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COMMISSION ON STRATIGRAPHY

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NEWSLETTER No. 33

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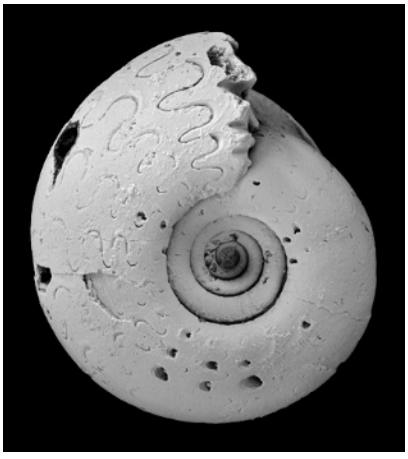

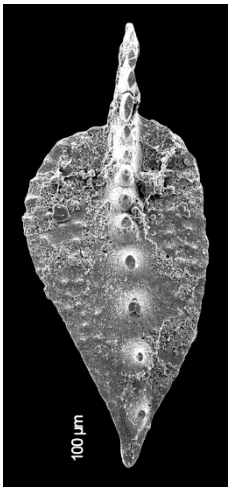

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SDS NEWSLETTER 33

Editorial

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

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

The Newsletter contributions should be quoted as: **"SDS Newsletter, 33: p. x-y."**

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MESSAGE FROM THE CHAIRMAN

Dear SDS Members,

Welcome to the 2018 SDS Newsletter. This is our yearly compilation of everything Devonian. Please remember that all SDS members, both CM and TM are expected to contribute news. It is often very important to see what research is going on in advance of publication. In addition, it's an excellent place to post notice of research in regional journals that we might otherwise not see.

Last year we lost a prominent Devonian worker, who was Art BOUCOT. You will find his obituary in this newsletter.

This year we met in July in Paris at the 5th International Palaeontological Congress. We put in a general The *Devonian Life, Environments and Time* session and were delighted to receive some 31 talks and 21 posters which occupied us for 2 days of the meeting. In addition, we had the SDS Business Meeting that was also well attended. The focus of this Business Meeting was the GSSP definition of the base of the Emsian. We had reports from Nadia, Nacho and Ladislav presented at ICOS in Valencia (2017) which showed that the key levels in the Zinzilban section do not contain diverse polygnathid conodont faunas. Hence, we reluctantly had to take the decision to look beyond Uzbekistan for the redefined base Emsian GSSP section. In Paris we had presentations from both Nacho and Ladislav that showed how the base Emsian GSSP could be redefined in both Spain and the Czech Republic. We also received additional information from Nadia on stable isotopes from the Zinzilban section. The process now is that SDS members can formally propose a new GSSP definition and section based on the morphological lineage that includes *Polygnathus excavatus* 114. We would anticipate that the new GSSP will be from a section that we already know but there is nothing that prevents a new section being proposed. But everyone should be aware that the standard of definition expected for a GSSP is now significantly higher than required when many of our original stages were defined. In addition to key palaeontological inceptions (ideally in a number of fossil groups) the expectation includes isotope curves, magnetic susceptibility, magnetostratigraphy, cyclostratigraphy and geochronology. It is also expected that we make realistic progress- we can't take another 10 years to start looking at unknown sections that might be better than what we already know. There is a history in ICS of GSSP's being chosen from less well known section that appear to be ideal but which continued study following GSSP definition are shown to have significant problems. Once we have one or a number of proposals then it goes to a vote of SDS TM's. If accepted then it is submitted to ICS Subcommission chairs for informed comment, followed by revision and then re-submission for the formal vote. The key step in this process is the informed comment. So, to progress, we would want an indication by our next meeting of likely formal proposals.

This next meeting is at STRATI 2019 in Milan and the conference website is now available as detailed elsewhere in this Newsletter. We have already submitted a proposal for a general Devonian session together with an SDS business meeting and hope to see SDS members supporting the meeting.

2019 will be my last SDS business meeting as Chair as I will have completed two full terms of four years. My replacement will need to be in place for the next IGC in India. So, following STRATI 2019 the process of selecting a new SDS Chair will need to be started.

Normally this SDS Newsletter comes at the start of the year and we offer New Year greetings. Given that we are writing this in the Boreal summer season one can only hope that any field collecting went well and that you had a good break with a real holiday.

John E. MARSHALL

OBITUARIES

Rudolf BIRENHEIDE
(6.2.1929 – 8.11.2017)

Eberhard SCHINDLER

On 8th November 2017, Rudolf BIRENHEIDE passed away aged 88. Although he was not a member of the international SDS (he was, of course, a member of the German SDS), we think of him as an important researcher on Devonian matters.

Rudolf (Rudi) BIRENHEIDE was born on 6 February 1929 in Dortmund where he grew up in his early years. As his later school years fell into the 2nd World War, he was moved to the area of Baden (SW Germany) in the frame of a project called "Kinderlandverschickung" (i.e., children were brought to secure areas during the war). In the last half year of the war, Rudi was trained as a "Flakhelfer" (i.e., anti-aircraft auxiliary) but luckily he was not required to fight. He returned to Dortmund where he graduated from grammar school in March 1950.

From 1951 to 1952, Rudolf BIRENHEIDE studied physics and mathematics at the University of Münster. From 1952 to 1955, he began his studies in geology/palaeontology at the University of Freiburg. After his pre-degree (Vordiplom), he returned to Münster University where, e.g., Franz LOTZE and Alexander VON SCHOUPPÉ were his academic teachers. The latter became his research supervisor and interested him in the field of coral research. At Münster University, Rudolf BIRENHEIDE received his PhD on 13 February 1959; the title (translated) of his doctoral thesis was: "Revision of the colony-building Spongophyllida in the Devonian."

Palaeozoic (and particularly Devonian) corals were the centre of Rudi's research throughout his career. His passion led him in 1959 to the Senckenberg Forschungsinstitut und Naturmuseum in Frankfurt. He started as an assistant of the famed Devonian specialist Wolfgang STRUVE, supported by the German Science Foundation (DFG). In 1962, he became a 'Scientific Assistant' at Senckenberg, not only doing research but also curating the coral collection to which he added a lot of material especially in later years (and also publishing a lot on that material). In 1967, Rudolf BIRENHEIDE became the head of the section 'Fossil Cnidaria' (later named 'Palaeozoology I'); 1968 he was appointed curator. He was the head of the section until retirement in spring 1994. In these ca 25 years, he undertook a number of travels for research and for enlarging the collections (in those days, it was still possible to go to the field just to collect material!).

Although Rudi was not happy when the Senckenberg leaders of the time decided to change the research focus of the section (ironically it was even his "fault", because the argument was that: "Rudolf BIRENHEIDE has brought the Devonian coral research to such a good point that we can stop this field for some time…!"), he was never angry with his 'successor' (i.e., me) who worked on other Devonian topics. For him this was normal – but more about his personality later.

After retirement, Rudolf BIRENHEIDE decided to indulge his passion: astronomy! He bought a pick-up car, mounted a telescope on it and drove to the Alps where he observed and photographed the stars. But he couldn't stay away from his beloved corals completely and helped the "Devonian colleagues" at Senckenberg with determinations and discussions – on 1 December 2002 he became an 'Appointed Honorary Co-worker' of the Senckenberg Natural Science Society.

It should not be forgotten that Rudolf BIRENHEIDE was the teacher of geology/palaeontology at the 'Senckenberg School for Technical Assistants'. He did this job with great pleasure and hundreds of assistants benefited from his committed teaching. At the end of his official career Rudolf BIRENHEIDE did something unusual, he published a paper on the history of his section (BIRENHEIDE 1994). This short publication contains

not only a sound review of his scientific work, the development of the section and a list of his papers, but shows also his special kind of humour which anybody who knew Rudi loved so much. On page 9 he described how he learned and improved the technique to visualize the growth patterns of corals, and at the end of the paragraph he wrote (translation E.S.): "The three ladies among the technical staff of the geological/palaeontological department suggested to me that I should sell the up to 40 cm wide drawings of the fossil corals' cross-sections as patterns for crochet antimacassars."

The main scientific output of Rudolf BIRENHEIDE is the two volumes of the book series 'Leitfossilien' ('guide fossils', a series initiated by the renowned researcher in the fields of geology, palaeontology, mineralogy and petrography Georg GÜRICH). Both so-called 'GÜRICHS', i.e., the one on rugose and the one on tabulate corals (BIRENHEIDE 1978, 1985), are still "text-books" in the field of Devonian coral research.

An anecdote from the time of publication of the first volume shows how unassuming Rudi was – it was told to me by his daughter. When she came home from school one day, the volume on rugosan corals was lying on the table in the living room, and when she asked him about the book on which she saw the name of her father, he just said: "Oh, that's what I was working on during the past years." – He had not made a big thing about his really outstanding work!

This little story tells so much about Rudolf BIRENHEIDE'S character. It is hardly possible to think of a more unassuming, unselfish and friendly colleague. The Devonian community has lost an important worker whom we will remember well. This was confirmed in the condolence e-mail of the Vice-chairman of the SDS, Carl BRETT: "I did not know Rudi very well, having just met him a couple of times. But I know this is a big loss. So many of the key specialists in groups are passing on; this leaves very few coral workers."

Literature (an almost complete list of his scientific papers can be found in BIRENHEIDE 1994)

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BIRENHEIDE, R. (1985): Chaetetida und tabulate Korallen des Devon. – In: ZIEGLER, W. (Ed.), Leitfossilien, **3**: 249 pp.; Berlin – Stuttgart (Gebrüder Borntraeger).

BIRENHEIDE, R. (1994): Historischer Werdegang der Nesseltier-Paläozoologie-Forschung (Paläozoologie I) im "Senckenberg" von 1860 bis 1993. – Fossil Cnidaria & Porifera, **23** (2.2): 27 pp.

Arthur James BOUCOT
(26.5.1924 - 10.4.2017)

copied from:
Sally E. WALKER, University of Georgia

Dr. Arthur James BOUCOT, 93, Emeritus professor, Department of Zoology, Oregon State University, Corvallis, Oregon, passed away April 10, 2017, in Denver, Colorado, after an operation for congestive heart failure. Art was internationally renowned in the fields of paleobiogeography, Paleozoic biostratigraphy, brachiopod taxonomy, paleocommunity evolution, natural history, and paleoecology. Art was also an ace field geologist, mineralogist and an inspired teacher who sought out, cultivated and nurtured nascent scientists from all over the world.

Born in Philadelphia, Pennsylvania, on 26 May 1924, Art showed an early interest in fossils and minerals that was cultivated by his mother and Samuel G. GORDON (1897–1952), the curator of minerals for the Philadelphia Academy of Natural

Sciences. At 11, Art started his geological studies at the Wagner Free Institute of Science (1935–1939) taking courses in physical and historical geology. Always with a practical bent, at 17, Art majored in chemical engineering at the University of Pennsylvania (1941–1942), but dropped out to work as a crystal finisher of quartz oscillator plates at RCA in New Jersey (1942–1943) until he was drafted into WWII. In WWII, he served as an ace navigator for the Army Air Corps, Eighth Air Force (First Lieutenant: 1943–1945), flying 45 missions over Western Europe in B-24 bombers. Awarded the Distinguished Flying Cross, among other service medals, Art returned from the War and facilitated by Dr. GORDON and Veteran's National Scholarships, he started his undergraduate mineralogical studies at Harvard College. He soon found that mineral physics was not his forte, and he turned to paleontology under the supervision of Preston CLOUD, graduating magna cum laude in Geology (A.B., 1948) and obtaining his masters a year later.

Art received his Ph.D. in 1953 at Harvard University for his work on the Silurian-Devonian stratigraphy of the Moose River Group, west-central Maine, mentored by Preston CLOUD and then Marland BILLINGS, after CLOUD moved to the U.S.G.S. Art also worked at the U.S. Geological Survey (1951–1956) and learned Paleozoic gastropods and brachiopods from J. Brookes KNIGHT and G. Arthur COOPER, respectively, at the Smithsonian Institution. Art went through the ranks to Associate Professor at MIT (1957–1961) and Professor at California Institute of Technology (1961–1968). He then transferred to the University of Pennsylvania in 1968, but after a year, became a Professor of Geology, and then Zoology, at Oregon State University (OSU), Corvallis, Oregon (1969–2006). At OSU, he was a Distinguished Professor of Zoology (1991–2006) and Emeritus Professor (2006–until his death).

Art's main emphasis concerned the biostratigraphy of Silurian and Devonian systems and paleocommunity evolutionary ecology and biogeography. He worked primarily with Paleozoic brachiopods discovering that rare species were important for recognizing stratigraphic boundaries (which led to 'boucotizing' outcrops to seek out the rare species to refine geologic maps and stratigraphic relationships), while cosmopolitan taxa were more resistant to extinction. A corollary to that discovery included that taxa with small populations evolved more quickly than taxa with larger populations. These findings led to the development of his evolutionary-ecology units (EEUs), laying the foundation for Phanerozoic community stasis during environmental stability and community turnover during environmental change. He also saw that behavior, once formed, was relatively fixed in ecological systems and over time. His early work also presaged taphonomic studies, including how current sorting affected shell distributions and distinguishing between live: dead assemblages in the fossil record. With Jane GRAY, they published the earliest records for land plants at that time. In all, Art published nearly 570 papers, including eight books, many geologic maps, book chapters, and edited volumes.

Art received many honors for his influential international work. He received a Guggenheim Fellowship to examine the Silurian-Devonian of Western Europe, and several distinguished honors from the National Academy of Sciences, including Exchange Fellow to the Soviet Union, Senior Scholar to China and Distinguished Scholar to China. He received the Congressional Antarctic Medal, SEPM's Raymond C. MOORE Medal, National Science Award (First Class) from the Academia Sinica, Paleontological Society Medal, and the Gilbert HARRIS Award of the Paleontological Research Institute, among other distinguished honors.

Art's service to Paleontology and Geology is legion, and only a few salient contributions are discussed here. He served from 1972 to his death as the U.S. member for the International Geological Congress (IGU) subcommittee on the Silurian System, as a U.S. member for IGU subcommittee on the Ordovician-Silurian Boundary (1974–1987), Chairman for Project Ecostratigraphy for IGU (1974–1976), National Research Council Panel member concerning pre-Pleistocene Climates (1980–1982), advisory committee member for NSF's Earth's Sciences (1982–1985), President of the Paleontological Society (1980–1981), President, International Palaeontological Association (1984–1989), and Vice-President, International Commission on Stratigraphy (1986–1989).

Art could not have done all his work without his beloved wife, Barbara "Bobbie" BOUCOT. Bobbie was a brilliant student at Radcliffe College and Art convinced her to teach him the French language so that he could pass his language exam. One thing led to another, and Bobbie and Art were married in Cambridge, Massachusetts in 1948. They had four children, Hanna, Samuel, Katherine, and Peter. Bobbie kept Art's life in order, from helping with

field work, boxing up fossils that took several semi-trucks to move, editing his manuscripts, raising their family, as well as engaging in her passion for genealogy and the Indiana Pacers. Sadly, Bobbie passed away in 2011 with Art by her side after 63 years of marriage. He was devastated. A few years passed and Art connected with Dr. Kathy NICHOLS, a Triassic paleontologist who had just lost her precious husband after 45 years of marriage, the Triassic biostratigrapher, Dr. Norm SILBERLING. Art and Kathy were dear companions until his death. Art's children, three grandchildren, and Kathy survive him. Art was preceded in death by his mother, the noted pulmonary specialist, Dr. Katharine BOUCOT STURGIS, and her first husband, Arthur Barrow GUEST, a lawyer and insurance agent (after WWII, Art changed his last name to BOUCOT after his mother's second husband).

Art was not "all" science, he had a passion for collecting "wicked" minerals from all over the world, including gigantic opals that gleamed and glistened brighter than the sun. He donated that world-class collection to the Smithsonian Institution along with his ~ 20,000 brachiopod specimens. He also loved his rhododendrons and fussy cats, and he had a kicker of a salad dressing, full of spicy seasonings from all over the world. He was on par with William BUCKLAND, devouring extreme gastronomic delights on his international travels. But most of all, he cared about the future of Paleontology. To that end, Bobbie and Art led a relatively frugal lifestyle (Art stuffed his 6' 3" frame into the same little red Datsun for 34 years), and they saved enough money to contribute to an endowment, the Arthur James BOUCOT Research Grants, to fund early career paleontologists. They transferred that fund to the Paleontological Society in 2000.

Art is honored with another fund at the Paleontological Society, the BOUCOT Fund, which supports undergraduate and graduate student research in paleontology. To honor Art's legacy, please consider donating to the BOUCOT Fund at the Paleontological Society. Art's stratigraphic insights and collections were foundational, his knowledge of the fossil record was unparalleled, and his support for the future of paleontology was unwavering. Paleontology has lost a giant, but he will never be forgotten.

Further reading

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Enzo FARABEGOLI
(12.3.1946 – 2017)

John A. TALENT

My Italian friend of many years, Enzo FARABEGOLI (born on the 12th March, 1946), was a geologist of formidable intellect, someone who could be described as having little time for ignoramuses. Or, to state this in another way, Enzo did not suffer fools gladly. Some thought Enzo inclined to be abrupt, but the brightest students came to him for supervision of their doctoral research in earth sciences in the Dipartimento di Scienze della Terra e Geologio Ambientali dell'Università degli Studi di Bologna, were high in praise of his knowledge and patience, and became friends for life. They worshipped him, much as Enzo had worshipped his guru, the late Giovanni VIEL (1944–2009) of the same department. Giovanni, only two years older than Enzo, had been Enzo's hero on everything to do with the geology of the Dolomites, especially its internationally famed sequence of Triassic carbonate rocks.

In the Dolomites, everything is exhilarating from all vantage points in whatever direction one looks, even its appallingly dangerous precipices and scree slopes, magnificently photogenic escarpments and wonderfully picturesque and verdant valleys dotted with Dark-Ages and Mediaeval churches, nunneries

and monasteries with stunning naïve frescoes—diligently exhumed from centuries hidden beneath repeated coats of whitewash. I could happily spend the rest of my days there…

Two disasters weighed heavily on Enzo. His guru, Giovanni VIEL, died from a heart attack under tragic circumstances when, appallingly, it took 48 hours to get a '*pronto soccorso*' (First Aid) helicopter-ambulance to collect him, mortally afflicted by a heart attack, and race him to a hospital. Giovanni expired while being wheeled into the hospital. Enzo had the honour of delivering the keynote address (a poignant eulogy about Giovanni) at the meeting of the Subcommission on Triassic Stratigraphy in the Museo Geologico of the Dipartimento di Geologia e Geodesia dell'Università degli Studi di Palermo, Sicily, in September 2010.

Though perilously enfeebled by cancer, Enzo insisted on participating in a memorial field meeting (17 and 18 September 2016) for his Triassic friends, Giulio PISA (Bologna; 1936–1976), Riccardo ASSERETO (Milano; 1939–1976), and Riccardo's nine-year-old son, Andrea, who was accompanying them on fieldwork in the Southern Calcareous Alps. On 15 September 1976, high on Monte Bivera—on the western end of the Carnic Alps adjacent to the Dolomites—they perished when a scree slope they were crossing was suddenly mobilised by an earthquake and buried all three of them.

Enzo's family came from Cesena, a small but noteworthy city (about 100,000 inhabitants) between Forli and Rimini on the main railway running southeast from Bologna to Rimini. Pliny the Elder (23–79 AD) gave Cesena a favourable mention, regarding its wines as being among the best. They still are! Cesena was originally an Etruscan town and subsequently a Roman garrison town. It is renowned for the bloodbaths it experienced during its long history, many of them involving popes and Holy Roman emperors. On a couple of occasions its commune achieved independence only to be crushed by yet another bloodbath.

Rimini, the home city of Enrica FARABEGOLI, Enzo's wife, has a rich historical and artistic heritage, the result of a succession of civilizations and historical events through its 22 centuries of history. Like Cesena, it has had a turbulent history, often ravaged by raiding armies, earthquakes, famines, floods and pirate attacks. Convents and churches were built, wrecked and rebuilt—providing work for illustrious artists.

Enzo and Enrica studied in the University of Bologna. Enzo ultimately completed research in earth sciences leading to the equivalent of a PhD, was awarded a position as University Researcher, and eventually became Professor of Geology. He was a contemporary of another friend of many Devonian workers, palaeontologist Cristina PERRI. For many years they shared an office in the Geology Department. Enzo and his wife Enrica—who, like Cristina was undertaking a degree in natural sciences when she met Enzo—had an apartment in the same building as Cristina. It was inevitable that a firm friendship developed between the three of them with occasional barbecues in the expansive, leafy surroundings of their structurally impressive apartment-building. Enzo was master of ceremonies for these alfresco events, producing imaginative arrays of produce barbecued to perfection and pizzas that would rival those produced by the best pizzerias in Bologna. Which is saying something—there are more than 200 pizzerias in Bologna….

About 10 years before Enzo's death, he bought a small motorised boat in Italy and dragged it behind his car from Bologna to Istria so they could have the pleasure of 'playing boats' in the waters around the Istrian peninsula at the head of the Adriatic Sea in Croatia. Before Enzo could drive the boat, he had to take lessons for an entire day, for which, after paying a lot of money, he received a boat-driver's licence. Perhaps because of this (possibly an under-the-counter transaction!), Enrica was reluctant to travel anywhere with Enzo driving the boat. I have foreign friends who have bought driver's licences in Australia and one who bought a licence to drive enormous cranes without ever having been near one. So this sort of thing happens in Italy as well as in Australia…

Enzo developed into a first class structural geologist with a possibly unique understanding of the mechanics of debris flows, terrestrial as well as submarine. One of his passions—that he revisited periodically— was refining understanding of the palaeogeography of the western part of Tethys, the lost ocean of Permian and post-Permian times, mainly obliterated by continent-continent collisions along the enormous mountainous Southeast Asian to Himalayan and Alpine tract of our globe. Enzo was arguably without peer in his knowledge of the stratigraphy, structure and understanding of the sedimentary succession in the Dolomites of northern Italy. He was passionate about global extinction events, particularly the largest of all such events, close to the Permian-Triassic boundary. Enzo wrote

extensively on this one, arguing that it had been the product of catastrophic volcanic activity involving transcendental outpouring of methane and carbon dioxide. Added to these research passions was his fervid interest in the impact of environmental change—he was one of the first in Italy to draw attention to its serious implications for our planet.

Because of the thoroughness of his research and its implications, Enzo was embarrassingly successful in obtaining numerous large research grants. One spinoff from this was difficulties in spending assorted (even overlapping) research grants within what always seemed a too-brief time-frame! Most scientists would relish a surfeit of grants for their research. Life was too short for Enzo's indefatigable brain.

Enzo produced numerous beautiful geological maps for the regional government of Emilia Romagna and was uncompromising in his insistence that all students he supervised should be able to do likewise. As noticed earlier, the brightest students came to him for supervision of their doctoral research and became friends for life. They worshipped him! Instance Giuseppe ONOREVOLI who, when Enzo was dying, arrived at short notice to make sure every dot and line on Enzo's last prodigious text-figures (for a manuscript on global extinctions during the Late Devonian) were scrupulously accurate.

Enzo's approach to his science had been indefatigable. He had tired of using a geology hammer to collect specimens layer-by-layer through rock sequences in quest of information on subtle changes in environments during the deep past, especially through the major extinction events in Earth history. For decades, other earth scientists had been satisfied with observations made on polished surfaces or rock slivers (thin sections) ground down on thin plate glass 'slides' extending over a mere 3 or 4 sq. cms and presenting non-exhaustive or casual information laterally and vertically. Enzo, however, craved continuity of data. He therefore bought an enormous concrete saw I could scarcely lift, and would lug this beloved instrument up mountain sides to rock exposures that had obvious potential for illuminating what had happened environmentally in the deep past. He would then cut a veritable trench a few centimetres deep and 30 cm wide—like someone cutting dimensional stone for facing a bathroom or kitchen—endeavouring to have a continuous, carefully labelled bed-by-bed rock record.

The resultant specimens would be meticulously wrapped, carted downslope (often not an easy matter), taken back to the university in Bologna, reassembled in sequence across a laboratory table, and enormous thin sections 20 or 30 cms across made on slabs of plate glass. His shallow, but sharply incised trenches (which he called 'inverted Mohawks') cut into solid rock in critical locations in the Southern Alps of Italy, are a semi-permanent witness to where the late Enzo FARABEGOLI sought maximum continuity of data.

Enzo used this method for getting a more subtle and better insight into what had happened environmentally across the Permian–Triassic boundary at Bulla in the Dolomites (illustrations in Farabegoli and Perri, 2012) and across the Upper Kellwasser global extinction event (end Frasnian–early Famennian boundary; mid-Late Devonian) in the Carnic Alps (illustrations in FARABEGOLI et al., in prep.). Had he survived his cancers, he intended to target superb sequences through other global events, working his way through the Upper Kellwasser event at Coumiac in the Montagne Noire of southern France, the Klonk Event (Silurian–Devonian boundary) in the Broken River of north-eastern Australia, and the magnificent sequences through the Ireviken Event (Early to Middle Silurian boundary) in Gotland and along Boree Creek in east-central New South Wales. But that was not to be.

In November 2014, Enzo was diagnosed with prostate cancer which had already metastasized into his bones. Curiously, it was followed by 4 to 5 months of remission connected with a new experimental medicine. Though the metastasis returned rapidly in the summer of 2015, Enzo continued to contribute intermittently to a manuscript with Cristina PERRI, Claudia SPALLETTA and others on the Frasnian–Famennian extinction—a few sentences at a time, all of them completed under great pain.

A bulletin from Cristina PERRI on 2 March 2017 informed me that Enzo appeared closer to 90 years of age than his 69. My once garrulous friend was now virtually without words, seeming to have lost much of his memory (as though plunged into Alzheimer's Disease) and, like a very sick child, was having to be spoon-fed by his wife, Enrica. His younger sister, Vanda—from Forli, a small city famed for having had a superb street map prepared by Leonardo DA VINCI—had been with him all day and given him five injections (presumably morphine) during the day. His skin had taken on a horrible pallor and he had lost his ability to undertake

the sort of elegant computer drafting—as he did, for instance, for the end-Permian extinction manuscript published by Springer in 2012. We had hoped for a similar feat for the manuscript on the enormous extinction event across the Frasnian-Famennian boundary. On that day (2 March) he tried to modify the legend for the pivotal Pramosio section (a two-page item) that he had drawn up, but found the task impossible. In fact, it seemed he had lost the ability to generate manuscript material of any kind—text or figures—and had become unable to correct older material any more. He was suffering incredible pain, alleviated to some degree by morphine. The injections impacted for only a few minutes, though occasionally there would be some alleviation of pain for a little longer, no more than half an hour before the pain would return. He had become a disaster, beyond medical help.

Enzo had been extraordinarily heroic throughout his life and monumentally so during the last cancer-blighted interval of his existence! He spent his last week in a hospice for the dying in Bentivoglio, a small town about half way between Bologna and Ferrara. A very moving 'wake', in the presence of his academic robes, took place in a dedicated room of the hospice with a view over a singularly pleasant garden. He insisted there should be no 'wake' in a religious institution. He and the late, astonishingly provocative, Christopher HITCHENS, who also had strong views about religions of all kinds, would have had much in common!

Clearing Enzo's office, *post mortem*, at the University of Bologna proved to be a task of monumental proportions for Enrica and Cristina. They said it was like having to deal with the devastation left by a tornado. One problem was what to do with his reprints. He had produced numerous publications and a prodigious number of expert reports on a vast range of topics. Add to this the vastness of his professional library. Who could possibly be interested in the entire range of published and unpublished reports of someone with such a diverse spectrum of interests, technical and otherwise? Clearing Enzo's office led to discovery of numerous books that he had borrowed from others, promising "to give them back never" [a quotation from Enzo]. Of minor moment was the problem of myriads of library books signed out to him on three-day loans that were still in his keeping after 30 years…

Enrica had in mind spreading Enzo's ashes in two areas: partly in his beloved Dolomites (already undertaken by the time of writing) and at two or three astonishingly beautiful localities in Sardinia where they had enjoyed many vacations together. At the time of writing this memorial, she has yet to confront this last goodbye…

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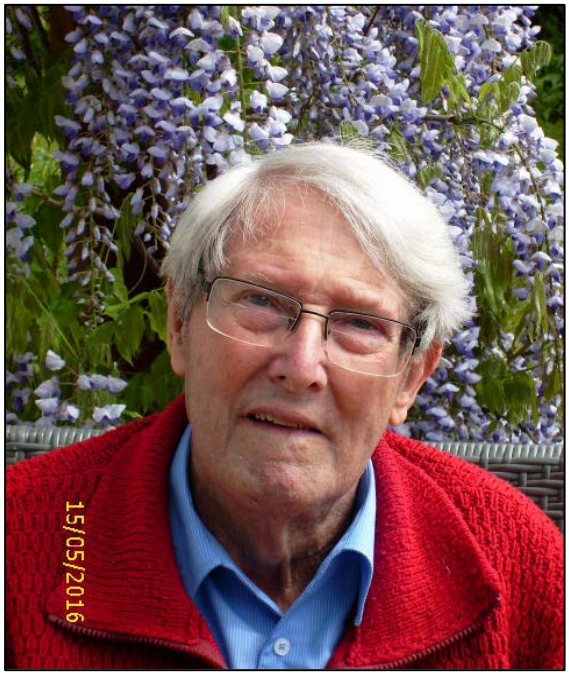
Jürgen KULLMANN
(23.5.1931 – 21.8.2018)

Svetlana V. NIKOLAEVA &
R. Thomas BECKER



Jürgen KULLMANN was born in Berlin on the 23rd May, 1931, and spent his school years during the war in Berlin. He graduated (received his Abitur) in Berlin on the 3rd June, 1950. He then began his study of geology and palaeontology in Berlin. After two semesters, he moved to Tübingen with his much valued teacher, the renowned Otto Heinrich SCHINDEWOLF.

He finished his studies in 1960 by obtaining his doctoral degree, on a monographic study of the Devonian and Carboniferous goniatites of the Cantabrian Mountains of Northern Spain. It was published in four parts in 1960 (the Devonian faunas, KULLMANN 1960) to 1963. In 1964, Jürgen KULLMANN received the "venia legendi" for his habilitation entitled "Rugose Korallen der Cephalopodenfazies und ihre Verbreitung im Devon des südöstlichen Kantabrischen Gebirges (Nordspanien)" (Rugose corals of the cephalopod facies and their distribution in the Devonian of the southeastern Cantabrian Mountains (Northern Spain), published a year later. His combination of coral and ammonoid work followed his main teacher, O.H. SCHINDEWOLF.

Based on his habilitation, he received in 1965 the position as a "Privatdozent" at Tübingen. During 1967/68 he spent a year of research with Bill FURNISH and Brian F. GLENISTER in Iowa City, USA. In 1971, he was awarded an "extraordinary professorship" at Tübingen, followed in 1978 by his appointment as a full professor.

Jürgen KULLMANN´s research on Devonian and Carboniferous ammonoids and deeper-water ("*Cyanthaxonia* Facies") corals was highly regarded internationally. In addition, he played a significant role in the "Special Research Program 53" of the German Research Foundation at Tübingen on "Subsidenz-Entwicklung im kantabrischen Variszikum und an passiven Kontinentalrändern der Kreide" (e.g. KULLMANN & SCHÖNEBERG 1975). One of his outstanding activities was the joint organization (with J. WIEDMANN) of the 2nd International Cephalopod Symposium in 1985 in Tübingen ("Cephalopods – Present and Past), which was devoted to O.H. SCHINDEWOLF.

Jürgen KULLMANN recognized the importance of ammonoid-conodont correlations (KULLMANN & ZIEGLER 1970) and he was among the first to recognize the significance of detailed ontogenetic morphometry for goniatite taxonomy and systematics. This led to several joint pioneer publications with Jürgen SCHEUCH and Rüdiger KANT. The same innovative approach was followed in rugose corals (KULLMANN 1972). He was also among the first to investigate in quantitative terms ammonoid palaeodiversity, especially in relation to the increasing recognition of global events, for example at the Devonian-Carboniferous boundary. With the improvements and increasing access to computers, he saw the importance of palaeontological databases for such studies. This resulted in his long-term project from 1990, the GONIAT Database (e.g. KULLMANN et al. 1993; KULLMANN 2007, from then on: GONIAT Online), which was the first of its kind in German palaeontology. He brought Dieter KORN to Tübingen, who contributed extensively to the GONIAT data (e.g. KORN et al. 1994). Jürgen KULLMANN hosted international postdoctoral students, who became his co-authors and often personal friends, e.g. Sergio RODRÍGUEZ, Svetlana NIKOLAEVA, among many others. He was anxious to begin a collaboration with Dieter WEYER (Berlin) as soon as this became possible, after the fall of the Berlin Wall.

Jürgen KULLMANN retired from teaching in 1995 but continued as a researcher for many subsequent

years. For technical aspects of GONIAT, he involved his son, Peter S. KULLMANN, and for further scientific continuation he passed the database on to the first author of this obituary. Jointly with the second author, he wrote in 1996 the Palaeozoic ammonoid chapter for the "Red Bible" on ammonoid palaeobiology. In 2009, the revised Treatise on Carboniferous and Permian ammonoids was eventually published after many years of preparation, after splitting it off (in 2004) from the Devonian part. Joint authors were Bill FURNISH (who had died in 2007), Brian F. GLENISTER, Jürgen KULLMANN, and ZHOU Zuren from Nanjing. In total he (co-)-authored ca. 150 publications, of which only Devonian ones are compiled here.

Jürgen KULLMANN was a devoted family man. In 1961 he married his wife Hilde Burkhardt. They had three own childs in 1964 to 1968 (Eva, Angela, and Peter), adopted another son in 1970 (Klaus Marcel) and added a foster child (Demsas Gebreab) in 1974. Without the fundamental and constant support of his wife, it would have been impossible to combine the growing family with his scientific career.

