Azrou regions. Rare conodonts showed the presence of a thick Emsian succession in a poorly studied region south of Meknes, which requires more future work.

Fig. 3. Re-sampled limestone clasts in the polymict "red conglomerate" at the base of the Jebel Ardouz succession W of Marrakech (western Jebilet).

Conodont data will also be supplied to the joint contourite project with Heiko HÜNEKE and his Greifswald team. Some faunas from the eastern Tafilalt were added to the joint publication on a rich pharcoceratid fauna from the upper Givetian (BOCKWINKEL et al. 2017).

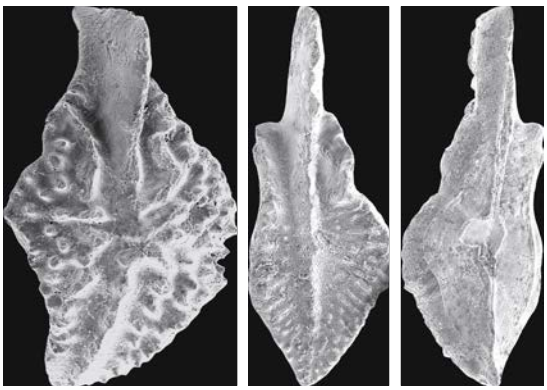

Fig. 4. Two new and unusual *Schmidtognathus* from the terminal Givetian of Giebringhausen.

Concerning the Rhenish Massif, there are additional faunas from the Padberg section in the eastern Sauerland (joint project with Greg RACKI and co-authors). Numerous conodont samples were identified for the ongoing work in the Velbert Anticline region (Hofermühle, Wülfrath and Neandertal reefs; e.g. ELLERKAMP et al. 2017). Sarah also assisted Sören in the identification of his Frasnian assemblages from boreholes of the Hönne Valley (STICHLING et al. 2017). Because new questions arose concerning the upper Givetian conodont zonation, the still unpublished detailed data from Giebringhausen were updated as a contribution to ICOS 4 (ABOUSSALAM & BECKER 2017; examples in Fig. 4).

Close cooperation with Carl BRETT, Jay ZAMBITO, Gordon BAIRD and Alex BARTHOLOMEW led to a revision of the Givetian, around the global Taghanic Crisis, in Kentucky. A joint manuscript has been submitted (BRETT et al. 2017, 2017 submitted). This work was utilized as a part of the base for a new DFG Project on "The Afro-Appalachian Seaway", which shall unite our Münster Group with Ahmed EL HASSANI, Lahssen BAIDER, and our American friends. It shall compare the complete Devonian sequences of SW Morocco with those of the Appalachian Basin, including eventual (quantitative) biogeographic comparisons. We are very eager to track the eastern North American sequences and events in the Aoucert and Smara region to the Tan-Tan region and western Dra Valley, and vice versa. It will take some time before we learn whether this ambitious project will receive funding.

CM Stephan HELLING

Fig. 5. Joint examination (with Oliver MAYER, Greifswald) of a steep Emsian cliff at Asserhmo N of Skoura (foot of the High Atlas).

At the end of last year and the beginning of 2017 I was involved in the planning and organization of the 88th Annual Conference of the Paläontologische

Gesellschaft (March 26th to 30th in Münster). The editing of the congress abstract volume (*Münstersche Forschungen zur Geologie und Paläontologie*, vol. **109**) was one of the main duties. In the course of a teaching position (that started in 2016), I was much occupided to prepare for the first time many lectures for the winter term. After finishing that position in spring, I joined Thomas during a short field campaign in Morocco, partly together with Ahmed EL HASSANI, Lahssen BAIDDER, Oliver MAYER, Heiko HÜNEKE and some students of the Greifswald group (Fig. 5), mainly in the areas around Ouarzazate and Marrakech. I focused on sampling Lower Devonian trilobites (Pragian to Emsian) as reference material for my studies on the trilobite faunas from Taourirt n´Khellil ("Ait Issa") and Ain-Al-Aliga (Oued Cherrat Valley region of the Meseta). Two papers will be published in 2018 with a description of these faunas.

In cooperation with the LWL Museum für Naturkunde in Münster I started to work on some rare trilobite specimens from the eastern Rhenish Massif, mainly upper Emsian to lower Eifelian in age. This work will continue until the end of 2017 and the results will be published next year.

Research students

Due to his limited time outside a full-time job in applied geology, **Stephan EICHHOLT** makes slow progress with his Ph.D. studies on Givetian/Frasnian reef facies developments in the Moroccan Meseta. A manuscript on the Oulmes (Ain Jemaa) Biostrome and reefal blocks of many other localities to the east (Meknes-Azrou-Fes regions) should be finished in 2018.

Sören STICHLING is in the second year of his Ph.D. study on the facies history and stratigraphy of the Hönne Valley Reef Complex (northern Rhenish Massif). It is funded by the Rheinkalk GmbH/Lhoist Group, who supply extensive cores of old and new boreholes. He gave a presentation at the annual meetings of the Paläontologische Gesellschaft in Dresden and at the ICOS symposium in Valencia (STICHLING et al. 2016, 2017). A manuscript on the final reef phase (e.g., Fig. 6), extinction and post-reefal beds is close to completion (planned for "Facies").

Anna SAUPE continued her M.Sc. project on agglutinating foraminifere assemblages form the Rhenish Massif, Thuringia, Montagne Noire, and Morocco (Khenifra region). Results of biofacies analyses were presented at the Münster Meeting of the Paläontologische Gesellschaft (SAUPE et al. 2017) as well as the annual meeting of the national SDS in spring 2017 in Hof (Franconia).

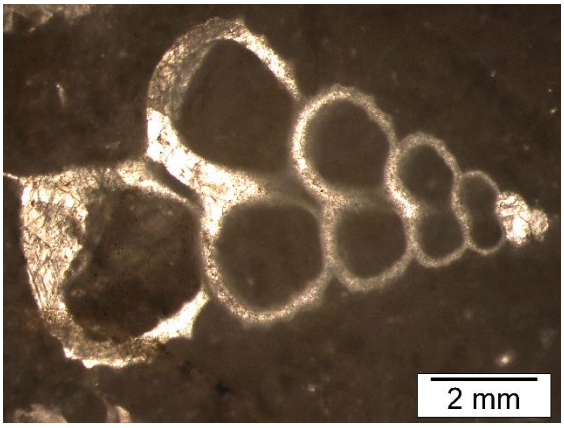

Fig. 6. Gastropod from the terminal (top lower/basal middle Frasnian) biostrome of the Hönne Valley Reef Complex (northern Rhenish Massif) at the Beul.

Till SÖTE has started a M.Sc. project on the comparison of lower Famennian goniatites from the Canning Basin with Rhenish type material, based on morphometric data. As noted above, he has published in 2017 the results of his B.Sc. Thesis, including data (by RTB) on the local ammonoid record (SÖTE et al. 2017).

Julia RICHTER finished her M.Sc. Thesis on the upper Emsian to lower Givetian and upper Famennian microfacies and conodont stratigraphy of the isolated Immouzer-du-Kandar Palaeozoic south of Fes. It was possible to track down the precise position of the Chotec Event whilst the Kacak Event is locally not evident as a facies break. The origin of a thick pile of (reworked) volcanic pebbles below the studied upper Famennian sequence remained enigmatic.

Felix LÜDDECKE presented his B.Sc. Thesis at the 4th International Conodont Symposium (ICOS IV) and participated in the post-conference fieldtrip to the Prague Synform and the Carnic Alps. His thesis dealt with the conodont biofacies analysis of a monotonous, middle Famennian carbonate succession (Upper Ballberg Quarry, Rhenish Massif). Results are online at DOI 10.1007/s12549-017-0288-x and published in the IGCP 596 issue of *Palaeodiversity and Palaeoenvironments*. The paper includes a new approach to conodont biofacies and a new icriodid species (LÜDDECKE et al. 2017). In Mai 2017, Felix and Sven spent ten days in southern France, partly with Markus ARETZ and Elise NARDIN (both Toulouse), to take conodont and microfacies

samples for Felix's upcoming M.Sc. thesis. It will concentrate on the so far insufficiently studied Famennian part of the Talweg de la Fontaine-de-Santé section.

Maro-Pascal ELLERKAMP started to write up his account of the Hofermühle (NW Velbert Anticline, western Rhenish Massif) gastropod fauna, which has been dated as upper Givetian to basal Frasnian (conodont data by Sarah) and which includes two new, rare taxa. There was a focus on the impact of the Taghanic Crisis on gastropod successions (see ELLERKAMP et al. 2017).

The B.Sc. of **Lars OTTO** dealt with the poorly studied Mauxion Quarry adjacent to the famous Bohlen section of Thuringia. He analyzed the microfacies and conodont faunas from just around the *Annulata* Events. As at the Bohlen, the Wagnerbank is developed as a *Prionoceras*-rich interval.

Sven and I gave **Patrick KRISPIN** Famennian limestone samples from the famous Kowala Quarry in the Polish Holy Cross Mountains in order to clarify aspects of the pelagic micrite origin by high-resolution SEM analysis. First results are very promising.

Stephanie ROSCHIG started in the frame of a B.Sc. project to use detailed ontogenetic morphometrics for a comparison of lower/middle Famennian sporadoceratid goniatites from the Rhenish Massif, southern Morocco, Iran, and Western Australia. There is more morphological variation than anticipated but, despiter their more distant origin, Australian specimens are closer to the German material than the Moroccan representatives.

Sascha MIKOLAJEWSKI conducts a mapping project in the type-region of the famous Neanderthal, where the famous *Homo neanderthalensis* lived in caves of hardly studied Givetian reef limestone. Some of the local quarries have never been visited by a professional geologist ! In cooperation with the mapping team of the Krefeld survey (Geologischer Dienst, notably with Martin SALAMON), Sascha concentrates on the Middle/Upper Devonian successions at the two limbs of the narrow Herzkamp Syncline, with the Neander valley in the N (southern end of Velbert Anticline) and the Millrath-Gruiten region in the SE (NW end of Remscheid-Altena Anticline). We hope to clarify the timing of reef extinctions in comparison to the Hofermühle and Wülfrath reefs to the north.

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CM Alain BLIECK

Research interests:

Palaeozoic vertebrates, and in particular Early Devonian Pteraspidomorphs (Heterostraci): taxonomy, phylogeny, palaeobiodiversity, biostratigraphy, palaeobiogeography, palaeoenvironments.

Research in progress: Lochkovian tesseraspids from Severnaya Zemlya (Russia), Lochkovian cyathaspid from Prince of Wales Island, Nunavut, Canada (in collaboration with Prof. D. K. ELLIOTT, NAU), new phylogenetic analysis of cyathaspid heterostracans …

Palaeontological / geological heritage of northern France.

History of geology, and in particular of the Société Géologique du Nord (funded 1870).

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BLIECK, A. (2016). - Le «Great Eodevonian Biodiversification Event» (GEBE): le cas des hétérostracés (vertébrés). - In: Congrès 2016 de l'Association Paléontologique Française (Elbeuf, 30 mars – 2 avril 2016), Résumés. Bull. Soc. Etude Sci. Natur. Elbeuf, 2016: 12; S.E.S.N.E. – = Journal de l`Association Paléontologie Francais, **70**: 18.

CUVELIER, J., BLIECK, A., OUDOIRE, T. & VACHARD, D. (2016). Les collections publiques lilloises de géologie, minéralogie et paléontologie: 10 catalogues publiés après 17 ans d'inventaire, et ce n'est pas fini…- In: Congrès 2016 de l'Association Paléontologique Française (Elbeuf, 30 mars – 2 avril 2016), Résumés. Bull. Soc. Etude Sci. Natur. Elbeuf, 2016: 12; S.E.S.N.E. – = Journal de l`Association Paléontologie Francais, **70**: 37 [poster].

BLIECK, A. (2016). The Great Eodevonian Biodiversification Event: The case of heterostracan vertebrates. – In: GURDEBEKE, P., DE WEIRDT, J., VANDENBROUCKE, T. R. A. & CRAMER, B. D. (Eds.), The Early to Mid Palaeozoic Revolution (IGCP 591 Closing meeting, 6-9 July 2016, Ghent), Abstracts: 26; Ghent University publ.

BLIECK, A. (2017). Les Tesséraspidiformes, un groupe d'organismes énigmatiques au sein des vertébrés basaux. – In: Congrès APF 2017 – Dijon (29 mars – 1er avril 2017), Livret des résumés: 4; Biogéosciences, Dijon.

BLIECK, A. & BURROW, C. J. (2017). Fifty years of international symposia on early/lower vertebrates: honoring Dr. Susan TURNER, colleague, friend and mentor. – In: GINTER, M. (Ed.), 14th International Symposium on Early and Lower Vertebrates, Chęciny, Poland, 2017, Ichthyolith Issues, Special Publication, **13**: 10-11.

BLIECK, A. (2017). Tesseraspidiformes (Vertebrata: †Pteraspidomorphi: Heterostraci), a group of enigmatic early vertebrates. – In: GINTER, M. (Ed.), 14th International Symposium on Early and Lower Vertebrates, Chęciny, Poland, 2017, Ichthyolith Issues, Special Publication, **13**: 21-22.

CM Iliana BONCHEVA

I can not tell much about activities for SDS because, apart from me, no one else works on conodonts in Bulgaria. Unfortunately, young people and students haven't much interest to work in such a difficult and low-paid profession. I've been working in recent years on dating the sedimentation duration until the end of the Paleozoic, before the closing of the Rheic Ocean (s.l.) to the distant East. I also keep interests in the shallow-water zonation and facies.

An annual conference of the Bulgarian Geological Society is held annually in December, where I usually present a poster or a report associated with conodont stratigraphy.

Abstracts

BAHRAMI, A., BONCHEVA, I. & YAZDI, M. (2016). Devonian shallow water deposits at Northern margin of Gondwana: case study from Central Iran, Isfahan province. – Reviews of the Bulgarian Geological Society, Geosciences 2016: 105-106.

BONCHEVA, I. & V. SACHANSKI (2016). Upper Devonian global events in Western Bulgaria. - Reviews of the Bulgarian Geological Society, Geosciences, **77**: 107-108.

BONCHEVA, I. & V. SACHANSKI (2016). New data on the age of the rocks of Rizovtsi allochthone (Morava Unit) at Stradalovo village, Kyustendil district. - Reviews of the Bulgarian Geological Society, Geosciences, **77** (1): 19–25.

TM Carlton E. BRETT

During the summer of 2016, I continued working with colleague Dr. James ZAMBITO (Wisconsin Geological Survey) on sampling of new exposures of Middle Devonian rocks in Kentucky. These samples have been processed for conodonts and carbon isotopes at the Wisconsin Geological Survey. Assuming that these samples yield abundant datable material, we will work toward establishing a late Givetian GSSP (stratotype) in Kentucky. Regardless, the results will lead to a more nuanced view of the interplay of eustatic and tectonic factors during a very volatile time in Earth history. We have prepared a paper on our preliminary findings and are about to submit it for publication

I am continuing to collaborate with Dr. Charles VER STRAETEN (New York State Geological Survey), Gordon BAIRD (SUNY College Fredonia), Alex BARTHOLOMEW (SUNY New Paltz), Jay ZAMBITO (Wisconsin Geological Survey), and several other New York straitgraphers in the revision of the New York State Devonian Stratigraphic Correlation Chart, which is intended to comprise a series digital charts showing the 2012 geological time scale, biostratigraphy, stratigraphic units, facies changes, bioevents and others.

