



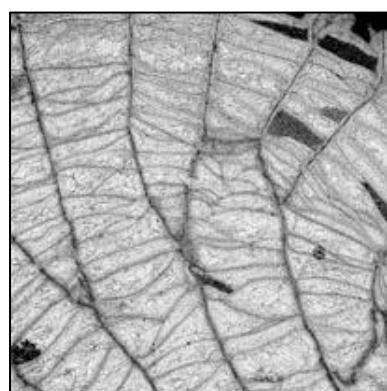
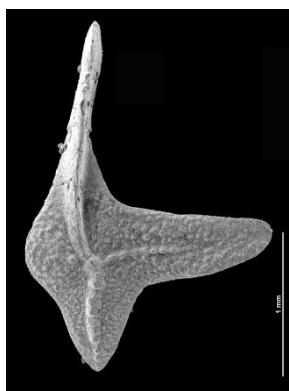
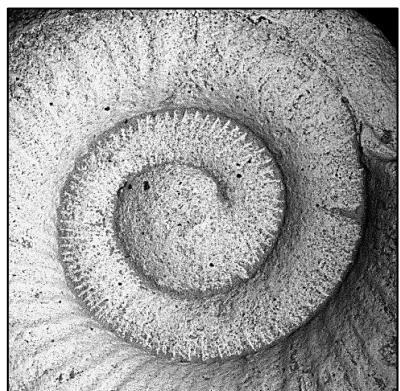
INTERNATIONAL UNION OF
GEOLOGICAL SCIENCES
COMMISSION ON STRATIGRAPHY

—S—D—S—

**SUBCOMMISSION ON
DEVONIAN STRATIGRAPHY**

NEWSLETTER No. 30

R.T. BECKER, Editor
WWU Münster
Germany



SDS NEWSLETTER 30

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.

Editor: Prof. Dr. R. Thomas BECKER
Institut für Geologie und Paläontologie
Westfälische Wilhelms-Universität
Corrensstr. 24
D-48149 Münster, Germany
rbecker@uni-muenster.de

Circulation 120 hard copies,
pdf files of current and past issues are freely available from the SDS Homepage at
www.unica.it/sds/

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. 31 is August 2016.

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

Content:

Message from the Chairman (J.E. MARSHALL)	1
Obituaries	
Jochen HELMS (WEYER, D. & HEINRICH, W..)	2-5
Elzbieta TURNAU (MASIAK, M. & STEMPIEN-SALEK, M)	6-7
Ingrid Zagora (Groos-Uffenorde, H.)	7
SDS Reports	
1. Minutes of the Mendoza Business Meeting (BRETT, C. E. & BECKER, R. T.)	8-12
2. Marburg GeoArchive (SCHINDLER, E. & AMLER, M.R.W.)	13-14
SDS Documents	
1. Late Famennian/Early Tournaisian proxies to Gondwanan Glaciations (ISAACSON, P.E. et al.)	14-19
2. The Kellwasser type locality in the Harz Mountains, Germany (SCHINDLER, E. et al.)	20-27
Devonian Meetings	
1. Palaeozoic Stratigraphy of Gondwana, Perugia, Italia, April 2016	28-31
2. IGCP 591 Closing Meeting & Annual Meeting of SDS, Ghent, July 2016	32-38
3. 35 th International Geological Congress, Cape Town, August/Serptember 2016	39-40
Devonian Publications	
1. IGCP 596 & IGCP 580 Joint Meeting, Mongolia, Abstract volume	41-42
2. IGCP 596 & SDS, Brussels Meeting, Abstract volume, Strata, Série 1, 16	42-45
3. IGCP 596 & SDS, Brussels Meeting, Field Guidebook, Strata, Série 1, 17	45-46
4. Geological Society, London, Special Publications, 423	46
5. Münstersche Forschungen zur Geologie und Paläontologie, 108	47
6. Planet Earth in Deep Time, Devonian & Carboniferous	48
Membership News	
CM Olga V. ARTYUSHKOVA and the Ufa Group	48-49
CM Gordon C. BAIRD	49-50

TM R.Thomas BECKER and the Münster Group (including CMs Sven HARTNFELS and Sarah Z. ABOUSSALAM)	50-55
TM Alain BLIECK	55-56
TM Carlton E. BRETT	56
CM Denise BRICE	56-57
CM Rainer BROCKE	57-58
CM Carole BURROW	58
TM Carlo CORRADINI	58-60
CM Cathrine CRÔNIER	60
CM Anne-Christine DA SILVA	60-62
CM Mercedes DI PASQUO	62-64
TM Nadezhda G. IZOKH and the Novosibirsk Group (including CMs Olga OBUT, O. IZOKH and Aleksandr Y. YAZIJKOV)	64-66
TM Ulrich JANSEN	66-67
CM Elga MARK-KURIK	67-68
TM John E. MARSHALL and the Southampton Group	68-69
CM Bruno MISTIAEN	69
CM M. NARKIEWICZ	69-70
TM Maria-Christina PERRI	70
CM Luiza C.M.O. PONCIANO	70-72
CM QIE Wenkun	72-74
TM Eberhard SCHINDLER	74-75
TM Ladislav SLAVIK	75-77
CM Claudia SPALLETTA	77
CM Thomas J. SUTTNER	77-79
TM José Ignacio VALENZUELA-RÍOS & LIAO Jau-Chyn	79-82
CM Chuck VER STRAETEN	82-83
CM Michael WHALEN	83-84
CM James J. ZAMBITO	84

MESSAGE FROM THE CHAIRMAN

Dear SDS Members,

Welcome to the 2015 SDS Newsletter, ably produced as ever by Thomas BECKER. This is our yearly compilation of all things Devonian and full of useful reports, news of important and hard to locate local publications, accounts of past meetings and notices of forthcoming conferences. It is now being produced at a more fieldwork friendly time as regards North Africa. The end March deadline certainly gets us away from the year end rush.

We have just received news of the death of Des OSWALD. You may not immediately remember the name but he was editor of the 2 oddly shaped green volumes that resulted from the 1967 Devonian Symposium in Calgary. As Des used to say Hated by Librarians because it would never fit on any shelf. Des had a career in the petroleum industry including the important Devonian fields in western Canada. He had been long retired in the UK and had mostly recently come to attention by putting in a claim to drill a fold closure on the British Queen's estate at Windsor. Needless to say it never got drilled but got him many column inches in newspapers.

In November 2014 we learnt of the sudden death of CM Valentina MANTSUROVA, a palynologist with Lukoil in Volgograd, Russia. Valentina was an excellent attendee at international meetings and the author of over 120 publications. Valentina had made significant contributions to the Mid and Late Devonian of southern Russia. There is an obituary in CIMP Newsletter 83 http://cimp.weebly.com/uploads/6/4/0/5/6405206/cimp_-_newsletter_83_march2015.pdf and a list of publications on the CIMP website.

We have just received news of the SDS grant for 2015. This includes support for a group including colleagues from Novosibirsk and Uzbekistan to work on the redefinition of the base Emsian in Zinzilban. The ICS regard completion of all GSSP definitions as a major priority. Fieldwork including resampling of key conodont levels should take place this year so hopefully we can expect good progress. The ICS will not permit us to propose official definitions for sub-stages until all our GSSP's are finished.

The 2015 SDS Meeting

In 2015 the formal SDS meeting will be jointly with IGCP 596 in Brussels. The will be the closing meeting of IGCP 596 and will report on 5 years of progress. There will be a pre-meeting 4 day fieldtrip to the classic Devonian and Carboniferous rocks of

Belgium followed by 2 full days of presentations (21st-22st September) in the Museum of the Royal Belgian Institute of Natural Sciences. There will then be a 7 day conference excursion to the classic Devonian and Carboniferous of Germany finishing in Frankfurt.

You are reminded that the reply to the 1st circular was 25th January 2015!

The conference circular is available from IGCP596-SDS2015@naturalsciences.be

In July (20th-23rd) there is also the STRATI 2015 meeting in Graz, Austria. This is the ICS Stratigraphy Conference. Although the SDS is not formally meeting we have proposed and had accepted a general session (Devonian Events, Correlation and Time) to ensure that we are represented for the Devonian contributions. There is also a Devonian-Carboniferous Boundary session convened by Markus ARETZ and Carlo CORRADINI.

In addition, Ladislav SLAVÍK is leading a 3 day pre-conference fieldtrip to the Silurian and Devonian of the Prague Synform.

Post-conference SDS members Carlo CORRADINI, Thomas SUTTNER and Monica PONDRELLI are leading a 4 day fieldtrip to the pre-Variscan of the Carnic Alps. This includes some quite remote classic sections in stunning scenery.

The STRATI 2015 website is at <http://strati2015.uni-graz.at/>

Abstracts are due the 24th April, with early registration by the 29th May. The fieldtrip deadline is the 30th April.

Our main SDS meeting in 2014 was at the 4th IPC in Mendoza, Argentina. Here we had a full day of Devonian presentations in a meeting that we dedicated to our colleague Mena SCHEMM-GREGORY who we so sadly lost at a young age in 2013. Many SDS members were able to attend the post-congress excursion A Palaeozoic Marine Journey through the Argentine Cordillera. Here we were treated to a wonderful series of exposures that took us through the Palaeozoic rocks of Argentina. We thank all our Argentinian colleagues for an excellently organised meeting and fieldtrip.

With best wishes to all,

John MARSHALL

OBITUARIES

JOCHEN HELMS

1932-2015

D. WEYER & W. HEINRICH

(Museum of Natural History, Leibniz Institution,
Humboldt University, Berlin.)



Jochen HELMS, August 2014

We report with great sadness that Diplom-Geologe Dr. Jochen HELMS, retired curator at the Museum für Naturkunde in Berlin (MfN) and co-founder of Upper Devonian conodont biostratigraphy in Germany, passed away in Berlin on February 10, 2015, at the age of 83 (after Parkinson disease).

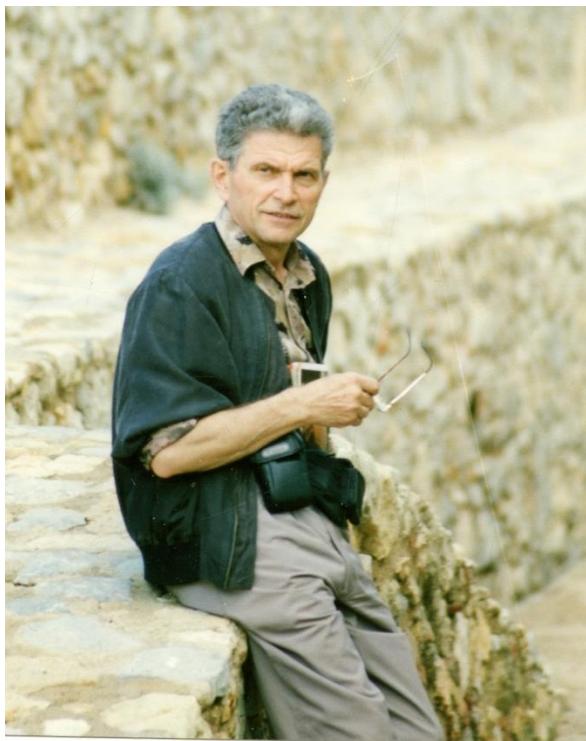
Jochen HELMS was born on January 24, 1932, in Parchim, a county seat in the southeast of Schwerin (province Mecklenburg-Vorpommern, northern Germany). He grew up at his birthplace, a small lovely town, embedded in a charming countryside, which was formed during the last Pleistocene inland glaciation. Most likely, the eventful history of his hometown that is traceable to the 12th century, and the fossil-bearing glacial erratics (including his favourite Oligocene Sternberger Gestein), which could easily be found in the fields and gravel pits, were the reasons for his early interest in nature and local history, particularly in geology and geography. He entered primary school in 1938 and graduated from the local grammar school with the high school diploma (Abitur) in 1951. Then he started as a mason apprentice for the purpose to study architecture (as his father), but at the beginning of 1952, he went to Berlin and took up a post as trainee student at the Department of Engineering Geology of

the Geological Survey. In the same year Jochen HELMS matriculated at the Humboldt-University of Berlin and began with the study of geology and palaeontology at the Geologisch-Paläontologisches Institut und Museum (GPIM). Among his university teachers were distinguished geoscientists such as Serge VON BUBNOFF, Walter GROSS, Eberhard KAUTZSCH, Will KLEBER, and Werner SCHWAN. It was the renowned German vertebrate palaeontologist Walter GROSS (1903-1974), who aroused his interest in conodonts, which were then still an enigmatic and highly disputed group of microfossils.

In 1957, Jochen HELMS finished his university studies with a diploma thesis on late Devonian and early Carboniferous conodonts from the famous Bohlen section near Saalfeld in Thuringia (central Germany). After graduation from the university, he joined the GPIM in 1957 and began his professional career as scientific assistant. In succeeding years he continued his studies on conodonts from the Bohlen site and sampled further exposures in the Upper Devonian beds of Thuringia (mainly Schleiz region, Berga Anticline of the eastern Thuringian Slate Mountains). Supervised by W. GROSS, Jochen HELMS was awarded his doctorate in 1961 with an excellent thesis that substantially improved our knowledge of the Upper Devonian biostratigraphy in central Europe. From 1962 to 1967 he was involved in teaching, lecturing palaeontology of invertebrates. He was very popular among students, who valued particularly his practical exercises with fossils in the GPIM and the mapping internships in the field. In 1969, Jochen HELMS was appointed as curator of the collection of fossil invertebrates at the MfN, a position he held until his retirement in 1997. From 1981-1986 he served as head of the Palaeontological Department at the MfN.

The scientific career of Jochen Helms began promisingly. Important articles on Devonian conodonts were published in the early 1960s, including the significant work on the genus *Palmatolepis*. His phylogenetic tree (1962, 1963, 1981, in its Frasnian part now much improved by KONOVOVA & OVONATANOVA (2005, 2008) is now an obligatory part of many text-books, testifying his delicate feeling in morphological and phylogenetical problems of zoology. In 1964, Jochen HELMS and his wife Annelies were invited to the Lomonosov University in Moscow by the head of the palaeontological chair, professor Vladimir Vasil'evich DRUSHCHITS, in order to give some introductory lectures and practical advices for the study of conodonts – to a just arising group of Russian conodont workers in the Soviet Union. Some, as Lyudmila Ivanovna KONOVOVA, feel themselves as conodont pupils of Jochen HELMS. Together with other colleagues he rejected passionately the FAHLBUSCH-

hypothesis, according to which conodonts are to be interpreted as remains of fossil algae (1965).



Jochen HELMS, Spain, 1993

Unfortunately, Jochen HELMS soon fell ill. An Iritis in 1962 caused increasingly severe strain so that further studies on conodonts had to be abandoned: medical advice ordered stop of microscope work. Later, he was suffering from a serious kidney disease, followed (after 8 month of dialysis) by a transplant in 1988. Despite poor health, he continued to serve the MfN through the following decades. As curator he catalogued a large number of invertebrate fossils that came as valuable new additions to the museum's collections. In all years he maintained a continuing interest in the museum's public relations work. Along with other colleagues, he wrote storyboards for the palaeontological exhibits at the MfN, which conveyed a vivid impression of the diversity of fossil invertebrates that ruled the seas and the continents in the past. In addition, he remained for decades the reliable contact person for an immense number of enthusiastic laymen, who brought their fossils to the museum for identification. Moreover, he was active in public education, contributing to exhibition guides and to school text-books for biology, and by a series of popular science papers on selected palaeontological topics such as fossils in erratics, Tendaguru dinosaurs, Archaeopteryx, insects of the Baltic amber etc. Finally, there are Jochen HELMS' valuable contributions to

popular scientific literature as author and coauthor of informative books. These include his highly readable book entitled "Die Botschaft der Steine" (The message of the stones, 1985, 1987) and two other popular books coauthored with R. DABER. These are "Das große Fossilienbuch" (The large book of fossils, 1978) and "Fossile Schätze" (1981), the latter of which was also translated into English and published under the title "Fossil treasures" and "Fossils, the oldest treasures that ever lived".

Jochen HELMS was reserved and modest, even a bit shy. He was very popular with the staff members of the Palaeontological Department, who appreciated particularly his balancing character and helpfulness. Once, some authorities had encouraged him to become a member of the communist party (SED), a supposition for a career as a university professor, but he preferred to renounce such a step against his social democrat education. Jochen Helms is survived by his wife, Annelies, and two daughters, Dörte Bayer and Katrin Buttler, and their families.

List of publications

- HELMS, J. 1957. Conodontenstratigraphie am Bohlen bei Saalfeld (Oberdevon-Unterkarbon). – unpublished Diplomarbeit, Geologisch-Paläontologisches Institut of Humboldt-Universität Berlin; 1-60, 4 tabs., 11 pls. [library: Museum für Naturkunde (Leibniz.Institut) an der Humboldt-Universität, Berlin].
- HELMS, J. 1959a. Versteinertes Leben am Ostseestrand. – Wissen und Leben, **4** (7): 515-518, 8 figs.; Leipzig, Jena (Urania-Verlag).
- HELMS, J. 1959b. Conodonten aus dem Saalfelder Oberdevon (Thüringen). – Geologie, **8** (6): 634-677, 3 figs., 6 pls.; Berlin.
- DIEBEL, K. & HELMS, J. 1960. Eine Einrichtung zum Zeichnen von Mikrofossilien. – Geologie, **9** (1): 102-105, 1 pl.; Berlin.
- HELMS, J. 1960. Die Stereofotografie im Dienst der Mikropaläontologie. – Geologie, **9** (4): 440-455, 4 pls.; Berlin.
- HELMS, J. 1961a. Die „*nodocostata*-Gruppe“ der Gattung *Polygnathus*. Oberdevonische Conodonten. – Geologie, **10** (6): 674-711, 17 figs., 4 pls.; Berlin.
- HELMS, J. 1961b. Die Bedeutung der Conodonten für die Stratigraphie. – Geologie, **10** (8): 973-995, 3 pls.; Berlin.
- HELMS, J. 1961c. Conodonten-Stratigraphie. Eine rückschauend wertende Betrachtung und neue

- spezielle Ergebnisse aus dem Oberdevon Thüringens. – unpublished Dissertation, Geologisch-Paläontologisches Institut of Humboldt-Universität Berlin; 1-145, 31 figs., 1 tab., 7 pls. [library: Museum für Naturkunde (Leibniz-Institut) an der Humboldt-Universität, Berlin].
- HELMS, J. 1961d. Hochgebirge am Meer. Expedition in die geologische Vergangenheit des Kaukasus. – Wissen und Leben, **6** (4): 264-269, 10 figs.; Leipzig, Jena (Urania-Verlag).
- Helms, J. 1961e. Saurier des Museums für Naturkunde in Berlin. – Natur und Heimat, **1961** (8): 403-406, 6 figs.; Leipzig (Urania-Verlag).
- HELMS, J. 1962. Phylomorphogenesis of *Palmatolepis*. – In MÜLLER, K. J.: Taxonomy, evolution, and ecology of Conodonts. – In: HASS, W. H., HÄNTZSCHEL, W., FISHER, D. W., HOWELL, B. F., RHODES, F. H. T., MÜLLER, K. J. & MOORE, R. C.: Treatise on Invertebrate Paleontology, Part W, Miscellanea. Conodonts, conoidal shells of uncertain affinities, worms, trace fossils and problematica. – Geological Society of America; W83-91 (W89-90, fig. 47): Lawrence (University of Kansas Press).
- HELMS, J. 1963a. Zur „Phylogenetese“ und Taxonomie von *Palmatolepis* (Conodontida, Oberdevon). – Geologie, **12** (4): 449-485, 3 figs., 4 pls.; Berlin.
- HELMS, J. 1963b. [Conodonten]. – In: BLUMENSTENGEL, H., HELMS, J., KNÜPFER, J. & ZAGORA, K.: Exkursion 1. Biostratigraphie und Fazies vom höheren Ordovizium bis zum tieferen Unterkarbon an der SE-Flanke des Schwarzbürgersattels. – Geologische Gesellschaft in der Deutschen Demokratischen Republik, Exkursionsführer zur Herbsttagung 13.-16. Oktober 1963, Leipzig, „Biostratigraphie des ostthüringisch-vogtländischen Paläozoikums“: 5-25, 5 figs., 3 tabs.; Berlin.
- HELMS, J. 1963c. [Conodonten]. – In: BLUMENSTENGEL, H., HELMS, J., KNÜPFER, J. & ZAGORA, K.: Exkursion 2. Biostratigraphie und Fauna vom Silur bis zum tieferen Unterkarbon am NW-Rand des Bergaer Sattels. – Geologische Gesellschaft in der Deutschen Demokratischen Republik, Exkursionsführer zur Herbsttagung 13.-16. Oktober 1963, Leipzig, „Biostratigraphie des ostthüringisch-vogtländischen Paläozoikums“: 27-40, 2 figs.; Berlin.
- HELMS, J. 1963d. Europa – Südsee-Archipel der Jurazeit. Entwicklung der Tier- und Pflanzenwelt vor etwa 150 Millionen Jahren. – Urania Wissen und Leben, **8** (6); Leipzig, Jena (Urania-Verlag).
- HELMS, J. 1963e. [Fauna]. – In DABER, R.: Paläobotanische Hinweise auf eine paralisch beeinflusste Oberkarbon-Senke im tieferen Untergrund Nordostdeutschlands. – Geologie, **12** (6): 683-699, 2 figs., 4 pls., Berlin.
- HELMS, J. 1965a. Mikropaläontologie. Wissenschaft im Dienst der Erörerkundung. – Urania Wissen und Leben, **10** (3): 204-207, 2 figs.; Leipzig, Jena (Urania-Verlag).
- HELMS, J. 1965b. Zur Conodonten-Stratigraphie des Oberdevon in Ostthüringen. – Berichte der Geologischen Gesellschaft in der Deutschen Demokratischen Republik, **10** (2): 208-210; Berlin.
- BECKMANN, H., COLLINSON, C., HELMS, J., HUCKRIEDE, R., KLAPPER, G., KREBS, W., LINDSTRÖM, M., RHODES, F. H. T., WALLISER, O. H. & ZIEGLER, W. 1965. Sind Conodonten Reste fossiler Algen? – Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, **1965** (7): 385-300; Stuttgart.
- HELMS, J. 1966. Als unsere Braunkohle Urwald war. – Technikus, **10**: 20-21; Berlin.
- HELMS, J. & WOLSKA, Z. 1967. New Upper Devonian Conodonts from Poland and Germany. – Acta Palaeontologica Polonica, **12** (2): 227-238, 5 figs., 1 tab.; Warszawa.
- HELMS, J. 1970. Donnerkeile oder fossile Thermometer. – Urania, **33** (3): 5-7, 5 figs.; Leipzig (Urania-Verlag).
- JAEGER, H., HELMS, J. & KRUEGER, H.-H. 1970. Geschiebeforschung – die wissenschaftliche Bedeutung der Geschiebe. – Wissenschaftliche Zeitschrift der Humboldt-Universität zu Berlin, Mathematisch-Naturwissenschaftliche Reihe, **19** (2/3): 204-215, 5 figs., 3 pls.; Berlin.
- HELMS, J. 1970a. Fossilien in Geschieben – Bedeutung des Geschiebesammelns für unsere Bildungsaufgaben. – Wissenschaftliche Zeitschrift der Humboldt-Universität zu Berlin, Mathematisch-Naturwissenschaftliche Reihe, **19** (2/3): 215-219, 3 figs.; Berlin.
- HELMS, J. 1970b. Conodonten – vom Nutzen problematischer Tierreste. – Wissenschaftliche Zeitschrift der Humboldt-Universität zu Berlin, Mathematisch-Naturwissenschaftliche Reihe, **19** (2/3): 228-232, 5 figs.; Berlin.
- RÜFFLE, L. & HELMS, J. 1970. Waldsteppe und Insektenwelt im Bernstein. Beispiele aus der

- Bernsteinsammlung des Paläontologischen Museums. – Wissenschaftliche Zeitschrift der Humboldt-Universität zu Berlin, Mathematisch-Naturwissenschaftliche Reihe, **19** (2/3): 243-249, 6 figs., 2 pls.; Berlin.
- HELMS, J. 1974. Im Reicher der Saurier. – *Urania*, **50** (3): 58-63, figs.; Leipzig (Urania-Verlag).
- DABER, R. & HELMS, J. 1975. Mein kleines Fossilienbuch. – 1-96; Innsbruck (Pinguin-Verlag), Leipzig, Jena, Berlin (Urania-Verlag, 1976).
- HELMS, J. 1976. Lebende Fossilien. – *Urania*, **52** (3): 24-29, 6 figs.; Leipzig (Urania-Verlag).
- DABER, R. & HELMS, J. 1978. Das große Fossilienbuch. – 1-264; Leipzig, Jena, Berlin (Urania-Verlag).
- DABER, R. & HELMS, J. 1981. Fossile Schätze. – 1-232, Leipzig (Edition-Verlag).
- HELMS, J. 1982. Zur Fossilisation der Federn des Urvogels (Berliner Exemplar). – Wissenschaftliche Zeitschrift der Humboldt-Universität zu Berlin, Mathematisch-Naturwissenschaftliche Reihe, **31** (3): 185-199, 10 figs.; Berlin.
- HELMS, J. 1985. Die Botschaft der Steine. Geologische Streifzüge durch unsere Heimat. – 1-313 Berlin (Verlag Neues Leben).
- HELMS, J. 1995a. Ein mehrfach verzweigtes *Rhizocorallium* aus dem Wellenkalk von Rüdersdorf. – Berliner geowissenschaftliche Abhandlungen, A, **168**: 301-308, 2 figs., 1 pl.; Berlin.
- HELMS, J. 1995b. Hermann JAEGER – Nachruf. – Paläontologische Zeitschrift, **69** (3/4): 303-312, 1 fig.; Stuttgart.
- HELMS, J. 1996. Fossilien im Kalkstein von Rüdersdorf. – Ökowerk-Magazin, **10**: 4-8.; Rangsdorf (Verlag Natur und Text in Brandenburg).
- HELMS, J. 1997. August Heinrich Ernst BEYRICH als Paläontologe. – Zeitschrift der deutschen geologischen Gesellschaft, **148** (3/4): 291-308, 1 fig., 4 tabs.; Stuttgart.

Taxa named after Jochen HELMS

- Palmatolepis helmsi* ZIEGLER, 1962 – Famennian, Germany
- Palmatolepis subperlobata helmsi* OVNATANOVA, 1976 – Famennian, Russia; a homonym, renamed *Conditolepis linguloba* Dzik, 2006 (p. 138: not

identical with *Palmatolepis lobicornis* SCHÜLKE, 1995, as thought by KLAPPER et al. 2004)

Polygnathus helmsi KUZ'MIN, 1992 – Famennian, Kazakhstan

Icriodus alternatus helmsi SANDBERG & DREESEN, 1984 – Famennian, USA

References

- DZIK, J. 2006. The Famennian “Golden Age“ of Conodonts and Ammonoids in the Polish part of the Variscan Sea. – *Palaeontologia Polonica*, **63**: 1-360.
- KLAPPER, G., UYENO, T. T., ARMSTRONG, D. K. & TELFORD, T. G. 2004. Conodonts of the Williams Island and Long Rapids Formations (Upper Devonian, Frasnian-Famennian) of the Onakawana B drillhole, Moose River Basin, northern Ontario, with a revision of Lower Famennian species. – *Journal of Paleontology*, **78**: 371-387.
- KUZ'MIN, A. V. 1992. Ispol'zovanie konodontov dlya raschleneniya famenskih otlozheniy Atasuyskogo Rudnogo rayona (Tsentral'nyy Kazakhstan). – *Izvestiya Rossiskoy Akademii Nauk, seroya geologicheskaya*, **1992** (8): 30-40.
- OVNATANOVA, N. S. 1976. Novye pozdnedevonskie konodonty Russkoy platformy [New Upper Devonian Conodonts of the Russian Platform]. – *Paleontologicheskiy Zhurnal*, **1976** (2): 106-115.
- SANDBERG, C. A. & DREESEN, R. 1984. Late Devonian icriodontid biofacies models and alternative shallow-water conodont zonation. – *Special Paper, Geological Society of America*, **196**: 143-178.
- SCHÜLKE, I. 1995. Evolutive Prozesse bei *Palmatolepis* in der frühen Famenne-Stufe (Conodonta, Oberdevon). - *Göttinger Arbeiten zur Geologie und Paläontologie*, **67**: I-IV, 1-108.
- ZIEGLER, W. 1962. Taxionomie und Phylogenie oberdevonischer Conodonten und ihre stratigraphische Bedeutung. – *Abhandlungen des Hessischen Landesamtes für Bodenforschung*, **38**: 1-166.

ELŻBIETA TURNAU

22.4.1933 – 23.6.2015

M. MASIĄK & M. STEMPIEN-SALEK

Professor Elżbieta TURNAU died after a short illness on June 23, 2015. She was 82. Characteristically, Professor TURNAU continued to remain professionally active in the Institute of Geological Sciences Polish Academy of Sciences, Research Centre in Kraków, up until a few weeks before her death.

Professor TURNAU was a widely respected Upper Palaeozoic palynostratigrapher who gained international acclaim for her detailed palynological studies of the entire Devonian and Carboniferous, both in Poland and Europe. During her long career at the Kraków Research Centre laboratory, she published approximately 100 papers, and gave numerous oral presentations at various international conferences. She was also an author of many texts for Polish industry.

The published record of Professor Elżbieta TURNAU, as both sole author and co-author of many professional publications, can be divided into four main groups: 1. miospore zonation of the Devonian and Carboniferous; 2. correlation of miospore assemblages; 3. taxonomy of miospores; and 4. megaspores.

Elżbieta TURNAU was born into a manorial (land-owners) family on April 22, 1933, in Moszczany, in southeastern Poland. Her ancestors were connected with agriculture for years, but also were interested in art (literature, paintings, music) and education (especially agricultural education). A major influence throughout Elżbieta's life were her close family ties, which included her father's sister Maria TURNAU-MORAWSKA, who was a professor of petrology and mineralogy at Warsaw University, and a cousin who was a botanist at Jagiellonian University in Kraków.

From 1951 to 1956 Elżbieta TURNAU studied at Jagiellonian University in Kraków in the Department of Biology and Earth Sciences, where her specialization was botany. She obtained an Msc degree in 1956 based on her thesis on Carboniferous floras from boreholes. This thesis served as the basis for Elżbieta's interest in paleobotany, palynology, and geology. After finishing her studies, she began her career in the Institute of Geological Sciences PAS in Krakow, where she worked until the end of her life. At first, she was a secretary and librarian of the Institute, but after six years she started her own investigations on the microflora from the coals of the Carpathian flysh.

She earned a PhD in 1966 from the Department of Biology and Earth Sciences, Jagiellonian University.

Her thesis topic was "Age and origin of coal clasts in Outer Carpathian flysh (concerning on the redeposition of miospores)." In the same year, she was continuously employed in the Krakow branch of the Institute as a researcher.

Elżbieta TURNAU was on scientific visit in Holland (Heerlen, Utrecht). Her work there and the papers that resulted from that research involved the spore zonation of uppermost Devonian and Lower Carboniferous deposits of Western Pomerania and the correlation of Upper Devonian and Carboniferous deposits of Western Pomerania based on miospores; this was the basis for her habilitation.

In 1992 she was awarded the title Professor of Earth Sciences from the President of Poland. Although she retired from the Institute in 2005, she continued working there, right up until a few weeks before her death.

Professor TURNAU was very active in the "scientific life" of Poland and other countries. She was a member of many different scientific organizations and societies. A partial list of these includes the Polish Botanical Society, Polish Geological Society, Commission Internationale de Microflore du Paléozoïque (CIMP), Micropalaeontological Society, and the American Association of Stratigraphic Palynologists.

Professor TURNAU was a corresponding member of the International Subcommission on Devonian Stratigraphy of IUGS (International Union of Geological Sciences), and of the International Subcommission on Carboniferous Stratigraphy. She was also a member of the editorial staff of the journals Review of Palaeobotany and Palynology (1997– 2004), Acta Palaeobotanica (1986-2015), and Studia Geologica Polonica (2004-2015).

Since the 1970s, Professor TURNAU effectively cooperated with many palynological research centres, including the Natural History Museum, London, British Geological Survey, Nottingham, and Trinity College, Dublin. After 1989, she was also associated with the Belorusskij naučno-issledovatel'skij geologorazvedočnym institutem (BelNIGRI) Minsk (Bielaruss) and Vserossijskij naučno-issledovatel'skij geologičeskij neftjanoj institutem (VNIGNI) in Moscow (Rossija). As a result of these co-operations, she was given many awards (by the President of the Polish Academy of Sciences and Geological Society of Poland) and numerous papers were published as a result of these collaborations.

Professor TURNAU was a very modest person and did not seek publicity for her accomplishments. In fact, her patience and even temperament were legendary. She was very kind, friendly, and, most discrete, an

important attribute during pre-Solidarity and the "Solidarity" time period in Poland.

From 1976-1980, Elżbieta TURNAU was a distributor of KSS KOR papers (Polish underground association, which was illegal at that time according to the socialistic government authorities). During the time of martial law that was imposed in Poland in 1981, she was indispensable to the Malopolska Region of Solidarity. She registered payments using a special code: She coded the name of the payer as a spore name in Latin. The sum payment was coded as a spore diameter. All of that data were written on an index card for an individual borehole (among different real spores occurring in that borehole). She also made available her own home for an underground printing office and to hide people that were connected with the opposition. For that activity, she was arrested.

Professor Elżbieta TURNAU led an exemplary life, both scientifically and politically. She will be greatly missed by all those who knew her, yet we have all benefited from her devotion to the science of palynology and for her courageous activities during the time of "Solidarity" in Poland.

before marrying Karl ZAGORA (Ingrid Jentzsch 1962 in Geologie **11**: 961-985). For her thesis she continued the research on the Thuringian microfauna of eastern Thuringia. Her first paper on silicified Early Devonian ostracodes appeared in 1967 (Geologie **16**: 303-343). After her theses at the University of Jena, Ingrid worked together with her husband Karl ZAGORA for the DDR Oil and Gas Company in Grimmen in NE-Germany.

After the German unification they published only some of their results on the sedimentology, palaeosalinity and porosity of Devonian to Permian sediments in boreholes of the Isle of Rügen and the coastal area of W-Pomerania. The continuation of their joint studies in Thuringia is visible in several publications on the biostratigraphy and sedimentology of the Early Devonian.

After an early retirement Ingrid cooperated with the Geological Institute of Greifswald University mostly concentrating on the sedimentology of Old Red sandstones.

For many years Ingrid took care of her husband, which was a very time and energy consuming work because of the slowly growing illness of Karl. When he was completely depending on a wheelchair, they moved from Grimmen to a flat in Stralsund where Karl died in October 2011. Because of the severe illness of her husband Ingrid could not attend the meetings of SDS or excursions, but both were interested to read results and reports of the SDS meetings.

The community of Micropalaeontologists, Sedimentologists and Stratigraphers interested in the Devonian have lost a warm-hearted, modest and open minded colleague in February 2015.



Ingrid in Thuringia 2013

Ingrid ZAGORA began her studies in the Devonian of the German Thuringian Mountains. Some results of her Diploma thesis on conodonts have been published



SDS REPORTS

MINUTES OF SDS ANNUAL BUSINESS MEETING 2014, MENDOZA

October 3, 2014 Sheraton Hotel, Mendoza,
Argentina

C. E. BRETT

(with additions by R. T. BECKER)

Attendance:

ARETZ, Marcus:
 marcus.arez@get.dos-mip.fr

BECKER, R. Thomas (TM)
 rbecker@uni-muenster.de

MOTTEQUIN, Bernard
 bmottequin@natural science.be

BRETT, Carl TM
 carlton.brett@uc.edu

CORRADINI, Carlo TM
 corradini@unico.it

DENAYER, Julien
 julien.denayer@ulg.ac.be

DI PASQUO, Mercedes (CM)
 medipa@cicytpp.org.ar

FINNEY, Stan (ICS Chairman)

HARTENFELS, Sven (CM)
 shartenf@uni-muenster.de

HERBIG, H.-G.
 herbig.paleont@uni-koeln.de

LIAO, Jau-Chyn (CM)
 jan.liao@uv.es

JANSEN, Uli (TM)
 ulrich.jansen@senckenberg.de

KOENIGSHOF, Peter
 peter.koenigshof@senckenberg.de

MARSHALL, John TM
 jeam@noc.soton.ac.uk

MATSAMURA, William
 williammatsamura@gmail.com

MOSSONI, Angelo
 angelo.mossoni@AUCE.it

NARKIEWICZ, Katarzyna (CM)
 katarzyna.narkiewicz@pgi.gov.pl

PONCIANO, Luiza (CM)
 luizaponciano@gmail.com

SCHEFFLER, S.M.
 schefflersm@gmail.com

VALENZUELA-RÍOS, Nacho TM
 jose.i.valenzuela@uv.es

ZAMBITO, James (CM)
 jay.zambito@wgnhs.uwex.edu

1. Introduction and apologies for absence

SDS Chair John MARSHALL called the meeting to order at about 18:35, after leaving a playroom. Beginning with introduction of himself, Vice-Chair Carlton E. BRETT, and past Chair and Newsletter Editor, R. Thomas BECKER, and webmaster Carlo CORRADINI, the CHAIRMAN read list of apologies from those unable to attend (see revised list).

2. Chairman's Business

The CHAIRMAN read names of members of SDS who had passed away since the last meeting in Morocco: CM Mena SCHEMM-GREGORY and CM Kolya BAKHAREV; it was duly noted that a memorial slideshow prepared by TM U. JANSEN was presented at the joint SDS/IGCP 596 symposium held earlier in the day.

The CHAIRMAN introduced Bernard MOTTEQUIN, who made a formal proposal that the next meeting of SDS be held in Brussels, Belgium, in mid to late September of 2015 (replacing the previously scheduled venue in Frankfurt, as Senckenberg Museum is scheduled for renovation at that time). This would also be the final meeting of IGCP project 596 headed by Peter KOENIGSHOF. The meeting, organized by B. MOTTEQUIN and Cyrille PRESTIANI, would include 1-2 days of presentations at the **Royal Institute of Brussels**, preceded by 2-4 days of field excursions in Belgium and followed by ca. a week in the Rhenish Massif of Germany. B. MOTTEQUIN proposed to hold field trips in Devonian to Carboniferous (Eifelian-Namurian) to show a variety of critical reference sections and facies including crinoidal mud mounds, and evidence for several bioevents including Kacak and Kellwasser levels. Trips in the western Rheinische Schiefergebirge would be led by TM R.T. BECKER (and his Münster team) and Peter KÖNIGSHOF.

In addition, there is the meeting of STRATI 2015 in July of next year, to be held in Graz, Austria; this would be preceded by a pre-meeting field trip in the Prague area, led by TM Lad SLAVIK and others, as well as a post-meeting trip in the Carnic Alps of Austria to be hosted by TM C. CORRADINI, who provided details of the proposed, relatively demanding trip to classic sections of the Carnic Alps including Cellon and Lake Wolayer (see flier about STRATI 2015 meeting INSERT Weblink).

As TM J.I. VALENZUELA-RIOS had to leave the meeting early to catch a plane, the Chairman asked him for a report on the status of the Pragian-Emsian boundary revision. TM J.I. VALENZUELA-RIOS briefly reviewed the situation. During the 2008 SDS meeting in Uzbekistan members of the subcommission visited the proposed revised GSSP sections/levels in the Kitab

Reserve and SDS made three decisions regarding the boundary:

- 1) The base of the Emsian should be moved up to the FAD of *Po. excavatus* Morphotype 114;
- 2) the basal Emsian stratotype should stay in Uzbekistan;
- 3) although the basal Emsian GSSP would be moved upward from the present *Po. kitabicus* level, the former might be useable as the GSSP for a formal Upper Pragian substage.

A team of workers, including TM N. IZOKH, CM P. CARLS, TM L.v SLAVIK, and TM J.I. VALENZUELA-RÍOS, worked in the field in considerable detail on the Zinzelban Gorge section and three series of samples were taken to Prague, Novosibirsk and to TM VALENZUELA Ríos' lab in Valencia, Spain. The results to date are somewhat disappointing (poor polygnathids) and seem to have not included the critical levels. There is a need to go back to Zinzelban and resample some intervals and possibly lateral sections. Two years ago a landslide cut off the main road into the Kitab Reserve and it is still not open to larger field parties but a small group of 2-3 people could probably get permission to return and work on the sections. In the meantime TM J.I. VALENZUELA-RÍOS has made considerable progress in characterizing the conodont biostratigraphy of Celtiberica and this work is now being combined with a multi-proxy approach including chemostratigraphy and carbon isotopic profiles.

The CHAIRMAN stressed the need for progress on this project. He will write to CM A. KIM and TM N. IZOKH that there has been little progress in several years and that they need to push forward on the research. TM R.T. BECKER stressed that ICS Chair Stan FINNEY had noted to him that we must move ahead with the Pragian-Emsian boundary stratotype. On the other hand, FINNEY was rather positive that if SDS applied for additional money for work on the stratotype, he could provide a small amount of grant money through an NSF initiative to improve global stratigraphic studies. TM R.T. BECKER also pointed out that he had produced together with CMs Z.S. ABOUSSALAM and P. BULTYNCK an extensive paper on sections of the Pragian-Emsian interval in southern Morocco and that it has considerable importance for the required international correlations [published in the meantime in the Bulletin of Geosciences, 90 (4), 893-980]. He noted that the *excavatus* M114 Zone was excellently exposed and that it is now well studied but that it follows a black shale with macrofauna (*Devonobactrites* Shale) but without conodonts. The latter was not the Basal Zlichkov Event of original definition (sensu I. CHLUPAC), but is thought to

correspond to a slightly lower dark shale in the Prague Basin with the so-called *Neomonograptus atopus* fauna, the globally youngest pelagic graptolite fauna, and a transgressive sea level event. This correlation suggests that the *excavatus* M114 level has the potential to be recognized by sequence and isotope stratigraphy. As published by TM L. SLAVIK, the Bohemian succession also yields the oldest *Latericriodus bilatericresens gracilis* near this level. Therefore, the proposed future Emsian GSSP can obviously be recognized in two different conodont lineages.

TM J.I. VALENZUELA-RÍOS noted that the Pyrenees sections also have both polygnathids and icriodontids. TM R.T. BECKER stressed that we need a "rosetta stone" section with mixed conodonts and benthic faunas to tie in TM U. JANSEN'S well-studied brachiopod bearing sections of the Emsian type region.

TM C. CORRADINI noted that it is important to have real names for conodonts, not numbers (e.g. *Po. excavatus* 114) and that the systematic revision of conodonts needs to be formally published.

At this point TM J.I. VALENZUELA-RÍOS and CM J.-C. LIAO excused themselves and left the meeting for the airport. The CHAIRMAN noted that we could then resume the main agenda.

3. Approval of 2013 Minutes

Minutes of previous meeting, held in Brisbane, Australia, distributed in the SDS Newsletter 29 were formally approved.

4. ICS Matters

The CHAIRMAN noted that ICS Chairman Stan FINNEY had wanted subcommissions to review a recent paper by DEVLEESHOWER et al. 2014 that appeared in *Geology*. These authors claimed that the spline methodology used for interpolating absolute age dates in the 2012 Geologic Time Scale book were invalid. DEVLEESHOWER et al. used the Devonian as an example, but their critique means that potentially many of the dates in that key reference are invalid. The issue was tabled for now.

STRATI 2 is in Graz, Austria, in July 19-23, 2015, previously discussed by TM C. CORRADINI. It could have been a venue for the next SDS meeting but that has been scrapped in favor of the Brussels meeting discussed by B. MOTTEQUIN. The CHAIRMAN had attended the earlier meeting in Lissabon in 2013. He will attend the Graz meeting, but it will not be a formal SDS activity.

5. Revision of GSSPs

5.1. Pragian-Emsian

We have already heard from TM J.I. VALENZUELA-RIOS's report on the status of the Pragian-Emsian boundary revision, which is the most pressing issue. He suggests that we make a proposal to Stan FINNEY for supplemental funds to send a small working group comprised of TM J.I. VALENZUELA-RIOS, TM L. SLAVIK and one or two others to the Zinzilban Gorge and neighbouring successions to restudy potential stratotype sections.

TM R.T. BECKER made a remark about the SDS Emsian working group, currently headed by TM Ruth MAWSON. Regrettably, we understand that Dr. MAWSON has been unwell for a longer period and hence could not be proactive on Emsian issues. We need to find a way of making of making progress. TM R.T. BECKER will contact the Australian SDS members on this matter. There is the option that TM J.I. VALENZUELA-RIOS could take over the role of heading up the Emsian working group.

5.2. D/C Boundary

Marcus ARETZ, the D/C Boundary Task Group Chairman, present at the meeting, is in charge of assembling proposals from various countries. He has put various individual working groups on notice that he needs these proposals for more than a year, but has yet to receive a single proposal. TM R.T. BECKER urged M. ARETZ to be more proactive and forceful in trying to obtain these reports. He, however, notes that he has repeatedly sent follow-up notices. TM R.T. BECKER noted that if our members (from the Devonian side) fail to communicate we must replace them. A major reorganization may be needed that puts current research acitivity above past scientific merits.

Markus ARETZ noted that it would be important to have a target date. A D-C boundary workshop will take place at the Graz meeting with a follow-up discussion at the SDS meeting in Brussels later in 2015.

TM R.T. BECKER notes that work by Tomas KUMPAN and co-authors from Czechia shows what can be done using hand held gamma ray spectroscopy and modern geochemistry. The Münster group re-sampled a number of classical D-C boundary sections, such as the Oberrödinghausen Railway Cut and Riescheid, and is currently revising the Wocklum type section. The Münster and Cologne institutes are cooperating in this effort.

Again, there is a need for short summaries; need deadlines and reminders. Now the deadline for proposals should be the Brussels meeting.

5.3. Substages

Lochkovian: TM C. CORRADINI has already made a proposal and TM J.I. VALENZUELA-RÍOS had slightly different ideas. Perhaps it is time to make a joint proposal. TM R.T. BECKER notes that he needs a brief writeup for the SDS Newsletter; three substages have been suggested.