The scientific achievements of Jürgen KULLMANN were honoured by several taxa that were named after him: the coral *Oligophyllum kullmanni* WEYER, 1973, the crinoid *Atokacrinus kullmanni* STRIMPLE, 1976, the coral *Plerophyllum (Ufimia) kullmanni* SOTO & GARCÍA-MEADE, 1976 (now *Ufimia kullmanni*, see SOTO 1982), the coral *Breviphrentis kullmanni* BIRENHEIDE, 1978, the ostracod *Kullmannissites kullmanni* G. BECKER, 1981, the goniatite *Eumorphoceras kullmanni* NIKOLAEVA, 1997, the goniatite *Vallites kullmanni* KORN, 1997, and the coral *Neaxon kullmanni* SOTO & LIAO, 2002, which was transferred to the genus *Marocaxon* by BERKOWSKI (2008).

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Elga MARK-KURIK
(26.12.1928 – 6.11.2016)

On November 06, 2016, our long-time colleague and co-author Elga MARK-KURIK passed away. She had a long life and fruitful professional career. Her main passion were Devonian fishes and how they lived. Her many contributions to Devonian stratigraphy span over seven decades, working as a researcher at the Institute of Geology of the Estonian S.S.R. Academy of Sciences, in Tallinn, later a part of Tallinn University.

Elga graduated in 1955 as Candidate (corresponding to a PhD) of Geological and Mineralogical Sciences with a thesis on the agnathan psammosteids (MARK 1955). She was mentored by D.V. OBRUCHEV of Moscow. Elga chose Devonian placoderms and psammosteid heterostracans as her main research objects (with over 50% of her publications), understanding the implications of her fossils for functional interpretation and palaeogeography, and their contribution to biostratigraphy. In consideration of her research on early vertebrates, she was awarded in 1992 the K.E. VON BAER's Memorial Medal by the Estonian Academy of Sciences.

An important Memorial volume in her honour was published this year: KALJO, D. (Ed., 2018). Devonian and its Fossil World [with nine papers submitted by close colleagues or even unofficial students]. - Estonian Journal of Earth Sciences, **67**(1), 1-111 [for content see http://www.kirj.ee/29882/].

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(compiled in 2018 with the help of Hans-Peter SCHULTZE, Michael J. NEWMAN, and the Tallinn website:
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Victor I. PUSHKIN

(27.7.1944 – 4.3.2018)

Semen A. KRUCHEK & Dimitry P. PLAX

The Belarusian Devonian Group regrets to inform that this March the member of our research group, Dr. Victor I. PUSHKIN, a well-known Belarusian scientist, geologist, paleontologist and stratigrapher, passed away. He contributed greatly to the study of bryozoans and brachiopods, and also in development of the Stratigraphic Charts of the Ordovician, Silurian and Devonian deposits of Belarus and the East European Platform. In total, V. I. PUSHKIN wrote over 200 scientific publications (articles, abstracts, books), which contained a great amount of descriptions of new species, genera, and families from Ordovician, Silurian, and Devonian deposits. Since 2006, after his retirement, he continued working on the description and publishing of collections of bryozoans and brachiopods, that were kept in his house. More complete information about Victor I. PUSHKIN is presented in Russian in the more extensive obituary published in the journal “Litosphere” (2018, **1** (48): 179-180).

Harald TRAGELEHN
(11.9.1962 – 26.9.2018)

Hans-Georg HERBIG & Sven HARTENFELS

Harald TRAGELEHN, a dedicated palaeontologist and geologist, as well as a respected colleague and good friend, passed away much too early, shortly after his 56th birthday. Though not widely known to the international scientific community, he was a long-term member of the German Subcommission on Devonian Stratigraphy. Harald was regarded as an eminent specialist on the geology and stratigraphy of the Franconian Forest and, in particular, on taxonomy as well as on the stratigraphy of its Devonian conodonts.

The Franconian Forest, a small Saxothuringian Massif in northeastern Bavaria, southern Germany, is characterized by its complex late early Cambrian to later Mississippian sedimentary succession, hidden in steep valleys, dark forests, and on a wide central plateau with harsh climate. Born and grown up in the region, in the village of Wallenfels, it is this rough region, to which Harald was in love throughout his life.

In autumn 1983 he started his studies in geology and palaeontology at the University of Würzburg and graduated in late 1989 with a mapping thesis in the Franconian Forest supervised by Josef GANDL, another dedicated researcher of the region. The succeeding Ph.D. thesis, supervised by the famous Erik FLÜGEL at the Institute of Palaeontology, University of Erlangen, and financed by a scholarship, dealt with facies development and fauna of Maastrichtian to Palaeocene shallow-water limestones and reefs at the eastern margin of the Northern Alps in Austria and in the western Carpathians in Slovakia. Unfortunately, this voluminous monograph consisting of a text volume and a volume of plates with accurately placed micrographs of thin-sections remained unpublished. Simultaneously, he continued his studies in the Palaeozoic of the Franconian Forest and got first teaching responsibilities in palaeontology. Already before the finalization of his Ph.D. thesis in late 1996, Harald got a position at the Institute of Geology, Laboratory of Palaeontology and Historical Geology, University of Cologne with the first author, where he served as researcher and "Scientific University Assistant" from the first days of January 1995 to beginning of February 2003. During this time, he continued his research in the Cretaceous to Palaeogene Gosau basins of the Northern Alps, but also renewed his activities in the Franconian Forest. It also became clear that his true passion was not in scientific writing or academia, but in teaching. Students were strongly appealed by his thoroughly prepared lectures and his empathical mentoring of their theses. It is, therefore, not surprising that, during his time in Cologne, he probably supervised more students than myself (HGH). But, as a result, many of his important research data is hidden in abstracts.

After the end of the time limited contract in Cologne, Harald went back to his hometown in the Franconian Forest, and as a gifted tale-teller of geological facts he developed to be a strong promoter of popularization of the regional geology. Restlessly roaming through the valleys and forests, he rediscovered classical localities, in part from the early 19th century, established geotrails, and published the corresponding brochures and displays. Additionally, he dug deeply in archaeology, history, as well as local ethnic studies and customs. Thus, Harald also revived the traditional charcoal burning in the valley of the river Rodach.

His accuracy in section logging and his love to conodonts endured throughout his life. Without financial help he processed hundreds of samples from Upper Devonian to Tournaisian cephalopod limestones to establish a regional advanced, most fine-tuned conodont stratigraphy as well as a very differentiated and new look upon the ancestors and phylogeny of the genus *Siphonodella* (see SDS Newsletter 25). Unfortunately, his unexpected death prevented a completion of this detailed work.

When I (SH) started my studies at the University of Cologne in autumn 1996, I met Harald for the first

time. Among us students, he was held in great esteem because he invested an extraordinary amount of time to promote our student theses and I very well remember our long discussions (commonly enriched by apple donuts) on maps, thin-sections, and conodonts, which piled up in front of him in numerous samples. Quickly, Harald arouse my enthusiasm and passion for conodonts and the Devonian time. In 2004, when I joined the University of Münster for the next 14 years, we stayed in close contact. During several and very enjoyable joint field trips to the Rhenish Massif, Montagne Noire, Holy Cross Mountains (together with Grzegorz RACKI), and mostly Franconia, many localities and sections were sampled in detail. Harald was very generous to share important material from his huge conodont collection. As comparison material, this contributed significantly to papers and abstracts on Devonian and lower Tournaisian conodont taxonomy and stratigraphy. His conodont work was honoured by SH in 2011 with the naming of *Clydagnathus tragelehni* from the Maider region (SE Morocco).

After a stroke some years ago, he fought back to continue his passions, and only two years ago, he guided the German Subcommissions on Devonian and Carboniferous Stratigraphy through the Franconian Forest. A new stroke ended all activities. The German geologists, palaeontologists, and stratigraphers loose a regional hero and his eminent knowledge. He was the last member of scientists mostly educated at Würzburg University, who passed down the ever growing knowledge on the Franconian Forest since Adolf WURM in the twenties of the last century. We don't know anybody, who will continue his work and could fill the gap. Harald TRAGELEHN is survived by three children, two grand-children, and his companion in life, Birgit GSCHMEL.

Harald, gladly we remember our joint days.

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SDS REPORTS

MINUTES OF THE ANNUAL SDS BUSINESS MEETING

July 12, 2018, Paris, France

Attendance:

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

TMS: R.T. BECKER (Newsletter Editor), R. BROCKE, C. CORRADINI (webmaster), A.-C. DA SILVA, U. JANSEN, J.I. VALENZUELA-RÍOS

CMS: C. DOJEN, I. EVDOKIMOVA, C. GIRARD, S. HARTENFELS, A. HUŠKOVÁ , T. KUMPAN, J.- C. LIAO, E. LUKŠEVIČS, C. PENN-CLARKE, W. QIE, E. SCHINDLER, G. YOUNG

GUESTS: M. ARETZ, H. BYRNE, T. DE BACKER, J. DENAYER, E. DOWDING, J. LU, F. LÜDDECKE, J. PONSTEIN, L. QIAO , C. RANDON, S. STICHLING, M. ZHANG, X. ZHANG

Total attendance: 34 people

The meeting began at 10:45 AM

1. Introductions and apologies for absence

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

Apologies for non-attendance were received from:

TMs: X. Ma

CMs: Z.S. ABOUSSALAM, G. BAIRD, J. FRÝDA, J. GARCÍA-ALCALDE, A. BARTHOLOMEW, J. EBERT, M. ERINA, R. GESS, S. GOUWY, S. HELLING, J. HLADIL, N. IZOKH, O. IZOKH, A. KIM, W. KIRCHGASSER, H. MATYJA, A. NAZIK, S. NIKOLAEVA, O. OBUT, J. OVER, L. PONCIANO, U. RAKHMONOV, C. SPALLETTA, S. TURNER, C. VER STRAETEN, J. ZAMBITO

2. Formal approval of 2017 minutes

JM asked if there were comments on the minutes of last year's SDS meeting in Valencia. There were none and then the Minutes of 2017 meeting in Valencia were approved; they had already been edited and appeared in the Newsletter 32.

3. Chair's Business

JM reported that he had not been notified of deaths of SDS members. However, CM Eberhard SCHINDLER reported the passing of R. BIERENHEIDE, a well-known: Devonian coral expert from Senckenberg, and of J. WINTER FROM FRANKFURT A.M., who did much work on zircon studies and tephrostratigraphy in the Devonian of the Rhemnish Massif.

It was also noted that there should be a tribute to the late Prof. Art BOUCOT in the SDS newsletter; TM Thomas Becker noted that he would probably use the statement published by the Paleontological Society.

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

Note of appreciation

JM expressed his sincere thanks to the organizers of last year's ICOS 4 meeting and to the organizers of the present IPC in Paris, noting that we were allotted a good long time slot for the meeting.

He further noted that when we put out a call for abstracts for the symposium titled: *The Devonian: Environments, and Time*, we were surprised and delighted to receive some 54 abstracts, including 33 talks and 21 posters. The Ordovician and Silurian subcommissions were not running annual meetings at Paris, but we are in good stead.

4. ICS Matters

At the recent meeting chaired by ICS Chairman DAVID HARPER, the three subdivisions of the Holocene had been ratified. In addition, three GSSPs have been established for the Chattian Stage, the Wuliuan Stage and the Maolingian Series (both in the Cambrian), and the Sakmarian stage. So, ICS is getting on with identifying and approving GSSPs and this puts pressure on the Devonian Subcommission to do the same.

5. Revision of the Pragian/Emsian boundary

The main discussion of this meeting is again the Pragian-Emsian boundary, which still requires redefinition. John MARSHALL provided an "outsider's perspective" on the state of affairs with respect to this boundary:

When a new GSSP for the base of the Emsian was established in 1997 in the Zinzilban section at Kitab State Reserve, this action was well received by the ICS; the section seemed to be well documented

and was valued by SDS, particularly for being in Uzbekistan. Hence, it appeared to be a good GSSP.

But as better correlations were established with the nominal Pragian based on the Praha Formation in Prague Synform and with the traditional base of the German Emsian, it was found that this redefined Emsian had become excessively long, with the Pragian highly reduced and the new boundary did not closely match any traditional usage. Then SDS held a field meeting in Uzbekistan in 2008 in order to review the sections and consider whether or not the boundary was adequately placed and the GSSP adequate. This resulted in the establishment of a working group, including, apart from our Uzbek members (CM´s Aleksey KIM and Utkir RAKHMONOV), TM's Ladislav SLAVÍK, Nacho VALENZUELA-RÍOS, and Nadya IZOKH to consider a new and higher stage boundary. The first sampling commenced 10 years ago, in 2008, when it was decided that the present boundary placed at the *Polygnathus* [or *Eocostapolygnathus*] *kitabicus* Zone was too low relative to the traditional Pragian of the Prague Synform. The SDS in 2008 formally voted on the new definition level based on *Polygnathus* [or *Eolinguipolygnathus*] *excavatus* ssp. 114. Subsequently, when there appeared to be a need for further sampling, a second field trip took place three years ago in 2015. But, again, samples did not all yield many conodonts and there were only five which yielded polygnathids. There was clearly not nearly enough material to establish a new and higher boundary.

Thus, the Zinzilban section was found to be unacceptable as a stratotype for a new level close to the original Emsian base, as defined in Germany because there are no long unbroken records of suitable conodont lineages and there is little good supplemental data. This section does not have the strengths needed to hold up to modern standards for GSSPs. We will be judged by criteria similar to those used for Mesozoic: single fossil lineages showing unbroken successions, C and O isotopic and other geochemical data, magnetic susceptibility, cyclostratigraphy, geochronology etc. Many of these are not adequately sampled for the Zinzilban.

At this point JM turned the program over to TM and Secretary L. SLAVÍK to review the current status of the Pragian-Emsian boundary.

5.1. Pragian-Emsian

A new document has arrived from workers in Novosibirsk. The status of the Pragian-Emsian boundary working group was made up of the Secretary LADISLAV SLAVÍK (LS). Sample splits from the 2015 sampling at Kitab Reserve, Zinzilban, have now been studied independently in the labs of himself, TM Nacho VALENZUELA-RÍOS, AND TM Nadya IZOKH. Most samples have now been processed; the results are not promising.

However, the new document from the Novosibirsk group does provide new data on high-resolution C and O isotope patterns. But there seem to be some problems. For example, in many places around the World, a cooling trend has been documented from the Lochkovian into the Pragian. For example, in the Praha Formation there is a continuous increase in $\delta^{18}O_{carb}$. The Zinzilban data, by contrast, show a very minor positive shift in $\delta^{18}O_{carb}$ near the boundary but no steady trend above. The map of the Kitab State Geological Reserve provided in the document shows the Zinzilban Gorge section and other possible sections in parallel gorges. There was a suggestion by colleagues from Novosibirsk that there are two more sections with no significant facies change that potentially could be sampled (the Bursyhirman Range and Sangitovar Gorge).

Because of video-projection problems with the Word document, and in the apologized absence of our Novosibirsk members, LS asked TM Nacho VALENZUELA-RÍOS to summarize the contents of the Novosibirsk document he had in hand. The colleagues from Novosibirsk do not recommend the base of the *excavatus* Zone of the Emsian Stage or the FAD "*Po. excavatus* ssp. 114" (or morph 114; sample MZ891-42/7) as a candidate for the revision of the Emsian GSSP. Instead, they suggest focusing on the much lower interval. In their opinion "*Po. excavatus* ssp. 114" should be identified as *Po. gronbergi* KLAPPER & JOHNSON (YOLKIN et al. 1994), although this has been refuted in the subsequent literature.

To exclude influence of changes in the lithofacies on variations of the carbon and oxygen isotope composition, they suggest to investigate a number of Pragian-Emsian parallel sections croppeing out on the west and on the east of the Zinzilban Gorge within the Kitab State Geological Reserve.

TM Nacho VALENZUELA-RÍOS then remarked that the decision had been to move the boundary up from *Po. kitabicus* to "*Po. excavatus groenbergi*" near "level 114"; but there was a misidentification of the specimens considered originally as *Po. gronbergi*. The morphotype of *Po. excavatus* at

"level 114" is not *gronbergi*, which in fact occurs much higher in the section. "Morphotype 114" could be used but the succession around this level has regionally yielded only rare or no conodonts. Even the colleagues from Novosibirsk admit that the conodont succession is poor, but suggest other sections.

JM. Argued that we can't delay for another three years and then try to sample a section 1 km away only to risk not finding conodonts again.

LS. Pointed out that there are other issues. New security checkpoints have been set up; it takes negotiation and paperwork to be allowed to pass these. It is now both difficult for local people and for the foreigners to be granted with access to the Kitab State Reserve.

CM Eberhard SCHINDLER. Noted that one of the key criteria for stratotype sections is that they should be readily accessible to future workers. The Kitab Reserve is not necessarily accessible to many workers.

TM Thomas BECKER (TB): Zinzilban may be poor but there is another section at Khodzha Kurgan Gorge, where he had obtained good ammonoid occurrences. He thought this might be better.

LS: We have re-visited this section in 2015. This section is too short, condensed at the base, and with faults.

TB: Perhaps the section is not impossible; new levels might be found based with *Po. excavatus* morph 114. He also pointed out however that there may be problems with the isotopic data; noting that the $\delta^{18}O_{carb}$ were done just on micrite, not on conodonts, and that there were parallels between the $\delta^{18}O_{carb}$ and the $\delta^{13}C_{carb}$, which commonly indicates diagenetic alteration rather than a primary signature.

JM: Where to go from here? We can suggest eventually formalizing a late Pragian substage boundary (Zinzilbanian) in the Kitab Reserve but should not stay in Zinzilban for a redefined Emsian stage boundary?

TM Nacho V-R: Indicated that *Eocostapolygnathus excavatus* ssp. 114 (i.e., non *gronbergi*) will be an important working taxon in the finalization of the Emsian basal boundary. The new lineage succession will be (in descending order):

Eol. excavatus morph (or ssp.) 114
Eoc. kitabicus
Eoct. pireneae

It is possible to see a series of evolutionary changes in transverse ridges (separated to semi-crossed) and in the inversion of the basal cavity.

The new morphotype was localized at Zinzilban in terms of beds 41 and 43, in fact these are intervals between beds. The original measurement of the section was not by thickness, but by the length of the section alongside the gorge. Therefore *Polygnathus* ssp. 114 is not corresponding to 114 m in thickness above the section base.

In summing up, and based on cross correlation with brachiopods and other faunas, the morphotype 114 level might be just a little below the traditional base of the Emsian. So it would appear to be an acceptable new datum for the Emsian base. Next question then is where?

JM: In a year SDS members and colleagues should come to STRATI in Milano in 2019 with solid proposals for a new stratotype section using this datum.

TB: In a joint paper on Morocco with CM Sarah ABOUSSALAM and CM Pierre BULTYNCK, we reported conodonts abundant 114 morphotype, but there is a black shale below this that cannot be sampled for conodonts; so one cannot be sure where the taxon/zone starts precisely. If we chose to use the "114 datum" we would be close to the ancestry of goniatites, since the new oldest Moroccan fauna was discovered this spring in the upper part of the ssp. 114 Zone.

JM: Again, we need to have talks and lists of taxa for the Milano meeting.

Markus ARETZ: Have you voted on criteria for the stratotype?

TM Nacho VALENZUELA-RÍOS: In 2008 biostratigraphic criteria were laid out when it was decided to look for a new level in Zinzilban; after ten years, we are still not there.

CM Eberhard SCHINDLER: If there is a need to vote on new criteria, should we do it now?

JM: No, we would have to have a proposal put out to the membership via e-mail and a formal vote.

TB: For him the Pyrenees would be the best region. He saw sections on last year's ICOS trip and felt sections were excellently documented in terms of conodonts. Nacho may need to do a more refined study of other proxies; all the other sorts of studies would be needed: isotope profiles, magnetic susceptibility, etc.

JM: We are no longer in 1975! No serious GSSP can be considered without multiple criteria; it is also important to have parastratotypes. These are all regional references and it is important to have several.

TB: Then we are also back to the age of the Emsian; many people feel that the stage is too long. Is there any progress on this front; new bentonites, etc?

JM: TM Anne Christine DA SILVA has disturbing news.

Anne Christine DA SILVA: Based on astrochronology, everything else is getting shorter but the Emsian continues to get longer!

TB: There needs to be a call for new age dates for the Emsian.

JM: Colleagues should bring proposals to STRATI.

TB: Who will make the proposal for the STRATI sessio ?

JM: It will come from himself (John MARSHALL) and Ladislav SLAVÍK. (That proposal was put in the same day).

5.2. Devonian-Carboniferous (D-C) Boundary

JM: As SDS we "own" the Silurian-Devonian boundary but not the D-C. Markus ARETZ will have a short section following the SDS meeting. We defer further discussion to that meeting.

6. Devonian Substages

JM. Moving on from the D-C boundary he noted that substages were still on hold. Stan FINNEY had tabled further discussion of substages until all needed redefinitions and other issues (e.g., Pragian-Emsian and D-C boundary) are resolved. He had hoped that under the new leadership of David HARPER the ban on substage work until all stages complete might be lifted. But this is not clear. So, for now, these discussions are still on hold.

CM Nacho VALENZUELA-RÍOS: Even though substages are not officially accepted, we should move ahead with substage proposals and have them ready to go if and when the substage adoption takes place.

JM: Of course, no substages is the official policy for the moment but he is in agreement and had even mentioned the likelihood of making a Zinzilbanian substage of Emsian himself.

TB: Still begging for things for the Newsletter; he notes that there is a pretty well accepted division of lower, middle, and upper Lochkovian. Could someone write that up as a formal proposal? Nacho?

Eifelian: TB reminded Carl BRETT (CB) that he had asked him some time ago to make a proposal for two substages of the Eifelian. CB agreed to try to get on with this.

Givetian: It appears that CM Pierre BULTYNK is no longer able to continue with this task. TB would like to move ahead with the upper Givetian. Question is where to put the stratotype; it appears that Nevada is not good; a Morocco section is possible; but now we must work outside the Military Zone, though some good sections are within.

TM Carlo CORRADINI: Note that now the rank of subseries has been formally adopted by ICS (mainly for Cenozoic workers).

JM: There is some concern that this could interfere with substage adoption. We could elevate our stages to subseries *(or series?)* and change our substages to stages. That would be more in line with the Silurian series and stages, but probably the terminology of stages and series is too entrenched.

TB: One more thing: the Famennian the Belgian workers have long considered the latest part of the Famennian or Strunian to be a substage equivalent to the late Famennian. Trouble is that the Famennian is now divided into four substages, lower, middle, upper and uppermost. Strunian would be uppermost. This should be at base of the *Bispathodus ultimus* Zone, but *ultimus* is now divided into subspecies; the correct term should be *ultimus ultimus* Zone (BTW: there is also an *Bi. ultimus corradinii*!). CM Sven HARTENFELS and Dieter WEYER are working on this, but they need to get out a "real" paper on the subject.

7. Membership

Proposal of new members

JM: There are no new titular members under consideration. This comes up only every four years. By 2020 we will need to have a new chair. There is a procedure to be followed involving nominations and then voting for a replacement chair of SDS.

There has been discussion about the roles of CMs and "other members". For example, we should encourage student members, who will eventually become corresponding members in the future. It might make the Newsletter more difficult.

Are there any new CM proposals?

LS: CM Svetlana NIKOLAEVA wished to propose Dr. Sezim MUSTAPAEVA from Kazakhstan, a worker

on foraminifers as a new corresponding member. She has sent her CV that was projected by LS. She was then proposed by LS, seconded by TB.

CM Carlo CORRADINI (CC): We now have a list of most TMs and CMs; it would be nice to have this list on the website.

CM Eberhard SCHINDLER: If names and e-mails were to be put on the website, we would need permission from those involved, because of new GDPR measures.

TB: In other subcommissions the rule is to request permission and then take a "no reply" as an acceptance.

CC: That may not even be legal.

TM Nacho VALENZUELA-RÍOS: It is in fact legal.

Markus ARETZ: Notes that it may not be legal for long; EU may institute a new law that would prevent this.

CC: We should send out a formal request for approval and then post the list on the website.

TB: In some subcommissions there are photos of TMs and CMs.

CM Eberhard SCHINDLER: At the Senckenberg a formal request was sent out: "do you agree to have name, affiliation, e-mail, photo included on the public list?" If yes, for any given item then that including. Many did not respond; they were removed from the website.

JM: This only applies to the EU, if the newsletter, were to be moved out of the EU, for example to North America, then these rules would not apply.

8. Publications

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

TM Nacho's proposal to Peter KOENIGSHOF for a volume of papers related to the Valencia ICOS meeting was accepted. For those wishing to publish a paper in this volume, the deadline has been extended from July to end of September. The volume will include not only Devonian but also other papers related to conodonts.

TB: The volume for the 10th International Cephalopod Symposium (held in Morocco spring 2018) was published in the *Münstersche Forschungen zur Geologie und Paläöontologie* journal. Volume 110 includes abstracts and a complete field guide to famous Devonian localities in the Anti-Atlas, with many new data, not only on cephalopods. However, all copies were bought out by the Moroccans. He needs to decide how many copies are wanted for a possible reprint. He asked for signatures of those who wished to purchase a copy.

CM Sven HARTENFELS, CM Peter KOENIGSHOF and others are planning a special volume on the Devonian to Carboniferous geology of the Rhenish Massif and Ardennes. Sven had a sheet to pass around for prospective papers.

SDS Newsletter

RTB Reminded the subcommission that the official deadline for receipt of newsletters items for the next issue is listed on the inside of front cover (p.2); it had stated June, 2018, but most people did not see this, so now the deadline is August 20, 2018. The next issue should include the document on the basal Emsian boundary. Any documents that you wish to get out quickly can be put in the newsletter.

TMs and CMs are reminded that all should submit contributions. TMs are required to make reports; CMs should also correspond regularly.

TB also wants the minutes of this meeting, any obituaries, an advert for the STRATI meeting etc., by then. He reminded SDS that the newsletter is a good forum for getting out short reports quickly.

TM Nacho VALENZUELA-RÍOS asked if there is any way to approve material before it is printed. His name got mixed up before and some parts of his reports did not appear, etc.

TB: Expressed surprise at this and asked Nacho to show him.

JM: Suggested that the newsletter contents could be put on line on the website for people to check it.

9. Future Meetings

2019

STRATI in Milano, Italy. TM Carlo CORRADINI, noted that he just became aware of a website with information on the STRATI conference, which will take place in July 2-5, 2019 in Milan. The organizers have already requested proposals for symposia by the end of July, 2018.

JM suggested that we "recycle" the proposal we used for the IPC meeting and he would get that in right away together with a request for a meeting time for the annual SDS meeting. (It was submitted the same day).

CB had today discussed with TM Jeff OVER the organization for a major meeting of SDS in western New York in 2020. This would begin with a 3-4 day pre-meeting field trip in western New York near Lake Erie to include a visit to Niagara Falls, a 3 day meeting in Geneseo (noted two new hotels) – with mid-meeting field trip in the Genesee Valley area near Geneseo. Post-meeting trips in the Lower-Middle Devonian of the Hudson Valley and eastern New York (3 days). The meeting would also include a workshop on cyclostratigraphy and astrochronology run by TM Anne-Christine DA SILVA.

TM A.-C. DA SILVA also reminded the FIRST IGCP-652 Meeting in Bremen will take place in September 12-19, this autumn.

2020

IGC is in New Delhi, India, but it is likely that few members will attend. The ISC requires attendance. We will need to have a new chair of SDS by then. There is no decision for the next IPC so far.

10. Financial Report

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

11. Any Other business

None brought forth.

The meeting was adjourned at 12:15 PM so attendees and others from the Carboniferous subcommission could have a brief meeting on the status of the D-C boundary.

ANNUAL REPORT TO ICS

SDS Chairman John E. MARSHALL

1. TITLE OF CONSTITUENT BODY

Subcommission on Devonian Stratigraphy

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

In 2017, SDS has continued its work on the revision of problematic GSSPs (base Emsian and the Devonian-Carboniferous boundary). Discussions on GSSP revisions were held at the Annual Business Meeting during the ICOS 4 conodont meeting in Valencia (June 2017). Other continued activities include multidisciplinary international correlation, the organisation of Devonian stratigraphic symposia, publication of the SDS Newsletter, and of monographic books/journal volumes.

All listed objectives fit the directions of IUGS and ICS:

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

3. ORGANISATION - interface with other international projects / groups

Actively supporting *IGCP 652, Reading geologic time in Paleozoic sedimentary rocks: the need for an integrated stratigraphy*

NOMINATED OFFICERS FOR 2016-2020:

Chair: J.E.A. MARSHALL
Vice-Chair: C.E. BRETT
Secretary: L. SLAVÍK

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

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

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

5. CHIEF ACCOMPLISHMENTS IN 2017 (including any publications arising from ICS working groups)

- The joint SDS/Uzbekistan/RAS field expedition to Zinzilban George, Uzbekistan that resampled the potential level for the base Emsian GSSP reported at ICOS 4 in Valencia. It was not good news in that despite triplicate samples the nominated conodont *Polygnathus excavatus* ssp. (or morphotype) 114 was not found in the expected interval. In general, polygnathids were too rare and the base Emsian cannot be defined at this level in Zinzilban. The SDS is disappointed by this outcome as it was our intent

that the GSSP should remain in Uzbekistan. There is a final report in SDS Newsletter 32, available on the SDS website. We are taking a year to informally consider this outcome and are meeting at the IPC in Paris in 2018 where we will decide how to proceed.

- Meeting at ICOS 4 (Valencia, Spain, June 2017) with a day of Devonian talks and SDS Business Meeting.
- Publication in 2017 of *Climate change and biodiversity patterns in the mid-Palaeozoic* as a special part of *Palaeobiodiversity and Palaeoenvironments* (vol. **97**, part 3) edited by B. MOTTEQUIN, L. SLAVÍK and P. KÖNIGSHOF, and resulting from the 2015 IGCP 596/SDS meeting in Brussels.

6. SUMMARY OF EXPENDITURE IN 2017:

SDS Newsletter	$600
Attendance of SDS Vice-Chair C.E. BRETT in Valencia	$400
Attendance of SDS Secretary L. SLAVÍK in Valencia	$300
Attendance of SDS Chair J.E. MARSHALL in Valencia	$200

7. SUMMARY OF INCOME IN 2017:

ICS	$1500

8. BUDGET FROM ICS IN 2017

IUGC	$1500

Potential funding sources external to IUGS

Continued support from SDS members

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

- Focused discussion on revision of the basal Emsian GSSP at the IPC 5 in Paris.
- Revision of the D/C boundary in the frame of the D/C Boundary Task Group (Chairman: M. ARETZ) in close collaboration with the Carboniferous Subcommission. Progress towards selection of candidate stratotypes following selection of boundary criteria in September 2016

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

- Redefine the base of the Emsian Stage.
- Redefinition of the Devonian/Carboniferous Boundary with the joint Task Group.
- Annual meetings

BUDGET REQUEST FOR 2018

	$1800
SDS Newsletter	$600
Attendance of Vice Chair C.E. Brett at IPC5	$600
Attendance of Secretary L. Slavík at IPC5	$400
Attendance of Chair J.E. Marshall at IPC5	$200

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

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LIST OF WORKING (TASK) GROUPS AND THEIR OFFICERS

There is a working group appointed to reinvestigate the D-C boundary. This has currently 10 members from the SDS and 9 from the SCS.

The Devonian members are:
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SDS DOCUMENTS

THE DEVONIAN-CARBONIFEROUS BOUNDARY LOCALITY IN BERCHOGUR (WESTERN KAZAKHSTAN) REVISITED

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Introduction

The present contribution is a report on a recent field trip to the Berchogur Depression in Western Kazakhstan, which exhibits Devonian-Carboniferous (D-C) boundary beds with ammonoids, conodonts, foraminifers, miospores, ostracodes, brachiopods and corals (Figs. 1, 2).

Historical background

The history of the locality, and lists of ammonoids, conodonts, foraminifers, ostracodes, and miospores, were published by BALASHOVA (1944, 1953), ROZMAN (1962), SIMAKOV et al. (1985), BARSKOV et al. (1984, 1988), KUSINA (1985), and KOCHETKOVA et al. (1987). Sections in the basin of Burtybai Creek in the Mugodzhary Mountains (Berchogur Depression) were extensively studied in the 1980s owing to the works towards a redefinition of the base of the Carboniferous system, which until 1991 was defined by the first appearance of the ammonoid *Gattendorfia subinvoluta* (MÜNSTER, 1839). The Berchogur sections were a focus of the D-C research, because some of them contain a diverse ammonoid fauna with *Acutimitoceras* in association with conodonts and foraminifers. Most publications on Berchogur (variant spelling "Birshoghyr") are in Russian, including an extensive monograph with the geological setting and facies descriptions edited by KOCHETKOVA et al. (1987). Two sites with ammonoids of the so-called "*Acutimitoceras* fauna" have been reported from the Berchogur Depression – in the east and the west of the depression. BALASHOVA (1953) studied ammonoids from the west of the depression, whereas KUSINA (1985) and BARSKOV et al. (1984; 1988) published a synchronous ammonoid fauna from the north-east of the depression, in the upper reaches of Burtybai Creek. KOCHETKOVA et al. (1987) described in detail three successions on the banks of Burtybai Creek, and one of these ("Berchogur") was the same as KUSINA'S. BARSKOV et al. (1984, 1988) also described the Berchogur section and its fauna. In 1991, the D-C boundary was officially placed at the level of the first appearance of the conodont *Siphonodella sulcata* in its evolutionary lineage from *S. praesulcata*, with a stratotype in the La Serre section (France). Some ten years ago it became apparent that this boundary needed to be redefined, because *S. sulcata* was found below the official boundary level just above an interval of facies change (see BECKER et al. 2016 for references). During an inofficial vote of the D-C working group at a conference in Montpellier (2016), the conodont *Protognathodus kockeli* received a majority of votes as the best potential marker for the redefined D-C boundary. This level is close to the beginning of radiation of the Carboniferous biota and at the end of a large regression, which in the European successions is near the top of the Hangenberg Sandstone. However, the geographical distribution of *P. kockeli* is limited. Protognathids are generally rarely found in the Urals and Western Kazakhstan, and *P. kockeli* has been recorded neither in the Urals, nor in the Volga-Urals region. It is necessary to find additional markers for successions that lack *Pr. kockeli*, if that species were to be officially approved as a primary marker. The Berchogur sections are a good place to search for such markers.