I spent a total three weeks working collaboratively with German, Czech, and Belgian colleagues on a new research initiative on the cycle, sequence stratigraphy, paleoecology and bioevents of the Devonian of Morocco and North America. I spent a week collaborating with Dr. Anne Christine DASILVA on the Devonian of New York State. The objective of this research is to quantify evident cyclicity in the Early to Middle Devonian of the Appalachian Basin using magnetic susceptibility. We are testing for hierarchical cycles that would indicate Milankovitch band, orbitally-related climatic cyclicity. Preliminary results are very positive. This holds the promise that we may be able to greatly improve the resolution of chronology for the Devonian stages using astrochronology. It also suggests that facies and biotas were responding to short, intermediate, and long term cyclicity mediated by climatic and/or eustatic sea level.

I also began collaboration with a former student, Dr. Wendy TAYLOR (University of Cape Town, SA) and her colleague Dr. Cameron PENN-CLARKE (proposed as a new CM for Devonian Subcommission) on Devonian sequence stratigraphy and paleontology of the Bokkeveld Group in South Africa. I am now serving as outside advisor for Wendy's student Mhairi REID, who is working on taphonomy and paleoecology of Lower-Middle Devonian ophiuroid assemblages from the Voorstehoek Formation of the Bokkeveld Group.

Publications

ZAMBITO, J. J. IV, JOACHIMSKI, M. M., BRETT, C. E., BAIRD, G. C & ABOUSSALAM, S. Z. (2015 online). A Carbonate Carbon Isotope Record for the Late Givetian (Middle Devonian) Global Taghanic Biocrisis in the Type Region (Northern Appalachian Basin). - In: BECKER, R. T., KOENIGSHOF, P. & BRETT, C. E. (Eds.), Devonian Climate, Sea Level and Evolutionary Events. Geological Society, London, Special Publications, **423**: 201-222, http://doi.org/10.1144/SP423.2

BECKER, R. T., KOENIGSHOF, P. & BRETT, C.E. (2016). Devonian climate, sea level and evolutionary events: an introduction. - In: BECKER, R. T., KOENIGSHOF, P. & BRETT, C. E. (Eds.), Devonian Climate, Sea Level and Evolutionary Events. Geological Society, London, Special Publications, **423**: 1-11, http://doi.org/10.1144/SP423.15.

BŁAŻEJOWSKI, B., BRETT, C. E., KIN, A., RADWAŃSKI, A. & GRUSZCZŃSKI, M. (2016). Ancient animal migration: A case study of eyeless, dimorphic Devonian trilobites from Poland. – Palaeontology, **59** (5): 1-9, doi: 10.1111/pala.12252.

BRETT, C. E., ZAFFOS, A. & MILLER, A. I. (2016). Niche conservatism, tracking, and ecological stasis: A Hierarchical Perspective. – In: ELDREDGE, N., PIEVANI, T., SERRELLI, E.,AND TEMKIN, I. (Eds.), Evolutionary Theory: A Hierarchical Perspective, University of Chicago Press: 282-306.

TM Rainer BROCKE

Research activities were mainly related to our long-term work in the Eifel area and the Rheinisches Schiefergebirge in general:

Work on the Mid Devonian of the Eifel area went on and results of a combination of different methods (palynology, magnetic susceptibility, cyclicity) applied on a rather monotonous marlstone succession in the Hillesheim Syncline (Müllertchen section) were presented at the meeting in Ghent (SCHINDLER et al.). A subsequent paper has been submitted.

Work on the Hunsrückschiefer continued, mainly on palynology of facies equivalents (here Zerf Formation) of the Hunsrückschiefer Lagerstätte. Results have been presented at the meeting IGCP 591/SDS meeting in Brussels (2015) and a subsequent paper has been submitted.

A paper on the Choteč Event (online in 2015) is now available in print (BROCKE et al.).

Contributions to the German Stratigraphic Table 2016 (Stratigraphische Tabelle von Deutschland 2016, STD) were made together with a team of German colleagues. The table should be presented at the 35th International Geological Congress in Cape Town (August/September) by Manfred MENNING, GFZ Potsdam).

Publications

BROCKE, R., FATKA, O., LINDEMANN, R. H., SCHINDLER, E. & VER STRAETEN, C. A. (2016). Palynology, dacryoconarids and the lower Middle Devonian Basal Choteč Event: Case studies from the Prague and Appalachian basins. – In: BECKER, R. T., KOENIGSHOF, P. & BRETT, C. E. (Eds.), Geological Society of London, Special Publications, **423**: 123-169, doi.org/10.1144/SP423.8.

SCHINDLER, E., BROCKE, R., BRETT, C. E., ELLWOOD, B. B., HARTKOPF-FRÖDER, C., RIEGEL, W. & TOMKIN, J. H. (2016). Comparison of palynofacies, magnetic susceptibility and cyclicity of the Mid Devonian Müllertchen Section (Eifel area, Germany). – IGCP 591 "The Early to Middle Paleozoic Revolution", Closing Meeting, Ghent University, Belgium, 6-9 July 2016, Abstracts: 70.

CM Carole BURROW

continues collaborating with European colleagues Mike NEWMAN, Bob DAVIDSON, Jan den BLAAUWEN, and Roger JONES on the ORS fishes of Scotland, with Sue TURNER on Welsh Borderland LORS vertebrates, with Australian colleagues on Devonian early vertebrate faunas from Western Australia, New South Wales and Queensland, with European colleagues including Piotr SZREK on *Machaeracanthus*, and with QM colleague Sue TURNER, and John MAISEY and other American and Canadian colleagues on acanthodian-early shark relationships.

Publications

Journal contributions

BURROW, C. (2017). Reassessment of a mid-Palaeozoic vertebrate assemblage from Laúndos, Portugal. - Journal of Iberian Geology, **43**: 97-110.

BURROW, C. & MURPHY, M. (2016). Early Devonian (Pragian) vertebrates from the northern Roberts Mountains, Nevada. - Journal of Paleontology, **90**: 734-740.

BURROW, C., HU, Y. & YOUNG, G. (2016). Placoderms and the evolutionary origin of teeth: a comment on RUCKLIN & DONOGHUE (2015). - Biology Letters, **12**: 27677820.

BURROW, C., DEN BLAAUWEN, J., NEWMAN, M. & DAVIDSON, R. (2016). The diplacanthid fishes (Acanthodii, Diplacanthiformes, Diplacanthidae) from the Middle Devonian of Scotland. - Palaeontologia Electronica, **19** (1.10A): 1-83.

BURROW, C., DAVIDSON, R., DEN BLAAUWEN, J. & NEWMAN, M. J. (2015). Revision of *Climatius reticulatus* AGASSIZ, 1844 (Acanthodii, Climatiidae), from the Lower Devonian of Scotland, based on new histological and morphological data. - Journal of Vertebrate Paleontology, **35**: e913421.

HAIRAPETIAN, V. & BURROW, C. (2016). A new ischnacanthiform (Acanthodii) from the latest Devonian of Iran and the palaeogeography of Late Devonian ischnacanthiforms. - Journal of Asian Earth Sciences, **124**: 227-232.

LONG, J.., BURROW, C., GINTER, M., MAISEY, J., TRINAJSTIC, K., COATES, M., YOUNG, G. & SENDEN. T. J. (2015). First shark from the Late Devonian (Frasnian) Gogo Formation, Western Australia sheds new light on the development of tessellated calcified cartilage. - PLoS ONE, **10**: 1-24.

NEWMAN, M., BURROW, C., DAVIDSON, R., DEN BLAAUWEN, J. & JONES, R. (2017). Comparison

of the vertebrate faunas of the Lower Old Red Sandstone of the Anglo-Welsh Basin with contemporary faunas in Scotland. - Proceedings of the Geologists' Association.

TURNER, S., BURROW, C., WILLIAMS, R., TARRANT, P. (2017). Welsh Borderland bouillabaisse: Lower Old Red Sandstone fish microfossils and their significance. - Proceedings of the Geologists' Association, **128**: 460-479.

BURROW, C., TURNER, S., MAISEY, J., DESBIENS, S. & MILLER, R. (2017 in press). Spines of the stem chondrichthyan *Doliodus latispinosus* (WHITEAVES) comb. nov. from the Lower Devonian of eastern Canada. - Canadian Journal of Earth Sciences.

Abstracts

BURROW, C., NEWMAN, M., DEN BLAAUWEN, J., JONES, R. & DAVIDSON, R. (2017). The Early Devonian ischnacanthiform acanthodian *Ischnacanthus gracilis* from the Midland Valley of Scotland. – In: GINTER, M. (Ed.), 14th International Symposium on Early and Lower Vertebrates University of Warsaw, Checiny, Poland, 3-8 July 2017: 25.

BURROW, C. & SZREK, P. (2017). Acanthodians from the Lower Devonian (Emsian) 'Placoderm Sandstone', Holy Cross Mountains, Poland – In: GINTER, M. (Ed.), 14th International Symposium on Early and Lower Vertebrates. University of Warsaw, Checiny, Poland, 3-8 July 2017: 25-26.

LONG, J., THOMSON, V. & BURROW, C. (2017). Fossil chondrichthyan and placoderm remains from the Middle Devonian South Blue Range, Victoria, Australia: biostratigraphic implications. – In: GINTER, M. (Ed.), 14th International Symposium on Early and Lower Vertebrates Checiny, Poland, 3-8 July 2017: 54-55.

TRINAJSTIC, K., DUPRET, V., JOHANSON, Z., BURROW, C., SMITH, M., LONG, J., FRASER, G., CLEMENT, A. & MAKSIMENKO, A. (2017). A mechanism for tooth resorption in arthrodires. – In: GINTER, M. (Ed.), 14th International Symposium on Early and Lower Vertebrates Checiny, Poland, 3-8 July 2017: 75.

TURNER, S., BURROW, C., TARRANT, P. & WILLIAMS, R. (2017). New LORS microvertebrates (ichthyoliths) from the Welsh Borderland. – In: GINTER, M. (Ed.), 14th International Symposium on Early and Lower Vertebrates. University of Warsaw, Checiny, Poland, 3-8 July 2017: 77-78.

SNYDER, D., DENTON, J., PRADEL, A., BRONSON, A., MILLER, R., BURROW, C., JANVIER, P. & MAISEY, J. (2017). Basal chondrichthyan phylogeny and a new affinity for *Doliodus problematicus* suggest a complex pattern of pectoral evolution spanning the acanthodian chondrichthyan transition. - Journal of Verebrate Paleontology, Program and Abstracts**, 2017**: 104.

BURROW, C., PARDO, J., ANDERSON, J. & TURNER, S. (2016). Multiple techniques yield complementary data on gyracanth anatomy. - Journal of Verebrate Paleontology, Program and Abstracts, **2016**: 228.

TM Anne-Christine DA SILVA

My research focused in 2016-2017 mostly on the Devonian of Belgium, Czech Republic, and New York State in the U.S. 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 and elemental geochemistry and cyclostratigraphy. This year, we have focused on improving the Emsian and Eifelian time scales. With D. De VLEESCHOUWER (University of Bremen), we are also working on a cyclostratigraphic framework of the Frasnian-Famennian boundary.

In summer 2016 and 2017, in collaboration with Jeff OVER, Chuck VER STRAETEN, and Alex BARTHOLOMEW, we have sampled two sections, in New York Basin (Emsian and Eifelian) for cyclostratigraphy.

Publications

PAS, D., DA SILVA, A.-C., DEVLEESCHOUWER, X., DE VLEESCHOUWER, D., CORNET, P., LABAYE, C. & BOULVAIN, F. (2017). Insights into a million-year scale carbonate platform evolution through a pluri-disciplinary approach: example of a Givetian carbonate records from Belgium. - Geological Magazine, **154** (4): 707-739

DA SILVA, A.-C., HLADIL, J., CHADIMOVÁ, L., SLAVÍK, L., HILGEN, F. J., BÁBEK, O. & DEKKERS, M. J. (2016). Refining the Early Devonian time scale using Milankovitch cyclicity in Lochkovian–Pragian sediments (Prague Synform, Czech Republic). - Earth and Planetary Science Letters, **455**: 125-139

KÖNIGHSOF, P., DA SILVA, A.-C., SUTTNER, T., KIDO, E., WATERS, J., CARMICHAEL, K., JANSEN, U., PAS,

D., SPASSOV, S. & JOACHIMSKI, M. M. (2016). 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 Publication, **423**: 171-199.

CM David DE VLEESCHOUWER

I am still working full-time on Cenozoic astrochronology and paleoclimatology at the Center for Marine Environmental Sciences (MARUM) at the University of Bremen. Nevertheless, I continue to be active on Devonian side projects. Most recently, Newsletters on Stratigraphy accepted a manuscript on which I am the lead author, presenting a cyclostratigraphic framework for the Emsian - Eifelian GSSP section (Wetteldorf Richtschnitt, Germany). The dataset presented in this work consists of 4-cm spaced elemental data of an 8.65 m thick interval, using a Bruker Tracer handheld XRF device.

http://www.ingentaconnect.com/content/schweiz/nis/pre-prints/content-nos_00_0_0000_0000_vleeschouwer_0397_prepub

A paper on the astronomical pacing of the late Frasnian is currently under review. In this paper, we combine geophysical (magnetic susceptibility) and geochemical (carbon stable isotopes) from six different sections around the globe (Canada, USA, Belgium, Poland, China). These findings were presented at the EGU General Assemblee in April 2016, during the IGCP 591 Closing Meeting in Ghent in July 2016, during the meeting of the German subcommission for Devonian stratigraphy in May 2017, and will be presented at the meeting of the International Association of Sedimentologists in October 2017 in Toulouse.

I updated the Bayesian age-modelling for the Devonian timescale (De VLEESCHOUWER et al. 2014), by including the cyclostratigraphic age constraints for the Lower Devonian by Anne-Christine Da Silva (DA SILVA et al. 2016). This update is available from my personal website: http://daviddevleeschouwer.webs.com/publications.htm

In September 2017, I plan to sample the Steinbruch Schmidt section (with Anne-Christine DA SILVA) and the Effenberg Quarry (with Thomas BECKER, Sven HARTENFELS and Peter KÖNIGSHOF).

Publications

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., HLADIL, J., CHADIMOVA, L., SLAVÍK, L., HILGEN, F. J., BÁBEK, O. & DEKKERS, M. J. (2016). Refining the Early Devonian time scale using Milankovitch cyclicity in Lochkovian–Pragian sediments (Prague Synform, Czech Republic). - Earth and Planetary Science Letters, **455**: 125-139.

DE VLEESCHOUWER, D., DA SILVA, A.-C., SINNESAEL, M., CHEN, D., DAY, J. E., WHALEN, M. T., GUO, Z. & CLAEYS, P. (2017). Obliquity-pacing of the Late Devonian mass extinction event. - Session RTS2 Time calibration of paleoclimatic and paleoceanographic events. International Meeting of Sedimentology 2017, Toulouse, France, 10-12 July 2017. (sciencesconf.org:ims2017:158575)

DE VLEESCHOUWER, D., DA SILVA, A.-C., SINNESAEL, M., CHEN, D., DAY, J. E., WHALEN, M.T., GUO, Z. & CLAEYS, P. (2017). Obliquity-pacing of the Late Devonian mass extinction event. - 42. Ordentliche Sitzung der Subkommission für Devon-Stratigraphie, Hof, Germany, 4 May 2017.

DE VLEESCHOUWER, D., KÖNIGSHOF, P. & CLAEYS, P. (2017 in press). Reading time and paleoenvironmental change in the Emsian-Eifelian boundary GSSP section (Wetteldorf, Germany): A combination of cyclostratigraphy and facies analysis - Newsletters on Stratigraphy.

CM Mercedes DI PASQUO

Among her activities developed in the last years in collaboration with colleagues from Argentina and elsewhere, several contributions are ongoing dealing with Devonian palynofloral changes in Bolivia and Argentina, and especially the last contributions listed below, involved the study of the latest Devonian and Mississippian palynofloras (DI PASQUO et al. 2017) and conodonts (RICE et al. 2017) from Montana (USA).