Pragian: already briefly discussed under the heading of Pragian-Emsian boundary revisions. There was a suggestion that the former lower boundary of Emsian could become a Zinzilbanian Substage boundary within the Pragian.

Emsian: The base of old (Czech) Dalejan stage was favoured for a substage boundary. CM J. FRYDA had made a proposal that the base of substage could be the base of the *Nowakia elegans* zone, but TM R.T. BECKER felt that it was too low, as it coincided with the Upper Zlichov deepening event (sensu CM J. GARCÍA-ALCALDE). The main Daleje base coincides instead approximately with base of the *Now. cancellata* Zone, but there is still the need for a very detailed revision of the systematics of *Now. cancellata*.

Eifelian: There has as yet been no formal proposal for a substage boundary within the Eifelian Stage. TM R.T. BECKER called upon TM C.E. BRETT to make a proposal. TM C.E. BRETT suggested that a position at the *costatus/australis* Zonal boundary would divide the Eifelian into approximate equal substages and would have the virtue of coinciding with a major transgression and the onset of a series of named bioevents, culminating in the Kacak (sensu stricto) at or near the end of the substage. TM R. T. BECKER suggested a formal proposal for the Newsletter.

Givetian: As for the upper substage, TM R.T. BECKER and CM Z.S. ABOUSSALAM have recently sampled the classic Blauer Bruch section in Germany and found that the "Taghanic" interval is highly condensed so this would not be an appropriate stratotype. Other possible stratotypes are in Morocco, Nevada or possibly the Emanuel Baptist Church section, Kentucky (Portwood Member sections near Irvine), visited during the 2009 Devonian field trip. Conodont studies are under way (jointly by TM C.E. BRETT, CM J. ZAMBITO, CM Z.S. ABOUSSALAM & TM R.T.BECKER). Further details from Spanish sections would also be significant.

The middle Givetian substage has been studied by former SDS Chair Pierre BULTYNCK, who was contacted for a progress report.

Frasnian: TM J.D. OVER has headed up this has recently reported that he has not made progress but is working on the detailed cyclostratigraphy of the lower-Kellwasser interval. He has said that in 2015 he

will take some leave time to work on Frasnian substage issues. TM R.T. BECKER notes that Willi ZIEGLER suggested a reference section at Heimberg in the eastern Rhenish Massif for the *punctata* Zone as a stratotype for a lower-middle division. This level roughly coincides with the so-called *punctata* or "Middlesex" Event. A re-sampling of the re-discovered Heimberg section has only just started. TM G. RACKI and his Polish colleagues have done a lot of work at this level.

Famennian: TM R.T. BECKER had wanted to bring proposed definition of the latest Famennian substage to a vote. However, a publication by L. KONOVOVA & D. WEYER (see p. 40 of 2013 Newsletter) raised new questions concerning the taxonomy and stratigraphy of the proposed index species *Bispathodus ultimus*. He also repeated the idea that the base of the *annulata* Zone be used for the base of the upper division; this is associated with the global (Lower) *Annulata* Event and an eustatic, transgressive level. The CHAIRMAN noted that the study and data generated by studies of boundaries is critical and more important than bringing these issues to an immediate vote.

6. Nomination/Election of New Corresponding Members

Mercedes DI PASQUO of Argentina, who has been working on Devonian palynology and who was elected in 2013, was welcomed.

Luiza Ponciano, who has been working in the Devonian trilobite-rich succession of the Paranaiba Basin was proposed by TM C.E. Brett as a new CM and seconded by TM R.T. Becker.

(During the subsequent field conference Juan Jose RASTON, co-leader of the Pre-cordillera excursion and an active worker on Devonian successions, including trilobites, in Argentina, was proposed as a CM by TM R.T. BECKER, seconded by TM C.E. BRETT and supported by the CHAIRMAN and TM U. JANSEN who were all present at the field conference.) Thus, SDS has gone from no representatives from South America to five CMs.

There is a need for replacement of our member (CM H. THERON) from South Africa. TM R.T. BECKER has corresponded briefly with a potential candidate, who has not yet finished studies but who will be further contacted.

There is also a need for a new member from Belarus to replace CM T. OBUKHOVSKAYA, who has retired. CM K. NARKEWIECZ suggested Dimitri PLAX, who has done a considerable amount of work on Devonian stratigraphy including fish.

CM Hans Peter SCHÖNLAUB of Austria is long retired. TM R.T. BECKER, therefore, proposed a former student of CM P. CARLS and active Devonian ostracod worker, Claudia ("Dodo") DOJEN, as a new CM for Austria.

7. Publications

The Special Publication (number 423) of the Geological Society of London on "Devonian Climate, Sealevel and Evolutionary Events", edited jointly by TMs R.T. BECKER, C.E. BRETT and Peter KÖNIGSHOF, is in progress. A total of ten papers have been received to date and all have been reviewed. Within a month 5-6 fully edited and revised manuscripts should be received and editor Angharad HILLS has indicated that these can be made available as electronic publications within this year [which has happened]. She also indicated that the volume could go forward with ten papers although she would prefer to see it closer to 15. Three to four more manuscripts are in the works that may be ready for submission within the next months. TM R.T. BECKER hopes that the volume will be completed within 2015.

The volume of papers resulting from 2012 Novosibirsk meeting to be published as a special issue of "Palaeo-2" is making some progress as the deadline for submission approaches. Eight papers have been promised; nothing however, has been received to date. Peter KÖNIGSHOF has written to potential authors urging them to submit manuscripts even if they are not in "perfect" form. He hopes to have a batch of papers in 2015 and publication some time in 2016.

Devonian Newsletter editor Thomas BECKER requests a deadline of end March 2015 for submission of contributions for the next newsletter. He noted that he would like to see all older versions of SDS newsletters available on-line. He has copies of all but one of the older issues edited by Rex CRICK, except volume 10. He will contact CM G. KLAPPER and/or CM P. BULTYNCK for the missing issue. TM and Webmaster C. CORRADINI indicated that if he can receive scanned pdfs of these newsletters, he will try to upload them to SDS website.

In a brief discussion of the new popular book on Paleozoic geology edited by P. KÖNIGSHOF, CM L. PONCIANO offered to help translate the book to Portuguese. P. KÖNIGSHOF noted that the book was already translated into 17 different languages including Portuguese [and it has been published in late 2015].

8. Stan Finney's Discussion

ICS chairmnr Stan FINNEY arrived late at the meeting but wanted to report several things:

STRATI 2015 organizers are still requesting proposals for symposia. It would be good to have a general Devonian session if possible.

The Devonian subcommission meets regularly with IPC; S. FINNEY would like all subcommissions to meet at STRATI in the years intervening between the IPC and IGC.

He notes, as already discussed, that the Stratigraphic Commission is seeking proposals for \$5000 to 7000 for field work on potential stratotype sections. This money supported by NSF could also be used to improve websites or to encourage participation at meetings by underrepresented and/or younger workers.

Rich LANE (director of NSF) wants all data on stratotype sections and, eventually all measured sections, to be archived in a central database that could be linked with the existing stratigraphic database directed by Juanxan FAN of Nanjing Institute.

R. LANE will have a workshop at the STRATI meeting, including FAN and others, on the best use of databases. Some money will be available to support participation by member from each subcommission, ideally one active in biostratigraphy of major taxa to attend this workshop.

The plan is to start by archiving data generated in GSSP studies and then move to auxiliary sections. In future all GSSP proposals will have to have data archived before they can be voted on.

S. FINNEY also discussed the new *Encyclopedia of Stratigraphy*. He wants proposals for short papers by November to formalize his list of contributions. Thus, he wants titles for manuscripts in the next four weeks. Manuscripts should be received within four months afterwards. He suggests that papers might fall into one of three groups: longer contributions (e.g. Devonian Stratigraphy) of 8000 to 10,000- words; intermediate (3000-4000 words) and short <1000 words). Articles are to be written at a level suitable for advanced undergraduate and beginning graduate students, Springer will set up a system of electronic publication of individual contributions available on-line after reviewed and approved. Would include geology of periods and/or regions and summaries of biostratigraphy of all major groups.

TM R.T. BECKER agreed to do a longer overview of the Devonian. TM C.E. BRETT agreed informally to do one to two general papers on event stratigraphy and perhaps one on Devonian of eastern North America.

After ICS Chairman S. FINNEY excused himself from the remainder of the meeting, discussion resumed on other business.

There is a need to propose the symposia for the Graz meeting in the next few weeks. It would be good to have a session of 6-8 talks on Devonian issues.

The CHAIRMAN asked if P. KÖNIGSHOF planned a meeting of IGCP 596. P. KÖNIGSHOF responded that he anticipated some presence of the IGCP group at the meeting but the main focus for next year would be the Brussels meeting.

9. Future Meetings

SDS is obliged to meet with IGC in South Africa in 2016. It is hoped that SDS can also have a field excursion to the superb Devonian sections in the area. JM suggested that John Almond, a local geologist in South Africa with considerable experience with the local Devonian, might be contacted to find out if he would be willing to organize such a trip.

TB also notes that there had been a proposal to meet in Bulgaria in the near future. But lack of a report from Bulgarian colleagues suggests that this may not be a viable option. In 2017 ICOS will meet in Valenica. This would be an opportune time for a field meeting to examine sections in the Spanish Pyrenees. It might also be possible to arrange (with T. SUTTNER or C. CORRADINI) a field meeting in the Carnic Alps. There will be a circular on the ICOS meeting sent in June or July.

TM R.T. BECKER mentions that in summer next year there will be a major meeting on the Carboniferous and Permian. There is a need to have representation on the D-C boundary issues.

Also, there is a question of whether we need to start thinking about another International Devonian Symposium.

10. Financial Report

A total of \$1303.00 received. About half went to publication of the newsletter. Remaining funds were used for Vice Chair and Secretary to attend business meeting and field conferences.

11. Other Business

There is a continual need to correct and update addresses of all SDS members for Newsletter.

The CHAIRMAN put on record sincere thanks from members of SDS to the organizers of the International Palaeontological Congress in Mendoza for a highly successful and well organized meeting. The meeting closed at 20:10 and members adjourned for further informal discussion over dinner.

**The collections of Marburg University
(GeoArchive Marburg) are now located at
the Senckenberg Research Institute and
Natural History Museum Frankfurt**

E. SCHINDLER¹, D. UHL¹ & M.R.W. AMLER²

¹Senckenberg Forschungsinstitut und Naturmuseum Frankfurt, Abteilung für Paläontologie und Historische Geologie, Senckenbergsanlage 25, 60325 Frankfurt am Main, Germany

²Universität zu Köln, Institut für Geologie und Mineralogie, AG Paläontologie und Historische Geologie, Zülpicher Str. 49a, 50674 Köln, Germany

This note should be of particular interest for Devonian researchers, as it informs about the transfer of an important collection with rich Palaeozoic (especially Devonian) material.

In 2004, the government of the State of Hessen (Germany) decided to close down the Faculty of Geosciences at Philipps University of Marburg. As one of many consequences, a solution for the storage of the important and extensive collections of the former Institute of Geology and Palaeontology as a part of the faculty had to be sought. Consequently, another institution rooted in Hesse was considered – the Senckenberg Research Institute and Natural History Museum Frankfurt. Here, extensive biological and geological/palaeontological collections are housed and continuous curation of the numerous specimens is guaranteed in the future. Therefore, in 2013 the transfer of the collections was agreed by contract between the Philipps University Marburg and the Senckenberg Nature Research Society and carried out in the same year. It was also agreed that the material should have the status of a ‘permanent loan’ for 15 years and thereafter be owned by Senckenberg. The material comprises almost the entire collections of the GeoArchive Marburg which, following sorting prior to transportation, resulted in the abiotic Quarternary collections being transferred to the Museum of Natural History “Specimens for the GeoArchive Marburg have been collected for more than 200 years – the oldest dating from the end of the 18th century. The collections are subdivided into four main parts:

1. type material of fossil animals and plants formally described and published [all the specimens carrying the acronym MbG, plus a specimen number],
2. systematic comparative collections of fossils (invertebrates, vertebrates, palaeobotanical material),

3. stratigraphical and regional geological collections, and
4. collections of microfossils.

In summary, the collections of the GeoArchive Marburg include about 142,000 specimens. They fill 125 cabinets with ca 6,000 drawers plus 600 microfossil trays with some 11,500 micropalaeontological slides. Although the material is derived from all parts of the world and all systems of Earth History, the focus clearly lies on the Palaeozoic (especially Devonian). In the regional collections, material from the Alps is well-documented in addition to classical Palaeozoic areas.

The collection of type material is the most important part. It consists of 8,200 specimens kept in five metal cabinets belonging to ca 300 publications on macrofossils. The oldest type material was deposited in the early 19th century (ULLMANN, 1803). Many famous palaeontologists have deposited their specimens in this collection – including E. KAYSER, O. H. SCHINDEWOLF, F. DREVERMANN, R. RICHTER and W. ZIEGLER.

The systematic macrofossil collection and the stratigraphic/regional collection make up by far the most numerous parts of the collection. In the first, specimens are subdivided into invertebrates, vertebrates, palaeobotany, and ichnofossils. The latter contains all kinds of samples (e.g., again fossils, but also rock specimens for facies/sedimentology samples, etc.).

Microfossils are kept separately and include material for some 50 micropalaeontological publications, especially on conodonts.

The integration of the GeoArchive Marburg into the Senckenberg database system ‘SeSam’ has already started. First, the type material is added to the system. As specified in the contract, the source of the material is maintained by including the prefix of the original Marburg collection numbers (MbG) in the database as well as on the labels.

Access to the material of the GeoArchive Marburg is provided via the regular loan system of Senckenberg. All collections of macrofossils and stratigraphy/regional geology are accessible via Dieter UHL (dieter.uhl@senckenberg.de) and the microfossil collection is available via Peter KÖNIGSHOF (peter.koenigshof@senckenberg.de).

The transfer of the outstanding collection of the GeoArchive Marburg to Senckenberg guarantees that more than 200 years of collecting palaeontological/geological material are safeguarded in the future and that accessibility will be maintained.

More details about the collection can be found in OPPL et al. (2014).

References

- OPPL, S., HIRSCHMANN, S., SCHINDLER, E., UHL, D., AMLER, M.R.W. & JANSEN, U. 2014. Alte Schätzneu entdeckt – Das GeoArchiv Marburg zieht ins Frankfurter Senckenberg-Institut um. – SENCKENBERG – natur • forschung • museum, **144** (9/10): 310-315.
- ULLMANN, J.C. 1803. Mineralogische berg- und hüttenmännische Beobachtungen über die Gebirge, Grubenbaue und Hüttenwerke der hessen-casselischen Landschaft an der Edder. – 303 pp. (Neue academische Buchhandlung, Marburg)

SDS DOCUMENTS

The search for Late Famennian/Early Tournaisian proxies to Gondwanan Glaciations

P.E. ISAACSON,¹ M. DI PASQUO,² A. WARREN¹ & G.W. GRADER,¹

¹University of Idaho, Moscow, USA

²CICYTTP-CONICET, Diamante, Argentina

The Gondwana Glacial and Paleoclimate Connection

The Late Devonian through Carboniferous was an important period in Earth's history, for it recorded widespread Gondwanan glaciations (CROWELL 1999; FRAKES et al. 1992; ISAACSON et al. 1999, 2008). The timing and mode of initiation of Gondwanan glaciation, and its mechanistic link to eustatic fluctuations, changes in continental weathering rates, and paleoceanographic and climatic conditions remain poorly resolved. This reflects in part the disparity between various proxy records, the problem of accurately dating Gondwana diamictites (as either part of ice advance or retreat). Onset of the glaciation is believed to have occurred in the late Famennian epoch at 360.7 Ma (KAUFFMAN 2006) or 358.9 Ma (BECKER et al. 2012). Recent cyclostratigraphic study of carbonate, medium-fine grained siliciclastic and black shale sedimentary rocks, and stable isotopic study of latest Devonian marine strata further support a rapid deterioration of Late Devonian paleoclimate that

initiated Gondwana and Laurentian glaciation in the latest Devonian, Famennian epoch (CECIL et al. 2004; BREZINSKI et al., 2010). To what degree the Late Devonian glacial episode was short-lived (CAPUTO 1985; CAPUTO et al. 2008; STREEL et al. 2000), events heralding the onset of the main phase of widespread glaciation later in the Mississippian, or whether they are evidence of earlier initiation of main-stage glaciation remains a topic of debate. Furthermore, some isotopic proxy data (MII et al. 1999; JOACHIMSKI & BUGGISCH, 2002) suggest that the Famennian may even have been a time of global cooling with warmer times in the Tournaisian. Yet it has been suggested oceans were quite warm at this time (BRAND 1993, 1998; VAN GELDERN et al. 2006), with cooling in the Mississippian. Data for this interval are scarce.

We hypothesize that the changes in sea level, continental weathering patterns, and oceanographic and paleoclimatic conditions that would have accompanied the significant change in ice-sheet dynamics associated with either onset of glaciation or potentially intermittent deglaciation during the Devonian-Carboniferous (D-C) boundary interval should be recorded in the sedimentologic and biostratigraphic records of late Famennian and early Tournaisian sedimentary rocks. We further hypothesize that each of the two aforementioned scenarios would have imparted, on the D-C boundary deposits, a unique set of stratigraphic and geochemical signatures that can be used to place quantitative constraints on the hypothesized evolutionary paths of glaciation during the latest Devonian.

Newer information from Gondwana (PLAYFORD et al., 2012; DI PASQUO et al. 2015) describe an early to middle Tournaisian palynomorph “recycling event” attesting to glaciation at that time. Glacial proxy beds in Montana record a hiatus in the early Tournaisian, representing at least three conodont zones.

Montana D-C Proxy Units

The Bakken Formation petroleum boom of north-central USA and adjacent Canada has shown how tenuous the placement of the Devonian-Carboniferous boundary is in Laurentia. This is a result of several phenomena that need resolution. Within the Bakken, placement of the exact boundary is hampered by very poor recovery of conodonts (the principal biostratigraphic tools on the USA side of the border) in the Middle Bakken - where the boundary lies. In outcrops of Bakken equivalents (Sappington Formation of Montana), previous work has placed the boundary at various horizons, depending on whether conodonts (again, very limited recovery), and brachiopods were used.

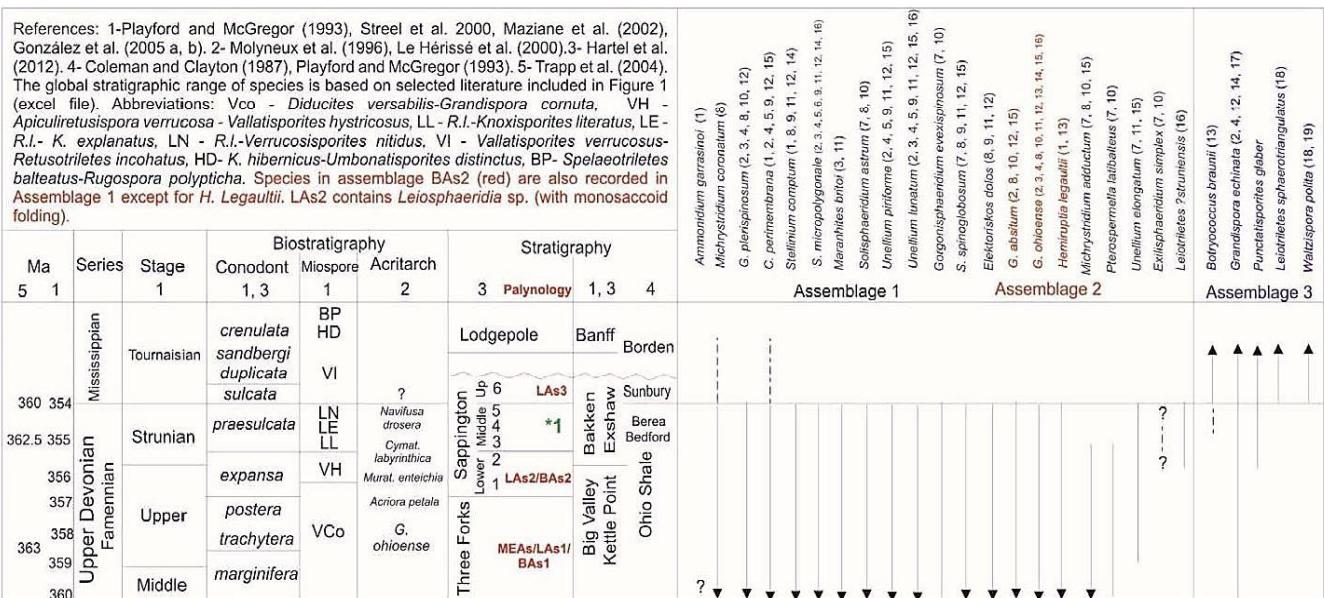
D-C rocks in southwestern and central Montana were deposited in shallow seas that developed approximately 10°S of the equator (SCOTSESE 1997). Deposition was largely within the Big Snowy Trough, which is dissected orthogonally by a structurally controlled, east-west trending depositional trough that accumulated mixed carbonate and siliciclastic sediments.

Palynomorph potential: a new direction for Sappington research

Detailed biostratigraphic correlations in central Montana are far from complete. Fortunately, previous and our preliminary work (through proprietary

funding) on a few exposures from western Montana and subsurface from eastern Montana (see DI PASQUO et al. 2012) confirmed that the main three fossil groups, i.e. palynomorphs, conodonts and brachiopods occur in its D-C formations. They are abundant and offer potential for an integrated approach to biostratigraphic correlations that will be independent of lithofacies changes. Such often occur over short distances. There is disagreement between biostratigraphic results provided by these groups; an integrated approach is required.

In the D-C Exshaw-Bakken-Sappington basins, the only study of the D-C boundary through palynomorphs is that of PLAYFORD & MCGREGOR (1993) in Alberta.



Tab. 1 (from DI PASQUO et al. 2012).

Sappington Formation palynomorph assemblages. ME (Milligan East section); L (Logan section); B (Bakken Fm., Big Sky core, NE Montana). 1- SANDBERG et al. (1972) described and illustrated Sappington Formation conodonts, defining *Siphonodella praesulcata* and its fauna. A spore assemblage (7 samples) containing abundant *Retispora lepidophyta* was recorded at Peak 9559, Bridger Range, bracketed by the *S. praesulcata* conodont fauna in Unit 4 of SANDBERG (KLAPPER 1966; SANDBERG et al. 1972), and by WARREN et al. (2014) at Logan. It was deposited in a restricted regressive-marine lithofacies, lacking normal marine species. References for species' stratigraphic distributions: 1- OTTONE (1996); 2-PLAYFORD (1993); 3-GONZÁLEZ et al. (2005a,b); 4-PLAYFORD & MCGREGOR (1993); 5-WICANDER & PLAYFORD (1985); 6-PLAYFORD (1981); 7-WICANDER (1974); 8-WICANDER & LOEBLICH (1977); 9-WICANDER & PLAYFORD (1985); 10-WICANDER (1975); 11-LE HÉRISSÉ et al. (2000); 12-LU & WICANDER (1988); 13-PÖTHE DE BALDIS (2000); 14-MOLYNEUX et al. (1984, 1996); FILIPIAK (2005); 16-PARIS et al. (1985); 17-SANDBERG et al. (1972); 18-SMITH & BUTTERWORTH (1967); AZCUY & DI PASQUO (2005)

However, recent collections by Grader, di Pasquo, and Warren (DI PASQUO et al. 2012; WARREN et al. 2014) from the Trident Member of the Three Forks Formation and Sappington Formation at Milligan Canyon in Montana yielded low diversity

palynoassemblages, with different preservations (e.g., orange well-preserved, dark brown and black poorly preserved palynomorphs). The Milligan assemblages (MEAs) and the older three samples from Logan (LAs1) are mostly composed of cosmopolitan, long

ranging phytoplankton species that are recorded from the Frasnian to the Strunian (e.g., *Cymatiosphaera perimembrana* STAPLIN, *Elektoriskos dolos* WICANDER & LOEBLICH, *Gorgonisphaeridium ohioense* (WINSLOW) WICANDER, *Gorgonisphaeridium absitum* WICANDER, *Gorgonisphaeridium plerisporosum* WICANDER, *Maranhites britoi* STOCKMANS & WILLIÈRE, *Michrystridium adductum* WICANDER, *Solisphaeridium astrum* WICANDER, *Stellinum comptum* WICANDER & LOEBLICH, *Unellium piriforme* Rauscher, *Unellium lunatum* (STOCKMANS & WILLIÈRE) EISENACK et al. Some species have a more restricted stratigraphic range (*Ammonidium garrasinoi* Ottone from Givetian to late Frasnian, *Gorgonisphaeridium evexispinosum* WICANDER from the Famennian, *Unellium elongatum* WICANDER and a *Pterospermella latibalteus* WICANDER from mid-late Famennian, *Exilisphaeridium simplex* WICANDER from ?Strunian, and *Leiotriletes struniensis* MOREAU-BENOIT from Strunian palynofloras). Hence, these marine assemblages (MEAs and LAs1) are likely pre-Strunian Famennian in age.

From the basal part of the Lodgepole depositional system (upper Sappington shale) at Logan, dark brown shales yielded badly preserved, dark brown to black trilete spores with quite abundant *Botryococcus braunii* KÜTZING. A Tournaisian age is given to the upper Sappington (LAs3) based on few biostratigraphically useful species such as *Waltzispora polita* (HOFFMEISTER et al.) SMITH & BUTTERWORTH, *Leiotriletes sphaerotriangulus* (LOOSE) POTONIÉ and KREMP, ?*Grandispora echinata* Hacquebard, and *Punctatisporites glaber* (NAUMOVA) PLAYFORD.

The ages observed in the study agree with previous conodont work for the Three Forks Formation (Trident Member - middle Famennian *marginifera/trachytera* zones), lower Sappington (*expansa* Zone), and for the upper Sappington black shale (Tournaisian *duplicata/sandbergi* Zones). The Strunian *praesulcata* Zone was previously defined in shales of the Unit 4 interbedded within the middle Sappington (reservoir) in the Bridger Range in Montana by SANDBERG et al. (1972).

WARREN et al. (2014) have updated DI PASQUO et al. (2012), and reported results from 47 samples were collected. Out of these, 7 samples from the middle shale were productive, yielding well preserved, diverse assemblages of miospores and acritarchs. Miospore species found include *Auroraspora macra*, *Emphanisporites rotatus*, *Endosporites micromanifestus*, *Grandispora clandestina*, *G. echinata*, *Knoxisporites concentricus*, *Lophozonotrilites* spp., *Punctatisporites hannibalensis*, *Pustulatisporites dolpii*, *Retispora lepidophyta*, *Retusotrilites crassus*, *Tumulispora rarituberculata*,

Vallatisporites drybrookensis, *V. splendens*, *V. vallatus*, and *Verrucosporites nitidus*. Acritharch species found include *Dictyotidium fairfieldense*, *Gorgonisphaeridium absitum*, *G. ohioense*, *G. plerisporosum*, *Navifusa* sp., *Stellinum micropolygonale*, and *Veryhachium downiei*. Many leiosphaerids were found. The co-occurrence of *R. lepidophyta* with *V. nitidus* in the middle shale indicates a late Strunian LN Zone and allows for approximate placement of the D-C boundary at the top of this unit. The results of this study confirm the previous *R. lepidophyta* range in the middle shale at Peak 9559, Bridger Mountains, MT, in a new locality. Most of our taxa were recognized in the Strunian LN Zone of the Saverton Shale in Pike County, IL, USA, and in the Bakken Formation (subsurface), near Regina, southern Saskatchewan, Canada.

Working Hypothesis

RODRIGUEZ (2014) and ISAACSON et al. (2014), utilizing (by permission) data from proprietary work, have presented an interesting hypothesis, when known conodont and palynologic biostratigraphies are applied to the Sappington Formation (Fig. 1). That is, four sequence boundaries appear to occur, thereby suggesting four D-C ice advances in Gondwana. Further, it also suggests that glacial beds in Brazil, Bolivia and the Appalachians may represent a latest Devonian (Strunian) ice retreat.

Our continuing research intends to further delineate extents of the lacunae. Most interesting is the early Tournaisian hiatus that appears to coincide with coeval glacial recycling events in the Bolivian subsurface (DI PASQUO et al. 2015) and Brasil (PLAYFORD et al. 2012).

References

- AZCUY, C.L. & DI PASQUO, M.M. 2005. Early Carboniferous palynoflora from the Ambo Formation, Pongo de Mainique, Peru. - Review of Palaeobotany and Palynology, **134** (3-4): 153-184.
- BECKER, R.T., GRADSTEIN, F.M. & HAMMER, O. 2012. The Devonian Period. - In: GRADSTEIN, F., OGG, J., SCHMITZ, M. & G. OGG (eds.), The Geologic Time Scale, v. 2: 559-602, Elsevier.
- BRAND, U. 1993. Global perspective of Famennian-Tournaisian oceanography: geochemical analysis of brachiopods. - Annales Societe géologique Belgique, **115** (2): 491-496.
- BRAND, U. 1998. Global climatic changes during the Devonian-Mississippian: stable isotope biogeochemistry of brachiopods. - Global and Planetary Change, **1** (4): 311-329.

BREZINSKI, D.K., CECIL, C.B. & SKEMA, V.W. 2010. Late Devonian glaciogenic and associated facies from the central Appalachian Basin, eastern United States. - Geological Society of America. Bulletin, **122** (1-2): 265-281.

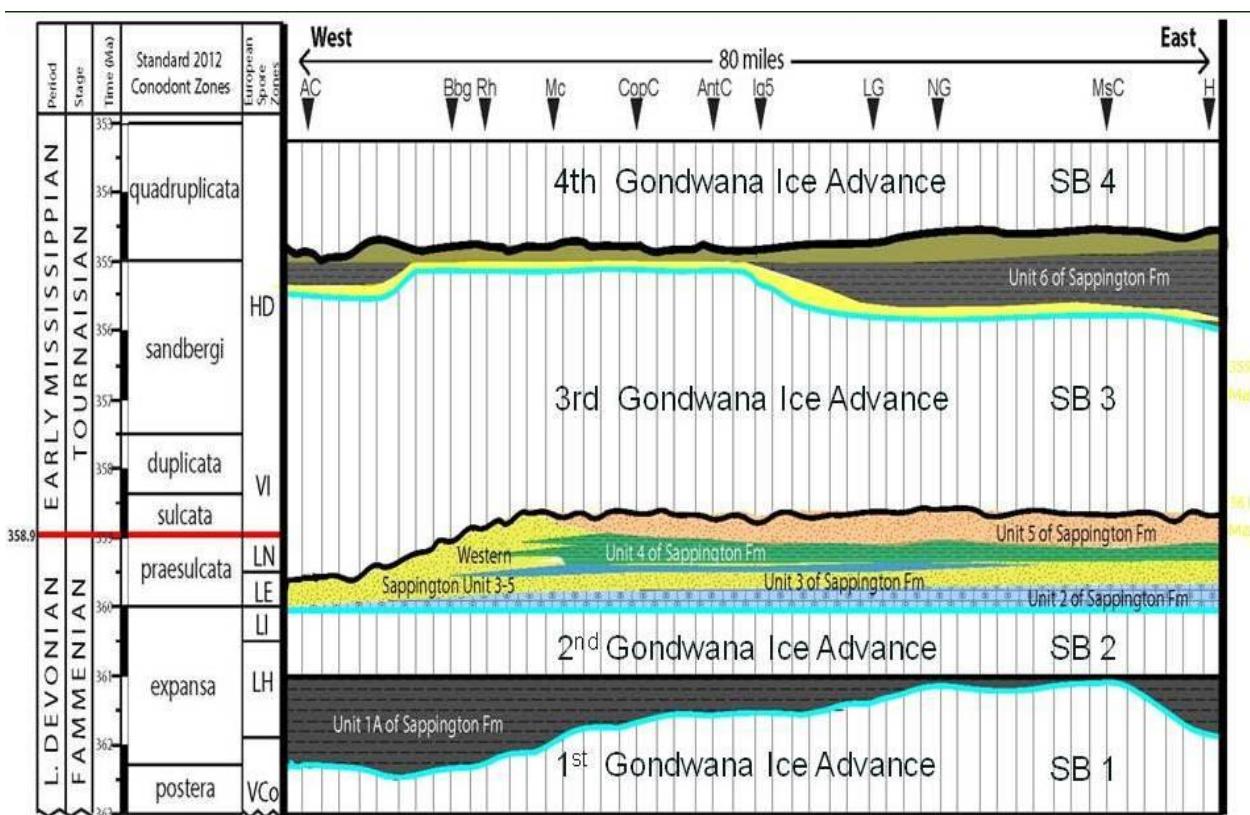
CAPUTO, M.V. 1985. Late Devonian glaciation in South America. - Palaeogeography Palaeoclimatology Palaeoecology, **51**: 291-317.

CAPUTO, M.V., DE MELO, J.H.G., STREEL, M. & ISBELL, J.H. 2008. Late Devonian and Early Carboniferous glacial records of South America. - In: FIELDING, C.R., FRANK, T.D. & ISBELL, J.L. (eds.), The Late Paleozoic Gondwanan Ice Age: Timing, Extent, Duration and Stratigraphic

Records, Geological Society of America, Special Paper, **441**: 161-173.

CECIL, C.B., BREZINSKI, D.K. & DULONG, F. 2004. The Paleozoic record of changes in global climate and sea level: central Appalachian basin. - In: SOUTHWORTH, S. (Ed.), Geology of the National Capitol Region, Field Trip Guidebook, U.S. Geological Survey Open-file Report. **98-577**: 77-135.

Fig. 1. Wheeler diagram showing depositional/erosional lacunae in Sappington Formation.



CROWELL, J.C. 1999. Pre-Mesozoic ice ages; their bearing on understanding the climate system. - Geological Society of America, Memoir, **192**: 106 pp.

COLEMAN, U. & CLAYTON, G. 1987. Palynostratigraphy uppermost Devonian and Lower Mississippian of eastern Kentucky (USA) and correlation with western Europe. - Courier Forschungsinstitut Senckenberg, **98**: 75-93.

DI PASQUO, M.M., GRADER, G.W. & ISAACSON, P.E. 2012. Palynology of the Devonian-Mississippian transition in western Montana: Three Forks, Sappington and Bakken formations. - AASP-CIMP (Palynology), 45th Annual Meeting, Lexington, KY, Program and Abstracts: 18-19.

DI PASQUO, M.M., WOOD, G.D., ISAACSON, P., & GRADER, G. 2015 (in press). Palynostratigraphic reevaluation of the Manuripi X1 (1541-1150 m interval), Madre de Diód Basin, northern Bolivia: recycled Devonian species and their implication for

- the timing and duration of Gondwanan glaciation. - XVI Simposio Argentino de Paleobotánica y Palinología.
- FRAKES, L.A., FRANCIS, J.E. & SYKTU, J.I. 1992. Climate modes of the Phanerozoic. - Cambridge, Cambridge University Press, 274 pp.
- GONZÁLEZ, F., PLAYFORD, G. & MORENO, C. 2005a. Upper Devonian biostratigraphy of the Iberian Pyrite Belt, southwest Spain. Part One: Miospores. - *Paleontographica, Abt. B*, **273**: 1-51.
- GONZÁLEZ, F., PLAYFORD, G., & MORENO, C. 2005b. Upper Devonian biostratigraphy of the Iberian Pyrite Belt, southwest Spain. Part Two: Organic walled microphytoplankton. - *Paleontographica, Abt. B*, **273**: 53-86.
- HARTEL, T.H.D., RICHARDS, B.C. & LANGENBERG, C.W. 2012. Wabamum, Bakken equivalent Exshaw and Banff formations in core, cuttings and outcrop from southern Alberta. - *Geoconvention 2012*: 19 pp.
- ISAACSON, P.E., HLADIL, J., JIAN-WEI, S., KALVODA, J. & GRADER, G. 1999. Late Devonian (Famennian) glaciation in South America and marine offlap on other continents. - In: FEIST, R., TALENT, J.A. & DAURER, A. (eds.), North Gondwana: Mid-Paleozoic Terranes, Stratigraphy and Biota, *Jahrbuch der Geologischen Bundesanstalt (Wien)*, **54**: 239-257.
- ISAACSON, P.E., DÍAZ-MARTÍNEZ, E., GRADER, G. KALVODA, J., BABEK, O. & DEVUYST, F.X. 2008. Late Devonian Glaciation in Gondwana. - In: SOREGHAN, G.S. & MONTAÑEZ, I.P. (Eds.), Geosystems: investigations of the Late Paleozoic Tropical Earth System, Palaeogeography, Palaeoclimatology, Palaeoecology, Special Issue, **268**: 126-142.
- ISAACSON, P.E., GRADER, G.W. DI PASQUO, M., WARREN, A. & RODRIGUEZ, A.P. 2014. Correlating Sappington Formation sequences intrabasinally and as proxies to Late Devonian glaciation: utilizing palynostratigraphy. - *Geological Society of America, Abstracts with Program*, **46** (5): 3.
- JOACHIMSKI, M.M. & BUGGISCH, W. 2002. Conodont $\delta^{18}\text{O}$ signatures indicate climatic cooling as a trigger for Late Devonian mass extinction. - *Geology*, **30** (8): 711-714.
- KAUFFMAN, B. 2006. Calibrating the Devonian time scale: a synthesis of U-Pb ID-TIMS ages and conodont stratigraphy. - *Earth-Science Reviews*, **76**: 175-190.
- KLAPPER, G. 1966. Upper Devonian and Lower Mississippian Conodont zones in Montana, Wyoming, and South Dakota. - *University of Kansas, Paleontological Contributions, Paper 3*: 1-49.
- LE HÉRISSÉ, A., SERVAIS, T. & WICANDER, R. 2000. Devonian acritarchs and related forms. - *Courier Forschung Senckenberg*, **220**: 195-205.
- LU, L-C. & WICANDER, R. Upper Devonian acritarchs and spores from the Hongguleleng Formation, Hefeng district in Xinjiang, China. - *Revista Española Micropaleontología*, **20**: 109-148.
- MAZIANE, N., HIGGS, K.T. & STREEL, M. 2002. Biometry and paleoenvironment of *Retispora lepidophyta* (KEDO) PLAYFORD 1976 and associated miospores in the latest Famennian nearshore marine facies, eastern Ardennes (Belgium). - *Reviews of Palaeobotany and Palynology*, **118**: 211-226.
- MII, H.-S., GROSSMAN, E.L. & YANCEY, T.E. 1999. Carboniferous isotope stratigraphies of North America: implications for Carboniferous paleoceanography and Mississippian glaciation. - *Geological Society of America, Bulletin*, **111**: 960-973.
- MOLYNEUX, S.G., LE HÉRISSÉ, A. & WICANDER, R. 1996. Paleozoic phytoplankton. - In: JANSONIUS, J., MCGREGOR, D.C. (eds), *Palynology: principles and application*, American Association of Stratigraphic Palynologists Foundation, **2**: 493-529.
- MOLYNEUX, S.G., MANGER, W.L. & OWENS, B. 1984. Preliminary account of Late Devonian palynomorph assemblages from the Bedford Shale and Berea Sandstone Formations of central Ohio, USA. - *Journal of Micropaleontology*, **3** (2): 41-51.
- OTTONE, E.G. 1996. Devonian palynomorphs from the Los Monos Formation, Tarija Basin, NW Argentina. - *Palynology*, **20**: 105-155.
- PARIS, F., RICHARDSON, F., RIEGEL, J.B., STREEL, W., AND VANGESTAINE, M. 1985. Devonian Emsian - Famennian palynomorphs. - *Journal of Micropalaeontology*, **4** (1): 49-81.
- PLAYFORD, G. 1981. Late Devonian acritarchs from the Gneuda Formation in the western Carnarvon Basin, Western Australia. - *Geobios*, **14**: 145-171.
- Playford, G. 1993. Miospores and organic-walled microphytoplankton characteristic of strata contiguous with the Devonian-Carboniferous boundary. - *Comptes Rendus XII ICCP (Buenos Aires 1991)*, **I**: 127-160.
- PLAYFORD, G. & MCGREGOR, D.C. 1993. Miospores and organic-walled microphytoplankton of Devonian-Carboniferous boundary beds (Bakken

- Formation), southern Saskatchewan: a systematic and stratigraphic appraisal. - Geological Survey of Canada, Bulletin, **445**:1-107.
- PÖTHE DE BALDIS, E. 2000. Acrílicas y prasinofitas del límite Devónico – Carbonífero, en el pozo Mendoza-1, Paraguay occidental. - XI Simposio Argentino de Paleobotánica y Palinología (Tucumán), Abstracts: 92.
- RODRIGUEZ, A.P. 2014. Lateral Facies and Thickness Change of the Devonian-Mississippian Sappington Formation Along Inverted Margins of the Central Montana Trough, Three Forks, Montana. - American Association of Petroleum Geologists Bulletin, Search and Discovery.
- SANDBERG, C.A., STREEL, M. & SCOTT, R.A. 1972. Comparison between conodont zonation and spore assemblages at the Devonian-Carboniferous boundary in the western and central United States and in Europe. Comptes Rendu 7th International Congres on Carboniferous Stratigraphy and Geology, Krefeld, Germany, **1**: 179-203.
- SCOTSESE, C.R. 1997. Paleogeographic Atlas. - PALEOMAP Progress Report 90-0497, University of Texas at Arlington, 37 pp.
- STREEL, M., CAPUTO, M.V., LOBOZIAK, S. & MELO, J.H. 2000. Late Franian- Famennian climates based on palynomorph analyses and the question of Late Devonian glaciations. - Earth Science Reviews, **52**: 121-173.
- TRAPP, E., KAUFMANN, B., MEZGER, K., KORN, D. & WEYER, D. 2004. Numerical calibration of the Devonian-Carboniferous boundary: two new U-Pb isotope dilution-thermal ionization mass spectrometry single-zircon ages from Hasselbachthal (Aauerland, Germany). - Geology, **32**: 857-860.
- VAN GELDERN, R., JOACHIMSKI, M.M., DAY, J., JANSEN, U., ALVAREZ, F., YOLKIN, E.A. & MA, X.P. 2006. Carbon, oxygen and strontium isotope records of Devonian brachiopod calcite. - Paleogeography Paleoclimatology Paleoecology, **240** (1-2): 47-67.
- WARREN, A., DI PASQUO, M.M., GRADER, G.W., ISAACSON, P.E. & RODRIGUEZ, A.P. 2014. Latest Famennian middle Sappington Shale: *lepidophyta* – *Verrucosporite nitidus* (LN) zone at the Logan Gulch type section, Montana, U.S.A. - Annual Meeting, Geological Society of America, Abstracts with Programs, **46** (6): 163.
- WICANDER, E.R. 1974. Upper Devonian – Lower Mississippian acritarchs and prasinophycean algae from Ohio, USA. – Paleontographica, Abt. B, **148**: 9-43.
- WICANDER, E.R. 1975. Fluctuations in a late Devonian-Early Mississippian phytoplankton flora of Ohio, USA. - Paleogeography Paleoclimatology Paleoecology, **17**: 89-108.
- WICANDER, E.R. & LOEBLICH, A. 1977. Organic-walled microphytoplankton and its stratigraphic significance from the Upper Devonian Antrim Shale, Indiana, USA. – Paleontographica, Abt. B, **160**: 129-165.
- WICANDER, R. & PLAFORD, G. 1985. Acritarchs and spores from the Upper Devonian Lime Creek Formation, Iowa, U.S.A. – Micropaleontology, **31** (2): 97-138.

The Kellwasser type locality in the Harz Mountains, Germany

E. SCHINDLER¹, M. GEREKE², M. PIECHA³,
F.W. LUPOLD⁴ & D. STOPPEL⁵

¹Senckenberg Forschungsinstitut und Naturmuseum Frankfurt, Senckenberganlage 25, 60325 Frankfurt am Main, Germany; eberhard.schindler@senckenberg.de

²Hopfengarten 6, 35085 Heskem-Mölln, Germany; m.gereke@arcor.de

³Geologischer Dienst NRW, De-Greiff-Straße 195, 47803 Krefeld, Germany; piecha@gd.nrw.de

⁴Landesamt für Bergbau, Energie und Geologie, Stilleweg 2, 30655 Hannover, Germany; Friedrich.Wilhelm.Luppold@lbeg.niedersachsen.de

⁵Kampstraße 90, 30629 Hannover, Germany

Introduction

The present contribution is a modified and shortened version of a paper recently published in the German language (GEREKE et al. 2014) describing the Kellwasser type locality in the Harz Mountains (Figs. 1-3). Here, we focus on biostratigraphy and conodonts. For other aspects, such as history of the locality, sedimentology/facies, events and the geosite aspect, we refer to the German publication. These topics can be followed there; particularly, explanations of sedimentology and facies are given in extensive figure captions in English.

The Kellwasser type locality

The type locality of the Kellwasser horizons (often referred to as Kellwasser limestones) has been known since the middle of the 19th century (ROEMER 1850). It was the wall of a limestone quarry operated by a former iron foundry (SCHINDLER & STOPPEL 1988), but had been almost buried when BEUSHAUSEN (1900a) published his excellent monograph on the area of the northwestern Harz Mountains. In his monograph, he named the Kellwasser horizons for the first time (then called ‘Kellwasser-Kalke’ = Kellwasser limestones – more details on the history of Kellwasser discoveries in the area are given in SCHINDLER 1990b; GEREKE 2007; GEREKE et al. 2014). But even in those times, the value of the dark Kellwasser horizons as marker beds was recognised and used for wide-ranging correlation (e.g., KAYSER 1871, 1873; v. KOENEN 1883; SANDBERGER 1873; FRECH 1887; WALDSCHMIDT 1885; DENCKMANN 1895, 1900, 1901; 1909; HOLZAPFEL

1897; BEUSHAUSEN 1900b; BORN 1912; WEDEKIND 1913; SCHINDEWOLF 1922).

Because the Kellwasser horizons are related to the Kellwasser Crisis near the Frasnian/Famennian boundary, they became interesting for event research (e.g., BUGGISCH 1972; SCHINDLER 1990 a, b; GEREKE 2007 and literature therein). More recently, the locality was included in comparative publications dealing with global events, but also with ‘Time-Specific Facies’ including its power for high resolution litho- and event stratigraphy (GEREKE & SCHINDLER 2012).