Berchogur locality revisited

To our knowledge, no stratigraphers or palaeontologists have visited the Burtybai sections since the 1980s, and their locality data have largely been forgotten. Finding the Burtybai sections proved to be difficult because of the changing industrial landscape and lack of coordinates, photographs or detailed maps in previous publications. In June 2018 we revisited the Berchogur and other Burtybai sections, aiming to summarize the current state of knowledge of the region, and re-evaluate potential levels that can be correlated with the level of *Pr. kockeli*. We successfully located the sections discussed by SIMAKOV et al. (1985) and KOCHETKOVA et al. (1987), and focused on the Berchogur section, as the only one with ammonoids.

We found this section in close proximity to the new Alabas limestone quarry, on national land, close to the road connecting the old and new Alabas

quarries. This section is on the left bank of a dried stream in the upper reaches of Burtybai Creek (where it flows south), a shallow-water argillaceous series with intercalations of carbonate beds. The beds are mostly covered by debris, and needed to be excavated to be re-studied.

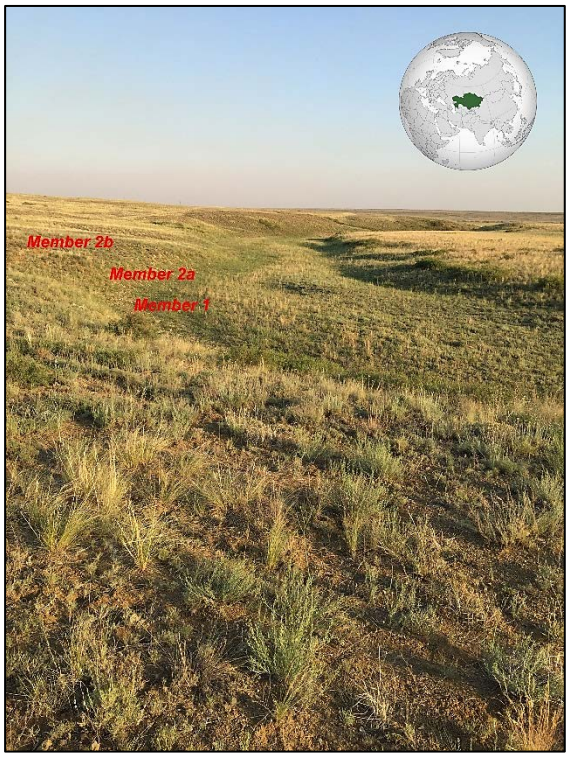

Fig. 1. Succession of the D-C boundary beds in the dry riverbed and on the left bank of Burtybai Creek (Kazakhstan, Aktobe Region), showing Members 1, 2a, 2b (according to the description by BARSKOV et al., 1988). The photograph is facing south.

After the initial excavation, we found all the beds described by previous authors, measured their attitudes, took GPS coordinates, and collected new ammonoid material, mainly from Member 3, and some from Member 4 of BARSKOV et al. (1984, 1988), as well as some lithological and foraminiferal samples. We found and photographed the signposts left by I.S. BARSKOV, A.S. ALEKSEEV and L.I. KONONOVA back in 1983, which they confirmed that they had installed. The old trenches are all filled in, but their position is discernible.

The section is composed of four lithostratigraphic units (members) numbered 1 to 4 by BARSKOV et al. (1984), and two subunits are recognized within Member 2 (Member 2a and 2b; Fig. 1; BARSKOV et al. 1988). Member 1 is composed of light gray algal limestone, over 10 m thick; Member 2a is represented by brown-gray arenaceous limestones, 0.2-0.7 m thick; Member 2b is composed of black clay, 2-2.5 m thick; Member 3 is a yellowish-gray limestone with ammonoids, brachiopods, trilobites and foraminifers, 0.2-0.4 m thick (Fig. 2); Member 4 is a black calcareous clay with ammonoids, nautiloids, brachiopods, corals, etc., 18.5 m thick.

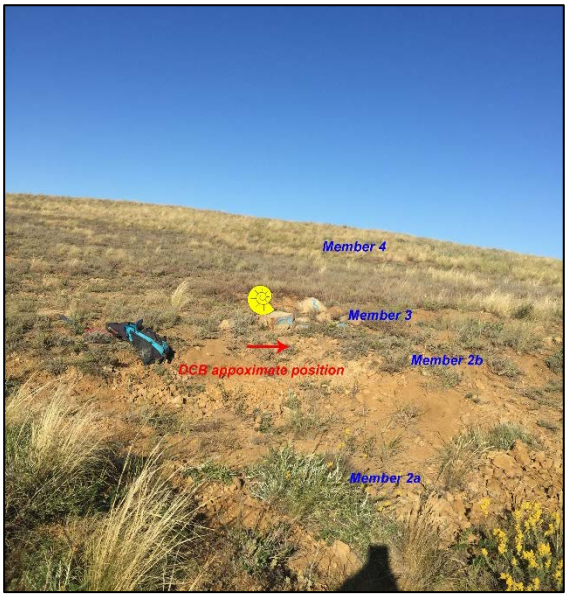

Fig. 2. Berchogur section, facing east and showing Members 2a, 2b, 3, and 4 (according to the description by BARSKOV et al., 1988). The arrow indicates the ammonoid locality in Member 3 (called "*Imitoceras* Beds" by KUSINA, 1985).

According to SIMAKOV et al. (1985), KOCHETKOVA et al. (1987), BARSKOV et al. (1988), and KULAGINA (2013), Member 1 contains foraminifers of the *Quasiendothyra regularis* Zone, Member 2a contains foraminifers of the *Q. kobeitusana substricta* and *Endoglomospiranella imminuta* Zone, and a single specimen of *Tournayellina pseudobeata* (in the Berchogur Section), Member 2b contains no foraminifers; Member 3 corresponds to the *Tournayellina pseudobeata* Zone.

The ammonoid assemblage from Member 3 corresponds to the fauna described by KUSINA (1985). It contains:

?*Mimimitoceras bertchogurense* (BALASHOVA 1953)
Acutimitoceras "subbilobatum" (MÜNSTER, 1839),
Acutimitoceras mugodzharense KUSINA, 1984;
Acutimitoceras carinatum (SCHMIDT, 1924);
Sulcimitoceras yatskovi KUSINA, 1985;
Acutimitoceras intermedium (SCHINDEWOLF, 1923)

This assemblage corresponds to the Stockum Fauna of Western Europe (*Acutimitoceras* Genozone), and most likely to the *Acutimitoceras prorsum* Zone. The ammonoid-bearing beds of Member 3 are overlain by shales of Member 4 with *Acutimitoceras pulchrum* KUSINA, 1985 and *Acutimitoceras rotiforme* (LIBROVITCH, 1940).

Siphonodella praesulcata in Berchogur was found in Member 2b, approximately one meter below Member 3, which contains ammonoids and *S. sulcata* (BARSKOV et al. 1984; SIMAKOV et al. 1985). However, BARSKOV et al. (1988) argued that *S. sulcata* appears in the uppermost part of Member 2b, immediately below the beds with ammonoids. Hence, the current D-C boundary, based on previous *S. sulcate* records, is at the base of the beds with ammonoids of Member 3.

The first definite *Siphonodella sulcata* were recorded from Member 3 (BARSKOV et al., 1984), along with the ammonoids. However, this is most likely not the first evolutionary appearance of *S. sulcata*. A preliminary conclusion, based on conodonts from earlier sampling, is that the levels synchronous to the FADs of *P. kockeli* and *S. sulcata* are somewhere in Member 2. The list of conodonts from Member 2b (BARSKOV et al. 1984, 1988) includes:

Icriodus costatus
Apathognathus varians
Polygnathus inornatus inornatus
Po.. lobatus
Po longiposticus,
Po. parapetus
Po. vogesi,
Siphonodella praesulcata
Bispathodus stabilis
B. anteposicornis
Pseudopolygnathus fusiformis.

According to BARSKOV et al. (1988), the record of *P. fusiformis* suggests the presence of basal Carboniferous beds in Member 2b.

We have begun to resample the Berchogur section for ammonoids and conodonts, focusing on Member 2b and Member 3.

Outlook

Further excavation of this section and bed-by-bed sampling will help to correlate this shallow-water succession with deeper-water sections, e.g., of the Rhenohercynian Basin. We hope that the excavated outcrop can be kept open and not overtaken by the Alabas limestone quarry. We aim to resample the entire section and collect sedimentological probes.

Acknowledgments

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CARBON AND OXYGEN ISOTOPE COMPOSITION AND CONODONT DATA ON THE ZINZILBAN GORGE, EMSIAN GSSP

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We studied carbon and oxygen isotope composition in carbonates, as well as the carbon isotope composition in carbonate-associated dispersed organic matter for the upper Lochkovian, Pragian and lower Emsian strata cropping out in the Zinzilban Gorge, Kitab State Geological Reserve (Zeravshan-Gissar Mountainous Area, Uzbekistan, Fig. 1), with a specific focus on the Pragian–Emsian boundary interval and the *excavatus* Zone as an alternative for the Emsian GSSP.

The suitability of the carbonates for isotope studies was assessed in petrographic thin sections and using geochemistry of the carbonate material. Insubstantial post-depositional alteration of the carbonate material suggests that the preserved carbon and oxygen isotope composition is near-primary.

The Lochkovian–Pragian interval of the studied section is characterised by $\delta^{18}O$ values of -5.2‰ to 2.4‰, with the average at -3.4‰, whereas the Emsian part shows $\delta^{18}O$ values ranging between -4.2‰ and -0,9‰, with the average at -2.3‰ (Fig. 2). The observed increase in $\delta^{18}O$ values in the Emsian strata relative to the Lochkovian–Pragian interval is coeval with a well-defined basinward facies shift (the appearance of dark-grey finely laminated limestones in the section). Therefore, it cannot be entirely excluded that the observed variations in carbon isotope composition in the Lochkovian–Pragian interval mirror a change in the depositional environment.

Variations in $\delta^{13}C$ range between -30.9‰ and -25.7‰ in the organic carbon and between -0.1‰ and 2.9‰ in the carbonate material in the studied section. The $\delta^{13}C_{carb}$ and $\delta^{13}C_{org}$ curves demonstrate almost synchronous variation of the values, with most profound negative excursions near the *sulcatus–kindlei* conodont zonal boundary and at the base of the Emsian Stage (of its current definition; Fig. 2). At the *sulcatus–kindlei* boundary, the $\delta^{13}C_{carb}$ values drop from 1.7‰ to 0.3‰, whereas the $\delta^{13}C_{org}$ values decrease from -26.4‰ to -30.9‰. At the base of the (current GSSP) Emsian, the $\delta^{13}C_{carb}$ values shift from 1.8‰ to -0.1‰, and the $\delta^{13}C_{org}$ values decrease from -26.1‰ to -28.8‰. These stratigraphic intervals in the Zinzilban Gorge section are marked by major phylogenetic changes in the conodont genus (s.l.) *Polygnathus*. The synchronous drop in $\delta^{13}C$ values in both the organic and carbonate matter indicates that variations in carbon isotope composition at these levels mark global changes that affected isotope composition of the carbon reservoir, which can be used for global correlation.

By contrast, the $\delta^{13}C_{carb}$ values in the lower part of the *excavatus* Zone of the Emsian Stage in the Zinzilban Gorge section (Beds 40–41) range between 0.9 and 1.8‰, followed by an increase up to 2.5‰ in the middle of the *excavatus* Zone almost synchronous with a rise in $\delta^{13}C_{org}$ values from -29.2‰ from -27.1‰ (Fig. 3).

In 2008, 2015, and 2016, in collaboration with the Kitab State Geological Reserve, we studied

diversity of early polygnathids in beds 40–42 of the Zinzilban Gorge section. The beds 40–44 in this section are correlated with the *excavatus* conodont Zone. The conodont assemblage extracted from beds 40–42 comprises *Polygnathus excavatus* CARLS & GANDL, *Po. pannonicus* MASHKOVA ET APEKINA, *Po. foveolatus* PHILIP & JACKSON, and *Po. gronbergi* KLAPPER & JOHNSON (Fig. 2).

The polygnathid phylogenetic lineage in the studied interval is devoid of any notable changes in the morphology of platform elements. Minor changes are manifested in a shift of the rear end of the carina towards a medial position on the element (*Po. foveolatus* JACKSON and *Po. gronbergi* KLAPPER & JOHNSON) and a decrease in the depth of basal cavity on the lower side of the element (a beginning of the inversion).

The most significant changes in early polygnathid phylogeny have been observed in the transitional interval from *Po. pireneae* BOERSMA to *Po. kitabicus* YOLKIN et al. and associated with the appearance of *Po. nothoperbonus* MAWSON (Fig. 1). First, three phylogenetic lineages of polygnathids emerged, one of these lineages (*Po. sokolovi – Po. hindei – Po. tamarae*) being short-lived, whereas the other two continuing the evolution of the genus *Polygnathus* (s.l.) in the Devonian. Second, there was an appearance of the taxon *Po. nothoperbonus* characterised by an inversion of the basal cavity.

We do not recommend the base of the *excavatus* Zone of the Emsian Stage and the FAD of "*Po. excavatus* M114" (Sample MZ891-42/7) as a candidate for the revision of the Emsian GSSP. Instead, we suggest focusing on the much lower interval. In our opinion "*Po. excavatus* M114" should be identified as *Po. gronbergi* KLAPPER & JOHNSON (YOLKIN et al., 1994).

To exclude influence of changes in the lithofacies on variations of the carbon and oxygen isotope composition, we suggest to investigate a number of Pragian-Emsian parallel sections cropped out on the west and on the east of the Zinzilban Gorge section in the Kitab State Geological Reserve.

In addition to the Zinzilban Gorge section, Pragian / Emsian boundary has been recognised from conodont distribution in the Bursyhirman Range and Sangitovar Gorge where it is accompanied by no significant variation in lithofacies (Fig. 1).

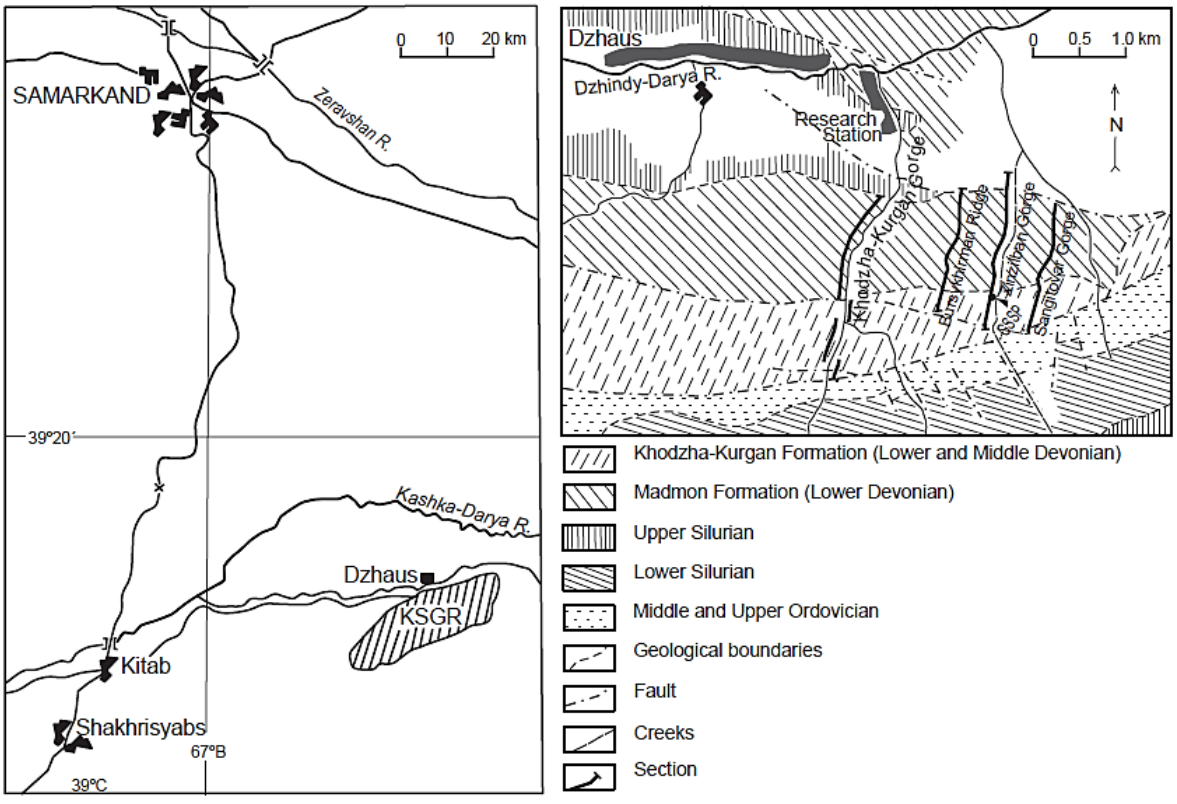


Fig. 1. Location and geological map of the Kitab State Geological Reserve (KSGR), Uzbekistan.

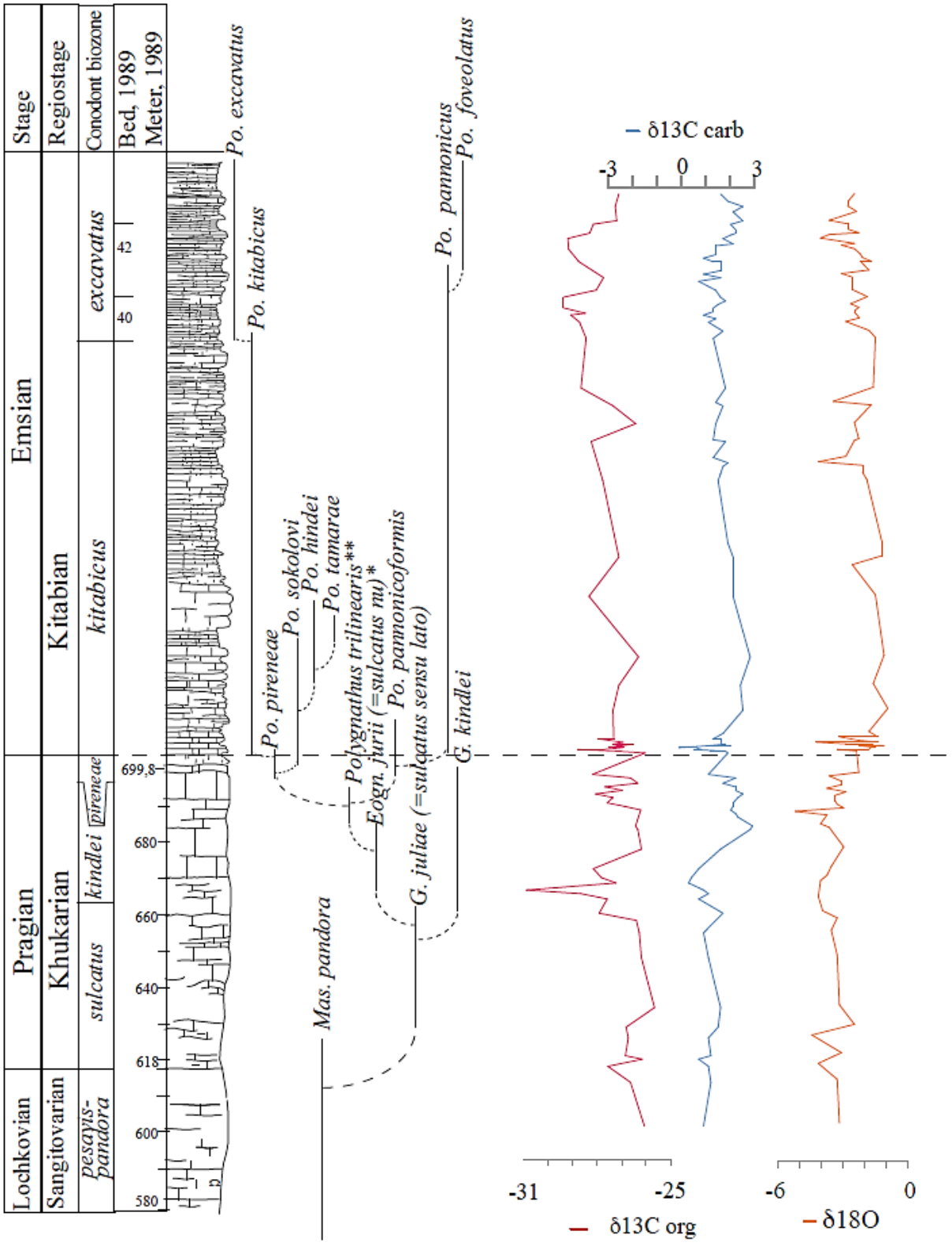


Fig. 2. Phylogenetic relationships of eognathodids and early polygnathids according to data from Devonian sequences of the Kitab State Geological Reserve (YOLKIN et al., 2011) and covariation of $\delta^{13}C$ org, $\delta^{13}C$ carb, $\delta^{18}O$.

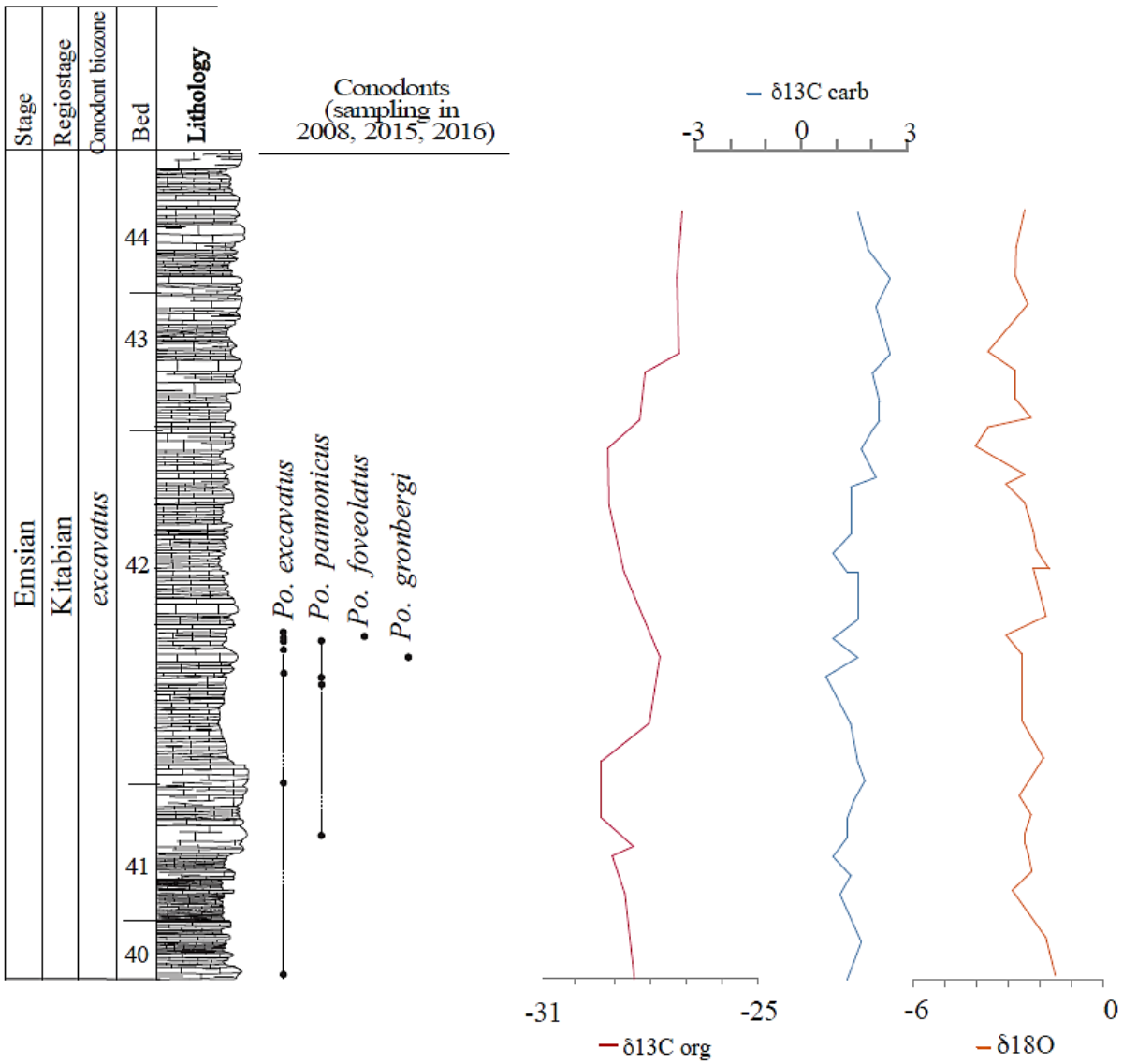


Fig. 3. Ranges of polygnathids and covariation of $\delta^{13}C$ org, $\delta^{13}C$ carb, $\delta^{18}O$ in 40-42 beds of the Zinzilban section (Kitab State Geological Reserve).

DEVONIAN MEETINGS

3rd International Congress on Stratigraphy

strati 2019

2-5 July 2019, Milano, Italy

Commissione Italiana di Stratigrafia

UNIVERSITÀ DEGLI STUDI DI MILANO

DIPARTIMENTO DI SCIENZE DELLA TERRA "ARDITO DESIO"

First Circular

We are pleased to announce the third International Congress on Stratigraphy, which will be held in

Milano (Italy), 2-5 July 2019

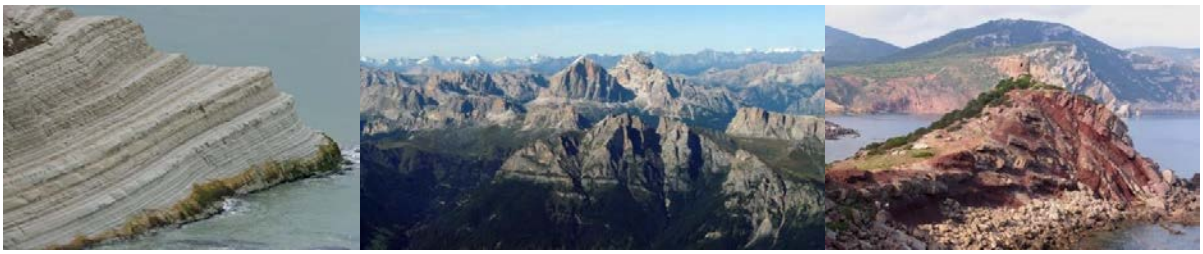
Following the first edition of this congress, held in Lisbon (Portugal) in 2013 and the second edition organized in Graz (Austria) in 2015, the third edition of STRATI has been assigned by the International Commission on Stratigraphy (ICS) to Italy, a country with a long historical tradition in Stratigraphy since the 17th century. Some milestones in the history of Stratigraphy were added in Italy by outstanding scientists such as Niels Stensen and Giovanni Arduino. Moreover, a wide variety of extraordinary stratigraphic successions and settings, often preserved in breath-taking natural environments, can be visited in Italy.

The topics of the congress will range from the Precambrian to the Holocene and will include all the stratigraphic techniques. The congress will provide the opportunity to discuss the recent developments in the study of the stratigraphy of the volcanic areas, Antarctic and Artic sedimentary successions and ice caps, as well as of crystalline rocks. We also invite specialists from georesources exploration and hydrogeology to present their most advanced contributions to subsurface stratigraphy.

As in previous editions, the congress will also host meetings of the ICS and of its Subcommissions to debate topics and problems in updating and improving the geological time scale.

We thank you in advance for your attention and hope to welcome many of you in Milano in July 2019!

The General Chairs of the
Congress:
Marco BALINI and
Elisabetta ERBA



VENUE

The congress will be held in the prestigious venue of the Università degli Studi di Milano, Via Festa del Perdono 7, located in the old "Ca' Granda" (literally "the Big House"). It is a striking historical complex in the heart of the city, located only a seven-minute walk from the famous Piazza del Duomo and easily reachable by public transportation. The University's main campus, a former hospital built between 1456 and 1472, consists of the most historically and artistically significant buildings in Milano.

THE CONGRESS VENUE:
Università degli Studi di Milano,
Via Festa del Perdono 7,
20100 Milano

LOCATION

Milano is a city with an eclectic spirit that can please everyone: those who seek for art and those who prefer food, recreation or business. Located in North Italy, Milano is often referred to as the Italian "capital of industry, commerce, finance, fashion and design". The history of the town dates back to Roman times. Such a long history is well documented by monuments and churches. Milano was also visited by several artists, especially during the Middle Age and the Renaissance, whose masterpieces are preserved in several Museums. The most representative monument is the Duomo, the highest expression of the Italian Gothic. The quality of accommodation and tourist attraction in Milano and the excellent transport links with most Italian and European towns, will make this event very interesting for the international audience.

ORGANIZATION

The congress will be organized by the *Commissione Italiana di Stratigrafia* (CIS)-*Società Geologica Italiana* (SGI) and the *Department of Earth Sciences "Ardito Desio"* of the University of Milano. The organizational framework for the congress is presently as follows:
General Chairs:
Marco BALINI, *Università di Milano, Italy*
Elisabetta ERBA, *Università di Milano, Italy*

SCIENTIFIC PROGRAM

The scientific program is intended to give space to researches through all stratigraphic fields, methodologies and applications. In order to achieve this scope, the following themes have been identified:

T1. History of Stratigraphy

T2. Stratigraphic tools

T3. Erathemes, Systems, Series and Stages

T4. Stratigraphy of carbonates and carbonate platforms

T5. Stratigraphy of volcanoes and of volcanic areas

T6. Antarctic and Arctic

T7. Stratigraphy and geological mapping

T8. Subsurface stratigraphy

T9. Geochronology and time scales

T10. Stratigraphy in crystalline rocks

T11. Open theme

CALL FOR SCIENTIFIC SESSION PROPOSALS

We invite the whole community of stratigraphers to propose sessions within the above themes.
All the proposals will be collected via the website of the congress www.strati2019.it. **Deadline for the submission of the scientific session proposals is 31st July 2018.**
The session proposals will be examined by the Scientific Committee for optimization. The list of the accepted sessions and the resulting Scientific Program, will be published on the congress website and announced within the second circular.
The final Scientific Program will be defined after the submission of the abstracts.

MEETING AND WORKSHOP PROPOSALS

We encourage the ICS Subcommission and INQUA Commission Chairs to submit proposals for business meetings to be held during the congress.
We also invite the submission of workshop proposals on specific stratigraphic topics.
Submission is via the website of the congress www.strati2019.it. **Deadline for the submission of the meeting and workshop proposals is 31st July 2018.**

LANGUAGE

English will be the official language of the meeting and field trips.

REGISTRATION FEES

Registration fees	Early registration (Before March 31, 2019)	Late registration (After March 31, 2019)
Full rate (including SGI membership*)	410 €	510 €
Full rate for SGI members**	350 €	450 €
Full rate	470 €	570 €
Reduced*** (including SGI membership*)	300 €	400 €
Reduced*** for SGI members**	260 €	360 €
Reduced***	340 €	440 €
Daily rate (including SGI membership)		220 €
Daily rate for SGI members **		160 €
Daily rate		280 €
Accompanying persons	180 €	230 €

*Participants will enrol the SGI starting from the date of registration to the congress to the end of 2019
**Participants having paid their annual membership fee for 2018 to the Società Geologica Italiana (SGI)
***Reduced rate for students and retired persons
Registration fee includes morning and afternoon coffee breaks and lunches. Details for payment will be available in the second circular.

HOW TO TRAVEL TO MILANO AND ACCOMMODATION

Milano can be easily reached by train and by plane (three international airports are located in the surrounding of the city). The venue of the congress is very easy to reach through a dense network of surface and underground/subway transportation. Detailed information on transportation, accommodation and tourism in Milano are provided in the congress website.

FIELD TRIPS

Field trips will be organized on a national scale; they will be led by most experienced specialists. A complete list with detailed information on the field trips will be provided in the second circular.

IMPORTANT DATES

Deadlines:

- Scientific session proposals: 31st July 2018
- Meeting and workshop proposals: 31st July 2018
- Registration: from 15th June 2018
- Payment of the registration fee: after the release of the 2nd circular

The second circular will be distributed in October 2018 and will provide information about approved scientific sessions, abstract submission, social program and field trips, including related deadlines and fees.

Congress website: http://www.strati2019.it Congress e-mail: info@strati2019.it

FIRST CIRCULAR

XIX ICCP
Cologne, Germany
July 29 - August 2, 2019

19TH INTERNATIONAL CONGRESS ON THE CARBONIFEROUS AND PERMIAN (XIX ICCP 2019)

Invitation

With great pleasure we invite you to attend the 19th International Congress on the Carboniferous and Permian, to be held at the University of Cologne, Cologne, Germany, July, 29th–August, 2nd, 2019. It is our special privilege, to host the ICCP again in Central Europe, following the successful meetings in Cracow 1995 and Utrecht 2003, and forty-eight years after the meeting in Krefeld 1971, hitherto the only "Congres International du Stratigraphie et Géologie du Carbonifère" held in Germany.