Mercedes is currently President of the *Asociación Latinoamericana de Paleobotánica y Palinología* (2009-2020, http://alpaleobotanicapalinologia.blogspot.com.ar).

Contributions (reprints and abstracts) are available at http://www.palino.com.ar (ask for username/password to medipa@cicyttp.org.ar for downloading papers) and also stored at Academia: http://independent.academia.edu/MercedesDiPasquo, and at Research Gate https://www.researchgate.net/profile/Mercedes_Di_Pasquo/).

Publications

ARÁOZ, L., NOETINGER, S., VERGEL, M. M. & DI PASQUO, M. (2017). Bioestratigrafía, paleogeografía y paleoecología del Paleozoico de Sierra de Zenta, Cordillera Oriental Argentina. - Instituto Superior de Correlación Geológica (INSUGEO), Serie Correlación Geológica, **32**: 43 – 64 (Tucumán, 2016 - ISSN 1514-4186 - ISSN on-line 1666-9479).

DI PASQUO, M., GRADER, G. W., WARREN, A., RICE, B., ISAACSON, P. E. & DOUGHTY, P. T. (2017 in press). Palynological delineation of the Devonian - Carboniferous boundary, west-central Montana. - Palynology, Special Issue in honor of Gordon WOOD.

DI PASQUO, M., WARREN, A., RICE, B., ISAACSON, P. & GRADER, G. W. (2016). Palynological delineation of the Devonian - Carboniferous boundary, West-Central Montana. - GSA 68th Annual Meeting, Moscow, 18–19 May 2016, Rocky Mountain Section - T7, Late Paleozoic Ice Age: Gondwana Systems and Proxies in the U.S. Cordillera, Abstract #275796.

Di PASQUO, M., NOETINGER, S., ISAACSON, P., GRADER, G., STARCK, D., MOREL, E. & ANDERSON FOLNAGY, H. (2015). Mid- Late Devonian assemblages of herbaceous lycophytes from northern Argentina and Bolivia: age assessment with palynomorphs and invertebrates and paleobiogeographic importance. - Journal of South American Earth Sciences, **63**: 70-83, DOI: 10.1016/j.jsames.2015.06.010.

DI PASQUO, M. (2015). First record of *Lagenicula mixta* (WINSLOW) WELLMAN et al. in Bolivia: biostratigraphic and paleobiogeographic significance. - XVI Simposio Argentino de Paleobotánica y Palinología (La Plata, mayo 2015), Ameghiniana, **52** (4), Suplemento 2015, Resúmenes: 41. http://www.xvisapp.fcnym.unlp.edu.ar/index.html

DI PASQUO, M., WOOD, G. D., ISAACSON, P. E. & GRADER, G. (2015). Palynostratigraphic reevaluation of the Manuripi-x1 (1541-1150 m interval), Madre de Dios Basin, northern Bolivia: recycled Devonian species and their implication for the timing and duration of Gondwanan glaciation. - XVI Simposio Argentino de Paleobotánica y Palinología (La Plata, mayo 2015), Ameghiniana, **52** (4) Suplemento 2015, Resúmenes: 23.

ISAACSON, P., GRADER, G. W. & DI PASQUO, M., (2016). A Paradigm Change: Late Devonian onset of Gondwana glaciation and its proxies. - GSA 68th Annual Meeting, Moscow, 18–19 May 2016, Rocky Mountain Section - T7, Late Paleozoic Ice Age: Gondwana Systems and Proxies in the U.S. Cordillera, Abstract #275805.

MILANA, J. P., DI PASQUO, M., FAJARDO, E. & MILANA, M. (2014). Primeros datos bioestratigráficos y glaciales de las formaciones El Planchón y Churupati (Mississippiano), Precordillera occidental de San Juan. - XIV Reunión Argentina de Sedimentología (Puerto Madryn, Chubut, 1-5 de Septiembre de 2014), Extended Abstracts: 184-185.

MATSUMURA, W. M. K., DI PASQUO, M. & IANNUZZI, R. (2015). New paleobotanical and palynological data from Early Givetian in Paraná Basin, southern Brazil. XVI Simposio Argentino de Paleobotánica y Palinología (La Plata, mayo 2015), Ameghiniana, **52** (4) Suplemento 2015, Resúmenes: 24.

MATSUMURA, W. M. K., IANNUZZI, R., BALZARETTI, N. M., DI PASQUO, M., TUBINO, B. N. & SOUZA, P. A. (2015). FTIR characterization of Devonian (*Spongiophyton* Kräusel and *Palaeostigma* KRÄUSEL & DOLIANITI) and Permian (?*Cyclostigma* DOLIANITI) fossil cuticles, Brazil. - XVI Simposio Argentino de Paleobotánica y Palinología (La Plata, mayo 2015), Ameghiniana, **52** (4) Suplemento 2015, Resúmenes: 52.

MATSUMURA, W. M. K., IANNUZZI, R., DI PASQUO, M., BOSETTI, E. P. (2015). An Early Givetian land plant and palynoassemblage and its biostratigraphical significance. - IX Simpósio Sul-Brasileiro de Geologia- II Workshop de Recursos Minerais da Região Sul, Florianópolis, Santa Catarina. Abstracts: 24.

NOETINGER, S., DI PASQUO M., ISAACSON P., ACEÑOLAZA G. F. & VERGEL M. M. 2016. Integrated study of fauna and microflora from the Early Devonian (Pragian – Emsian) of northwestern Argentina. - Historical Biology, **28**

(7): 913-929. http://dx.doi.org/10.1080/08912963.2015.1059833.

NOETINGER, S., DI PASQUO, M. & STARCK, D. (2015). Análisis palinológico de una sección devónica del Noroeste Argentino asociado a macroflora. - XVI Simposio Argentino de Paleobotánica y Palinología (La Plata, mayo 2015), Ameghiniana, **52** (4) Suplemento 2015, Resúmenes: 24-25.

QUETGLAS, M. A., DI PASQUO, M. & MACLUF, C. C. (2016). Diversidad de megasporas en los pozos Pando X1 y Manuripi X1, Bolivia: primera etapa de estudio. - 11º Congreso de la Asociación Paleontológica Argentina (Congreso Argentino de Paleontología y Bioestratigrafía), General Roca, provincia de Río Negro (17 al 21 de octubre de 2016), abstracts.

RICE, B. J., DI PASQUO, M., DOUGHTY, P. T., GRADER, G. W. & ISAACSON, P. E. (2016). *Retispora lepidophyta* assemblage near the Devonian-Carboniferous boundary: palynology of the Unit 4 shale in the middle Sappington Formation, Montana, USA. - TSOP-AASP-ICCP JOINT MEETING, September 18-23, Houston USA. http://palynology.org/home-page-2016-joint-meeting-tsop-aasp-iccp/.

RICE, B. J., GRADER, G. W., DOUGHTY, P. T., DI PASQUO, M. & ISAACSON, P. E. (2017). Revision of the type *Siphonodella praesulcata* Conodont locality at Lick creek, Montana. - GSA 2017 (Seattle, 22-25 october), Abstract #308600.

ZIMMERMANN, U., LOPEZ, S., DI PASQUO, M., ANDERSEN, T., HATLØY, S., MEHUS, T., RUUD, C. & SIMONSEN, S. L. (2015). Palynology and detrital zircons of the Silurian Cancañiri Formation from the Bolivian Altiplano. - CIMP meeting (Bergen), Abstracts: 48.

ZIMMERMANN, U., LOPEZ, U., DI PASQUO, M., ANDERSEN, T., HATLØY, S., MEHUS, T., RUUD, C. & SIMONSEN, S. L. (2015). U-Pb ages of detrital zircons and Palynology of the Silurian Cancañiri Formation from the Bolivian Altiplano. - XIV Congreso Geológico Chileno (La Serena 4-8.8. 2015), Actas volume II, 650-652. http://www.congresogeologicochileno.cl/programa.html.

CM James R. EBERT

After a brief dalliance with aeolian transport of microplastic pollutant particles to the coastal dunes of the Laurentian Great Lakes, I am in the early stages of rekindling my Devonian research.

The Mosquito Point Reef, a coralline buildup in central New York State, has been mapped as part of the Deansboro Member of the Coeymans Formation (Lochkovian, Helderberg Group; RICKARD 1962). During the past year, one of my undergraduate students recovered several pyritized conodont elements from beds that underlie the Mosquito Point Reef. TM Ladislav SLAVIK identified our preliminary samples as an unspecified icrodontid of probable Pragian to perhaps Emsian age and *Pelekysgnathus serratus brunsvicensis*, a species that indicates an early to middle Pragian age. OLIVER (1956) reported that the corals of the Mosquito Point and other buildups in the area bore some resemblance to corals of the Koněprusy Reef, a Pragian reef in the Bohemian Karst of the Czech Republic. Our preliminary conodont data suggests that the Mosquito Point Reef is younger than the Helderberg Group. If this is the case, then previous literature describing the Mosquito Point buildup as an earliest Devonian reef (e.g., ISAACSON & CURRAN 1981) were actually describing younger, Pragian reefs, which raises the question of why reefs and buildups are so rare in the Lochkovian.

Publications

MCADAMS, N. E. B., SCHMITZ, M. D., KLEFFFNER, M. A., VERNIERS, J., VANDENBROUCKE, T. R. A., EBERT, J. A. & CRAMER, B. D. (2017 in press). A new, high-precision CA-ID-TIMS date for the 'Kalkberg' K-bentonite (Judds Falls Bentonite). - Lethaia, doi: 10.1111/let.12241.

CM Sofie A. GOUWY

My main activity at the GSC Calgary is establishing a conodont biostratigraphic framework for the Devonian deposits of the Mackenzie Mountains (NWT, Canada). This includes studying the conodont collections amassed by Tom UYENO (CM) and obtaining new data through fieldwork. The focus has been on the Middle Devonian and Frasnian oil-bearing deposits of the Horn River Group so far. Our Devonian team combines detailed sedimentology, geochemical proxies, conodont biostratigraphy and gamma ray spectrometry to describe and define the members and formations of the Group. Last year's fieldwork concerned

sampling sections along the front of the Mackenzie Mountains (5 sections); this summer's fieldwork was concentrated in the higher part of the Mackenzie Mountains in more off-shore marine Devonian deposits (3 sections). A bachelor student (Wing C. CHAN, University of Calgary) investigated the drowning event at the contact between the Hume and Hare Indian formations in the northern Mackenzie Mountains using geochemical proxies, gamma ray spectrometry and conodont biostratigraphy.

Part of my time goes to studying and reporting on Lower to Upper Devonian conodont samples collected for GSC mapping purposes (as a member of the Mackenzie Mountains mapping team) and on all Devonian samples sent in from other GSC offices, provincial GS offices or external clients to be processed and studied in the GSC Calgary conodont lab.

Upper Frasnian strata from the Lompret Quarry (Dinant basin, Belgium) were collected for conodonts as part of a multidisciplinary project on the onset of anoxia in the Frasnian of the Dinant Basin (Southern Belgium) (collaboration with Stijn GOOLAERTS and Xavier DEVLEESCHOUWER, both Royal Belgian Institute of Natural Sciences, Brussels). In addition to conodonts, also goniatites, corals, brachiopods, fish remains and ostracods are sampled and studied. These will be combined with detailed sedimentology and magnetic susceptibility.

Publications

BRAUN, M., ARMSTRONG, D. K., CHOW, N. & GOUWY, S. A. (2016). Preliminary Lithostratigraphy, Chemostratigraphy and Lithofacies Analysis of the Devonian Succession, Moose River Basin, Northern Ontario. Summary of Field Work and Other Activities 2016. - Ontario Geological Survey, Open File Report, **6323** (27-1 to 27-13).

CHAN, W. C., KABANOV, P. & GOUWY, S. A. (2017). Capturing an Eifelian-Givetian drowning event in the Northwestern Canadian sub-arctic mainland. – In: LIAO, J.-C. & VALENZUELA-RÍOS, J. I. (Eds.), Fourth International Conodont Symposium, ICOS IV "Progress on Conodont Inbestigation", Cuadernos del Museo Geominero, **22**: 141-145.

FALLAS, K. M., MACNAUGHTON, R. B., FINLEY, T. D. & GOUWY, S. A. (2016). Report of activities for the GEM 2 Mackenzie Project: Northern Mackenzie Mountains bedrock mapping, stratigraphy, and related studies. - Geological Survey of Canada, Open File, **8132**: 15 pp.

GADD, M., PETER, J., GAIDIES, F. & GOUWY, S. A. (2017). In situ 3D modelling of conodonts using x-ray micro-tomography. - Explore, **174**: 22.

GOOLAERTS, S. & GOUWY, S. A. (2016). An extraordinary new site to study Upper Frasnian Cephalopods during the onset of anoxia in the Dinant Basin. - Geologica Belgica, 2016. Abstract.

GOUWY, S. A. (2016). Givetian (Belgium). – In: KONIGSHOF, P., KIDO, E., SUTTNER, T. & WATERS, J. (Eds.), Planet Earth in Deep Time, Paleozoic series: Devonian and Carboniferous: 90-91.

GOUWY, S. A. & BULTYNCK, P. (2016). Couvinian (Belgium). – In: KONIGSHOF, P., KIDO, E., SUTTNER, T. & WATERS, J. (Eds.), Planet Earth in Deep Time, Paleozoic series: Devonian and Carboniferous: 81-83.

GOUWY, S. A. & UYENO, T. T. (2017). A new assessment of the Middle and Upper Devonian conodont biostratigraphy of the Horn River Group in the Powell Creek reference section (Northern Mackenzie Mountains, NWT, CANADA). – In: LIAO, J.-C. & VALENZUELA-RÍOS, J. I. (Eds.), Fourth International Conodont Symposium, ICOS IV "Progress on Conodont Inbestigation", Cuadernos del Museo Geominero, **22**: 153-156.

GOUWY, S. A., LIAO J.-C. & VALENZUELA-RIOS J. I., (2016). Graphic correlation of the upper Eifelian to lower Frasnian (Middle-Upper Devonian) conodont sequences in the Spanish Central Pyrenees and comparison with composite standards from other areas. - Palaeontologia Electronica, **19.3.39A**: 1-18.

KABANOV, K. & GOUWY, S. A. (2017). The Devonian Horn River Group and the basal Imperial Formation of the central Mackenzie Plain, N.W.T., Canada: multiproxy stratigraphic framework of a black shale basin. - Canadian Journal of Earth Sciences. **54**: 409-429.

KABANOV, P., GOUWY, S. A. & CHAN, W. C. (2016). Geological and geochemical data from Mackenzie Corridor. Part VI: Descriptions and SGR logs of Devonian outcrop sections, Mackenzie Mountains, Northwest Territories, NTS 106G and 106H. - Geological Survey of Canada, Open File, **8173**.

KABANOV, P., GOUWY S. A., LAWRENCE, P. A., WELESCHUK, D. J. & CHAN, W. C. (2016). Geological and geochemical data from Mackenzie Corridor. Part III: New data on lithofacies, micropaleontology, lithogeochemistry, and Rock-Eval™ pyrolysis from the Devonian Horn River Group in the Mackenzie Plain and Norman Range, Northwest Territories. - Geological Survey of Canada, Open File, **7951**: 48 pp.

KABANOV, P., GOUWY, S. A. & CHAN, W. C. (2016). Report on field activity for Devonian studies in the Mackenzie Mountains in 2016. - GEM 2 Mackenzie Project, Open File, **8131**: 16 pp.