In 2009, the overgrown and partly buried outcrop was cleaned and significantly widened (Luppold et al. 2010) – parts of the new outcrop had not been exposed for many decades or had never been visible (Fig. 3). The creation of the new exposure brought to light strata up to the Upper Tournaisian cherty shales (= Kieselschiefer) as well as complicated tectonics. The latter topic is also not a focus of this note – one possible interpretation of the tectonic features was published by FRANZKE & MÜLLER (2012).

Stratigraphic setting and conodonts

The importance of the new exposure is in terms of biostratigraphy and conodonts. The exposed sequence covers strata from late Frasnian cephalopod limestones (= Cephalopoden-Kalke) to the Tournaisian Lower Alum Shales (= Liegende Alaunschiefer) and basal cherty shales. Embedded in the Late Devonian light grey cephalopod limestones are the well-developed dark grey to black intercalations of the Lower and Upper Kellwasser horizons – both very condensed compared to other localities also deposited in submarine rise settings – and the Lower and Upper *annulata* horizons (Figs. 3-4). The conodonts studied belong to the Late *rhenana* to Early *marginifera* zones (Figs. 4-6); conodonts from the higher parts of the section have not yet been investigated.

The limestones of the Kellwasser type locality are remarkably rich in conodonts (as they are in other fossils, e.g., homostenids and entomozoacean ostracods) – most probably due to the condensation in parts of the strata. In certain beds (namely in the black Kellwasser limestones) bivalves of the “Buchiola” group are common. Bed-by-bed sampling for conodont analyses had been done in the 1980ies by a working group of the University of Göttingen supervised by O.H. WALLISER (in co-operation with D.S.). Some of the samples are part of the dissertation of E.S. (SCHINDLER 1990b); additional samples were obtained in 2009 by M.G. in order to fill in gaps in the record of the lower part of the sequence. Originally, samples had been taken up to bed 175 by the WALLISER group (see Fig. 4) – as mentioned above, the interval studied for

conodonts covers strata from the Late *rhenana* to Early *marginifera* zones, i.e., it includes the two Kellwasser horizons and their overlying beds (Figs. 5-6). The material is housed at Senckenberg Forschungsinstitut und Naturmuseum Frankfurt.

The conodonts show the typical association similar to many sections of this stratigraphic interval. Due to the condensation of the rocks, some of the conodont subzones could not be perfectly discriminated (e.g., within the *crepida* Zone). In part the zonal boundaries lie within beds. Index conodonts may not be present or appear later in the record. In those cases, the zonal boundaries have been determined by alternative index forms or by conodont assemblages. *Palmatolepis linguiformis* – the index conodont of the *linguiformis* Zone – is rather rare in the Kellwasser Section, but present up to the higher parts of the Upper Kellwasser Horizon (Fig. 5). In the Usseln Limestone (Fig. 4, bed 120), the marker bed below the Lower Kellwasser Limestone (compare GEREKE 2007, GEREKE & SCHINDLER 2012), its typical index forms *Polygnathus cf. alatus* and *Icriodus preealternatus* are present (GEREKE 2007). This is very similar to the section “Auf’m Knoll 1” situated in the Waldeck Syncline of the eastern Rheinisches Schiefergebirge (GEREKE 2007) both in terms of lithology and faunal assemblage.

As the conodonts are mainly derived from earlier sampling, subsequent statistical analyses for biofacies aspects have not been undertaken. However, it can clearly be stated by visual estimation that all characteristic genera which are typical for the interval are present. Palmatolepids are significantly dominant. Accordingly, deposition in deeper water of a submarine rise setting must be assumed (SCHÜLKE 1995).

The CAI colour index is 4-5 which is typical for the conodonts of the Rheinisches Schiefergebirge and the Harz Mountains. According to KÖNIGSHOF (1992), these values indicate a palaeotemperature of 190–360°C, i.e., a burial depth of 3-5 km.

Outlook

We hope that the enlarged outcrop of this historical site can be kept open in the present form, although the exposure on a north-facing forest slope – i.e., rather wet – enables rapid growth of small trees and bushes. A good prospect for keeping the widened outcrop clean is that it became a geosite (no. 7) of the so-called ‘landmark no. 2’ of the European Geopark Harz – Braunschweiger Land – Ostfalen (SCHINDLER & WILDE 2011).

Acknowledgements

We thank Barbara PIESKER (BGR) for handling an early version of the graphs of Figs. 1-3. The Deutsche Gesellschaft für Geowissenschaften (DGG) is acknowledged for financial support of the widening of the Kellwasser type locality. We thank Alan LORD (Senckenberg Forschungsinstitut und Naturmuseum Frankfurt) for linguistic control. Use of figures which are taken and partly modified from GEREKE et al. (2014) courtesy of E. Schweizerbart’sche Verlagsbuchhandlung OHG (Stuttgart, Germany; www.schweizerbart.de).

References

- BEUSHAUSEN, L. 1900a. Das Devon des nördlichen Oberharzes mit besonderer Berücksichtigung der Gegend zwischen Zellerfeld und Goslar. – Abhandlungen der königlich preußischen Geologischen Landesanstalt, Neue Folge, **30**: 383 pp.
- BEUSHAUSEN, L. 1900b. Über den Nachweis des Kellwasserkalkes mit *Buchiola angulifera* A. ROEM. bei Büdesheim in der Eifel. – Zeitschrift der Deutschen Geologischen Gesellschaft, **52**: 14-16.
- BORN, A. 1912. Die geologischen Verhältnisse des Oberdevons im Aeketal (Oberharz). – Neues Jahrbuch für Mineralogie, Beilagen-Band, **34**: 553-632.
- BUGGISCH, W. 1972. Zur Geologie und Geochemie der Kellwasserkalke und ihrer begleitenden Sedimente (Unteres Oberdevon). – Abhandlungen des hessischen Landesamtes für Bodenforschung, **62**: 68 pp.
- DENCKMANN, A. 1895. Zur Stratigraphie des Oberdevon im Kellerwalde und in einigen benachbarten Devon-Gebieten. – Jahrbuch der königlich preußischen Geologischen Landesanstalt und Bergakademie für 1894, **15**: 8-64.
- DENCKMANN, A. 1900. Bericht über die Aufnahmen im Kellerwalde im Sommer 1899. – Jahrbuch der königlich preußischen Geologischen Landesanstalt und Bergakademie für 1899, **20**: IV-IX.
- DENCKMANN, A. 1901. Der geologische Bau des Kellerwaldes. – Abhandlungen der königlich preußischen Geologischen Landesanstalt, Neue Folge, **34**: 1-88.
- DENCKMANN, A. 1909. Über eine Exkursion in das Devon- und Culmgebiet nördlich von Letmathe. – Jahrbuch der königlich preußischen Geologischen Landesanstalt für 1906, **27**: 20-47.
- FRANZKE, H.J. & MÜLLER, R. 2012. Exkursion in einem geologischen Profil durch den West- und

- Mittelharz. – Exkursionsführer und Veröffentlichungen der Deutschen Gesellschaft für Geowissenschaften, **248**: 7-39.
- FRECH, F. 1887. Die paläozoischen Bildungen von Cabrières (Languedoc). – Zeitschrift der Deutschen Geologischen Gesellschaft, **39**: 360-487.
- GEREKE, M. 2007. Die oberdevonische Kellwasserkrise in der Beckenfazies von Rhenoherzynikum und Saxothuringikum (spätes Frasnium/ frühestes Famennium, Deutschland). – Kölner Forum für Geologie und Paläontologie, **17**: 228 pp.
- GEREKE, M., LUPOLD, F.W., PIECHA, M., SCHINDLER, E. & STOPPEL, D. 2009. Die Typikalität der Kellwasserkalke am Weganschnitt im Kellwasser-Tal NE Altenau/Oberharz. – Exkursionsführer und Veröffentlichungen der Deutschen Gesellschaft für Geowissenschaften, **239**: 51-53.
- GEREKE, M., LUPOLD, F.W., PIECHA, M., SCHINDLER, E. & STOPPEL, D. 2014. Die Typikalität der Kellwasser-Horizonte im Oberharz, Deutschland. – Zeitschrift der Deutschen Gesellschaft für Geowissenschaften, **165** (2): 145-162.
- GEREKE, M. & SCHINDLER, E. 2012. “Time-Specific Facies” and biological crisis – the Kellwasser Event interval near the Frasnian/Famennian boundary (Late Devonian). – Palaeogeography, Palaeoclimatology, Palaeoecology, **367-368**: 19-29.
- HOLZAPFEL, E. 1897. Bericht über die Ergebnisse der Aufnahmen im Jahre 1896. – Jahrbuch der königlich preußischen Geologischen Landesanstalt und Bergakademie, **17**: XXXVIII-XLVIII.
- JACOBSEN, W. & SCHNEIDER, H. 1950. Die Erzgänge des nordwestlichen Oberharzes. Eine Erläuterung zur Gangkarte 1 : 25000. – Geologisches Jahrbuch, **65**: 707-768.
- KAYSER, E. 1871. Studien aus dem Gebiete des rheinischen Devon. II. Die devonischen Bildungen der Eifel. – Zeitschrift der Deutschen Geologischen Gesellschaft, **23**: 289-376.
- KAYSER, E. 1873. Studien aus dem Gebiete des rheinischen Devon. IV. Über die Fauna des Nierenkalks vom Enkeberge und der Schiefer von Nehden bei Brilon, und über die Gliederung des Oberdevon im Rheinischen Schiefergebirge. – Zeitschrift der Deutschen Geologischen Gesellschaft, **25**: 602-674.
- KOENEN, A. VON 1883. Über das Oberdevon von Montpellier. – Neues Jahrbuch für Mineralogie, Geologie und Paläontologie, **1883** (2): 170-171.
- KÖNIGSHOF, P. 1992. Der Farbänderungsindex von Conodonten (CAI) in paläozoischen Gesteinen (Mitteldevon bis Unterkarbon) des Rheinischen Schiefergebirges. Eine Ergänzung zur Vitrinitreflexion. – Courier Forschungsinstitut Senckenberg, **146**: 118 pp.
- LUPOLD, F.W., SCHINDLER, E., BROCKE, R. & STOPPEL, D. 2010. Typikalität der Kellwasser-Horizonte erweitert. – Gmit, **39**: 25-26.
- ROEMER, F.A. 1850. Beiträge zur geologischen Kenntniss des nordwestlichen Harzgebirges. Erste Abtheilung. – Palaeontographica, **3** (1): 67 pp.
- SANDBERGER, F. 1873. Briefwechsel. Mittheilungen an Professor G. LEONHARD. – Neues Jahrbuch für Mineralogie, Geologie und Paläontologie, **1873**: 57-59.
- SCHINDEWOLF, O.H. 1922. Versuch einer Paläogeographie des europäischen Oberdevons. – Zeitschrift der Deutschen Geologischen Gesellschaft (1921), **73**: 137-223.
- SCHINDLER, E. 1990a. The Late Frasnian (Upper Devonian) Kellwasser Crisis. – Lecture Notes in Earth Sciences, **30**: 151-159.
- SCHINDLER, E. 1990b. Die Kellwasser-Krise (hohe Frasne-Stufe, Ober-Devon). – Göttinger Arbeiten zur Geologie und Paläontologie, **46**: 115 pp.
- SCHINDLER, E. & STOPPEL, D. 1988. Stop B13 Kellwasser valley. – Courier Forschungsinstitut Senckenberg, **102**: 214-215.
- SCHINDLER, E. & WILDE, V. 2011. The Kellwasser Valley, pinpointing a global event 375 million years ago in the Geopark Harz • Braunschweiger Land • Ostfalen. – European Geoparks Network Magazine, **8**: 27.
- SCHÜLKЕ, I. 1995. Evolutive Prozesse bei *Palmatolepis* in der frühen Famenne-Stufe (Conodonta, Oberdevon). – Göttinger Arbeiten zur Geologie und Paläontologie, **67**: 108 pp.
- WALDSCHMIDT, E. 1885. Über die devonischen Schichten der Gegend von Wildungen. – Zeitschrift der Deutschen Geologischen Gesellschaft, **37**: 906-927.
- WEDEKIND, R. 1913. Die Goniatitenkalke des unteren Oberdevon vom Martenberg bei Adorf. – Sitzungsberichte der naturforschenden Freunde Berlin, **1913** (1): 23-77.

Figures:

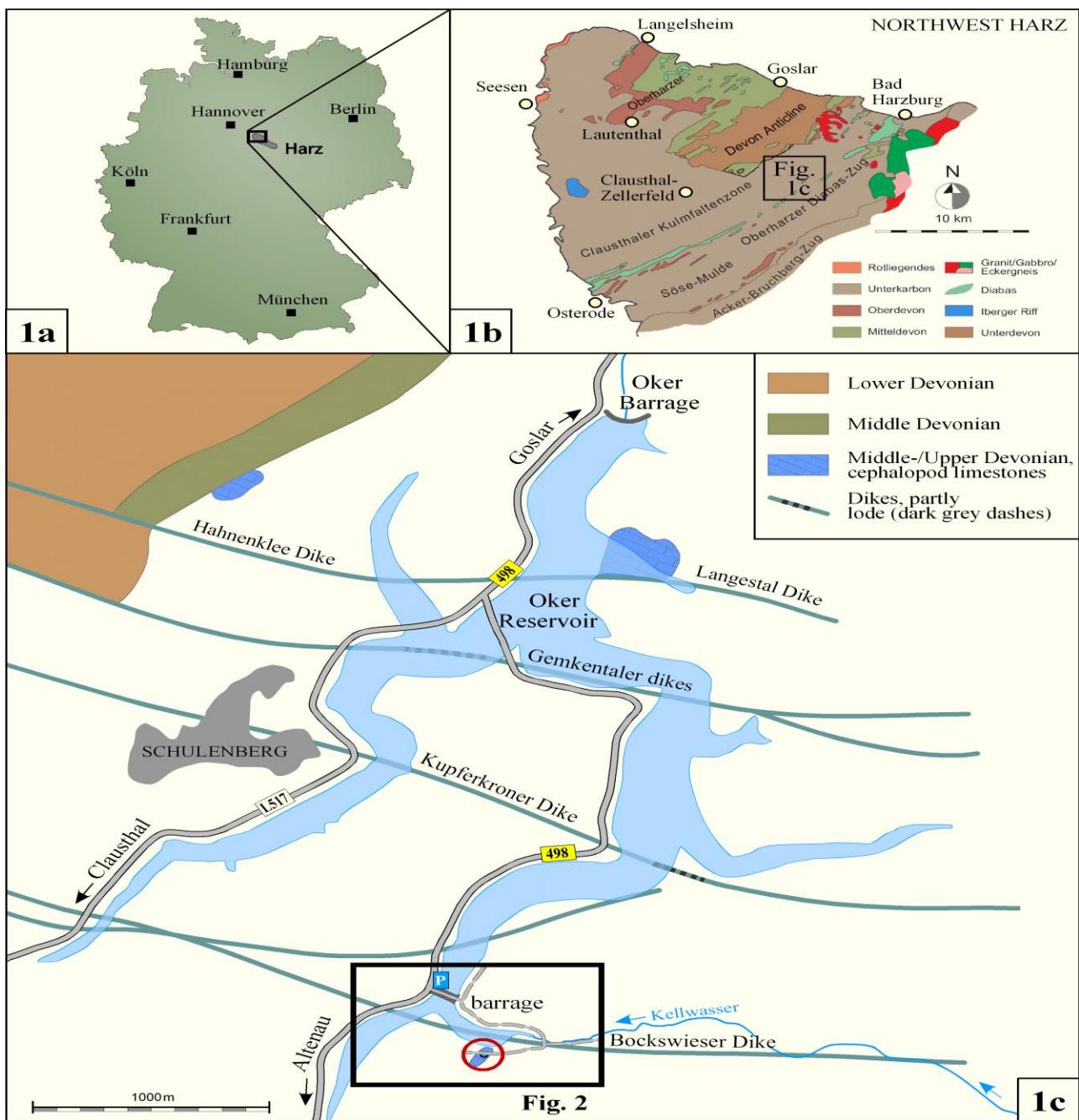


Fig. 1. Location of the section in the Kellwasser Valley, modified after GEREKE et al. (2009, 2014).

1a. Location of the Harz Mountains in Germany.

1b. Geological map of the northwestern Harz Mountains.

1c. Detailed map of the ore veins of the western Harz (modified after JACOBSEN & SCHNEIDER 1950) with the type locality of the Kellwasser horizons (red circle); uncoloured area in 1c = Lower Carboniferous.

The section is located on the Geological Mapsheet 1:25.000 Clausthal-Zellerfeld (Gauß-Krüger coordinates: R 35 99 984, H 57 43 875; 436 m above sea level).

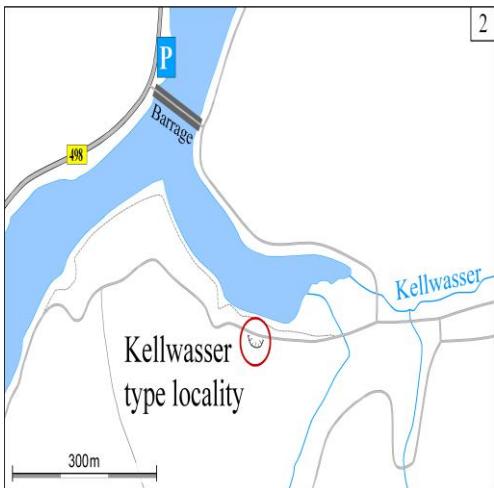


Fig. 2. Sketch map of the type locality of the Kellwasser horizons in the Kellwasser Valley near Altenau (northwestern Harz Mountains); detailed descriptions are given in GEREKE et al. (2009, 2014).



Fig. 3. (modified after GEREKE et al. 2014)

(Upper photo). General view of the type locality of the Kellwasser horizons in the Kellwasser Valley in 2004. The left (eastern) part shows the “old section” presented in GEREKE et al. (2014: Fig. 4/1); this section as well as the western part were severely overgrown by vegetation or had never been exposed (the height of the white information board visible on the right is 1 m).

(Lower photo). General view of the type locality in the Kellwasser Valley in 2010. The black Kellwasser horizons can be recognized in the centre of the picture. Two *annulata* black shales are also visible in the succession. The old “main section” at the left (comp. Gereke et al. 2014: Fig. 4/1) now only represents a small part of the outcrop. To the right from the “main section”, the succession which was used by SCHINDLER & STOPPEL (1988) for the demonstration of the locality at the 5th European Conodont Symposium (ECOS V) can be seen. Strong tectonic overprint can be seen in the centre and to the right.

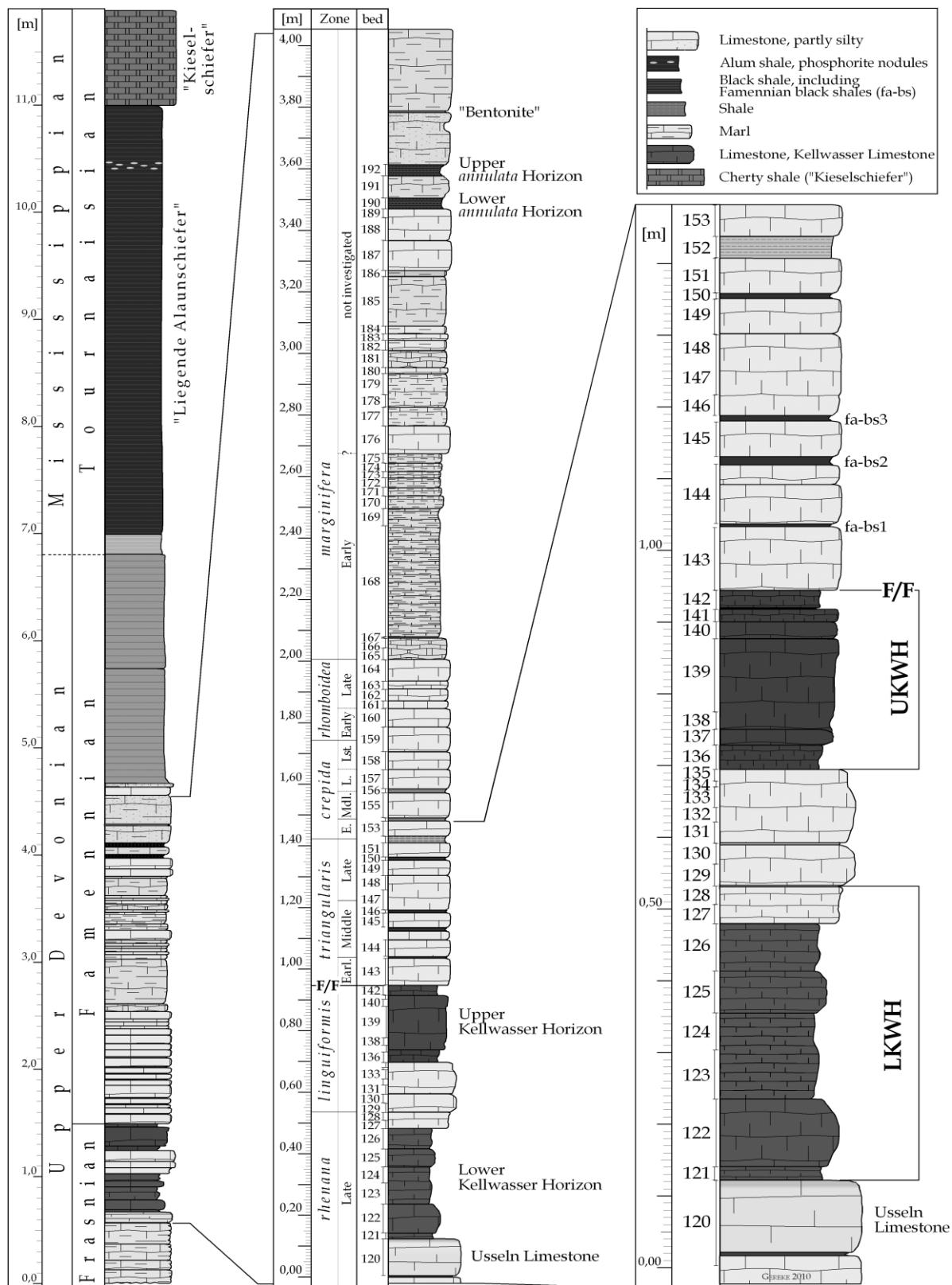


Fig. 4. Stratigraphic section of the type locality in the Kellwasser Valley (modified after GEREKE et al. 2014). LKWH = Lower Kellwasser Horizon, UKWH = Upper Kellwasser Horizon, F/F = Frasnian/Famennian boundary, fa-bs1 to 3 = dark (marker) shales of the lower Famennian.

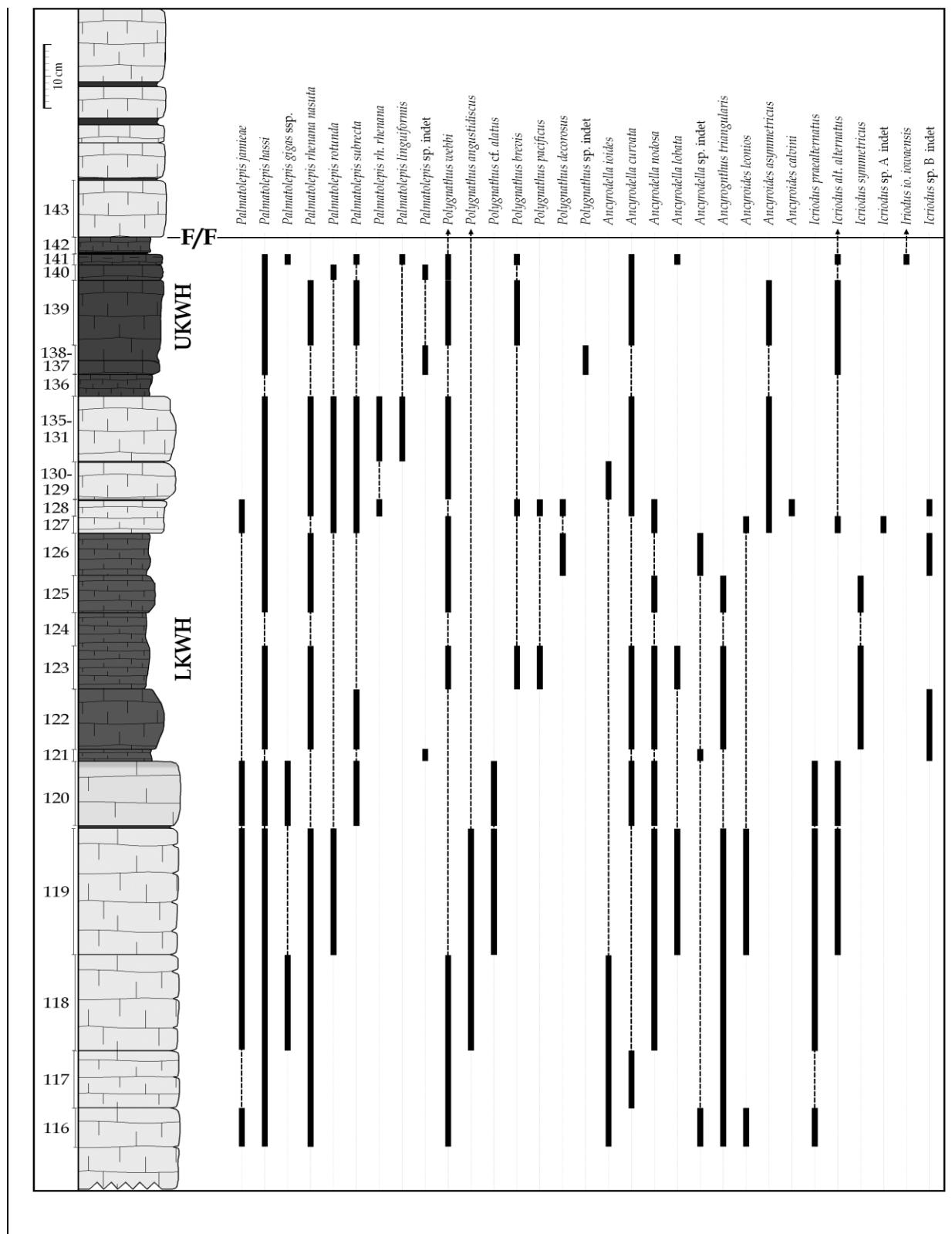


Fig. 5. Occurrence of conodonts around the Kellwasser horizons at the type locality (Kellwasser

Valley, Harz Mountains). Figure modified after Gereke et al. (2014).

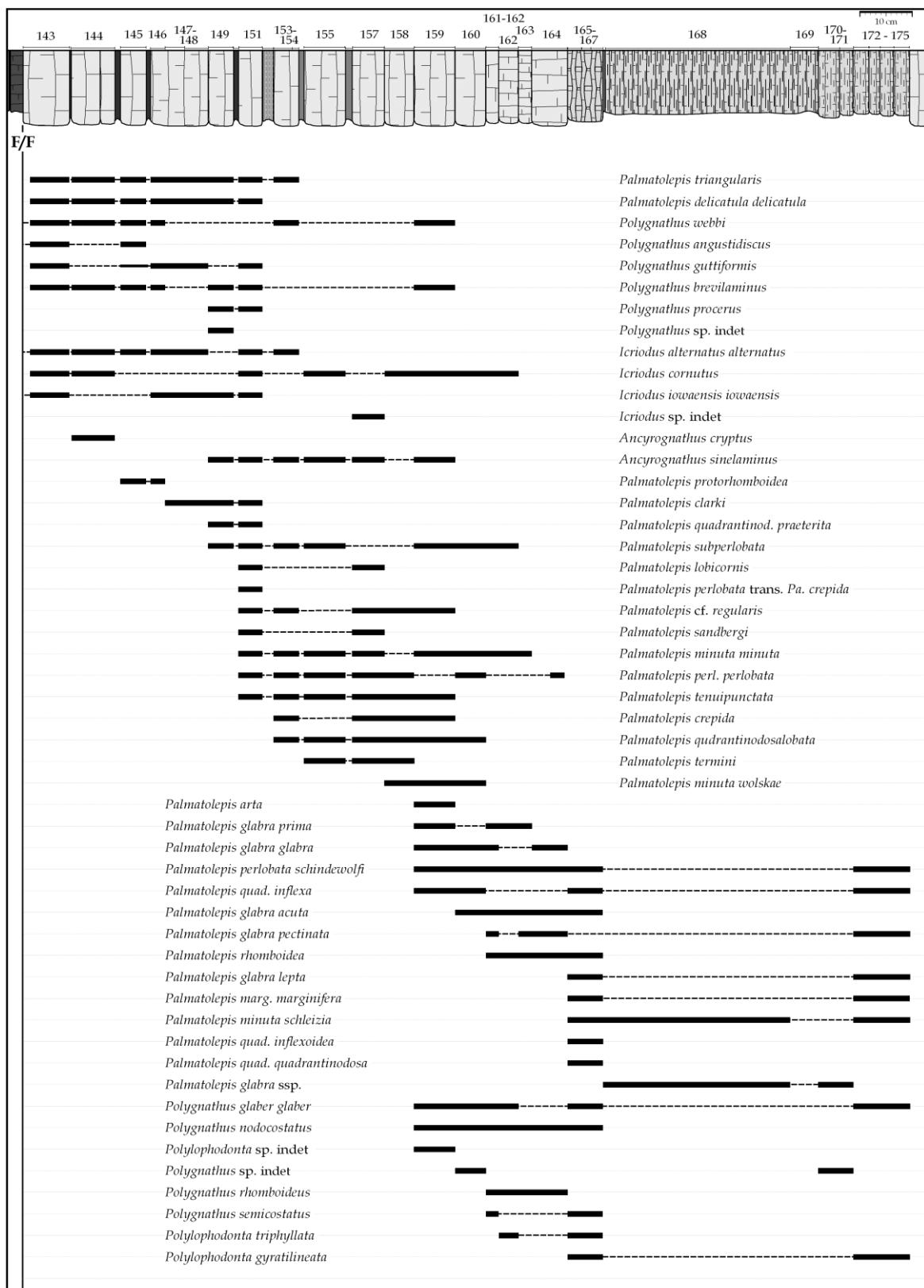


Fig. 6. Occurrence of conodonts above the Frasnian/Famennian boundary at the type locality of the Kellwasser horizons (Kellwasser Valley, Harz Mountains). Figure from GEREKE et al. (2014).

DEVONIAN MEETINGS

Second Circular

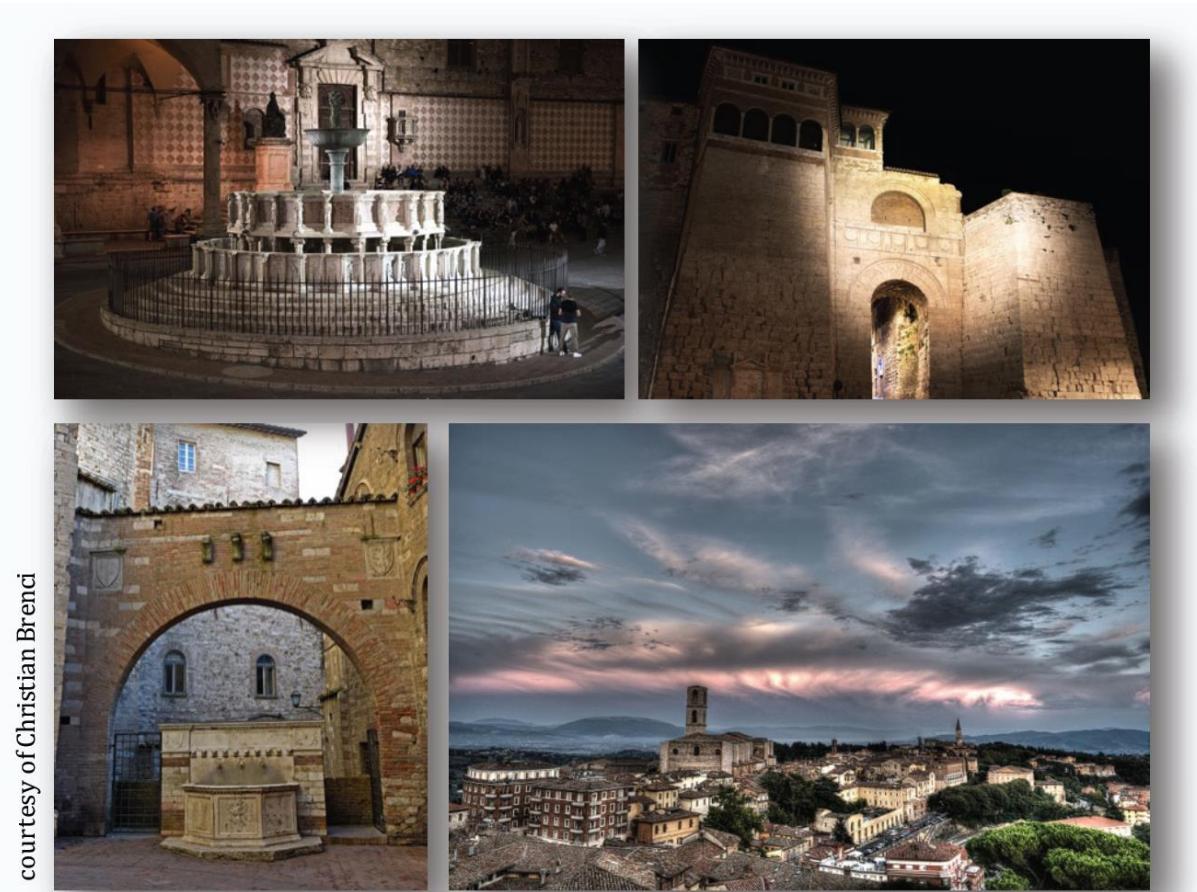
The Congress (<http://icpsg.com/>) is organized jointly by the **Department of Physics and Geology (University of Perugia, Italy)** and **Arianzamin Pars Geological Center of Teheran, Iran**. It will be addressed to promote interdisciplinary approaches, to make the state-of-the-art and to expand the knowledge on the Palaeozoic Gondwana realm. The Congress aims to provide an opportunity for constructive interactions between academia and industry in exchanging ideas, perspectives and challenges.

Venue

Perugia is a charming and historically important city in central Italy with an international vocation as venue for major meetings. It is a cultural center known from many centuries and home to many creative spirits in the fields of science, music and art. Attendants to the Congress will enjoy the beauty of Italian architecture during early spring days, and have a taste of the large variety of the excellent food and wines the region is famous for.

Perugia amalgamates all the advantages of a small city with the facilities and services usually found in much larger cities! It provides a unique environment to meet colleagues in a relaxing atmosphere.

On behalf of the Organizing Committee, we look forward to introduce you to Perugia. We are sure the city will offer the ideal place to discuss cutting-edge geology, stratigraphy and oil exploration, as well as to explore new scientific frontiers that are relevant to the various societal challenges facing the 21st century.



courtesy of Christian Bencic

International Workshop on PALAEozoic SMALLER FORAMINIFERA

Organizers: Daniel Vachard (President; University of Lille, France), Demir Altiner (Middle East Technical University, Ankara, Turkey); Roberto Rettori (University of Perugia, Italy).

The workshop will be held on April 13rd in a pre-Congress session. Topics will focus on taxonomy, biostratigraphy, evolution and palaeobiogeography of Palaeozoic Smaller Foraminifera. The contributions will be published in the "Rivista Italiana di Paleontologia e Stratigrafia" (ISSN:0035-6883; IF: 0.93) after peer review.

CIMP "Commission Internationale Microflore Paléozoïque" Special Session

Organizer: Amalia Spina (Department of Physics and Geology, University of Perugia).

This session will be held on April 15th. Topics will focus on taxonomy, biostratigraphy and palaeogeographic distribution of Palaeozoic Palynomorphs.

Congress Location

The Congress will be held at **Hotel Giò – Perugia Congress Centre**. With its 206 rooms, 26 meeting rooms and Auditorium seating for up to 700 places, Hotel Giò proposes itself as a functional structure, reference point for the entire central part of Italy. Two halls with areas expressly devoted to informal meeting, living bar for aperitif and coffee break and comfortable working and reading corners will be available.

Language of the Congress

English will be the official language of the meeting. No translation facilities will be available.

Access

Perugia is not far from Rome, Pisa and Florence and can be easily reached from these three cities by train, bus or car.

- The major international gateway is Rome's Airport "Leonardo da Vinci", known as Fiumicino (FCO) (30 km/19 mi southwest of Rome, phone: (+39)0665951; www.adrit.it).
- Pisa's Airport "Galileo Galilei" (PSA) (12 km/7 mi south of Pisa and 80 km/50 mi west of Florence, phone: (+39)050500707; www.pisa-airport.com) has flights from London, Amsterdam, Brussels, Paris and other European cities, as well as connections to Rome and Milan.
- Florence's Airport "A. Vespucci", known as Peretola (FLR) (10 km/6 mi northwest of Florence, phone: (+39)0553061700; www.aeroporto.firenze.it), has connections to Brussels, Paris, London, Rome, and Milan.

Flying time is approximately 9 hours from New York, 11 hours from Chicago, 12 hours from Dallas (via New York), 12 hours from Los Angeles, 2 hours from London (to Milan), and 24 hours from Sydney.

The solution that we suggest to you to reach Perugia by air is to land to Rome and to continue for Perugia with bus or by train.

Daily bus connections (www.sulga.it) are from Roma Fiumicino Airport (International Departure Terminal "C") and Perugia (P.le Partigiani).

Several trains daily connect Perugia with both Florence (via Terontola) and Rome (via Foligno or via Terontola). For the timetable and information please visit the website www.trenitalia.com.

Local Airport

Perugia's Airport "Sant'Egidio" (PEG) (phone: (+39)075592141) has flights to and from Rome, Munich, London, Bruxelles, Barcelona and other European cities. For information about Perugia's Airport Sant'Egidio please visit the Airport website (www.airport.umbria.it).

Accommodation

Hotel Giò is a unique building with 206 rooms, divided into two thematic areas. These areas are linked by a musical arcade with secluded listening points and peculiar Business Cellar with Internet Positions. Free Wi-Fi is available in the whole Hotel. Parking and Garage are free for the Guests. Moreover, Perugia and its vicinity have over 5000 rooms in more than 90 hotels. Many hotel rooms at different levels have been already blocked in order to secure the best rates. Lodging in student housing of the University can also be available.

Registration Fees

The registration fees which includes opening ice-breaker, coffee breaks and lunch packages are as follows:

	Until November 30 th	Until February 28 th	On site
Regular participant	300 €	400 €	550 €
Student participant	200 €	250 €	300 €
Accompanying person	150 €	200 €	250 €

Key Dates

November 30th 2015 – Deadline for an ‘early-bird’ (low) registration fee

November 30th 2015 – Deadline for abstract submission (talks and posters)

February 1st 2016 – acceptance of abstracts for oral or poster presentation

March 31st 2016 – deadline for regular (full) registration fee

March 2016 – distribution of the 3rd Circular with final programme

Scientific and Organizing Coordinators

Roberto Rettori

Mansour Ghorbani

e-mail: comitato.gondwana@unipg.it

Scientific Committee

Demir Altiner (Middle East Technical University, Ankara, Turkey)

Marco Balini (University of Milano, Italy)

Sveva Corrado (University of Roma Tre, Italy)

Jalil Ghalamghash (Geological Survey of Iran)

Hormoz Ghalavand (NIOC, Iran)

Bahaeddin Hamdi (Arianzamin, Iran)

Rossana Martini (University of Geneva, Switzerland)

Shuzhong Shen (Nanjing Institute of Geology and Paleontology, China)

Bahman Soleimani (NIOC, Iran)

Michael Stephenson (British Geological Survey)

Alireza Tahmasebi (NIOC, Iran)

Andrea Zanchi (University of Milano Bicocca, Italy)

Organizing Committee

Roberto Rettori (University of Perugia, Italy)

Simonetta Cirilli (University of Perugia, Italy)

Caterina Petrillo (University of Perugia, Italy)

Mansour Ghorbani (Arianzamin, Iran)

Enrico Capezzuoli (University of Perugia, Italy)

Marco Cherin (University of Perugia, Italy)

Amalia Spina (University of Perugia, Italy)

Lucia Angiolini (University of Milano, Italy)

Anoshiravan Kani (Arianzamin, Iran)

More information are available in the Congress website (<http://icpsg.com/>).

Looking forward to seeing you in Perugia!

IGCP 591 'the early to mid Palaeozoic revolution' closing meeting / 6-9 July 2016 / Ghent - Belgium



International Geoscience Programme Project 591 - Closing Meeting 'The Early to Mid Palaeozoic Revolution' Ghent University

jointly with: The International Subcommission on Cambrian Stratigraphy (ISCS)
The International Subcommission on Ordovician Stratigraphy (ISOS)
The International Subcommission on Silurian Stratigraphy (ISSS)
The International Subcommission on Devonian Stratigraphy (ISDS)

Ghent, Belgium, 6-9 July 2016

Second circular & website. This second circular provides an update of our plans for the closing meeting of IGCP 591, to be held next summer at Ghent University (Ghent, Belgium), following our first announcement of the meeting earlier this year. A third circular, including a full programme, will be prepared closer to the meeting but we invite you to check our website regularly for news, registration details and programme updates: www.IGCP591.ugent.be

Summary schedule

12 February 2016	Registration opens
13 March 2016	Early bird registration closes
15 April 2016	Abstract submission deadline
5 July 2016	GCM modelling workshop, Dept. of Geology, UGent (included in registration)
6-9 July 2016	Closing meeting IGCP591 scientific sessions at 'het Pand', UGent
8 July 2016	Mid-meeting workshops at 'het Pand', UGent (included in registration)
10-15 July 2016	Welsh Basin (UK) Field Trip " <i>Revolutions that made the Palaeozoic world - Revealed in the ancient strata of Wales</i> " (to be booked separately)

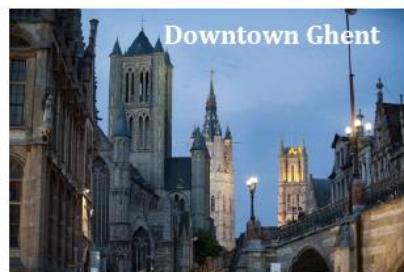
IGCP 591 'the early to mid Palaeozoic revolution' closing meeting | 6-9 July 2016 | Ghent - Belgium

Conference theme

A combined data-model approach to understand the early to middle Palaeozoic revolution

This multidisciplinary meeting aims at bringing together specialists from the data-community, including but not exclusively, sedimentology, physical stratigraphy, (micro)palaeontology, geochemistry, geochronology and palaeogeography with specialists from the numerical modelling community who focus on, e.g., climate, ice-sheet, geochemical, palaeo-ecological or sedimentological modelling. Using data-model comparison methods, we aspire to obtain a better understanding of the complex processes that shaped the Earth during the IGCP591 'time window', and, by extension, the whole Palaeozoic. As such, we will construct a synthesis of the advances made during the whole IGCP591 programme and associated projects, and help set the agenda for continued community-driven initiatives for the future.

Given that deep-time data-model comparison requires a profound understanding of the stratigraphy, this will be a joint meeting with the Cambrian, Ordovician, Silurian and Devonian commissions on stratigraphy. Break-out sessions for each of the sub-commissions' specific research and business will be organized as part of the meeting. The ISDS session will be co-sponsored by our friends of IGCP 596.



Keynote presentations

The organizers intend to achieve a dynamic discussion through a series of invited standard and keynote lectures by recognized specialists in the field, including contributions on methods still to gain firm footing in Palaeozoic deep-time. The preliminary list of keynote-speakers (and covered themes) includes:

Keynotes

- Dr. Poul Emsbo (United States Geological Survey – *Geochemistry of Silurian oceans*)
- Prof. Timothy Lenton (University of Exeter, UK – *Ordovician to Devonian climate modelling*)
- Dr. David De Vleeschouwer (Marum/Bremen University, Germany – *Palaeozoic Astrochronology*)
- Prof. Stephen Hesselbo (University of Exeter, UK – *Ocean anoxia through time*)
- Prof. David Beerling (University of Sheffield, UK – to be confirmed)

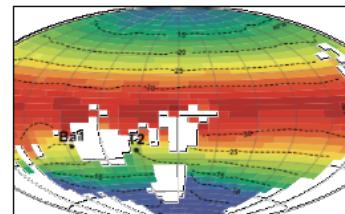


IGCP 591 'the early to mid Palaeozoic revolution' closing meeting / 6-9 July 2016 / Ghent - Belgium

Workshops

Pre-meeting workshop on 5 July 2016: GCM climate models in deep-time

Short course / workshop on climate modelling, mainly targeted at members of the data-community and convened by Dr. Yannick Donnadieu (CNRS).

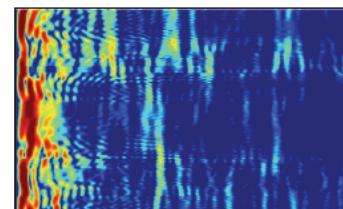


Part of IGCP 591's focus has been to document the major steps in the evolution of Phanerozoic climate, its links to biotic change, and the ways in which these climates can be tracked by fossil proxies and simulated by advanced numerical computer models. Sophisticated climate models are at the forefront of such studies, but their full potential remains to be realised in the early - mid Palaeozoic. In addition, it remains essential to evaluate the robustness of output produced by such models through comparison with palaeoclimate proxies, such as synthesised (micro)fossil data (which are especially important for deep-time applications). As part of the IGCP591's closing meeting, we are organising a short course, scheduled for the day before the talks commence (i.e., July 5th 2016), providing a practical introduction to various aspects of climate modelling, targeted at an audience of (predominantly) data-gatherers, showcasing how models work exactly, what we can and cannot do with/learn from climate models, and how data can be integrated most efficiently. With this short course, we seek to promote further integration of geological and numerical approaches, and to facilitate the development of comprehensive reconstructions of Earth's past climate. We hope to highlight the potential of further collaboration between the modelling and data communities, which we think can be an important topic for a potential successor project. We have approached climate modellers and palaeoclimatologists to give a series of synthesis papers and short-course style presentations. At present, confirmed speakers are:

Prof. Alan Haywood (University of Leeds, UK)
Dr. Yves Goddérès (CNRS, Université Toulouse III - Paul Sabatier, France)
Dr. Fanny Monteiro (University of Bristol, UK)
Dr. Didier Roche (CEA/CNRS-INSU/UVSQ, Gif-sur-Yvette, France)
(VU University Amsterdam, the Netherlands)

Mid-meeting workshop on 8 July 2016: "A Short Course on the Construction of High-precision Astronomically-calibrated Time Scales"

A mid-meeting workshop led by Prof. Stephen Meyers, University of Wisconsin, USA.