The widened spectrum of the congress and major advances made in almost 50 years are a unique opportunity to demonstrate the scientific progress in Germany and adjacent countries of Central Europe, to put these into a global frame enabled by the presentations of established researchers and young scientists and students from all over the world, and to evaluate the results on various fieldtrips in classical and new localities. The Carboniferous and Permian of Central Europe display a multitude of facies, which might suit everybody's interest. In the Mississippian, facies range from carbonate platform environments in Belgium and westernmost Germany to the classical basinal Kulm successions

in the Rhenish Mountains and beyond, also seen during the proposed field trip to the Moravo-Silesian Zone (Czech Republic). Pennsylvanian successions contain in part coal-bearing paralic and intramontane succession. The latter continue throughout most of the Permian ("Rotliegend"), and finally are topped by the carbonate and salt deposits of the uppermost Permian "Zechstein" sea, both constituting the classical Northwest-Central European Permian. Finally, an excellent glimpse of the Northwestern margin of the Palaeotethys will be provided by a field trip to the Carnic Alps and Karavanke in the border triangle of Austria, Italy and Slovenia. New data concern stage and substage boundaries, among those on the Devonian-Carboniferous, Viséan-Serpukhovian, and Permian-Triassic boundaries, sequence stratigraphic interpretations, refined biostratigraphic data and non-marine–marine correlations, refined facies interpretations, and spectacular Pennsylvanian-Permian fossils sites. Last but not least, the future economic potential of Carboniferous deposits after ending of coal mining in Germany and adjacent countries is of major interest and new models for the tectonic assemblage of the Variscides "in the heart of Pangaea" emerged in recent years.

We would appreciate to welcome all of you in Cologne. Do not miss this unique forum on the Carboniferous and Permian, meet old and new friends to discuss latest results, and contribute to cutting-edge research of our favourite time slice. We will do our best to organize a splendid meeting!

Members of the Scientific Committee and areas of specialization

Michael Amler (Köln), Carboniferous marine invertebrates.

Markus Aretz (Toulouse), Carboniferous and Permian carbonate environments and reefs.

Ondřej Bábek (Olomouc), Co-leader of proposed field trip to the Mississippian of Moravia; multiproxy stratigraphy, sequence stratigraphy and climate-eustacy interactions in the Carbonifeous

Julien Denayer (Liège), Leader of proposed field trip to the Mississippian of Belgium; Carboniferous stratigraphy and marine macrobiota.

Holger Forke (Berlin), Leader of proposed field trip to the Pennsylvanian and Permian of the Carnic Alps and Karavanke Mts.; Pennsylvanian and Permian fusulines, stratigraphy and regional geology.

Anette Götz (Porthmouth), Permo-Carboniferous of Gondwana and its conventional and unconventional energy resources.

Hans-Georg Herbig (Köln), Carboniferous stratigraphy and facies; Congress Chair.

Jiří Kalvoda (Brno), Co-leader of proposed field trip to the Mississippian of Moravia; Carboniferous stratigraphy and marine microbiota.

Hans Kerp (Münster), Permo-Carboniferous palaeobotany.

Tomas Kumpan (Brno), Leader of proposed field trip to the Mississippian of Moravia; multiproxy stratigraphy of Devonian and Carboniferous carbonate successions

Svetlana Nikolaeva (Moscow-London), Vice-chair of the International Subcommission on Carboniferous Stratigraphy; Carboniferous stratigraphy and marine macrobiota.

Matevž Novak (Ljubljana), Leader of proposed field trip to the Pennsylvanian and Permian of the Carnic Alps/Karavanke Mts.; Pennsylvanian and Permian palaeontology, stratigraphy and regional geology.

Edouard Poty (Liège), Co-leader of proposed field trip to the Mississippian of Belgium; Carboniferous marine invertebrates, biostratigraphy and sequence stratigraphy.

Ausonio Ronchi (Pavia), Non-marine Permian basins in Europe, their stratigraphy and biota.

Martin Salamon (Krefeld), Conventional and unconventional Permo-Carboniferous energy resources in Europe.

Jörg Schneider (Freiberg), Vice-chair of the International Subcommission on Permian Stratigraphy; Co-leader of the proposed field trip to the classical Northwest-European Permian in central Germany; Permian marine – non-marine correlations.

Shuzong SHEN (Nanjing), Chair of the International Subcommission on Permian Stratigraphy; Permian stratigraphy.
Vladimir SILANTIEV (Kazan), Chair of the 18th International Congress on the Carboniferous and Permian; non-marine Permian stratigraphy and biota.
Lucas F. SPENCER (Albuquerque), Permo-Carboniferous vertebrate palaeontology and marine – non-marine correlations.
Sebastian VOIGT (Thallichtenberg), Leader of the proposed field trip to the Pennsylvanian-Permian non-marine Saar-Nahe Basin, SW Germany; Carboniferous–Triassic non marine biota, palaeoichnology and palaeoenvironments
Xiangdong WANG (Nanjing), Chair of the International Subcommission on Carboniferous Stratigraphy; Carboniferous stratigraphy.
Volker WREDE (Krefeld): Leader of the proposed field trip to the Pennsylvanian paralic foreland basin of the Ruhr area; regional and structural geology, coals.
Silvio ZEIBIG (Kassel), Co-leader of the proposed field trip to the classical Northwest-European Permian in central Germany; Zechstein deposits of central Europe and salt mining.

Members of the Organization Committee

Hans-Georg HERBIG, Michael AMLER, Sarah ESTEBAN-LOPEZ, Sven HARTENFELS, Hannah CZIESZINSKI, Eliza STEHR (all University of Cologne), Markus ARETZ (Unversité de Toulouse).

Venue

Cologne, the fourth biggest German city, is a vibrant metropolis with somewhat more than one million inhabitants in the western part of Germany. Based on an older local settlement, it was founded by the Romans and is thought to be the oldest city of Germany. During centuries people from many countries met in its open-minded atmosphere. Its flair is due to the unique location at River Rhine, the mixture of modern and historical buildings – the famous cathedral is included in the UNESCO world heritage list, and the many students visiting several universities. The University of Cologne, which will host the 19th ICCP has almost 50,000 students in six faculties covering the complete spectrum of natural and cultural sciences. Cologne is an ideal base to visit classical Carboniferous localities in the near-by Belgian Ardennes, the German Rhenish Mountains and the Ruhr area. Permian outcrops are somewhat more distant, but easily reached via a dense net of highways. Do not forget additional touristic highlights, including four UNESCO world heritages: scenic “Upper Middle Rhine Valley”, “Germanic-Rhaetic Limes”, the originally 550 km long boundary fortification of the Romans, as well as the rococo castles “Augustusburg” and “Falkenlust”, both only some kilometres south of Cologne.

Schedule for 2019

Pre-Congress field trips
July 28: Arrival in Cologne, Registration and welcome reception
July 29-August 2: Talks, poster-sessions, workshops
July 31: Mid-Congress Field trip
August 1: Congress Dinner (River Rhine Cruise)
August 3: Departure
Post-Congress field trips

Travel

Cologne is reached by a dense network of highways and high-speed trains. By air, it is reached via the airport Cologne-Bonn CGN (12,000,000 passengers/year, 130 destinations, also by low-cost carriers). Participants from overseas may find good travel deals to the airports of Düsseldorf DUS, Frankfurt/Main FRA, or even to Brussels BRU (Belgium) and Amsterdam AMS (The Netherlands). All airports are directly connected by high-speed trains with Cologne:

Düsseldorf (40 km, 25 min)
Frankfurt (180 km, 1 h)
Brussels (230 km, 2 h)
Amsterdam (280 km, 3h)

Please check to see if your visit in Germany will require a visa. On request, we will provide official invitation letters to delegates who need to apply for a visa.

Scientific Programme

Talks and posters: The congress will take place in the central lecture hall of the University of Cologne. This will enable easy changeover between parallel sessions of talks. Time for oral presentation is limited to 20 minutes, including questions and discussion. The posters will be also displayed in the central lecture hall and be accessible during the entire duration of the congress.
We plan to limit speakers to one presentation, but individuals may participate as non-presenting co-author in additional talks. The number of poster presentations per person is not limited. Poster format will be portrait layout DIN A 0 (width 841 mm, height 1189 mm). Details will follow in the second circular.

Proposed Sessions: Herein, we propose a framework of sessions/topics. However, we encourage the scientific community to propose additional sessions or more specialized 'subsessions' to the organization committee **until November, 15th 2018**. Proposals should be accompanied by an outline of the session topic, maximum 150 words long. Final acceptance will be based on the potential to attract a wide audience and to stimulate further research. Additional session titles will be published in the second circular.

A. The world of stratigraphy

A1. Carboniferous stage boundaries, stratotype sections, and GSSPs
A2. Permian stage boundaries, stratotype sections, and GSSPs
A3. Carboniferous and Permian multistratigraphy and correlations (including isotope stratigraphy, magnetostratigraphy, sequence stratigraphy, and cyclostratigraphy)
A4. Revision of the Devonian-Carboniferous boundary and associated events and extinctions
A5. End-Permian extinction and early Triassic recovery
A6. Late Carboniferous to earliest Triassic non-marine – marine correlation

B. The world of palaeontology

B1. Carboniferous and Permian marine biota: taxonomy, palaeoecology, palaeogeography

B2. Carboniferous and Permian non-marine biota and plants: taxonomy, palaeoecology, palaeogeography

C. The world of facies, environments and basin analysis

C1. Carboniferous and Permian reefs, mounds, and biostromes

C2. Carboniferous and Permian carbonate platforms and basins from cold-water to the tropics

C3. Permian evaporite basins

C4. Carboniferous and Permian siliciclastics and shales

C5. Non-marine basins and environments of the Variscides and beyond

C6. Permo-Carboniferous basins and environments from Gondwana

C7. The Permo-Carboniferous glaciations - record and impact

D. The world of oceans and mountains

D1. Carboniferous and Permian plate tectonics and the evolution of relief (building and deconstruction of mountains)

D2. Carboniferous and Permian palaeoceanography

E. The world of economic geology

E1. Carboniferous and Permian coals and evaporites

E2. Carboniferous and Permian conventional and unconventional hydrocarbon systems

E3. Carboniferous and Permian geothermal resources

Abstracts: Abstracts are due April, 15, 2019. A request for abstracts will be announced in the second circular, including instructions for the authors. Abstracts are limited to one page, format DIN A4. The fully citable abstracts will be published in *Kölner Forum für Geologie und Paläontologie*. The volume will be distributed to the registered delegates.

Proceedings: Congress proceedings will be published, but at the time being no final decision on the format has been made. However, we prefer a publication in the “Compte Rendue” style of earlier congresses, as in our opinion dispersion in several journals minimizes the importance and impact of the congress.

Workshops: Free workshops will be available for any colleagues or working groups on demand. Please contact us not later than April, 15th, 2019 with workshop titles, duration and expected number of participants. Rooms will be available for the business meetings of the Subcommissions on Carboniferous and Permian stratigraphy.

Proposed Field Trips

Field trip participation will be on a first-come first-served base. Independently to modifications/restrictions by the fieldtrip leaders a maximum of 30 persons per field trip is expected. Duration, excursion routes, and costs will be detailed in the Second Circular. Pre-congress and post-

congress field trip themes supplement each other to enable maximum coverage for participants interested in two field trips. Field trips will not require extensive walking or walking in rugged landscape except for some stops in post-Congress field trip C3.

A. Pre-Congress field trips

A1. The Mississippian carbonate platform of the Ardennes, Belgium – fauna, facies, and stratigraphy.

A2. The Mississippian Kulm Basin of the Moravo-Silesian Zone, southern Czech Republic – counterpart of the German Rhenish Mountains.

A3. The classical Northwest-Central European Permian: continental "Rotliegend", restricted marine to evaporitic deposits of "Zechstein", and the Permian-Triassic transition in central Germany.

A4. The Pennsylvanian of the Ruhr area, western Germany – fauna, facies, and stratigraphy of a paralic foreland basin of the Variscides including coal formation.

B. Mid-Congress field trips: to be announced in the Second Circular.

C. Post-Congress field trips

C1. The Mississippian Kulm Basin of the Rhenish Mountains, western Germany – fauna, facies, and stratigraphy of a mixed carbonate-siliciclastic foreland basin.

C2. The Pennsylvanian–Permian of the Saar-Nahe Basin, southwestern Germany – fauna, facies, and stratigraphy of an intramontane continental molasse basin of the Variscides.

C3. The Pennsylvanian–Permian of the Southern Alps (Carnic Alps/Karavanke Mts.), Austria/Italy/Slovenia – fauna, facies and stratigraphy of a mixed carbonate-siliciclastic shallow marine platform along the northwestern Palaeotethys margin.

General information

Guest programme: No formal guest programme is planned at this time. All places of interest can be reached by foot or public transport. For information see the official website https://www.cologne-tourism.com/. Feel free to request further information from the organizers.

Accomodation: A large variety of hotels is available in Cologne. Prices during summertime are reasonable, as no trade fares or other big events will take place. We will suggest some which are in walking distance (max. about 30 minutes) to the congress location on the website. Student dormitories are not available, but low cost hostels and youth hostels might be booked.

Weather conditions: Due to its position relatively close to the Atlantic and the North Sea, Cologne has a mild, maritime influenced climate. Average maximum temperatures in July and August are 24°C during the day, minimum temperatures 12–13°C at night. Rain cannot be excluded and even some hot days with temperatures up to 30°C.

Type of clothing: A light rain coat and a sweater should be obligatory. For field trips bring also sturdy boots and, if possible, a hammer.

Registration

Electronic registration will be available on the Congress website http://iccp2019.uni-koeln.de/ after December, 1, 2018. It is our wish to organize a meeting at reasonable prices to enable participation of a wide audience. The fees, however, still might be subject to minor changes due to pending funding.

Registration fees:

	Before March 15, 2019 (Early Bird)	**March 15–May 30, 2019 (Late registration interval)**
Regular participant	280 €; includes congress fee, printed abstract volume, printed volume of all field trips, additional USB stick with electronic versions of both volumes. Icebreaker party and refreshments during the sessions	330 €; includes congress fee, printed abstract volume, printed volume of all field trips, additional USB stick with electronic versions of both volumes. Icebreaker party and refreshments during the sessions
Student	190 €; as above, applies only with valid student ID card	240 €; as above, applies only with valid student ID card
Accompanying person	80 €; icebreaker party and refreshments during the sessions	100 €; icebreaker party and refreshments during the sessions

Important dates

August, 15th, 2018: First Circular; call for sessions
November, 15th, 2018: Deadline for proposal of sessions
December, 1st, 2018: Second Circular, opening of online registration
April, 15th, 2019: Deadline for Early Bird payment, abstract submission; announcement of workshops
May, 30th, 2019: Third Circular, end of late registration interval

Contact

Email: ICCP-2019@uni-koeln.de, Website: http://iccp2019-Cologne.uni-koeln.de/

SDS INTERNATIONAL MEETING, SUMMER 2020

200 years of Study in the North American Type Devonian

Geneseo, New York State, 26 July – 28 July 2020

Geneseo is located on the western edge of the Finger Lakes in upstate New York, 3 hours from Toronto, Ontario and 5:30 hours from New York City. The conference will be hosted by the State University of New York at Geneseo and the meeting and technical sessions will be held in the Integrated Science Building and adjacent Newton Hall.

Geneseo

A small picturesque historic village in rural Livingston County on the eastern side of the Genesee River Valley and home to the State University College at Geneseo. Main Street has several distinct inns, shops, and restaurants; a larger commercial and retail area is on the edge of the village. The closest urban center is Rochester, NY which is a transportation, medical, education, and cultural hub.

Technical Sessions

Meetings and technical sessions are scheduled for the first and third day of the conference, there will be a mid-conference field trip to visit Upper Devonian strata that include the Frasnian-Famennian boundary. The language of the conference will be English; oral presentations will use PowerPoint; posters will be viewed for the duration of the conference.

Lodging

Single and double occupancy dormitory rooms are available on campus, adjacent to dining facilities. Additional lodging is available in the village as well as nearby towns and greater Rochester approximately 30 minutes from Geneseo.

Transportation

Commercial transportation directly to Geneseo is limited, which can be reached only by bus or private vehicle. Rochester, 30 minutes north of Geneseo, can be reached by bus, train, or airline. A shuttle will be arranged to transport people from Rochester to Geneseo.

Field Trips

Pre-meeting (22-25 July) – clastic dominated Upper Devonian and Lower Carboniferous strata in the distal part of the Appalachian Basin in Ohio, Pennsylvania, and western New York. The Frasnian-Famennian boundary interval and Hangenberg Interval will be featured. Field trip will begin in Geneseo or Cleveland, Ohio.

Post-meeting (29 July - 2 August) – carbonate and clastic dominated Lower and Middle Devonian strata in central and eastern New York which will include the Paleontological Research Institute in Ithaca, NY. Field trip will terminate near New York City.

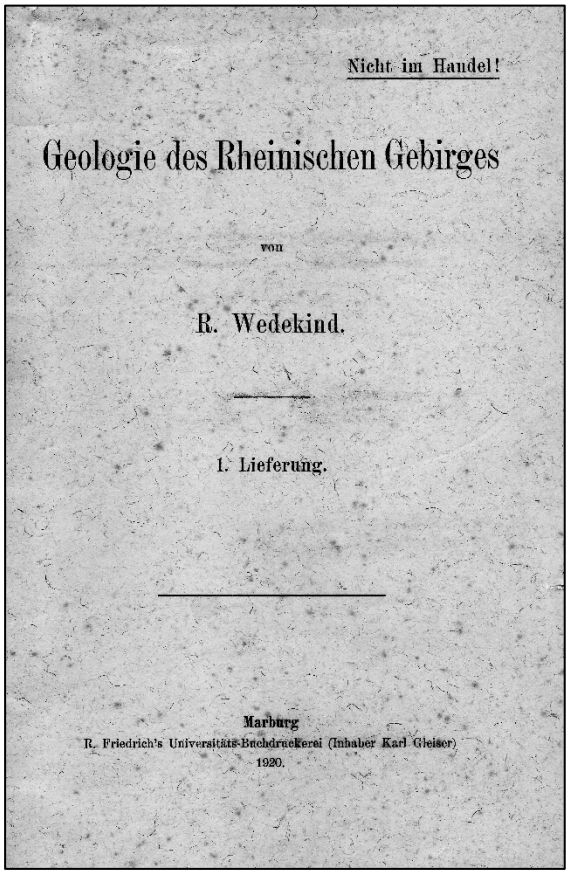
Expect the first circular in Spring 2019.

Organizers and scientific committee: G.C. BAIRD, A. BARTHOLOMEW, D. BOYER, C.E. BRETT, A. BUSH, E. DANIELSEN, A.C. DA SILVA, J. EBERT, J. OVER, D. PAS, C. VER STRAETEN, J. ZAMBITO

DEVONIAN PUBLICATIONS

WEDEKIND (1920) – A FORGOTTEN EARLY SUMMARY OF DEVONIAN (AND CARBONIFEROUS) STRATIGRAPHY

R. Thomas BECKER


Nicht im Handel!

Geologie des Rheinischen Gebirges

von

R. Wedekind.

1. Lieferung.

Marburg
R. Friedrich's Universitäts-Buchdruckerei (Inhaber Karl Gleiser)
1920.

Rudolf WEDEKIND (1883-1961), who worked at the Göttingen and Marburg universities in the period from before the First World War (1908) until the end of the Second World War (1940), was one of the most important Devonian stratigraphers of his time. As evident from the obituary by O.H. SCHINDEWOLF (1961), he was a most difficult person that kept himself outside the scientific community. Because of his strong support for the Nazi regime, he was expelled from Marburg University after the war, which ended his scientific career. Many of his publications appeared in regional journals that do not exist anymore. Mostly, there are no pdfs on the internet. This made his research rather inaccessible, especially internationally.

Set apart from his unpleasant character, WEDEKIND´s work formed a major foundation for Upper Devonian ammonoid stratigraphy (e.g. WEDEKIND 1908, 1913, 1914a), which he combined with numerous observations on the lithostratigraphy and regional geology of the eastern Rhenish Massif (e.g. WEDEKIND 1911, 1914b, 1919). Equally significant were his publications on the Devonian of the Eifel Mountains. This included a Rhenish biozonation based on shallow-water rugose corals (e.g. WEDEKIND 1922a, 1922b, 1924, 1925, 1934). In addition, there was work on Lower Devonian brachiopod stratigraphy in the southern Rhenish Massif (WEDEKIND & HELMBRECHT 1923).

By the courtesy of Michael W. AMLER and Sven HARTENFELS (Cologne), I received the reprint of an early summary of (Rhenish) Devonian stratigraphy by WEDEKIND (1920), which seems to have been completely forgotten subsequently. There are only a few, very rare quotations in SCHINDEWOLF (1923, 1961). But the paper is without doubt a valid publication in the scope of Article 8.1 of the Code since it was regularly printed by the Marburg University printing office and distributed to other universities (such as Cologne) and colleagues. According to the Code (Article 8.1.2), it is not relevant that the paper was not available by trade/purchase, as stated on the cover.

All Devonian ammonoid workers, including myself, were unaware of this early compilation of systematics and biostratigraphy, although WEDEKIND introduced a first goniatite zonation for the upper Emsian (*Anarcestess*tufe), and Eifelian to middle Givetian (Lower and Upper *Maeneceras*stufe). There are even a new genus and a new goniatite family in the publication, which did not find their way into any of the subsequent reviews of taxonomy and systematics (e.g. SCHINDEWOLF 1938; MILLER et al. 1957, HOUSE 1981, BECKER & KULLMANN 1996; KORN & KLUG 2002). *Stilleoceras* n. gen. was based on *Goniatites calculiformis* BEYRICH, 1837, and is an objective senior synonym of *Maternoceras* HOUSE & ZIEGLER, 1977.

At the time of the paper, the genus *Maeneceras* HYATT, 1884 was widely used for the characteristic Givetian index goniatites around *M. terebratum*. Only later, SCHINDEWOLF (1933) recognized that the *Maeneceras* type-species (*Goniatites acutolateralis*) is a Famennian sporadoceratid. Therefore, he introduced the, unfortunately, very similarly named genus *Maenioceras* for the Givetian species. Nevertheless, the family Maeneceratidae established by WEDEKIND (1920) is based on the name-giving type genus, not on the *terebratum* Group. As a consequence, the Maeneceratidae have priority to the Sporadoceratidae of MILLER & FURNISH, 1957

(in MILLER et al. 1957; nom. transl. RUZHENCEV 1957). This leads to further priority of a superfamily Maeneceratoidea (nom. transl.) to the Praeglyphioceratoceae RUZHENCEV, 1957 (now Praeglyphioceratoidea) and of a subfamily Maeneceratinae (nom. transl.) to the Xenosporadoceratinae KORN, 2002 (in the revised diagnosis of BECKER & MAPES 2010). The Sporadoceratinae MILLER & FURNISH (in MILLER et al. 1957) can be kept for the genera with two pointed A-lobes.

Apart from the significance for ammonoid taxonomy and stratigraphy, WEDEKIND (1920) provides also reviews of rugose coral and brachiopod systematics and phylogeny. In the paper, he developed taxonomic keys and successions for the genera *Dalmanella*, *Sieberella*, *Uncinulus*, *Camerotoechia*, lower Devonian "*Atrypa*", *Eospirifer*, *Brachyspirifer*, *Euryspirifer*, and *Reticularia*. The Middle Devonian rugose coral zonation is also summarized.

There are also some data for Carboniferous goniatites and corals. For example, WEDEKIND characterized an upper Viséan genus *Paraglyphioceras*. Giving some credit to the authorship of K. BRÜNING, who worked with him at Marburg at the time, he provided brief definitions for four species. However, BRÜNING´s description of *Paraglyphioceras* did not appear before 1923, in a similarly unconventional way as WEDEKIND´s paper. Much later, KORN (1988) designated *P. rotundum* as its type-species. It seems that WEDEKIND (1920) became without clear intention the author of *Paraglyphioceras*. At the time it was not essential to illustrate new taxa. Since *P. rotundum* was not included by WEDEKIND in his list of species, it is not available as the type species of the genus. *Paraglyphioceras costulatum* (nom. corr.; referred to BRÜNING) or *P. dorsoplanum* (nom. corr.; also referred to BRÜNING) could become the corrected type-species. Both, however, were not included in the revised genus *Paraglyphioceras* sensu KORN (1988). KORN regarded the type of *costulatus* as a poorly preserved possible specimen of *Arnsbergites falcatus* (ROEMER, 1850), whilst *P. dorsoplanum* is based on the whorl fragment of an otherwise unknown Kulm goniatite. The third species listed in WEDEKIND (1920) is *Goniatites discus* ROEMER, 1852, which is an invalid homonym of *Gon. discus* ROEMER, 1850. The Carboniferous form belongs to *Girtyoceras* (see GISCHLER & KORN, 1992). WEDEKIND (1920) also introduced *P. Schaelkense*, which became later the type-species of *Emstites* KORN, 1988. However, he kept that rather globular form clearly separate from the other three typical, discoidal species of the genus. Therefore, *P. Schaelkense* cannot become the correct/new generotype. Carboniferous goniatite workers have to work out a new *Paraglyphioceras* revision; in the scope of WEDEKIND (1920), the genus is not based on material that is suitable for a generic definition. The case may have to be brought to ICZN ruling.

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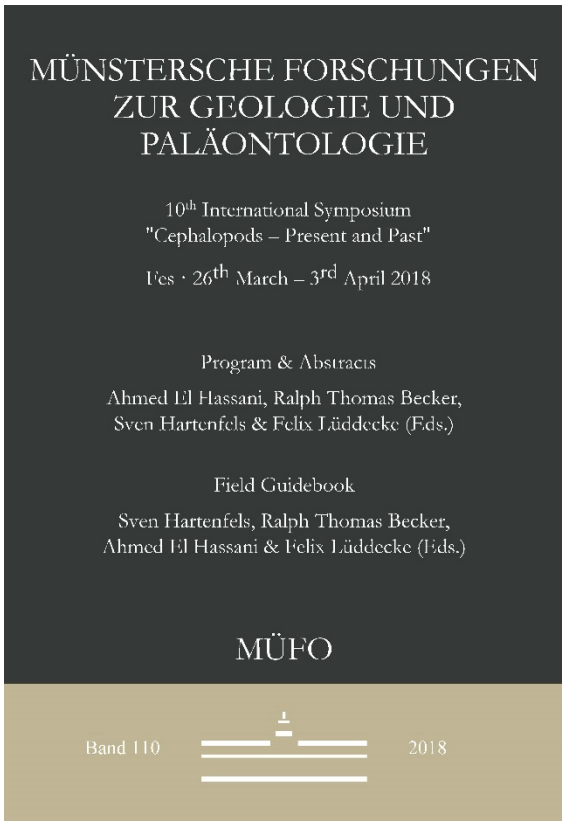
10th INTERNATIONAL SYMPOSIUM „CEPHALOPODS – PRESENT AND PAST“, FES, 26th MARCH – 3rd APRIL 2018, FIELD GUIDEBOOK

HARTENFELS, S., BECKER, R. T., EL HASSANI, A. & LÜDDECKE, F. (Eds., 2018), 10th International Symposium „Cephalopods – Present and Past“, Fes, 26th March – 3rd April 2018, Field Guidebook, Münstersche Forschungen zur Geologie und Paläontologie, **110**: 109-311, ISBN 978-3-00-059200-3, ISSN 0368-9654 [sold out but all individual chapters are available as pdf on ResearchGate or from the authors].



The post-symposium excursion led to the Jurassic of the High and Middle Atlas (two chapters) but had a focus on the cephalopod-rich Devonian of the Tafilalt and Maïder regions of the eastern Anti-Atlas. All locality descriptions contain a complete review of all previous publications, outcrop maps and photos, section logs, detailed litho-, event and biostratigraphy (conodonts, dacryoconarids, ammonoids), data on sedimentology and microfacies, compilations of all fossils (not only of cephalopods) recorded from individual strata, range charts, plates (trilobites and ammonoids), and photos of individual nautiloids, ammonoids, and of some associated fauna. The following chapters, the last two of them published only online, are essential for the current knowledge of Anti-Atlas Devonian stratigraphy:

Content

BECKER, R. T., EL HASSANI, A., ABOUSSALAM, Z. S., HARTENFELS, S. & BAIDDER, L. The Devonian and Lower Carboniferous of the eastern Anti-Atlas: introduction to a „cephalopod paradise“, pp. 145-157 [with an updated chart of Tafilalt litho- ammonoid, and conodont stratigraphy].

BECKER, R. T., ABOUSSALAM, Z. S., HARTENFELS, S., EL HASSANI, A. & BAIDDER, L. Bou Tchrafine – central Tafilalt reference section for Devonian stratigraphy and cephalopod succession, pp. 158-187 [with *Oculoceras* n. gen, Palaeogoniatitinae, Teicherticeratidae].

BECKER, R. T., ABOUSSALAM, Z. S., HELLING, S., AFHÜPPE, L., BAIDDER, L. & EL HASSANI, A. The world-famous Devonian mudmounds at Hamar Laghdad and overlying cephalopod-rich strata., pp. 188-213 [with new trilobite and ammonoid records].

BECKER, R. T., ABOUSSALAM, Z. S. & EL HASSANI, A. Jebel Mech Irdane – the Eifelian/Givetian boundary GSSP and an important cephalopod locality, pp. 214-228 [pointing out the GSSP defining early morphotype of *Po. hemiansatus*; with *Parodiceras irdanensis* n. sp. and *Alberticeras trapezium* n. gen. n. sp., both Parodiceratidae].

BECKER, R. T., ABOUSSALAM, Z. S., HARTENFELS, S., GIBB, A., MAYER, O. & HÜNEKE, H. Emsian events, Frasnian-Famennian boundary, and *Gonioclymenia* Limestone at Jebel Ihrs (western Tafilalt Platform), pp. 229-243.

KLUG, C. & POHLE, A. The eastern Amessoui Syncline – a hotspot for Silurian to Carboniferous cephalopod research, pp. 244-260.

HARTENFELS, S. & BECKER, R. T. The upper Famennian Dasberg Crisis and *Gonioclymenia* Limestone at Oum el Jerane (Amessoui Syncline, southern Tafilalt Platform), pp. 261-272 [with *Protoxyclymenia perlineata* n. sp. and *?Rodeckia ater* n. sp.].

BECKER, R. T., HARTENFELS, S., KLUG, C., ABOUSSALAM, Z. S. & AFHÜPPE, L. The cephalopod-rich Famennian and Tournaisian oft he Aguelmous Syncline (southern Maïder), pp.

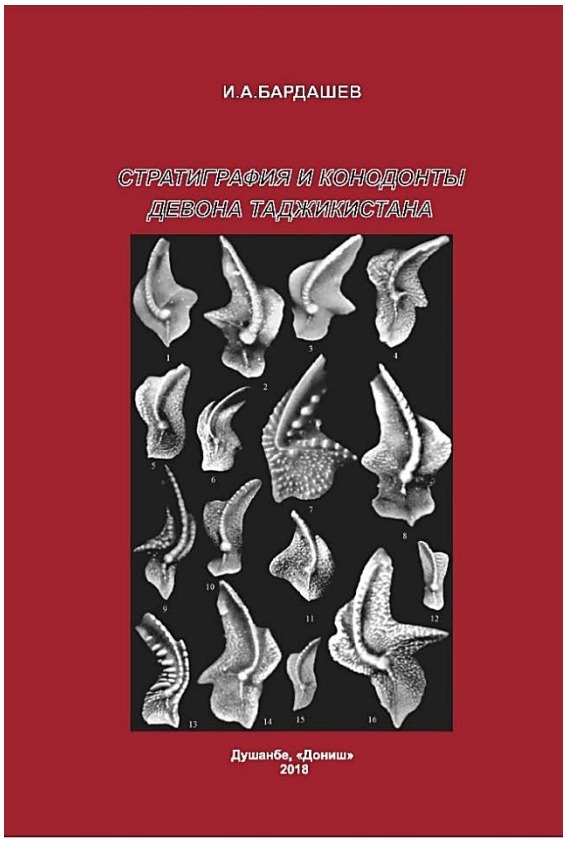
273-306 [with new ammonoid and nautiloid records, in open nomenclature].

ABOUSSALAM, Z. S., BECKER, R. T., MAYER, O., GIBB, A. & HÜNEKE, H. Emsian to middle Famennian bioevents and cephalopod faunas at Mdoura (western Tafilalt Platform), pp. 312-326 [with new goniatite records and sedimentological data for the Frasnes Event styliolinites].

KAISER, S. I., BECKER, R. T., HARTENFELS, S. & ABOUSSALAM, Z. S. The global Hangenberg Crisis and Lower Alum Shale Event at El Atrous (southern Tafilalt Platform), pp. 327-338 [an update of the 2013 SDS Field Guide paper].

DEVONIAN STRATIGRAPHY AND CONDONTS OF TAJIKISTAN

BARDASHEV, I. A. (2018). Devonian Stratigraphy and Condonts of Tajikistan. – Akademia Nauk Respubliki Tadzikistan, Institut Geologii, Seismostoikogo Stroitelystvai i Sejsmologii, 316 pp.; Dushanbe.