TM Nadezhda G. IZOKH and Novosibirsk Group

During the year 2017 our team continued the investigation of Devonian and Lower Carboniferous stratigraphy of the Russian Arctic region (Norilsk region and lower riches of the Lena River) and Central Asia (Kitab State Geological Reserve, Uzbekistan). The research group from the Trofimuk Institute of Petroleum Geology and Geophysics, SB RAS, includes: Drs. N. G. IZOKH, O. T. OBUT, N. E. MIKHALTSOV, I. V. TUMASHOV, I. V. VARAKSINA, and T. P. KIPRIYANOVA, Ph.D. student T. A. SHCHERBANENKO, and Dr. O. P. IZOKH from the SOBOLEV Institute of Geology and Mineralogy. SB RAS.

Different topics were under investigation:
TM Dr. Nadezhda G. IZOKH – conodonts,
CM Dr. Olga T. OBUT – radiolarians,
CM Dr. Olga P. IZOKH – geochemistry
Tatiana A. SHCHERBANENKO – brachiopods,
Nikolay E. MIKHALTSOV - paleomagnetic studies
Igor V. TUMASHOV - sedimentology
Irina V. VARAKSINA - sedimentology

Main results obtained in 2017

We continued studies of the Upper Devonian and Lower Carboniferous sections of the lower riches of the Lena River. The new data of the Upper Devonian conodonts of the Stolb Island in the Lena Delta and of the late Tournaisian conodonts in the Upper Bastakh Member provide more reliable base for inter-regional correlations of units of the Upper Devonian-Lower Carboniferous stratigraphic chart for the Northern Kharaulakh region. The conodont biostratigraphic analysis suggests a correlation of the Stolb Beds from the upper Frasnian up to the lower Famennian interval (*rhenana* to *rhomboidea* zones) and of the Upper Bastakh Member within the upper Tournaisian *isosticha*-Upper *crenulata – anchoralis-latus* zones. (IZOKH 2017; IZOKH & YAZIKOV 2017)

The paper by VARAKSINA et al. (2017a, 2017b) reports the results of litho- and biostratigrahic studies of the Devonian deposits exposed in the Norilsk area in the North of the Tunguska Syneclise. The facies analysis showed that sedimentation occurred withina shallow basin with limited water circulation and increased salinity. Periods of major transgressions restored normally marine conditions. Conodonts associations represent cosmopolitan taxa, which confirms the existence of an open sea environments in the transgressive upper Eifelian, lower and middle Frasnian periods.

We have done a complex study of Devonian deposits recovered by two deep boreholes. The Fokina drilling block is located on the south part of the studied area and the North-Vologochan drilling block in the northern part of the Noril'sk region. The main results are as follows:

1. The Norilsk region Devonian sequence is represented by different facies. The Lower and Middle Devonian at the Fokina drilling block is composed of an alternation of carbonate, argillaceous-carbonate and sulphate rocks. The Upper Devonian in the south part of the Norilsk area is represented by different types of limestones and dolomites, and in the central part of this area (North-Vologochan drilling block) by anhydrite with carbonate rocks.

Such a heterogeneous structure of the Devonian sequence is due to the periodic change of a shallow basin with limited water circulation and high salinity conditions with normal marine regime, which was restored in the periods of major transgression in the studied area.

Geochemistry results

We conducted a study of stable isotope ($\delta^{13}C$ and $\delta^{18}O$) and chemical (Fe, Mn, Sr, Ca, Mg, Al) composition of Lower Devonian carbonates in the Zeravashan-Gissar Foldbelt, Spanish Pyrenees, and Salair Ranges. The preservation and suitability of the carbonates for the analyses were assessed by petrographic examination prior to the isotope-chemical studies, in addition to the application of geochemical criteria, such as $Mn/Sr \leq 0.2$ and $Fe/Sr \leq 5$, and their correlation with variations in isotopic composition of carbon and oxygen.

The resulting carbon isotope variation curves in the studied sections demonstrate medium high $\delta^{13}C$

values (0.8–1.5 in Spanish Pyrenees; 1.5–2.5 in Salair; 0.5–2.5 in Zeravshan-Gissar), a ubiquitous negative excursion in the mid-Lochkovian (supposedly at the base of the *Lanea omoalpha* Zone), followed by a moderate increase. The beginning of the Pragian is marked by an increase in $\delta^{13}C$ from 0.3 to 2.7 in the Salair section, from 1.1 to 2.8 in the CP-I section, and from 0.8 to 1.8 in the Zinzilban section, followed by a decrease in the mid-Pragian down to 2.4, 2.7 and 2.9, respectively, and then by another increase up to 2.4, 2.7 and 2.9, respectively. The base of the Emsian (sensu its GSSP) is confidently recognised in the Zinzilban section and characterised by a significant drop in $\delta^{13}C$ values down to -0.5. This latter interval can be correlated using palaeontological data and $\delta^{13}C$ curves with the Salair sections (IZOKH et al. 2015); however, isotope data are currently lacking from the CP-I section.

The constructed curves represent disparate palaeogeographic provinces allowing the recognition of global chemostratigraphic C-isotope markers, such as: (1) the negative mid-Lochkovian excursion at the base of the *Lanea omoalpha* Zone; (2) the negative mid-Pragian excursion in the middle of the *pirineae* Zone in the Salair, Zeravshan-Gissar and Spanish Pyrenees; (3) the negative lower Emsian excursion in the Salair and Zeravshan-Gissar sections.

Similar pattern are seen in the Lower Devonian of the existing composite $\delta^{13}C$ curve based on material from European sections (GRADSTEIN et al. 2012), the only difference being the less obvious mid-Pragian and lower Emsian excursions. When the isotope-geochemical data are compared with the conodont phylogeny of the genus *Polygnatus* in the Zinzilban section (Uzbekistan), some of the phylogenetic changes correlate with major variations in $\delta^{13}C$ values in carbonates and organic matter (IZOKH & IZOKH 2016).

Field trips

In 2017, we continued our studies of the Upper Devonian and Lower Carboniferous sequence in the lower riches and delta of the Lena River (Russian Arctic region). These sections are located on the Stolb Island, on the mountains America Khaya, Orto-Khaya and Kubalakh-Khaya, and on the right bank of the Bykov Chanel (Krest-Khamo Cape; Fig. 1). The Upper Kellwasser global biotic Event, which marks the Frasnian–Famennian boundary, was established in the Upper Devonian section at the Stolb Island. Rock samples (Fig. 2). It was collected for various analysis: paleomagnetic, biostratigraphy (conodonts and brachiopods) and geochemical studies (carried out by Drs. N. G. IZOKH & N. E. MIKHALTSOV).

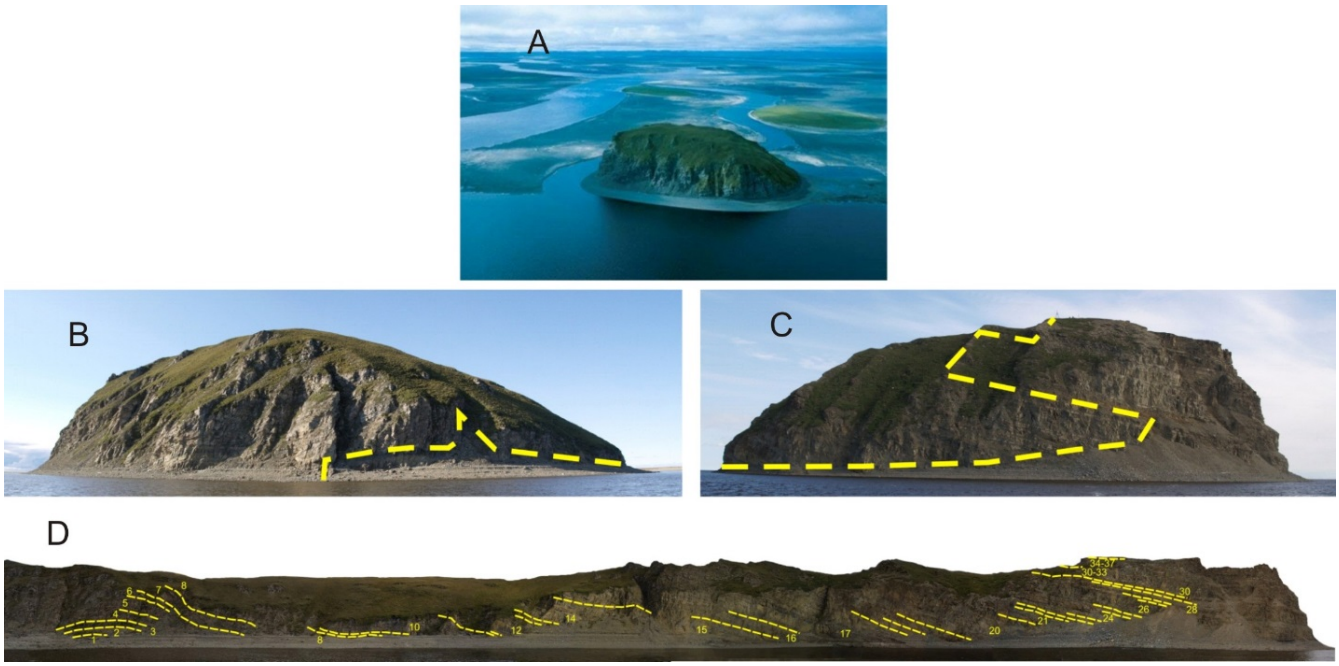

Fig. 1. Upper Frasnian-Lower Famennian section exposure on the Stolb Island, the Delta of Lena River, Russian Arctic region (A – Stolb Island, overall view; B and C – section line; D – succession of beds).

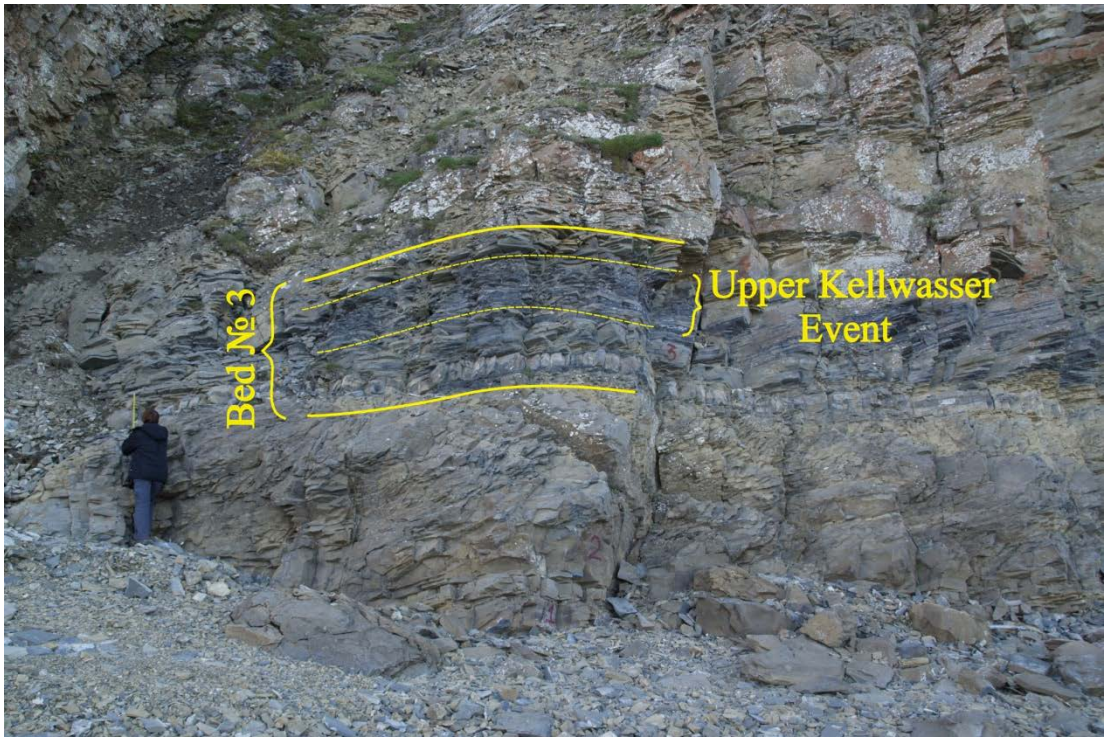

Fig. 2. The Frasnian-Famennian boundary interval, Stolb Island, the Delta of Lena River, Russian Arctic region.

Publications

Journal contributions

IZOKH, N. & YAZIKOV, Y. A. (2017). Discovery of Early Carboniferous Conodonts in Northern Kharaulakh (lower reaches of the Lena River, northeastern Siberia, Arctic Russia). – Revue de Micropaléontologie, **60**: 213-232.

VARAKSINA, I. V., IZOKH, N. G. & TUMASHOV, I. V. (2017b in press). Devonian lithology and stratigraphy of the north part of the Tunguska sineclise (Norilsk Area). - Geology and mineral resources of Siberia. Novosibirsk, SNIIGGIMC, [in Russian].

Abstracts

IZOKH N.G. (2017). Late Devonian – Early Carboniferous conodonts from the Northeastern Siberia, Arctic Russia. - In: LIAO, J.-C. & VALENZUELA-RÍOS, J. I. (Eds.), Fourth International Conodont Symposium, ICOS IV "Progress on Conodont Inbestigation", Cuadernos del Museo Geominero, **22**: 201-204.

VARAKSINA, I. V. IZOKH, N. G., TUMASHOV, I. V. (2017a). Facies characteristics and conodont complexes of Devonian of the Norilsk Areas. - Contributions of Interekspo Geo-Siberia-2017: XIII International Conference "Subsurface management/ Mining, New trends and techniques for prospecting, exploration and exploitation of mineral resources, Economy. Geoecology", Novosibirsk, SSUGT, **1**: 96-100 [in Russian, Abstract in English].

IZOKH, O. P. & IZOKH, N. G. (2016). Use of C-isotope data for correlation of the lower Devonian deposits. General stratigraphic scale and methodological problems of development of regional stratigraphic scale of Russia. - Materials of the Interdepartmental workshop, Saint Petersburg, 17-20 October 2016 – SPb, Izd-vo VSEGEI: 78-80 [in Russian].

TM Ulrich JANSEN

Activities of the last 12 months concentrated on preparing the collections of my section for the transport to another building: The Department of Palaeontology and Historical Geology of the Senckenberg with all its collections will move from the 'Kuhwaldstraße" to the 'JÜGEL-Haus' located next to the main building of the Senckenberg Museum; the move will largely take place from January to May 2018. Due to the additional work load resulting from this, my works on the monograph of the uppermost Silurian to Middle Devonian

brachiopods from the Rhenish Massif (Germany) are delayed.

In January, I visited the Field Museum in Chicago to study North American brachiopods, in particular the spiriferides, and mainly for comparison with the Rhenish materials. Specimens of the James HALL collection could be examined.

A paper on the first find of *Teicherticeras* from the lower Emsian of the Eifel region was published in cooperation with colleagues from the University of Erlangen (ÜBELACKER et al. 2016). As the specimen has been found in association with a biostratigraphically indicative brachiopod fauna, it is significant with regard to neritic-pelagic correlation.

Another submitted manuscript summarizes the results of a joint project with geochronology colleagues in Dresden (LINNEMANN et. al.), who conducted provenance analyses of sedimentary rocks from allochthonous units in the eastern Rhenish Massif (Germany). Palaeobiogeographic data from the brachiopods are consistent with their results.

The multidisciplinary work (microfacies, geochemistry, conodonts, brachiopods) on the Zefreh Section in Central Iran resulted in a publication (KÖNIGSHOF et al. 2017). Brachiopod data helped to constrain the stratigraphic range of the section and the position of the Givetian/Frasnian boundary.

A manuscript on the genus *Paraspirifer*, carried out in cooperation with Susan ANDERKO, is still not finished.

My master candidate Alessandra KUNZMANN (2016) has finished her palaeoecological study on a fauna from the Wiltz Formation (upper Emsian, Eifel).

Publications / Thesis

ÜBELACKER, C., JANSEN, U. & DE BATES, K. (2016). First record of the Early Devonian ammonoid *Teicherticeras* from the Eifel (Germany): biogeographic and biostratigraphic importance. – Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, **282** (2): 201–208.