Numerical dating of the geologic record provides an essential framework for interpreting the rich history of our planet. However, as geoscientists increasingly pursue high (spatial) resolution stratigraphic analyses in deep time, the short temporal scales (<100,000 years) of the processes investigated push the limits of high-precision geochronology. This short course will examine the application of astrochronology to enhance the accuracy and precision of geologic time scales. Astrochronology uses the geologic record of climate oscillations—those ascribed to periodic changes in the Earth's orbit and rotation—to measure the passage of time from rhythmic layers in strata. The

IGCP 591 'the early to mid Palaeozoic revolution' closing meeting / 6-9 July 2016 / Ghent - Belgium

approach is especially valuable for constraining time scales through ash-poor intervals that cannot be directly dated with radioisotopic methods. We will discuss the potential for developing a complete astronomically-tuned Phanerozoic time scale, the fundamental challenges to achieving this goal, and potential solutions to address these challenges. The short course will include a tutorial with the software "Astrochron: An R Package for Astrochronology".

Mid-meeting workshop on 8 July 2016: 'Numerical Biochronology: Sequencing Large Numbers of Palaeobiologic First- and Last-Appearance Events'.

Instructor: Prof. Peter Sadler, University of California Riverside, USA.



The workshop will review the logic of a range of computer algorithms available for correlation and seriation of biostratigraphic and chemostratigraphic events. These algorithms implement familiar ground rules from biostratigraphy to generate time lines with finer resolution than traditional biozones. Hands-on application to real Palaeozoic data sets will explore a range of options in the CONOP (CONstrained OPTimization) software, written for Windows (XP, 7, 10) 32-bit and 64-bit operating systems (or Windows emulation on Mac computers). CONOP conducts brute-force, trial-and-error searches that employ a simple physical analogy rather than esoteric mathematics. We will use it to mimic the logic of several different seriation programs. Course notes, the CONOP program and data-manager, manuals and sample datasets will be provided to all participants.

**Field trip: 10-15 July 2016 Revolutions that made the Palaeozoic world
Revealed in the ancient strata of Wales**

Leader: Prof. Mark Williams, University of Leicester, UK.

Visit the magnificent and ancient landscape of Wales, birthplace of the Cambrian, Ordovician and Silurian systems. From its volcanic origins in the late Precambrian, Wales gave birth to a sedimentary marine basin in the Cambrian Period that endured for some 100 million years. In Welsh strata is preserved the story of Earth's first complex marine ecosystems during the Cambrian substrate revolution, and the birth of a global macrozooplankton and complex planktonic ecosystems during the Great Ordovician Biodiversification Event. Here too, are preserved some of the first rivers to flow in a meandering pattern on Earth – witness to the extension and impact of a terrestrial biosphere during the Devonian, now fossilised in strata of Pembrokeshire. In the land of poetry and song, unfolds a tale of how Earth's biosphere became diverse and resilient. Of how it responded to, and survived, the great upheaval of the end Ordovician extinction.

On this field excursion we will traverse the story of the early Palaeozoic Welsh depositional basin, from its terrestrial margins, through shallow marine settings into the deep abyss of its centre, glimpsing ancient and sometimes bizarre seabed ecosystems from deep beneath the ancient sea, and understanding the history, facies and biota of perhaps the most remarkable and best studied lower Palaeozoic basin on Earth.

IGCP 591 'the early to mid Palaeozoic revolution' closing meeting / 6-9 July 2016 / Ghent - Belgium

The landscape and geology in a few images



Left. Contorted Ordovician strata form the cliffs of the beach below the beautiful Welsh village of Llangrannog. Slipping down the palaeoslope of the ancient Welsh Basin in the Late Ordovician, these wet sediment folds signal a fall in global sea level as, 1000s of kilometres to the south, the southern polar ice sheet reached its glacial maximum.



Right. Magnificent Marloes Sands records a detailed transition from marine to terrestrial settings during the Silurian. Sir Roderick Impey Murchison visited Marloes in the 1830s during his work to establish the Silurian System.



Left. The ancient cathedral at St. David's rises above a majestic peninsula that preserves some of Wales' most ancient rocks, including strata with evidence of the Cambrian marine substrate revolution.



Right. The ancient standing stones of Pentre Ifan burial mound form part of the unique Neolithic heritage of the Prescelly Mountains in south Wales. We will stay in this area of Wales as a base for the field trip.

Venue

The conference will take place at 'het Pand', Ghent University's main conference venue, right in the historical city centre of Ghent and housed in a former medieval Dominican monastery. Ghent is an enchanting and vibrant city, which is often referred to as one of the most beautiful historic cities in

IGCP 591 'the early to mid Palaeozoic revolution' closing meeting / 6-9 July 2016 / Ghent - Belgium

Europe. From St. Michael's bridge, literally 2 minutes away from the meeting venue, there is a breath-taking view of the skyline of Ghent with the three impressive towers of St. Nicholas' Church, the Belfry with its bell tower and St. Bavo's cathedral, which houses the world famous painting "The Adoration of the Mystic Lamb" by Jan van Eyck (1426-1432), currently being restored, but open to the public. Traces of the Middle Ages run throughout the city. The old port, with its guild halls on the Graslei and Korenlei, is merely one example of the beautiful sights this town has to offer. Not far from the Graslei arises the Castle of the Counts, once the medieval fortress of the Counts of Flanders, which will be the venue for the welcome reception. Other social activities will include a convivial evening at Ghent's famous Jazz Festival.



Travel and accommodation

Transport into Ghent is easy, quick and affordable when booked early: travel times by train from London St. Pancras to Brussels South Station are less than 2 hours (www.eurostar.com); Paris Nord - Brussels South is just over an hour (www.nmbs.be). Ghent station is a less than 30 minutes direct train ride away from Brussels South station. Many European and intercontinental airlines fly directly into Brussels Airport, which is easily reached by direct train from Ghent railway station (allow 1 hour). The city of Ghent has a good public transport network, allowing you to get to the hotels and conference venues very quickly and easily. Hotels in the historic city centre typically are within walking distance of the venues.

Registration for the meeting will not include accommodation, and conference participants are responsible for making their own bookings. More details and suggestions to help you make your travel arrangements will become available closer to the meeting (visit our website).

Registration

Registration (online via <http://www.igcp591.ugent.be>) will open on February 12th 2016 and an "early bird" registration (i.e., substantially reduced fees) **deadline is set on March 13th**. Check our website (<http://www.igcp591.ugent.be>) for details as they become available. Fees will be c. €330 for professionals and c. €280 for students (this will cover full registration, lunches, coffee-breaks, and all social events; this will also include access to the workshops on 5 and 8 July, at no additional charge). Registration for the field trip will be limited to 25 participants as it is impossible to take a large coach to the some of the outcrops. In case of over-subscription, the first-come-first-served principle will apply, in combination with criteria that ensure priority for scientists having travelled far, requiring access to specific sites for current research, and/or a fair spread amongst participants across institutes.

IGCP 591 'the early to mid Palaeozoic revolution' closing meeting | 6-9 July 2016 | Ghent - Belgium

Abstract submission

Abstract submission will be via e-mail and instructions for formatting will be available on our website (www.IGCP591.ugent.be) when registration opens. Deadline for submission of abstracts will be April 15th.

Organising Committee

Thijs Vandenbroucke (Ghent University, Belgium)
 Bradley Cramer (University of Iowa, USA)
 Anne-Christine da Silva (Université de Liège, Belgium)
 Mark Williams (University of Leicester, UK)
 Philippe Claeys (Vrije Universiteit Brussel)
 Stephen Louwye (Ghent University, Belgium)
 Yannick Donnadieu (CNRS, France)
 Kurt Blom (Ghent University, Belgium)
 Marc Faure (Ghent University, Belgium)
 Wim Lievens (Ghent University, Belgium)

Scientific committee

Thijs Vandenbroucke (Ghent University, Belgium)
 Bradley Cramer (University of Iowa, USA)
 Michael Melchin (St. Francis Xavier University, Nova Scotia, Canada)
 Jacques Verniers (Ghent University, Belgium)
 Robert Speijer (University of Leuven, Belgium)
 Philippe Claeys (Vrije Universiteit Brussel)
 David Harper (Durham University, UK)
 John Marshall (University of Southampton, UK)

Contact: Thijs.vandenbroucke@UGent.be

Partners and sponsors



PalAss Grant n°: PA-GA201509



The poster features a red background with a faint map of the world at the top. In the upper left corner is the logo for the 35th International Geological Congress, which includes a circular emblem with the text "XXXV GEOLOGORUM CONVENTUS CAPE TOWN 2016 SOUTH AFRICA MENTE ET MALLEO" and two crossed hammers. The main title "35TH INTERNATIONAL GEOLOGICAL CONGRESS" is written in large white capital letters across the center. Below it, the dates "27 AUGUST - 4 SEPTEMBER 2016 | CAPE TOWN, SOUTH AFRICA" are in smaller white text. The lower half of the poster shows a scenic sunset over a coastal landscape with mountains in the background.

SECOND CIRCULAR

April 2015

www.35igc.org

giya ngomhlaba
dance with earth

CRITICAL DATES

31 May 2015	Symposia proposals close
1 July 2015	Opening of abstract submissions, and applications for the GeoHost Support Programme
1 September 2015	'Super Early-bird' registration opens
1 October 2015	Third Circular released
2 November 2015	'Early-bird' registration opens
31 December 2015	Workshop and Short Course proposals close
31 January 2016	Abstract submissions close
1 March 2016	Fourth Circular released
30 March 2016	GeoHost support scheme applications close
31 March 2016	Formal notifications to authors on their abstracts
7 April 2016	Successful GeoHost applicants to be notified
22 April 2016	Volunteer applications close
1 May 2016	Accommodation bookings close
9 May 2016	Successful volunteers notified
31 May 2016	Presenters' registration deadline and Field Trip bookings close
1 June 2016	Standard registrations open and 'Early-bird' registrations close
1 July 2016	Fifth Circular released — preliminary programme
27 August 2016	On-site registration



Relevant Symposia for SDS (and organizers)

Geochronology (Richard ARMSTRONG et al.)

Isotope Geoscience (Adrian BOYCE et al.)

Evolution of the Biosphere and Biogeoscience (Kurt KRONHAUSER)

Palaeontology and Palaeoanthropology (Francis THACKERAY)

Stratigraphy and the Geological Time Scale (James OGG)

For excursions see the IGC Homepage. There is no excursion with a specific Devonian focus.

DEVONIAN PUBLICATIONS

IGCP 596 & IGCP 580 Joint Meeting and Field Workshop, International Symposium in Mongolia

Ulaanbaatar, Mongolia, 5-18th August 2014

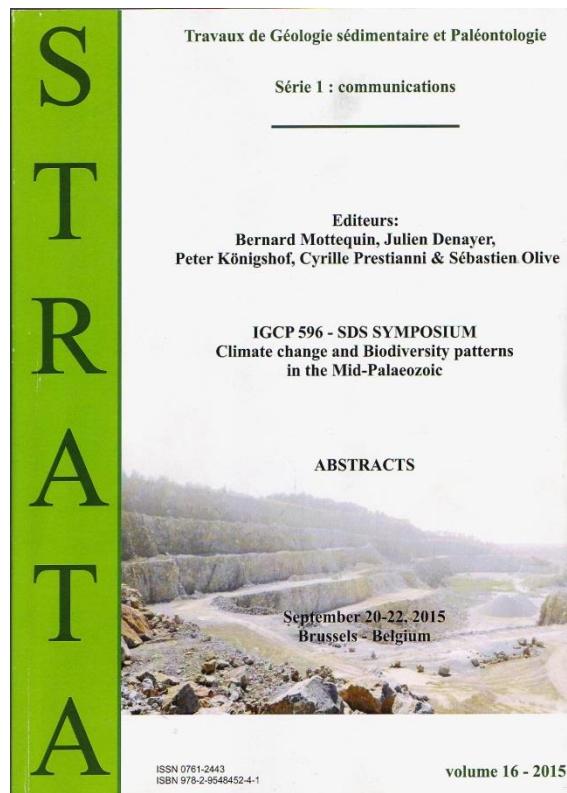
E. KIDO, J. A. WATERS, Y. ARIUNCHIMEG, S. GONCHIGDORI, A. C. DA SILVA, M. WHJALEN, T. J. SUTTNER & P. KÖNIGSHOF (eds), Berichte des Institutes für Erdwissenschaften, Karl-Franzenz-Universität Graz, **19**: 1-65. (free access from Graz institute homepage)

Content

- ARIUNCHIMEG, Y. Devonian biostratigraphy of Mongolia. - p. 13-14.
- ARIUNCHIMEG, Y., NYAMSUREN, G. & ARISTOV, A.V. Devonian/Carboniferous boundary intervals in Mongolia. - p. 15-16.
- BATCHELOR, C.J., DREW, C., CARMICHAEL, S.K. & WATERS, J.A. Zircon age Dating of the Late Devonian Heishantou Formation. - p. 17.
- CARMICHAEL, S.K., WATERS, J.A., SUTTNER, T.J., KIDO, E., BATCHELOR, C.J., DEREUIL, A.A., MOORE, L.M. & SANCHEZ, S.K. Terrane accretion, sediment geochemistry, and ocean anoxia in the Late Devonian: the role of paleogeography and tectonic environment in black shale formation during the Kellwasser and Hangenberg Anoxia Events. - p. 18-20.
- DE VLEESCHOUWER, D., DAY, J.E., GOUWY, S., MACLEOD, K. & CLAEYS, P. Eifelian climatic and environmental change inferred from magnetic susceptibility and stable isotope records: Grand Tower and St. Laurent Formations, southern Illinois Basin (USA). - p. 21.
- DE VLEESCHOUWER, D., DAY, J.E., WHALEN, M. & CLAEYS, P. A high-resolution chronology for the late Frasnian constructed by integrated bio-, chemo-and cyclostratigraphy. - p. 22.
- GATOVSKY, Y.A. Devonian and Carboniferous boundary on the western slope of the Middle Urals. - p. 23-26.
- HUNTER, A.W., RUSHTON, A.W.A. & STONE, P. Protasterid ophiuroid from the Early Devonian of the Fox Bay Formation Falkland Islands; unravelling the missing fossil record of Upper Palaeozoic Asterozoans from Gondwana. - p. 27-28.
- KIDO, E. & SUTTNER, T. Middle Devonian biotic crisis in the Carnic Alps: results of the Project FWF P23775-B17. - p. 29-30.
- KÖNIGSHOF, P., BAHRAMI, A., BONCHEVA, I., YAZDI, M. & EBRAHIMI KHAN-ABADI, A. Devonian and Carboniferous shallow water sections in Central Iran. - p. 31.
- KÖNIGSHOF, P., KOMATSU, T., KATO, S., HIRATA, K., TAKASHIMA, R., OGATA, Y., OBA, M., NARUSE, H., TA HOA, P., NGUYEN, P.D., DANG, H.T., DOAN, T.N., NGUYEN, H.H., SAKATA, S. & KAIHO, K. Devonian-Carboniferous transition in the Paleotethys (Pho Han Formation, Vietnam). - p. 32-33.
- KÖNIGSHOF, P., SUTTNER, T.J., BONCHEVA, I., IZOKH, N.G., TA HOA, P., CHAROENTITIRAT, T., WATERS, J., KIESSLING, W. & KIDO, E. Climate Chance and Biodiversity Patterns in the mid-Palaeozoic (IGCP 596) – introduction and report. - p. 34.
- LIAO, J.-C. & VALENZUELA-RÍOS, J.I. Conodont Biofacies Evolution from the Eifelian to the Middle Frasnian (Middle and Upper Devonian) of the Spanish Central Pyrenees. - p. 35.
- MOTTEQUIN, B. & POTY, E. The uppermost Famennian Hangenberg Event in the Namur-Dinant Basin (southern Belgium). - p. 36-37.
- PAS, D., POULAIN, G., LABBAY, C., DA SILVA, A.C., CORNET, P., DEVLEESCHOUWER, X., DE VLEESCHOUWER, D., HLADIL, J. & BOULVAIN, F. Diversity and correlation of Givetian records in southern Belgium. - p. 38-40.
- SLAVÍK, L., VALENZUELA-RÍOS, J.I., CHADIMOVÁ, L., LIAO, J.-C., HUŠKOVÁ, A. & CALVO, H. High-Resolution correlation of the Lochkovian-Pragian (Lower Devonian) sections in the key regions of peri-Gondwana. - p. 46-47.
- SUTTNER, T.J. & KIDO, E. Conodont distribution across the Kačák crisis from the shallow marine Kellergrat Formation and the pelagic Valentin Formation (Carnic Alps). - p. 49.
- SUTTNER, T.J. & KIDO, E. Evidence for the Lochkov-Prag Event in the Carnic Alps. - p. 50-51.
- TAGARIEVA, R.H. Pathological forms of conodonts of the genus *Palmatolepis* from the Frasnian-Famennian boundary interval (Upper Devonian) in the South Urals. - p. 52.
- VALENZUELA-RÍOS, J.I. & CARLS, P. Lower Devonian Conodont successions from Nigüella (Iberian Chains, Spain) with emphasis on evolutionary events. - p. 55.
- WATERS, J.A., SUTTNER, T.J., KIDO, E. & CARMICHAEL, S.K. Rebound of the Shallow Marine Ecosystem after the Frasnian-

Famennian Extinction Event (Late Devonian) in the Central Asian Orogenic Belt: data from China and Mongolia. - p. 56.

YURYEVA Z.P. Lower and overlying Devonian deposits (northern part of the Timan-Pechora Region, Russia). - p. 58-60.



B. MOTTEQUIN, J. DELAYER, P. KÖNISHOF, C. PERESTIANNI & S. OLIVIE (eds), *Strata, Travaux de Géologie sédimentaire et Paléontologie, Série 1: communications, 16: 1-157 (ISSN0761-2443, ISBN 978-2-9548452-4-1)*. (free access via journal homepage and ResearchGate)

Content

ARIUNCHIMEG, Y. Upper Devonian bryozoans from western Mongolia. - p. 7.

BÁBEK, O., FAMÉRA, M., HLADIL, J., POUKAROVÁ, H. & ŠIMÍČEK, D. Lower Devonian red pelagic carbonates of the Barrandian area, Czech Republic: how red is red and why to bother about? - p. 8-9.

BAHRAMI, A., BONCHEVA, I., KÖNIGSHOF, P., YAZDI, M. & PARSANEJAD, H. Biostratigraphy of the Late Devonian (Famennian) deposits of the Kuh-e-Kaftar section (Chah-Riseh area), Central Iran. - p. 10-11.

BATCHELOR, C., CARMICHAEL, S., WATERS, J., COLEMAN, D., KIDO, E. & SUTTNER, T.

Constraining the ages of Late Devonian Extinction events in the Central Asian Orogenic Belt (COAB): U-Pb zircon ages and igneous petrology. - p. 12-13.

BECKER, R.T., ABOUSSALAM, Z.S., EL HASSANI, A., HARTENFELS, S. & BAIDDER, L. The timing of Eovariscan block faulting, reworking and redeposition in the Moroccan Meseta. - p. 14-15.

BLIECK, A. An Early Devonian peak of biodiversity: the case of heterostracan. - p. 16-17.

BONCHEVA, I., BAHRAMI, A., KÖNIGSHOF, P., YAZDI, M., HOVEIDA, M. & RAZI ALLIPOUR, B. Devonian deposits of Bahram Formation in the Kuh-e-Reza-Abad and the Kuh-e-Shorab sections (southwest Damghan), Central Iran. - p. 18-19.

BRAZEAU, M.D., JERVE, A., SANSOM, R., ARIUNCHIMEG, Y. & ZORIG, E. Devonian vertebrates of Mongolia. - p. 20.

BRETT, C.E., BAIRD, G.C., BARTHOLOMEW, A.J., VER STRAETEN, C. & ZAMBITO, J. Revised Devonian time scales and evidence for variable eustatic, climatic, and biotic volatility: example from the Lower-Middle Devonian of the Appalachian Basin. - p. 21-22.

BRICE, D. & MOTTEQUIN, B. New insights on Uppermost Famennian brachiopods from north-western France (Avesnois). - p. 23-24.

BROCKE, R., KNEIDL, V., RIEGEL, W. & WILDE, V. The Lower Devonian "Hunsrückshiefer" of the Rheinisches Schiefergebirge: new insights from palynology. - p. 25.

BULTYNCK, P. & NARKIEWICZ, K. New data on Middle Devonian conodonts from New York State with emphasis on the Icriodontidae. - p. 26.

CARMICHAEL, S. & WATERS, J. A decade of deciphering the Late Devonian: more answers, but many more questions. - p. 27-29.

CARPENTER, D.K., MARSHALL, J.E.A., BEERLING, D.J. & WELLMAN, C.H. Wildfire activity as a proxy for atmospheric oxygen content during Romer's Gap. - p. 30.

CASIER, J.-G., MAILLET, S. & PRÉAT, A. Ostracods from the Emsian–Eifelian and Eifelian–Givetian boundaries in the Dinant Synclinorium: paleoenvironmental implications. - p. 31-32.

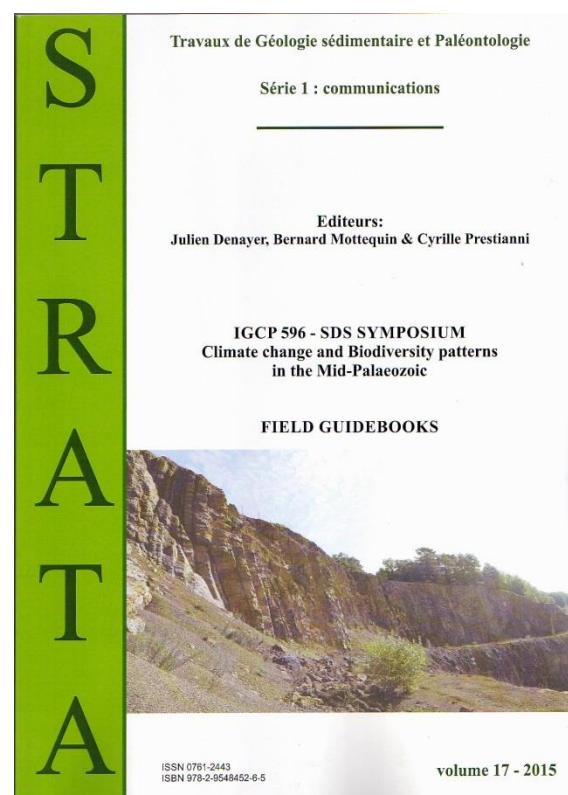
CLACK, J.A. & SMITHSON, T.R. Tetrapod diversity in the Tournaisian. - p. 33-34.

CLÉMENT G., OLIVE S., GUERIAU P., LAGEBRO L., PRESTIANNI C. & DENAYER, J. Assessment on the Late Devonian fauna of Strud, Belgium. - p. 35-36.

- CORRADINI, C., ARETZ, M. & THE WORKING GROUP. The redefinition of the Devonian–Carboniferous boundary: recent developments. – p. 37.
- CRÔNIER, C., KHALDI, A.Y., HAINAUT, G., ABBACHE, A. & OUALI MEHADJI, A. Biodiversity and palaeobiogeographical affinities of Lower Devonian trilobites from Algeria. – p. 38.
- DA SILVA, A.-C., CHADIMOVÁ, L., HLADIL, J., SLAVÍK L., HILGEN, F.J. & DEKKERS, M.J. Unravelling orbital climatic cycles from Devonian magnetic susceptibility signal – The quest for a better age model for the Lochkovian and Pragian stages (Czech Republic). – p. 39.
- DENAYER, J. & MOTTEQUIN, B. Middle and Upper Devonian Events in Belgium: review and new insights. – p. 40-42.
- DENAYER, J. & WEBB, G.E. Post-extinction recovery of the earliest Carboniferous rugose corals, a glimpse from eastern Australia. – p. 43.
- DERYCKE, C., MAILLET, S., VACHARD, D., RANDON, C., NICOLLIN, J.-P., ARMYNOT DU CHÂTELET, E., CRÔNIER, C., HUBERT, B., RECOURT, P. & ABBACHE, A. Palaeoenvironmental input of new faunas from Upper Famennian levels at Ouarourout (Ougarta, Algeria). – p. 44-45.
- DREESEN, R., VACHARD, D., MARION, J.-M. & MOTTEQUIN, B. The Red Marble of Baelen, an exceptional mid-Famennian mud mound complex in a carbonate ramp setting from Eastern Belgium. – p. 46-47.
- EVDOKIMOVA, I.O. New data on the Frasnian ostracods from the Middle Timan Region, Russia: taxonomy, biostratigraphy, palaeoecology. – p. 48-49.
- FARABEGOLI, E., JOACHIMSKI, M.M., PERRI, M.C., PONDRELLI, M. & SPALLETTA, C. Physical and biological events across the Frasnian–Famennian boundary in oxic carbonate successions in the Carnic Alps (Italy–Austria). – p. 50.
- GATOVSKY, Y.A. Famennian–Tournaisian boundary on the western slope of the South Urals, Russia: new look. – p. 51-52.
- GIESEN P. & BERRY C.M. A reassessment of the Lindlar Flora (Devonian, Mid Eifelian), Germany. – p. 53-54.
- GIRARD, C., CHARRUAULT, A.-L., CORRADINI, C., CORNÉE, J.-J., WEYER, D., BARTZSCH, K. & FEIST, R. Paleoenvironmental trends in two Famennian sections of “Galantian” Superterrane: Col des Tribes (Montagne Noire, France) and Buschteich (Thuringia, Germany). – p. 55-56.
- GLINSKIY, V. & IVANOV, A. The assemblages of psammotid agnathans from the Middle-Late Devonian of the Andoma Hill (Russia). – p. 57-59.
- GONCHIGDORJ, S. & KIDO, E. Tabulate corals from the Samnuuruul Formation (Upper Devonian) in southwestern Mongolia. – p. 60.
- GOOLAERTS, S. & GOUWY, S. The Lahonry quarry at Lompret, Belgium: an extraordinary new site to study Upper Frasnian cephalopods during the onset of anoxia in the Dinant Basin. – p. 61-62.
- GOUWY, S. & GOOLAERTS, S. Upper Frasnian deposits at the Lahonry quarry (Lompret, Belgium): conodont biostratigraphy, microvertebrates and bentonites. – p. 63.
- GOUWY, S., LIAO, J.-C. & VALENZUELA-RÍOS, J.I. Upper Eifelian–Lower Frasnian (Middle–Upper Devonian) conodont biostratigraphy improved by graphic correlation in the Spanish Central Pyrenees. – p. 64.
- GUERIAU, P. The early continental aquatic arthropod fauna from the Late Devonian of Strud, Belgium: implications for terrestrialization strategies. – p. 65.
- HARTENFELS, S. & BECKER, R.T. Revised conodont stratigraphy of the famous Ballberg section (Famennian, Rhenish Massive, Germany). – p. 66-67.
- HELLING, S. & BECKER, R.T. A new Pragian trilobite assemblage from Aïn-Al-Aliliga (western Meseta, NW Morocco). – p. 68-69.
- HUŠKOVÁ, A., SUTTNER, T.J., SLAVÍK, L., VALENZUELA-RÍOS, J.I., LIAO, J.-C., GATOVSKY, Y.A., ARIUNCHIMEG, Y., KIDO, E., GONCHIGDORJ, S., WATERS, J.A., CARMICHAEL, S.K. & BATCHELOR, C. Late Devonian conodonts of western Mongolia: preliminary results. – p. 70.
- JANSEN U. Brachiopod diversity, biofacies and events of the Rhenish Lower Devonian (Germany). – p. 71-72.
- JIANG Q., XU H.-H., WANG Y & FENG J. Aneurophytalean plants from the Middle Devonian of North Xinjiang, China and their ecosystematic inference in the associated Hujiersite flora. – p. 73.
- KÖNIGSHOF, P., BAHRAMI, A., BONCHEVA, I., YAZDI, M. & TALEBI TORGHABEH, E. Middle to Late Devonian carbonate ramp sedimentation in Central Iran (Zefreh section, NE Isfahan). – p. 74.
- KÖNIGSHOF, P., PHUONG, T.H., CARMICHAEL, S., WATERS, J., BATCHELOR, C. & KOMATSU, T. Events in the Mid-Palaeozoic: examples from

- the eastern Palaeotethys (NE Vietnam). – p. 75-76.
- KUMPAN, T., BÁBEK, O., KALVODA, J., MATYS GRYGAR, T. & FRÝDA, J. High-resolution stratigraphy of the Devonian-Carboniferous boundary in Europe: multidisciplinary approach. – p. 77-78.
- KURILENKO, A.V. & MININA, O.R. The correlation of Devonian deposits of Eastern and Western Transbaikal (Eastern Russia). – p. 79-80.
- LUKŠEVIČS, E. The latest Famennian vertebrate and trace fossils from the Ketleri site, Latvia. – p. 81-82.
- LUKŠEVIČS, E. & STINKULIS, G. Signatures of biotic crisis in the Frasnian–Famennian boundary beds from Latvia. – p. 83-84.
- MAILLET, S., DANELIAN, T., MONNET, C., CRÔNIER, C. & MILHAU, B. Biodiversity changes of ostracods across the late Mid-Devonian global Taghanic biocrisis. – p. 85-86.
- MAILLET, S., MILHAU, B., VREULX, M. & SÁNCHEZ DE POSADA, L.-C. Givetian ostracods of the Candás Formation (Asturias, north-western Spain): taxonomy, stratigraphy, palaeoecology, relationship to global events and palaeogeographical implications. – p. 87-88.
- MALTI, F.Z., BENYOUCEF, M., SAMAR, L. & SID HOUN, R. The Devonian–Carboniferous boundary in the Saoura Valley (western Algerian Sahara). – p. 89-90.
- MANCHUK, N. & KAZUHIRO, T. The Siluro-Devonian age confirmation based on radiolarian biostratigraphy and zircon dating. – p. 91.
- MARSHALL, J.E.A. An early Carboniferous palaeoclimate record from East Greenland. – p. 92-93.
- MATYJA, H., SOBIEŃ, K., MARYNOWSKI, L., STEMPIEŃ-SAŁEK, M. & MAŁKOWSKI, K. The expression of the Hangenberg Event (Latest Devonian) in a relatively shallow-marine succession in Poland. – p. 94.
- MAVRINSKAYA, T.M. & ARTYUSHKOVA, O.V. Conodonts from Pragian and Emsian boundary intervals in different facies of the South Urals. – p. 95-97.
- MEYER-BERTHAUD, B., DECOMBEIX, A.-L., DUNSTONE, R., GERRIENNE, P., MOMONT, N. & YOUNG, G. New Middle to early Late Devonian aneurophytales showing dissected appendages from southeastern. – p. 98.
- MILLWARD, D., DAVIES, S.J., BENNETT, C.B., KEARSEY T., BROWNE, M.A.E., SHERWIN, J., CURTIS, R. & BRAND, P. Environment and habitat variation on the Tournaisian (early Carboniferous) coastal plain of northern Great Britain. – p. 99-100.
- MOTTEQUIN, B. & DENAYER, J. Pridolian–Lochkovian macrofaunas from southern Belgium and northern France: de Koninck (1876) revisited. – p. 101-102.
- MOTTEQUIN, B. & SIMON, E. Diversity of athyridide brachiopods during the Late Devonian–Tournaisian in southern Belgium. – p. 103-104.
- MUNKHJARGAL, A. Devonian trilobites from The Samnuuruul Formation in the Baitag Bogd area (western Mongolia). – p. 105.
- NARKIEWICZK., NARKIEWICZN., BULTYNCKP. & KRZEMIŃSKA, E. Conodont biostratigraphy, biofacies and apatite isotope records of the late Eifelian Kačák Event in the shallow marine Belarusian. – p. 106-108.
- NAVAS-PAREJO, P. & KÖNIGSHOF, P. Devonian and Carboniferous shallow-water successions from Sonora (NW Mexico) and their importance in global event studies. – p. 109-110.
- NAVAS-PAREJO, P., SANDBERG, C.A. & POOLE, F.G. Paleogeographic implications of early Famennian *crepida* Zone conodont faunas, Sonora, NW Mexico. – p. 111-112.
- NIKOLAEVA, S., KIM, A. & ERINA, M. Early Devonian ammonoids from Shakhimardan (South Tien-Shan). – p. 113-114.
- OLIVE, S. What's new with the Famennian vertebrate fauna from Belgium? – p. 115-117.
- PONCIANO, L.: Devonian fossils of the Amazonas and Parnaíba basins, Brazil. – p. 118-119.
- PONCIANO, L. & CARVALHO, M. Devonian trilobites of the Amazonas and Parnaíba basins. – p. 120.
- POTY, E., MOTTEQUIN, B. & DENAYER, J. Orbitally forced sequences and climate reconstruction around the Devonian–Carboniferous boundary, and the Hangenberg Extinction Event. – p. 121.
- PRESTIANNI, C., GESS, R., RUSTÁN, J.J., BALSEIRO, D., VACCARI, E. & STERREN, A.F. Continental ecosystems at high palaeolatitude before and after the Devonian–Carboniferous boundary: two examples from South Africa and Argentina. – p. 122.
- REEVES, E. (and team TW:eed). Vegetational recovery on an Early Carboniferous coastal plain following the End Devonian Mass Extinction Event. – p. 123.
- RUSTÁN, J.J., VACCARI, E. & BALSEIRO, D. Infaunal molting in Mid Paleozoic trilobites: new insights based on data from South America. – p. 124-125.
- SARDAR ABADI M., KULAGINA, E., VOETEN DENNIS, F.A.E., DA SILVA, A.-C. & BOULVAIN,

- F. Foraminiferal proliferation in the Alborz basin (Northern Iran): global response to Carboniferous glaciations. – p. 126-127.
- SCHINDLER, E., GEREKE, M., PIECHA, M., LUPOOLD, F.W. & STOPPEL, D. The Kellwasser type locality in the Harz Mountains (Germany) revisited – new results after widening of the classical outcrop. – p. 128-129.
- SLAVÍK, L., HLADIL, J., CHADIMOVÁ, L., VALENZUELA-RÍOS, J.I., HUŠKOVÁ, A. & LIAO, J.-C. Cooling or warming in the Pragian? The sedimentary records and petrophysical logs from the key peri-Gondwanan sections. – p. 130-131.
- SMITHSON, T., RICHARDS, K. & CLACK, J. ROMER'S Gap: the beginning of the modern fish. – p. 132-133.
- SOBOLEVA, M., SOBOLEV, D. & KÖNIGSHOF, P. Conodont stratigraphy of Frasnian deposits of the western slope of the Polar Urals - p. 134.
- SPALLETTA, C., PERRI, M.C., CORRADINI, C. & OVER, J.D. Proposed revision of the Famennian (Upper Devonian) standard conodont zonation. – p. 135-136.
- STEPHENSON, C., BOND, D. & ROGERSON, M. Palynology and palaeobotany of the Devonian Samnuuruul Formation, western Mongolia – an update. – p. 137.
- STICHLING, S., ABOUSSALAM, Z.S., BECKER, R.T., EICHHOLT, S. & HARTENFELS, S. Event-controlled reef drowning and extinction in the Hönne Valley (northern Rhenish Massif, Hagen-Balve reef complex. - p. 138-139.
- STREEL, M. Palynomorphs (miospores, acritarchs, prasinophytes) before and during the Hangenberg crisis. – p. 140-143.
- TONAROVÁ, P., VODRÁŽKOVÁ, S. & FERROVÁ, L. Microfossils across the Daleje Event (Lower Devonian, Emsian) from the Pekárek Mill section (Prague Basin, Czech Republic). – p. 144-145.
- VALENZUELA-RÍOS, J.I., LIAO, J.C. & CALVO, H. Achievements in the Pyrenean Lochkovian conodont evolution and biodiversity and its global role in correlations: from Graz 2011 to Brussels 2015, an IGCP-596 ongoing Research. – p. 146-147.
- VODRÁŽKOVÁ, S., VODRÁŽKA, R., MUNNECKE, A., TONAROVÁ, P. & FRANCŮ, J. Microbial activity exemplified by wrinkle structures in the Middle Devonian siliciclastics of the Prague Basin, Czech. – p. 148.
- WATERS, J., SUTTNER, T., KIDO, E. & CARMICHAEL, S. Echinoderm ecosystem rebound and diversification after the Frasnian–Famennian extinction: data from the Central Asian Orogenic belt. – p. 149-150.
- XU, H.H., JIANG, Q. & WANG, Y. On the Mid Devonian Hujiersite flora from west Junggar, Xinjiang (China) and its characteristics, age and palaeoenvironment. - p. 151.
- ZAMBITO, J. & DAY, J. Integrated stratigraphic analysis of the Middle Devonian (late Givetian) Geneseo Event in the Appalachian and Michigan basins. – p. 152-153.
- ZAMBITO J., DAY, J. & NARKIEWICZ, K. New insights into the trilobite and conodont biostratigraphy of the Middle–Upper Devonian Genesee Group in eastern New York State. – p. 154.



J. DELAYER, B. MOTTEQUIN & C. PERESTIANNI (eds), *Strata, Travaux de Géologie sédimentaire et Paléontologie, Série 1: communications, 17: 1-81 (ISSN 0761-2443, ISBN 978-2-9548452-6-5)*. (free access via journal homepage)

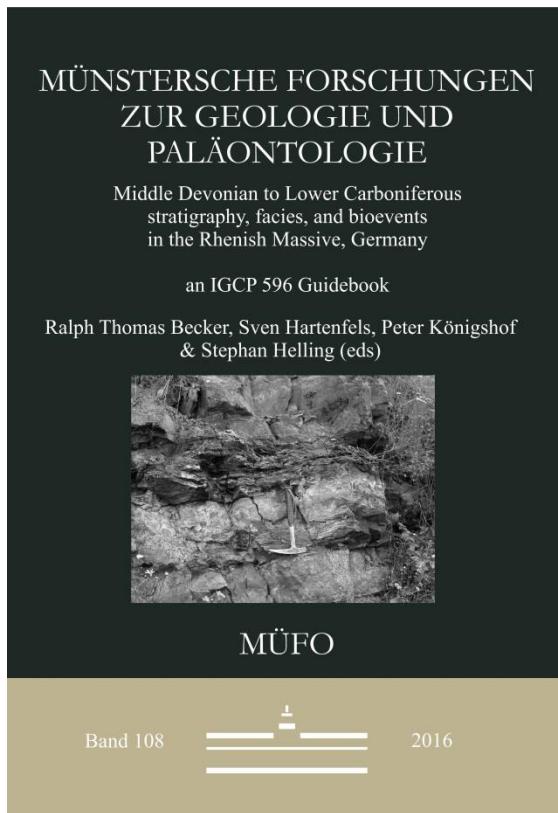
Content

- DENAYER, J., MOTTEQUIN, B., MARION, J.-M., DEVLEESCHOUWER, X. & PRESTIANNI, C. The Middle Devonian succession in the Dinant Synclinorium. - p. 3-23.
- MOTTEQUIN, B., DENAYER, J., POTY, E. & DEVLEESCHOUWER, X. Middle to Upper

- Frasnian succession, Kellwasser events and the Frasnian–Famennian Boundary in the Namur–Dinant Basin. – p. 24–43.
- DENAYER, J., MOTTEQUIN, B., DREESEN, R., MARION, J.-M., OLIVE, S. & PRESTIANNI, C. The Famennian succession: marine, continental and reefal facies in the Dinant Synclinorium and Vesdre area. – p. 46–58.
- DENAYER, J., PRESTIANNI, C., SAUTOIS, M., POTY, E. & MOTTEQUIN, B. The Devonian – Carboniferous Boundary and the Lower Carboniferous succession in the type area. – p. 59–81.
- FORTHCOMING:**
Devonian Climate, Sea Level and Evolutionary Events
- BECKER, R. T., KÖNIGSHOF, P. & BRETT, C. E.** (eds), Geological Society, London, Special Publications, vol. **423** (online access requires subscription to the Lyell Collection).
- Content** (partly published online, see doi)
- SUTTNER, T.J. & KIDO, E. Distinct sea-level fluctuations and deposition of a megaclast horizon in the neritic Rauchkofel Limestone (Wolayer area, Carnic Alps) correlate with the Lochkov–Prag Event. – 13 pp. [doi.org/10.1144/SP423.1]
- MASHALL, J.E.A. Palynological calibration of Devonian events at near-polar palaeolatitudes in the Falkland Islands, South Atlantic. – ca. 25 pp.
- JANSEN, U. Brachiopod faunas, facies and biostratigraphy of the Pridolian to early Eifelian succession in the Rhenish Massif (Rheinisches Schiefergebirge, Germany). – ca. 70 pp.
- BROCKE, R., FATKA, O., LINDEMANN, R.H., SCHINDLER, E. & VER STRAETEN, C. Palynology, dacryconarids and the lower Middle Devonian Basal Chotec Event: Case studies from the Prague and Appalachian Basins. – ca. 40 pp. [doi.org/10.1144/SP423.4]
- KÖNIGSHOF, P., DA SILVA, A.C., SUTTNER, T.J., KIDO, E., WATERS, J., CARMICHAEL, S.K., JANSEN, U. & SPASSOV, S. Shallow-water facies setting around the Kacák Event: a multidisciplinary approach. – 29 pp. [doi.org/10.1144/SP423.4]
- NARKIEWICZ, K., NARKIEWICZ, M. & BULTYNCK, P. Conodont biofacies of the Taghanic transgressive interval (middle Givetian): Polish record and global comparisons. – 22 pp. [doi.org/10.1144/SP423.2]
- ZAMBITO, J.J., JOACHIMSKI, M.M., BRETT, C.E., BAIRD, G.C. & ABOUSSALAM, Z.S. A carbonate carbon isotope record for the late Givetian (Middle Devonian) global Taghanic Biodcrisis in the type region (northern Appalachian Basin). – 11 pp. [doi.org/10.1144/SP423.7]
- MOTTEQUIN, B. & POTY, E. Kellwasser horizons, sea-level changes and brachiopod-coral crises during the late Frasnian in the Namur-Dinant Basin (southern Belgium): a synopsis. – 16 pp. [doi.org/10.1144/SP423.6]
- MCNAMARA, K.J. & FEIST, R. The effect of environmental changes on the evolution and extinction of Late Devonian trilobites from the northern Canning Basin, Western Australia. – 21 pp. [doi.org/10.1144/SP423.5]
- HAIRAPETIAN, V., ROELOFS, B.P.A., TRINAJSTIC, K.M. & TURNER, S. Famennian survivor thuriiniid thelodonts of North and East Gondwana. – 17 pp. [doi.org/10.1144/SP423.3]
- HARTNFELS, S. & BECKER, R.T. The global Annulata Events – review and new data from the Rheris Basin (northern Tafilalt) of SE Morocco. – ca. 45 pp.
- BECKER, R.T., KAISER, S.I. & ARETZ, M. Review of chrono-, litho- and biostratigraphy across the global Hangenberg Crisis and Devonian–Carboniferous Boundary. – 32 pp. [doi.org/10.1144/SP423.10]
- KAISER, S.I., ARETZ, M. & BECKER, R.T. The global Hangenberg Crisis (Devonian–Carboniferous transition): review of a first-order mass extinction. – 50 pp. [doi.org/10.1144/SP423.9]
- LAKIN, J.A., MARSHALL, J.E.A., TROTH, I. & HARDING, I.C. Greenhouse to icehouse: A biostratigraphic review of latest Devonian – Mississippian glaciations and their global effects. – ca. 30 pp.

FORTHCOMING:
Middle Devonian to Lower
Carboniferous stratigraphy, facies, and
bioevents in the Rhenish Massive,
Germany

R. T. BECKER, S. HARTENFELS & P. KÖNIGSHOF (eds), Münstersche Forschungen zur Geologie und Paläontologie, **108**: ca. 250 pp. (extended field guide of post-conference excursion, 23th-29th September 2015, Final Meeting of IGCP 596, Brussels –25-30 €, orders from April 2016 on via email to S. HARTENFELS, Münster)



Content

- KÖNIGSHOF, P., BECKER, R.T. & HARTENFELS, S. The Rhenish Massive as part of the European Variscides.
 ABOUSSALAM, Z.S. & BECKER, R.T. A lower Frasnian reef drowning episode

("Grenzschiefer") at Walheim (Aachen region, Inde Syncline, NW Rhenish Massive).

BECKER, R.T. & WEBER, H.M. The Devonian-Carboniferous transition in the Aachen region (western Rhenish Massive).

KÖNISHOF, P., HELLING, S., HARTENFELS, S., DE VLEESCHOUWER, D., SCHREIBER, G. & BECKER, R.T. Eifel Synclines.

HARTKOPF-FRÖDER, C. & WEBER, H. M. From Emsian deltas to Frasnian reefs and lagoons

BECKER, R.T., ABOUSSALAM, Z.S., HARTENFELS, S., NOWAK, H., JUCH, D. & DROZDZEWSKI, G. Drowning and sedimentary cover of the Velbert Anticline reef complexes (northwestern Rhenish Massive).

HARTENFELS, S., HARTKOPF-FRÖDER, C., HERBIG, H.-G., BECKER, R.T. & ESTEBAN LÓPEZ, S. Middle Famennian to Viséan stratigraphy at Riescheid (Herzkamp Syncline, Rhenish Massive)

BECKER, R.T., ABOUSSALAM, Z.S., STICHLING, S. & EICHHOLT, S. The Givetian-Frasnian Höhne Valley reef complex (northern Sauerland) – an outline of stratigraphy and facies development.

HARTENFELS, S. & BECKER, R.T. Famennian sedimentation, faunas, and event stratigraphy at Effenberg Quarry (Remscheid-Altena Anticline, Rhenish Massive).