Abstract (translated into English)

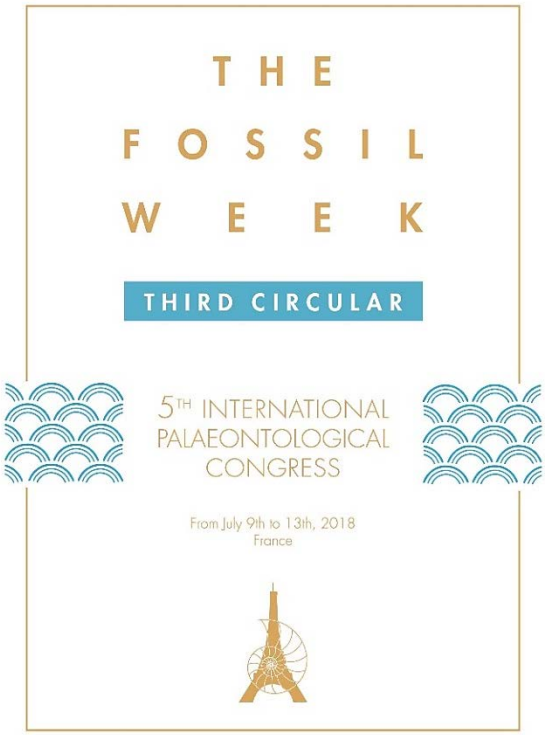
The paper presents the results of the first complex and detailed study of sections that represent almost all facies in the Devonian and adjacent deposits of Tajikistan and of some neighbouring areas of Uzbekistan and Kyrgyzstan. In most cases, a new facies characterization of the studied deposits was carried out. The continuity of Devonian sedimentation in Tajikistan was established. The occurrence of Middle and Upper Devonian deposits in Central Tajikistan, previously denied by most experts, was proven. The age of the unstudied and problematic siliceous and siliceous-carbonate-terrigenous formations in the Zeravshan-Gissar area was confirmed and the heterogeneity of the disputable terrigenous-carbonate sequences of the Zeravshan Ridge was proven. A bathymetric interpretation was applied in the analysis of facies distribution for the first time. On this basis, an attempt to reconstruct the sedimentary palaeo-setting was made. The various Devonian facies and adjacent deposits were suggested to have formed on various areas of shelf and slope of a passive (Atlantic-type) continental margin and on a deep abyssal plain near the continental foot of the Kazakhstan Continent, in the Turkestanian geosynclinal basin, on the northern Gondwana Continent, and in the Palaeotethys geosynclinal basin. For the first time in Central Asia, a broad development of turbidite flow formations (turbidites, grain debris) has been recorded. Also for the first time, Devonian conodonts from various facies of Tajikistan were studied in detail. They are represented by 45 genera and 556 species, most of them are of stratigraphic importance. Two families, 11 genera, and 83 species were first identified by the author. Based on the material from Tajikistan and in comparison with the global literature, fundamentally new schemes of phylomorphogenetic developments of biostratigraphically important conodont genera in the Lower Devonian, Givetian-Frasnian, and Frasnian deposits were suggested; the scheme of phylomorphogenetic developments of Middle Devonian polygnathids was specified. For the first time, the biostratigraphic subdivision of Devonian deposits is based on a continuous sequence of 52 conodont zones, preferably standard zones of global use. These are compared to biostratigraphic units of graptolites, tentaculitoids, foraminifers, corals, brachiopods, and ISS units. Qualitatively, new detailed schemes of regional and local stratigraphic units were developed. 100 strata, 50 of which were first identified by the author, were described, giving detailed lithological and palaeontological characteristics. For Lower Devonian (Pragian and Emsian stages), alternative schemes of conodont zonations based on the evolutionary sequence of taxa

belonging to the same genus, were suggested instead of the generally accepted synthetic scale. The position of the international stratotype of the Prague-Emsian boundary in Zinzilban section (Uzbekistan) was specified to be in fact at the basis of an older zone. Instead of Lower and Upper *hermanni-cristatus* zones in Givetian, it is suggested to establish *hermanni* and *cristatus* zones, respectively. New names for three zones of Frasnian standard conodont zonation are proposed: *falsiovalis* instead of Lower *falsiovalis*, *ovalis* instead of Upper *falsiovalis* Zone, and *nasuta* instead of Lower *rhenana* Zone.

The book is designed for palaeontologists, stratigraphers, geologists, as well as for students of geological high schools [[a voluminous pdf is available from the author].

5th INTERNATIONAL PALAEONTOLOGICAL CONGRESS, PARIS, ABSTRACTS

The fossil week, 5th International Palaeontological Congress, July 9th to 13th, 2018, France, Abstract Book.



Devonian contributions

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STOLFUS, B.M., CLARK, R.J., TASSIER-SURINE, S.A., DAY, J., WITZKE, B.J. & CRAMER, B.D. Revised conodont biostratigraphy of the Kinderhookian

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THUMMEL, R., STROMBERG, C.A.E. & BRIGHTLY, W. Evolution of phxytolith deposition in modern bryophytes – implications for early land plants. – paper 199-12.

WHALEN, C.D. & BRIGGS, D.E.G. Paleozoic pelagic and benthopelagic macroecology: Was there a Devonian nekton revolution? – Paper 100-9.

WHITE, D.A., ELRICK, M., ROMANIELLO, S.J. & ZHANG, F. Tracking global seawater redox trends during the Late Devonian extinction using U isotopes of Upper Devonian marine carbonates. – Paper 11-6.

ZHOU, K. & PRATT, B.R. Sedimentology of two mound reefs on an Upper Devonian (Frasnian) ramp, western Alberta, Canada. – Paper 182/439.

EARLY AND MIDDLE FAMENNIAN SEDIMENTOGENESIS IN THE PRIPYAT RIFT BASIN

OBROVETS, S.M., YASHIN, I.A. & KRUCHEK, S.A. (2017). Early and Middle Famennian sedimentogenesis in the Pripyat Rift basin. – 201 pp.; Republican Unitary Enterprise «Research and Production Centre for Geology», branch «The Institute of Geology»; Republican Unitary Enterprise «Production Association «Belarusneft», BelNIPIneft, Gomel: Belarusian State University of Transport (BelGUT), ISBN 978.985-554-661-1 [in Russian].

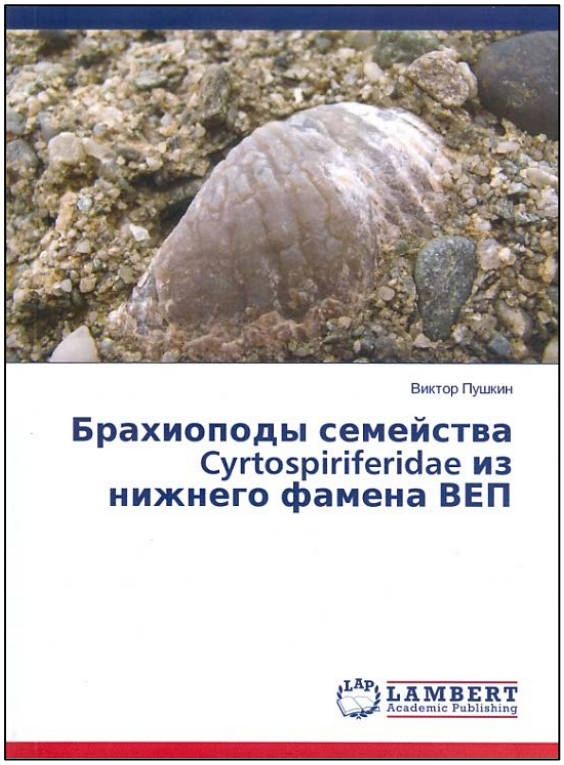
The book presents new materials on the stratigraphy, lithology, sedimentology, paleogeomorphology, and facies of important oil-bearing complexes of the Pripyat Trough: the lower Famennian inter-salt formation (Zadonsk, Yelets, and Petrikov horizons), and the Upper Famennian halite subformation (Lebedjan Horizon). The conditions for the formation of terrigenous, carbonate and sulfate sedimentogenesis in the Pripyat paleorift in the mature phase of the rift are considered. On the basis of a detailed study of the sedimentary rocks of the inter-salt complex and the halite subformation, the paleogeomorphological conditions of sedimentation in the Zadonsk-Petrikov and the Lebedjan basins were reconstructed and conditions of their formation substantiated. Based on the results of lithological and facies studies, taking into account earlier studies, twenty nine lithological-facies zones (LFZ I-XXIX) were distinguished in the territory of the Pripyat Trough. These reflect the different sedimentary conditions of the paleobasin. The influence of lystric tectonics on sedimentation is considered. Paleogeomorphological reconstructions for the deposits of the inter-salt complex and nonsaline deposits of the halite subformation were made. On the basis of these studies, nineteen zones are distinguished, which are promising for the search for lithologically limited traps for organogenic deposits, the Domanic Facies and terrigenous bodies.

BRACHIOPODS OF THE FAMILY *CYRTOSPIRIFERIDAE* FROM THE LOWER FAMENNIAN OF THE EAST EUROPEAN PLATFORM (EEP)

PUSHKIN, V.I. (2018). Brachiopods of the family *Cyrtospiriferidae* from the Lower Famennian of the East European Platform (EEP). – 59 pp.; LAP Lambert Academic Publishing, RU, ISBN 978-613-9-83147-0 [in Russian].

Brachiopods of the order Spiriferida are extremely widespread in the lower Famennian of the East European Platform (EEP). This monograph describes the representatives of the family

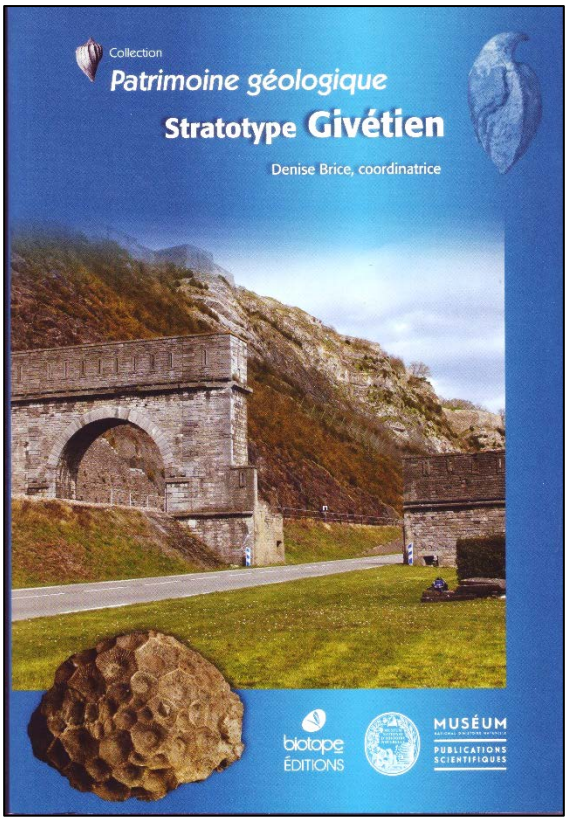
Cyrtospiriferidae TERMIER & TERMIER, 1949 from the lower Famennian deposits of Belarus (Pripyat Trough), Ukraine (Lviv Depression) and Russia (Central Devonian Field, Lipetsk and Voronezh regions). The main material described was derived from the Pripyat Trough. The book redescribes the family Cyrtospiriferidae, the genus *Cyrtospirifer* NALIVKIN, 1918 several of its species *C. europeus* sp. nov., *C. wenyukovi* sp. nov., *C. veresnitsensis* sp. nov., *C. petrikovensis* sp. nov., *C. ljachovitsensis* LINNIK, 1966; *C. brodi* WENYUKOV, 1886; also the genus *Pripyatispirifer* PUSHKIN, 1996, its type species *P. belorussicus* (LYASHENKO, 1959), the genus *Cyrtiopsis* GRABAU, 1923, its species *Cyrt. unifersus* ZHEJBA, 2004, *Longilaminaspirifer* gen. nov., its species *L. lyashenkoi* sp. nov. and *L. acer* sp. nov., *Belarusispirifer* gen. nov., and its type species *B. liplyanensis* sp. nov.



PATRIMOINE GÈOLOGIQUE, STRATOTYPE GIVÉTIEN

BRICE, D. (Ed., 2016). Stratotype Givétien. – 268 pp.,; Collection Patrimoine géologique, Publications scientifiques du Muséum, Paris, ISBN 978-2-85653-791-6, ISSN 2101-0072.

This highly recommended, excellently illustrated review of the type Givetian, written in French, combines a survey of the regional research history, the regional geology and stratigraphy, the rich fossil record, and numerous fossil plates, with chapters on the mineral resources, mining, quarrying, and industrial history with the significance of the Givet geoheritage for natural protection and geotourism (explained excursion stops). The 37 individual authors are to be congratulated for a book that shows how Devonian rocks and fossils can be presented to a broad auditorium.



MEMBERSHIP NEWS

CM Gordon C. BAIRD

Work with Joseph HANNIBAL (Cleveland Natural History Museum) continues on offshore deposits of the Late Famennian Bedford Formation and adjacent units in central and southern Ohio in order to characterize the depositional setting of the enigmatic, unfossiliferous red mudstone interval within the Bedford. The key questions surrounding this deposit is whether it is an offshore marine or terrestrial unit, and whether it is, in some way linked to a glacial or non-glacial phase of the end-Devonian story.

Efforts continue, in conjunction with Carlton BRETT and museum staff at the Paleontological Research Institute in Ithaca, NY, to build and organize a large, curated, stratigraphic collection of rock specimens and associated fossils that we have assembled over a 45 year period. Over 200 new samples from the late- Middle Givetian, Frasnian, and early-Middle Famennian of New York State and adjacent areas have now been added to the museum holdings, which will be rendered digitally accessible in the coming years.

Publications

Field guide articles

MAYER, S., BAIRD, G.C., BRETT, C.E. (2017). Depositional environments across a central trough of the northern Appalachian Basin: Deep Run Shale Member (Moscow Formation) of the Finger Lakes (Excursions A1 and B1). – In: MULLER, O. H. (Ed.), Field Trip Guidebook, New York State Geological Association, 89th Annual Meeting, Alfred, New York: 56-73.

BUSH, A.M., BEARD, J.A., BAIRD, G., OVER, D.J., TUSKES, K., BRISSON, S.K. & PIER, J.Q. (2017). Upper Devonian Kellwasser extinction events in New York and Pennsylvania: offshore to onshore transect across the Frasnian-Famennian boundary strata on the eastern margin of the Appalachian Basin (Excursions A2 and B2). - In: MULLER, O. H. (Ed.), Field Trip Guidebook, New York State Geological Association, 89th Annual Meeting, Alfred, New York: 74-116.

Abstract

BAIRD, G.C., HANNIBAL, J.T., WICKS, J.L. (2018). End-Devonian (Latest Famennian) succession in western and central Ohio: potential depositional continuity through the Hangenberg time-rock interval and its regional implications. - Geological Society of America, Abstracts with Program, **50**: 1 p.; Burlington, VT.

CM Margaret E. BRADSHAW

Ongoing research on Devonian sequences in New Zealand, Australia and Antarctica:

In New Zealand, Silurian and Devonian rocks between the Wangapeka and Takaka valleys (NW South Island) comprise the Ellis and Baton Formations. Middle to Late Silurian Ellis sandstones rest conformably on Wangapeka rocks in the south are probably equivalent to the Hailes Quartzite in the north. A conglomerate in Moran Creek, previously considered the base of the Baton Formation, contains a granite clast with a U-Pb age of 375 Ma (Late Devonian), suggesting that it may be an infaulted slice of Permian rocks. A significant limestone at the top of the Ellis Formation on the ridge south of Skeet River appears to be the same as the limestone previously found to the north in Baton River that has Lochkovian conodonts. Further outcrops of limestone on the Mt Gomorrah-Wangapeka spur are being investigated. The limestone is overlain by mudstones containing tabulate corals, including *Pleurodictyum*. Preliminary faunal studies of both the Ellis and Baton Formations indicate strong links with Victoria, Australia. Trace fossils occur in the Ellis Formation (*Zoophycus*, *Spirophyton*, *Chondrites*) and fine sediments near the base of the Baton Formation contain hyolithids, tentaculitids, plated annelid worms (machaeridians), ostracods and the bivalve *Praectenodonta*, previously unknown in New Zealand.

In Australia, the Mount Ida Formation, near Heathcote (Victoria), is the youngest unit of a conformable succession of Silurian to Early Devonian sediments deposited along the western edge of the Melbourne Basin. The Formation is 2.1 km thick where it is exposed in the eastern limb of the Mount Ida Syncline. It has been divided into the Cornella, Dealba and Stoddart Members, and the latter has the best bivalve faunas. They are accompanied by a prolific brachiopod, trilobite, gastropod, hyolithid, crinoid, receptaculiitid, ostracod, and tabulate coral fauna. The fossils occur in shell layers deposited in an energetic nearshore environment. The majority of shells are disarticulated, and some are bound or coated by bryozoan growths, and provided a substrate for the coral *Pleurodictyum megastoma*. The growth of the latter suggests quiet conditions following turbulent

deposition. The most common bivalves are epibyssate pteroids such as *Cornellites* (several species) and *Leptodesma*, also *Lyriopecten*, *Modiomorpha* (3 species), *Goniophora* and "*Goniophorina*". Infaunal deposit feeding Palaeotaxodonts include *Notonucula* (3 species), *Phestia* (2 species), *Nuculites* (3 species) and *Praectenodonta* (2 species). Burrowing suspension feeding bivalves include *Glossites*, *Palaeoneilo*, *Paracyclas* and *Eoschizodus*. These bivalve taxa have very different life styles and their occurrence in a single bed suggest episodes of erosion and mixing from several environments.

In Antarctica, in the McMurdo portion of the Transantarctic Mountains, the Taylor Group (1.2 km thick) rests unconformably on the Cambrian Ross orogen. It is predominantly arenaceous with minor siltstone and is divided into seven formations that make up at least four sedimentary sequences. The Devonian age is constrained by an ?Emsian microflora in siltstone near the base and a rich late Middle to early Late Devonian fish fauna in the youngest formation, the Aztec Siltstone. Trace fossils are common at certain levels. The burrow *Heimdallia* forms dense populations in thelower two formations with *Diplichnites* trackways on forsets. Small arthropod traces (*Cruziana*, *Rusophycus*) occur in the intervening siltstone. A major sequence boundary coincides with a dramatic change in ichnofauna to one dominated by *Skolithos* and U-shaped burrows. The highest sandstone formations contain the first appearance of *Beaconites* (*B. antarcticus*, *B. barretti*) with the latter ichnospecies persisting up into the Aztec Siltstone. Very large trackways are also present. A range of marginal marine sedimentary facies are typical of the bulk of the succession with a rapid change to sandy flood plain deposits in the uppermost unit.

In Western Australia, in the Murchison River gorge near Kalbarri, the Tumblagooda Sandstone comprises a similar thickness of sandstone of possible Silurian or Early Devonian age. It contains, *Diplichnites, Skolithos and Heimdallia.* This the only occurrence of *Heimdallia* outside Antarctica. While some specimens of this ichnogenus are very similar to those of Antarctica, others show behavioural differences that may justify a separate ichnospecies. Above a prominent pebble horizon, which may mark a sequence boundary, the higher part of the succession contains a trace fossil assemblage that indicates shallow marine conditions with *Daedalus*, *Skolithos*, *Diplocraterion* and *Monocraterion.*

TM R. Thomas BECKER, CM Z. Sarah ABOUSSALAM, CM STEFAN HELLING, and the Münster Group

The past year, since the last report in Newsletter 32, was dominated by the organization of the 10th International Cephalopod Symposium, which took place in Fes, Morocco, in March 2018 (Fig. 1). The very successful meeting was small but included many highly interesting presentations, and had a very productive, most pleasant atmosphere. Of course, our group presented Devonian cephalopod studies. Without our Moroccan friends, especially without the help of CM Ahmed EL HASSANI, the symposium would have been impossible to organize. The post-symposium excursion visited the Jurassic of the Middle and High Atlas on the way south but had a clear focus on the Devonian of the eastern Anti-Atlas. Therefore, we had invited SDS Members to join, especially if they hadn´t seen the superb and extremely fossiliferous Moroccan Devonian before. This offer was taken by two Devonian non-cephalopod workers from South America (Juan RUSTAN and Luiza PONCIANO).

Fig. 1. 10th ICS field lunch at the wall of Mdoura (famous from the the last James BOND movie): Christian KLUG (left), Heiko HÜNEKE (foreground), René HOFFMANN, Juan RUSTÁN, Sarah, and Sven.

Conference abstracts and field guide were published as separate parts of Volume 110 in our institute journal, the *Münstersche Forschungen zur Geologie und Paläontologie*. In the Devonian publications section (see above) you can find the SDS relevant content of the volume. Chapters on the Bou Tchrafine reference section, the world-famous Hamar Laghdad mudmound region, the Jebel Mech Irdane basal Givetian GSSP, the southern Maïder Famennian, the Aguelmous Syncline succession etc. are not just summaries but are presented in a refined

stratigraphic order, with many new faunal records and numerous illustrations of section logs. Unfortunately, the volume is already sold out; but all papers are available as pdf via ResearchGate (or on request from us). Two chapters on Mdoura-East and the D-C transition did not make it into the printed version and were published online only (see free ResearchGate downloads).

Fig. 2. The highly fossiliferous Emsian at Tizi Ourthi NNE of Ouarzazate, with the Daleje Event Interval as a marl unit in the middle, between top lower Emsian massive limestones (foreground) and goniatite-rich upper Emsian nodular limestones.

During the excursion, some important faunal discoveries were made. A new, oldest, monospecific ammonoid level of the region was found at the northern slope of Jebel Mech Irdane. It will be described in a joint paper in the symposium proceedings volume in the Swiss Journal of Palaeontology. Before the meeting, RTB and Sören STICHLING joined the Greifswald group around Heiko HÜNEKE and Oliver MAYER in the frame of their DFG project on Devonian contourites (MAYER et al. 2017, 2018). In the focus were this time poorly studied but thick sections in the SW Tafilalt near Ottara, in the NE Maider near Bou Dib (top-Eifelian to Givetian), and in the Skoura region NE of Ouarzazate (Fig. 2). The latter outcrops lie at the foot of the High Atlas, providing laterally similar successions across the southern Variscan Front. This shows that the post-sedimentary tectonic boundary does not correlate with any interruption of Devonian facies. There was complete continuity of sedimentation from the southern margin of the Variscan Moroccan Meseta to the stable craton of NW Gondwana. We followed Lochkovian black limestones with giant orthocones (*Deiroceras*) and a *Mimagoniatites* marker level at the top of the lower Emsian: We also re-discovered the very rich upper Emsian anarcestid faunas mentioned 80 years earlier by E. ROCH. Rather unexpectedly, we also found a thick Givetian shaly/marly succession at Taliouine, just below massive Eovariscan conglomerates and breccias. In several sections, this unit yields isolated (transported but not exhumed) top-Givetian to Frasnian corals (e.g. phillipastreids); the age of the first major Eovariscan tectonic episode clearly pre-dates the F-F boundary.

In the Tafilalt, we used the occasion to re-sample the fossiliferous Seheb-el-Rhassal section S of Erfoud across the middle/upper Givetian boundary. Since the better Ouidane Chebbi section to the East is now in a military zone, with difficult access, this is currently our prime candidate for a basal upper Givetian GSSP locality in the region. Sören, Sven HARTENFELS, and several M.Sc. students of our group stayed longer in the region in order to sample various sections for their M.Sc. projects and for planned new work on the F-F boundary.

Due to the time consuming symposium preparations, other running projects had to slow down. This applies to the description of further pharciceratid faunas from Morocco, jointly with Jürgen BOCKWINKEL, and to the finalization of a long awaited paper on new Emsian goniatites from Victoria, Australia. Gladly, there was enough time to finish the joint manuscript, with ZHANG and MA Xueping, on the first cymaclymeniid fauna from the Hangenberg Black Shale of South China (ZHANG et al. 2018). The global review of previous occurrences made it clear that the taxonomic complexity of these opportunistic survivors is far from fully understood.

Close cooperation with Polish colleagues resulted in a paper on the provenance of D-C boundary siliciclastics (e.g. Hangenberg Shale and Sandstone) of the northern Rhenish Massif (KOLTONIK et al. 2018). This showed that the material was not shed from uplifted areas/islands in the core of the Sauerland, as it was claimed in the "PAPROTH Palaeogeography", but that it had typical Old Red Continent zircon populations. We are currently working jointly with Greg RACKI, Agnieszka PISARZOWSKA, and others on a paper on the carbon isotope stratigraphy near the lower/middle Frasnian boundary.

Other work in the Rhenish Massif were the essential parts of the Ph.D. study of Sören and of various B.Sc. projects (see below). We concentrate on the Velbert Anticline in the NW (partly with M. SALAMON, D. JUCH and G. DROZDZEWSKI from the Geologischer Dienst, Krefeld), on the Hönne Valley

between Menden and Balve, and on the Beringhauser Tunnel F-F section. In the latter case, Tomas KUMPAN kindly agreed to study the trace element geochemistry of that rather mysterious (in terms of microfacies) succession. In autumn 2017, we started in the frame of the new IGCP Project 652 a cooperation with David DE VLEESCHOUWER (Bremen) and Peter KÖNIGSHOF on Upper Devonian cyclostratigraphy. For a start, the complex cyclicity of the Effenberg Quarry was examined, with a focus on the pre-*Annulata* to post-Dasberg Event part of the section, where cycle thicknesses suggest Milankovitch frequencies. Sven and I continued the existing bed-by-bed collecting for conodonts, ammonoids and microfacies to the top of the exposure (ca. to the middle part of the Wocklumian or Famennian VI, uppermost Famennian).

Fig. 3. Summer visit of QIE W., HUANG J., and LI, Q. (Nanjing) in the Rhenish Massif (group photo in a Hönne Valley Quarry, with Sören and Sven)

In summer 2018, right before the Paris ICP, we were pleased to lead QIE Wenkun and colleagues (HUANG J. and LI, Q.) from Nanjing to classical Devonian sections of the Rhenish Massif (Fig. 3); this was intended to be part of a long-term cooperation. During the summer holiday time, Maya ELRICK also visited Rhenish sections, in order to take samples for uranium isotopes; she was looked after by Felix LÜDDECKE. In the course of a student field trip, the top part of the Blauer Bruch and the basal Famennian of the famous Steinbruch SCHMIDT (both in the Kellerwald) were re-sampled - once more. The latter now shows clear evidence for reworking and mass flow deposition right above the F-F boundary.

We re-submitted our extensive research proposal to the DFG. The planned project intends to study jointly with Ahmed EL HASSANI, Lahssen BAIDDER, Carl BRETT, and others, the very poorly known Devonian "Appalachian Seaway" between SW Morocco and eastern North America. It has often, but wrongly, been called a part of the Rheic Ocean. We plan to focus on its facies history and viability for faunal migrations, especially for conodonts, ammonoids, and trilobites. At the end of October we still keep our fingers crossed for funding.

Fig. 4. The true level of the Hangenberg Extinction (Hangenberg Black Shale) in the Ardennes? Basal limestone of the Hastiere Limestone at Royseux, Bed 104a, showing a crinoidal limestone rich in the last phacopids sharply overlain, with an undulating erosional unconformity, by a strictly laminated (not graded) dark (Hangenberg) shale with isolated (floating) brachiopods that lack a consistent convex-up orientation, which excludes a current deposition.

Work on the D-C boundary revision progressed slowly but Sven and I finished the re-sampling of the Borkewehr or Wocklum section, which is the type locality of *Protognathodus kockeli*, It is clear that the earliest post-Hangenberg protognathodids are rather different from the *kockeli* type specimens (HARTERNFELS & BECKER 2018). The review of Rhenish D-C boundary sections is due towards the end of the year. Conodonts from Royseux (Belgium, Fig. 4) haved been picked but not yet been identified.

The shallow-water Klein-Steinkothen section in the NW Rhenish Massif, unfortunately, hardly has any conodonts. In the near future, we will come back to the Lalla Mimouna and other Moroccan sections.

RTB cooperated within the German SDS on the explanation chapter for the stratigraphical chart of Germany, STD 2016. It came out early in 2018 (SCHINDLER et al. 2018) and it was written simultaneously in German and English. For ICS, RTB has started to revise the Devonian chapter for the GTS 2020 volume. Co-authors will be Anne-Christine DA SILVA, John MARSHALL, and Felix GRADSTEIN. Manuscript deadline is at the end of November, 2018. Other papers in progress will deal with the Kacak Event in Morocco (jointly with Sarah, for the Devonian Event volume of G. RACKI), (led by Sarah) with the timing of Devonian reef growth and extinction in Morocco, and with the discovery of basal Famennian tornoceratids in the Ardennes (jointly with Stijn GOOLAERTS and Bernard MOTTEQUIN).

CM Z. Sarah ABOUSSALAM

In the last year, Sarah partizipated in the organization of the 10th Cephalopod Symposium and took part in the Anti-Atlas field trip. She identified various conodont samples for the Devonian contourite project of the Greifswald Group and additional samples from the Moroccan Meseta. The main goal of the latter is to finalize joint manuscripts on the timing of reef growth and extinctions and on the age of Eovariscan block faulting, slumping and re-deposition. The revision of supposed Devonian reef limestones from the S of Marrakesh has been published in the volume in honor of the late G. LANE (ABOUSSALAM et al. 2017). Ongoing efforts with Thomas concern the Kacak Event at Oued Ferkla, just N of the Tafilalt.

The collaboration with Carl BRETT, Jay ZAMBITO and others on the Kentucky Givetian led to a very detailed paper in "Palaeo x 2" (BRETT et al. 2018). She hopes that this pleasant cooperation can be continued in the frame of the planned project on the "Afro-Appalachian Seaway". Sarah also assisted the group around MA Xueping in the identification and publication of Givetian conodonts from Yunnan (ZHANG et al. 2018). Other still unfinished Chinese work (waiting for Thomas…) includes the missing taxonomic descriptions of various polygnathids and icriodids from the Junggar Basin (Wulankeshun section; see WANG Zhihong et al. 2017).

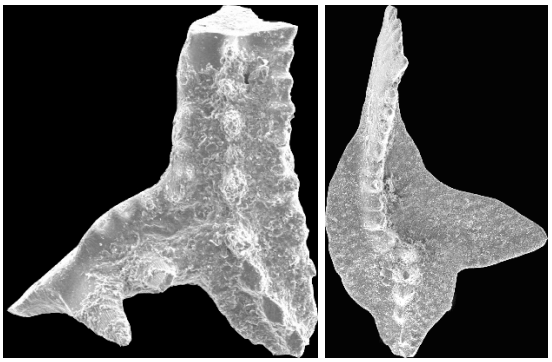


Fig. 5. Two conodonts from the top-Frasnian (upper MN Zone 13a) of borehole B102 in the Hönne Valey: *Ancyrognathus iowaensis* and *Palmatolepis muelleri*.

In the Rhenish Massif, Sarah provided conodont data for various projects, from the gastropod work of Maro-Pascal ELLERKAMP (ELLERKAMP et al. 2018), to the mapping and regional geology of the Neandertal and Wülfrath Reefs, and to Sören´s Hönne Valley Ph.D. (Fig. 5; STICHLING et al. 2018, manuscript in prep.). Conodont faunas from Padberg in the eastern Sauerland will be published jointly with Polish colleagues, who searched for carbon isotope perturbations around the lower/Middle Frasnian boundary in the Rhenish Massif.

The search for possible middle/upper Givetian boundary GSSP sections was continued (e.g. BECKER & ABOUSSALAM 2018, initial meeting of IGCP 652), for example at Blauer Bruch and in the Tafilalt (Seheb-el-Rhassal). Thomas collected (with the help of Nacho and Theresa) some samples from the Pyrenees for comparison.

CM Stephan HELLING

From September 2017 to May 2018, Hans Martin WEBER, Anna SAUPE, Christoph HARTKOPF-FRÖDER, and I conducted excavations at a construction side in Upper Devonian (late Famennian) shales in Wuppertal Uellendahl (Bergisches Land, northern Rhenish Massif). This was part of a palaeontological conservation project since the construction ground is an official geological monument since several years, due to its rich trilobite fauna (WEBER et al. 2018). Besides the trilobites, ostracods, bivalves, and ammonoids were associated rare fossil groups. Preparations and taxonomic work just started and will last until 2019.

In cooperation with the LWL Museum für Naturkunde Münster, I worked on some rare trilobite specimens from the eastern Rhenish Massif, mainly upper Emsian to lower Eifelian in age. Results

(HELLING & SCHÖLLMANN 2018 in press) will be published soon in the updated LWL journal "Geologie and Paläontologie in Westfalen", which will also be available online.

Work on the Pragian trilobite faunas from Taourirt n´Khellil ("Ait Issa", southern Variscan Front) and Ain-Al-Aliga (Oued Cherrat Valley region of the Moroccan Meseta) is nearly finished; these manuscripts will be finalized at the end of 2018 and early in 2019.

Ph.D. Students

Stephan EICHHOLT is working full-time for an environmental geology company, which leaves him very little time to continue his work on the Givetian/Frasnian reefs of the Moroccan Meseta. A paper on the biostromes of the Oulmes region and on isolated, often reworked reef facies to the East is ca. half-written.

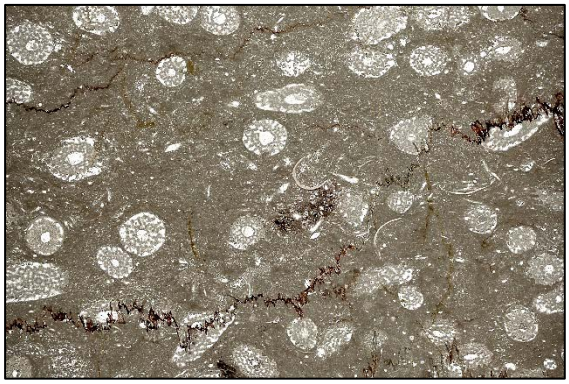


Fig. 6. Typical lagoonal, micrite-rich *Amphipora* Bafflestone from the upper part of the Hönne Valley reef, borehole HON_1101.