KÖNIGSHOF, P., CARMICHAEL, S. K., WATERS, J., JANSEN, U., BAHRAMI, A., BONCHEVA, I. & YAZDI, M. (2017). Palaeoenvironmental study of the Palaeotethys Ocean: the Givetian-Frasnian boundary of a shallow-marine environment using combined facies analysis and geochemistry (Zefreh Section/Central Iran). — Palaeobiodiversity and Palaeoenvironments, **97** (3): 517–540.

KUNZMANN, A. (2016). Brachiopods and palaeoecology of the Upper Emsian Daleiden Fauna (Wiltz Formation, Lower Devonian, Eifel region). – Master Thesis, University of Erlangen.

CM William T. KIRCHGASSER

Having published work with Gil KLAPPER on Frasnian conodonts from New York, I am finishing a paper, with Gordon BAIRD (SUNY Fredonia) and Carl BRETT (Univ. Cincinnati), on ammonoids (goniatites) and conodonts from the late Givetian to early Frasnian of Central Pennsylvania (Taghanic to Timan Events). It is scheduled to be published in a Geological Society of America Special Publication in honor of the late John DENNISON (Univ. of North Carolina). The fossils were first reported long ago in abstract form at the SDS meeting at the International Geological Congress in Beijing, August, 1996*.

Publications

KLAPPER, G. & KIRCHGASSER, W. T. (2016). Frasnian Late Devonian conodont biostratigraphy in New York: graphic correlation and taxonomy. - Journal of Paleontology, **90** (3): 525-554, doi: 10.1017/jpa.2015.70.

*KIRCHGASSER, W. T. (1996). Conodont and ammonoid correlations in the upper Givetian to lower Frasnian in New York and Pennsylvania. - Abstracts, SDS Symposium “Devonian High Resolution Stratigraphy”, IGC, Beijing: 4.

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

The research group from «The Institute of Geology», Branch of the State Enterprise «Research and Production Centre for Geology» includes:

CM Dr. Semen A. KRUCHEK – conodonts;
CM Dr. Tamara G. OBUKHOVSKAYA – miospores;
Dr. Victor I. PUSHKIN – bryozoa, brachiopods;
Veronika Y. OBUKHOVSKAYA – miospores, acritarches;
Tathyana F. SACHENKO – brachiopods;
Sergei V. ANTIPENKO – cyanobacteria, calcareous algae;
Tamara V. Strel’chenko – conodonts.

The groups also includes CM Dr. Dmitry P. PLAX, for fish remains, from the Belarusian National Technical University and Dr. Yurij V. ZAIKA, for corals, from United Enterprise «Geoservise».

During the end of 2016 and in 2017 our team continued the study mainly of Devonian and partly Silurian deposits of Belarus.

Publications

Journal contributions

PLAX, D. P., KRUCHEK, S. A. & OBUKHOVSKAYA, V. Y. (2016). Stratigraphy of Eifelian stage deposits of the Middle Devonian in the western part of the Pripyat trough. – Lithosphere, **2** (45): 29-47 (in Russian, with English summary).

The paper presents a detailed stratigraphic division of the Middle Devonian sediments, mainly divided into substages of the Eifelian deposits, in the sections of boreholes of the Pinsk sheet located in the western part of the Pripyat Trough, and their correlation within both Belarus and transborder territories of neighboring countries. The basis for the stratification of deposits of the Eifelian Stage is presented by a typical section of the Pinsk 26 borehole drilled within the Turov Centrocline, which also describes a new Vulka Formation isolated by the authors in the section of this borehole, which is characterized by a clayey-carbonate type of section and corresponds to the Kostyukovichi Regional Stage of the Upper Eifelian Substage of the Middle Devonian in the territory of Belarus. To allocate the new formation, the holostratotype and parastratotype are indicated; its bedding conditions are described; its detailed division into separate litho-geophysical packs is given; a detailed palaeontological and geophysical characteristic is presented; its stratigraphic volume is indicated, and its distribution and correlation with synchronous deposits of the sections of boreholes which are located in the territory of the Turov and Starobin Centroclines of the Pripyat Trough are shown. The data presented in the paper should be taken into account when updating the Stratigraphic Chart of the Devonian deposits of Belarus (2010) and included into keys for new geological maps of pre-quaternary deposits of various scales.

PLAX, D. P. (2016). Stratigraphic ichthyofauna assemblages of the Devonian deposits of the Vileyka Buried Ridge of the Belarusian Anteclise. – Natural resources, **2**: 14–44.

The paper presents summarized data on the Devonian ichthyofauna determined in the Upper Emsian (Obol and Lepel Beds of the Vitebsk Regional Stage), Eifelian (Adrov, Osveya, Gorodok and Kostyukovichi Regional Stages) and Lower Givetian (Goryn and Stolin (lower part) Beds of the Polotsk Regional Stage) deposits in the territory of the Vileyka Buried Ridge located within the Belarusian Anteclise. Apart from their ichthyofaunistic data, some literature sources, which present the information about the Devonian vertebrates found within the investigation area, were used to complete the information. The ichthyofauna presented enabled the author to refine and supplement its taxonomic composition in the above-mentioned deposits of the Vileyka Buried Ridge, as well as to determine the age of rocks and to correlate them with coeval deposits developed within other tectonic structures of the East-European platform, namely, the Baltic Syneclise, Orsha Depression, Latvian and Zhlobin Saddles, Voronezh Anteclise, Pripyat Trough and Volyn Monocline. The detailed lithological description of the above-mentioned deposits is given and the taphonomic characterization of the agnathan and fish remains is reviewed in the paper separately. Based on these data, palaeoecological conclusions are drawn. The obtained fish fauna adds also some new details concerning their palaeogeographic distribution. On the whole, the Devonian ichthyofauna of the Vileyka Buried Ridge supplements the information about the systematic composition of fish fauna in the territory of the republic and its stratigraphic distribution. The Stratigraphic Chart of the Devonian deposits of Belarus (2010) has been taken as a stratigraphic basis for the division of the Lower and Middle Devonian deposits in the studied area.

PLAX, D. P. (2016). Ichthyofauna of the Osveya Regional Stage of the Eifelian Stage of Belarus. - Vestnik of Brest University, Series 5, Chemistry, Biology, Earth Sciences, Brest, **2**: 91–94 (in Belarusian, with English summary).

On the basis of literature data and the author's palaeoichthyological studies, the taxonomical review of all currently known agnathans and fishes from the deposits of the Osveya Regional Stage of the Eifelian Stage of the Middle Devonian of the territory of Belarus is given. The information on ichthyofauna supplements palaeontological characteristic of the Osveya Regional Stage and can be applied for the determination of the age of these deposits and their correlation.

MAKHNACH, A. A., KRUCHEK, S. A. & POKROVSKY, B. G. (2016). Gypsum in Silurian deposits of Belarus: isotopic structure of sulfur and genesis.

– Doklady of the National Academy of Sciences of Belarus, **60** (5): 113–119 (in Russian, with English summary).

Gypsum was found in the Silurian deposits of Belarus for the first time. It composes nodules, file cracks and fenestras in clayey-carbonate rocks revealed by the Davtiuny 3k borehole (Grodno area, Ostrovets region). With the use of sulphur isotope data it is shown that gypsum formed during diagenesis in Silurian seawater concentrated as inbonate deposits formed in shallow subtidal and intratidal conditions.

MAKHNACH, A. A., KRUCHEK, S. A., POKROVSKY, B. G., STRELTSOVA, G. D. & MURASHKO, O. V. (2016). Formation conditions of the Silurian deposits in the North West of Belarus based on isotopic data. – Lithosphere, **2** (45): 129–145 (in Russian, with English summary).

The paper contains results of the study of Silurian clayey-carbonate deposits from the Llandovery-Telychian to the Gorstian (Ludlow) Stage broken down by the Davtiuny 3k borehole in the north-west of Belarus. A positive $\delta^{13}C$ excursion with an amplitude of 4.7 ‰ has been revealed in Sheinwoodian Stage sediments; the excursion corresponds to the Ireviken biotic event, as shown in the global chemostratigraphic curve. $\delta^{18}O$ values of the studied carbonate (25.5-29.2‰ SMOW) are close to those for the Silurian of the Baltic, Scandinavia, Ukraine, Poland, and Canada. Thus, the isotopic composition of carbonate carbon and oxygen of the studied section suggests that there is a connection between the outermost part of the Baltic Silurian sedimentation basin, which is in the Belarusian territory, with the Rheic Ocean. Throughout the section, the postsedimentary gypsum is located in the form of nodules, crack fillings and fenestras. $\delta^{34}S$ values of the gypsum are close to values for the Silurian in the Phanerozoic isotopic curve. The gypsum formation is caused by the frequent superimposing of a supratidal environment onto the clayey-carbonate substratum, formed in shallow subtidal and intratidal conditions. Interground water evaporation led to the formation of gypsum nodules within sediments, which had no time to become lithified, as well as to filling cracks and fenestras in already lithified layers with gypsum.

ZAIKA, Y. V. (2016). On exceptionally well-preserved Paleozoic Tabulate corals redeposited in Pleistocene sands of Belarus. – BarSU Herald. Series: Biological sciences. Agricultural sciences, General biology, Baranovichi, **4**: 20–26 (in Belarusian, with English summary).

OBUKHOVSKAYA , V. Y. (2017). Palynology of the Upper Emsian, Eifelian and Givetian deposits of the South East of Belarus. – Lithosphere, **1** (46): 31–67 (in Russian, with English summary).

The detailed palynological study of the Devonian deposits of the Zhlobin Saddle, North Pripyat area, and Bobrujsk buried off set in the southeast of Belarus has allowed to determine the presence of local miospore zones: *Rhabdosporites mirus – Gneudnaspora divellomedia* in the upper Emsian; *Periplecotriletes tortus – Elenisporis biformis, Grandispora naumovii, Cirratriradites monogrammos, Rhabdosporites langii – Chelinospora timanica* in the Eifelian, and zones *Geminospora extensa* and *Ancyrospora incisa – Geminospora micromanifesta* in the Givetian. Their correlation with zones of the East European platform and zones, which are distinguished in deposits of the same age in Western Europ, are carried out. A detailed stratigraphical subdivision of the later Emsian – Givetian deposits of the studied area is substantiated by palynological data. The article is followed by text-figures of important species of miospores and acritarches (50 species in 10 text-figures).

PLAX, D. P. (2017). Agnathan and fish remains from the Gorodok Regional Stage of the Eifelian Stage of Belarus. – Vesnik of Brest University, Series 5, Chemistry, Biology, Sciences about Earth, Brest, **1**: 96–101 (in Belarusian, with English summary).

On the basis of literature data and the author's own palaeoichthyological studies, the systematical review of all currently known taxa of agnathans and fishes from the deposits of the Gorodok Regional Stage of the Eifelian Stage of the Middle Devonian of Belarus is given. The information on ichthyofauna supplements palaeontological characteristic of the Gorodok Regional Stage and can be employed for determination of the age of these deposits and their correlation.

NARKIEWICZ, M., NARKIEWICZ, K., KRZEMINSKA, E. & KRUCHEK, S. A. (2017). Oxygen isotopic composition of conodont apatite in the equatorial epeiric Belarusian basin (Eifelian) – relationship to fluctuaning seawater salinity and temperature. – Palaios, **32**: 439–47.

Conodont apatite from a shallow-marine Middle Devonian transgressive unit has been investigated in

five borehole sections representative of the epicontinental Belarusian Basin located in a near-equatorial setting. The transgression is related to the onset of the late Eifelian Kačak Event, an important biotic episode recorded worldwide. $\delta^{18}O_{apatite}$ data were acquired using the secondary ion mass spectrometry (SHRIMP) technique. The mean corrected values in the studied sections are in the range from 19.8 to 20.2 ‰, significantly exceeding the values measured for late Eifelian low-latitude open marine basins. This can be explained by higher average $\delta^{18}O_{seawater}$ levels related to elevated seawater salinities in the Belarussian epeiric basin, in agreement with the presence of improverished marine fauna. The intra-specimen $\delta^{18}O$ variability, with differences ranging up to 2.6 ‰ in some specimens, can be explained by fluctuating $\delta^{18}O_{seawater}$ and, to a smaller degree, temperature variations in the Belarussian inland sea under a monsoonal climate. The present results demonstrate that local paleoclimate and epeiric paleogeography may considerably obscure the global climatic signature of the conodont apatite isotopic record.

TOLSTOSHEEV, V. I., KRUCHEK S. A., LEVIY, M. G. & SAKHARUK, P. O. (2017). Geological structure of the Luchin graben of the Zhlobin saddle and its adjacent structures. – Lithosphere, **1** (46): 77–97 (in Russian, with English summary).

A large amount of biostratigraphic and geophysical material on formations of the platform cover of the Luchin Graben, in the southern part of the Zhlobin Saddle, has been obtained. The questions of the geological structure of the territory of Devonian deposits, complicated by the occurences of volcanic magmatism, of the "explosion tubes", in the Late Frasnian (Rechista) time are considered. The results enabled the authors to compose a structural map of the surface of the crystalline basement of the Luchin Graben and its adjacent structures, a geological cross-section, and geological maps of the Riphean and Devonian deposits. Two local structures are identified in the graben: the West-Yelenets Trough and the Yelenets structural nose, as well as a small-blocked structure of the surface of the basemant in the southern part of the Zhlobin Saddle and adjacent territories.

Abstracts

OBUKHOVSKAYA, V. Y. (2017). Palynostratigraphy Lower Devonian (Emsian) deposits of South East of Belarus. – In: LUKASHEV, O. V, SANKO, A. F. et al. (Eds.), Modern Problems of Geochemistry, Geology and Prospecting for Mineral Deposits: Materials of the International Scientific Conference dedicated to the 110th anniversary of Academician K. I. LUKASHEV (1907–1987), May 23 – 25, 2017, Vol. 1: 51–53; Minsk, Pravo i Ekonomika Publ. (in Russian).

KRUCHEK, S. A. & OBUKHOVSKAYA, V. Y. (2017). Givetian stage of sedimentation on Zhlobin saddle and North Pripyat shoulder and his lithological and palynological markers. – In: LUKASHEV, O. V, SANKO, A. F. et al. (Eds.), Modern Problems of Geochemistry, Geology and Prospecting for Mineral Deposits: Materials of the International Scientific Conference dedicated to the 110th anniversary of Academician K. I. LUKASHEV (1907–1987), May 23 – 25, 2017, Vol. 1: 39-41; Minsk, Pravo i Ekonomika Publ. (in Russian).

SACHENKO T. F. & KRUCHEK S. A. (2017). Organogenous oil-prospective deposits of Yelets suprahorizon of Lower Famennian on South East of Belarus: specific features of forming and distribution. – In: LUKASHEV, O. V, SANKO, A. F. et al. (Eds.),. Modern Problems of Geochemistry, Geology and Prospecting for Mineral Deposits: Materials of the International Scientific Conference dedicated to the 110th anniversary of Academician K. I. LUKASHEV (1907–1987), May 23 – 25, 2017, Vol. 1: 67-70; Minsk, Pravo i Ekonomika Publ. (in Russian).

PLAX, D. P. (2017). History of the study of the Devonian ichthyofauna of the Orsha Depression (Belarus). – In: BOGDANOVA T. N. et al. (Eds.), Integral Palaeontology: Development Prospects for Geological Purposes, Proceedings of the LXIII session of the Palaeontological Society of the Russian Academy of Sciences (St. Petersburg, April 3-7, 2017): 201-204 (in Russian).