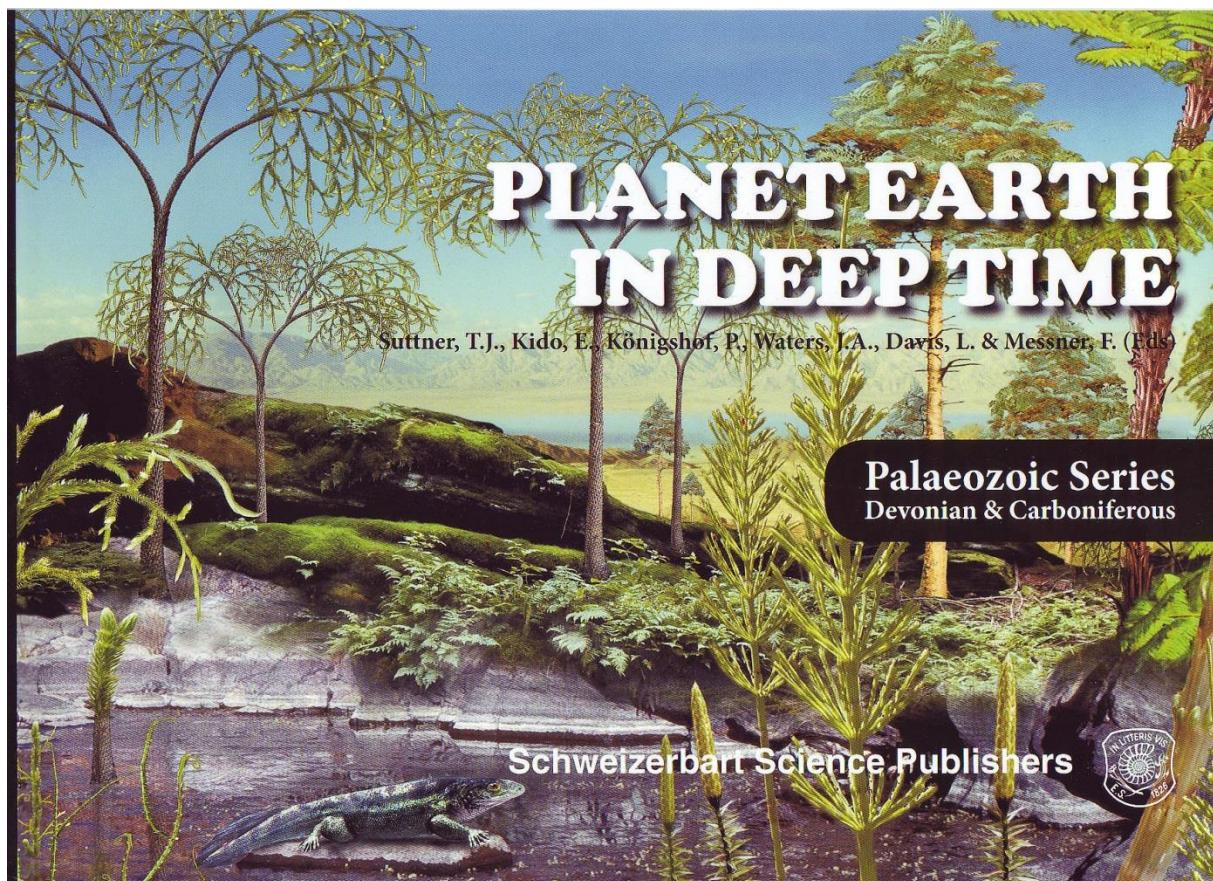
BECKER, R.T., HARTENFELS, S., WEYER, D. & KUMPAN, T. The Famennian to Lower Viséan at Dreher (northern Rhenish Massive).

BECKER, R.T., HARTENFELS, S., HELLING, S. & SCHREIBER, G. The „Nehden Goniatite Shale“ (lower Famennian, Brilon Reef Complex, NE Rhenish Massive).

HARTENFELS, S., BECKER, R. T. & ABOUSSALAM, Z.S. Givetian to Famennian stratigraphy and events at Beringhausener Tunnel (Messinghausen Anticline, eastern Rhenish Massive).

BECKER, R.T., PIECHA, M. & GEREKE, M. The Frasnian/Famennian boundary in shelf basin facies north of Diemelsee-Adorf.

KÖNIGSHOF, P. Southeastern Rhenish Massive (Lahn Syncline and allochthonous units).



IGCP 596 popular sciences book, 261 pp., ISBN 978-3-510-65335-5

MEMBERSHIP NEWS

CM Olga ARTYUSHKOVA and the Ufa Group

In 2014 summer there was a short field trip to examine the Pragian-Emsian conodont succession within the Mayaktau Cliff limestones. The Mayaktau structure is located in the north of the Western slope of the South Urals, bordering on Middle Urals. In the modern relief it's a tectonic cliff – a part of the Bardym allochthon (Ufimian amphitheatre). It consists of primary siliceous rocks in a frame of Famennian and Carboniferous flyshoid deposits.

In publications of the nineteen fifties-seventies, the Ordovician and Silurian were proven based on faunal finds (brachiopods and graptolites, respectively). In the eighties, the first Middle Devonian conodonts were found by Kirill IVANOV (1983).

In the past two years several locations with conodonts in cherts and limestones were discovered. Our results helped to find out that in the southern part of the Mayaktau Cliff there is an imbricated structure that consist of some slices of Ordovician (Sandbian) and early Upper Devonian

fragments. Devonian deposits are represented by grey, green-grey, and black cherts with deep-water limestones and siliceous-clastic beds among them.

The results of detailed conodont biostratigraphy of the Lower Devonian interval (upper Lochkovian, upper Pragian and lower Emsian) are interesting. This interval is established in outcrops of limestones in thickness of a few meters. Commonly they are light grey and grey microbioclastites with feeble bedding.

In a single location, with a thickness of 2.5 m, several stratigraphic intervals are established. The upper Pragian is a tentaculitic limestone with *Pandorinellina miae* (BULTYNCK), *Pseudogondwania kindlei*, *Pelekysanthus ex gr. serratus* JENTZSCH, and *Pedavis cf. klappereri* (BARDASHEV) in samples M-401 – 408, thickness 0.6 m. The Pragian-Emsian boundary interval yielded *Pand. miae*, *Ped. mariannae* LANE & ORMISTON, and *Polygnathus pirenaeae* BOERSMA in samples M-409, 411-412, thickness 0.4 m. The base of the Emsian contains *Pandorinellina cf. miae*, *Po. kitabicus* YOLKIN, WEDDICE, IZOKH & ERINA, *Po. pirenaeae*, *Po. sokoloviformis* morph a, and *Po. sokolovi* YOLKIN, WEDDICE, IZOKH & ERINA, samples M-413 – M-415, 0253, thickness 0.3 m.

The uppermost part of an outcrop above a non-sampled interval (0.7 m) is formed by thick-bedded

bioclastic, silicified limestones with an upper Emsian conodont complex: *Po. cf. cracens* ZIEGLER, KLAPPER & MASHKOVA, *Pol. foliformis* SNIGIREVA, *Po. aff. linguiformis bulytyncki* WEDDIGE, *Po. cf. serotinus* TELFORD, samples M-416-418, 02539.

The limestones are overlain by bedded, bluish-grey and dark-grey cherts with ultra-thin pelitic films on bedding surfaces. There are taxonomically diverse and abundant upper Eifelian conodonts: *Po. ex gr. costatus* KLAPPER, *Po. cf. latus* WITTEKINDT, *Po. ex gr. linguiformis* HINDE, *Po. trigonicus* BISCHOFF & Ziegler, *Tortodus cf. intermedius* (BULTYNCK) *T. cf. kockelianus kockelianus* (BISCHOFF & ZIEGLER). Thus this section is one of few ones in the South Urals where we can see a conodont succession from the Pragian to Eifelian. It gives hope to fill current gaps between *Po. kitabicus* and *Po. serotinus* appearances.

Publications

ARTYUSHKOVA, O.V. & MASLOV, V.A. О возрасте кремнисто-терригенной толщи, подстилающей зилаирскую свиту в Восточно-Зилаирской зоне (Южный Урал) // Geology, minerals and geoecology problems of Baschkortostan, Urals and adjacent territories. - Preceedings of the 10th Inter-Regional theoretical and practical conference, Ufa, 13-15 May.

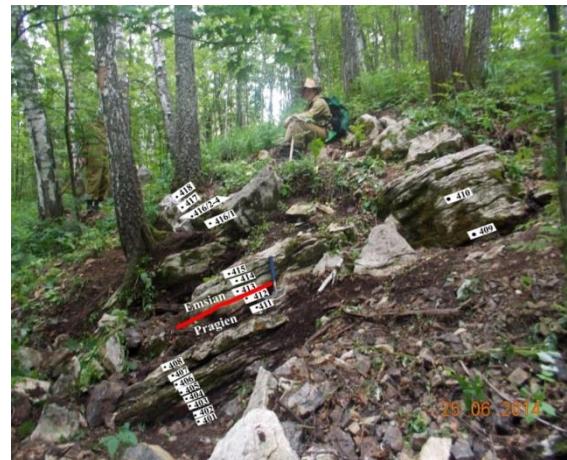
TAGARIEVA, R.C. 2014. Lower Famennian conodont zonation in deposits of Kuk-Karauk section (South Urals). Geology, geoecology and resource potential of Urals and adjacent territories. - Proceedings of the II All-Russian youth geological conference. Ufa, October 2014: 190-194, Ufa, DesignPress.

TAGARIEVA, R.C. 2014. Pathological forms of conodonts of the genus *Palmatolepis* from the Frasnian-Famennian boundary interval (Upper Devonian) in the South Urals. - Berichte des Institutes für Erdwissenschaften der Karl-Franzenz-Universität Graz. **19:** 52.

ARTYUSHKOVA, O.V. 2014. Devonian conodonts from volcano-siliceous deposits in Magnitogorsk megazone, South Urals. - Ufa: DesignPress, 152 pp.

AVRINSKAYA, T.M., SAVELYEVA, E.N. & SHUMATBAEV, K.D. 2015. Lithology and biostratigraphy of the Upper Silurian and Lower Devonian sediments: well data from Roman Trebs Oil Field. - : Neftyanoe Khozyaistvo - Oil Industry, **4**.

TAGARIEVA, R.C. & MIZENS, A.G. 2015. Sections in the western slope of the South Urals perspective for the choice of the Famennian Regional stratotype point. - Lithosphaera, **2**.



northern Ohio and adjacent Pennsylvania. - Geological Society of America, Abstracts with Programs, **46** (2): 22, Lancaster.

TM R. Thomas BECKER and the Münster Group

Research in 2014 and early 2015 concentrated on the completion of the joint DFG-CNRST Maroc research programme, with Sarah and Ahmed EL HASSANI as co-leaders, on "Eovariscan evolution of the southern and northern Prototethys: high-resolution stratigraphy, facies developments, biogeography, and geodynamic interpretation". In the past four years it also involved on the German side Stephan EICHHOLTZ, Stephan HELLING, Sven HARTENFELS, Heiko HÜNEKE and Christoph HARTKOPF-FRÖDER, on the Moroccan side also Lahcen BAIDER, Mustafa BENFRINKA, Fouad EL KAMEL, and Abdelfatah TAHIRI. Denice BRICE kindly identified brachiopods for us. In total, more than 400 conodont samples were taken from 52 localities in 30 regions of the Meseta and Atlas realm (Fig. 1), which cover the Lochkovian to Tournaisian. Accidentally also the top Viséan, since one supposed Givetian reef locality south of Marrakesch turned out to contain advanced *Mestognathus* (and no reef organisms at all).

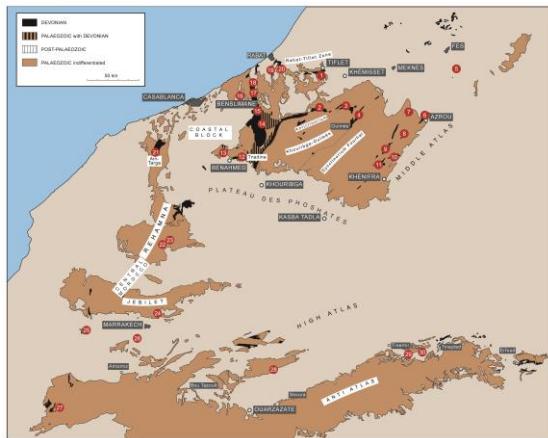


Fig. 1. Position of the more than 30 Devonian regions sampled in the frame of the joint DFG-CNRST Maroc programme in 2011-2015 (red dots).

We have started to write summary papers on the timing and extinction of Meseta Devonian reefs, on the age of Eovariscan reworking and re-deposition phases, and on the palaeogeographical evolution of the region in the context of plate tectonics across the Gondwana-Laurussia transition (western Prototethys). However, the wealth of new data on regional stratigraphy, structural geology, conodont and ammonoid faunas is too vast to be incorporated. Therefore, there are plans for a special issue of the "Notes et Mémoires" series of the Geological Survey of Maroc. This certainly will

take some time. The best or most interesting new ammonoid faunas of the Meseta are from the Oued Aricha (Famennian IV), Boudouda N of Benahmed (upper Frasnian), and from the isolated Immouzerdu-Kandar south of Fes (upper Emsian, upper Givetian, upper Frasnian, basal Famennian).

For the comparison of the external southern and northern Variscides, varied detailed work also continued in the Rhenish Massive. There was a focus on the Aachen Devonian, on the Bergisches Land, and on the eastern Sauerland (Nehden, Dreier, Beringhausener Tunnel, Martenberg, Winsenberg Road Section, Schmidt Quarry). Many new and partly preliminary results will be presented during the planned post-symposium excursion in conjunction with the IGCP 596-SDS meeting in Brussels. At the Wülfrath and Hofermühle Reef Complexes (Velbert Anticline) we enjoyed the good cooperation with the Rheinkalk GmbH, Dierk JUCH, Günter DROZDZEWSKI (both formerly from the Krefeld Survey), and with various amateur collectors, such as Thomas MAGIERA and Carlo HERD.

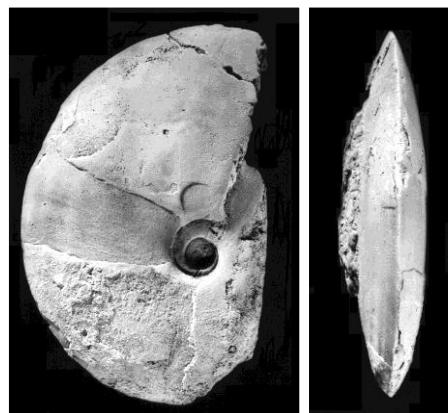


Fig. 2. *Petteroceras* n. sp. from Ouidane Chebbi.

Together with Jürgen BOCKWINKEL studies of the rich upper Givetian goniatite faunas of the Anti-Atlas were continued. A third pharciceratid contribution dealt with the mixed pelagic-neritic assemblages of the northern Maider (Ait-ou-Amar, BOCKWINKEL et al. 2015). This enabled a comparison with the previously described faunas of roughly the same age of the deeper Tafilelt Basin (Hassi Nebech). It is possible to identify taxa that are more generalists (tornoceratids) and forms that preferred a deeper habitat (e.g., *Synpharcicera*). Subsequently, we started to work on the rich pelagic platform assemblages of Ouidane Chebbi at the eastern margin of the Tafilelt (Fig. 2). Jürgen is also leading joint investigations of new middle Famennian ammonoid faunas from a previously unknown shale unit between lower Famennian crinoidal limestones and the overlying, famous, shallow-water Velbert Formation (Hofermühle region, new motorway building site).

A further important topic are our studies around the Devonian-Carboniferous boundary. The publication of our Lalla Mimouna faunas from the northern Maider is delayed because Harald TRAGELEHN, after his stroke, still could not finish his monograph on the “siphonodelloids” of Franconia and Thuringia. We found many representatives of this group in the latest Famennian (*Kalloclymenia* Limestone) of the Tafilalt (HARTENFELS & BECKER in prep.). But we were unsuccesfull to find new relevant D-C sections in the Moroccan Meseta. In the Rhenish Massive, together with the Cologne group around Hans-Georg HERBIG, we started to revise the type section of the Wocklum Limestone at the Borkewehr near Wocklum, where the weathered Hangenberg Blackshale has a very sharp base. Together with Tomás KUMPAN, Jirí KALVODA, Ondrey BÁBEK, JIRÍ FRYDA, and Tomás GRYGAR, classical Rhenish D/C boundary sections where re-studied using modern techniques, such as magneto-susceptibility, gamm ray spectroscopy, and element geochemistry (KUMPAN et al. 2015). Thomas joint Sandra KAISER and Markus ARETZ to write a detailed review of the global Hangenberg Crisis, which will be published in the IGCP 596-SDS volume (KAISER et al. in press). Based on a review of all published D-C sections, it will include a new model for this sixth 1st order Phanerozoic mass extinction that combines all available evidence. But it will also highlighten the many still open questions and future research directions. The review of D-C litho- and biostratigraphy has been extracted and will be published as a separate chapter in the same volume (BECKER et al. in press). This summary evaluates the proposed possible future D/C GSSP levels, with the conclusion that the main extinction at the onset of the global black shale event, the “natural boundary” of O.H. WALLISER, has still/currently the best practical potential.



Fig. 3. The re-sampled top of the Wocklum Limestone and overlying Hangenberg Blackshale at Oberrödinghausen.

Other work will have new data on the Brewer (BECKER et al. in prep.) and Oberrödinghausen sections (Fig. 3, M.Sc. M. SACHER). Jointly with MA Xueping a new Hangenberg Blackshale locality in South China will be published.

In addition there are various smaller projects, such as the first documentation of Upper Devonian global events in Bulgaria (BONCHEVA et al. 2015), new Emsian ammonoids from Victoria (with Clem EARL), stratigraphical data for Emsian ostracod faunas from southern Morocco (DOJEN et al. in prep), and, still not finished, new upper Givetian to basal Frasnian ammonoids from the Rudnyi Altai. At the International Cephalopod Symposium in Zürich, new data on prionoceratids (FISCHER & BECKER 2014) and on the origin and phylogeny of the Gephyroceratina were presented (BECKER 2014).

Research students: **Achim SCHWERMANN** finished his systematic screening of our hundreds of Moroccan conodont samples for shark teeth, in order to document their regional distribution patterns in time and space. Besides wide-spread *Phoebodus*, *Omalodus*, *Thrinacodus*, *Jalodus*, *Denea*, *Cladodus*, *Proacrodus*, and *Stethacanthus* species, he also found *Squatinaactis*, *Orodus* and *Arduodens*. In addition, there are some rare and new teeth, including a new genus. To our surprise, there is not a single pre-Givetian shark tooth; the group did not populate main Gondwana in Lower Devonian to Eifelian times.

Sebastian POMMERERING continued previous studies of the Münster Group on the palaeopathology of mid-Palaeozoic ammonoids. Failed predation rates (healed shell fractures) reflect the palaeoecology of taxa and correlate with shell form types. This approach was extended for the first time to the Middle Devonian, based on our rich collections from the Dra Valley of the Anti-Atlas.

Two B.Sc. students, **Anna SAUPE** and **Nadine VERKERK**, analyzed the impact of the *Annulata* and Dasberg events on assemblages of agglutinating foraminifers from pelagic carbonate ramps. The studies were based on the Oese section in the Rhenish Massive and on the Kahlleite Quarry in Thuringia. Both separate regions show somewhat different foraminifer assemblages but comparable strong changes of foraminiferae associations caused by hypoxic event phases, without any extinctions or long-lasting evolutionary change.

The B.Sc. project of **Till SÖTE** fell into our D/C boundary research. He studied the biostratigraphy and microfacies of the Reigern Quarry in the northern Sauerland. This is a famous clymeniid locality (type section for several species) but its succession has never been documented. There is a sudden hiatus at the D/C boundary but Til found for the first time evidence that there is not only the

lower Wocklumian but also a thin development of the *Wocklumeria* Zone.

Stephan HELLING continued his Devonian trilobite studies in the frame of a cumulative Ph.D. programme. He tries to finish a paper on the Pragian trilobite limestone clasts in the Eovariscan breccia of Taourirt n'Khellil (SE of Tinerhir, Morocco), in order to clarify their palaeobiogeographic relationships across the "Southern Variscan Front" (the Meseta-stable Gondwana margin). For this aim, a new Pragian fauna from Ain-al-Aliliga in the Cherrat Valley (south of Rabat) is important (HELLING & BECKER 2015b, Fig. 4). He also investigates the impact of the Chotec Event on phacopids in the northern/central Tafilalt and a new phacopid bed from within the thick Daleje Shale equivalents of the southern Tafilalt (HELLING & BECKER 2015a). Manuscripts on new Moroccan *Gerastos* (Proetidae) and on the middle Frasnian trilobites of the central Tafilalt are not yet finished because new material became available in 2015.



Fig. 4. *Metacanthina issimourensis* from the Pragian at Ain-al-Aliliga, Oued Cherrat, Meseta.

Stephan EICHHOLTZ is continuing his Ph.D. on the comparison of Givetian/Frasnian reefs of the southern (Moroccan Meseta) and northern (Rhenish Massive) external Variscides, across a significant palaeolatitudinal gradient in the southern hemisphere (across the at least 3000 km wide Prototethys, including the Armorican Terrain Assemblage and southern European plates). He is close to complete a first, long manuscript (for "Facies") on the reefs of the Oued Cherrat Valley and adjacent regions to the south (Al Attamma) and southeast (Khatouat Massive), including reworked reef clasts of Eovariscan breccias and olistostromes. Some complication stemmed from Sarah's conodont data since she proved that one of the largest supposed Givetian reef belt is in fact of lower Emsian age. It is intriguing how similar Meseta reefs are, in terms of microfacies, to Rhenish reefs, whilst there are clear differences to the mostly small Anti-Atlas bioherms and biostromes. Research will continue with a detailed

study of the Oulmes region reefs and of isolated occurrences eastwards.

Sören STICHLING started a new Ph.D. programme financed by the Rheinkalk GmbH. The aim is to use microfacies, conodont- and cyclostratigraphy to reconstruct the palaeoecological and palaeogeographic development of the economically very important reef complex of the Hönne Valley through its almost 1000 m of thickness. The study is based on numerous boreholes (Fig. 5), which have never been available to science, and on the large active quarries.

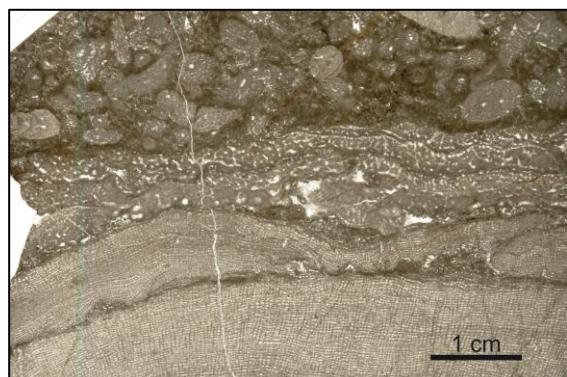


Fig. 5. Laminar stromatoporoids overlain by *Stachyodes* Baffle-/Rudstone (reef core facies), subsurface at Beul, eastern Hönne Valley.

Sven, Sarah and Thomas assisted a visiting Ph.D. student from Wuhan, **WANG Zihong**, in his study of the Upper Devonian (mostly Famennian) of the isolated Wulankeshun section in the western Junggar Basin. Conodont faunas are strongly endemic and require the establishment of new local zonations, separately for icriodids and polygnathids. There is a strange new group of "polygnathids" with "siphonodelloid" large basal cavity, which is better placed (in future) in a new genus. Zihong moved on to Erlangen to work with Michael JOACHIMSKI on the isotope stratigraphy of his section. Results will be published in a special volume on Palaeozoic events in China, in "Palaeo x 3" (WANG et al. 2015).

CM Sven HARTENFELS

is deeply involved with the supervision of the named research students and took part in the 4th International Palaeontological Congress, held in Mendoza, Argentina. Together with Thomas, he guided a field excursion for Master students in the Moroccan Meseta, Maider and Tafilalt in spring 2015. He continues his studies on the Famennian successions of Ziyyar (Moroccan Meseta) and El Khraouia (Tafilalt). New results of the *Annulata* Event(s) in the latter sequence were presented at the 2nd International Congress on Stratigraphy (Graz, Austria) in July 2015. Furthermore, he worked on the revision of the Ballberg section (Rhenish Massive, HARTENFELS & BECKER 2015). It

becomes famous, because it was one, on which ZIEGLER (1962) based his standard conodont zonation for the middle to upper/uppermost Famennian. Currently, 54 of 82 carbonate layers were sampled for conodonts. First results will be presented at the final meeting of the IGCP 596 in Brussels, Belgium. Together with **Marius SACHER** (current M.Sc. thesis), he measured and re-sampled the Famennian to Tournaisian succession at Oberrödinghausen railway-cut (Fig. 6). First conodont data document that the section starts in the *Pa. marginifera marginifera* (= Lower *marginifera*) Zone and ranges, as long known, into the Lower Tournaisian.



Fig. 6. The Annulata Blackshale units (upper left) in the Oberrödinghausen Railway Cut.

Together with Christoph HARTKOPF-FRÖDER (Krefeld), partly with Hans-Georg HERBIG and Sarah ESTEBAN LOPEZ (both Cologne), there is an ongoing revision of the Famennian to Lower Carboniferous Riescheid section of the Velbert Anticline. Furthermore, Sven continues his studies on Famennian conodont faunas from just above the last, microbialitic limestones of the Wülfrath and Hofermühle reef complexes.

Finally, together with Thomas and Peter KÖNIGSHOF, he works on organizing and preparing the Brussels IGCP 596 post-conference fieldtrip to the Rhenish Massive and editing the associated field guide.

CM Z. Sarah ABOUSSALAM

Sarah struggled hard to deal with the huge piles of Meseta conodont samples. The identification and dating of often strongly mixed assemblages from Eoviscan breccia and conglomerate beds was a special challenge since homoemorphic icriodids and polygnathids of widely different age had to be recognized and distinguished. There are also surprisingly diverse assemblages from brecciated biostromes (Fig. 7). The results provide a completely new picture of the timing of synsedimentary block faulting and tilting of NW Gondwana. Some localities yielded odd forms that are probably new species. An isolated, large olistolite from between Tinerhir and Tinejdad,

derived directly from the Southern Variscan front, produced very rich conodont faunas from non-black Kellwasser beds. The wealth of data led to joint presentation at the Mendoza IPC and Brussels meetings.

Equally demanding were the supervision of B.Sc./M.Sc. students and the identification of many Givetian-Frasnian samples of the Rhenish Massive, especially from the Hofermühle, Wülfrath, and Hagen-Balve reef complexes. Many new results will be in the IGCP 596-SDS Field Guide in September 2015. Together with Carl BRETT, Jay ZAMBITO and Thomas, there are also ongoing efforts to clarify the Givetian stratigraphy of Kentucky, with the hope to identify regionally the position of the Taghanic Events.

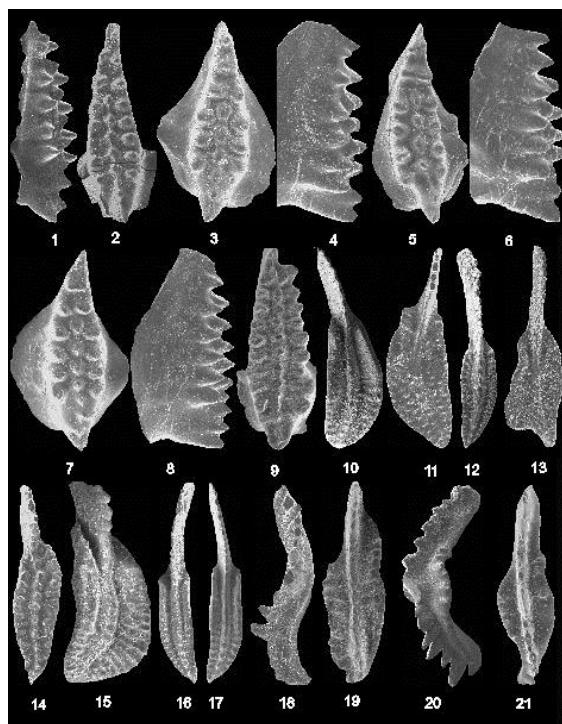


Fig. 7. Mixed Upper Givetian conodont assemblage from the brecciated reefal limestones at Ain-al-Aliliga (Oued Cherrat Valley, Moroccan Meseta).

The intense and rather long-running attempt to revise and refine the Emsian conodont stratigraphy of the Anti-Atlas, jointly with Pierre BULTYNCK and Thomas, is finally coming to an end (ABOUSSALAM et al. 2015). It involved the introduction of parallel regional icriodid and polygnathid zonations that are best correlated with the “conodont steps” of Celtiberia. It is impossible to recognize the “*kitabicus* boundary” in the study region since Pragian polygnathids were strongly restricted in their distribution, even in wide-spread dacryconarid facies. *Eolinguiopolygnathus excavatus* M114, the planned future basal Emsian index taxon, is very common in the region, and its variability and range is documented. There is one related new polygnathid (*Eol. radula* n. sp.) and

Pierre found two new icriodids (*I. ovalis* and *I. praerectirostratus*) in the basal upper Emsian.

A joint attempt with G. RACKI and his colleagues to find the significant carbon isotope excursion associated with the Middlesex Event (lower/middle Frasnian transition) in the Rhenish Massive resulted in the re-sampling of the type locality of the Padberg Limestone in the eastern Sauerland. Locally the upper part of the lower Frasnian (MN Zones 3/4) is rather thick and the *punctata* Zone has not yet been identified.

Publications

KUMPAN, T., BÁBEK, O., KALVODA, J., GRYGAR, T. M., FRÝDA, J., BECKER, R.T. & HARTENFELS, S. 2015. Petrophysical and geochemical signature of the Hangenberg Events: an integrated stratigraphy of the Devonian-Carboniferous boundary interval in the Northern Rhenish Massif (Avalonia, Germany). – Bulletin of Geosciences, **90** (3): 667-694.

BOCKWINKEL, J., BECKER, R.T. & EBBIGHAUSEN, V. 2015. Late Givetian ammonoids from Ait Ou Amar (northern Maider, Anti-Atlas, southeastern Morocco). – Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, **278** (2): 123-158.

ABOUESSALAM, Z. S., BECKER, R.T. & BULTYNCK, P. 2015. Emsian (Lower Devonian) conodont stratigraphy and correlation of the Anti-Atlas (Southern Morocco). – Bulletin of Geosciences, **90** (4): 893-980.

BONCHEVA, I., SACHANSKI, V. & BECKER, R.T. 2015. Sedimentary and faunal evidence for the Late Devonian Kellwasser and *Annulata* events in the Balkan Terrane (Bulgaria). – Geologica Balcanica, **44** (1-3): 17-24.

Abstracts

BECKER, R.T. 2014. Origin and evolution of the Gephuoceratina (Ammonoidea, Agoniatitida). - In: KLUG, C. & FUCHS, D. (Eds.), 9th International Symposium, Cephalopods – Present and Past, in combination with the 5th International Symposium, Coleoid Cephalopods through Time, Zürich 2014, Abstracts and program: 24.

FISCHER, T. & BECKER, R.T. 2014. Ontogenetic morphometry, taxonomy and biogeographic aspects of Famennian (Upper Devonian) Prionoceratidae. - In: KLUG, C. & FUCHS, D. (Eds.), 9th International Symposium, Cephalopods – Present and Past, in combination with the 5th International Symposium, Coleoid Cephalopods through Time, Zürich 2014, Abstracts and program: 36.

BECKER, R.T. & ABOUESSALAM, Z.S. 2014. Devonian global events in the Moroccan Meseta

– an update. – 4th International Palaeontological Congress, Mendoza, Argentina, September/October 2014, Abstracts: 1 p.

HARTENFELS, S. & BECKER, R.T. 2014. New data on Upper Devonian black shale events in the eastern part of the central Moroccan Meseta. - 4th International Palaeontological Congress, Mendoza, Argentina, September/October 2014, Online Abstracts: 1 p.

HARTENFELS, S. & BECKER, R.T. 2015. New middle Famennian conodont data and the *Annulata* Event at El Khraouia (Amessoui Syncline, southern Tafilelt, Morocco). – In: GÜLLI, E. & PILLER, W. E. (Eds.), STRATI 2015, 2nd International Congress on Stratigraphy, 19. – 23. July 2015, Graz, Austria, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **21**: 151.

HELLING, S. & BECKER, R.T. 2015. Phacopid trilobites from the Daleje Event Interval (Emsian, Devonian) at El Khraouia (Amessoui Syncline, southern Tafilelt, Morocco). – In: GÜLLI, E. & PILLER, W. E. (Eds.), STRATI 2015, 2nd International Congress on Stratigraphy, 19. – 23. July 2015, Graz, Austria, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **21**: 158.

WANG, Z., BECKER, R.T., ABOUESSALAM, Z.S., HARTENFELS, S. & GONG, Y. 2015. Conodont stratigraphy and palaeobiogeography near the Frasnian/Famennian boundary at Wulankeshun, Junggar Basin, NW China. - In: GÜLLI, E. & PILLER, W. E. (Eds.), STRATI 2015, 2nd International Congress on Stratigraphy, 19. – 23. July 2015, Graz, Austria, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **21**: 395.

BECKER, R.T., ABOUESSALAM, Z.S., EL HASSANI, A., HARTENFELS, S. & BAIDDER, L. 2015. The timing of Eovariscan block faulting, reworking and re-deposition in the Moroccan Meseta. – Strata (Travaux de Géologie sédimentaire et Paléontologie), Série 1 (communications), **16**: 14-15.

HARTENFELS, S. & BECKER, R.T. 2015. Revised conodont stratigraphy of the famous Ballberg section (Famennian, Rhenish Massive, Germany). - Strata (Travaux de Géologie sédimentaire et Paléontologie), Série 1 (communications), **16**: 66-67.

HELLING, S. & BECKER, R.T. 2015. A new Pragian trilobite assemblage from Ain-Al-Aliliga (western Meseta, NW Morocco). - Strata (Travaux de Géologie sédimentaire et Paléontologie), Série 1 (communications), **16**: 68-69.

Devonian Theses

- POMMERINGER, S. 2014. Paläopathologie und Autökologie bei Ammonoideen des Mittel-Devons von Süd-Marokko. – B. Sc. Thesis, 59 pp. [in German]
- SAUPE, A. 2014. Agglutinating foraminifera around the *Annulata* Events and Dasberg Crisis (famennian, Upper Devonian, Thuringia) – palaeoecology and palaeodiversity. – B.Sc. Thesis, 39 pp.
- SÖTE, T. 2015. Stratigraphie und Fazies an der Devon/Karbon-Grenze im Forststeinbruch Reigern (Hachen, Nordsauerland). – B.Sc. Thesis, 30 pp.
- SCHWERMANN, K. 2014. Devonian shark teeth from Morocco – taxopnomy, stratigraphy and facies distribution. – M. Sc. Thesis, 80 pp. [in German].
- VERKERK, N. 2014. Palaeoecology and palaeodiversity of Famennian (Upper Devonian) agglutinated foraminifera of the Rhenish Massive. – B.Sc. Thesis, 30 pp. [in German].

TM Alain BLIECK

Last year's activities have been mostly devoted to :

- (1) Early Devonian vertebrates, and in particular pteraspid heterostracans from N. France, Belgium (the Ardenne Massif), Spitsbergen and USA; and
- (2) The history of geology through the history of the Société Géologique du Nord (SGN), which is based in the University of Lille (Sciences and Technologies).

After having been president of the SGN from 2010 to 2014, I am now its Editor-in-chief. I am also involved in the regional geological heritage: inventory of the geological sites of northern France (Nord - Pas-de-Calais), and preservation of geological wall paintings of the former Institute of Natural Sciences of the University of Lille (lab of geology) in its original building situated inside the City of Lille. I have officially retired from the French National Centre of Scientific Research (CNRS) on August 2014, but have got the CNRS emeritus status for the next 5 years.

Publications

- BLIECK, A., CRÔNIER, C., DECOMBEIX, A.-L., GAND, G., GALTIER, J., LEFEBVRE, B., MEYER-BERTHAUD, B., MONCERET, E., OLIVE, S., STEYER, J.-S. & STRULLU-DERRIEN, C. 2014. Quoi de neuf en paléontologie du Paléozoïque ? – In: SUSTRAC, G. (dir.), Géologie de la France : quoi de neuf ?, Géologues, **180**: 47-53, 5 fig., Société géologique de France, Paris [in French].

BLIECK, A., avec la collaboration de BRICE, D., CHARVET, J., CUVELIER, J., DE BAERE, J.-P., DHAINAUT, A., MATRION, A., MEILLIEZ, F., MISTIAEN, B., OUDOIRE, T., RICOUR, J., SOMMÉ, J. & TRENTESAUX, A. 2014. La Société Géologique du Nord et les sciences de la Terre dans le nord de la France: science, industrie et société. - In: BLIECK, A. & DE BAERE, J.-P. (eds), La Société géologique du Nord et l'histoire des sciences de la Terre dans le nord de la France, Mémoires de la Société géologique du Nord, **XVII**: 3-40, 13 fig., 9 tabl., 5 annexes, Société géologique du Nord, Villeneuve d'Ascq [in French].

MEILLIEZ, F. & BLIECK, A. 2014. Les dix premières années de la Société géologique du Nord et sa place dans la société en cours d'industrialisation du XIXe siècle. - In: BLIECK, A. & DE BAERE, J.-P. (eds), La Société géologique du Nord et l'histoire des sciences de la Terre dans le nord de la France. - Mémoires de la Société géologique du Nord, **XVII**: 41-48, 2 tabl. ; Société géologique du Nord, Villeneuve d'Ascq [in French].

BLIECK, A. & STYZA, A. 2014. Devonian sandstones from the Liévin shaft n° 8, Avion (Pas-de-Calais, France): historical context and additional vertebrate remains. - Annales de la Société géologique du Nord, Série 2, **21**: 25-33, 3 fig., 1 pl.

BLIECK, A. 2015 in prep. Early Devonian heterostracans of Wihéries and Paliseul, with notes on pteraspids of La Gileppe and an acanthodian of Paliseul (Belgium).- Geologica Belgica.

BLIECK, A. & MEILLIEZ, F. 2015 in prep. The Société géologique du Nord" (SGN) and Earth sciences in northern France. - In: BOURROUILH, J. & ARGYRIADIS, I. (eds) ["volume Michel DURAND-DELGA"], Boletín Geológico y Minero de España.

ELLIOTT, D.K., SCHULTZE, H.-P. & BLIECK, A. 2015 in prep. A new pteraspid (Agnatha: Heterostraci) from the Lower Devonian Drake Bay Formation, Prince of Wales Island, Nunavut, Arctic Canada, and comments on environmental preferences of pterasids. –Journal of Vertebrate Paleontology.

PERNÈGRE, V. & BLIECK, A. 2015 in prep. A revised ichthyostratigraphy of the Wood Bay Formation (Lower Devonian, Spitsbergen) and correlation with the Russian Arctic archipelago. - Geodiversitas.

Editorials

- BLIECK, A. & DE BAERE, J.-P. 2014 (eds). La Société géologique du Nord et l'histoire des sciences de la Terre dans le nord de la France. -

Mémoires de la Société géologique du Nord, **XVII**: 1-183 (15 articles, 22 authors), Société géologique du Nord., Villeneuve d'Ascq.

BLIECK, A. 2014 (Ed.). Annales de la Société Géologique du Nord. - 2e Série, **21**: 1-68. (5 articles, 15 authors), Société Géologique du Nord, Villeneuve d'Ascq.

Abstracts

BLIECK, A. 2014. Les Vertébrés Ptéraspidomorphes (Ordovicien-Dévonien) et leur utilisation en sciences de la vie et de la Terre. - In: Les Fossiles: objets géologiques, objets biologiques, Congrès annuel APF –Réunion spécialisée SGF, Paris, 14-17 mai 2014, Résumés: 7; Journal de l'APF, **66**: 22-23.

BLIECK, A. & ELLIOTT, D.K. 2014. Pteraspidomorphs (Vertebrata) and the Old Red Sandstone. - In: The Old Red Sandstone :is it Old, is it Red and is it all Sandstone ?, 3-5 October 2014, Brecon, Wales, Programme and Abstracts: 9 [oral communication given by C.J. BURROW].

TM Carlton E. BRETT

During summer of 2014 a new initiative was established. Working with Prof. Wojtek KOZLOWSKI (University of Warsaw) and Axel MUNNECKE (Erlangen) I examined sections of Devonian in the Holy Cross Mountains near Kielce, Poland. We were able to re-discover the horizon of famed queues of the eyeless trilobite *Trimeroceraspis chopani* and examine the paleoecological context of these remarkable occurrences, which are apparently in deep water dark shale facies associated with distal tempestite deposits. I am presently working with Professor Blazej BLAZEJOWSKI (also of Warsaw) on completing projects on these remarkable trilobites started by the late Adrian Kin.

In addition, Prof. KOZLOWSKI located cores from central Poland and near the Ukrainian border that showed complete sections through the Eifelian-Givetian boundary and the Kačák events. These cores display strong cyclicity, including black shale-carbonate cycles that show remarkable parallels with those of the Marcellus-Skaneateles Formation interval in the Middle Devonian of the Appalachian Basin. We intend to pursue further chemostratigraphic, facies, and sequence stratigraphic studies of these Polish cores as a comparative sample of the stratigraphy of this critical interval in Baltica.

I worked with colleagues Eberhard SCHINDLER and Rainer BROCKE (Senckenberg Institute, Frankfurt, Germany) on new drill cores by the local water companies in the Eifel area. These cores have been made available to the Senckenberg Institute.

Cores are being sampled for microfacies, petrology and geochemistry. This project has provided a major impetus for to complete several projects including paleoenvironments, palynology, and cycle stratigraphy of the Givetian strata in this classic region.

I continue to collaborate with Charles VER STRAETEN, New York State Museum, Gordon BAIRD (SUNY College Fredonia), Alex BARTHOLOMEW (SUNY New Paltz), Jay ZAMBITO (Wisconsin Geological Survey), and several other New York stratigraphers on the revision of the New York State Devonian Stratigraphic Correlation Chart, which is intended to comprise a series digital charts and a book discussing the details of Devonian stratigraphy.

University of Cincinnati PhD student Andrew ZAFFOS completed his dissertation, including new studies on the ecological stability of faunas from the Middle Devonian Hamilton Group. He designed a hierarchical sampling strategy for one of the better-studied intervals of hypothesized evolutionary-ecological stability, the Middle Devonian of New York State. Fossil assemblages were sampled at the scale of individual widespread beds or bedsets, members, and formations; these stratigraphic units represent small and larger-scale sequences on time scales of a few thousand, hundreds of thousands, and about a million years, respectively. In addition, biotic patterns diagnosed from these samples were compared across a major biotic turnover event, the mid Givetian Tully-recurgent Hamilton fauna turnover, identified previously as an evolutionary ecological subunit boundary. In each case, gradients of fossil assemblages were identified using detrended correspondence analysis (DCA) and delineation of the niches of individual taxa, parameterized based on DCA axis 1 scores. Overall, the results indicate a strong tendency toward niche conservatism, despite local and regional fluctuations, on time scales of hundreds of thousands to a few million years. This result is consistent with a model of habitat tracking by most taxa, which permitted maintenance of niche conservancy and may explain patterns of shared stability, such as "coordinated stasis".

Publication

CLEMENT, C.R. & BRETT, C.E. 2015. Echinoderm faunas from the Decatur Limestone and Ross Formation (Upper Silurian to Lower Devonian) of West-central Tennessee. - Bulletins of American Paleontology, **388**: 1-118.

CM Denise BRICE

During 2013-2014 my research topics are focused on the systematics, biostratigraphy of Devonian brachiopods (topic 1) from France

(Avesnois), Algeria (Ougarta), Morocco (Maïder) principally related with Upper Devonian (Famennian) and their distribution in the world around Devonian-Carboniferous boundary (topic 2) in collaboration with Thomas BECKER, Marie LEGRAND-BLAIN, Bruno MISTIAEN and Bernard MOTTEQUIN.

Since 2008, I assume the coordination of a volume titled "Stratotype Givétien" finalized in 2014-2015, which will be published in the "Collection Patrimoine géologique" biotope Muséum, "Publications Scientifiques du Muséum" National d'Histoire Naturelle in Paris

Publications

- BECKER R. T., HARTENFELS S., ABOUSSALAM Z. S., TRAGELEHN H., BRICE D. & EL HASSANI A.; 2013. The Devonian-Carboniferous boundary at Lalla Minouna (Northern Maider) – a progress report. – In: International Field Symposium "The Devonian and Lower Carboniferous of northern Gondwana" Morocco 2013; Documents de l'Institut Scientifique, Rabat, **27**: 109-120.
- CRONIER C., FATIMA Z. M., ANGELA F. & BRICE, D. 2013. First occurrence of a phacopid trilobite faunule from the Upper Devonian of Saoura Valley, Algeria and patterns of diversification during the late Devonian. - Geological Magazine, **150** (6): 1002-1021.
- MISTIAEN, B., BRICE, D., HUBERT, B., KHATIR, A., MOTTEQUIN, B., NICOLLIN, J.-P. & POTY, E. 2013. Le «Calcaire d'Etroeungt» dans les coupes historiques d'Etroeungt et d'Avesnelles, Avesnois, Nord de la France. Annales de la Société géologique du Nord, Lille, **20** (2^{ème} série):43-51.
- BRICE, D., NICOLLIN, J.-P. & MOTTEQUIN, B. 2013. Diversity of strophomenide, orthotetide and orthide brachiopods in the uppermost Famennian ('Strunian'; Upper Devonian) of the Avesnois (Northern France). - Annales de la Société géologique du Nord, Lille, **20** (2^{ème} série): 53-63.
- MOTTEQUIN, B., BRICE, D. & LEGRAND-BLAIN, M. 2014. Biostratigraphic significance of brachiopods near the Devonian/Carboniferous boundary. - Geological Magazine, **151** (2): 216-228.
- MOTTEQUIN B., MALTI F.Z., BENYOUCEF M., CRONIER C., RANDON C. & BRICE, D. 2015 in press. Famennien rhynchonellides (Brachiopoda) from deep water facies of the Ougarta Basin (Saoura Valley, Algeria). - Geological Magazine, **152** (6): 1009-1024.