Sören STICHLING completed his last (third) year on the very thick reef complex of the Hönne Valley (northern Rhenish Massif), financed by the Rheinkalk GmbH/Lhoist Group. New results concerning the initial biostromal phase were presented at the IPC in Paris (STICHLING & BECKER 2018). A joint manuscript (with Sarah and Sven) on the reef drowning and extinction (for *Facies*) is close to completion. It combines outcrop and borehole data (Fig. 6). Conodont faunas from the small core samples were unexpectedly rich; eventually these will have to be documented in a separate publication. The last project phase concentrated on the microfacies-based correlation of several cores from the thick, main part of the bioherm. From autumn 2018 on, Sören will start to work at the Geologischer Dienst in Krefeld. Congratulations, but, unfortunately, the new job will slow down his Ph.D. progress.

M.Sc. Students

Anna SAUPE continued and finished her study on the comparison of Famennian faunas of agglutinated foraminifers along a palaeolatitudinal gradient, from the Rhenish Massif, Saxothuringia, to the Montagne Noire (Col de Tribes section) and Moroccan Meseta (Ziyyar). Impacts of the *Annulata* and Dasberg Events on foraminifer biofacies and assemblage structures were a main point. The extensive results were outstanding and will have to be published in a monograph. Anna presented them at the GeoBonn congress in September 2018 (SAUPE et al. 2018). Her work earned her a Ph.D. position at Cologne University, where she will change to much younger, Neogene/Quaternary forams. In addition, Anna work for the excavation project at Wuppertal-Uellendahl (WEBER et al., 2018).

Fig. 7. *Praemeroceras* n. sp. with distinctive dorsolateral varices from the lower Famennian of the Canning Basin.

Till SÖTE studied the ontogenetic morphometry, taxonomy, and palaeobiogeographic relationships of lower Famennian goniatites of the Canning Basin, collected in the 80ties and 90ties by RTB and Michael HOUSE. At a close look, there are more differences to European and North African contemporaneous faunas than recognized originally, for example in comparison with the monograph by Morris PETERSEN from 1975. This resulted in the recognition of several new species and of a surprising complesity of early dimeroceratids (Fig. 7). Results were presented at the Fes symposium and at the IPC in Paris. Till has started to write jointly with RTB a lengthy manuscript. He will continue as a research assistant and for a Ph.D. at Münster. The new project will deal with the taxonomy, phylogeny, and palaeodiversity of tornoceratid goniatites from

the upper Frasnian into the lower Famennian. He will begin with an undescribed fauna from between the two Kellwasser levels of the Eifel Mts. (Büdesheim), collected mostly by Jürgen BOCKWINKEL and the late Volker EBBIGHAUSEN.

Felix Lüddecke is about to finish his M.Sc. on the Famennian conodont biostratigraphy and biofacies of the long neglected Minervois Nappe of the Montagne Noire, southern France. Preliminary results were presented at the IPC in Paris and GeoBonn (HARTENFELS & LÜDDECKE, 2018; LÜDDECKE & HARTENFELS 2018). In autumn 2017, he participated in the joint conference of the Paläontologische Gesellschaft and of the Palaeontological Society of China in Yichang. His presentation on Famennian conodont biofacies (LÜDDECKE et al. 2017) was awarded by a prize for the best young palaeontologists. Before the congress, Felix and Sven were invited by QIE Wenkun to field work in South China, with a focus on the D-C boundary. It is planned that Felix continues after his M.Sc. completion as a research assistant and Ph.D. student in Münster. He will have to deal with the enormous amount of often incredibly rich F-F boundary conodont samples that we assembled in the last decade. There will be a focus on ontogeny, taxonomy, palaeodiversity and extinction patterns across climatic and facies gradients, and on conodont biofacies and palaeobiogeography.

Lukas AFHÜPPE only just started with his M.Sc. project on the taxonomy, morphometry, variability, and palaeogeography of Middle/Upper Devonian oncoceratids from southern Morocco. He presented his B.Sc. results on various, rare cyrto-, gyro- and torticonic Devonian nautiloids at the Fes Cephalopod Symposium (AFHÜPPE et al., 2018). Some of his taxa made it into field guide chapters; therefore, he became a co-author of some of them.

Lara HOLDERIED began a M.Sc. on the morphometry and taxonomy of middle Frasnian goniatite faunas of the Canning Basin, in comparison with German type material. She also presented her B.Sc. results, on the taxonomy and stratigraphy of Canning Basin Paratornoceratinae (lower Famennian), at Fes. Her contribution earned her the 2nd prize of the Poster Awards.

Maro-Pascal ELLERKAMP is in the final part of his M.Sc. Thesis on the comparison of middle/upper Givetian gastropod assemblages from the shallow-water (peri-reefal) Rhenish Massif and from the pelagic black shale facies of the eastern Dra Valley of southern Morocco (unpublished collections of RTB and ZSA). It was not really a surprise that there are several new taxa in the Moroccan faunas but these belong to the same genera that are common in neritic facies. He presented preliminary results at GeoBonn (ELLERKAMP & BECKER 2018). His diverse B.Sc. faunas from the reef at Hofermühle were announced in a popular science contribution (ELLERKAMP et al. 2018); a more detailed manuscript is ca. half way through.

After an intensive excursion into the field of hydrogeology, **Phillip HERBERS** decided very recently to return for a M.Sc. to palaeontology, where he did his B.Sc. conodont project. Using unpublished Montagne Noire samples as a starting point, he will try to give precision to Famennian conodont biofacies models using cluster analyses.

Another new M.Sc. student is **Konrad SEYFFERT**, who graduated at the Free University Berlin. After some negotiations, Stephan agreed to let him work on the morphometry, taxonomy and facies distribution of phacopid trilobites from the Emsian of Morocco.

B.Sc. Students

Patrick KRISPIN´s B.Sc. provided extraordinary results, the first recognition of Devonian calcareous-walled nanospheres in pelagic micrites. Results shall be published in a high level journal. Patrick moved on to Bonn University, where there is a new M.Sc. program that combines biology and palaeontology.

Stephanie ROSCHIG followed the question whether there was a single pantropical ammonoid genpool in the Famennian Palaeotethys, stretching from Europe-Morocco far eastwards to Iran and the Canning Basin. She used two sporadoceratids of different age (*Maeneceras subvaricatum*, UD II-G, and *Sporadoceras angustisellatum*, UD III-B/C) as a case study. Results were interesting but somewhat equivocal, partly due to preservation problems. We will continue the highly interesting story.

Sascha MIKOLAEWSKI mapped the Devonian succession at the southern margin of the Velbert Anticline, in the famous Neandertal area, and, along the Düssel River, towards the NW limb of the Remscheid-Altena Anticline (Millrath-Gruiten region). The idea was to find out how significant facies transitions in the subsurface of the narrow Herzkampe Syncline have been. Differences stem mostly from the individual reef developments. There are important new data for the extinction of the Neandertal Reef but, unfortunately, the majority of his numerous conodont samples were barren. In any

case, the regional lithostratigraphy (formation names) will have to be changed completely.

Fig. 8. The hardly studied, now lake-filled, well-bedded middle Givetian reef limestone quarry north of the Neaderthal Valley. The quarry wall collapse to the right ended most of the active operations.

Publications

Journal articles and book chapters (for MÜFO 110 contributions see Devonian Publications section)

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ZHANG, M., BECKER, R.T., MA, X., ZHANG, Y. & ZONG, P. (2018). Hangenberg Black Shale with cymaclymeniid ammonoids in the terminal Devonian of South China. – Palaeodiversity and Palaeoenvironments, **98** (4): 14 pp., doi.org/10.1007/s12549-018-0348-x.

ZHANG, Y.-B., MA, X.-P., ABOUSSALAM, Z.S. & ZHANG, M. (2018). Conodonts from the Yidade Formation at the Panxi section of Yunnan, South China. – Journal of Stratigraphy, **42** (3): 301-312 [in Chinese with English summary].

KOLTONIK, K., PISARZOWSKA, A., PASZKOWSKI, M., SLAMA, J., BECKER, R.T., MARYNOWSKI, L., KRAWCZYNSKI, W. & HARTENFELS, S. (2018 online). Provenance of Famennian siliciclastics from the northern Rhenish Massif – paleostructural, paleogeographical and paleoclimatic implications. – International Journal of Earth Sciences, doi.org/10.1007/s00531-018-1628-4.

BRETT, C.E., BAIRD, G.C., ZAMBITO, J.J. IV, ABOUSSALAM, Z.S., BECKER, R.T. & BARTHOLOMEWS, A.J. (2018). Litho-, Bio-, Chemo-, and Sequence Stratigraphy of the Boyle-Portwood Succession (Middle Devonian, Central Kentucky, U.S.A.). – Palaeobiodiversity and Palaeoenvironments, **98** (2): 331-368, doi.org/10.1007/s12549-018.0323-6.

SCHINDLER, E., BROCKE, R., BECKER, R.T., BUCHHOLZ, P., JANSEN, U., LUPPOLD, F.W., NESBOR, H.-D. SALAMON, M., WELLER, H. & WEYER, D. (2018). The Devonian in the Stratigraphic Table of Germany 2016. – Zeitschrift der Deutschen Gesellschaft für Geowissenschaften, **168** (4): 447-463.

ABOUSSALAM, Z.S., BECKER, R.T., EL HASSANI, A., EICHHOLT, S. & BAIDDER, L. (2017). Late Lower Carboniferous conodonts from a supposed Middle Devonian reef limestone of the Marrakech region (Morocco). – Stratigraphy, **14** (1/3): 7-14.

BECKER, R.T. & HARTENFELS, S. (2016). Species list of *Palmatolepis*. – SDS Newsletter, **31**: 35-44.

BECKER, R.T. (2016). Addition to the *Polygnathus* (s.l.) species list. – SDS Newsletter, **31**: 31-34.

Editorials

DE VLEESCHOUWER, D., KÖNIGSHOF, P., HARTENFELS, S. & BECKER, R.T. (Eds., 2018). Middle to Late Paleozoic Sedimentary Rocks in the Rhenish Massif. Reading time in Paleozoic sedimentary rock. - IGCP-652 Opening Meeting, Bremen, Fieldtrip Guidebook, 102 pp.

HARTENFELS, S., BECKER, R.T., EL HASSANI, A. & LÜDDECKE, F. (Eds., 2018). 10th International Symposium "Cephalopods – Present and Past", Fes, 26th March – 3rd April 2018, Field Guidebook.- Münstersche Forschungen zur Geologie und Paläontologie, **110**: 109-306.

EL HASSANI, A., BECKER, R.T., HARTENFELS, S. & LÜDDECKE, F. (Eds., 2018). 10th International Symposium "Cephalopods – Present and Past", Fes, 26th March – 3rd April 2018, Program & Abstracts. - Münstersche Forschungen zur Geologie und Paläontologie, **110**: 1-108.

HARTENFELS, S. & HELLING, S. (Eds, 2017). 88. Jahrestagung der Paläontologischen Gesellschaft, Münster, 26.-30. März 2017, Programm – Kurzfassungen. – Münstersche Forschungen zur Geologie und Paläontologie, **109**: 1-87.

Popular Science contributions

ELLERKAMP, M.-P., BECKER, R.T., SCHLÖSSER, M. & ABOUSSALAM, Z.S. (2018). Die einzigartige Schneckenfauna aus dem Grenzbereich des

Mittel- und Oberdevons von Hofermühle. – Archäologie im Rheinland, **2017**: 33-35.

HARTENFELS, S., BECKER, R.T., DROZDZEWSKI, G., JUCH, D. & ABOUSSALAM, Z.S. (2018). „Kommen und Gehen" einer bisher unbekannten Gesteins- und Fossilabfolge beim A 44-Neubau bei Hülsbeck. – Archäologie im Rheinland, **2017**: 36-38.

WEBER, H.M., HELLING, S., SAUPE, A. & HARTKOPF-FRÖDER, C. (2018). Neue spät oberdevonische Fossilfunde von Wuppertal-Uellendahl. - Archäologie im Rheinland, **2017**: 39-41.

EL HASSANI, A., ABOUSSALAM, Z.S., BECKER, R.T., EL WARTITI, M. & EL HASSANI, F. (2017). Patrimoine géologique marocain et développement durable: l´exemple du Dévonien du Tafilalt, Anti-Atlas oriental. – Geologues, Revue Officielle de la Sociètè Géologique de France, Géosciences appliquées, **194**: 112-117.

Abstracts (for contributions to the IPC in Paris see the Devonian publications section)

BECKER, R.T. & ABOUSSALAM, Z.S. (2018). The upper Givetian – strange mid-Palaeozoic interval with maximum biostratigraphic time resolution and rapid eustatic fluctuations. – Opening Meeting IGCP 652 "Reading Time in Paleozoic sedimentary Rock", 12th – 13th September 2018, Bremen, Germany, Oral Presentations: 2 pp.

SAUPE, A., HARTERNFELS, S. & BECKER, R.T. (2018). Biofacies analysis of agglutinated foraminifers along an Upper Devonian transect from Central Europe to North Africa. - In: GeoBonn 2018, 2-6 September 2018, Bonn, Germany, Abstracts: 266.

BECKER, R.T. (2018). Iterative evolution as the rule – not exception – in ammonoids and other cephalopods. - In: GeoBonn 2018, 2-6 September 2018, Bonn, Germany, Abstracts: 253.

HARTENFELS, S. & BECKER, R.T. (2018). Borkewehr near Wocklum (northern Rhenish Massif), a possible future Devonian/Carboniferous boundary GSSP section. - In: GeoBonn 2018, 2-6 September 2018, Bonn, Germany, Abstracts: 252.

ELLERKAMP, M.-P. & BECKER, R.T. (2018). A comparison of Givetian gastropod faunas from the Tata region (Dra Valley, southern Morocco) and the Rhenish Massif. - In: GeoBonn 2018, 2-6 September 2018, Bonn, Germany, Abstracts: 251.

SÖTE, T. & BECKER, R.T. (2018). The early radiation of ammonoids after the global Kellwasser Crisis in the Canning Basin (Frasnian-Famennian boundary, Western Australia). - In: GeoBonn 2018, 2-6 September 2018, Bonn, Germany, Abstracts: 217.

SÖTE, T. & BECKER, R.T. (2018). The early radiation of ammonoids after the global Kellwasser Event in the Canning Basin (Frasnian-Famennian boundary, Western Australia). – In: EL HASSANI, A., BECKER, R.T., HARTENFELS, S. & LÜDDECKE, F. (Eds., 2018): 10th International Symposium "Cephalopods – Present and Past", Fes, 26th March – 3rd April 2018, Program & Abstracts.- Münstersche Forschungen zur Geologie und Paläontologie, **110**: 100.

HOLDERIED, L., BECKER, R.T. & HARTENFELS, S. (2018). Ontogenetic morphometry, taxonomy and phylogeny of Paratornoceratinae (Goniatitida) from the lower Famennian of NW Australia. – In: EL HASSANI, A., BECKER, R.T., HARTENFELS, S. & LÜDDECKE, F. (Eds., 2018): 10th International Symposium "Cephalopods – Present and Past", Fes, 26th March – 3rd April 2018, Program & Abstracts.- Münstersche Forschungen zur Geologie und Paläontologie, **110**: 47-48.

BECKER, R.T. & HARTENFELS, S. (2018). Upper Famennian sea-level changes and ammonoid radiations in the eastern Anti-Atlas (Southern Morocco). – In: EL HASSANI, A., BECKER, R.T., HARTENFELS, S. & LÜDDECKE, F. (Eds., 2018): 10th International Symposium "Cephalopods – Present and Past", Fes, 26th March – 3rd April 2018, Program & Abstracts.- Münstersche Forschungen zur Geologie und Paläontologie, **110**: 18-19.

AFHÜPPE, L., BECKER, R.T. & HARTENFELS, S. (2018). New data on cyrto- and gyroconic nautiloids from the Devonian of the eastern Anti-Atlas. – In: EL HASSANI, A., BECKER, R.T., HARTENFELS, S. & LÜDDECKE, F. (Eds., 2018): 10th International Symposium "Cephalopods – Present and Past", Fes, 26th March – 3rd April 2018, Program & Abstracts.- Münstersche Forschungen zur Geologie und Paläontologie, **110**: 15-16.

WANG, Z**.,** HARTENFELS, S., BECKER, R.T., ABOUSSALAM, Z. S. & GONG, Y. (2017). New Upper Devonian conodonts from Northwestern

Junggar Basin, Xinjiang, Northwest China. - In: YANG, Q., REITNER, J., WANG, Y. & REICH, M. (Eds.), Critical Intervals in Earth History: Palaeobiological Innovations., 2nd Joint Conference of the Palaeontological Society of China and the Paläontologische Gesellschaft: 382-383; University of Science and Technology of China Press.

HARTENFELS, S., BECKER, R.T. & KUMPAN, T. (2017). A possible new Devonian-Carboniferous Boundary stratotype section: Borkewehr near Wocklum (Northern Rhenish Massif, Germany). - In: YANG, Q., REITNER, J., WANG, Y. & REICH, M. (Eds.), Critical Intervals in Earth History: Palaeobiological Innovations., 2nd Joint Conference of the Palaeontological Society of China and the Paläontologische Gesellschaft: 79-81; University of Science and Technology of China Press.

LÜDDECKE, F., HARTENFELS, S. & BECKER, R.T. (2017). Middle Famennian conodont biofacies: a new approach. – In: YANG, Q., REITNER, J., WANG, Y. & REICH, M. (Eds.), Critical Intervals in Earth History: Palaeobiological Innovations., 2nd Joint Conference of the Palaeontological Society of China and the Paläontologische Gesellschaft: 206-208; University of Science and Technology of China Press.

Devonian Theses

KRISPIN, P. (2017). Genese mikritischer Karbonate im Famennium des Steinbruchs Kowala (Heilig-Kreuz-Gebirge, Polen). – B.Sc. Thesis, 72 pp.

LÜDDECKE, F. (2018). Conodontenbiostratigraphie, -biofazies und Karbonatmikrofazies im Famennium der Minervois-Decke (Ravin de la Fontaine de Santé, Montagne Noire, Süd-Frankreich. – M.Sc. Thesis, 102 pp., 1 tab.

MIKOLAJEWSKI, S. (2018). Geologische Kartierung im Raum östliches Neanderthal/Gruiten (NW Rheinisches Schiefergebirge) –B.Sc. Thesis, 56 pp., 1 map.

SAUPE, A. (2018). Biofazies-Analyse agglutinierender Foraminiferen entlang eines Transekts von Mitteleuropa bis Nordafrika im mittleren bis oberen Famennium (Oberdevon). – M.Sc. Thesis, 112 pp.

SÖTE, T. (2018). Die frühe Radiation der Ammonoideen nach der Kellwasser-Krise im Canning Basin (Frasnium-Famennium-Grenze, NW-Australien). – M.Sc. Thesis, 164 pp.

ROSCHIG, S. (2017). Comparison of ontogenetic morphometry and taxonomy of sporadoceratids (Ammonoidea, Middle Famennian) from Southern Morocco, Germany and NW Australia. – B.Sc. Thesis, 105 pp.

TM Carlton E. BRETT

During the summers of 2017 and 2018, I completed projects with Dr. James ZAMBITO (Wisconsin Geological Survey, now Beloit College) on sampling of new exposures of Middle Devonian rocks in Kentucky. New field work resulted in the discovery of Middle Devonian paleokarst, including a cave filled with black shale (also Middle Devonian age). Samples were processed for conodonts at the Wisconsin Geological Survey though there remain ambiguities owing to poor yield at some levels. Regardless, the results, published this year (BRETT et al. 2018a) led to an updated conodont zonation and a more nuanced view of the interplay of eustatic and tectonic factors during a very complex geologic interval.

Revision of the New York State Devonian Stratigraphic Correlation Chart and stratigraphic terminology, with Charles VER STRAETEN, New York State Geological Survey, is nearing completion. Gordon BAIRD (SUNY College Fredonia), Alex BARTHOLOMEW (SUNY New Paltz), Jay ZAMBITO (Beloit College) and I are preparing extensive manuscripts stratigraphic terminology, re-description of units and facies analysis of the Middle Devonian of New York and adjacent regions. Our intent is to have this chart and text published in time for the anticipated SDS Devonian meeting in New York State in the summer of 2020.

Gordon BAIRD and I are working with the Paleontological Research Institution (PRI) to assemblage and fully document our combined collections from the Devonian of New York State and elsewhere. As part of this initiative, a wing of a building at PRI is being renovated, in part, to accommodate the several ton stratigraphic collection. This effort is combined with plans for a digital atlas of Middle Devonian fossils and an extensive database of geographic and stratigraphic data based on these collections.

During summer of 2017 I spent a total three weeks working collaboratively with, Czech colleagues, Ladislav SLAVÍK and Jiří FRYDA, in Prague, on the comparative cycle, sequence stratigraphy, paleoecology and bioevents of the

Devonian of the Prague Basin, Bohemia and North America. Hopefully, this research will compare the detailed patterns of stratigraphy, geochemistry, paleontology and paleoecology of bioevents in North America with the classic type areas for these events in the Prague Basin. In this way, we hope to tease out the local vs. global signatures of these events and provide further insights into process. Plans for similar comparative study, with R. Thomas BECKER, Sarah ABOUSSALAM (Münster University) and Ahmed EL HASSANI (Rabat), of Devonian paleobiogeography, sea level fluctuations and bioevents in Morocco and North America and funding is currently being sought to support this research.

In summer of 2018 I continued research with Rainer BROCKE, Eberhard SCHINDLER (Senckenberg Institute), Walter RIEGEL (Göttingen University), and others, on the palynology and paleoecology of unusual dark, spore-, algae-, and leperditian-rich shale seams intercalated with shallow marine carbonate facies of the Lahr Member, in the lower Givetian of the Eifel region, Germany. New results show statistical associations of physical and biotic parameters with the recurring dark shales and suggest a model for the formation of these deposits associated with increased influx of runoff from coastal areas that produced influx of siliciclastic sediment and terrestrially derived spores, as well as eutrophication in shallow lagoonal areas.

Research continued with Anne-Christine DA SILVA on the Devonian cyclostratigraphy of New York State. The objective of this research is to quantify evident cyclicity in the Early to Middle Devonian of the Appalachian Basin using magnetic susceptibility; MS data from samples obtained in the summer of 2017 are being analyzed for time series analysis. This research will provide for a well-tuned geochronology for the upper Emsian and Eifelian stages. It also suggests that facies and biotas were responding to short, intermediate, and long term cyclicity mediated by climatic and/or eustatic sea level.

Finally, I continued study of relative volatility of in the Silurian and Devonian interval. As noted in an earlier report, new absolute dates for the stages have led to surprising and counterintuitive results. This suggests a genuinely bimodal distribution of frequency of events that I term "volatility". During 2017-2018 I worked with Jay ZAMBITO (now Beloit College), Patrick MCLAUGHLIN (Indiana Geological Survey) and Poul EMSBO (USGS Denver) on documenting relative volatility of Devonian stages, based upon relative number of conodont and goniatite zones per stage and per 5 million year time slice (BRETT et al., 2018b). We made preliminary comparisons with other proxies of volatility including carbon isotopic excursions, third order sea level fluctuations, and named bioevents. Predictably, certain intervals (e.g. the late Eifelian and Givetian and late Famennian) have large numbers of biozones and exhibit numerous events and sea level oscillation. In contrast other intervals, most notably the long Emsian Stage, exhibit relatively few biozones or physical and biotic fluctuations. In the next phase of this work we intend to better document correlations of volatility with evidence for paleotemperature and ocean oxic vs. anoxic states. We hope that this work will lead to a more general predictive model that will help to shed light on critical processes in Earth and life history.

TM Rainer BROCKE

Research in 2017 was primarily concerned with the following activities:

In the Eifel area work was carried forward together with our American colleagues and a paper of the Müllertchen section in the Hillesheim Syncline was published (BROCKE et al. 2017a).

In the Hunsrück area research - mainly related to palynology and regional stratigraphy - continued and results were published (BROCKE et al. 2017b).

In addition to the publication of the German Stratigraphic Table 2016 (Stratigraphische Tabelle Deutschland 2016, STD), two connected papers have been published together with German colleagues: Annotations to the Devonian part of the chart (SCHINDLER et al. 2018) and on the Devonian time scale (MENNING et al. 2018).

Furthermore, results of our Turkish–German cooperation projects were prepared for publication.

Publications

BROCKE, R., BRETT, C.E., ELLWOOD, B.B., HARTKOPF-FRÖDER, C., RIEGEL, W., SCHINDLER, E. & TOMKIN, J.H. (2017a). Comparative palynofacies, magnetic susceptibility and cyclicity of the Middle Devonian Müllertchen Section (Eifel area, Germany). - Palaeobiodiversity and Palaeoenvironments, **97** (3): 449-467, doi: 10.1007/s12549-017-0289-9.

BROCKE, R. **,** KNEIDL, V., WILDE, V. & RIEGEL, W. (2017b). Palynological data from sediments of

the Hunsrückschiefer type, Lower Devonian of the SW Hunsrück, Germany. - Bulletin of Geosciences, **92** (1): 59-64, doi 10.3140/bull.geosci.1614.

SCHINDLER, E., BROCKE, R., BECKER, R.T., BUCHHOLZ, P., JANSEN, U., LUPPOLD, F.W., NESBOR, H.-D., SALAMON, M., WELLER, H. & WEYER, D. (2018). The Devonian in the Stratigraphic Table of Germany 2016. - Zeitschrift der Deutschen Gesellschaft für Geowissenschaften, **168** (4): 447-463, doi: 10.1127/zdgg/2017/0135.

MENNING, M., GLODNY, J., BROCKE, R., JANSEN, U., SCHINDLER, E. & WEYER, D. (2018). The Devonian time scale in the Stratigraphic Table of Germany 2016 (STG 2016). - Zeitschrift der Deutschen Gesellschaft für Geowissenschaften, **168** (4): 465-482, doi: 10.1127/zdgg/2017/0151.

CM Carole BURROW

I continue to work on mid-Palaeozoic vertebrates and their biostratigraphy, concentrating on acanthodians. Various projects continue on the ORS fishes of Scotland, and a new project has started on the Middle Devonian vertebrates of Spitsbergen, co-ordinated by Mike Newman. Carole is lead author on three publications about acanthodians and other stem chondrichthyans for the AGP volume based on presentations at the Early Vertebrates/Lower Vertebrates conference in Poland in 2017. She is also collaborating with John Maisey and colleagues on investigations into the structure of the hard tissues of early sharks. Several papers recently published (TURNER & BURROW 2018) and in progress (from a Western Australian borehole, and Northern Territory outcrops) deal with correlating vertebrate microremain occurrences from assemblages previously unstudied or only superficially studied, with better known sequences in other regions.

Publications

BURROW, C. & GENDRY, D. (2017). Lost and found *Machaeracanthus* spines from the Lower Devonian of western France. - Annales de la Societe Géologique du Nord, **24** (2nd series): 71-78.

BURROW, C., TURNER S, MAISEY, J. & DESBIENS, S. & MILLER, R. (2017). Spines of the stem chondrichthyan *Doliodus latispinosus* (Whiteaves) comb. nov. from the Lower Devonian of eastern Canada. - Canadian Journal of Earth Sciences, **54**: 1248-62.

SNYDER, D., TURNER, S., BURROW, C. & DAESCHLER, E. (2017). *"Gyracanthus" sherwoodi* (Gnathostomata, Gyracanthidae) from the Late Devonian of North America. - Proceedings of the Academy of Natural Sciences of Philadelphia, **165**: 195-219.

BURROW, C.J., IVANOV, A.O. & ERSHOVA, V.B. (2018). Acanthodians from the Silurian–Devonian boundary beds of Novaya Zemlya Archipelago, Russia. - GFF: 1-8.

NEWMAN, M. & BURROW, C. (2018). Allocation of Devonian acanthodian lectotypes. - Scottish Jou&rnal of Geology: 1 p.

TURNER, S. & BURROW, C. (2018). Microvertebrates from the Silurian–Devonian boundary beds of the Eastport Formation, Maine, eastern USA. - Atlantic Geology, **54**: 171-187.

BURROW, C. & SZREK, P. (2018 in press). Acanthodians from the Lower Devonian (Emsian) 'Placoderm Sandstone', Holy Cross Mountains, Poland. - Acta Geologica Polonica, **68** (3).

BURROW, C., NEWMAN, M., DEN BLAAUWEN, J., JONES, R. & DAVIDSON, R. (2018 in press). The Early Devonian ischnacanthiform acanthodian *Ischnacanthus gracilis* (EGERTON, 1861) from the Midland Valley of Scotland. - Acta Geologica Polonica, **68** (3).

(new student member) Tamara CAMILLERI

Regarding my current research, I am completing my PhD under the supervision of Dr. Mark WARNE, Dr. Elizabeth WELDON at Deakin University, and Dr. David J. HOLLOWAY at Melbourne Museum. I am currently working on the reclassification of mid-Palaeozoic Ostracoda of Victoria, particularly the Fairy Bed Formation (Devonian) and the Norton Gully Sandstone (Silurian) in Eastern Victoria. I have recently reclassified the ostracod taxa found within the Humevale Siltstone and Woori Yallock Formation in the Lilydale and Chirnside Park area of Victoria and the Bungonia District in New South Wales as well as ostracod genera in eastern North America. My research also involves palaeoenvironmental geology and the development of understanding depositional environments.

Publications

CAMILLERI, T.T.A. & WARNE, M.T. (2015). Preservation and assemblage characteristics of some ornate Lower Devonian Ostracoda from the

Humevale Siltstone and Woori Yallock Formation, southeastern Australia. - Alcheringa, **39**: 71-91.

CAMILLERI, T.T.A., WARNE, M.T. & HOLLOWAY, D.J. (2017). Review and clarification of *Bungonibeyrichia* Copeland, 1981 (Ostracoda) from the upper Silurian-Lower Devonian of New South Wales, Australia. - Alcheringa, **41** (3): 397-402.

TM Carlo CORRADINI

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

A paper on the updated Famennian conodont zonations was published (SPALLETTA et al., 2017)

Main researches in progress on the Devonian of the Carnic Alps deal with:

• Conodonts from several upper Silurian and Lower Devonian sections (with M. G. CORRIGA and others): beside several new sections, data of some classical localities have been updated, both restudying old collections and new samples. Many of those data were published in the guidebook of the ICOS 4 congress. A paper on the revised stratigraphy of the classical Rauchkofel Boden section was published (SCHÖNLAUB et al., 2017a).

• A paper on conodont stratigraphy across the Silurian/Devonian boundary was submitted to the GeCKO special Issue of Palaeo3.

• The Kacak event, studied in some sections in the central part of the Carnic Alps (with T. SUTTNER, E. KIDO and others). Research deals with conodonts, microfacies, isotopes, magneto-susceptibility, gamma rays, and other fossil groups. A paper was published (Suttner et al., 2017).

• The geology and stratigraphy of selected key areas (with several co-authors). Manuscripts on the Lake Wolayer and the central part of the Carnic Alps are in progress.

In the Montagne Noire, research deals with conodonts, stratigraphy and facies in the Famennian and lowermost Tournaisian (with C. GIRARD, R. FEIST, S. HARTENFELS, S.I. KAISER, and others).

Other Devonian research deals with:

• conodont taxonomy, stratigraphy and apparatus reconstruction in the Lochkovian (with M.G. CORRIGA);

• conodont stratigraphy of the Silurian and lowermost Devonian of the Precordillera, Argentina (with M.-J. GOMEZ, A. MESTRE and S. HEREDIA);

• a paper on the Famennian Buschsteich section, in Thuringia, was published (GIRARD et al., 2017).

Finally, a public exposition on the Devonian of the Carnic Alps was opened in June and July 2018 in Tolmezzo, the main village on the Italian side of the Carnic Alps. Slightly reduced, the exposition is now open at the Museo Geologico della Carnia at Ampezzo until June 2019. In connection with the exposition, a popular bilingual (Italian and German) booklet was published ("Le scogliere della Carnia – Die Karnischen Riffe.

Publications

GIRARD C., CORNÉE J.-J., CHARRUALT A.L., CORRADINI C., WEYER D., BARTZSCH K., JOHACHIMSKI M. & FEIST R. (2017). Conodont biostratigraphy and paleoenvironmental trends during the Famennian (Late Devonian) in the Thuringian Buschteich section (Germany). - Newsletters on Stratigraphy, **50** (1): 71-89, doi: 10.1127/nos/2016/0318.

SPALLETTA C., PERRI M.C., OVER D.J. & CORRADINI C. (2017). Famennian (Upper Devonian) conodont zonation: revised global standard. Bulletin of Geosciences, **92** (1): 31-57, doi: 10.1340/bull.geosci.

SCHÖNLAUB H.P., CORRADINI C., CORRIGA M.G. & FERRETTI A. (2017). Litho-, chrono- and conodont bio-stratigraphy of the Rauchkofel Boden Section (Upper Ordovician-Lower Devonian), Carnic Alps, Austria. - Newsletters on Stratigraphy, **50** (4): 445-469, doi: 10.1127/nos/2017/0391.

SUTTNER T., KIDO E., CORRADINI C., VODRÁŽKOVÁ S., PONDRELLI M. & SIMONETTO L. (2017). Conodont diversity across the late Eifelian Kačák Episode of the southern Alpine realm (central Carnic Alps, Austria/Italy). - Palaeogeography, Palaeoclimatology, Palaeoecology, **479**: 34-47, doi:10.1016/j.palaeo.2017.04.