PLAX, D. P. (2017). Ichthyofauna from the Lower and Middle Devonian deposits of the Belarusian part of the Baltic Syneclise. – In: LUKASHEV, O. V, SANKO, A. F. et al. (Eds.), Modern Problems of Geochemistry, Geology and Prospecting for Mineral Deposits: Materials of the International Scientific Conference dedicated to the 110th anniversary of Academician K. I. LUKASHEV (1907–1987), May 23 – 25, 2017, Vol. 1: 58-61; Minsk, Pravo i Ekonomika Publ. (in Russian).

KRUCHEK, S. A. & OBUKHOVSKAYA, V. Y. (2017). The Emsian and Eifelian stages of sedimentation on South East of Belarus and their lithological and palaeontological markers. – In: KARABANOV

A. K. et al. (Eds.), Geology and Mineral Raw Materials of the West of Eastern European Platform: Problems of Rational Nature Management Study, Materials of International Scientific Conference dedicated to the 215 anniversary from the day of I. DOMEYKO, Minsk, July 31 – August 3, 2017, The National Academy of Sciences of Belarus: 163-166; Minsk, StroyMediaProekt Publ. (in Russian, with English summary).

MAKHNACH, A. A. KRUCHEK, S. A. & PROKROVSKY. B. G. (2017). Sulphur isotopic composition and the origin of gypsum in Silurian deposits of Belarus. – In: KARABANOV, A. K. et al. (Eds.), Geology and Mineral Raw Materials of the West of Eastern European Platform: Problems of Rational Nature Management Study, Materials of International Scientific Conference dedicated to the 215 anniversary from the day of I. DOMEYKO, Minsk, July 31 – August 3, 2017, The National Academy of Sciences of Belarus: 192-195; Minsk, StroyMediaProekt Publ. (in Russian, with English summary).

CM Tomáš KUMPAN

My research activities focused on Upper Devonian and Lower Carboniferous high resolution multiproxy stratigraphy (conodont biostratigraphy, carbonate petrography, gamma-ray spectrometry, magnetic susceptibility, element and carbon isotope geochemistry). Although the main attention in 2016 and 2017 was predominantly paid to a lower Tournaisian research project „Earliest Carboniferous Greenhouse-Icehouse Climatic Oscillations – a Multidisciplinary Approach“ (funded by Czech Grant Agency, together with Jiří KALVODA, Ondřej BÁBEK, and Jiří FRÝDA), other research activities have been concentrate to Devonian and DCB stratigraphy.

Devonian-Carboniferous boundary intervals, as well as lower Tournaisian, were measured and sampled in several regions of the world during 2016 and 2017. In the Moravian Karst, Czech republic were sampled new sections in active Mokrá and Lesní lom quarries and also outcrops in the Říčka Brook and Křtiny valleys (some of these sections are now processed by Bc. And M.Sc. Students). Ondřej BÁBEK, Jiří FRÝDA and me worked in the Confusion Range and Burbank Hills in Utah (sections kindly recommended to us by Dr. Charles SANDBERG) on May 2016. Field work were also conducted in the Montagne Noire (section Col des Tribes) in October 2016 and in southern China, together with the kind help of Wenkun QIE, in Guizhou (sections Muhua, Gedongguan, Wangyou) and Guangxi (section Duli) provinces in March 2017.

Two papers on the DCB boundary geochemistry and petrophysics, prepared in 2015, were published in 2016 (BÁBEK et al. 2016; FAČEVICOVÁ et al. 2016).

A study of the Frasnian-Famennian boundary was carried out during 2016 based on material from the Moravian Karst, Czech Republic, and Kellerwald, Germany (WEINER et al. 2017), in collaboration with Eberhard SCHINDLER. Conodont and foraminiferal biostratigraphy of the F/F interval and petrophysical and element geochemical signature of the Kellwasser Events have been compared and correlated between these two regions.

Geochemical and petrophysical data from the Rhenish Massif DCB sections were published in a review paper on the Drewer section (BECKER et al. 2016) and presented in a poster concerning the Borkewehr section at the ICOS IV symposium in Valencia (HARTENFELS et al. 2017).

Uppermost Famennian and mainly lower Tournaisan conodont faunas from the Rhenish Massif and Moravian Karst were just published in a paper together with Sandra KAISER (KAISER et al. 2017) and also presented during the ICOS IV meeting.

Bryozoans from the lowermost Tournaisan from the Moravian Karst were described in collaboration with Zoya TOLOKONNIKOVA (TOLOKONNIKOVA et al. 2017).

Our Czech DCB working group presented proposal for a new position of the DCB boundary level during the task group meeting, held in Montpellier in October 2016. The proposed level is the FAD of *Protognathodus kockeli* in the first limestone bed just above the Hangenberg Events horizon (or better, above Hangenberg Sandstone Event), coinciding with a sudden drop in concentrations of K, Al, Th, Rb and other detrital proxies (e.g. Computed Gamma Ray value) and change in their ratios.

Results of my Ph.D. thesis on “A high-resolution stratigraphy of the Devonian-Carboniferous boundary interval” (defended in February 2016) were presented at the closing meeting of IGCP 596.

Publications

Journal contributions

BÁBEK O., KUMPAN, T., KALVODA, J. & MATYS GRYGAR, T. (2016). Devonian/Carboniferous boundary glacioeustatic fluctuations in a platform-to-basin direction: A geochemical approach of sequence stratigraphy in pelagic settings. – Sedimentary Geology, **337**: 81-99.

BECKER, R. T., HARTENFELS, S., WEYER, D. & KUMPAN, T. (2016). The Famennian to Lower Viséan at Drewer (northern Rhenish Massif). – Münstersche Forschungen zur Geologie und Palaeontologie, **108**: 158-178.

FAČEVICOVÁ, K., BÁBEK, O., HRON, K. & KUMPAN, T. (2016). Element chemostratigraphy of the Devonian/Carboniferous boundary – A compositional approach. – Applied Geochemistry, **75**: 211-221.

KAISER, S. I., KUMPAN, T. & CÍGLER, V. (2017 in press). New unornamented siphonodellids (Conodonta) of the lower Tournaisian from the Rhenish Massif and Moravia (Germany and Czech Republic). – Neues Jahrbuch für Geologie und Paläontologie.

TOLOKONNIKOVA, Z., KALVODA, J. & KUMPAN, T. (2017). An early Tournaisian (Mississippian) bryozoan fauna from the Moravian Karst (Rhenohercynian Zone, Czech Republic). – Geobios, **50** (4): 341-348.

WEINER, T., KALVODA, J., KUMPAN, T., SCHINDLER, E. & ŠIMÍČEK, D. (2017). An Integrated Stratigraphy of the Frasnian-Famennian Boundary Interval (Late Devonian) in the Moravian Karst (Czech Republic) and Kellerwald (Germany). – Bulletin of Geosciences, **92** (2): 257-281.

Abstracts

HARTENFELS, S., BECKER, R. T. & KUMPAN, T. (2017). Uppermost Famennian to Lower Tournaisian stratigraphy at Borkewehr near Wocklum (Northern Rhenish Massif, Germany). - In: LIAO, J.-C. & VALENZUELA-RÍOS, J. I. (Eds.), Fourth International Conodont Symposium, ICOS IV "Progress on Conodont Inbestigation", Cuadernos del Museo Geominero, **22**: 195-197.

KUMPAN, T., BÁBEK, O., KALVODA, J., FRÝDA, J. & GRYGAR, T. M. (2016). Devonian-Carboniferous boundary in Europe - a multidisciplinary approach. – Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **22**: 47-50.

TM John E. MARSHALL and the Southampton Group

2017 was a great relief from the turmoil of the previous year in not having to look after vertebrate palaeontology. Then I didn't even have the consolation of the students being interested in projects on Devonian fish or early Carboniferous tetrapods. Just Mesozoic and with big teeth!

Amongst the conferences attended were the Palaeontological Association Annual Meeting in Lyon, France where we had a number of TW:eed Project Tournaisian talks and posters. This Xmas the PalAss meeting is in London, for about the first time.

I also attended the IPC14/IOPC meeting in Salvador, Brazil, along with Emma REEVES and we gave presentations on Devonian megaspores and the re-zonation of the Tournaisian of Scotland. This September we also attended the AASP-Palynology Society meeting in Nottingham where Emma was runner up in best student talk prize. Other meetings attended were the 88th Annual Paläontologische Gesellschaft meeting in Münster, the Bolivian Geological Congress in Santa Cruz, and ICOS IV in Valencia for the SDS business meeting. We also had the Rhynie Chert meeting in London at the Royal Society. This was to celebrate 100 years since publication of the first paper on the Rhynie Chert.

For fieldwork I visited Scotland twice for the TW:eed Project. Initially looking at western exposures of the early Tournaisian Ballagan Formation. I then returned with Emma REEVES for low spring tide on Burnmouth shore. This trip we were particularly successful in finding a bed that contains exceptional numbers of well preserved lycopod megaspores and seeds. But the highlight was finding a palynological assemblage in the uppermost Old Red Sandstone. No spores have ever been found before from the onshore ORS of Scotland or northern England. This unequivocally shows that the top of the ORS is latest Famennian in age and restores the ORS-Ballagan Formation boundary (which marks a major facies change) to near equivalence with the D-C boundary. For over 75 years the top of the ORS had been placed well within the Tournaisian based on vertebrates. This discovery has all sorts of implications including showing that major groups of Devonian fish do go extinct at the D-C boundary. It also helps populate Romer's Gap

with tetrapods by pulling the ranges down into the early and mid Tournaisian.

2017 also saw a return for a short visit to East Greenland and accompanied by Ian TROTH. Here we managed to locate the D-C boundary on Traill Ø and collect a section through the Tournaisian. This gives us a terrestrial palaeoclimate record from the interior of the ORS continent that we can link to the spore record and to marginal sections in Scotland.

Other fieldwork included southern Bolivia (again with Ian TROTH) where we investigated more Devonian sections in the Tarija area.

Publications

CLACK, J. A., BENNETT, C. E.; CARPENTER, D. K.; DAVIES, S. J., FRASER, N. C., KEARSEY, T. I., MARSHALL, J. E. A., MILLWARD, D., OTOO, B. K. A., REEVES, E. J., ROSS, A. J., RUTA, M., SMITHSON, K. Z., SMITHSON, T. R. & WALSH, S. A. (2016). Phylogenetic and environmental context of a Tournaisian tetrapod fauna. - Nature, Ecology & Evolution, **1**, doi: 10.1038/s41559-016-0002.

MARSHALL, J. E. A., ZHU, H.-C., WELLMAN, C. H., BERRY, C. M., WANG, Y., XU, H. & BREUER, P. (2016). Provincial Devonian spores from South China, Saudi Arabia and Australia. - Revue de Micropaléontologie, http://dx.doi.org/10.1016/j.revmic.2016.10.003.

KEARSEY, T. I, BENNETT, C. E., MILLWARD, D., DAVIES, S. J., GOWING, C. J. B., KEMP, S. I., LENG, M. J., MARSHALL, J. E. A. & BROWNE, M. A. E. (2016). The terrestrial landscapes of tetrapod evolution in earliest Carboniferous seasonal wetlands of SE Scotland. - Palaeogeography, Palaeoclimatology, Palaeoecology, **457**: 52-69, doi. /10.1016/j.palaeo.2016.05.033.

BENNET, C. E., HOWARD, A. S., DAVIES, S. J., KEARSEY, T. I., MILLWARD, D., BRAND, P. J.; BROWNE, M. A. E.; REEVES, E. J. & MARSHALL, J. E. A. (2017). Ichnofauna record cryptic marine incursions onto a coastal floodplain at a key Lower Mississippian tetrapod site. - Palaeogeography, Palaeoclimatology, Palaeoecology, **468**: 287-300.

BENNETT, C. E., KEARSEY, T. I., DAVIES, S. J., MILLWARD, D., CLACK, J. A., SMITHSON, T. R. & MARSHALL, J. E. A. (2016). Early Mississippian sandy siltstones preserve rare vertebrate fossils in seasonal flooding episodes. - Sedimentology, **63***:* 1677-1700, doi: 10.1111/sed.12280

CM Marek NARKIEWICZ

During the last year and in the first half of the current 2017 the stratigraphical and palaeoecological studies of the Devonian have been carried on, with particular emphasis on the Middle Devonian conodont biostratigraphy and palaeoecology.

The results of the biofacies study of the mid-Givetian Taghanic transgressive interval have been published in the volume edited by R. T. BECKER, P. KÖNIGSHOF and C. E. BRETT (K. NARKIEWICZ et al. 2016). The main outcome of the study is the proposed scheme of the conodont biofacies distribution against main palaeogeographic elements of Givetian marine basins. The possible influence of a global palaeogeography and also a dynamic aspect of temporal biofacies successions related to the Taghanic sea-level changes have been discussed.

The results of the joint Polish-Belarussian project on the Kačak Event in shallow-marine upper Eifelian facies of Belarus and Poland have been successively analysed, discussed and prepared for a publication. In particular, selected conodont *Icriodus* species have been revised and their stratigraphic ranges have been re-evaluated and constrained, based i.a. on the Belarussian material (K. NARKIEWICZ & BULTYNCK 2016). The study of the Belarussian conodont apatite (M. NARKIEWICZ et al. 2017) documented complex controls on the oxygen isotope composition, including salinity fluctuations in addition to sea-water temperature. The monsoonal climatic conditions are probably reflected in a considerable intra-specimen and inter-specimen variability of $\delta^{18}O_{apatite}$ values obtained from secondary ion mass spectrometry (SHRIMP) technique. The results, discussed in a broad global context, suggest that global climatic cooling proposed for the Middle Devonian by JOACHIMSKI et al. (2009) could have been of a smaller amplitude than originally presumed. The results confirm the palaeolatitudinal, physiographic, bathymetric and climatic analogies between the Belarussian epeiric basin and the inland Indonesian Seas, the Arafura Sea in particular.

Review of previous results together with the preliminary study of the upper Eifelian – early Givetian conodont collections from Belarus, Belgium, Czech Republic, Germany and Morocco prompted a biostratigraphic revision of the interval comprising the *kockeli*, *ensensis* and *hemiansatus* zones of the global subdivision. The first results of the joint study with P. BULTYNCK (Leuven) and P. KÖNIGSHOF (Senckenberg Institut, Frankfurt) were

presented during the ICOS IV in Valencia (K. NARKIEWICZ et al. 2017). It is planned to carry on the study within the framework of a wider international project based in the Polish Geological Institute-NRI, Warszawa, to be launched in the forthcoming months.

Publications/abstracts

NARKIEWICZ, K. & BULTYNCK P. (2016). Taxonomy and biostratigraphic significance of *Icriodus orri* KLAPPER et BARRICK and related Middle Devonian conodont species. - Journal of Paleontology, **90**: 1181-1196, doi: 10.1017/JPA.2016.41.

NARKIEWICZ, K., NARKIEWICZ, M. & BULTYNCK, P. (2016). Conodont biofacies of the Taghanic transgressive interval (middle Givetian): Polish record and global comparisons. - In: BECKER, R. T., KÖNIGSHOF, P. & BRETT, C. E. (Eds.), Devonian Climate, Sea Level and Evolutionary Events, Geological Society, London, Special Publications, **423**: 201-222, doi:10.1144/SP423.2.

NARKIEWICZ, M., NARKIEWICZ, K., KRZEMIŃSKA, E. & KRUCHEK, S.A. (2017). Oxygen isotopic composition of conodont apatite in the equatorial epeiric Belarussian Basin (Eifelian) – relationship to fluctuating seawater salinity and temperature. - Palaios, **32** (7): 339-447.

NARKIEWICZ, K., NARKIEWICZ, M., BULTYNCK, P. & KÖNIGSHOF, P. (2017). The past, present and future of the upper Eifelian conodont zonation. - In: LIAO, J.-C, VALENZUELA-RIOS, J. I. (Eds.), 4th International Conodont Symposium, ICOS IV "Progress on Conodont Investigation", Valencia, Cuadernos del Museo Geominero, **22**: 137-140.