CM Rainer BROCKE

I am currently working on palynomorphs of the Mid-Devonian Choteč Event. In cooperation with Olda FATKA (Charles University, Prague), Eberhard SCHINDLER (Senckenberg, Frankfurt), Richard LINDEMANN (Skidmore College, Saratoga Springs) and Charles VER STRAETEN (New York State Museum, Albany,) we submitted a paper (GSL) dealing with material from the Choteč type section in the Prague Basin and coeval strata in the Appalachian Basin.

In cooperation with Walter RIEGEL (Göttingen), Volker WILDE (Frankfurt), and Volker KNEIDL (Bad Kreuznach) we study palynomorphs from the Lower Devonian Hunsrückshiefer and its facies equivalents in Germany.

Studies in Central and Southern Taurids of Turkey are continued (with colleagues from Turkey and Senckenberg). Main focus of the palynological studies concerns the Silurian/Devonian interval and the Upper Devonian (Frasnian-Famennian).

Publications

- BROCKE, R., KNEIDL, V., RIEGEL, W. & WILDE, V. 2014. The Lower Devonian "Hunsrückshiefer" of the Rheinisches Schiefergebirge: New evidence from palynology. - Schriftenreihe der Deutschen Gesellschaft für Geowissenschaften, **85**: 213.
- YALÇIN, M.N., SCHINDLER, E., WEHRMANN, A., NAZIK, A., YILMAZ, I., WILDE, V., ÖZKAN, R., BOZDOGAN, N., BROCKE, R., SAYDAM-DEMIRAY, G., WEDDIGE, K., SANÇAY, R.H., JANSEN, U., NALCIOĞLU, G., KOZLU, H., LINNEMANN, U., SAHİN, N. & GROOS-UFFENORDE, H. 2014. Devonian stratigraphy of the Central and Eastern Taurides. - In: 67th Geological Congress of Turkey, Ankara.
- BROCKE, R., FATKA, O., LINDEMANN, R.H., SCHINDLER, E. & VER STRAETEN, C.A. 2014. The Early Mid-Devonian Choteč event in its type area in the Prague Basin and the Appalachian Basin: New insights from palynomorphs and dacryconodontids. - In: 9th European Palaeobotany – Palynology Conference.
- SCHINDLER, E., NAZIK, A., HAUDE, R., BROCKE, R., SEKER, E., BOZDOGAN, N., SANÇAY, R.H., GROOS-UFFENORDE, H., JANSEN, U., WEDDIGE, K., ÖZKAN, R., YALÇIN, M.N., WEHRMANN, A. & WILDE, V. 2014. First record of loboliths in Turkey: Scyphocrinoids and other palaeontological evidence for the Silurian/Devonian boundary interval in the Eastern and Central Taurides. - In: 67th Geological Congress of Turkey, Ankara.
- NAZIK, A., YALÇIN, M.N., SCHINDLER, E., WILDE, V., WEHRMANN, A., HAUDE, R., FINKS, R.M.,

WEBSTER, G.D., YILMAZ, I., BROCKE, R., JANSEN, U., ÖZKAN, R., SEKER, E., GROOS-UFFENORDE, H., BOZDOGAN, N., SANCAY, R.H., NALCIOGLU, G., SAYDAM-DEMIRAY, D.G., WEDDIGE, K., & KOZLU, H. 2014. Important paleontological evidences of Devonian strata in the Eastern Taurides. - In: 15. Paleontoloji-Stratigrafi Çalıştayı, Ankara.

CM Carole BURROW

continues collaborating with European colleagues Mike NEWMAN, Bob DAVIDSON, Jan DEN BLAAUWEN, and Roger JONES on the ORS fishes of Scotland, and with Australian colleagues on Devonian early vertebrate faunas from Western Australia, New South Wales and Queensland. During 2014 she attended the Australian Earth Sciences Convention in Newcastle, NSW, where unfortunately she was one of the very few palaeontologists in attendance. Later in the year, she attended a meeting in Brecon, Wales on the Old Red Sandstone, where she had the opportunity to catch up and co-author presentations on the Scottish vs Anglo-Welsh vertebrate faunas of the LORS with her coworkers on the Scottish ORS, as well as with Sue TURNER (QM) on an update of the microvertebrate faunas of the Anglo-Welsh Late Silurian-Early Devonian ORS. The meeting also provided the opportunity to meet the locals studying the vertebrate fossils of the region, and visit some vertebrate localities.

Publications

BURROW, C.J. & RUDKIN, D. 2014. Oldest near-complete acanthodian: the first vertebrate from the Silurian Bertie Formation Konservat-Lagerstätte, Ontario. - PLoS ONE, **9** (8): 7.

NEWMAN, M.J., BURROW, C.J., DEN BLAAUWEN, J.L. & DAVIDSON, R.G. 2014. The Early Devonian acanthodian *Euthacanthus macnicoli* Powrie, 1864 from the Midland Valley of Scotland. - Geodiversitas, **36** (3): 321-348.

TRINAJSTIC, K., ROELOFS, B., BURROW C.J., LONG, J.A. & TURNER, S. 2014. Devonian vertebrates from the Canning and Carnarvon Basins with an overview of Paleozoic vertebrates of Western Australia. - Journal of the Royal Society of Western Australia, **97**: 133-151.

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

LONG, J.A., BURROW C., GINTERN M., MAISEYN J., TRINAJSTICN K., COATENS M., YOUNGN G. & SENDENN T. 2015. First shark from the Late

Devonian (Frasnian) Gogo Formation, Western Australia sheds new light on the development of tessellated calcified cartilage. - PLoS ONE.

Abstracts

BURROW, C., YOUNG, G. & SENDEN, T. 2014. An antipodean Palaeospondylus? Australian Earth Sciences Convention (AES), Sustainable Australia. - Newcastle, 7-10 July 2014, Geological Society of Australia, Abstracts, **110**: 217-218.

NEWMAN, M.J., BURROW, C.J., DAVIDSON, R.G., DEN BLAAUWEN, J.L. & JONES, R. 2014. Scottish Lower Devonian ORS: a separate realm or connected with the Anglo-Welsh Basin? The vertebrate perspective. - In: The Old Red Sandstone: Is it old, is it red, and is it all sandstone? Brecon, Wales, 3-5 October 2014: 10..

TURNER, S., BURROW, C.J. & WILLIAMS R. 2014. Welsh Borderland bouillabaisse: bonebeds, age control, palaeo(bio)geography lifestyles and diversity of microvertebrates (thelodont, acanthodian, 'shark', placoderm scales. – In: The Old Red Sandstone: Is it old, is it red, and is it all sandstone? Brecon, Wales, 3-5 October 2014: 11-13.

TM Carlo CORRADINI

My research is mainly devoted to conodont biostratigraphy in several North Gondwana regions (the Carnic Alps, Morocco, Sardinia, Montagne Noire, Iran), from Silurian to lower Carboniferous, specially focusing across the Silurian /Devonian and the Devonian/Carboniferous boundaries. The latter are mainly related with the International working Group on the redefinition of the Devonian/Carboniferous Boundary (led by M. ARETZ, Toulouse). A manuscript on conodont distribution across the D/C boundary is in preparation (with C. SPALLETTA, A. MOSSONI, H. MATJYA, D.J. OVER and S.I. KAISER).

In the Carnic Alps a huge project on formal lithostratigraphic units of the pre-Variscan sequence of the Carnic Alps, coordinated by T. SUTTNER (Graz) and me, is almost completed. All the formation of the "Pre-Variscan" sequence are now well defined and formalized according to the stratigraphic code, and named univocally on both sides of the Italian-Austrian border. A volume is in press in the Abhandlungen der Geologisches Bundesamt series. Within this project, several sections and outcrops from Silurian to Lower Carboniferous are in study in various areas of the Carnic Alps (with L. SIMONETTO, M. PONDRELLI, M.G. CORRIGA, C. SPALLETTA, A. MOSSONI, T. SUTTNER, E. KIDO, and others).

Other projects in progress in the Carnic Alps deal on:

- conodonts from several upper Silurian and Lower Devonian sections (with M.G. CORRIGA): beside several new sections, some classical localities have been sampled, like Costone Lambertenghi/Seekopf Sockel, Rauchkofel Boden, Seewarte and Cellon. A manuscript on the updated conodont stratigraphy of the Silurian part of the famous Cellon section have been published (CORRADINI et al. 2015), and the lower Devonian part of the section is in study.

- the Kacak event, studied in some sections in the central part of the Carnic Alps (with T. Suttner, E. KIDO and others). Researches deal on conodonts, microfacies, isotopes, magnetosusceptibility, Gamma rays, and other fossil groups.

- the geology and stratigraphy of selected key areas (with several co-authors). Two papers have been published: one on the Upper Devonian of Mt. Freikofel (PAS et al. 2014), the other on the depositional evolution of Mt. Pizzul area from Late Ordovician to early Carboniferous (PONDRELLI et al. 2015).

- Late Devonian and Early Carboniferous conodonts (with C. SPALLETTA and A. MOSSONI). Famennian and Tournaisian sections and outcrops in the central part of the Carnic Alps are in study.

In Sardinia researches are mainly devoted to the Clymeniae Limestones of the southeastern part of the island, mainly looking for sections exposing the D/C boundary (with A. MOSSONI and C. SPALLETTA). A paper on the Broncu Bullai section have been published (MOSSONI et al. 2015).

In Morocco conodonts and crinoids across the Silurian/Devonian boundary in the Tafilalt have been studied (with M.G. CORRIGA and R. HAUDE). The sections were sampled by O.H. WALLISER and R. HAUDE in the 90', and the material is stored in Göttingen University. Three papers have been published: one on conodont and crinoid stratigraphy of the *Scyphocrinites* beds (CORRIGA et al. 2014a), the second on conodont taxonomy and stratigraphy from Ludlow to middle Lochkovian (CORRIGA et al. 2014b), the third on scyphocrinoids (HAUDE et al. 2014).

In the Montagne Noire researches deal both on conodont stratigraphy across the S/D boundary and on stratigraphy and facies in the Famennian and lowermost Tournaisian (with C. GIRARD, R. FEIST and others).

In Iran researches are carried on in cooperation with A. BAHRAMI (Isfahan) and deal on conodonts and stratigraphy of sections from Middle Devonian to Lower Carboniferous in different parts of country. More precisely, from Frasnian to Tournaisian in the southern part of the Shotori

Range (Tabas area) and Frasnian and Famennian of the Kerman province.

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

Angelo MOSSONI is concluding his PhD project on Famennian biostratigraphy in Sardinia and the Carnic Alps, with special focus around the Condroz, *Annulata* and Hangenberg events. In these time frames the magnetosusceptibility and geochemistry of some major elements is also studied (this part under the supervision of A.C. Da Silva, Liege).

Publications

BAHRAMI, A., ZAMANI, F., CORRADINI, C., YAZD,I M. & AMERI, H. 2014. Late Devonian (Frasnian) conodonts from the Bahram Formation in the Sar-e-Ashk Section, Kerman Province, Central-East Iran Microplate. - Bollettino della Società Paleontologica Italiana, **53** (3): 179-188, doi 10.4435/BSPI.2014.15

CORRADINI, C., CORRIGA, M.G., KIDO, E., PONDRELLI, M., SCHÖNLAUB, H.P., SIMONETTO, L., SPALLETTA, C. & SUTTNER, T. 2014. Lochkovian (Lower Devonian) conodont stratigraphy of the Carnic Alps (Italy-Austria). - In: CERDEÑO E. (Ed.), 4th International Palaeontological Congress, Abstract Volume: 843.

CORRADINI, C., CORRIGA, M.G., MÄNNIK, P. & SCHÖNLAUB, H.-P. 2015. Revised conodont stratigraphy of the Cellon section (Silurian, Carnic Alps). - Lethaia, **48**: 56-71, doi:10.1111/let.12087

CORRIGA, M.G., CORRADINI, C. & WALLISER, O.H. 2014. Upper Silurian and Lower Devonian conodonts from Tafilalt, southeastern Morocco. - Bulletin of Geosciences, **89** (1): 183-200, DOI:10.3140/bull.geosci.1473.

CORRIGA, M.G., CORRADINI, C., HAUDE, R. & WALLISER, O.H. 2014. Conodont and crinoid stratigraphy of the upper Silurian and Lower Devonian scyphocrinoid beds of Tafilalt, southeastern Morocco. - GFF, **136**: 65-69, DOI:10.1080/11035897.2013.862849.

GIRARD C., CORNÉE J.-J., CORRADINI C., FRAVALO A. & FEIST R. 2014. Paleoenvironmental changes at Col des Tribes (Montagne Noire, France), a reference section for the Famennian of north Gondwana-related areas. Geological Magazine, **151**: 864-884, doi:10.1017/S0016756813000927.

HAUDE, R., CORRIGA, M.G., CORRADINI, C. & WALLISER, O.H. 2014. Bojen-Seelilien (Scyphocrinitidae, Echinodermata) in neu-datierten Schichten vom oberen Silur bis untersten Devon von SE-Marokko. - Göttingen Contributions to Geosciences, **77**: 129-145, doi:10.3249/webdoc-3924.

MOSSONI, A., CARTA, N., CORRADINI, C. & SPALLETTA, C. 2015. Conodonts across the Devonian/Carboniferous boundary in SE Sardinia (Italy). - Bulletin of Geosciences, **90** (2), 371-388, doi: 10.3140/bull.geosci.1524.

MOSSONI, A., CORRADINI, C. & SPALLETTA, C. 2014. The Devonian/Carboniferous boundary in Sardinia (Italy). - In: CERDEÑO E. (Ed.), 4th International Palaeontological Congress, Abstract Volume: 862.

PAS, D., DA SILVA, A.-C., SUTTNER, T., KIDO, E., PONDRELLI, M., CORRADINI, C., BULTYNCK, P., DE VLEESCHOUWER, D., DOJEN, C., BOULVAIN, F. 2014. Insight into the development of a carbonate platform through a multi-disciplinary approach: a case study from the Upper Devonian slope deposits of Mount Freikofel (Carnic Alps, Austria/Italy). - International Journal of Earth Sciences, **103**: 519-538, doi: 10.1007/s00531-013-0969-2.

PONDRELLI, M., CORRADINI, C., CORRIGA, M.G., KIDO, E., MOSSONI, A., SIMONETTO, L., SPALLETTA, C., SUTTNER T. & CARTA N. 2015. Depositional and deformational evolution of a Lower Paleozoic portion of the Southalpine domain: the Mt. Pizzul area (Carnic Alps, Italy). - International Journal of Earth Sciences, **104**: 147-178, doi: 10.1007/s00531-014-1069-7.

CM Catherine CRÔNIER

During last years, my research focuses on the study of the Devonian trilobites and especially from the Ardennes Massif (France and Belgium), the Prague Basin (Czech Republic), the Anti-Atlas (Morocco) and the Saoura Basin (Algeria) in order to evaluate the Devonian trilobite paleobiodiversity and to understand their fluctuations in time and space.

Phacopid trilobites are relatively widespread in Devonian deposits of North Gondwana and some have been collected from several sections from the Lower to the Upper Devonian of the Saoura Valley, SW Algeria.

For the Upper Devonian, new occurrences of phacopids assigned to *Trimeroceraspis*, *Dianops* and *Phacops sensu lato* are described from this area and comparisons are made with closely allied species from Morocco and Europe. These new occurrences have been integrated into an analysis of Upper Devonian phacopid biodiversity. Diversity

fluctuations reflect environmental changes, bioevents and stratigraphic turnovers throughout the Upper Devonian. Peak diversity was attained after the post-Kellwasser event (CRÔNIER et al. 2013). Moreover, in order to evaluate their distribution patterns at a global level, clustering analyses, in a paleogeographical and paleoenvironmental framework, enabled us to establish (1) bathymetrical gradients showing some taxa such as *Omegops* restricted to shallower environments and other taxa such as *Ductina* or *Dianops* to deeper environments; (2) and paleobiogeographical affinities showing exchanges along the margins of North-Gondwana and Avalonia/Baltica and probable connections along the margin of North-East Gondwana, after the major mid-Givetian Taghanic transgression (CRÔNIER & FRANÇOIS 2014).

Publications

BIGNON, A. & CRÔNIER, C. 2015. Trilobite faunal dynamics on the Devonian continental shelves of the Ardenne Massif and Boulonnais (France, Belgium). - Acta Palaeontologica Polonica, <http://dx.doi.org/10.4202/app.00019.2013>.

BIGNON, A. & CRÔNIER, C. 2014. The systematic and phylogeny of the Devonian subfamily Asteroyginæ (Trilobita: Phacopida). - Journal of Systematic Palaeontology, **12**: 637–668.

CRÔNIER, C. 2013. Morphological disparity and developmental patterning: contribution of Phacopid trilobites. - Palaeontology, doi:10.1111/pala.12024.

CRÔNIER, C. & FRANÇOIS, A. 2014. Distribution patterns of Upper Devonian phacopid trilobites: Paleobiogeographical and paleoenvironmental significance. - Palaeogeography, Palaeoclimatology, Palaeoecology, **404**: 12–23.

CRÔNIER, C., MALTİ, F.Z., FRANÇOIS, A., MADANI, B. & BRICE, D. 2013. First occurrence of a phacopid trilobite faunule from the Upper Devonian of Saoura Valley, Algeria and biodiversity fluctuations. - Geological Magazine, **150**:1002–1021.

KLAPPER, G., CRÔNIER, C. & VODRAZKOVA S. 2012. Conodont evidence for a latest Emsian to early Eifelian (Devonian) age for the phacopid trilobite *Plagiolaria kitabi* from Uzbekistan. - Memoirs of the Association of Australasian Palaeontologists, **44**: 25–26.

CM Anne-Christine DA SILVA

My research focused in 2014 mostly on the Devonian of Belgium, China, and Czech Republic. We have applied a multi-proxy approach in order to get a better understanding of the paleoenvironments of these Devonian successions, through sedimentology, magnetic susceptibility and extra

magnetic measurements and geochemistry (elemental and carbon and oxygen isotopes) and cyclostratigraphy.

Within the framework of the IGCP-580 (Application of magnetic susceptibility as a paleoclimatic proxy on Paleozoic sedimentary rocks and characterization of the magnetic signal), we have focused on the application of magnetic susceptibility as a correlation tool, paleoenvironmental proxy and for cyclostratigraphy. We have almost finished a special issue from the Geological Society of London on the IGCP-580 (volume **414** in press).

Projects in progress are related to:

The paleoecology of Devonian stromatoporoids, with sections in Belgium and in the Devonian and Silurian of U.K. Detailed description of the fauna and relationship with the sedimentological setting. This work is done in collaboration with S. KERSHAW, Brunel and U. BALTHASAR, Glasgow.

NWO funding on the cyclostratigraphy of Devonian sections (Netherlands science foundation)

Southern China (Fuhe section), focusing on the Frasnian-Famennian boundary: geochemistry (with M.T. WHALEN, Alaska), microfacies, Gamma Ray Spectrometry (with X. DEVLEESCHOUWER, Brussels), Magnetic Susceptibility and cyclostratigraphy (with D. DE VLEESCHOUWER, Brussels).

Czech Republic, Prague synform, Pod Barrandovem section, detailed sampling for Magnetic susceptibility and hysteresis, geochemistry and cyclostratigraphy.

Belgium, Frasnes trench section from the Frasnian, magnetic susceptibility, geochemistry, hysteresis.

Damien PAS is doing his PhD in Liège university on the Paleoenvironmental evolution through the Devonian, with sections in Germany, Carnic Alps and Belgium (PAS et al. 2014).

Hocine DJOUDER is doing a PhD in Liège university on the Silurian Devonian succession from the eastern Algerian Sahara.

Publications

DA SILVA, A.C., WHALEN, M.T., HLADIL, J., KOPTIKOVA, L., CHEN, D., BOULVAIN, F., SPASSOV, S. & DEVLEESCHOUWER, X. 2014. Application of magnetic susceptibility as a paleoclimatic proxy on Paleozoic sedimentary rocks and characterization of the magnetic signal – IGCP-580 projects and events. *Episodes*, **37** (2): 87-95.

DA SILVA, A.C., KERSHAW, S., BOULVAIN, F., HUBERT, B.L.M., MISTIAEN, B., REYNOLDS, A. & REITNER, J. 2014. First record of demosponge-type spicules in a Devonian basal

skeleton stromatoporoid (Frasnian, Belgium). - *Lethaia*, **47**: 365-375.

PAS, D., D.A. SILVA, A.C., SUTTNER, T., KIDO, E., PONDRELLI, M., CORRADINI, C., BULTYNCK, P., DE VLEESCHOUWER, D., DOJEN, C. & BOULVAIN, F. 2014. Insight into the development of a carbonate platform through a multi-disciplinary approach - A case study from the Upper Devonian slope deposits of Mount Freikofel (Carnic Alps, Austria/Italy). – *International Journal of Earth Sciences*, **103**: 519-538.

DA SILVA, AC., WHALEN, M.T., HLADIL, J., KOPTIKOVA, L., CHEN, D., SPASSOV, S., BOULVAIN, F. & DEVLEESCHOUWER, X. 2015. Magnetic susceptibility application – a window onto ancient environments and climatic variations: Foreword. – Geological Society, London, Special Publications, **414**.

KÖNIGSHOF, P., DA SILVA, A.C., SUTTNER, T., KIDO, E., WATERS, J., CARMICHAEL, K., JANSEN, U., PAS, D. SPASSOV, S. & JOACHIMSKI, M. 2015. Shallow water facies setting around the Kačák Event – a multidisciplinary approach. – In: BECKER, R.T., KÖNIGSHOF, P. & BRETT, C.E. (eds), Devonian Climate, Sea-level and Evolutionary Events, Geological Society, London, Special Publications, **423**.

DE VLEESCHOUWER, D., BOULVAIN, F., DA SILVA, A.C., PAS, D., LABAYE, C., CLAEYS, P. 2015. astronomical interpretation of the magnetic signal signal of the Givetian sections in the Dinant Synclinorium (La Couvinoise, Monts de Baileux, Fromelles-Flohmont and La Thure). - Geological Society, London, Special Publications, **414**.

WHALEN, M.T., ŚLIWIŃSKI, M.G., PAYNE, J.H., DAY, J.E., CHEN, D., DA SILVA, A.C. 2015. Chemostratigraphy of the late devonian Frasnian-Famennian transition in western Canada and Southern China: implications for carbon and nutrient cycling and mass extinction. - Geological Society, London, Special Publications, **414**.

PAS, D., DA SILVA, A.C., DEVLEESCHOUWER, X., DE VLEESCHOUWER, D., LABAYE, C., CORNET, P., MICHEL, J. & BOULVAIN, F. 2015. Sedimentary development and magnetic susceptibility evolution of the Frasnian in Western Belgium (Dinant Synclinorium, La Thure section). - Geological Society, London, Special Publications, **414**.

BOULVAIN, F., MABILLE, C. & DA SILVA, A.C. 2015 in press. Le phénomène récifal Givétien en Ardenne. Le Givétien. - Muséum national d'Histoire Naturelle, Paris.

Abstracts

PAS, D., POULAIN, G., LABAYE, C., DA SILVA, A.C., CORNET, P., DEVLEESCHOUWER, X., DE VLEESHOUWER, D., HLADIL, J. & BOULVAIN, F. 2014. Diversity and correlation of Givetian records in southern Belgium. - Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **19**: 38-40.

DJOUDER, H., BOULVAIN, F., DA SILVA, A.C., CORNET, P. & LÜNING, S. 2014. Tassili n'Ajjer (Sahara Oriental Algérien) – Résultats préliminaires sur le Silurien-Dévonien. - Journée Thématische de l'Association des Sédimentologistes Français (ASF) «Diagenèse : avancées récentes et perspectives», Paris, France, ASF: 122.

CM Mercedes DI PASQUO

Mercedes DI PASQUO is working as Senior Researcher CONICET, and she is in charge of the Laboratory of Paleopalynology and Paleobotany at the Institute CICyTTP-Diamante, Entre Ríos, Argentina (di Pasquo and Silvestri, 2014; more information at <http://www.cicytpp.org.ar>, <http://www.palino.com.ar> - ask for username/password to medipa@cicytpp.org.ar for downloading of papers, <http://independent.academia.edu/MercedesDiPasquo>, https://www.researchgate.net/profile/Mercedes_Di_Pasquo/). Her researches are mostly focused on the Silurian–Permian palynofloras (and megafloras) of South America in collaboration with several colleagues from Argentina (Sol NOETINGER, María VERGEL, Daniel STARCK, Juan Pablo MILANA, Victoria VALDÉZ), and elsewhere (e.g., Paulo A. SOUZA, Roberto IANNUZZI, Gordon WOOD, Peter ISAACSON, George GRADER, James MARTIN, Heidi ANDERSON, Enrique DÍAZ MARTÍNEZ, Delfino HERNÁNDEZ, Benjamin KELLER, Paulo PAIM, William MATSUMURA; see reference list).

Concerning the Devonian, Mercedes is currently working on Mid-Late Devonian *Haplostigma* flora deposits bearing palynofloral and invertebrates associated and interbedded from Bolivia and northern Argentina in collaboration with several colleagues (DI PASQUO et al. 2013; DI PASQUO, 2013). Related to this study, she is collaborating with W. MATSUMURA (PhD student at UFRGS) and R. IANNUZZI (supervisor), carrying on the analysis of the palynoassemblages associated to the Mid-late Devonian floras (especially with *Haplostigma*) from the Paraná Basin (Brazil). This flora is also correlated to the Bolivia and northern Argentina ones (MATSUMURA et al. 2014, 2015).

As Affiliate Associate Professor at the Department of Geological Sciences, University of Idaho (Moscow, Idaho, USA, since 2010, not

tenure-track position), she was working with Dr. Peter ISAACSON. He stayed three months at the CICYTTP during his sabbatical time in 2011, and Audrey WARREN (Dr. Peter ISAACSON's master student) spent July 2014 to work on Late Devonian (including the Struniann with *Retispora lepidophyta*) and Lower Carboniferous palynofloras from Montana (U.S.A.). Conodonts were also recovered and both groups are treated in a complete manuscript currently in progress to have a more complete information about the D/C boundary in the studied area (DI PASQUO et al. 2012; ISAACSON et al. 2013, 2014; WARREN et al. 2014).

Further contributions deal with Upper Palaeozoic (Devonian-Carboniferous) palynofloral changes in Bolivia and Argentina during the Gondwanaland glaciation (e.g. DI PASQUO and ANDERSON, 2012; NOETINGER and DI PASQUO, 2013, 2014; DI PASQUO et al. 2012, 2013, 2014; MILANA et al. 2014; VALDEZ et al. 2014, WOOD et al. 2014; see also reference list). Other recent Devonian study of Bolivia was published by NOETINGER (2014). In 2014, a multi-author contribution of Argentinian researchers deals with the Devonian Stratigraphy of Devonian System in Argentina, which involves geological and paleontological updated information on the stratigraphic and biostratigraphic units (available in http://www.segumar.gov.ar/P_Lexico/index.htm).

On behalf of the Asociación Latinoamericana de Paleobotánica y Palinología (ALPP 2009-2016, www.ufrgs.br/alpp, alpaleobotanicapalinologia.blogspot.com), as its president she supported the organization of the XVI Simposio Argentino de Paleobotánica y Palinología, which will be held at La Plata city (Buenos Aires Province, Argentina), in May 26th to 29th 2015. More information at <http://www.xvisapp.fcnym.unlp.edu.ar/index.html>.

Publications (2012-2014)

- DI PASQUO, M.M. 2014. Unidades estratigráficas del Devónico del norte de Argentina. – In: Léxico Estratigráfico de la Argentina. Sistema Devónico. Asociación Geológica Argentina y SEGEMAR, http://www.segumar.gov.ar/P_Lexico/index.htm
- DI PASQUO, M.M. & IANNUZZI, R. 2014. New palynological information from the Poti Formation (upper Visean) at the Roncador creek, Parnaíba Basin, northern Brazil. - Boletín Geológico y Minero, **125** (4): 405-435.
- DI PASQUO, M.M., GRADER, G.W., ISAACSON, P., SOUZA, P.A., IANNUZZI, R., DIAZ-MARTINEZ, E. 2014. Global biostratigraphic comparison and correlation of an early Cisuralian palynoflora from Bolivia. - Historical Biology, **2014** (4), <http://dx.doi.org/10.1080/08912963.2014.910204>

- DI PASQUO, M. & GRADER, G.W. 2012. The palynology of the Lower Permian (Asselian–?Artinskian) Copacabana Formation of Apillapampa, Cochabamba, Bolivia. - *Palynology*, **36**: 264-276 (with taxonomic supplementary online material), <http://dx.doi.org/10.1080/01916122.2012.677644>
- DI PASQUO, M.M. & SILVESTRI, L. 2014. Las colecciones de Palinología y Paleobotánica del Laboratorio de Paleopalinología y Paleobotánica del Centro de Investigaciones Científicas y Transferencia de Tecnología a la Producción (CICYTTP), Entre Ríos, Argentina. Contribuição à RESCEPP “Rede Sul-americana de Coleções e Ensino em Paleobotânica e Palinologia”. - Boletín de la Asociación Latinoamericana de Paleobotánica y Palinología, **14**: 39-47, ISSN 0325-0121.
- NOETINGER, S. 2014. Spore diversity trends in the Middle Devonian of the Chaco-Salteño Plain, northwestern Argentina. - *Palaeogeography, Palaeoclimatology, Palaeoecology*, **417**: 151–163.
- NOETINGER, S. & DI PASQUO, M. 2013. New palynological information from the subsurface Copo, Caburé and Rincón formations (upper Lochkovian – Emsian), Salta Province, Argentina. - *Alcheringa*, **44**: 107-121.
- Abstracts**
- DI PASQUO, M.M. & GRADER, G.W. 2012. Palynostratigraphy and correlation of the Cisuralian Vitiacua Formation in southern Bolivia. - XV Simposio Argentino de Paleobotánica y Palinología, Corrientes, 11-13 de Julio de 2012. - *Ameghiniana*, **49** (4), Suplemento 2012–Resúmenes: R124.
- DI PASQUO, M.M. & ANDERSON, H. 2012. Palynological record of Devonian and Pennsylvanian units in the Espejos Range, western Santa Cruz de la Sierra, central Bolivia. - 45 Annual Meeting of AASP (The Palynological Society) and CIMP (Commission Internationale de la Microflore du Paléozoïque Subcommissions), Lexington, Kentucky 2012, July 21st-25th, Abstracts: 19-20.
- DI PASQUO, M.M., GRADER, G.W., ISAACSON, P.E. & 2012. Palynology of the Devonian-Mississippian transition in western Montana: Three Forks, Sappington and Bakken formations. - 45 Annual Meeting of AASP (The Palynological Society) and CIMP (Commission Internationale de la Microflore du Paléozoïque Subcommissions), Lexington, Kentucky 2012, July 21st-25th, Abstracts: 21-22.
- DI PASQUO, M.M., GRADER, G.W. & BREEDLOVESTROUT, R. 2012. Palynology and paleoenvironment of the Cisuralian Vitiacua Formation in southern Bolivia. - 45 Annual Meeting of AASP (The Palynological Society) and CIMP (Commission Internationale de la Microflore du Paléozoïque Subcommissions), Lexington, Kentucky 2012, July 21st-25th. Abstracts: 22-23.
- DI PASQUO, M.M. 2013. Palinoestratigrafía del Devónico en el área de Yesera, Departamento de Tarija, Bolivia. - XIV Simpósio Brasileiro de Paleobotânica e Palinologia, Rio de Janeiro, Anais do Museu Nacional Rio de Janeiro, **49** (Resúmenes): 60.
- DI PASQUO, M.M., GRADER, G.W., ISAACSON, P.E., IANNUZZI, R., SOUZA, P.A. & DÍAZ-MARTÍNEZ, E., 2013. Early appearance of *Lueckisporites virkkiae* in South America and global Lower Permian biostratigraphic and paleobiogeographic significance. - XIV Simpósio Brasileiro de Paleobotânica e Palinologia (Rio de Janeiro), Anais do Museu Nacional Rio de Janeiro, **49** (Resúmenes): 61.
- VALDÉZ, V., PAULO, S.G. PAIM, P., SOUZA, A. & DI PASQUO, M.M. 2013. Carboniferous deglacial record in Paraná Basin (Brazil) and its analog in Paganzo Basin (Argentina): a comparison between Pennsylvanian and Permian sections. - 6th Latin American Congress of Sedimentology, São Paulo, Brazil, July 14th-17th, 2013.
- DI PASQUO, M.M. & HERNÁNDEZ-LÁSCARES, D. 2013. Primeros Registros Palinológicos de las Formaciones Matzitzí y Zapotitlán, regiones de Coatepec y Teotitlán, Estados de Oaxaca y Puebla, México. - VIII Congreso Latinoamericano de Paleontología y el XIII Congreso Nacional de Paleontología, Guanajuato, 23-27 de septiembre de 2013, Abstracts: 45.
- VALDÉZ, V., DI PASQUO, M.M. & KNELLER, B. 2013. Palinoasociaciones carboníferas en la Formación Guandacol en el área de Cerro Bola, La Rioja, Argentina. - XXIII Congresso Brasileiro de Paleontologia, Gramado 13-18/10, Abstracts: 40
- DI PASQUO, M.M., NOETINGER, S., STARCK, D., GRADER, G.W., ISAACSON, P.E. & MOREL, E. 2013. Devonian plants – *Haplostigma* Seward of Argentina and Bolivia: New records, palynoassemblages, and ages. - XXIII Congresso Brasileiro de Paleontologia, Gramado 13-18/10, Abstracts: 173.
- ISAACSON, P.E., DI PASQUO, M.M., GRADER, G.W., DÍAZ-MARTÍNEZ, E. & ANDERSON, H. 2013. Transition from cold climate endemic faunas and glaciation to glaciation-proxy carbonates (Devonian-Permian), Central Andes. - GSA Annual Meeting, Denver, 125th Anniversary of GSA, 27-30 October 2013, Abstracts: #227653, <https://gsa.confex.com/gsa/2013AM/top/papers>)

- ISAACSON, P.E., GRADER, G.W., DI PASQUO, M.M., WARREN, A.M. & RODRIGUEZ, A.P. 2014. Correlating Sappington Formation sequences intrabasinally and as proxies to Late Devonian Glaciation: Utilizing Palynostratigraphy. - GSA 2014 Joint Rocky Mountain/ Cordilleran Section Meeting, 18-21 mayo 2014 Bozeman, Montana, GSA Abstracts with Programs **46** (5).
- MILANA, J.P., DI PASQUO, M.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: 2 pp.
- MILANA, J.P., DI PASQUO, M.M. & VALDEZ BUSO, V. 2014. Nuevos datos sobre el límite Carbonífero - Pérmico en la sección Río del Peñón, precordillera riojana. - XIV Reunión Argentina de Sedimentología, Puerto Madryn, Chubut, 1-5 de Septiembre de 2014, Extended Abstracts: 2 pp.
- VALDÉZ, V., DI PASQUO, M.M., MILANA, J.P., KNELLER, B. & PAIM, P. 2014. Palynoassemblages in the Sierra de Maz area, La Rioja Province, Argentina: an older age for the base of the Guandacol Formation. - XIV Reunión Argentina de Sedimentología, Puerto Madryn, Chubut, 1-5 de Septiembre de 2014, Extended Abstracts: 2 pp.
- DI PASQUO, M.M., GRADER, G.W., ISAACSON, P.E. & WOOD, G. 2014. Palynozonation of the Permian of Bolivia and Peru. - 4th International Palaeontological Congress, Mendoza 28/9-3/10 de 2014, Abstracts.
- MATSUMURA, W.M.K., DI PASQUO, M., IANNUZZI, R., NOETINGER, S. & BOSETTI, E. 2014. Devonian flora succession in Gondwana: State of art in South America. - 4th International Palaeontological Congress, Mendoza 28/9-3/10 de 2014, Abstracts.
- DI PASQUO, M.M. & SOUZA, P.A. 2014. New findings of the *Lueckisporites virkkiae* Zone (late Cisuralian-Gadalupian) in the Serra do Rio do Rastro and neighboring localities (Paraná Basin) in Santa Catarina, Brazil. - 4th International Palaeontological Congress, Mendoza 28/9-3/10 de 2014, Abstracts.
- NOETINGER, S. & DI PASQUO, M.M. 2014. Eifelian-Givetian diversity trends in palynofloras of northwestern Argentina. - 4th International Palaeontological Congress, Mendoza, 28/9-3/10 de 2014, Abstracts.
- WOOD, G.D., DI PASQUO, M.M., ISAACSON, P.E. & GRADER, G.W. 2014. New taxa and comprehensive overview of Devonian palynomorphs from the Oxy-Mobil Pando x-1 core, Madre de Dios Basin, Bolivia. - 4th International Palaeontological Congress, Mendoza 28/9-3/10 de 2014, Abstracts.
- ISAACSON, P.E., DI PASQUO, M.M., GRADER, G.W. & ANDERSON, H. 2014. Late Paleozoic carbonates and coeval glacial deposits in Bolivia: correlations across a significant paleoclimatic gradient. AAPG/SEPM HEDBERG Research Conference "Latitudinal Controls on Stratigraphic Models and Sedimentary Concepts", 28/10-01/10-2014, Banff, Alberta, Canada, Extended abstracts: 4 pp.
- WARREN, A., DI PASQUO, M.M., GRADER, G.W., ISAACSON, P.E. & RODRIGUEZ, A. 2014. Latest Famennian Middle Sappington Shale: *Lepidophyta-Verrucosisorites nitidus* (LN) Zone at the Logan Gulch type section, Montana, USA. - GSA Annual Meeting, Vancouver, British Columbia, 19–22 October 2014, GSA Abstracts with Programs, **46** (6), Abstract 248057.

TM Nadezhda G. IZOKH and the Novosibirsk Group

During the year 2014 our team continued investigation of Devonian and Lower Carboniferous stratigraphy of the Salair and Kuznetsk Basin (south of the West Siberia) and lower riches of Lena River (Russian Arctic region). Research group from the Trofimuk Institute of Petroleum Geology and Geophysics SB RAS includes Drs. N.G. IZOKH, O.T. OBUT, V.G. KHROMYKH, N.V. Sennikov, E.S. Sobolev and A.Y. YAZIKOV, T.P. KIPRIANOVA, O.A. RODINA, T.A. SHCHERBANENKO; 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 Aleksandr Y. YAZIKOV – brachiopods,
CM Dr. Olga P. IZOKH – geochemistry,
Dr. Vladimir G. KHROMYKH – stromatoporoids,
Dr. Nikolay V. SENNIKOV – graptolites,
Dr. Evgeny S. SOBOLEV – ammonoids,
Olga A. RODINA – fish remains,
Tanyana A. SHCHERBANENKO – brachiopods.

Main results obtained in 2014

TM Nadezhda G. IZOKH analyzed the distribution of conodonts in Famennian (Upper Devonian) strata of Taimyr and North Siberia (Stolb Island, Lena River delta, north of Selenyakh Ridge). Among the predominant conodonts are *Palmatolepis*, common in relatively deep sedimentary environments. Conodonts characterize the *triangularis*, *crepida*, *rhomboidea* and

marginifera zones of the lower and lower part of the middle Famennian.

Nadezhda G. IZOKH, in collaboration with student **Ekaterina ANDREEVA**, studied new conodont association from the Tournaisian, Lower Carboniferous, of Salair. They are represented by cosmopolitan taxa, such as *Pseudopolygnathus multistriatus* MEHL & THOMAS, *Neopolygnathus communis* (BRANSON & MEHL), *Clydagnathus darensis* RHODES, AUSTIN & DRUCE, and *Mestognathus groessensi* BELKA; these characterize shallow-water *typicus-isosticha* Zone.

Our field trips were conducted in autumn 2014 to Devonian type sections of Salair, where we sampled for conodonts, brachiopods, ammonoids (new finding), and for isotopic analysis. Along with Devonian sequences, we started investigation of Lower Carboniferous conodont biostratigraphy in the Salair region and hope to continue field studies in 2015.

CM Aleksandr Y. YAZIKOV

successfully defended his dissertation on "Brachiopods and biostratigraphy of the Middle Devonian of the folded margins of the Kuznetsk Basin" in November 2014. The taxonomic revision of all Siberian brachiopods species, the reconstruction of their phylogeny and a modern regional brachiopod zonation were accomplished based on new stratigraphic data. Contemporaneous sections with different facies Devonian were aligned by several faunal groups, which enabled to estimate critically species features related to inhabited environments. Lateral rows of morphs from adjacent environments allowed to evaluate limits of intraspecific variation.

CM Olga T. OBUT,

in collaboration with TM Nadezhda G. IZOKH, continued to study Late Devonian - Early Carboniferous siliceous and carbonate sequences from the southern Char belt, East Kazakhstan. Radiolarians together with conodonts were obtained from cherts and limestones, respectively of the Karabaev and Urumbaev formations. Famennian associations included *Trilobite*, *Tetraentactinia*, *Astroentactinia*, and *Archocyrtium*, whereas a Tournaisian fauna is characterized by various *Archocyrtium* and *Albaillella*, as well as by *Helioentactinia*, *Polyentactinia*, and *Stygmospaerostylus*. Famennian conodonts are represented by *Palmatolepis rhomboidea* SANNEMANN and *Polygnathus* sp., the Tournaisian by *Gnathodus cf. punctatus* (COOPER), *Polygnathus* sp., and *Siphonodella cf. belkai* KONONOVA & MIGDISOVA.

Evgeny S. SOBOLEV continued the investigation of Eifelian ammonoids from Salair. During field studies in October 2014, ammonoids were found for the first time from the upper part of

the reef limestones of Pesterovo Beds (Eifelian). At the present stage of investigation, we suppose that there could be five different levels characterized by ammonoids in the Eifelian of Salair.

Tatyana A. SHCHERBANENKO returned to study Devonian brachiopods. The main topic of her research is connected with Frasnian brachiopods from the margins of the Kuznetsk Basin, south of West Siberia. She is conducting taxonomic investigation of athyridids from Izly and Vassino horizons cropping out along the Izly River (Novosibirsk area). A revision of *Athyris* and *Anathyris* from the Upper Devonian of the Kuznetsk Basin will be done.

CM Olga P. IZOKH

conducted isotope-geochemical studies in the Devonian of the Salair and Rudny Altai. Whole-rock carbon isotope analyses of the Upper Devonian section (Rudny Altai) represented by carbonate reef facies reveal a negative excursion at the base of *punctata* Zone. When compared to conodont biofacies turnovers and the Upper Devonian events chart, the new data have demonstrated a synchronism between the negative excursion and the coeval decline in conodont biodiversity corresponding to the Middlesex anoxic event of the Frasnian Stage of the Upper Devonian.

Abstracts

IZOKH, N.G. 2014. Upper Devonian conodonts from the Arctic Siberia. - In: Interekspo Geo-Siberia-2014, X. International conference "Subsurface management. Mining, New trends and techniques for prospecting, exploration and exploitation of mineral resources, Geoecology", Novosibirsk, April 8-18, 2014, SGGA, 1: 35-36. [in Russian, Abstract in English].

IZOKH N.G. & ANDREEVA E.S. 2014. Upper Devonian and Lower Carboniferous conodont biostratigraphic markers in the south West Siberia. - In: Interekspo Geo-Siberia-2013: X. International conference "Subsurface management. Mining, New trends and techniques for prospecting, exploration and exploitation of mineral resources, Geoecology", Novosibirsk, April 8-18, 2014, SGGA, 1: 37-40. [in Russian, Abstract in English].

IZOKH, N.G. & YAZIKOV, A.Y. 2014. The Stratigraphic chart of the Lower Devonian of Salair. - In: Correlation of Altaids and Uralids: magmatism, metamorphism, stratigraphy, geochronology, geodynamics and metallogenesis, Proceedings of the Second Russian-Kazakh International scientific meeting, Novosibirsk, 1-4 April 2014: 67-68, Novosibirsk, SB RAS [in Russian].