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TM Anne Christine DA SILVA

My research focused in 2016-2017 mostly on the Devonian of Czech Republic, Germany and New York State in the U.S. We have applied a multi-proxy approach in order to get a better understanding of the paleoenvironments of these Devonian successions, through sedimentology, magnetic measurements and elemental geochemistry, we are building astrochronological time scales for part of the Devonian. This year, we have focused on improving the Emsian time scales, with 40 m of section sampled every 2 cm in New York State Kingston (U.S.A.) and Magnetic susceptibility measured on these samples. This work is done in collaboration with C.E. BRETT, C. VER STRAETEN, and A. BARTHOLOMEW. With D. PAS (Utrecht University) and Jeff OVER, we are working on the cyclostratigraphy of the Eifelian through the sampling and ICPMS high resolution geochemistry measurements at the Seneca Stone quarry.

With D. DE VLEESCHOUWER (University of Bremen), we worked on an integrated time frame for the Frasnian Famennian boundary through the study of 6 different records from the U.S.A., Canada, Belgium, Poland and China (reference below) and we are continuing this work at the Steinbruch Schmidt section, with Magnetic susceptibility, carbon isotopes and XRF geochemistry measurements. We have visited this section with Lawrence PERCIVAL (U. Laval) who resampled the ash bed at Steinbruch Schmidt between the Kellwasser and published a new radiometric age (below). We have also been working on the Lochkovian and Pragian from Czech Republic (with L. SLAVIK, L. CHADIMOVA, J. HLADIL from the Czech Academy of Sciences). One of the project concerns small scale cycles recorded in the Pragian and Lochkovian (Praha Formation) of the Pod Barrandovem section (submitted to Geology) and the other project concerns the Zlichovian formation and its cyclostratigraphic time scale (measurements in progress).

Publications

PERCIVAL, L.M.E., DAVIES, J.H.F.L., SCHALTEGGER, U., DE VLEESCHOUWER, D., DA SILVA, A.C., FÖLLMI, K.B. (2018) Precisely dating the Frasnian–Famennian boundary: implications for the cause of the Late Devonian mass extinction. -Scientific Report, **8:** 9598.

DE VLEESCHOUWER, D., DA SILVA, A.C., SINNESAEL, M., CHEN, D., DAY, J.E., WHALEN, M.T., GUO, Z. & CLAEYS, P. (2017). Timing and Pacing of the Late Devonian Mass extinction event regulated by eccentricity and obliquity. - Nature Communications, **8**: 2268.

PAS, D., DA SILVA, A.C., POULAIN, G., SPASSOV, S., BOULVAIN, F. (2018 SUBMITTED). Magnetic susceptibility records for global stratigraphic correlations? New constraint in the context of carbonate platform reconstruction (Givetian, Ardennes). Under revision at International Journal of Earth Sciences

DA SILVA, A.C., DEKKERS, M.J., DE VLEESCHOUWER, D., HLADIL, J., CHADIMOVA, L., SLAVÍK, L. & HILGEN, F.J. (2018 submitted). Devonian greenhouse millennial cycles manifest Hallsatt solar cycle and Milankovitch combination tones. Under revision at Geology

CM James R. EBERT

Ongoing lithostratigraphic, biostratigraphic (chitinozoans), and sequence stratigraphic research in the Helderberg Group (Přídolí to Lochkovian) of New York State continues to yield new and surprising relationships. Most recently, conodonts from the Deansboro Member of the Coeymans Formation that underlie the famous Mosquito Point Reef (purportedly “early Early Devonian;” Oliver 1960) have been identified by TM Ladislav SLAVÍK as the Pragian forms *Pelekysgnathus serratus brunsvicensis* and an icriodid of the *steinachensis* group (EBERT, J.R., SLAVÍK L., MATTESON, D.K. & BARR, M. 2018). This suggests that the Mosquito Point Reef is Pragian or possibly Emsian in age. OLIVER (1960) commented on similarities between the corals of the Mosquito Point Reef and those from the Koněprusy reef in the Czech Republic. Therefore, a Pragian age is most likely for the Mosquito Point Reef.

The identification of Pragian conodonts in the Deansboro also suggests that strata that overlie the Deansboro at the type locality (Oriskany Falls Quarry) have been misidentified as the Lochkovian

Kalkberg Formation (RICKARD 19062). Ebert and Matteson (submitted; see below) have renamed this unit the Buckley Mill Formation. Study of chitinozoans from the Buckley Mill Formation is currently in progress.

A 2018 Lethaia paper by MCADAMS et al. presents detailed biostratigraphic information and a very precise radiometric age for this important Judds Falls Bentonite in the Lochkovian New Scotland Formation (Helderberg Group). This ash has been used for twenty years in anchoring the oldest portions of the Devonian Time Scale (e.g. TUCKER et al. 1998).

The results of this recent work and our previous work on the Helderberg Group are summarized in a manuscript submitted for inclusion in a revised correlation chart for the Devonian of New York, under the leadership of TM Chuck VER STRAETEN.

Publications

MCADAMS, N.E.B., SCHMITZ, M.D., KLEFFNER, M.A., VERNIERS, J., VANDENBROUCKE, T.R.A., EBERT, J.R. & CRAMER, B.D. (2018). A new, high-precision CA-ID-TIMS date for the 'Kalkberg' K-bentonite (Judds Falls Bentonite). - Lethaia, **51**: 344–356.

EBERT, J.R., SLAVÍK L., MATTESON, D.K., and Barr, M. (2018). Post-Jamesville Member (Manlius Formation, Helderberg Group) Stratigraphy and the Age of the Mosquito Point Reef, Munnsville, New York: - Geological Society of America, Abstracts with Programs, **50** (2), 1 p.

EBERT, J.R. & MATTESON, D.K. (2018, submitted). Litho-, Bio-, and Sequence Stratigraphy of the Helderberg Group in the Appalachian Standard Succession (New York): submitted for eventual publication in revised - Devonian stratigraphic chart of New York State to be published by the Paleontological Research Institution.

CM Sven HARTENFELS

At the end of July my contract at the University of Münster came to an end. Therefore, I was very glad that Hans-Georg HERBIG, Institute of Geology and Mineralogy, University of Cologne, offered me a new position in his working group for the next three years. This allows me to continue my work in the Upper Devonian. As a part of the congress committee, I was strongly involved with the organization of the 10th International Symposium "Cephalopods – Present and Past", and as a part of the editorial board, occupied with finalizing the congress abstract volume and field guidebook (*Münstersche Forschungen zur Geologie und Paläontologie, **110***). The congress took place in Fès, Morocco, March 26th to April 3rd, 2018, and together with Moroccan and German colleagues, an excursion to Mesozoic successions of the Middle and High Atlas as well as to the Palaeozoic of the Anti-Atlas was successfully guided.

After the post-congress excursion (Fig. 1), I accompanied a group of Münster master students (Lukas AFHÜPPE, Lara HOLDERIED, Felix LÜDDECKE, Anna SAUPE, Till SÖTE) for a field campaign in SE Morocco, mainly in the areas around Alnif, Erfoud, and Tinejdad. Together with Sören STICHLING, we focused on sampling Lower to Middle Devonian successions (Bou Tchrafine, Boultan South, Mdoura East, Oued Ferkla) as well as the Frasnian/Famennian boundary interval (Bou Tchrafine, Jebel Erfoud, Jebel Ihrs, Mdoura East) for up-coming master and Ph.D. theses. Additionally, the Dasberg Crisis Interval at Ziyyar (Moroccan Meseta) was sampled for conodonts and carbonate microfacies analyses. In parallel, I continued my studies on the uppermost Famennian to lower Tournaisian conodont faunas of Lalla Mimouna.

Fig. 1. Post-symposium fieldtrip to the Devonian of the Tafilalt, showing the group in the lower Emsian flat at the base of the Jebel Mech Irdane (with the Givetian GSSP positioned at the far backside of the cliff).

Jointly with QIE Wenkun, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, and colleagues, several Devonian/Carboniferous boundary sections have been visited in southern China (Dapaoushang, Fig. 2, Duli, Huohua, Wangyou) and Germany (Borkewehr, Drewer, Oberrödinghausen, Oese,

Riescheid), in order to advance work on the re-definition of the boundary. HUANG Jiayuan, one of Wenkun's master students, studied the Givetian of the Hönne Valley Reef Complex in comparison to reef communities in South China. The trip to China was linked with the 2nd Joint Conference of the Palaeontological Society of China and the Paläontologische Gesellschaft, held in Yichang, October 10th to 14th, 2017. The German follow-up visit was connected with the 5th International Palaeontological Congress, July 9th to 13th, 2018, which took place in Paris. The co-operation will be continued. It is planned to spend several days in the field in the frame of the 19th International Congress on the Carboniferous and Permian (ICCP), held in Cologne next year.

The co-operation with Tim CIFER (Ljubljana), Carlo CORRADINI (Cagliari), Catherine GIRARD, Raimund FEIST, Jean-Jacques CORNÉE (all Montpellier), and Sandra I. KAISER (Stuttgart) continued. Additional samples of the Devonian/Carboniferous boundary section "La Serre trench C" (200 m to the east of the present GSSP trench E', Montagne Noire, southern France) were dissolved for conodonts. In the frame of his master thesis, I worked together with Felix LÜDDECKE on conodont faunas of the Ravin de la Fontaine de Santé section (Minervois Nappe, Montagne Noire).

Fig. 2. Field photo of the famous Dapaoushang D-C boundary xection, autumn 2017.

Research in the Rhenish Massif concentrated in the last year on Famennian and lower Mississippian successions. I continued to collaborate with David DE VLEESCHOUWER (Bremen), Christoph HARTKOPF-FRÖDER (Krefeld), Peter KÖNIGSHOF (Frankfurt am Main), Tomáš KUMPAN (Brno), Dieter WEYER (Berlin), and, of course, Hans-Georg HERBIG, Sarah Esteban LOPEZ (both Cologne) as well as the Münster Group. Additional conodont samples were taken around the base of the *Bispathodus ultimus ultimus* Zone and/or the Hangenberg Black Shale at Effenberg, Oberrödinghausen, and Borkewehr. New insights into the phylogene of early representatives of the genus *Protognathodus* were presented at the GeoBonn, September 2nd to 6th, 2018 (HARTENFELS & BECKER, 2018).

Jointly with Thomas, many B.Sc. and M.Sc. students have been supervised, some of which (see membership news of the Münster Group) presented their results at national and international meetings.

Together with Christoph HARTKOPF-FRÖDER, Peter KÖNIGSHOF, and Hans Martin WEBER (Bergisch Gladbach), a Special Issue on the Devonian and Mississippian of the Ardenno-Rhenish Massif was set in motion and will be published in Palaeobiodiversity and Palaeoenvironments.

Publications

Journal papers (for MÜFO 110 field guide papers see Devonian publications section)

KOŁTONIK, K., PISARZOWSKA, A., PASZKOWSKI, M., SLÁMA, J., BECKER, R.T., SZCZERBA, M., KRAWCZYŃSKI, W., HARTENFELS, S. & MARYNOWSKI, L. (2018). Baltic provenance of top-Famennian siliciclastic material of the northern Rhenish Massif, Rhenohercynian zone of the Variscan orogen. – International Journal of Earth Sciences (Geologische Rundschau). – 25 pp., doi.org/10.1007/ s00531-018-1628-4.

Editorials

EL HASSANI, A., BECKER, R. T., HARTENFELS, S. & LÜDDECKE, F. (Eds., 2018). 10th International Symposium "Cephalopods – Present and Past", Fes · 26th March – 3rd April 2018, Program & Abstracts. – Münstersche Forschungen zur Geologie und Paläontologie, **110**: 1-108.

HARTENFELS, S., BECKER, R.T., EL HASSANI, A. & LÜDDECKE, F. (Eds., 2018). 10th International Symposium "Cephalopods – Present and Past", Fes · 26th March – 3rd April 2018, Field Guidebook. – Münstersche Forschungen zur Geologie und Paläontologie, **110**: 109-311, 312-338 (online).

Popular science contribution

HARTENFELS, S., BECKER, R.T., DROZDZEWSKI, G., JUCH, D. & ABOUSSALAM, Z.S. (2018).

„Kommen und Gehen“ einer bisher unbekannten Gesteins- und Fossilabfolge beim A 44-Neubau bei Hülsbeck. – Archäologie im Rheinland, **2017**: 36-38.

Abstracts (without repeating the contributions to the IPC in Paris – see Devonian publications section)

HARTENFELS, S. & BECKER, R.T. (2018). The Effenberg Quarry – cyclic sedimentation patterns and simplified time relationships of conodont zones (Famennian, Remscheid-Altena Anticline, Rhenish Massif). – In: DE VLEESCHOUWER, D. (Ed.), Opening Meeting IGCP 652 - Program, “Reading Time in Paleozoic sedimentary Rock”, Bremen: 2 pp.

SAUPE, A., HARTENFELS, S. & BECKER, R.T. (2018). Biofacies analysis of agglutinated foraminiferes along an Upper Devonian transect from Central Europe to North Africa. – GeoBonn, Living Earth, 2. - 6. September 2018, Bonn: (online).

LÜDDECKE, F. & HARTENFELS, S. (2018). New insights into the Famennian of the Minervois Nappe (Ravin de la Fontaine des Santé, southern France). – GeoBonn, Living Earth, 2. - 6. September 2018, Bonn (online).

HARTENFELS, S. & BECKER, R.T. (2018). Borkewehr near Wocklum (Northern Rhenish Massif, Germany) – a possible future Devonian-Carboniferous boundary GSSP section. – GeoBonn, Living Earth, 2. - 6. September 2018, Bonn (online).

HOLDERIED, L., BECKER, R.T. & HARTENFELS, S. (2018). Ontogenetic morphometry, taxonomy and phylogeny of Paratornoceratinae (Goniatitida) from the lower Famennian of NW Australia. – In: HASSANI, A. EL, BECKER, R. T., HARTENFELS, S. & LÜDDECKE, F. (Eds.): 10th International Symposium “Cephalopods – Present and Past”, Fes · 26th March – 3rd April 2018, Program & Abstracts. – Münstersche Forschungen zur Geologie und Paläontologie, **110**: 47-48.

BECKER, R.T. & HARTENFELS, S. (2018). Upper Famennian sea-level changes and ammonoid radiations in the eastern Anti-Atlas (southern Morocco). – In: HASSANI, A. EL, BECKER, R. T., HARTENFELS, S. & LÜDDECKE, F. (Eds.): 10th International Symposium “Cephalopods – Present and Past”, Fes · 26th March – 3rd April 2018, Program & Abstracts. – Münstersche Forschungen zur Geologie und Paläontologie, **110**: 18-19.

AFHÜPPE, L., BECKER, R.T. & HARTENFELS, S. (2018): New data on cyrto- and gyroconic nautiloids from the Devonian of the eastern Anti-Atlas. – In: HASSANI, A. EL, BECKER, R. T., HARTENFELS, S. & LÜDDECKE, F. (Eds.): 10th International Symposium “Cephalopods – Present and Past”, Fes · 26th March – 3rd April 2018, Program & Abstracts. – Münstersche Forschungen zur Geologie und Paläontologie, **110**: 15-16.

WANG, Z., HARTENFELS, S., BECKER, R.T., ABOUSSALAM, Z.S. & GONG, Y. (2017). New Upper Devonian conodonts from northwestern Junggar Basin, Xinjiang, Northwest China. – In: YANG, Q., REITNER, J., WANG, Y. & REICH, M. (Eds.): Critical intervals in earth history: palaeobiological innovations. Abstract Volume of the 2nd Joint Conference of the Palaeontological Society of China and the Paläontologische Gesellschaft. – University of Science and Technology of China Press, 382-383, Hefei.

LÜDDECKE, F., HARTENFELS, S. & BECKER, R.T. (2017). Middle Famennian conodont biofacies: a new approach. – In: YANG, Q., REITNER, J., WANG, Y. & REICH, M. (Eds.), Critical Intervals in Earth History: Palaeobiological Innovations., 2nd Joint Conference of the Palaeontological Society of China and the Paläontologische Gesellschaft: 206-208; University of Science and Technology of China Press.

HARTENFELS, S., BECKER, R. T. & KUMPAN, T. (2017). A possible new Devonian-Carboniferous stratotype section: Borkewehr near Wocklum (northern Rhenish Massif, Germany). – In: YANG, Q., REITNER, J., WANG, Y. & REICH, M. (Eds.): Critical intervals in earth history: palaeobiological innovations. Abstract Volume of the 2nd Joint Conference of the Palaeontological Society of China and the Paläontologische Gesellschaft. – University of Science and Technology of China Press, 79-81, Hefei.

TM Nadezhda G. IZOKH and the Novosibirsk Group

Our team continued the investigation of Devonian and Lower Carboniferous stratigraphy of the Russian Arctic region (lower riches of the Lena River, Yuryung-Tumus Peninsula), Altai-Sayan Folded Area, and Central Asia (Kitab State Geological Reserve, Uzbekistan).

The Research Group includes:

TM Nadezhda G. IZOKH (conodonts), CM Olga T. OBUT (radiolaria), research fellow Tatiana A. SHCHERBANENKO, (brachiopods), and Ph.D. student B.M. POPOV (ostracods) from the Trofimuk Institute of Petroleum Geology and Geophysics, SB RAS.

CM Olga P. IZOKH (isotope geochemistry) from the SOBOLEV Institute of Geology and Mineralogy, SB RAS.

Ekaterina D. PETROVA (Upper Devonian conodonts from Arctic region, Stolb Island) and Polina N. LEIBGAM, students of the Novosibirsk State University.

Main results obtained in 2018:

TM Nadezhda G. IZOKH continued the study of Devonian and Lower Carboniferous conodonts from Siberia and Central Asia. Together with the student of the Novosibirsk State University, **Ekaterina PETROVA,** we also study Upper Devonian conodonts from Stolb Island (lower riches of the Lena River). Conodonts are very rare in Frasnian sections of the Lena River delta.

Nadezhda G. IZOKH together with **CM Olga P. OBUT** completed the study of Late Devonian conodonts and radiolarians from siliceous and carbonate rocks of the Akbasay Formation on the left side of the Kule Gorge, Zeravshan-Gissar mountainous area (Uzbekistan; Fig. 1; (IZOKH et al., 2018). Eight conodont zones were defined for the Frasnian-Famennian interval (from the *guanwushanensis* Zone up to the *expansa* Zone). The radiolarian assemblages were found in six of them along with conodonts. They include 10 genera of spherical and spiny *Trilonche* HINDE, 1899, *Stigmosphaerostylus* RUST, 1892, *Haplentactinia* FOREMAN, 1963, *Palaeoscenidium* DEFLANDRE, 1953, *Radiobisphaera* WON, 1997, *Palaeothalomnus* DEFLANDRE, 1973, *Moskovistella* AFANASIEVA, 2000, *Nazarovites* AFANASIEVA, 2000, *Ceratoikiscum* DEFLANDRE, 1953, and *Tetrentactinia* FOREMAN, 1963. The four latter genera are very rare; predominant is *Trilonche*. The association with conodonts is very useful for a precise age control of the radiolarian associations.

CM Olga P. IZOKH conducted isotope-geochemical studies in the Devonian of the Salair and in the Kitab State Geological Reserve. She and her student **Polina N. LEIBGAM** from the Novosibirsk State University work on isotope-geochemical studies of Lower Devonian sections of the Maly Bachat Formation (Pragian Stage) of the Salair.

Boris M. POPOV studies the Upper Devonian ostracods from of the Salair and Kuznetsk Basin.

Tatiana A. SHCHERBANENKO continues her studies on e brachiopods from the Silurian and Devonian deposits of the Altai-Sayan Folded Area and the Yuryung-Tumus Peninsula (NW Siberia).

Publications

Journal Paper

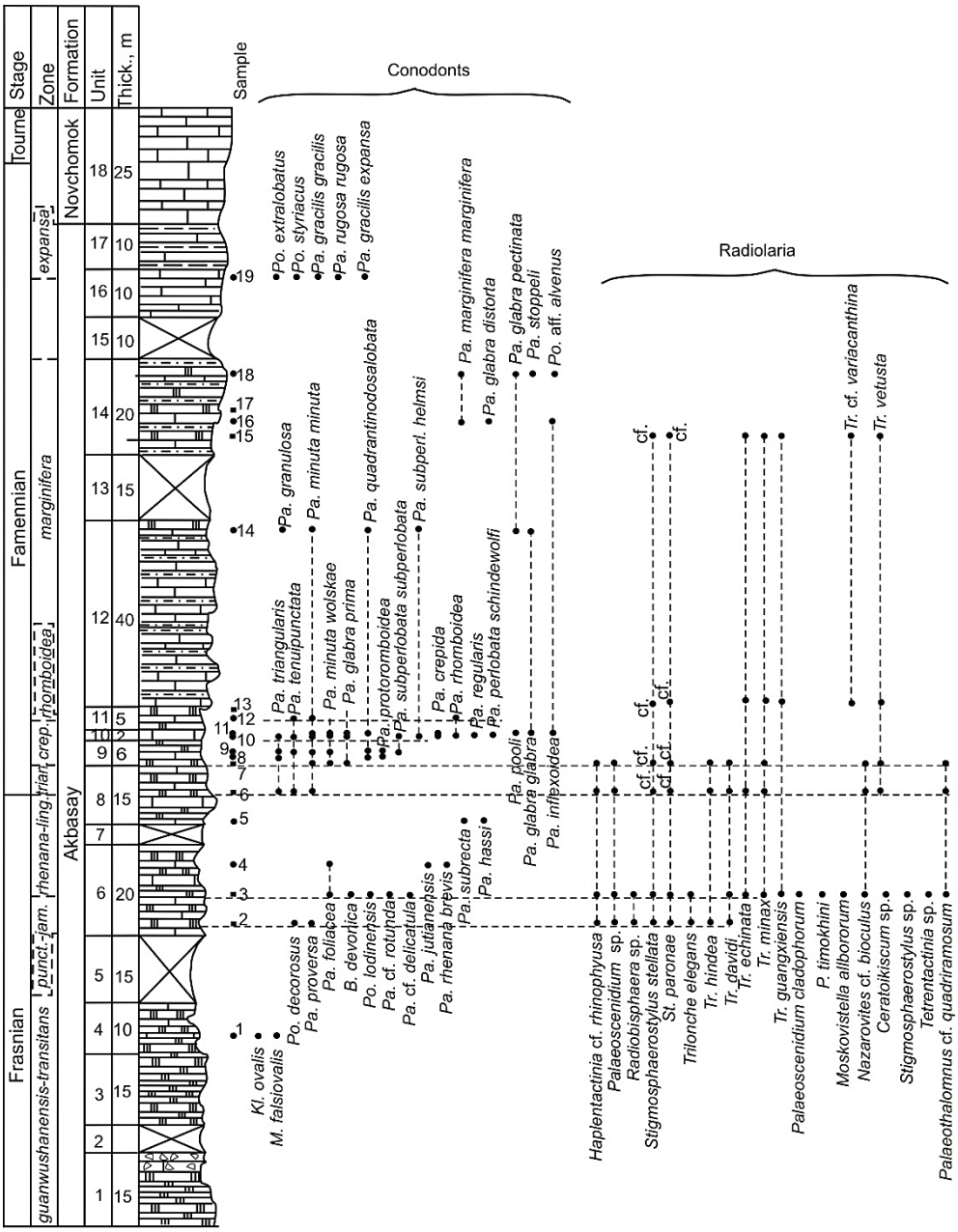
SENNIKOV, N.V., SHCHERBANENKO, T.A., VARAKSINA, I.V., IZOKH, N.G., SOBOLEV, E.S. & YAZIKOV, A.Y. (2018). Biostratigraphy and Sedimentary Settings of the Middle Devonian Succession of the Yuryung-Tumus Peninsula, Khatanga Gulf of the Laptev Sea. – Stratigraphy and Geological Correlation, **26** (3): 267-282.

Abstracts

IZOKH, N.G. (2018). Frasnian-Famennian conodonts from the margins of the Siberian craton. - In: Proceedings of LXIV Session Paleontological Society of the Russian Academy of Sciences (April 2-6, 2018, St. Petersburg), St.-Pb. Publishing House of VSEGEI: 49-51 [in Russian].

IZOKH, N.G. (2018). Devonian conodont biostratigraphy of the Norilsk area. - Contributions of Interekspo Geo-Siberia-2018, XIV International Conference "Subsurface management. Mining, New trends and techniques for prospecting, exploration and exploitation of mineral resources, Economy, Geoecology", Novosibirsk, SSUGT, **1**: 3-6 [in Russian, Abstract in English].

IZOKH, N.G., ERINA, M.V., OBUT, O.T., ABDIEV, N.K., KIM, A.I. & RAKHMONOV, U.D. (2018). Late Devonian microfauna (conodonts, radiolarians) from the Zeravshan-Gissar mountainous area. - Contributions of the XVII Allrussian Micropaleontological Conference "Modern micropaleontology-problems and prospects.



Samples: 1- IX-3/90, 2 - 08083101, 3 -08083102, 4 - IX-4/121, 5 - IX-4/126, 6 - 08083103, 7 - 08083104, 8 - IX-6/230, PT-78/1, 9 - IX-6/238, PT-78/2, 10 - PT-78, 79, 11 - PT-79/7, 12 - IX-6/275, 13 -08083105, 14 - IX-6/360, 15 - 08083106, 16 - IX-6/405, 17 - 08083107, 18 - IX-7/515, 19 - IX-7/600

Fig. 1. Ranges of conodont and radiolarian taxa in the Akbasay Formation, left bank of the Kule Gorge, Kitab State Geological Reserve.

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

OBUKHOVSKAYA, V.Y. (2017). Palynology of Lower-Middle Frasnian deposits of South East of Belarus. – Lithosphere, **47** (2): 43-67 [in Russian, with English summary].

A detailed palynological study of the lower-middle Frasnian deposits of the southern part of the Zhlobin Saddle (Yelenets Block), the North Pripyat shoulder, and the Gomel structural bridge in the South East of Belarus allowed to distinguish four local miospore zones ("lones"): *Raistrickia bucera* and *Sinuosisporis vermiculatus* zones, which corresponds to the lower and upper parts of the Zhelon Horizon, the *Archaeozonotriletes variabilis insignis* and *Geminospora semilucensa* – *Ancyrospora laciniosa* zones, corresponding to the Sargayevo and Semiluki horizons of the Stratigraphical scheme of Devonian deposits of

Belarus (2010). The correlation of the local zones with zones of the East European Platform and zones distinguished in contemporaneous deposits of Western Europe is provided. The paper includes photos of local zonal index species, of main and characteristic species, which are important for age assignments or for the biostratigraphic division and correlation with adjacent and more distant areas. There are both miospores and acritarches (28 species on five plates).

PLAX, D.P. (2017) Ichthyofauna from the Devonian deposits of the Orsha Depression (Belarus). Natural Resources, **2**: 12-50.

The development of practical geology creates an ever increasing demand to refine the stratigraphic divisions and the accuracy of their correlations. Progress in solving these problems can be achieved by integrating the palaeontological, lithological, and geophysical data. The summarized data on the Devonian ichthyofauna from the upper Emsian (Obol and Lepel Beds of the Vitebsk Regional Stage), Eifelian (Adrov, Osveya, Gorodok, and Kostyukovichi Regional Stages), Givetian (Goryn, Stolin, and Moroch Beds of the Polotsk Regional Stage, Ubort Regional Stage) and lower Frasnian (Zhelon Regional Stage, Skrygalovo and Saria Beds of the Sargaevo Regional Stage) deposits in the territory of the Orsha Depression are presented. To complete the information the author uses in addition to his personal ichthyofaunistic data some literature evidence concerning the Devonian agnathans and fishes found within the considered tectonic structures. The ichthyofauna data enabled the author to refine and supplement its taxonomic composition in the deposits of the Orsha Depression, and also to determine the age of rocks, to subdivide and to correlate them with coeval deposits developed within other tectonic structures of the East European Platform, namely, the Baltic Syneclise, Vileyka Buried Ridge, Latvian and Zhlobin Saddles, Bobruysk Buried Ridge, Voronezh Anteclise, Pripyat Trough, and Volyn Monocline. The brief history of the study of the Devonian ichthyofauna of the Orsha Depression, the taphonomic characteristics of the vertebrate remains, and a detailed lithological description of established stratigraphic units are considered separately. The ichthyofauna materials add also some new details concerning stratigraphic and palaeogeographic distributions, clarify the palaeontological characteristics of the subregional stratigraphic subdivisions of the last Stratigraphic Chart of the Devonian deposits in the territory of Belarus, and, once again, emphasize the great importance of the ichthyofauna in solving problems of stratigraphic division and of the correlation of synchronous terrigenous and carbonate-terrigenous deposits of the upper Emsian – Frasnian of the republic. The Stratigraphic Chart of the Devonian deposits of Belarus (2010) was taken as the base for the division of Lower, Middle and Upper Devonian deposits in the studied area.

PLAX, D.P. (2017). Findings of Palaeozoic ichthyofauna remains in the territory of Belarus. - BarSU Herald, Series: Biological sciences. Agricultural sciences, Baranovichi, **5**: 54-64 [in Belarusian, with English summary].

The paper provides information on Palaeozoic skeletal elements of different groups of agnathans and fishes in Silurian, Devonian and Carboniferous deposits of Belarus. It informs about their diversity and distribution as well as their morphological characteristics. The data significantly complement the previously known information on the ichthyofauna of the time interval and can be used in regional palaeontological and stratigraphic studies as well as for palaeoecological and palaeogeographic reconstructions.

MURASHKO, O.V. (2018). Conodont fauna studies from the Devonian deposits of the territory of Belarus. – Lithosphere, **48** (1): 78-87 [in Russian, with English summary].

Conodont faunas were first determined in the 40s of the 19th century by the paleontologist Christian PANDER. They have been used for more than hundred-fifty years as reliable stratigraphic markers for global correlations of the Palaeozoic subdivisions and for system, series and stage deliminations. Conodonts have a special significance for Belarusian geology and especially for Devonian studies, as far as the efficiency of geological exploration on many types of economically important minerals depends on the detailed and correct stratigraphy. Frequent occurrences of conodont elements in different marine facies of Devonian rocks (limestones, dolomites, marls, etc.) and their quite good preservation allowed Belarusian stratigraphers successfully to compare the Devonian Regional Scheme with the Global Standard Zones. This holds prospects for further research.

OBUKHOVSKAYA, T.G., OBUKHOVSKAYA, V.Y. & KRUCHEK, S.A. (2018). Stratigraphy of Upper

Frasnian deposits of Orsha depression within Belarus. – Lithosphere, 48 (1): 88-104 [in Russian, with English summary].

The study deals with upper Frasnian deposits distributed in a discontinuous narrow strip to the east of the Orsha Depression within Belarus. Lithological criteria characterize three suites: Yakubovschina, predominantly clay with beds of siltstones, marls, and dolomites, Mstislavl, clay-carbonate, corresponding to the Voronezh and possibly the Rechitsa horizons, and Paradin, predominantly carbonate-clay. Analogues of deposits of Kustovnitsa-Anisimovka, Skolodin, and Chernin are allocated. They corresponded to the Yevlanovo and Liven horizons of Central regions of the East Europe Platform. The age of rocks is confirmed mainly by miospore complexes. The obtained data complete the stratigraphic characteristic of upper Frasnian deposits of the Orsha Depression at the boundary between Belarus and Russia.

IVANOV, A.O. & PLAX, D.P. (2018). Chondrichthyans from the Devonian–Early Carboniferous of Belarus. - Estonian Journal of Earth Sciences. – **67** (1): 43-58.

Diverse remains of chondrichthyans were found at several stratigraphic levels in 18 cores of the Devonian and Lower Carboniferous of Belarus. Most of the taxa are first reported from that territory. A new species of ctenacanthiform shark, *Tamiobatis elgae* n. sp., is described. The internal structure of the teeth of this species is reconstructed using microtomography. The distribution of chondrichthyan taxa is analysed.

PLAX, D.P., LAMSDELL, J.C., VRAZO, M.B &, BARBIKOV, D. V. (2018). A new genus of eurypterid (Chelicerata, Eurypterida) from the Upper Devonian salt deposits of Belarus. - Journal of Paleontology, **92** (5): 838-849.

We describe a new stylonurid eurypterid from the evaporitic potassium-salt deposits of the Upper Devonian (Famennian) Soligorsk Formation in the Pripyat Trough of Belarus. All specimens are assigned to *Soligorskopterus tchepeliensis* new genus new species, which represents the first formally described eurypterid species from Belarus. The occurrence of well-preserved eurypterids in these unusual evaporite deposits is most likely due to transport from freshwater stream habitats into a hypersaline setting following death. *S. tchepeliensis* n. gen. n. sp. appears to be intermediate between the traditionally considered parastylonurids and stylonurids and, thus, extends our understanding of stylonurid evolution in the mid-Paleozoic. The new genus extends the occurrence of Famennian eurypterids into eastern Laurussia and of the Stylonuridae into the Upper Devonian. The new taxon could be part of a global eurypterid habitat shift that took place in the Late Devonian.

Abstracts

KRUCHEK, S.A., OBUKHOVSKAYA, V.Y. & SACHENKO, T.F. (2017). The Famennian stage of sedimentation on the North Pripyat Shoulder of the Pripyat trough and its lithological and paleontological markers. – In: Actual problems of earth sciences: use of natural resources and preservation of the environment, Proceedings of the International scientific and practical conference, dedicated to the Year of Science in the Republic of Belarus, Brest, 25-27 Sept. 2017, **1**: 79-82 [in Russian].

KRUCHEK, S.A., TOLSTOSHEEV, V.I. & SAKHARUK, P.O. (2017). About the features of structure and distribution of sediments of the Rechitsa horizon (the Upper Devonian) on the Zhlobin saddle (Belarus). – In: Actual problems of earth sciences: use of natural resources and preservation of the environment, Proceedings of the International scientific and practical conference, dedicated to the Year of Science in the Republic of Belarus, Brest, 25-27 Sept. 2017, **1**: 82-86 [in Russian].