TM D. Jeffrey OVER

Studies continue on conodont biostratigraphy of Middle and Upper Devonian strata in the Appalachian Basin in collaboration with students and John REPETSKI at the US Geological Survey and Tom ALGEO at the University of Cincinnati. Work in the western basins in collaboration with James HAGADORN and others at the Denver Museum of Science and Nature progresses, as well as with Jed Day and Michael Whalen. Magnetic susceptibility tied in with astrochronology has involved work with Mark Schmitz, Chuck VER STRAETEN, Carl BRETT, Anne Christine DA SILVA, and former students. New York stratigraphy is being revised - updating the charts constructed by RICKARD (1975) - lead by Chuck VER STRAETEN. And, finally, following the ICOS field trip in Valencia, the uppermost strata of the griotte facies at the Pi-section was determined to be Famennian.

Publications

SPALLETTA, C., PERRI, M. C., OVER, D. J. & CORRADINI, C. (2017). Famennian (Upper Devonian) conodont zonation: revised global standard. - Bulletin of Geosciences, **92**: 31-57.

DANIELSEN, E. M., OVER, D J., BAIRD, G. C. & VER STRAETEN, C. A. (2017). The Marcellus subgroup in the type area, central New York State. - Stratigraphy, **13**: 155-162 [imprint 2016].

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 proposal of an updated conodont zonation. - Geological Magazine, **154** (4): 888-902, doi: 10.1017/S001675681600039X

LANIK, A., OVER, D. J., SCHMITZ, M. D., AND KIRCHGASSER, W. T. (2016). Testing the limits of chronostratigraphic resolution in the Appalachian Basin, Upper Devonian (Middle Frasnian), eastern North America: new U-Pb zircon dates for the Belpre Tephra Suite. - Geological Society of America, Bulletin, 10.1130/B31408.1

WHALEN, M. T., DE VLEESCHOUWER, D., SLIWINSKI, M., DAY, J. E., OVER, D .J. & CLAEYS, P. (2016). Pattern and timing of the Late Devonian biotic crisis in western Canada: insight from carbon isotopes and astronomical calibration of magnetic susceptibility data. - SEPM Special Publication. **107**: 10.2110/sepmsp.107.02.

SULLIVAN, N., OVER, D. J., CHULUUN, M. & MYROW, P. (2016). Subsidence and the drowning of a carbonate platform in south-central Mongolia (Gobi Altai Region) during the Late Eifelian to Early Givetian: A synthesis of biostratigraphy, magnetic susceptibility, and paleoecology. - Journal of Asian Earth Sciences, **115**: 204-213

MCGINN, E., OVER, D. J., KOSLOSKI, M. E., DAY, J. E. (2017). High Frasnian conodonts from the Canaseraga Sandstone, Java Group, Upper Devonian, western New York. - Geological Society of America, Abstracts with Programs, **49** (2).

OVER, D. J. & WALLACE, J. (2017). Conodonts and the Frasnian-Famennian boundary (Upper Devonian) in the New Albany Shale., Illinois Basin, western Kentucky. - Geological Society of America, Abstracts with Programs, **49** (2).

OVER, D. J., HORNER, H.G., WISTORT, Z. P., HAGADORN, J. W., SOAR, L. K. & BULLECKS, J. (2016). Late Devonian conodonts from the shallow shelf strata of the Broken rib and Coffee Pot members, Dyer Formation, Chaffee Group, Colorado. - Geological Society of America, Abstracts with Programs, **48** (7).

HAGADORN, J. W., BULLECKS, J., SOAR, L. K., LAHEY, B. L., OVER, D .J., WISTORT, Z. P. & HOLM-DENOMA, C. S. (2016). Colorado mass extinction: weird facies and cool fossils from the end-Devonian Dyer Formation. - Geological Society of America, Abstracts with Programs, **48** (7).

WALLACE, J. & OVER, D. J. (2016). Depositional cyclicity indicated by magnetic susceptibility in the New Albany Shale Frasnian (Upper Devonian) strata in the Illinois Basin of western Kentucky. - Geological Society of America, Abstracts with Programs, **48** (7).

OVER, D. J. & SULLIVAN, D. P. (2016). Cosmopolitan conodonts in the Shurtleff Concretion horizon, upper Cashaqua Shale, Sonyea Group, middle Frasnian (Upper Devonian), Appalachian Basin in western New York State. - Geological Society of America, Abstracts with Programs, **48** (2): 52-6.

CM Luiza C. M. O. PONCIANO

During the last year I continued to work on Devonian outcrops in northeastern and northern Brazil, although a good deal of time was devoted to Geological Heritage, Geoconservation, and Earth Sciences Education projects, due to many events that have prohibited the development of scientific projects or caused the destruction of Devonian outcrops in Brazil.

Current studies on Early and Middle Devonian fossil assemblages from the Pimenteira Formation (late Eifelian–late early Givetian, Parnaíba Basin) and Maecuru Formation (latest Emsian–early Eifelian, Amazonas Basin) are also related to field trips itineraries based on information retrieved by the analysis of Kenneth E. CASTER'S correspondence and field notebooks. These documents have been used to develop an inventory of the most valuable occurrences of Devonian fossils in Brazil. Some of the Devonian outcrops (already considered Paleontological Heritage), as the fossiliferous outcrop of Oiti, a record of a Devonian sea in Northeastern Brazil, are under increasing risk of total or partial deterioration, mainly due to anthropic activities. The inexistence of a systematic and comprehensive inventory means that the geological evidence that has supported decades of studies and research, and the spending of vast amounts of public and private money, may disappear forever.

The study of Kenneth E. CASTER'S documents also complement the analysis of other materials, such as the fossils deposited in scientific collections from Brazil (Museu Nacional, Rio de Janeiro) and USA (GEIER Collections & Research Center, Cincinnati), in order to understand the original geological context from which this material was removed. South American stratigraphy and the Brazilian Devonian fossils were areas of great interest to Kenneth E. CASTER, who saw in the visit to Brazil the possibility of examining these deposits in the field, in order to complement the correlations with the regions of North America and other countries he had already studied. During his time in Brazil, he traveled to several locations in order to collect fossils and improve the geological mapping. In his correspondence, he described a significant area of the Brazilian territory. The information include the description of stratigraphic sequences observed in the field, new fossil localities and fossiliferous levels, and the confrontation of theories about the chronostratigraphic attribution of the Brazilian Paleozoic deposits. I would like to express thanks to TM Carlton E. BRETT, David L. MAYER, Warren D. HUFF, Lewis A. OWEN, and Barry J. MAYNARD (University of Cincinnati / Department of Geology) for allowing the study and scanning of Kenneth E. CASTER'S field notebooks and correspondence, and for the donation of Brazilian fossils ("CASTER'S Collection") to the Museu Nacional (Rio de Janeiro). I am also thankful to Brenda HUNDA (Cincinnati Museum Center / GEIER Collections & Research Center) for allowing the study and loan of Brazilian fossils, helping to continue the studies on the Pimenteira Formation.

Publications

LIMA, J. D. C. & PONCIANO, L. C. M. O. (2017). Importance of Kenneth Edward CASTER (1908-1992) personal correspondence and field notebooks to the Brazilian Paleontological

Heritage. – Geoheritage, https://doi.org/10.1007/s12371-017-0241-4.

MANSUR, K. L., PONCIANO, L. C. M. O. & CASTRO, A. R. S. F. (2017). Contributions to a Brazilian Code of Conduct for Fieldwork in Geology: an approach based on Geoconservation and Geoethics. - Anais da Academia Brasileira de Ciências, **89**: 431-444.

SANTOS, L. B. M., HORMANSEDER, B. M., SANTOS, L. F., ARAUJO, D. O., LOPES, M. L. O. C., LEME, G. F. P. & PONCIANO, L. C. M. O. (2016). Paleontologia cultural: uma análise sobre fósseis e monstros da Amazônia: O Mapinguari. - l Colóquio de Zoologia Cultural - Livro do evento, Editora Perse: 114-128.

LIMA, J. D. C. & PONCIANO, L. C. M. O. (2016). Kenneth Edward CASTER (1908-1992) visita o Brasil: a correspondência de um paleontólogo como subsídio para proteção do patrimônio paleontológico brasileiro. - Anais do IV Seminário Internacional Cultura Material e Patrimônio de C&T. RJ: Museu de Astronomia e Ciências Afins (MAST): 688-714.

SANTOS, L. B. M., HORMANSEDER, B. M., SANTOS, L. F., ARAUJO, D. O., LOPES, M. L. O. C., LEME, G. F. P. & PONCIANO, L. C. M. O. (2016). Invertebrados da Bacia do Amazonas: divulgação da paleofauna devoniana através do sabor Maecuru. - Anais do I Colóquio de Zoologia Cultural, Editora Perse: 202-203.

CM Eberhard SCHINDLER

Research went on mainly related to the following activities:

In the aftermath of Turkish–German cooperation projects further presentations (talks, posters) were given and papers are in advanced stages of preparation. Results have been presented e.g., at the joint SDS/IGCP 591 Meeting in Ghent (NAZIK et al.) and at the 87th Annual Conference of the Paläontologische Gesellschaft in Dresden (SCHINDLER et al.).

A paper on the Choteč Event including new dacryoconarid taxa which had been online earlier is now available in print (BROCKE et al.).

Work on the Eifel area continued and results of a combination of different methods (palynology, magnetic susceptibility, cyclicity) applied on a rather monotonous marlstone succession in the Hillesheim Syncline were presented at the before mentioned meeting in Ghent (SCHINDLER et al.). A subsequent paper has been submitted.

Together with Czech colleagues, work on a paper comparing sections in the Moravian Karst with the Steinbruch Schmidt Section of the Kellerwald area (Rheinisches Schiefergebirge) was conducted and the manuscript has been submitted.

Contributions were made to the German Stratigraphic Table 2016 (Stratigraphische Tabelle Deutschland 2016, STD) together with a bunch of German colleagues. The table was ready (thanks to Manfred MENNING, GFZ Potsdam!) and could be presented at the 35th International Geological Congress in Cape Town (August/September).

Already mentioned in last year's report, the preparation of moving the collections and all other facilities of the palaeontological/geological department at Senckenberg has begun and starts to hinder other activities seriously.

Publications (in chronological order)

SCHINDLER, E., BROCKE, R., BRETT, C. E., ELLWOOD, B. B., HARTKOPF-FRÖDER, C., RIEGEL, W. & TOMKIN, J. H. (2016). Comparison of palynofacies, magnetic susceptibility and cyclicity of the Mid Devonian Müllertchen Section (Eifel area, Germany). – IGCP 591 "The Early to Middle Paleozoic Revolution", Closing Meeting, Ghent University, Belgium, 6-9 July 2016, Abstracts: 70.

NAZİK, A., GROOS-UFFENORDE, H., OLEMPSKA, E., YALÇIN, M. N., WİLDE, V., SCHİNDLER, E., KÖNİGSHOF, P. & ŞEKER, E. (2016). Contribution of the Silurian-Devonian Ostracods to the Palaeogeographical Assignment of the Western Pontides, Central and Eastern Taurides, Turkey. – IGCP 591 "The Early to Middle Paleozoic Revolution", Closing Meeting, Ghent University, Belgium, 6-9 July 2016, Abstracts: 118-119.

SCHİNDLER, E., YALÇIN, M. N., WİLDE, V., NAZİK, A., WEHRMANN, A. & YILMAZ, İ. (2016). Enigmatic fossils from the Middle Devonian of the Eastern Taurides (Turkey). – 87th Annual Conference of the Paläontologische Gesellschaft, Dresden 2016: 136-137.

BROCKE, R., FATKA, O., LINDEMANN, R. H., SCHINDLER, E. & VER STRAETEN, C. A. (2016): Palynology, dacryoconarids and the lower Middle Devonian Basal Choteč Event: Case studies from the Prague and Appalachian basins. – Geological Society of London, Special

Publications, **423**: 123-169. doi.org/10.1144/SP423.8

TM Ladislav SLAVÍK

During 2016 the most important activities were concentrated to the recently finished projects. The main results from the project "Hi-res correlation and dating of Mid-Palaeozoic sedimentary sequences of Peri-Gondwana using integrated biostratigraphy and chemo-physical methods" have been published in 2016: The paper deals with the correlation of two pyrenean sections that include the Lochkovian/Pragian boundary. Data from magnetic susceptibility, Dynamic Time Warping method that used the processed MS data and gamma spectrometric logging under biostratigraphic control offer an interpretation of major paleoclimatic changes in the Early Devonian.

By the end of 2016 the project: “Sequence stratigraphy of Devonian bioevents – sea level changes at the transition from greenhouse to icehouse world” supported by Czech Science Foundation was accomplished. The team headed by Ondřej Bábek (Olomouc) already presented and published several results from this project. In autumn 2016 a joint paper (manuscript) on red carbonates from the Lower Devonian of the Prague Synform has been submitted.

The SDS project “Progress on the Basal Emsian GSSP redefinition”: In early 2016 all the samples that we have taken jointly during the 2015 field work in the Zinzilban section, Kitab State Reserve, Uzbekistan (see the SDS Newsletter No. 31) and that were shipped to Prague have been processed in my laboratory. In the late autumn all 24 samples of approximate total weight of 50 kg have been completely finished and concentrated and conodont elements have been picked. The results (rather disapointing) are going to be reported in the SDS meeting in Valencia next year.

Publications

Journal / book contributions

SLAVÍK, L., VALENZUELA-RÍOS, J. I., HLADIL, J., CHADIMOVÁ, L., LIAO, J.-C., HUŠKOVÁ, A., CALVO, H. & HRSTKA, T. (2016). Warming or cooling in the Pragian? Sedimentary record and petrophysical logs across the Lochkovian-Pragian boundary in the Spanish Central Pyrenees. - Palaeogeography, Palaeoclimatology, Palaeoecology, **449**: 300-320.

DA SILVA, A. C., HLADIL, J., CHADIMOVÁ, L., SLAVÍK, L., HILGEN, F. J., BÁBEK, O. & DEKKERS, M. J. (2016). Refining the Early Devonian time scale using Milankovitch cyclicity in Lochkovian–Pragian sediments (Prague Synform, Czech Republic). - Earth and Planetary Science Letters, **455**: 125-139.

SLAVÍK, L. (2016). 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

DA SILVA, A.-C, HLADIL, J., CHADIMOVA, L., SLAVÍK, L., HILGEN, F. J. & DEKKERS, M. J. (2016). Millenial to Million year cyclities from the Lower Devonian. – 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, July 6-9, Abstracts: 36.

SLAVÍK, L., JOACHIMSKI, M. M., DA SILVA, A.-C., BÁBEK, O. & HLADIL, J. (2016). The Pragian in the Prague Synform: Questions, Durations and Global Correlation. - 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, July 6-9, Abstracts: 74.

HUŠKOVÁ A. & SLAVÍK, L. (2016). Spathognathodontid conodonts of the Silurian/Devonian boundary (Prague Synform): Preliminary results. - 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, July 6-9, Abstracts: 110.

SLAVÍK, L., HLADIL, J., ŠTORCH, P., HUŠKOVÁ, A. & CHADIMOVÁ, L. (2016). Multiproxy approach and HI-RES stratigraphy: Contrasting examples of degree of precision attained in correlation of mid-Palaeozoic strata. - 35th International Geological Congress, Cape Town, RSA, August 27 - September 4, 2016, Abstract, American Geosciences Institute (AGI) website: Paper number 1654.

SLAVÍK, L., HLADIL, J., VALENZUELA-RÍOS, J. I., CHADIMOVÁ, L., HUŠKOVÁ, A. & LIAO, J.-C. (2016).