OBUT, O.T. & IZOKH, N.G. 2014. Devonian-Carboniferous microfossils from the southern Char Belt, east Kazakhstan. - In: SANTOSH, M.,

- PRADEEPKUMAR, A.P. & SHAJI, E. (eds), Convention & 11th International Conference on Gondwana to Asia, Abstract Volume: 105-106 (International Association for Gondwana Research IAGR Conference Series, **20**).
- YAZIKOV, A.Y. 2014. Middle Devonian brachiopod associations of Salair. - In: Interekspo Geo-Siberia-2013, X International conference "Subsurface management. Mining, New trends and techniques for prospecting, exploration and exploitation of mineral resources, Geoeology", Novosibirsk, April 8-18, 2014, SGGA, **1**: 35-36. [in Russian].
- YAZIKOV, A.Y. 2014. Phylogeny of the Siberian species of the genus *Protodouvillina* (brachiopods, Devonian). - In: Interekspo Geo-Siberia-2013, X International conference "Subsurface management. Mining. New trends and techniques for prospecting, exploration and exploitation of mineral resources. Geoeology", Novosibirsk, April 8-18, 2014, SGGA, **1**: 231-235. [in Russian, Abstract in English].
- YAZIKOV, A.Y. & IZOKH, N.G. 2014. Frequency of ecosystem rearrangements in the Early and Middle Devonian of the Salair. - In: Proceedings of LX Session Paleontological Society of the Russian Academy of Sciences, April 7-11, 2014, St. Petersburg: 147-148, St.-Petersburg Publishing House of VSEGEI. [in Russian].
- YAZIKOV, A.Y. & IZOKH, N.G. 2014. Crises of ecosystems in the Lower and Middle Devonian of Salair. - In: Interekspo Geo-Siberia-2014, X International conference "Subsurface management. Mining. New trends and techniques for prospecting, exploration and exploitation of mineral resources. Geoeology", Novosibirsk, April 8-18, 2014, SGGA, **1**: 241-244. [in Russian, Abstract in English].
- YAZIKOV, A.Y. & IZOKH, N.G. 2014. Devonian biostratigraphy of Salair. - In: Geology, geophysics and mineral resources of Siberia, Proceedings of 1st scientific Conference, Novosibirsk, SNIIGGiMS, **1**: 254-258. [in Russian].
- YAZIKOV, A.Y., IZOKH N.G. & SOBOLEV, E.S. 2014. The Stratigraphic chart of the Middle Devonian of Salair. - In: Correlation of Altaids and Uralids: magmatism, metamorphism, stratigraphy, geochronology, geodynamics and metallogenesis, Proceedings of the Second Russian-Kazakh International scientific meeting, Novosibirsk, April 1-4, 2014: 185-186, Novosibirsk, SB RAS. [in Russian].
- Dissertations**
- YAZIKOV, A.Y. 2014. Brachiopods and biostratigraphy of the Middle Devonian of the folded margins of the Kuznetsk Basin. - Candidate Dissertation abstract, Novosibirsk: IPGG SB RAS, 19 pp. [in Russian].
- YAZIKOV, A.Y. 2014. Brachiopods and biostratigraphy of the Middle Devonian of the folded margins of the Kuznetsk Basin. - Candidate Dissertation Thesis, Novosibirsk: IPGG SB RAS, Volume 1 and 2, 231 pp., 148 figs. 19 pls. [in Russian, unpublished].
- TM Ulrich JANSEN**
- During the last year, I have continued my works for the monograph of Lower Devonian brachiopods from the Rhenish Massif. A general account of the Rhenish brachiopod faunal succession and its interrelationships to different palaeoenvironments in connection with eustatic sea-level fluctuations, crustal subsidence and sedimentation rates has been submitted for the forthcoming Devonian Volume of the *Geological Society of London Special Publication*. The work includes a description of several subfacies within the Devonian phenotypic facies and many new biostratigraphic data from the brachiopods.
- I continued my work in the Turkish-German cooperation programme (DECENT; see report by E. SCHINDLER), focusing on Devonian sections in the central and eastern Taurides (southern Turkey), in particular the brachiopods and their implications on Devonian stratigraphy, events and palaeo(bio)geography. In 2014, I presented results together with colleagues at the Fourth International Palaeontological Congress in Mendoza (Argentina) and the 67th Geological Congress of Turkey in Ankara. I also took part in joint field work in the Harz Mountains and a workshop in Wilhelmshaven (Germany).
- On January 1, 2015, a new EU Programme has been launched, which I participate in as the representative from the Senckenberg Institute as partner organisation. It is entitled: BASELiNE Earth (*Brachiopods As SEnsitive tracers of gLoBal mariNe Environment: Insights from alkaline, alkaline Earth metal, and metalloid trace element ratios and isotope systems; from 2014-2018*). BASE-LiNE Earth is an Innovative Training Network funded by the European Commission within the Marie SKŁODOWSKA-CURIE Actions in Horizon 2020 'European Union Funding Programme for Research and Innovation'. In January this year, a first workshop took place in Praha. I expect to get new impulses for my brachiopod research in the Devonian from cooperations within this programme. [homepage: <https://www.base-line-earth.eu/de>]
- Publications 2014-2015**
- JANSEN, U. 2015 in press. Brachiopod faunas, facies and biostratigraphy of the Pridolian to early Eifelian succession in the Rhenish Massif

- (Rheinisches Schiefergebirge, Germany). – Geological Society, London, Special Publication, **423**.
- KÖNIGSHOF, P., DA SILVA, A.C., SUTTNER, T.J., KIDO, E., WATERS, J., CARMICHAEL, S.K., JANSEN, U., PAS D., SPASSOV S. & JOACHIMSKI, M.M. 2015 in press. Shallow water facies setting around the Kačák Event – a multidisciplinary approach. – Geological Society, London, Special Publications, **423**.
- JANSEN, U. 2014. Strophomenid brachiopods from the Rhenish Lower Devonian. – Bulletin of Geosciences, **89** (1): 113-136, <http://www.geology.cz/bulletin/contents/art144>.
- JANSEN, U., BOZDOĞAN, N., BROCKE, R., ERTUĞ, K., FINKS, R.M., GROOS-UFFENORDE, H., HAUDE, R., KOZLU, H., NALCIOĞLU, G.F., NAZIK, A., ÖZKAN, R., SANCAY, R.H., SAYDAM-DEMIRAY, D.G., SCHINDLER, E., ŞEKER, E., WEDDICE, K., WEHRMANN, A., WILDE, V., YALÇIN, M.N. & YILMAZ, İ. 2014. New palaeontological data from the Devonian of Turkey. – 4th International Palaeontological Congress, Mendoza, Abstract Volume: 848.
- JANSEN, U., NAZIK, A., NALCIOĞLU, G.F., ÖZKAN, R., GROOS-UFFENORDE, H., ŞEKER, E., BROCKE, R., SANCAY, R.H., BOZDOĞAN, N., YILMAZ, İ., YALÇIN, M.N. & SCHINDLER, E. 2014. New paleontological data from the Devonian of Turkey and their paleobiogeographical implications. – 67th Geological Congress of Turkey, Ankara, Abstracts Book: 675.
- YALÇIN, M.N., SCHINDLER, E., WEHRMANN, A., NAZIK, A., YILMAZ, İ., WILDE, V., ÖZKAN, R., BOZDOĞAN, N., BROCKE, R., SAYDAM-DEMIRAY, G., WEDDICE, K., SANCAY, R.H., JANSEN, U., NALCIOĞLU, G., KOZLU, H., LINNEMANN, U., ŞAHİN, N. & GROOS-UFFENORDE, H. 2014. Devonian stratigraphy of the Central and Eastern Taurides. – 67th Geological Congress of Turkey, Ankara, Abstracts Book: 703.
- SCHINDLER, E., NAZIK, A., HAUDE, R., BROCKE, R., ŞEKER, E., BOZDOĞAN, N., SANCAY, R.H., GROOS-UFFENORDE, H., JANSEN, U., WEDDICE, K., ÖZKAN, R., YALÇIN, M.N., WEHRMANN, A., & WILDE, V. 2014. First record of loboliths in Turkey: Scyphocrinoids and other palaeontological evidence for the Silurian/Devonian boundary interval in the Eastern and Central Taurides. – 67th Geological Congress of Turkey, Ankara, Abstracts Book: 705.
- NAZIK, A., YALÇIN, M.N., SCHINDLER, E., WILDE, V., WEHRMANN, A., HAUDE, R., FINKS, R.M., WEBSTER, G.D., YILMAZ, İ., BROCKE, R., JANSEN, U., ÖZKAN, R., ŞEKER, E., GROOS-UFFENORDE, H., BOZDOĞAN, N., SANCAY, R.H., SAYDAM-DEMIRAY, G., WEDDICE, K. & KOZLU, H. 2014. Important paleontological evidences of Devonian strata in the Eastern Taurides. – 15. Paleontoloji-Stratigrafi Çalıştayı, Antalya: 44.

CM Elga MARK-KURIK

The events taking place before the publication of a placoderm paper in the journal “Nature” in 2014 were quite exciting. John LONG (Flinders University, Adelaide, Australia) visited shortly the Institute of Geology, Tallinn University of Technology (Estonia), in September 2013. He studied our rich fossil fish collections, among others that of the Middle Devonian placoderm *Microbrachius*. This small bothriolepidoid antiarch was previously known from Scotland and preserved as articulate specimens. Estonian material of the same fish consists of isolated 3D skeletal elements. One of the body armour plates, the posterior ventrolateral (see Fig.), which had an attached hook-like dermal element, was of special interest. John recognized it as a clasper, i.e. a reproductive element of male individuals known earlier in other placoderms: ptyctodonts and arthrodires. This discovery became a stimulus of an extraordinarily active study of antiarchs. The study involved numerous specialists, arrangement of special field trips to collect more evidence, and the search for additional specimens in museums. The result was one of the Letters in “Nature”, a truly international paper with 12 co-authors from six countries. The paper “Copulation in antiarch placoderms and the origin of gnathostome internal fertilization” became available in October 2014 as an online version: doi:10.1038/nature13825, and in January 2015 “Nature”, **517** (7533): 196-199. All main groups of fossil fishes were included into the analyses. Among living fishes the internal fertilization is known in chondrichthyans (e.g. sharks) and some rare teleost fishes, whereas of fossil fish it characterized all placoderms and numerous chondrichthyans.

A stratigraphical side product of the above paper points to a disagreement in position of the Eifelian/Givetian boundary in Estonia and Scotland: in the latter it is considered to be probably higher than in Estonia [cf. fig. 3 in MARK-KURIK & PÖLDVERE 2012, “Estonian Journal of Earth Sciences”, **62** (3)]. Moreover, we have quite different ideas on the environment conditions. And despite of all this, we can correlate several local units of both regions, based on fossil fishes, some of which coincide even on the species level.

In co-operation with the Australian colleagues, John LONG and Gavin YOUNG one more paper was published: “Taxonomic revision of buchanosteoid placoderms (Arthrodire) from the Early Devonian of south-eastern Australia and Arctic Russia”,

Australian Journal of Zoology, 2014, **62**: 26-43. Buchanosteids, coming from the later Early Devonian are not very numerous but had a rather wide distribution: Australia, China, Central Asia, Russia (Ural region) and Middle East. E. M.-K. described a new buchanosteid, *Urvaspis lithuanica*, from the Arctic Severnaya Zemlya Archipelago. The genus belongs to the family Parabuchanosteidae nov.

Recently the study of Devonian floras from Baltic was revived. Russian paleobotanists Aleftina JURINA (Moscow University) and Marina RASKATOVA (Voronezh University) were busy with the Middle Devonian, Givetian flora. Both higher plant remains and miospores (for the first time) were identified from Joosu, the former infusible clay quarry, SE Estonia (now the quarry is recultivated). The samples with fossils (collected by E. M.-K.) come from the Abava Member, the upper part of the Burtnieki Regional Stage. It is the same unit that has yielded placoderms *Watsonosteus* and *Microbrachius*, earlier known only from the Givetian of Scotland. In addition to the earlier described fern (Cladoxylopsida) *Pseudosporochnus estonicus* KALAMEES, 1988, two more species of the genus – *P. verticillatus* and *P. chlupáči*, and also *Precyclostigma* sp. (Lycopodiphytida) were discovered. The macroflora shows great similarity to that of the Givetian flora in the Czech Republic and Belgium (in the latter to the Lower Givetian flora).



The Antiarch *Microbrachius*. Right posterior ventrolateral plate with clasper, visceral view. Locality: Essi farm, SE Estonia.

Miospores of genus *Geminospora*: *G. micromanifesta*, *G. compta*, *G. egregius* and particularly *G. extensa* from the Abava Member confirm the occurrence of the Givetian Zone EX in the Devonian of Estonia.

A. JURINA and M. RASKATOVA (E. MARK-KURIK as a co-author) gave a talk on the above topic “Higher plants and miospore assemblages of Burtnieki Regional Stage (Givetian), South Estonia (Joosu quarry)” on the 9th Baltic Stratigraphical Conference, in September 2014 in Vilnius, Lithuania. The Abstracts of the conference talks can be found in web by address: 2931-1886-1-PB.pdf.

TM John E. MARSHALL and the Southampton Group

Another busy year in Devonian spore world. I managed to get a semester of study leave in 2014. Part of this I spent at NIGPAS in Nanjing, China where I worked with ZHU Huaicheng, and WANG Yi on spores from Yunnan. I was very pleased to be able to revisit and resample in detail the Maoshanxiang locality where we had discovered an interesting endemic microflora in 2006. This included spores otherwise only known from either Australia or Saudi Arabia. Interestingly their age ranges are substantially younger in Yunnan. We also discovered some Early Devonian spores that are endemic and match the endemic contemporary land plant flora.

In June I went to New York State with Jenny MORRIS (Sheffield) and Dave CARPENTER (Southampton) to work with colleagues from the New York State Museum. We collected charcoal through the Devonian sequence and studied the Mid Devonian forest locality at Cairo. This is where Jenny and colleagues had previously drilled a series of cores through the palaeosols that underlie the in situ *Wattieza/Archaeopteris* forest.

Conference attendance was busy with presentations at AASP in San Francisco, the 9th EPPC in Padua, Italy where we had a session on Devonian forests and the Linnean Society Palaeobotany Group meeting in London. I attended IPC4 in Argentina including the excellent Palaeozoic fieldtrip. In Argentina Olga TEL'NOVA and I made our first F/F presentation from the science borehole we drilled at Sosnogorsk, near Ukhta, in the Timan. The conference year finished at PalAss in Leeds, UK.

Continuing PhD students working on the Devonian and Early Carboniferous are Jon LAKIN who is just completing his thesis on the D-C boundary glaciogenic sequence in Bolivia, Dave CARPENTER who is acquiring a mid Silurian to Carboniferous time series on micro-charcoal as an atmospheric oxygen palaeoproxy and Emma REEVES who is working on the palynology of the

TW:eed project borehole through the earliest Carboniferous in the Scottish Borders. This is to tie, with palynology, the new discoveries of early tetrapods in Scotland. Impressively we did some December fieldwork in Fife, Scotland with sunset at 15:30. However, despite this we still managed to make a collection of 6 golf balls from the sections, Fife being the home of golf (apparently).

CM Bruno MISTIAEN

Since my precedent report, several papers have been published or submitted; all of them principally devoted to Devonian builders. Like previously my main research projects are relative to the study of Devonian Stromatoporoids and Tabulate corals.

In the same time I participate to catalog and description of important geological outcrops to protect; This program is purchased by the “Conservatoire d’Espaces Naturels du Nord et du Pas-de-Calais”, specially palaeozoic outcrops in Boulonnais and in Avesnois (North of France).

I also participate to the book coordinated by Denise BRICE of the “Stratotype Givétien” of Givet, especially for Stromatoporoids and Tabulate corals chapters.

One of the main projects is to progress in the studies relative to the Strunian of Avesnois, with more particularly the revision of the stromatoporoids.

The project to study a rich material of Devonian tabulate corals from Afghanistan (Central Mountains and Band-e Bayan areas) is also progressing.

Publications

MISTIAEN, B., BRICE, D., DEVLEESCHOUWER, X., HUBERT, B.L.H., KHATIR, A., MOTTEQUIN, B., NICOLLIN, J.P. & POTY, E. 2013. Le “Calcaire d’Etroeungt” dans les coupes historiques d’Etroeungt et d’Avesnelles (Avesnois, Nord, France). The “Etroeungt Limestone” in the historical sections of Etroeungt and Avesnelles (Avesnois, Nord, France). - Annales de la Société Géologique du Nord, **20** (2e série): 43-51, 5 fig.

DA SILVA, A.-C., KERSHAW, S., BOULVAIN, F., HUBERT, B.L.M., MISTIAEN B., REYNOLDS, A. & REITNER, J. 2014. Indigenous demosponge spicules in a Late Devonian stromatoporoid basal skeleton from the Frasnian of Belgium. - Lethaia, **47**: 365–375.

MISTIAEN, B. & HUBERT, B.L.M. 2014. Encroûtements stromatolithiques dans le Givétien de Ferques Boulonnais, France (Stromatolitic buildups in the Givetian of Ferques area, Boulonnais, France). - Annales de

la Société Géologique du Nord, **21** (2e série): 43-49, 6 fig.

MISTIAEN, B., BRICE, D., HUBERT, B.L.M., PINTE, E. 2015. Devonian palaeobiogeographic affinities of Afghanistan and surrounding areas (Iran, Pakistan), - Journal of Asian Earth Sciences, **102**: 102-126.

HUBERT, B.L.H., MISTIAEN, B. & PINTE, E. 2016. France, Devonian (Palaeozoic Massif of Ferques, Boulonnais). – In: SUTTNER, T., KIDO, E., KÖNIGSHOF, P., WATERS, J.A., DAVIS, L. & MESSNER, F. (eds), Planet Earth in Deep Time, Palaeozoic Series, Devonian & Carboniferous: 92-93, Schweizerbart Science Publishers, Stuttgart.

MISTIAEN B. & HUBERT B.L.M. 2016. France. Devonian (Etroeungt, Avesnois). – In: SUTTNER, T., KIDO, E., KÖNIGSHOF, P., WATERS, J.A., DAVIS, L. & MESSNER, F. (eds), Planet Earth in Deep Time, Palaeozoic Series, Devonian & Carboniferous: 94-95, Schweizerbart Science Publishers, Stuttgart.

CM Marek NARKIEWICZ

The results of the Zachełmie tracksite project financed by the Polish National Research Centre have been published or accepted for a publication during the last year. The project was devoted mainly to explaining the palaeoecological context of the earliest tetrapod ichnorecord. The mid-Eifelian age of the trackways has been confirmed and further constrained to the lower part of the conodont *costatus* Zone, corresponding to the 390-391 Ma interval (NARKIEWICZ, in press; NARKIEWICZ & NARKIEWICZ 2015). The key paper, published online in November 2014 (NARKIEWICZ et al. 2015) presents an environmental interpretation of the trackway-bearing beds based on sedimentological, palaeontological, geochemical and palaeomagnetic methods.

The reconstructed tetrapod habitats comprised shallow-water lagoons separated from an open marine basin by sparsely vegetated islands and spits. The lagoonal waters were well-aerated and a few-meters deep at most, undergoing periodic desiccation. The dolomitic sediments, primarily of microbial origin, formed in tropical waters of slightly modified marine composition. The seasonal semi-arid to subhumid climate was probably of a tropical monsoonal type. The degree of restriction of the lagoonal system evolved from relatively open, evaporation-dominated towards increasingly closed, fresh-water influenced. The detailed observations of the footprint-bearing beds, as well as the characteristics of the tracks, indicate that they were formed mostly under subaqueous conditions, by wading, walking on the bottom or swimming animals. The lagoonal model of a quadrupedality

development has been presented, as opposed to the earlier tidal-flats and flooded-woodlands concepts. According to the model, functional limbs emerged among aqueous animals that acquired their locomotional capabilities in a shallow lagoonal water before attempting longer excursions on land.

Joint Polish-Belarussian project on the presumed Kačak Event(s) in shallow-marine Eifelian facies of Belarus and Poland has been continued (to be finished in 2015). The conodont study is particularly advanced, including revision of *Icriodus orri* KLAPPER & BARRICK, and related forms. The preliminary results have been presented during the Mendoza Congress (**K. NARKIEWICZ**, 2014, abstract).

The multidisciplinary study of Korczmin IG 1 borehole section, regional stratotype of the Frasnian in the Lublin Basin of SE Poland, was finished by the end of 2014. Main results include sedimentological and palaeomagnetic documentation of metre-scale cyclicity observed in shallow-subtidal and peritidal facies (with a contribution by Jacek Grabowski on magnetic susceptibility patterns). Of a more general importance are the results of the conodont study by Katarzyna Narkiewicz, which furnished interesting material representing polygnathid biofacies spanning also the Frasnian-Famennian boundary interval. Planned publication will be devoted to a taxonomic description and revision of several polygnathid and icriodid species, and verification of their stratigraphic ranges.

Publications/abstracts

GRABOWSKI J., NARKIEWICZ M. & DE VLEESCHOUWER D. 2015 in press. Forcing factors of the magnetic susceptibility signal in lagoonal and subtidal depositional cycles from the Zachełmie section (Eifelian, Holy Cross Mountains, Poland). - In: DA SILVA A.Ch. (Ed.), Magnetic susceptibility application: A window onto ancient environments and climatic variations, Geological Society, London, Special Publications, **414** [published online, <http://dx.doi.org/10.1144/SP414.5>].

NARKIEWICZ K. 2014. Systematics of the Middle Devonian Icriodids related to *I. orri* KLAPPER & BARRICK: an example of taxonomic problems involved in definition of conodont species (abstract). - 4th International Palaeontological Congress, Mendoza, Argentina, September 28 to October 3, 2014, "The history of life: a view from the Southern Hemisphere": 855.

NARKIEWICZ K. 2015 in press. Taxonomic revision and phylogenetic affinities of the conodont *Bipennatus montensis* (WEDDIGE, 1977) from the Eifelian (Middle Devonian) of Poland. - Paläontologische Zeitschrift [published online, doi 10.007/S12542-013-0218-9].

NARKIEWICZ K. & NARKIEWICZ M. 2015. The age of the oldest tetrapod tracks from Zachełmie, Poland. - Lethaia, **48**:10-12, doi 10.1111/let.12083.

NARKIEWICZ M., GRABOWSKI J., NARKIEWICZ K., NIEDZWIEDZKI G., RETALLACK G.J., SZREK P., DE VLEESCHOUWER D. 2015. Palaeoenvironments of the Eifelian dolomites with earliest tetrapod trackways (Holy Cross Mountains, Poland). - Palaeogeography, Palaeoclimatology, Palaeoecology, **420**: 173-192, doi: 10.1016/j.palaeo.2014.12.013.

NIEDZWIEDZKI G., NARKIEWICZ M. & SZREK P. 2014. Middle Devonian invertebrate trace fossils from the marginal marine carbonates of the Zachełmie tetrapod tracksite, Holy Cross Mountains, Poland. - Bulletin of Geosciences, **89** (3): 593-606, doi 10.3140/bull.geosci.1460.

TM Maria Cristina PERRI

In 2014 she continued to focus her research on Frasnian and Famennian conodont biostratigraphy in the Southern Alps. The biostratigraphic study is tied in with detailed sedimentologic analysis supported by geochemistry data and with evaluation of the conodont biodiversity and abundance variation pre- and post- the uppermost Frasnian biologic crisis. She is still interested in the Devonian-Carboniferous boundary problem.

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

CM Luiza C.M.O. PONCIANO and the Parnaíba and Amazonas basins

During the past two years my research projects have focused on shallow marine, siliciclastic systems of Devonian age in the Parnaíba and Amazonas basins of northeastern and northern Brazil. Current studies are mostly 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). Besides, I have been working on Devonian faunal correlations of the Parnaíba, Amazonas, and Paraná basins with other basins elsewhere in the world and the recognition of global event levels within Brazilian Devonian successions.



Field work in the Parnaíba Basin, State of Piauí, Brazil.



Field work in the Amazonas Basin, State of Pará, Brazil.

Field work conducted along the eastern border of the Parnaíba Basin, in the State of Piauí, has revealed new fossil localities and additional fossiliferous horizons at previously known sites, involving an array of different lithologies (siltstones, sandstones, and conglomerates). Initial taphonomic results obtained for the Parnaíba Basin have been integrated with revised sedimentological, stratigraphic, and paleobiological data in order to enhance the quality of environmental interpretations and to elucidate the genesis of Devonian fossil assemblages. Nevertheless, additional research is clearly required in the basin. Over the next years I intend to collaborate with TM Carlton BRETT (University of Cincinnati), CM Jay ZAMBITO (Wisconsin Geological Survey), and other researchers in a joint project aimed at revising the stratigraphy, taphonomy, and paleoenvironments of those Devonian strata.

I am presently collaborating with Maria da Glória CARVALHO (American Museum of Natural History, NY), on Devonian trilobites of Brazil and their paleobiogeographic significance (two papers in press), and Mario CAPUTO, on the stratigraphy of the Parnaíba and Amazonas basins (one paper in press). I am also working with other Brazilian specialists on Geological Heritage and Geoconservation projects, and contributing as a consultant and paleoartist to the preparation of upcoming paleontological exhibitions at the National Museum of Rio de Janeiro.

In May 2014 I took part in a two-week field work conducted by TM Carlton BRETT, focusing on the Geology and Paleontology of Utah and central Colorado. Besides, I continued with a mapping project in the Amazonas and Parnaíba basins (field work performed in August and December, 2014). Results of taphofacies studies on late early Givetian fossil assemblages of the Parnaíba Basin were presented at the 4th International Palaeontological Congress (Mendoza, Argentina, September–October, 2014). I also organized the first GEOEDUCA (National Meeting on Earth Sciences Education), which took place at the Federal University of the State of Rio de Janeiro, Brazil, in March, 2015.

Palynological investigations on Devonian sections of the Amazonas and Parnaíba basins have been conducted during the past two years by geologists José Henrique MELO and Márcia LONGHIM (Biostratigraphy and Paleoecology Management of Petrobras R&D Centre - Cenpes, Rio de Janeiro). Regional Devonian palynostratigraphic schemes have been erected on the basis of miospores and chitinozoans. Furthermore, a new, detailed acritarch-based biozonation for Silurian and Devonian strata of those basins is currently being constructed.

Publications

CARVALHO, M.G.P. & PONCIANO L.C.M.O. 2015 press. The Devonian trilobites of Brazil: a summary. - Journal of South American Earth Sciences.

PONCIANO, L.C.M.O. & CAPUTO, M.V. 2015. Devonian invertebrate fossils of the Amazonas, Parnaíba, and Paraná basins: age and stratigraphy. - Boletim do Museu Paraense Emílio Goeldi: Ciências Naturais.

CARVALHO, M.G.P. & PONCIANO, L.C.M.O. in press. Devonian trilobites from Amazonas Basin and their paleobiogeographic significance. - Boletim do Museu Paraense Emílio GOELDI, Ciências Naturais.

PONCIANO L.C.M.O. 2014. Tafonomia de Invertebrados. In: SOARES, M.B. (Org.). Livro Digital de Paleontologia: a paleontologia na sala de aula, 2nd ed.: 274 - 295.

PONCIANO, L.C.M.O., MACHADO, D.M.C. & CASTRO, A.R.S.F. 2014. Patrimônio Paleontológico. - In: SOARES, M.B. (Org.). Livro Digital de Paleontologia: a paleontologia na sala de aula, 2nd ed.: 460-473.

KUNZLER, J., NOVAES, M.G.L., MACHADO, D. M. C. & PONCIANO, L.C.M.O. 2014. Coleções paleontológicas como proteção do patrimônio científico brasileiro. - In: GRANATO, M. & RANGEL, M.F. (Org.). Anais do III Seminário Internacional Cultura Material e Patrimônio de C&T, RJ, Museu de Astronomia e Ciências Afins (MAST): 385-407.

MANSUR, K.L., PONCIANO, L.C.M.O., CASTRO, A.R.S.F. & Carvalho, I. S. 2013. Conservation and restoration of geological heritage and its relevance to geoconservation. - Boletim Paranaense de Geociências, **70**: 137-155.

PONCIANO, L.C.M.O., FONSECA, V.M.M., FERNANDEZ, A.C.S., MACHADO, D.M.C. & CASTRO, A.R.S.F. 2013. Fossiliferous Outcrop of Oiti, Parnaíba Basin, State of Piauí – Record of a Devonian sea in northeastern Brazil. - In: WINGE et al. (eds), Sítios Geológicos e Paleontológicos do Brasil, **3**, 1st ed.: 191- 200, Brasília, CPRM.

CAPUTO, M. V. & PONCIANO, L.C.M.O. 2013. Striated Pavement of Calembre, Brejo do Piauí, State of Piauí – Record of 360 million years old continental glaciers in Northeastern Brazil. - In: WINGE et al. (eds), Sítios Geológicos e Paleontológicos do Brasil, **3**, 1st ed.: 163-174, Brasília, CPRM.

PONCIANO, L.C.M.O. & CARVALHO, M.G.P. 2014. Stratigraphic, taphonomic and paleoenvironmental analysis of the Devonian Pimenteira Formation, Parnaíba Basin, Brazil. - In: Abstract volume of the 4th International Palaeontological Congress - The history of life, A view from the Southern Hemisphere, Mendoza, Argentina: 596.

(new) CM Wenkun QIE



Personal details:

Post doctor, Nanjing Institute of Geology and Palaeontology, CAS.

Ph.D. (Stratigraphy and Paleontology), China University of Geosciences-Wuhan, 2011.

B.Sc. (Geology), China University of Geosciences-Wuhan, 2006.

Research interests

- Carbonate sedimentology, especially the formation of reef system
- Stable isotope geochemistry
- Conodont biostratigraphy of Devonian-Lower Carboniferous

Publications

QIE, W.K., WANG, X.D., ZHANG, X.H., JI, W.T., GROSSMAN, E.L., HUANG, X., LIU, J.S. & LUO, G.M. 2015. Latest Devonian to earliest Carboniferous conodont and carbon isotope stratigraphy of a shallow-water sequence in South China. - Geological Journal (in review).

QIE, W.K., LIU, J.S., CHEN, J.T., WANG, X.D., MII, H.S., ZHANG, X.H., HUANG, X., YAO, L., ALGEO, T.J. & LUO, G.M. 2015. Local overprints on the global carbonate $\delta^{13}\text{C}$ signal in Devonian-Carboniferous boundary successions of South China. - Palaeogeography, Palaeoclimatology, Palaeoecology, **418**: 290-303.

Abstract: An integrated study of the litho-, bio-, and chemostratigraphy of the Devonian-Carboniferous boundary at four sections (Qilinzhai, Malanbian, Gedongguan and Long'an) in South China was undertaken in order to better understand paleoenvironmental changes and controls on $\delta^{13}\text{C}_{\text{carb}}$ variation during the Hangenberg Crisis. Sedimentological data record a major regression in the Middle *Siphonodella praesulcata* Zone, which coincided with the Hangenberg Extinction (HE) in South China. Our new $\delta^{13}\text{C}_{\text{carb}}$ data document a negative $\delta^{13}\text{C}_{\text{carb}}$ shift near the base of the Middle *Si. praesulcata* zone, which may have been related to the HE. Prior to and during the HE, respiration of organic matter contributed abundant ^{12}C -enriched dissolved inorganic carbon (DIC) to the restricted Nanning carbonate platform, resulting in a negative vertical $\delta^{13}\text{C}_{\text{DIC}}$ gradient in the study area. In the Upper *Si. praesulcata* Zone, all four sections exhibit a positive $\delta^{13}\text{C}_{\text{carb}}$ shift, suggesting that a vigorous biological pump existed in the aftermath of the latest Devonian glaciation. However, peak $\delta^{13}\text{C}_{\text{carb}}$ values differ markedly among the study sections, suggesting that local carbon cycling processes played an important role during the initial post-glacial transgression.

QIE, W.K., ZHANG, X.H., DU, Y.S., YANG, B., JI, W.T. & LUO, G.M. 2014. Conodont biostratigraphy of Tournaisean shallow-water arbonates in central Guangxi, South China. *Geobios*, **47**: 389-401.

Abstract: The conodont faunas of Tournaisian shallow water carbonates from central Guangxi are described mainly for biostratigraphic purposes. A complete series of samples was collected from Long'an and Du'an formations in the Long'an section. These formations are characterized by lime mudstone, skeletal and peloidal wackestone, packstone and grainstone with typical shallow water biota. In total, these samples produced 809 identifiable PI elements, belonging to 50 species in 11 genera, of which 1 species and 1 subspecies are new. The fauna enables the establishment of seven biozones, which in ascending order are, *Polygnathus spicatus*, *Siphonodella homosimplex*, *Si. sinensis*, *Si. dasaibaensis*, *Polygnathus communis carina* Acme, *Gnathodus cuneiformis* and *Po. communis porcatus* zones. Based on the new collections from central Guangxi and all data from literature, a conflated Tournaisian conodont zonation is proposed for shallow water successions in South China. Most of the conodont zones correlate well with their counterparts recognized in the Western Europe, which may be of greater significance in stratigraphic correlation than previously thought.

QIE, W.K., WANG, X.D. 2012. Carboniferous-Early Permian deep-water successions in northern margin of the Dian-Qian-Gui Basin and its sedimentary evolution. - Chinese Journal of Geology, **47** (4): 1071-1084. (in Chinese with English abstract)

QIE, W.K., ZHANG, X. H., DU, Y. S. & ZHANG, Y. 2011. Lower Carboniferous carbon isotope stratigraphy in South China: implications for the Late Paleozoic glaciations. - Science in China (Series D), **54** (1): 84-92.

Abstract: Studies on carbon isotopes of bulk carbonates from Longan and Baping sections of Lower Carboniferous in Guangxi of China show that the stable carbon isotope compositions in carbonate rocks of the isolated platform and deep slope facies were resistant to the influence of early meteoric diagenesis and late burial diagenesis. Three major positive carbon isotope excursions have been recognized in Lower Carboniferous in South China. The first major positive $\delta^{13}\text{C}$ shift of 4.19‰ occurred in the middle part of *Siphonodella isosticha*-upper *Siphonodella crenulata* zone (Tournaisian); the second with an amplitude of 4.65‰ occurred near the Tournaisian/Visean boundary; and the third of 2.23‰ in the lower part of *Gnathodus bollandensis* zone. The three positive shifts of $\delta^{13}\text{C}$ can be correlated with global carbon isotope excursions and are consistent with the fall in global sea level, indicating that abundant organic carbon burial, lowering of atmospheric CO₂, and glaciation may have occurred during these time intervals.

QIE, W.K., ZHANG, X.H. & ZHANG, Y. 2010. Geobiological characteristics of basinal facies

hydrocarbon source rocks of the Lower Carboniferous of Baping section in Nandan, Northern Guangxi. - Journal of Palaeogeography, **12** (2): 233-243. (in Chinese with English abstract).

QIE, W.K., ZHANG , X.H., CAI, X.F. & ZHANG, Y. 2007. Geobiological processes and the formation of hydrocarbon source rocks in the Carboniferous-Early Permian glacial period in South China. - Earth Science (Journal of China University of Geosciences), **32** (6): 803-810. (in Chinese with English abstract).

YAO, L., QIE, W.K., LUO, G.M., LIU, J.S., ALGEO, T.J. BAI, X., YANG, B. & WANG, X.D. 2015. The TICE event: Perturbation of carbon-nitrogen cycles during the mid-Tournaisian (Early Carboniferous) greenhouse-icehouse transition. - Chemical Geology, **401**: 1-14, <http://dx.doi.org/10.1016/j.chemgeo.2015.02.021>

YAO, L., WANG, X.D., LI, Y., QIE, W.K. & LIN, W. 2014. Microfacies of the Reef and Bank limestones from the Lower Carboniferous Shangsi Formation in Huishui, South Guizhou. - Geological Review, **60** (6): 1381-1392 (in Chinese with English abstract).

WANG, X.D., QIE, W.K., SHENG, Q.Y. , QI, Y.P. , WANG,Y., LIAO, Z.T., SHEN, S.Z. & UENO, K. 2013. Carboniferous and Lower Permian sedimentological cycles and biotic events. - The Geological Society, London, Special Publications, **376**: 33-46.

HUANG, X., ZHANG, X.H., QIE, W.K., WEN, Q. & WANG, C.N. 2013. Late Carboniferous rugose corals from Yuanling, Hunan province. - Acta Palaeontologica Sinica, **52** (3): 377-390 (in Chinese with English abstract).

HUANG, X., ZHANG, X.H., DU, Y.S., QIE, W.K., YANG, B. & DUAN, X.F. 2013. Control of sea-level changes over the forming of bauxite between Carboniferous and Permian in Northern Guizhou and adjacent regions. - Geological Science and Technology Information, **32** (1): 80-86 (in Chinese with English abstract).

HUANG, X., ZHANG, X.H., DU, Y.S., TAN, Y.J., WEN, S.F., LEI, Z.Y., QIE. W.K. & JIANG, T. 2012. Age of bauxite forming in Northern Guizhou. Geological Science and Technology Information, **31** (3): 49-54 (in Chinese with English abstract).

YIN, H.F., XIE, S.C., YAN, J.X., HU, C.Y., HUANG, J.H., TENGER., QIE, W.K. & QIU, X. 2011. Geobiological approach to evaluating marine carbonate source rocks of hydrocarbon. - Science in China (Series D), **54** (8): 1121-1135.

ZHANG, Y, QIE, W.K., LI, Y.L. & ZHANG, X.H. 2009. Carboniferous oolitic hematite in Longmenshan area of Sichuan Province and its

- paleoenvironmental significance. - *Acta Petrologica et Mineralogica*, **28** (4): 51-57 (in Chinese with English abstract).
- ZHANG, X.B., ZHANG, X.H., QIE, W.K. & ZHANG, Y. 2008. Several key problems about regional geological survey in the small 'Red basin' of South China: an example from Southeast Hubei and Northwest Jiangxi. - *Geological Science and Technology Information*, **27** (4): 15-19 (in Chinese with English abstract).
- ZHANG, X.B., ZHANG, X.H., QIE, W.K. & ZHANG, Y. 2008. Triassic trace fossils from Dinggye and Tingri, Xizang and their geological significance. - *Sedimentary Geology and Tethyan Geology*, **28** (4): 101-105 (in Chinese with English abstract).

TM Eberhard SCHINDLER

Non-Devonian activities: A task already mentioned in the 2013 report, i.e., the move of the collections of the geological/palaeontological department of the University of Marburg is now completed and has been announced in some short notes (AMLER et al., OPPL et al., SCHINDLER, UHL & AMLER) – since September 2014, the collections are “in other hands” inside Senckenberg (see note by SCHINDLER, UHL & AMLER in this newsletter).

Devonian research was mainly related to activities continuing from the year(s) before:

The Turkish-German cooperation project on “Devonian Cycles and Global Events in the Northern Gondwanan Taurides” (DECENT) ended in 2014. Results have been presented at the 67th Geological Congress of Turkey in Ankara (JANSEN, NAZIK et al.; YALÇIN et al.; SCHINDLER, NAZIK et al.; WILDE et al.; BROCKE, ERTUĞ et al.), the GeoFrankfurt2014 Meeting (LINNEMANN et al.), the IPC 4 / SDS Meeting in Mendoza (JANSEN, BOZDOĞAN et al.) and at the 15th Palaeontology/Stratigraphy Meeting in Antalya/Side (Nazik et al.). A final workshop of the Turkish and German partners was held at ‘Senckenberg am Meer’ in Wilhelmshaven including a field trip to the Harz Mountains. Altogether more than 4,000 m of Devonian rocks in three sections of the Central and Eastern Taurides are now studied in detail – in many fields, e.g., biostratigraphy (including new/first finds of certain fossils on Turkish territory and positioning of the Silurian/Devonian boundary), sedimentology/facies, provenance analysis/hinterland processes. Cordial thanks to all members of the cooperation team – it is hoped that it will be possible to continue work in the Turkish Taurides.

Vice Chairman Carl BRETT stayed in Frankfurt for few days during which work on Middle Devonian rocks from the Eifel Hills area has been

continued in the institute. Paper preparation is under way.

Work on the Choteč Event comparing strata and fossils from the Barrandian area and the Appalachian Basin resulted in the submission of a paper by CM Rainer BROCKE and co-workers for the Palaeo3 volume (*Geol. Soc. London, Spec. Publ.* – see minutes of the SDS Meeting) including description of rare palynomorphs and (partly new) dacryoconarids. The results have also been reported at the 9th European Palaeobotany-Palynology Conference in Padova (BROCKE, FATKA et al.).

A long-lasting effort to publish on the now substantially widened type locality of the Kellwasser horizons in the Kellwasser Valley (Harz Mountains, Germany) resulted in a paper in German (GEREKE et al.), however with extensive figure captions in English. A shortened version focusing on stratigraphy and conodonts is included in this newsletter (SCHINDLER, GEREKE et al.).

Publications 2014 (in chronological order)

JANSEN, U., NAZIK, A., NALCIOĞLU, G.F., ÖZKAN, R., GROOS-UFFENORDE, H., ŞEKER, E., BROCKE, R., SANCAY, R.H., BOZDOĞAN, N., YILMAZ, İ., YALÇIN, M.N. & SCHINDLER, E. 2014. New paleontological data from the Devonian of Turkey and their paleobiogeographical implications. – 67th Geological Congress of Turkey, Abstracts Book: 675.

YALÇIN, M.N., SCHINDLER, E., WEHRMANN, A., NAZIK, A., YILMAZ, İ., WILDE, V., ÖZKAN, R., BOZDOĞAN, N., BROCKE, R., SAYDAM-DEMIRAY, G., WEDDIGE, K., SANCAY, R.H., JANSEN, U., NALCIOĞLU, G., KOZLU, H., LINNEMANN, U., ŞAHİN, N. & GROOS-UFFENORDE, H. 2014. Devonian stratigraphy of the Central and Eastern Taurides. – 67th Geological Congress of Turkey, Abstracts Book: 703.

SCHINDLER, E., NAZIK, A., HAUDE, R., BROCKE, R., ŞEKER, E., BOZDOĞAN, N., SANCAY, R.H., GROOS-UFFENORDE, H., JANSEN, U., WEDDIGE, K., ÖZKAN, R., YALÇIN, M.N., WEHRMANN, A., & WILDE, V. 2014. First record of loboliths in Turkey: Scyphocrinoids and other palaeontological evidence for the Silurian/Devonian boundary interval in the Eastern and Central Taurides. – 67th Geological Congress of Turkey, Abstracts Book: 705.

WILDE, V., FINKS, R.M., WEHRMANN, A., SCHINDLER, E., ÖZKAN, R., NAZIK, A., YALÇIN, M.N., KOZLU, H. & YILMAZ, İ. 2014. A demosponge-dominated facies in the Middle Devonian of the Eastern Taurides. – 67th Geological Congress of Turkey, Abstracts Book: 707.

BROCKE, R., ERTUĞ, K.İ., SANCAY, R.H., BOZDOĞAN, N., WILDE, V., SCHINDLER, E.,

- WEHRMANN, A. & YALÇIN, M.N. 2014. Late Devonian palynology of the Eastern Taurides. – 67th Geological Congress of Turkey, Abstracts Book: 709.
- AMLER, M.R.W., SCHINDLER, E. & UHL, D. 2014. GeoArchiv Marburg jetzt im Senckenberg. – Gmit, **56**: 21-22.
- GEREKE, M., LUPOLD, F.W., PIECHA, M., SCHINDLER, E. & STOPPEL, D. 2014. Die Typikalität der Kellwasser-Horizonte im Oberharz, Deutschland. – Zeitschrift der Deutschen Gesellschaft für Geowissenschaften, **165** (2): 145-162.
- OPPL, S., HIRSCHMANN, S., SCHINDLER, E., UHL, D., AMLER, M.R.W. & JANSEN, U. 2014. Alte Schätzre finden neues Zuhause – Das GeoArchiv Marburg zieht ins Frankfurter Senckenberg-Institut um. – SENCKENBERG – natur • forschung • museum, **144** (9/10): 310-315.
- BROCKE, R., FATKA, O., LINDEMANN, R.H., SCHINDLER, E. & VER STRAETEN, C.A. 2014. The Early Mid-Devonian Choteč event in its type area in the Prague Basin and the Appalachian Basin: New insights from palynomorphs and dacryconarids. – 9th European Palaeobotany – Palynology Conference, 26-31 August 2014, Abstract Book: 31-32.
- JANSEN, U. & SCHINDLER, E. 2014. MENA SCHEMM-GREGORY, 1976-2013. – Subcommission on Devonian Stratigraphy, Newsletter, **29**: 6-8.
- LINNEMANN, U., YILMAZ, İ., KLAUS, I., YALÇIN, M.N., PUTZMANN, F., BOZDOĞAN, N., SCHINDLER, E., WILDE, V. & WEHRMANN, A. 2014. The signature of hinterland processes and climate of the N-Gondwanan margin in Devonian shelf deposits of the central Taurids (Turkey). – Schriftenreihe der Deutschen Gesellschaft für Geowissenschaften, **85**: 125.
- JANSEN, U., BOZDOĞAN, N., BROCKE, R., ERTUĞ, K., FINKS, R.M., GROOS-UFFENORDE, H., HAUDE, R., KOZLU, H., NALCIOĞLU, G.F., NAZIK, A., ÖZKAN, R., SANCAY, R.H., SAYDAM-DEMIRAY, D.G., SCHINDLER, E., ŞEKER, E., WEDDIGE, K., WEHRMANN, A., WILDE, V., YALÇIN, M.N. & YILMAZ, İ. 2014. New palaeontological data from the Devonian of Turkey. – 4th International Palaeontological Congress, Abstract Volume: 848.
- SCHINDLER, E., UHL, D. & AMLER, M.R.W. 2014. GeoArchive Marburg moved to Senckenberg Research Institute and Natural History Museum Frankfurt. – Bollettino della Società Paleontologica Italiana, **53** (2): 135-136.
- NAZIK, A., YALÇIN, M.N., SCHINDLER, E., WILDE, V., WEHRMANN, A., HAUDE, R., FINKS, R.M., WEBSTER, G.D., YILMAZ, İ., BROCKE, R., JANSEN, U., ÖZKAN, R., ŞEKER, E., GROOS-UFFENORDE, H., BOZDOĞAN, N., SANCAY, R.H., NALCIOĞLU, G., SAYDAM-DEMIRAY, G., WEDDIGE, K. & KOZLU, H. 2014. Important paleontological evidences of Devonian strata in the Eastern Taurides. – 15. Paleontoloji-Stratigrafi çalışayı: 44.

TM Ladislav SLAVÍK

Since my last report, various Devonian activities in 2013-2014 can be listed below:

Early in 2013 a manuscript concerning correlation of early Devonian conodont faunas from the South Urals together with Tatyana MAVRINSKAYA (Ufa, Russia) has been finalized for print and published.

In spring 2013, another, rather complicated study about polygnathid conodont faunas from Northeast Asia has been started with Valeryi BARANOV (Yakutsk, Russia) and Robert BLODGETT (Anchorage, U.S.A.), it has been finished in 2014.

In summer 2013, a comprehensive paper with Katarína HOLCOVÁ (Prague) on the morphogroups of small agglutinated foraminifera from the Devonian of the Prague Synform has been published (the publication process in 3xP was surprisingly fast!).

My student Aneta HUŠKOVÁ started her BSc thesis on biostratigraphic revision of the Silurian/Devonian boundary in the Prague Synform.

The most important Devonian activities were, however, in connection with our Devonian Czech-Spanish project "High-resolution correlation and dating of Mid-Palaeozoic sedimentary sequences of Peri-Gondwana using integrated biostratigraphy and chemo-physical methods" that was started late in 2012. In 2013, two field campaigns both in Prague synform and Pyrenees were organized by leaders (Ladislav SLAVÍK and Nacho VALENZUELA-RÍOS). Our team included Teresa LIAO and Helena CALVO (Valencia), Aneta HUŠKOVÁ and Leona CHADIMOVÁ (Prague). In Pyrenees we sampled two early Devonian sections (Segre II near Seu d'Urgell and Compte 1 near Baro and Sort) for magnetic susceptibility and made gamma spectrometric logging. All the samples for MS have been already measured and MS and GRS have been already processed. The paper with complex data is in preparation.