The Early Devonian sedimentary records, biostratigraphy and petrophysical logs from the key peri-Gondwanan sections and paleoenvironmental implications. – In: SUTTNER, T. J., KIDO, E., SIMONETTO, L., WATERS, J. A., CORRADINI, C., CARMICHAEL, S. K. & KÖNIGSHOF, P. (Eds.), IGCP 596 - On-Extended-Term Closing Meeting, Udine, October 10-12, 2016, Abstract Volume, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **22**: 69-73.

TM Claudia SPALLETTA

My research on Devonian lithostratigraphy of the Carnic Alps and conodont biostratigraphy continues. The latter is mainly focused on the Frasnian/Famennian and Devonian/Carboniferous boundaries. The studies on the second are within the frame of the International Working Group on the redefinition of the Devonian/Carboniferous Boundary (led by Markus ARETZ, Toulouse).

A manuscript on the Frasnian/Famennian boundary studied in two stratigraphic section of the Carnic Alps deposited in oxic environment was almost completed. The work was made in collaboration with Enzo FARABEGOLI, M. Cristina PERRI (both of Bologna), Monica PONDRELLI (Pescara), Michael M. JOACHIMSKI (Erlangen), and Anita ANDREW (Sydney). The completion of the manuscript registered an abrupt interruption last May when **Enzo FARABEGOLI**, first author of the paper, died. Enzo was suffering from cancer since some years. As a sort of "warrior", a person never giving up, he fought the illness with all his strength up to the very last days, continuing to work, but in the end the cancer won. The other authors continued the work at the point it was interrupted.

The paper on a new Famennian global conodont zonation in collaboration with Carlo CORRADINI (Cagliari), Jeff OVER (Geneseo) and M. Cristina PERRI (Bologna) was published in March.

In July I was one of the leader, together with Carlo CORRADINI (Cagliari), Hans-Peter SCHÖNLAUB (Vienna) and Luca SIMONETTO (Udine), of the ICOS 4 field trip in the Carnic Alps. The few people attending the field trip seemed very impressed by the local geology and landscape. They also appreciated the local Carnic Alps and Austrian food and hospitality.

Publications

Journal contributions

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, **154** (4): 888-982, doi:10.1017/S001675681600039X.

SPALLETTA, C., PERRI, M. C., OVER, D. J. & CORRADINI, C. (2017). Famennian (Upper Devonian) conodont zonation: revised global standard. Bulletin of Geosciences, **92** (1): 31-57.

SPALLETTA, C., PERRI, M. C., MOSSONI, A. & PONDRELLI, M. (2017). The *Annulata* Event at the Pramosio Bassa section. - Berichte des Institutes für Erdwissenschaften, Karl-Franzens--Universität Graz, **23**: 141-145.

SPALLETTA, C., PERRI, M. C., PONDRELLI, M. 2017. Late and latest Famennian conodonts at the Malpasso section. - Berichte des Institutes für Erdwissenschaften, Karl-Franzens--Universität Graz, **23**: 146-151.

Abstract

SPALLETTA, C., PERRI, M. C., OVER, D. J. & CORRADINI, C. (2016). The Famennian global conodont zonation. - In: SUTTNER, T. J., KIDO, E., SIMONETTO, L., WATERS, J. A., CORRADINI, C., CARMICHAEL, S. K. & KÖNIGSHOF P. (Eds.), IGCP 596 On-Extended-Term Closing Meeting Udine, 10-12th October 2016, Abstract Volume. - - Berichte des Institutes für Erdwissenschaften, Karl-Franzens--Universität Graz, **22**: 74-76.

CM Jau-Chyn ("Teresa") LIAO and TM José Ignacio ("Nacho") VALENZUELA-RÍOS

As last year no report was done on due time, this year a summary of activities of both years, is enclosed.

Main activities of TM VALENZUELA-RÍOS and CM LIAO focused on Lower, Middle and Upper Devonian conodont biostratigraphy, Middle Devonian conodont biofacies, and Lower and Middle Devonian microfacies analysis of selected Pyrenean sections. Most of these efforts were oriented towards the organization of the joint SDS-ICOS-ISSS preconference fieldtrip in the Spanish Pyrenees (June 2017). Besides the Pyrenees, studies

in the Iberian Cordillera have been re-launched and intensified. Cooperation with Raimund FEIST (Montpellier) started in fall 2015. Around 100 conodont samples were taken in selected outcrops in the Montagne Noire. We expect to elaborate the first results in the coming years.

Both in the Spanish Central Pyrenees and in the Iberian Chains multidisciplinary studies on Devonian sections and outcrops have started. In this context the following actions are noteworthy: Together with CM Sofie GOUWY a graphic correlation project for Pyrenean sections rendered the first results (GOUWY et al. 2016; see below). We have started with Middle and early Upper Devonian sections, and our intention is to continue with Lower Devonian ones.

A cooperation with TM Ladislav SLAVÍK, CM Leona CHADÍMOVÁ, and Aneta HUŠKOVÁ from the Czech Geological Survey aimed at a comparison of Lower Devonian conodont biostratigraphy, geophysical (mainly GRS and MS) and geochemical data from two European key regions, the Spanish Central Pyrenees and the Prague Synform. It has already produced important results for the middle and upper Lochkovian (VALENZUELA-RÍOS et al. 2015) and for the strata around the Lochkovian/Pragian boundary (SLAVÍK et al. 2016).

The long-term project of detail analysis of Bohemian conodont faunas around the S/D interval is on progress together with CMs Mike MURPHY and Peter CARLS.

Cooperation with paleobotanists has started in the Lower Devonian strata of the Iberian Chains. First results demonstrate the presence of high diversity of palynoflora (34 spore taxa from 20 genera) of early Pragian age (CASCALES-MIÑANA et al. 2015). The cooperation continues and we want to augment the palaeontological characterization of Lower Devonian strata in the Iberian Chains by adding to the already rich invertebrate and vertebrate data base, the paleopalynological record. This on-going project extends to the Middle and Upper Devonian strata of the Iberian Chains.

We have also started to pay close attention to the identification of "Events" in the Spanish Pyrenees. Preliminary results have already been presented in professional conferences (see below).

In cooperation with CM Olga IZOKH, three selected Devonian sections (and intervals) have been sampled for geochemical studies. The preliminary sampling started two years ago and has been completed this summer on the occasion of the Pyrenees fieldtrip together with TM Nadya IZOKH and Tatiana KHLEBNIKOVA.

CM LIAO has started a Middle and Upper Devonian joint project with Susana GARCÍA-LÓPEZ (University of Oviedo) on selected localities of the Cantabrian Mountains.

TM NACHO VALENZUELA, together with TMs Ladislav SLAVÍK and Nadya IZOKH, evaluate the conodont record from the Zinzilban section aiming at the redefinition of the base of the Emsian. This action is a consequence of SDS decisions in 2008 and the new sampling carried out in 2015 (see details in the report by SLAVÍK et al. this volume).

Other important actions in relevant Spanish outcrops include 1) the stratigraphical and palaeontological study of Lower Devonian outcrops in Ossa-Morena and Central-Iberian areas in south-western Spain, together with other Spanish colleagues (Miguel PARDO and Esperanza FERNÁNDEZ). This project entails large field-campaigns and mapping in rough areas. 2) Long-term collaboration with CM Peter CARLS on the Devonian of the Iberian Chains, a classical and key area for "Rhenish" (neritic) facies. 3) CM Jenaro L. GARCÍA-ALCALDE continues publishing large monographies on brachiopods from the Cantabrian Mountains.

Last but not least, a relevant event took place last year: On November 2016 our Chinese student Jianfeng LU successfully defended his dissertation "Lower Devonian Conodonts from Guangxi and southeastern Yunnan, South China" in the Nanjing Institute of Geology and Paleontology, University of Chinese Academy of Sciences. This action was jointly started with the late and lovely friend CHEN Xiuquin ("Suzi"); her early departure was a shock for the three of us. Our tribute to her determination and inspiration resulted in the beginning of this Chinese-Spanish cooperation that will continue in the future.

Publication

GOUWY, S., LIAO, J.-C., VALENZUELA-RÍOS, J. I. & MARTÍNEZ-PÉREZ, C.. (2017). Eifelian-Famennian Conodont succession in the Villech sections. - Berichte des Institutes für Erdwissenschaften, Karls-Franzes-Universität Graz, **23**:82-88.

CM Chuck VER STRAETEN

During 2016, a significant amount of my research was focused on lower Givetian to mid-Frasnian(?) terrestrial strata in eastern New York's Catskill Mountains. The geology there is still a relative frontier, knowledge-wise. The estimated ca. two-kilometer-thick terrestrial succession of the Catskills remains poorly documented. Over several years, I am attempting to document changes through the entire succession systematically (e.g., petrography, palynology, elemental geochemistry, detrital zircon ages, from regularly-spaced intervals). Collaborative Catskill work in process includes palynological study with John MARSHALL (30 samples from 2016, with more from 2014 and to come). Collection of relatively large samples (2-5 kg) through the succession will be reposited for future analyses. In addition, a few distinct marker intervals (e.g., two ca. 6 m-thick conglomerates, ca. 30 m apart; and an underlying sandstone of distinctly-unique mineral composition) appear to permit a few time-significant correlations through the Devonian Catskill terrestrial strata.

Additional research in 2016 included initial research with Anne-Christine DA SILVA, Carl BRETT and Alex BARTHOLOMEW on orbital cyclicity/magnetic susceptibility on upper Emsian strata in the lower part of the Schoharie Formation in eastern New York (Devonian Sequence Ib_4 of VER STRAETEN 2009). Additional work was done during August 2017.

Devonian additions to the New York State Museum's Sedimentary Rock Collection during 2016 included collections of: 1) Philip HECKEL'S classic upper Givetian Tully Limestone study, from New York and Pennsylvania (4 cases, ca. 900 samples), and; 2) samples of mid-Eifelian airfall volcanic "Tioga" tephras ("K-bentonites" and tuffs) from across the eastern U.S., collected by the late John M. DENNISON (1+ cases of small samples). Both collections are currently being processed.

Also during 2016 and early 2017 I was lead content expert for geology and paleontology exhibits at a new visitors' center at John Boyd THACHER State Park. The park is on the Helderberg Escarpment west of Albany here in New York. The geology of the Helderbergs area is classic North American geology, with a relatively well exposed latest Pridolian to lower Givetian marine, with initial terrestrial strata at the top. A geological cross section of THACHER Park was published first in 1820 (by Amos EATON). The area of the park and the Helderbergs was a famous haunt of James HALL and other early New York paleontologists and geologists. Following a trip in the 1840s, Charles LYELL stated "*The Helderberg outcrops must be known to every geologist if he were to understand his science*." Modest but new, specimen-rich exhibits bring the Devonian Period to the general public, students, and travelling professionals alike.

Publications

DANIELSEN, E., OVER, D. J., BAIRD, G. C. & VER STRAETEN, C. (2016). The Marcellus subgroup composite type section, in the type area, central New York State. - Stratigraphy, **13** (3): 155-162.

BROCKE, R., FATKA, O., LINDEMANN, R., SCHINDLER, E. & VER STRAETEN, C. (2016). Palynology, dacryoconarids and the lower Eifelian (Middle Devonian) Basal Chotecˇ Event: case studies from the Prague and Appalachian basins. - In: BECKER, R. T., KONIGSHOF, P. & BRETT, C. E. (Eds.), Devonian Climate, Sea Level and Evolutionary Events, Geological Society, London, Special Publications, **423**: 123-169, doi: 10.1144/SP423.8.

Also, five draft 7.5" Quadrangle bedrock maps of largely Lower to Middle Devonian strata in Albany Co., New York were released digitally (early 2017). Final versions are in process.

VER STRAETEN, C. A., OVER, D. J. & BAIRD, G. C. (2017 submitted). Arc-to-Craton: Devonian Airfall Tephras in the Eastern United States. – In: AVARY, K. L., DIECCHIO, R. & HASSON, K. (Eds.), Geological Society of America, Special Paper [The volume is dedicated to John DENNISON, a leading 20th Century Appalachian Basin Devonian researcher].

Abstracts

CORREIA, E., BARTHOLOMEW, A. J., DA SILVA, A.-C., BRETT, C. E. & VER STRAETEN, C. (2017 submitted). Outstanding Lower Devonian Milankovitch cyclicities exposed in the Hudson Valley, New York State. - Geological Society of America, Abstracts with Programs, **49**.

VER STRAETEN, C. A. (2016). Catskills Bedrock: Overview of its Elemental Geochemistry**.** - Catskill Environmental Research and Monitoring, Fourth Biennial Conference, Highmount, NY: 21.

VER STRAETEN, C. A. & KARABINOS, P. (2016). Integrating foreland and hinterland data: Toward

a greater synthesis of Appalachian tectonics and orogenesis. - Geological Society of America, Abstracts with Programs, **48** (2): doi: 10.1130/abs/2016NE-272712.

SELLECK, B., VER STRAETEN, C., CHIARENZELLI, J. R. & HOLZMAN, E. (2016). Provenance evolution during assembly of the Acadian/Neoacadian orogen: Detrital zircon data from the Devonian of New York. - Geological Society of America, Abstracts with Programs, **48** (2): doi: 10.1130/abs/2016NE-272512.

TERRY, D. O. & VER STRAETEN, C. (2016). The pedogenic expression of Acadian orogenic activity in the Appalachian Basin: The foreland-hinterland connection. - Geological Society of America, Abstracts with Programs, **48** (2): doi: 10.1130/abs/2016NE-272839.

CM James J. ZAMBITO

My Devonian activities in late 2016 and early 2017 continue to be focused on projects in the Michigan Basin (U.S.A.), specifically the Middle-Upper Devonian transition and the Taghanic Biocrisis. Together with CM J. DAY, drill cores from the throughout the basin have been studied using an integration of bio-, chemo- (portable XRF and $\delta^{13}C$), litho-, and sequence stratigraphy. In addition, work with TM C. E. BRETT and others on the Middle Devonian succession in the southern Appalachian Basin (Kentucky, U.S.A.) has reached the point of preliminary results that will be submitted for publication. I'm also in the early stages of a bio- and chemostratigraphic project on the Middle-Upper Devonian carbonate platform deposits of the Dawson Bay and Souris River formations (Williston Basin, North Dakota, U.S.A.).

Publications

ZAMBITO, J., DAY, J. & MCLAUGHLIN, P. (2017). The Devonian Succession in Wisconsin: Insights from Conodont Biostratigraphy and Carbonate Carbon Isotope Chemostratigraphy, northeastern/north-central regional meeting. - Geological Society of America Abstracts with Programs, **49** (2): doi: 10.1130/abs/2017NE-291252.

ZAMBITO, J., M. JOACHIMSKI, C. BRETT, C. E., BAIRD, G. C. & ABOUSSALAM, Z. S. (2016). A carbonate carbon isotopic record for the late Givetian (Middle Devonian) Global Taghanic Biocrisis in the type region (northern Appalachian Basin). – In: BECKER, R. T., KÖNIGSHOF, P. & BRETT, C. E. (Eds.), Devonian Climate, Sea Level and Evolutionary Events, Geological Society, London, Special Publications, **423**: 223-233, http://doi.org/10.1144/SP423.7.

ZAMBITO, J., MCLAUGHLIN, P., DAY, J. & EMSBO, P. (2016). Lithostratigraphic Revision Utilizing Portable XRF Analysis: A Case Study Using the Devonian Milwaukee Formation, north-central meeting. - Geological Society of America Abstracts with Programs, **48** (5): doi: 10.1130/abs/2016NC-275653.

ZAMBITO, J. & PANYARD, N. (2016). A New Tool for Characterizing Rock Properties: pXRF Elemental Analysis of the Squaw Bay and Antrim Formations. - Michigan Petroleum Technology Transfer Council and Michigan Geological Repository for Research and Education.