During late autumn 2014 another field campaign was organized by Nacho VALENZUELA-RÍOS and Teresa LIAO. We have jointly measured and sampled pyrenean sections Castells I and Castells II for MS (magnetic susceptibility) and microfacies analysis with focus on the Pragian/Emsian boundary. The data are being processed. Late in 2014, together with Nacho

VALENZUELA-RÍOS and Teresa LIAO we have also started a manuscript on the middle and upper Lochkovian conodont correlation.

In Summer 2014 me and Aneta Hušková joined the "IGCP 596 & IGCP 580: Joint Meeting and Field-Workshop; International Symposium in Ulaanbaatar, Mongolia (August 05-20. 2014)". Our work within the international team guided by Y. Ariunchimeg, G. SEERSMAA, T. SUTTNER and J. WATERS was focused on sampling of several sections in the Baruunhuurai Terrane (Western Mongolia) for biostratigraphy and magnetic susceptibility.

Early in 2014 a new project: "Sequence stratigraphy of Devonian bioevents – sea level changes at the transition from greenhouse to icehouse world" supported by Czech Science Foundation has been started. "The Prague crew" (Jindra HLADIL, Leona CHADIMOVÁ and Ladislav SLAVÍK) joined the larger team headed by Ondřej BÁBEK (Olomouc). In Summer 2014 we jointly sampled several early Devonian sections in the Prague Synform for microfacies and biostratigraphy.

Publications

BARANOV, V.V., SLAVÍK, L., BLODGETT, R.B. 2014. Early Devonian polygnathids of Northeast Asia and correlation of Pragian/Emsian strata of the marginal seas of Anqarida. - *Bulletin of Geosciences*, **89** (3): 645-678.

MAVRINSKAYA, T. & SLAVÍK, L. 2013. Correlation of Early Devonian (Lochkovian–early Pragian) conodont faunas of the South Urals (Russia). - *Bulletin of Geosciences*, **88** (2): 283–296.

HOLCOVÁ, K. & SLAVÍK, L. 2013. The morphogroups of small agglutinated foraminifera from the Devonian carbonate complex of the Prague Synform, (Barrandian area, Czech Republic). - *Palaeogeography, Palaeoclimatology, Palaeoecology*, **386**: 210–224.

Abstracts

SLAVÍK, L., VALENZUELA-RÍOS, J.I., CHADIMOVÁ, L., LIAO, J.-C., HUŠKOVÁ, A. & CALVO, H. 2014. Hi-res correlation of the Lochkovian-Pragian (Lower Devonian) sections in the key regions of peri-Gondwana. - IGCP 596 & IGCP 580 Joint Meeting and Field-Workshop, International Symposium in Mongolia. Ulaanbaatar 5.-18.8., 2014, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, Band, **19**: 46-47.

VALENZUELA-RÍOS, J.I., SLAVÍK, L., CALVO, H., HUŠKOVÁ, A., LIAO, J.-C. & KOPTÍKOVÁ, L. 2013. Correlation of the middle Lochkovian (Lower Devonian) conodont successions in peri-Gondwana key localities. – In: EL HASSANI, A., BECKER, R.T. & TAHIRI, A. (eds), International

Field Symposium "The Devonian and Lower Carboniferous of northern Gondwana", Abstract book, Document de l'Institut Scientifique, Rabat, **26**: 123-124.

MAVRINSKAYA, T. & SLAVÍK, L. (2013): Lochkovian conodont biostratigraphy in the South Urals. – In: EL HASSANI, A., BECKER, R.T. & TAHIRI, A. (eds), International Field Symposium "The Devonian and Lower Carboniferous of northern Gondwana", Abstract book, Document de l'Institut Scientifique, Rabat, **26**: 83.

SLAVÍK, L., HLADIL, J., KOPTÍKOVÁ, L. & ČEJCHAN, P. 2013. Subdivision of the "Original Pragian" - new data from the type area. - In: EL HASSANI, A., BECKER, R.T. & TAHIRI, A. (eds), International Field Symposium "The Devonian and Lower Carboniferous of northern Gondwana", Abstract book, Document de l'Institut Scientifique, Rabat, **26**: 117-118.

SLAVÍK, L. 2013. Late Silurian and Early Devonian Conodont Stratigraphy in the Prague Synform and correlation of bioevents. – In: ALBANESI, G. & ORTEGA, G. (eds), Conodonts from the Andes, Abstracts, 3rd International Conodont Symposium, July 15-19, 2013, Mendoza, Asociación Paleontológica Argentina, Publicación Especial, **13**: 149, Buenos Aires.

VALENZUELA-RÍOS, J.I., SLAVÍK, L., CALVO, H., HUŠKOVÁ, A., LIAO, J.-C. & KOPTÍKOVÁ, L. 2013. What conodonts can tell about the Spanish-Czech connection during Lochkovian times? – In: ALBANESI, G. & ORTEGA, G. (eds), Conodonts from the Andes, Abstracts, 3rd International Conodont Symposium, July 15-19, 2013, Mendoza, Asociación Paleontológica Argentina, Publicación Especial, **13**: 152, Buenos Aires.

VALENZUELA-RÍOS, J.I., SLAVÍK, L., CALVO, H., HUŠKOVÁ, A., LIAO, J.-C. & KOPTÍKOVÁ, L. 2013. Conodontos del Lochkoviense (Devónico Inferior) en los Pirineos Centrales Españoles y su correlación con las secuencias de Bohemia (República Checa). - In: Álvarez-Vázquez, C & López-Rodríguez, I. (eds), Libro de Resúmenes de las XXIX Jornadas de la Sociedad Española de Paleontología y Simposio del Proyecto PICG 596, October 2-5, 2013, Córdoba: 83.

SLAVÍK, L., VALENZUELA-RÍOS, J.I., HUŠKOVÁ, A., CALVO, H., LIAO, J.-C. & KOPTÍKOVÁ, L. 2013. Hi-res correlation and dating of Mid-Palaeozoic sedimentary sequences of Peri-Gondwana using integrated biostratigraphy and chemo-physical methods - an insight to the Lochkovian. – In: BAK, M., KOWAL-KASPRZYK, J., WAŚKOWSKA, A. & KAMINSKI, M.A. (eds), 14th Czech-Slovak-Polish Paleontological Conference and 9th Micropalaeontological Workshop, November 14-15, 2013, Kraków, Abstract

Volume, Grzybowski Foundation, Special Publication, **19**: 52-53.

CM Claudia SPALLETTA

During 2014 my research on Upper Devonian conodont biostratigraphy continued, and it was mainly focused on the Frasnian/Famennian and the Devonian/Carboniferous boundaries.

A manuscript on the study of the Frasnian/Famennian Boundary in stratigraphic sections of the Carnic Alps is in preparation. The biostratigraphic study will be presented together with detailed sedimentological analysis and geochemistry data. The work was carried out in collaboration with Enzo FARABEGOLI and M. Cristina PERRI (University of Bologna), Monica PONDRELLI (University of Pescara), and Michael JOACHIMSKI (University of Erlangen-Nuremberg).

The studies on the Devonian/Carboniferous Boundary are made within the frame of the International Working Group on the redefinition of the Devonian/Carboniferous Boundary. Data from a new section in Sardinia where the DCB is exposed have been recently published on line (MOSSONI et al., 2015). A manuscript on a review of the conodont genera across the D/C boundary is in preparation (with Carlo CORRADINI, Sandra KAISER, Hannah MATYJA, and Jeff OVER).

After six years of work, the project on the formal definition of the pre-Variscan lithostratigraphic units of the Carnic Alps, coordinated by Carlo CORRADINI and Thomas SUTTNER, and involving several colleagues from various countries, come to an end. Within this project I was responsible for the Devonian pelagic units, but was involved also in the study of Middle to Upper Devonian transitional carbonatic units. One product of the studies finalized to the definition of the lithostratigraphic units was already published (PONDRELLI et al., 2015). A dedicated volume of the *Abhandlungen der Geologische Bundesanstalt (Wien)* with the description of all the units, edited by the coordinators of the project, is in print. The volume will include 38 article, I am first author or co-author of 17 of these.

Last but not least, in 2014 I was the organizer of a friendly PANDER Society Workshop that took place in Bologna from February 28 to March 1. During the Workshop, attended by few, but valuable conodont lovers from four countries, 13 talks were presented, 9 of these were dealing with the Devonian. The meeting also constituted a nice occasion for delivering the HINDE Medal for Young Conodont Researchers to Maria CORRIGA.

Publications:

PONDRELLI, M., CORRADINI, C., SIMONETTO, L., CORRIGA, M.G., KIDO, E., MOSSONI A.,

SPALLETTA, C., SUTTNER, T. & CARTA, N. 2015. Depositional evolution of a lower Paleozoic portion of the Southalpine domain: the Mt. Pizzul area (Carnic Alps, Italy). – International Journal of Earth Sciences (Geol. Rundsch.), **104**: 147-178, doi 10.1007/s00531-014-1069-7 (published online in 2014).

MOSSONI, A., CARTA, N., CORRADINI, C. & SPALLETTA, C. 2015. Conodonts across the Devonian/Carboniferous boundary in SE Sardinia (Italy). - Bulletin of Geosciences, **90** (2): 371–388 (7 figures, 1 table, published online in February 2015).

Abstracts:

CORRADINI, C., CORRIGA, M.G., KIDO, E., PONDRELLI, M., SCHÖNLAUB, H.P., SIMONETTO, L., SPALLETTA, C. & SUTTNER, T. 2014. Lochkovian (Lower Devonian) Conodont Stratigraphy of the Carnic Alps (Italy-Austria). - In: CERDEÑO E. (Ed.), 4th International Palaeontological Congress, Mendoza, Argentina. 2014, Abstract Volume: 843.

MOSSONI, A. CORRADINI, C. & SPALLETTA, C. 2014. The Devonian/Carboniferous Boundary in Sardinia (Italy). - In: CERDEÑO E. (Ed.), 4th International Palaeontological Congress, Mendoza, Argentina. 2014, Abstract Volume: 862.

CM Thomas J. SUTTNER

In 2014, cooperation between our project on Middle Devonian rugose corals (FWF P23775-B17), IGCP 596 and IGCP 580 continued as successful as in preceding years. In April, the Carnic Alps working group met again in Udine for finalising the revision of units of the pre-Variscan Sequence in the Carnic Alps. Short after the meeting we started to work out a formal characterisation and prepared illustrations of the type section and dominating lithology of each formation. The revision resulted in 36 formations and will be published in the *Abhandlungen der Geologischen Bundesanstalt in Wien* in 2015.

Together with the Erlangen-team we achieved to initiate a multidisciplinary workshop on stable isotopes, the Paleobiology Database and carbonate microfacies in July. For each discipline, one full day was scheduled. The leading specialists Michael JOACHIMSKI, Wolfgang KIESLING and Axel MUNNECKE run an introductory lecture and provided hands-on-tutorials.

(LINK: <http://www.gzn.uni-erlangen.de/en/palaeontology/events/tagungen/igcp-596-super-triple-course>)

Additionally, we progressed with our work on Middle-Late Devonian sections of the Baruunhuurai Terrane in Western Mongolia.

During the field workshop in August, which was mainly organized by Johnny WATERS, Ariunchimeg YARINPIL, Sersmaa GONCHIGDORJ, Erika KIDO, Anne-Christine DA SILVA and Mike WHALEN, an international team of more than 20 researcher and students collected hundreds of samples for high-resolution bio- and chemostratigraphy, geophysics, for investigation of paleobiodiversity of flora and fauna and for microfacies. Task for 2015 will be analysis of all the rocks and fossils with the same team! – We are looking forward for fruitful joint research and exciting results.

Publications

CARMICHAEL, S.K., WATERS, J.A., SUTTNER, T.J., KIDO, E. & DEREUIL, A.A. 2014. A new model for the Kellwasser Anoxia Events (Late Devonian): Shallow water anoxia in an open oceanic setting in the Central Asian Orogenic Belt. – *Palaeogeography, Palaeoclimatology, Palaeoecology*, **399**: 394–403, doi:10.1016/j.palaeo.2014.02.016.

HUBMANN, B., EBNER, F., FERRETTI, A., KIDO, E., KRAINER, K., NEUBAUER, F., SCHÖNLAUB, H.-P. & SUTTNER, T.J. 2014. The Paleozoic Era(them). – In: Piller, W.E. (Ed.), The lithostratigraphic units of the Austrian Stratigraphic Chart 2004 (sedimentary successions), Vol. I, Second Edition, Abhandlungen der Geologischen Bundesanstalt, **66**: 9–133.

PAS, D., DA SILVA, A. C., SUTTNER, T., KIDO, E., BULTYNCK, P., PONDRELLI, M., CORRADINI, C., DE VLEESCHOUWER, D., DOJEN, C. & BOULVAIN, F. 2014. Insight into the development of a carbonate platform through a multi-disciplinary approach: a case study from the Upper Devonian slope deposits of Mount Freikofel (Carnic Alps, Austria/Italy). – *International Journal of Earth Sciences*, **103**: 519–538, DOI 10.1007/s00531-013-0969-2.

SUTTNER, T.J., KIDO, E., CHEN, X.Q., MAWSON, R., WATERS, J. A., FRÝDA, J., MATHIESON, D., MOLLOY, P.D., PICKETT, J., WEBSTER, G.D. & FRÝDOVÁ, B. 2014. Stratigraphy and facies development of the marine Late Devonian near the Boulongour Reservoir, northwest Xinjiang, China. – *Journal of Asian Earth Sciences*, **80**: 101–118.

Abstracts

CARMICHAEL, S.K., WATERS, J.A., SUTTNER, T.J., KIDO, E., BATCHELOR, C.J., DEREUIL, A.A., MOORE, L.M. & SANCHEZ, S.K. 2014. Terrane accretion, sediment geochemistry, and ocean anoxia in the Late Devonian: the role of paleogeography and tectonic environment in black shale formation during the Kellwasser and Hangenberg Anoxia Events. – In: KIDO, E., WATERS, J.A., ARIUNCHIMEG, Y., SERSMAA, G.,

DA SILVA, A.C., WHALEN, M.T., SUTTNER, T.J. & KÖNIGSHOF, P. (eds), IGCP 596 & IGCP 580 Joint Meeting and Field-Workshop, International Symposium in Mongolia, Ulaanbaatar, 5–18 August 2014, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **19**: 18–20.

CARMICHAEL, S.K., WATERS, J.A., SUTTNER, T.J., KIDO, E., BATCHELOR, C.J., DEREUIL, A.A., MCCAIN MOORE, L. & SANCHEZ, S.K. 2014. Terrane accretion, geochemistry, ocean anoxia, and faunal rebound in a Late Devonian Island Arc Complex: detection of both the Kellwasser and Hangenberg Anoxia Events in the Hongguleleng and Heishantou Formations, Xinjiang Province, China. – The 3rd International Conference of Geobiology, 16–18 June 2014, Wuhan, <http://www.cug.edu.cn/new>Show.aspx?ID=1607&cid=000103>.

CORRADINI, C., CORRIGA, M.G., KIDO, E., PONDRELLI, M., SCHÖNLAUB, H.P., SIMONETTO, L., SPALLETTA, C. & SUTTNER, T. 2014. Lochkovian (Lower Devonian) conodont stratigraphy of the Carnic Alps (Italy-Austria). – 4th International Palaeontological Congress, 28 September – 3 October 2014, Mendoza, Argentina: 845.

KIDO, E. & SUTTNER, T.J. 2014. Middle Devonian biotic crisis in the Carnic Alps: results of the Project FWF P 23775-B17. – In: KIDO, E., WATERS, J. A., ARIUNCHIMEG, Y.A., SERSMAA, G., DA SILVA, A. C., WHALEN, M. T., SUTTNER, T. J. & KÖNIGSHOF, P. (eds), IGCP 596 & IGCP 580 Joint Meeting and Field-Workshop, International Symposium in Mongolia, Ulaanbaatar, 5–18 August 2014, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **19**: 29.

KÖNIGSHOF, P., DA SILVA, A.C., SUTTNER, T.J., KIDO, E., WATERS, J., CARMICHAEL, S.K., JANSEN, U., PAS, D., SPASSOV, S. & JOACHIMSKI, M.M. 2014. Shallow water facies setting around the Kacak Event – a multidisciplinary approach. – 4th International Palaeontological Congress, 28 September – 3 October 2014, Mendoza, Argentina: 863.

KÖNIGSHOF, P., SUTTNER, T.J., BONCHEVA, I., IZOKH, N.G., TA HOA, P., CHAROENTITIRAT, T., WATERS, J., KIESSLING, W. & KIDO, E. 2014. Climate Change and Biodiversity Patterns in mid-Palaeozoic (IGCP 596) – introduction and report. – In: KIDO, E., WATERS, J. A., ARIUNCHIMEG, Y.A., SERSMAA, G., DA SILVA, A. C., WHALEN, M. T., SUTTNER, T. J. & KÖNIGSHOF, P. (eds.), IGCP 596 & IGCP 580 Joint Meeting and Field-Workshop, International Symposium in Mongolia, Ulaanbaatar, 5–18 August 2014, Berichte des

- Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **19**: 34.
- KÖNIGSHOF, P., SUTTNER, T.J., BONCHEVA, I., IZOKH, N.G., TA HOA, P., CHAROENTITIRAT, T., WATERS, J., KISSLING, W. & KIDO, E. 2014. Climate Change and Biodiversity Patterns in mid-Palaeozoic (IGCP 596) – introduction and report. – 4th International Palaeontological Congress, 28 September – 3 October 2014, Mendoza, Argentina: 849.
- SUTTNER, T.J. & KIDO, E. 2014. Conodont distribution across the Kačák crisis from the shallow marine Kellergrat Formation and the pelagic Valentin Formation (Carnic Alps). – In: KIDO, E., WATERS, J. A., ARIUNCHIMEG, Y., SERSMAA, G., DA SILVA, A. C., WHALEN, M.T., SUTTNER, T.J. & KÖNIGSHOF, P. (eds), IGCP 596 & IGCP 580 Joint Meeting and Field-Workshop, International Symposium in Mongolia, Ulaanbaatar, 5-18 August 2014, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **19**: 49.
- SUTTNER, T. J. & KIDO, E. 2014. Evidence for the Lochkov-Prag Event in the Carnic Alps. – In: KIDO, E., WATERS, J.A., ARIUNCHIMEG, Y., SERSMAA, G., DA SILVA, A C., WHALEN, M.T., SUTTNER, T.J. & KÖNIGSHOF, P. (eds), IGCP 596 & IGCP 580 Joint Meeting and Field-Workshop, International Symposium in Mongolia, Ulaanbaatar, 5-18 August 2014, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **19**: 50–51.
- TONAROVÁ, P., HINTS, O., KÖNIGSHOF, P., SUTTNER, T.J., KIDO, E., DA SILVA, AC. AND PAS, D. 2014. Middle Devonian scolecodonts of the Eifel area, Germany. – 4th International Palaeontological Congress, 28 September – 3 October 2014, Mendoza, Argentina: 856.
- WATERS, J.A., SUTTNER, T.J., KIDO, E. & CARMICHAEL, S.K. 2014. Rebound of the Shallow Marine Ecosystem after the Frasnian – Famennian Extinction Event (Late Devonian) in the Central Asian Orogenic Belt: data from China and Mongolia. – In: KIDO, E., WATERS, J.A., ARIUNCHIMEG, Y., SERSMAA, G., DA SILVA, A.C., WHALEN, M.T., SUTTNER, T.J. & KÖNIGSHOF, P. (eds), IGCP 596 & IGCP 580 Joint Meeting and Field-Workshop, International Symposium in Mongolia, Ulaanbaatar, 5-18 August 2014, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **19**: 56–57.
- WATERS, J.A., SUTTNER, T.J., KIDO, E. & CARMICHAEL, S. K. 2014. Rebound of the Shallow Marine Ecosystem after the Frasnian – Famennian Extinction Event (Late Devonian) in the Central Asian Orogenic Belt: the Hongguleleng and ‘Hebukehe’ Formations, Xinjiang Province, China. - The 3rd International Conference of Geobiology, 16-18 June 2014, Wuhan, <http://www.cug.edu.cn/new>Show.aspx?ID=1607&cid=000103>.
- Editorials**
- KIDO, E., WATERS, J.A., ARIUNCHIMEG, Y., SERSMAA, G., DA SILVA, A.C., WHALEN, M.T., SUTTNER, T.J. & KÖNIGSHOF, P. (eds). IGCP 596 & IGCP 580 Joint Meeting and Field-Workshop, International Symposium in Mongolia, Ulaanbaatar, 5-18 August 2014 – Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **19**: 1-65.
- WORKSHOPS**
- CORRADINI, C., SUTTNER, T.J. & SIMONETTO, L. 2014. Formal lithostratigraphic units in the pre-Variscan sequence of the Carnic Alps: International Workshop (Part VI), Udine, 16–18th April 2014.
- JOACHIMSKI, M., KISSLING, W. & MUNNECKE, A. 2014. Erlangen 2014: Short Courses, Erlangen, 15-17th July 2014.
- WATERS, J.A., ARIUNCHIMEG, Y., SERSMAA, G., DA SILVA, A.C., WHALEN, M.T., KIDO, E., SUTTNER, T.J. & KÖNIGSHOF, P. (eds). IGCP 596 & IGCP 580 Joint Meeting and Field-Workshop, International Symposium in Mongolia, Ulaanbaatar, 5-18th August 2014.

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

Main activities of TM VALENZUELA-RÍOS and CM LIAO have been focused on Lower, Middle and Upper Devonian conodont biostratigraphy, Middle Devonian conodont biofacies, Lower and Middle Devonian microfacies analysis from selected Pyrenean sections. The chief area is the Spanish Central Pyrenees where a multidisciplinary study on Devonian sections and outcrops has been launched. In this context the following actions are noteworthy: Together with CM Sofie GOUWY a graphic correlation project for Pyrenean sections is underway. We have started with Middle and early Upper Devonian sections, and our intention is to continue with Lower Devonian ones. Preliminary results were already presented in GSA meetings in Denver and Vancouver and a paper is about to be submitted (see details below).

A cooperation with TM Ladislav SLAVÍK, CM Leona CHADÍMOVÁ and Aneta HUŠKOVÁ from the Czech Geological Survey aiming at 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, has already produced important results that have been presented in several meetings and

first papers have and are going to be submitted. 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.

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. Citations are provided below.

Below, we included list of papers on Devonian matters that have been published by us and by other Spanish Devonian workers that were available to us.

Publications

BOTELLA, H., MANZANARES, E., FERRÓN, H.G. & MARTÍNEZ-PÉREZ, C. 2014. *Obruchevacanthus ireneae* gen. et sp. nov., a new Ischnacanthiforme (Acanthodii) from the Lower Devonian of Spain. - Paleontological Journal, **48** (10): 1067-1076, DOI: 10.1134/S0031030114100025

GARCÍA-ALCALDE, J.L. 2014. Terebratúlidos (braquiópodos), del Devónico de la Cordillera Cantábrica (N de España). - Trabajos de Geología, Universidad de Oviedo, **33**: 17-170.

GARCIA-ALCALDE, J.L. 2014. *Beethovenia* n. gen. y *Plicostropheodonta* SOKOLSKAYA, 1960 (Strophodontidae CASTER, 1939), del Devónico Inferior de Europa occidental. - Trabajos de Geología, Universidad de Oviedo, **34**.

GARCÍA-ALCALDE, J.L. 2013. Productidos Productidina y Stropholosiidina (Braquiópodos Articulados) del Devónico de la Cordillera Cantábrica (N de España). - Trabajos de Geología, Universidad de Oviedo, **32**: 10-62.

LIAO, J.-C., VALENZUELA-RÍOS, J.I. & GOUWY, S. 2014. Conodontos del Givetense (Devónico Medio) de la Subfacies Compte (Pirineo Central Español). - In: ROYO-TORRES, R. et al. (eds), XXX Jornadas de La Sociedad Española de Paleontología y Simposio del Proyecto PICG 596, Fundamental, **24**: 267-268.

LIAO, J.-C. & VALENZUELA-RÍOS, J.I. 2013. The Middle and Upper Devonian conodont sequence

from la Guardia d’Àres sections (Spanish Central Pyrenees). - Bulletin of Geosciences, **88** (2): 339-368, DOI: 10.3140/bull.geosci.1348.

MANZANARES, E.; PLA, C.; MARTÍNEZ-PÉREZ, C.; RASSKIN, D. & BOTELLA, H. 2014. The enameloid microstructure of Euselachian (Chondrichthyes) scales. - Paleontological Journal, **48** (10): 1060-1066. DOI: 10.1134/S0031030114100062.

GOUWY, S.; LIAO, J.-C. & VALENZUELA-RÍOS, J.I. 2013. Eifelian (Middle Devonian) to Lower Frasnian (Upper Devonian) conodont biostratigraphy in the Villech section (Spanish Central Pyrenees). - Bulletin of Geosciences, **88** (2): 315-338, DOI: 10.3140/bull.geosci.1348.

MARTÍNEZ-PÉREZ, C. & VALENZUELA-RÍOS, J.I. 2014. New Lower Devonian Polygnathids (Conodontata) from the Spanish Central Pyrenees, with comments on the early radiation of the group. - Journal of Iberian Geology, **40** (1): 141-155, DOI: 10.5209/rev_JIGE.2014.v40.n1.44095.

VALENZUELA-RÍOS, J.I., LIAO, J.-C., & CALVO, H. 2014. El Devónico Inferior de las secciones de Segre (Pirineo Central Español): conodontos. - In: ROYO-TORRES, R. et al. (eds), XXX Jornadas de La Sociedad Española de Paleontología y Simposio del Proyecto PICG 596, Fundamental, **24**: 273-275.

Abstracts

LIAO, J.-C. & VALENZUELA-RÍOS, J.I. 2013. Conodontos, microfacies y biofacies del Givetense de Renanué (Deónico Medio, Pirineos Aragoneses). - In: ÁLVAREZ-VÁZQUEZ, C & LÓPEZ-RODRÍGUEZ, I. (eds), Libro de Resúmenes de las XXIX Jornadas de la Sociedad Española de Paleontología y Simposio del Proyecto PICG 596: 205-206, ISBN: 978-84-938181-2-8.

MARTÍNEZ-PÉREZ, C. & VALENZUELA-RÍOS, J.I. 2013. Polignátidos del Emsiense en los Pirineos Centrales Españoles y su importancia para la comprensión de la evolución temprana del grupo. - In: ÁLVAREZ-VÁZQUEZ, C & LÓPEZ-RODRÍGUEZ, I. (eds), Libro de Resúmenes de las XXIX Jornadas de la Sociedad Española de Paleontología y Simposio del Proyecto PICG 596: 213-214, ISBN: 978-84-938181-2-8.

VALENZUELA-RÍOS, J.I. & MURPHY, M.A. 2013. Correlación de las secuencias de conodontos del Lochkovense (Devónico Inferior) de Nevada (USA) y de los Pirineos Centrales Españoles. - In: ÁLVAREZ-VÁZQUEZ, C & LÓPEZ-RODRÍGUEZ, I. (eds), Libro de Resúmenes de las XXIX Jornadas de la Sociedad Española de Paleontología y Simposio del Proyecto PICG 596: 221, ISBN: 978-84-938181-2-8.

- VALENZUELA-RÍOS, J.I., SLAVÍK, L., CALVO, H., HUŠKOVÁ, A., LIAO, J.-C. & KOPTÍKOVÁ, L. 2013. Conodontos del Lochkoviense (Devónico Inferior) en los Pirineos Centrales Españoles y su correlación con las secuencias de Bohemia (República Checa). - In: ÁLVAREZ-VÁZQUEZ, C & LÓPEZ-RODRÍGUEZ, I. (eds), Libro de Resúmenes de las XXIX Jornadas de la Sociedad Española de Paleontología y Simposio del Proyecto PICG 596: 222, ISBN: 978-84-938181-2-8.
- GOUWY, S., LIAO, J.-C. & VALENZUELA-RÍOS, J.I. 2013. Conodont-based Graphic correlation of the upper Eifelian to Lower Frasnian (Middle-Upper Devonian) sections in the Spanish Central Pyrenees. - In: ALBANESI, G.L. & ORTEGA, G. (eds.), Conodonts from the Andes, Proceedings of the 3rd International Conodont Symposium and Regional Field Meeting of the IGCP project 591, Publicación Especial Asociación Paleontológica Argentina, **13**: 141.
- LIAO, J.-C. & VALENZUELA-RÍOS, J.I. 2014. The Givetian (Middle Devonian) conodont succession from the Spanish Pyrenees: a reference standard for Gondwana and beyond. - In: PANKHURST, R. J. et al. (eds), Gondwana 15, North meets South. 96.
- GOUWY, S.; LIAO, J.-C. & VALENZUELA-RÍOS, J.I. 2013. Graphic correlation of the upper Eifelian to Lower Frasnian (Middle-Upper Devonian) conodont sequences in the Spanish Central Pyrenees. Geological Society of America Abstracts with Programs, **45** (7): 836
- LIAO, J.-C. & VALENZUELA-RÍOS, J.I. 2014. Conodont Biofacies Evolution from the Eifelian to the Middle Frasnian (Middle and Upper Devonian) of the Spanish Central Pyrenees. In: KIDO, E et al. (Eds.). Berichte des Institute für Erdwissenschaften, Karl-Franzens-Universität Graz, **19**: 35, ISSN: 1608-8166
- LIAO, J.-C. & VALENZUELA-RÍOS, J.I. 2014. Application of the intended Givetian subdivision (Middle Devonian) sensu SDS in the Spanish Central Pyrenees: support for global correlations. En: CERDEÑO, E. (Compiler). 4th IPC. The History of Life: a view from the southern hemisphere: 849.
- LIAO, J.-C. & VALENZUELA-RÍOS, J.I. 2014. Middle and Early Upper Devonian Conodont Biofacies from the Spanish Central Pyrenees. Annual Meeting of the Geological Society of America, Abstracts with Programs, **46** (6): 756.
- LIAO, J.-C. & VALENZUELA-RÍOS, J.I. (2013): The Givetian Conodont subdivision in the Spanish Central Pyrenees and its global correlation. Document de l'Institut Scientifique, Rabat, **26**: 78-79.
- LIAO, J.-C. & VALENZUELA-RÍOS, J.I. 2013.: Eifelian (Middle Devonian) to Middle Frasnian (Upper Devonian) Global correlations using conodonts: contributions from the Spanish Central Pyrenees. Geological Society of America Abstracts with Programs, **45** (7): 528.
- LIAO, J.-C., VALENZUELA-RÍOS, J.I. & GOUWY, S. 2014. Conodont biostratigraphy and facies analysis of Givetian rocks in the Spanish Central Pyrenees. Annual Meeting of the Geological Society of America, Abstracts with Programs, **46** (6): 821.
- LIAO, J.-C. & VALENZUELA-RÍOS, J. I. 2013. Revisiting Renanué, a never-ending Givetian history in the core of the Aragonian Pyrenees (Middle Devonian, Spain). - In: ALBANESI, G.L. & ORTEGA, G. (eds), Conodonts from the Andes, Proceedings of the 3rd International Conodont Symposium and Regional Field Meeting of the IGCP project 591, Asociación Paleontológica Argentina, Publicación Especial, **13**: 144.
- SLAVÍK, L., VALENZUELA-RÍOS, J.I., CHADIMOVÁ, L., LIAO, J.-C., HUŠKOVÁ, A. & CALVO, H. 2014. Hi-Res correlation of the Lochkovian-Pragian (Lower Devonian) sections in the key regions of peri-Gondwana. - In: KIDO, E. et al. (eds). Berichte des Institute für Erdwissenschaften, Karl-Franzens-Universität Graz, **19**: 46-47, ISSN: 1608-8166.
- SLAVÍK, L., VALENZUELA-RÍOS, J.I.; HUSKOVÁ, A., CALVO, H., LIAO, J.-C. & KOPTÍKOVÁ, L. 2013. Hi-res correlation and dating of Mid-Palaeozoic sedimentary sequences of Peri-Gondwana using integrated biostratigraphy and chemo-physical methods- an insight to the Lochkovian. - In: BAK, M., KOWAL-KASPRZYK, J., WAŚKOWSKA, A. & KAMINSKI, M.A. (eds), 14th Czech-Slovak-Polish Paleontological Conference and 9th Micropaleontological Workshop, Abstract Volume, Grzybowski FoundationSpecial Publication, **19**: 52-53.
- VALENZUELA-RÍOS, J.I. 2014. The Lochkovian (Lower Devonian) Conodont sequence in the Spanish Central Pyrenees: a reference for global studies on pelagic facies. - 4th IPC, The History of Life: a view from the southern hemisphere: 864.
- VALENZUELA-RÍOS, J.I. 2014. Lochkovian (Lower Devonian) conodont biotic events in the Spanish Pyrenees and their relevance to establishing a reference time-frame for Gondwana stratigraphy. - In: PANKHURST, R. J. et al. (Eds.). Gondwana 15: North meets South: 97.
- VALENZUELA-RÍOS, J.I & CARLS, P. 2014. The Lower Devonian Conodont successions from Nigüella (Iberian Chains, Spain) with emphasis on evolutionary events. - In: KIDO, E et al.

- (eds), Berichte des Institute für Erdwissenschaften, Karl-Franzens-Universität Graz, **19**: 55, ISSN: 1608-8166.
- VALENZUELA-RÍOS, J. I. & LIAO, J.-C. 2014. Evaluation of Devonian stages and their subdivision in the Spanish Central Pyrenees. A global perspective. - Annual Meeting of the Geological Society of America, Abstracts with Programs, **46** (6): 755.
- VALENZUELA-RÍOS, J. I. 2013. Lochkovian (Lower Devonian) conodont biotic Events and Global correlations. - Geological Society of America, Abstracts with Programs, **45** (7): 528.
- VALENZUELA-RÍOS, J. I. & MARTÍNEZ-PÉREZ, C. 2014. Conodont succession (Polygnathidae) around the Pragian/Emsian (Lower Devonian) transition in the Spanish Central Pyrenees and its relevance for global correlations. - Annual Meeting of the Geological Society of America, Abstracts with Programs, **46** (6): 821.
- VALENZUELA-RÍOS, J. I. & CALVO, H. 2013. The composite conodont sequence from the Segre sections (Spanish Central Pyrenees) and its relevance for the Lochkovian Global standardization (Lower Devonian). - In: ALBANESI, G.L. & ORTEGA, G. (eds), Conodonts from the Andes, Proceedings of the 3rd International Conodont Symposium and Regional Field Meeting of the IGCP project 591, Asociación Paleontológica Argentina, Publicación Especial, **13**: 151.
- VALENZUELA-RÍOS, J. I. & CALVO, H. 2013. Conodonts around middle/upper Lochkovian (Lower Devonian) from the section Segre 4 in the Central Spanish Pyrenees. - Document de l'Institut Scientifique, Rabat, **26**: 125-126.
- VALENZUELA-RÍOS, J. I. & LIAO, J-C. 2013. The conodont power: why geologists are afraid of these tiny beasts. An example from the Spanish Central Pyrenees. - In: ALBANESI, G.L. & ORTEGA, G. (eds), Conodonts from the Andes, Proceedings of the 3rd International Conodont Symposium and Regional Field Meeting of the IGCP project 591, Asociación Paleontológica Argentina, Publicación Especial, **13**: 150.
- VALENZUELA-RÍOS, J. I. & MARTÍNEZ-PÉREZ, C. 2013. Contribution to understanding the early evolution of polygnathids (Aragonian Pyrenees, Spain). - In: ALBANESI, G.L. & ORTEGA, G. (eds), Conodonts from the Andes, Proceedings of the 3rd International Conodont Symposium and Regional Field Meeting of the IGCP project 591, Asociación Paleontológica Argentina, Publicación Especial, **13**: 151.
- VALENZUELA-RÍOS, J. I.; SLAVÍK, L.; CALVO, H.; HUSKOVÁ, A.; LIAO, J-C. & KOPTÍKOVÁ, L. 2013. What conodonts can tell about the Spanish-Czech connection during Lochkovian times. - In: ALBANESI, G.L. & ORTEGA, G. (eds), Conodonts from the Andes, Proceedings of the 3rd International Conodont Symposium and Regional Field Meeting of the IGCP project 591, Asociación Paleontológica Argentina, Publicación Especial, **13**: 152.
- VALENZUELA-RÍOS, J. I.; SLAVÍK, L.; CALVO, H.; HUSKOVÁ, A.; LIAO, J-C. & KOPTÍKOVÁ, L. 2013. Correlation of the middle Lochkovian (Lower Devonian) conodont successions in peri-Gondwana key localities. - Document de l'Institut Scientifique, Rabat, **26**: 123-124.

CM Chuck VER STRAETEN

2014 was another busy year. One of the highlights was a research visit from John MARSHALL, Jenny MORRIS and Dave CARPENTER from the UK. We roved through eastern New York's Devonian terrestrial strata in the Catskill Mountains for seven days, collecting samples for palynology and microcharcoal from closely below or above the Eifelian-Givetian boundary to a position somewhere in the upper Frasnian (Mount Marion to lower Walton formations). We worked at a number of classic Devonian sites and strata in the Catskills and Hudson River Valley, including Gilboa (famed fossil forest) and other new Givetian and Frasnian forest sites. Favorite moments of the fieldwork included walking up behind a black bear in the forest, and watching it for ~ 3-4 minutes. And finding visible charcoal from a Givetian wildfire; it the third time I've found charcoal in New York; twice in the Givetian strata and once in the Famennian.

Another highlight was completing a manuscript comparing palynology and dacryoconarid data from the Chotec Event in the Prague and Appalachian basins, Czech Republic and the eastern United States. With Rainer BROCKE, Olda FATKA, Dick LINDEMANN, Eberhard SCHINDLER and myself. It's awaiting publication in the volume *Devonian Climate, Sea-Level and Evolutionary Events*, from the Geological Society of London,

Other work over 2014 included ongoing study of the New York Devonian terrestrial strata, regional orogenesis during the Devonian Acadian Orogeny (detrital zircon dating, conglomerate provenance/Acadian unroofing, and hidden indicators of silicic volcanic activity).

The writing stage lingers on for the team revising the New York Devonian Correlation Chart (a team of 12, including SDS members Carlton BRETT, Gordon BAIRD, Jeff OVER, Bill KIRCHGASSER, Alex BARTHOLOMEW, Jay ZAMBITO and myself, and others). Yes, getting authors to complete manuscripts is like herding porcupines (including myself, just another laggard).

In other news, the New York State Museum has inherited a very large Paleobotany Collection from the University at Binghamton (New York). Its key feature is its Devonian Collection, which includes material collected by Devonian paleobotanists such as Banks, Grierson, and Stein, and others. I've been told that with this collection we have the largest Devonian Paleobotany Collection in North America (or nearly so).

Also, the Museum is currently hiring a new Curator of Paleontology, following the retirement of Ed LANDING, longtime member of the Cambrian Subcommission. We look forward to a new peer here, to try to fill the shoes of not only Landing, but also James HALL and John CLARKE.

Publications

BROCKE, R., FATKA, O., LINDEMANN, R., SCHINDLER, E. & VER STRAETEN, C. 2015 in press. Palynology, dacryconarids and the lower Middle Devonian Basal Choteč 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 of London, Special Publications, **423**.

Abstracts 2014-2015

BROCKE, R., FATKA, O., LINDEMANN, R.H., SCHINDLER, E. & VER STRAETEN, C.A. 2014. The Early Mid-Devonian Choteč event in its type area in the Prague Basin and the Appalachian Basin: New insights from palynomorphs and dacryconarids. – 9th European Palaeobotany and Palynology Conference, Padova, Italy.

VER STRAETEN, C.A. 2014. A record of Acadian exhumation: Devonian conglomerates and foreland basin migration, New York State. – Geological Society of America, Abstracts with Programs, **46** (2). (Invited talk for theme session, Echoes of Exhumation: Comparing Exhumation Processes of the Ancient Appalachians to Those of Currently Active Orogenes).

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

VER STRAETEN, C., TERRY, D.O. jr. & OEST, C. 2015. Devonian terrestrial vertisols in the Catskill Mountains, NY: A fingerprint of explosive Acadian volcanism? – Geological Society of America, Abstracts with Programs, **47** (3): 122.

TERRY, D.O. jr., VER STRAETEN, C. & OEST, C. 2015. Devonian paleosols as indicators of

Acadian volcanic activity. Geological Society of America, Abstracts with Programs, **47** (3): 122.

VER STRAETEN, C. 2015. Devonian cherts of New York. – Geological Society of America, Abstracts with Programs, **47** (3): 85.

Bedrock map completed 2014:

STANDER, E., VER STRAETEN, C.A., ENGEL, T. & STANDER, J.. Bedrock geological map of the Gallupville 7.5 minute Quadrangle, Albany, Schoharie and Schenectady counties, eastern NY. – New York State Museum/Geological Survey (USGS State Map project), completed 2014. (Pridoli and Lochkovian to lower Givetian strata, plus Upper Ordovician).

CM Michael WHALEN

Our research on Devonian rocks continued apace during 2014. We published a summary of IGCP 580 activities in Episodes and a special volume of the Geological Society of London entitled "Magnetic Susceptibility Application: A Window onto Ancient Environments and Climatic Variations" that also resulted from IGCP 580 was published online. I was lead author on a paper comparing the F-F boundary in China and western Canada in that volume. Along with that paper we published several abstracts and made presentations at the American Association of Petroleum Geologists annual meeting in Houston, TX and the Geological Society of America annual meeting in Vancouver, BC, Canada.

Publications

DA SILVA, A.C., WHALEN, M.T., HLADIL, J., KOPTIKOVA, L., CHEN, D., SPASSOV, S., BOULVAIN, F. & DEVLEESCHOUWER, X. 2014. Application of magnetic susceptibility as a paleoclimatic proxy on Paleozoic sedimentary rocks and characterization of the magnetic signal – IGCP-580 projects and events. – Episodes, **37**: 87-95.

WHALEN, M.T., ŚLIWIŃSKI, M.G., PAYNE, J.H., DAY, J.E., CHEN, D. & DA SILVA, A.C. 2015. Chemostratigraphy And Magnetic Susceptibility Of The Late Devonian Frasnian–Famennian Transition in Western Canada and Southern China: Implications for Carbon and Nutrient Cycling and Mass Extinction. – In: DA SILVA, A.C., WHALEN, M.T., HLADIL, J., CHADIMOVA, L., CHEN, D., SPASSOV, BOULVAIN, F. & DEVLEESCHOUWER, X., Magnetic Susceptibility Application: A Window Onto Ancient Environments And Climatic Variations, Geological Society, London, Special Publications, **414**, <http://Dx.Doi.Org/10.1144/Sp414.8>.

Abstracts

- WHALEN, M.T., DE VLEESCHOUWER, D., ŚLIWIŃSKI, M., DAY, J.E., and CLAEYS, P. 2014. Calibration of a Sequence Stratigraphic Model Using Astronomically Tuned Magnetic Susceptibility Data: Upper Devonian, Western Canada. - American Association of Petroleum Geologists, Annual Convention, Program With Abstracts.
- WHALEN, M.T., DE VLEESCHOUWER, D., ŚLIWIŃSKI, M., DAY, J.E., and CLAEYS, P. 2014. Temporal Calibration of Late Devonian Depositional Sequences and Geobiologic Events with Spectral Analysis of Magnetic Susceptibility Data: Upper Devonian, Western Canada. - Geological Society of America, Abstracts With Programs, **46**: 832.
- DAY, J.E. DE VLEESCHOUWER, D., WITZKE, B.J., PRESLICKA, J., WHALEN, M.T., CLAEYS, P. 2014. Late Frasnian Kellwasser Extinctions Constrained by Integrated Conodont-Brachiopod-Ammonoid Biostratigraphy, Isotope Chemostratigraphy, Magnetostratigraphy and Astronomical Cyclostratigraphic Calibration: Iowa Basin-Western Laurussia. - Geological Society of America, Abstracts with Programs, **46**: 756.
- KOHN, J.L., OVER, D., DAY, J. & WHALEN, M. 2014. Tentaculitid Diversity and Biostratigraphic use in the Upper Devonian Flume, Perdix and Mount Hawk Formations, Canadian Rocky Mountains, Alberta. - Geological Society of America, Abstracts with Programs, **46**: 163.

CM James J. ZAMBITO

My Devonian activities in 2014 focused on finalizing projects in the Appalachian Basin and beginning work in the Michigan Basin focused on the Middle-Upper Devonian transition. Together with TM J. DAY and K. NARKIEWICZ, we now have conodont data to confirm previous lithostratigraphic correlations indicating that Diplourid trilobites survived the Taghanic Biocrisis in nearshore settings of the Appalachian basin. I have also continued participation with a group working to revise the Devonian correlation chart of the classic succession of New York State (USA), led by CM C. VER STRAETEN, and including CM G. BAIRD, CM A. BARTHOLOMEW, TM C. BRETT, CM J. EBERT, CM W. KIRCHGASSER, and TM J. OVER. In the Michigan Basin, I have continued work with TM J. DAY on drill cores from the throughout the basin with a recent focus on the western Michigan Basin succession of Wisconsin using an integration of bio-, chemo-, litho-, and sequence stratigraphy. This work has yielded new chronostratigraphic data resulting in the identification of a previously

unrecognized, unconformity-bound Devonian unit in the subsurface of Wisconsin. Finally, I have been assisting TM C.E. BRETT, TM R.T. BECKER and CM Z.S. ABOUSSALAM in processing samples of the Middle? Devonian Boyle Limestone of Kentucky for conodonts to better constrain its age, but no samples have yielded conodonts to date.

Abstracts

- ZAMBITO, J. & DAY, J. 2014. New Insights into the Stratigraphic Framework of the Middle-Upper Devonian Transition in the Michigan Basin. - Geological Society of America, Abstracts with Programs, **46** (6):754.
- ZAMBITO, J. & DAY, J. 2014. New Insights into the Stratigraphic Framework of the Middle-Upper Devonian Transition in the Michigan Basin, U.S.A. - 4th International Palaeontological Conference, Mendoza, Abstracts: 859.
- ZAMBITO, J., DAY, J. & NARKIEWICZ, K. 2014. New Insights into the Trilobite and Conodont Biostratigraphy of the Middle-Upper Devonian Genesee Group in Eastern New York State, - Paleontological Research Institute, Summer Symposium.