PLAX, D.P. & GRIGOREVICH, A.K. (2017). Clarification of the boundaries of the modern distribution of the Devonian deposits in the territory of northwestern Ukraine within the Volyn Monocline according to the study of the ichthyofauna. – In: KHROUSTALEV, B. M., RAMANIUK, F. A. & KALINICHENKO, A. S. (Eds.), Proceedings of the 15th International scientific and technical conference «Science for Education, Production and Economy Purposes», Minsk, Belarusian National Technical University, 2017, **3**: 231 [in Russian].

PLAX, D.P. & ZAIKA, Y.V. (2017). First findings of the redeposited Silurian ichthyofauna in the Quaternary deposits of Belarus. – In: KHROUSTALEV, B. M., RAMANIUK, F. A. & KALINICHENKO, A. S. (Eds.), Proceedings of the 15th International scientific and technical conference «Science for Education, Production and Economy Purposes», Minsk, Belarusian National Technical University, 2017, **3**: 232.

PLAX, D.P. (2018). Ichthyofauna from the Upper Frasnian deposits of Belarus / Fundamental and applied palaeontology. – In: BOGDANOVA T.N. et al. (Eds.), Proceedings of the 64th session of the Palaeontological Society of the Russian Academy of Sciences, St. Petersburg, April 2-6, 2018: 217-218 [in Russian].

CM Tomáš KUMPAN

Our Czech working group (Jiří KALVODA, Ondřej BÁBEK, Jiří FRÝDA) continued with multiproxy stratigraphic research of the Devonian-Carboniferous boundary (DCB) during the last year. Selected sections in the Moravian Karst, Czech Republic, were re-sampled for trace element geochemistry and conodont biostratigraphy, with special focus on protognathodid fauna. Field works in Sardinia were conducted jointly with Carlo CORRADINI (The University of Cagliari, Italy) in November 2017, where DCB sections Monte Tacu and Bruncu Bullai were sampled for geochemistry and measured by gamma-ray spectrometer (by Daniel ŠIMÍČEK from Palacký University, Olomouc, Czech republic). Joint field works were conducted with Wenkun QIE, Chen BO, Kun LIANG and Jianfeng LU (Chinese Academy of Sciences, Nanjing) in the Devonian of the Barrandian in co-operation with Stanislava VODRÁŽKOVÁ (Czech Geological Survey, Prag) and in the Moravian Karst during September 2017.

Further activities were focused on the Upper and Uppermost Famennian $\delta^{13}C$ chemostratigraphy in the Moravian Karst, and elemental geochemistry and conodont biostratigraphy of Austrian DCB sections Trolp and Grüne Schneid, in close co-operation with Sandra KAISER (Stuttgart State Museum of Natural History, Germany). Famennian and Tournaisian ostracodes from the Moravian Karst are studied together with Claudia DOJEN (Landesmuseum Kärnten, Klagenfurt, Austria). I'm also involved in research project of Štěpán RAK (Museum of Bohemian Karst, Czech Republic) and Krzysztof BRODA (University of Silesia in Katowice, Poland), focused on Devonian and Carboniferous crustaceans of the Moravian Karst.

Publications

HARTENFELS, S., KAISER, S., JOACHIMSKI, M., GIRARD, C. & KUMPAN, T. (2018). Environmental changes during Famennian low-order biocrises - stable isotope data from European successions. - In: 5th International Paleontological Congress 9-13 July 2018 Paris, Abstract book: 824.

KAISER S., KUMPAN T. & CÍGLER V. (2018). New unornamented siphonodellids (Conodonta) of the lower Tournaisian from the Rhenish Massif and Moravian Karst (Germany and Czech Republic). - Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, **286**: 1-33, doi:10.1127/njgpa/2017/0684.

KALVODA J., KUMPAN T., HOLÁ M., BÁBEK O., KANICKÝ V. & ŠKODA R. (2018). Fine-scale LA-ICP-MS study of redox oscillations and REEY cycling during the latest Devonian Hangenberg Crisis (Moravian Karst, Czech Republic). - Palaeogeography, Palaeoclimatology, Palaeoecology, **493**: 30-43, doi:10.1016/j.palaeo.2017.12.034.

KUMPAN, T., KAISER, S., JOACHIMSKI, M. & RASSER, M. (2018). Conodont biostratigraphy and geochemistry of pelagic Devonian-Carboniferous boundary successions at Trolp (Graz Paleozoic) and Grüne Schneid (Carnic Alps). - In: 5th International Paleontological Congress 9-13 July 2018 Paris, Abstract book: 828.

KUMPAN, T., KALVODA, J., TOLOKONNIKOVA, Z. & HOLÁ, M. (2018). New data on latest Famennian microbialites and early Tournaisian bryozoans of the Moravian Karst Palaeozoic (Czech Republic). - In: 5th International Paleontological Congress 9-13 July 2018 Paris, Abstract book, PP. 829.

RAK Š., BRODA K. & KUMPAN T. (2018.) First Carboniferous thylacocephalan from Europe and its significance for the understanding of functional morphology of Concavicarididae SCHRAM, 2014. – Crustaceana, **91**: 265-285, doi:10.1163/15685403-00003771.

TM MA Xueping

During the past few years, one of the investigated topics by my group is the Silurian–Devonian boundary succession in the marginal South China plate, which is a carbonate succession that is not seen in the traditional South China region. Preliminary work (WANG et al. 2018, jointly with Ladislav SLAVÍK) shows that the Lochkovian through lowermost Emsian strata yield a number of index conodonts, such as *Latericriodus steinachensis* eta morphotype, *Lanea* spp., *Masaraella pandora*, *Pseudogondwania ethingtoni*, *Gondwania*

irregularis, *Eocostapolygnathus kitabicus*, *Eoc. pireneae*, and others. Further detailed work is still needed in order to define the Siluro–Devonian boundary and to improve the regional Lochkovian and Pragian conodont zonation.

The second topic is related to the Middle and Upper Devonian boundary interval in the neritic facies of South China. Ambocoeliids are a major group of smooth-shelled brachiopods across the boundary, which, however, are not readily recognized. Research results are either in press or in preparation by ZHANG Meiqiong, who is currently a Postdoctoral Fellow (ZHANG & MA, 2018; ZHANG et al., 2018 in preparation). Conodonts have been discovered in the Panxi section, an important neritic reference section in South China, which first demonstrate that the Yidade Formation is of Late Givetian through Middle Frasnian age in light of conodont data (ZHANG Yubo et al. 2018, jointly with Zhor Sarah ABOUSSALAM).

The third topic is our continuous investigation of the Famennian strata in the Junggar Basin of northwestern China. Many new ammonoid specimens have been discovered from a number of levels in the Hongguleleng Fm. (Wulan Mbr) and need further study. Guided by myself in the field, Dr. M. STACHACZ and others of the G. RACKI group are working on the Famennian to Lower Tournaisian stratigraphy in light of palynological and ichnological aspects, with a paper being in preparation.

Since 2017, a few students have finished their theses, including LÜ Dan (2017, Ph.D.: Late Frasnian to Famennian brachiopods of central Hunan, South China), ZHANG Yubo (2018, Ph.D.: Biostratigraphy and event stratigraphy of the Middle Devonian-Lower Carboniferous in eastern Yunnan and southern Guizhou), and WANG Huanhuan (2018, M.Sc.: Lower Devonian conodont biostratigraphy of the Alengchu section in western Yunnan Province, South China). WANG Yining, a new PhD student, has just enrolled and will work on the Upper Devonian brachiopod material of the late Volker EBBIGHAUSEN.

Publications

LIAO Wei-Hua & MA Xue-Ping (2017). Devonian corals from Zhaotong, NE Yunnan (2) — Givetian rugose corals. - Acta Palaeontologica Sinica, **56** (1): 68–81 [in Chinese with English abstract].

LÜ Dan & MA Xue-Ping (2017a). Small-sized brachiopods from the Upper Frasnian (Devonian) of central Hunan, China. - Palaeoworld, **26**: 456–478.

LÜ Dan & MA Xue-Ping (2017b). Population Statistics of two late Frasnian (Late Devonian) brachiopod faunas from central Hunan of China and its paleoecological significance. - Acta Palaeontologica Sinica, **56** (2): 189–200 [in Chinese with English abstract].

MA Xue-Ping, WANG Huan-Huan & ZHANG, Meiqiong (2017a). Devonian Event Succession and Sea Level Change in South China — with Early and Middle Devonian carbon and oxygen isotopic data. - SDS Newsletter **32**: 17–24.

MA Xueping, ZHANG Meiqiong, ZONG Pu, ZHANG Yubo & LÜ Dan (2017b). Temporal and spatial distribution of the Late Devonian (Famennian) strata in the northwestern border of the Junggar Basin, Xinjiang, northwestern China. - Acta Geologica Sinica (English Edition), **91** (4): 1413–1437.

ZONG Pu, MA Xueping, ZHANG Meiqiong, ZHANG Yubo & LÜ Dan (2017). Comparative study of Famennian carbon isotope characteristics of Junggar, Xinjiang and central Hunan, South China. -Acta Scientiarum Naturalium Universitatis Pekinensis, **53** (5): 843–861 [in Chinese with English abstract].

LIAO Wei-hua & MA Xue-Ping (2018). Devonian corals from Zhaotong, NE Yunnan (3) — Early Frasnian rugose corals. - Acta Palaeontologica Sinica, **57** (1):74–83 ([in Chinese with English abstract].

WANG Huan-Huan, MA Xue-ping, Ladislav SLAVIK, WEI Fan, ZHANG Mei-Qiong & LÜ Dan. (2018). Lower Devonian conodont biostratigraphy of the Alengchu section in western Yunnan Province, South China. Journal of Stratigraphy, **42** (3): 288–300 [in Chinese with English abstract].

ZHANG Meiqiong & MA Xueping (2018). Origination and diversification of Devonian ambocoelioid brachiopods in South China. - Palaeobiodiversity and Palaeoenvironments, https://doi.org/10.1007/s12549-018-0333-4, 28 pp.

ZHANG Meiqiong, R. Thomas BECKER, MA, Xueping, ZHANG, Yubo & ZONG, Pu (2018). Hangenberg Black Shale with cymaclymeniid ammonoids in the terminal Devonian of South China. - Palaeobiodiversity and

Palaeoenvironments, doi.org/10.1007/s12549-018-0348-x.

ZHANG Yu-bo, MA Xue-ping, Zhor Sarah ABOUSSALAM & ZHANG Mei-qiong (2018). Conodonts from the Yidade Formation in the Panxi section of Yunnan, South China. - Journal of Stratigraphy, 42 (3): 301–312 [n Chinese with English abstract]

ZONG Pu & MA Xue-Ping (2018). Spiriferide brachiopods from the Famennian (Late Devonian) Hongguleleng Formation of western Junggar, Xinjiang, northwestern China. - Palaeoworld, **27**: 66–89.

TM John E. MARSHALL and the Southampton Group

2017-18 has been an eventful year for fieldwork with a number of important visits:

In October I visited the Mining University in St Petersburg at the invitation of Elena MIKHAILOVA. I was travelling with David Siveter from Leicester University and we met with a number of Devonian colleagues. Importantly we visited the historic Murchison locality on Lake Il'men that was one of the sites where Devonian fish and brachiopods occur together and provided the proof for the Devonian System. Without this correlation to the distinctive but localised Old Red Sandstone we would probably now all be working on a much longer Silurian Period. This classic site on the Lake Il'men Clint has now been proposed as a Geopark. I also took the opportunity of the visit to Russia to meet with Olga TEL'NOVA in Syktyvkar for further discussions on Frasnian and Famennian palynology.

In May, I made a brief field visit to Orkney to collect palynological samples from a number of lake beds and in collaboration with Oslo University who are determining high precision geochronological dates from interbedded volcanic rocks. Following this I visited, with Emma REEVES, the Albert LONG collection of early Tournaisian seeds in the Hunterian Museum, Glasgow. This was to identify pollen within the ovules and link dispersed palynomorphs to their plants. We then continued this theme with low spring tide collecting at Burnmouth for large blocks from selected beds that contain fragmentary seed plants.

In July I attended the SDS meeting at IPC5 in Paris where we had an excellent Devonian session with a day and a half of talks and posters.

It was immediately after Paris that we travelled to the main Devonian sedimentary sequence in northern Spitsbergen. Something we have been trying to do for a long time as it's is a rare but very remote occurrence of palaeo-equatorial terrestrial sediments. I travelled with Charlie WELLMAN (palynology, Sheffield University), Chris BERRY (palaeobotany, Cardiff University), Neil DAVIS (sedimentology and particularly the impact of vegetation on fluvial systems, Cambridge University) and F-J. LINDEMANN (vertebrates, Natural History Museum, Oslo). We were funded by National Geographic and worked from the MV Farm. This took us to the northern coast of Spitsbergen for 3 weeks and enabled us to study and sample a series of Silurian to Givetian localities in Raud Fjord, Wood Fjord and Wijde Fjord. We were successful in collecting palynological samples through the sequence together with fossils plants.

Following this fieldwork I attended the 10th EPPC in Dublin, (this is the European Palaeobotany and Palynology Conference) and together with Emma Reeves made presentation on the Devonian-Carboniferous boundary and the Tournaisian of Scotland.

Publications

MARSHALL, J.E.A. & TEL'NOVA, O.P. (2017). The 'last' tentaculitoids. - Palynology, **41**: 178-188.

MILLWARD, D., DAVIES, S.J., WILLIAMSON, F., CURTIS, R., KEARSEY, T.I., BENNETT, C.E., MARSHALL, J.E.A. & BROWNE, M.A.E. (2018). Early Mississippian evaporites of coastal tropical wetlands. – Sedimentology, doi: 10.1111/sed.12465

MARSHALL, J.E.A. GLENNIE, K.W., ASTIN, T.R. & Hewett, A.J. (2018). The Old Red Group (Devonian) – Rotliegend (Permian) Unconformity in the Inner Moray Firth. - In: MONAGHAN, A.A., UNDERHILL, J.R., HEWETT, A.J. & MARSHALL, J.E.A. (Eds.), Paleozoic Plays of NW Europe, Geological Society, London, Special Publications, **471**, doi.org/10.1144/SP471.12.

TEL'NOVA, O.P. & MARSHALL, J.E.A. (2018). Devonian spores of *Kryshtofovichia africani* NIKITIN (Tracheophyta): morphology and ultrastructure. - Palaeontological Journal, **52**: 342-349.

CM Hanna MATYJA

Work continues on Devonian conodont biostratigraphy and events but, above all, on the re-definition of the Devonian/Carboniferous Boundary in relation with the International Working Group, led by Marcus ARETZ (Toulouse). Preliminary results have been published earlier (2011-2015). The last paper by CORRADINI C., SPALETTA C., MOSSONI A., MATYJA H. & OVER D.J., published online in 2016 (*Geological Magazine*), presents an updated biozonation scheme across the D/C boundary, based on the first appearance of some conodonts, and suggests the new criterion for the definition of the base of the Carboniferous system.

The D/C boundary interval has been analysed in detail in the Kule section (Uzbekistan, South Tien Shan), using biostratigraphy (conodonts), microfacies analysis, magnetic susceptibility and geochemistry - a paper together with Sandra KAISER, Thomas BECKER and others colleagues is in preparation.

Research on the nature of the Hangenberg Event in sections in Poland has been continuing to accumulate large multidisciplinary datasets for key sections in different facies realms. Paper with Tatiana WORONCOWA-MARCINOWSKA, Katarzyna SOBIEN, Paweł BRANSKI, and Paweł FILIPIAK on uppermost Famennian conodonts and others fossil group, as well as on the nature of the Hangenberg Event in some Polish sections (Gorzysław 9 borehole section in the Pomeranian basin, Kowala quarry in the Holy Cross Mts and Dzikowiec in Sudety Mts), is in progress.

Publication

CORRADINI C., SPALETTA C., MOSSONI A., MATYJA H. & OVER J.D. (2016). Conodonts across the Devonian/Carboniferous boundary: a review and implication for the redefinition of the boundary and a proposal for an updated conodont zonation. Geological Magazine, **154** (4): 888-902, doi: 10.1017/S001675681600039X.

CM Atike NAZIK

(including data from the 2016 report that were unintentionally omitted from Newsletter 32)

In 2017, I continued research on Devonian Ostracods from NW Anatolia and the Taurides in Turkey. Several manuscripts are still in preparation with Turkish colleagues, the Senckenberg group, Helga GROOS-UFFENORDE (Göttingen University, Germany), and Ewa OLEMPSKA (Polish Academy of Sciences, Poland).

My student **Emine ŞEKER** is working on a Ph.D. Thesis on "Ostracod Analysis of the Devonian sequence from Eastern Taurides (Feke/Adana and Sarız/Kayseri): Biodiversity, Paleoecology, Paleogeography". The other student, **Recep ÖZKAN,** finished his Ph.D. on "Stratigraphic, micropaleontological (benthic foraminifera) and sedimentological characteristics of the Devonian sequence in Central and Eastern Taurus" in May 2018.

In 2016, I attended the International Geological Programme, Project 591 Closing Meeting "The Early to Middle Palaeozoic Revolution" on 6-9 July 2016 in Ghent, Belgium. I attended the SDS Business Meeting during this occassion. I also joined the Welsh Basin (UK) Field trip *"Revolutions that made the Palaeozoic World Revealed in the ancient strata of Wales"* on 10-15 July, 2016.

Publications

NAZIK, A., GROOS-UFFENORDE, H., OLEMPSKA, E., YALÇIN, M.N., WILDE, V., SCHINDLER, E., KÖNIGSHOF, P., ŞEKER, E. (2016). Contribution of the Silurian-Devonian Ostracods to the Palaeogeographical Assignment of the Western Pontides, Central and Eastern Taurides, Turkey. - International Geoscience Programme Project 591,Closing Meeting 'The Early to Mid Palaeozoic Revolution'5-10 July 2016, Ghent University, Belgium, Abstracts: 118-119.

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

ŞEKER E., NAZIK, A. (2016). Entomozoacean Ostracodes of NW Turkey (Şile -İstanbul). - Çukurova University Journal of the Faculty of Engineering and Architecture, **31** (2): 293-306.

NAZIK A., GROSS-UFFENORDE HELGA, ŞEKER ZOR, E. (2017). Ostracods near the Silurian/Devonian Boundary from the Central Taurides, Turkey. - 18th Paleontology-Stratigraphy Workshop with International Participation, Tekirdağ, Abstract book: 89-92.

SCHINDLER, E., FEIST, M**.,** NAZIK, A., WEHRMANN, A. & YALÇIN, M.N. (2018). First record of charophytes in the Devonian of Turkey (Central

Taurides). – 5th International Paleontological Congress, Paris, 9th-13th July 2018, Abstract Book: 809.

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TM D. Jeffrey OVER

Work continues on conodonts, magnetic susceptibility, and astrochronology of Middle and Upper Devonian strata, as well as the Devonian-Carboniferous boundary. Recent projects have investigated the Chattanooga Shale in the Illinois and Appalachian basins, the Three Lick Bed at the type locality in Kentucky, and the Dyer Formation in Colorado. Plans are to host the 2020 SDS meeting in Geneseo, New York which will include a pre-meeting field trip focusing on Upper Devonian clastic dominated strata and a post-meeting trip to visit carbonate and clastic dominated Lower and Middle Devonian locations. Please see announcement elsewhere in this newsletter.

CM Cameron PENN-CLARKE

I have a new paper in press that is set to appear in this September's issue of Journal of Sedimentary Research. As a note of interest, our research also made the cover of September's issue:

PENN-CLARKE, C.R., RUBIDGE, B.S. & JINNAH, Z.A. (2018). High-paleolatitude environmental change during the Early to Middle Devonian: Insights from Emsian–Eifelian (Lower–Middle Devonian) siliciclastic depositional systems of the Ceres Subgroup (Bokkeveld Group) of South Africa. - Journal of Sedimentary Research, **88** (9).

This paper is of importance in that not much is known about palaeoenvironmental and palaeoecological change at high polar latitudes during the Devonian period. This paper also gives insight into relative sea-level change in South Africa during this time period that also, is unknown.

I will be leaving my position as a post-doctoral researcher at Iziko Museums, Cape Town and the University of the Witwatersrand, Johannesburg. From 1 October, I will be embarking on a new career as a research scientist with the Council for Geoscience, Bellville, Western Cape. I will be continuing my research on the sedimentology and palaeontology of Devonian-aged successions of South Africa, as well remapping the Cape Fold Belt. This will generate lots of research on South African Devonian stratigraphy and (hopefully) geochronological and biostratigraphic constraints.

On 25 September (following South African Heritage Day celebrations) we will be hosting a public lecture on South Africa's first fossil hunters. Of interest is a press release on research of ours dealing with several cases of (possibly) the oldest known (~ 30 ka) evidence of fossil curation as well as early colonial (~1700-1900) interest in fossils. I can't say much for now about it, but all I can say is that Devonian trilobites and brachiopods are the stars of the show.

CM Eberhard SCHINDLER

The preparations concerning the move of the palaeontological/geological department at Senckenberg have started and slowed down other activities. Remaining research went on mainly related to the following activities:

In the aftermath of Turkish–German cooperation projects furthcer results were prepared for publication.

Work on the Eifel area continued together with American colleagues and a paper on a section in the Hillesheim Syncline was published (BROCKE et al. 2017).

Together with Czech colleagues, a paper comparing sections in the Moravian Karst with the Steinbruch Schmidt Section of the Kellerwald area (Rheinisches Schiefergebirge) has been published (WEINER et al. 2017).

In the aftermath of the publication of the German Stratigraphic Table 2016 (Stratigraphische Tabelle Deutschland 2016, STD), two papers have been published together with a bunch of German colleagues: Annotations to the Devonian part of the chart (SCHINDLER et al. 2018) and on the Devonian time scale (MENNING et al. 2018).

Connected to Senckenberg activities in the European Geopark Harz • Braunschweiger Land • Ostfalen, a talk on the type locality of the Kellwasser Horizons was given at a meeting in Schöningen and Helmstedt and a field guide for a meeting on geological and historical monuments held in Goslar was published (FRANZKE et al. 2017).

Publications

FRANZKE, H.-J., KNOLLE, F., RÖHLING, H.-G., SCHINDLER, E., TANNER, D.C., TEICKE, J., WELLMER, F.-W., WILDE, V. & ZELLMER, H. (2017). Die klassischen Quadratmeilen der Geologie. Exkursion II: Oberharz. – Schriftenreihe der Deutschen Gesellschaft für Geowissenschaften, **90**: 177-208, doi:10.1127/sdgg/90/2017/177

WEINER, T., KALVODA, J, KUMPAN, T., SCHINDLER, E. & ŠIMÍČEK, D. (2017). An Integrated Stratigraphy of the Frasnian-Famennian Boundary Interval (Late Devonian) in the Moravian Karst (Czech Republic) and Kellerwald (Germany). – Bulletin of Geosciences, **92** (2): 257-281, electronic supplementary appendix, doi: 10.3140/bull.geosci.1636.

BROCKE, R., BRETT, C.E., ELLWOOD, B.B., HARTKOPF-FRÖDER, C., RIEGEL, W., SCHINDLER, E. & TOMKIN, J.H. (2017). Comparative palynofacies, magnetic susceptibility and cyclicity of the Middle Devonian Müllertchen Section (Eifel area, Germany). – Palaeobiodiversity and Palaeoenvironments, **97** (3): 449-467, doi: 10.1007/s12549-017-0289-9.

SCHINDLER, E., BROCKE, R., BECKER, R.T., BUCHHOLZ, P., JANSEN, U., LUPPOLD, F.W., NESBOR, H.-D., SALAMON, M., WELLER, H. & WEYER, D. (2018). Das Devon in der Stratigraphischen Tabelle von Deutschland 2016. The Devonian in the Stratigraphic Table of Germany 2016. – Zeitschrift der Deutschen Gesellschaft für Geowissenschaften, **168** (4): 447-463, doi: 10.1127/zdgg/2017/0135.

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TM Ladislav SLAVÍK

From 2017 a new 3-year project "Přídolí Series in the Prague Synform - proposal for chronostratigraphic subdivision" has been started. It deals with the last series that remains not subdivided into the stages and also with the Silurian-Devonian boundary. L.S. acts as a team leader of the research team with members from the Institute of Geology of the Czech Academy of Sciences (P. ŠTORCH, A. HUŠKOVÁ) and the Czech Geological Survey (Š. Manda, Z. TASÁRYOVÁ, P. ČÁP).

In summer 2017 we enjoyed the wonderfully organized 4th International Conodont Symposium in Valencia and the connected fieldtrips. Accordingly, during the early half of 2017, the most important activities were concentrated on the preparation of the post-symposium field trip to the Silurian and Devonian localities of the Prague Synform, and production of the corresponding part of the ICOS Guidebook.

Aneta HUŠKOVÁ who accomplished the MSc study and started the Ph.D helped a lot with the Prague Synform fieldtrip organization. In her Ph.D., she is focused on the correlation of the Silurian-Devonian boundary based on conodont families Spathognathodontidae and Iriodontidae.

The special volume of Palaeobiodiversity and Palaeoenvironments "Climate Change and Biodiversity Patterns in the Mid-Palaeozoic" co-edited by B. MOTTEQUIN, L. SLAVÍK and P. KÖNIGSHOF was released. This volume represents proceedings of the IGCP596/SDS meeting in Brussels 2015.

At the end of the year, together with Jindra HLADIL and Aneta HUŠKOVÁ, we started a preparation of two Devonian papers on conodont stratigraphy and bioevents intended to the GEcKO Special Issue of Palaeogeography, Palaeoclimatology, Palaeoecology.

Publications

Editorial

MOTTEQUIN, B., SLAVÍK, L. & KÖNIGSHOF, P. (2017, Eds.). Climate change and biodiversity patterns in the mid-Palaeozoic. – Palaeobiodiversity and Palaeoenvironments, **97** (3): 367-686.

Journal papers

MOTTEQUIN, B., SLAVÍK, L. & KÖNIGSHOF, P. (2017). Increasing knowledge on biodiversity patterns and climate changes in Earth's history by international cooperation: introduction to the proceedings IGCP 596/SDS Meeting Brussels (2015). - In: MOTTEQUIN, B., SLAVÍK, L. & KÖNIGSHOF, P. (Eds.), Climate change and biodiversity patterns in the mid-Palaeozoic.

Palaeobiodiversity and Palaeoenvironments, **97** (3): 367-374.

SLAVÍK, L. & HLADIL, J. (2017). Geological overview of the Paleozoic of the Barrandian Unit. - In: SUTTNER, T.J., VALENZUELA-RÍOS, J.I., LIAO, J.-C., CORRADINI, C. & SLAVÍK, L. (Eds.): International Conodont Symposium 4: Progress on Conodont investigation, Field Guide Book, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **23**: 129-134.

SLAVÍK, L. (2017). Conodont studies in the Prague Synform - an overview. - In: SUTTNER, T.J., VALENZUELA-RÍOS, J.I., LIAO, J.-C., CORRADINI, C. & SLAVÍK, L. (Eds.), International Conodont Symposium 4: Progress on Conodont investigation, Field Guide Book, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **23**: 135-138.

SLAVÍK, L. (2017). Conodonts from the Silurian and Devonian of the Požáry Quarries. - In: SUTTNER, T.J., VALENZUELA-RÍOS, J.I., LIAO, J.-C., CORRADINI, C. & SLAVÍK, L. (Eds.), International Conodont Symposium 4: Progress on Conodont investigation, Field Guide Book, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **23**: 139-152.

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SLAVÍK, L. & HLADIL, J. (2017). Conodonts from the GSSP of the Pragian Stage at Velká Chuchle in the Prague Synform (Lower Devonian). - In: SUTTNER, T.J., VALENZUELA-RÍOS, J.I., LIAO, J.-C., CORRADINI, C. & SLAVÍK, L. (Eds.), International Conodont Symposium 4: Progress on Conodont investigation, Field Guide Book, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **23**: 165-170.

SLAVÍK, L. & VALENZUELA-RÍOS, J.I. (2017). Early Devonian conodonts from the Černá rokle near Kosoř. - In: SUTTNER, T.J., VALENZUELA-RÍOS, J.I., LIAO, J.-C., CORRADINI, C. & SLAVÍK, L. (Eds.), International Conodont Symposium 4: Progress on Conodont investigation, Field Guide Book, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **23**: 171-176.

ŠTORCH, P., MANDA, Š. & SLAVÍK, L. (2017). Silurian succession of the Kosov quarry near Beroun. - In: SUTTNER, T.J., VALENZUELA-RÍOS, J.I., LIAO, J.-C., CORRADINI, C. & SLAVÍK, L. (Eds.), International Conodont Symposium 4: Progress on Conodont investigation, Field Guide Book, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **23**: 177-183.

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Abstracts

SLAVÍK, L. (2017). Introduction to ICOS 4 field trip in the Prague Synform. - In: SUTTNER, T.J., VALENZUELA-RÍOS, J.I., LIAO, J.-C., CORRADINI, C. & SLAVÍK, L. (Eds.), International Conodont Symposium 4: Progress on Conodont investigation, Field Guide Book, Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **23**: 127.

HUŠKOVÁ, A. & SLAVÍK, L. (2017). Konodonti čeledi Spathognathodontidae z intervalu hranice Silur/Devon z pražské synformy. - In: WEINEROVÁ, H., WEINER, T. & KUMPAN, T. (Eds.), Paleozoikum 2017, Sborník abstraktů, MU Brno: 7.

SLAVÍK, L. (2017). Late Silurian and Early Devonian bioevents and conodont biostratigraphy in the Prague Synform. - In: LIAO, J.C & VALENZUELA-RÍOS, J.I. (Eds.), Fourth International Conodont Symposium. ICOS IV. "Progress on Conodont Investigation", Cuadernos del Museo Geominero, **22**: 109-112.

HUŠKOVÁ, A. & SLAVÍK, L. (2017). Conodonts of the family Spathognathodontidae from the Silurian/Devonian boundary, Prague Synform. - In: LIAO, J.C & VALENZUELA-RÍOS, J.I. (Eds.), Fourth International Conodont Symposium. ICOS IV. "Progress on Conodont Investigation", Cuadernos del Museo Geominero, **22**: 115-118.

TM Claudia SPALLETTA

I am continuing research on Devonian conodont biostratigraphy and lithostratigraphy of the Carnic Alps. My research is still focused mainly on the Frasnian/Famennian and Devonian/Carboniferous boundaries. A new section across the DCB is under study with the collaboration of Carlo CORRADINI (Cagliari), Monica PONDRELLI (Pescara) and M. Cristina PERRI (Bologna). Cristina is now retired, but still active in conodont research. Part of the achieved result will be included in the paper for the special volume on the DCB planned by Markus ARETZ and Carlo Corradini. The manuscript on the Frasnian/Famennian Boundary in the Carnic Alps is completed, but it seems to require some finishing touch, I hope in the end it will be submitted and published.

Publications

SPALLETTA, C. & CORRADINI, C. (2017). The history of conodont research in the Italian Carnic Alps. - Berichte des Institutes für Erdwissenschaften, Karl-Franzenz-Universität Graz, **23**: 220-227.

CORRADINI, C., PONDRELLI, M., SIMONETTO, L., CORRIGA, M.G., SPALLETTA, C., SUTTNER, T.J., KIDO, E., MOSSONI, A. & SERVENTI, P. (2017). Stratigraphy of the La Valute area (Mt. Zermula massif, Carnic Alps, Italy). - Bollettino della Società Paleontologica Italiana, **55** (1): 55-78, DOI: 10.4435/BSPI.2016.06 WOS:000379203400006.

CORRADINI, C., MOSSONI, A., PONDRELLI, M., SIMONETTO, L., SPALLETTA, C. & ZUCCHINI, R. (2017). Sub-aerial exposures in the Tournaisian (lower Carboniferous) of the central Carnic Alps. - Stratigraphy, **14**: 87–96, DOI: 10.29041/strat.14.1-4.87-96

CM Thomas J. SUTTNER

In 2016, IGCP 596 (OET) was concluded during a final meeting in Udine (Italy). The Abstract book is available for free download at: http://iewarchiv.uni-graz.at/berichte/band22/

Additionally, the book *Planet Earth – In Deep Time, Palaeozoic Series: Devonian & Carboniferous* was published finally (website: https://www.schweizerbart.de/publications/detail/isbn/9783510653355). However, still many IGCP related manuscripts especially regarding Devonian outcrops in northern China, western Mongolia and the Carnic Alps are in preparation.

The IGCP 596 subproject on *Mid-Paleozoic corals in Mongolia and Europe* (granted by the Austrian National Committee and coordinated by Erika Kido) was quite successful in 2016. Apart from progress in Devonian conodont studies, we achieved to publish a short report on the conodont workshop held for our Mongolian friends in Graz in 2015 in the *Episodes*.

Another successor project proposal for the Austrian Science Fund on Devonian rugose coral biodiversity informatics linked with oxygen isotope data from conodont apatite was declined for the second time, wherefore we decided not to resubmit it again.

In 2017, we have worked out a new proposal on icriodontid conodont palaeobiology, which too was declined after a six months lasting review process and decision finding by the Austrian National Science Fund in May 2018. A manuscript on conodont stratigraphy of late Devonian deposits from western Mongolia has been submitted to "Palaeo3" for the GECkO special Issue.

Publications

Journal papers

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SUTTNER, T.J., KIDO, E., CORRADINI, C., CORRIGA, M.G., PONDRELLI, M. & SIMONETTO, L. (2017). Late Eifelian to early Givetian conodonts of the Zuc di Malaseit Basso (ZMB) section. - In: SUTTNER, T.J., VALENZUELA-RÍOS, J.I., LIAO, J.-C., CORRADINI, C. & SLAVÍK, L. (Eds.), International Conodont Symposium 4, Progress on Conodont investigation, Field Guide Book, Valencia, 25-30 June 2017, Berichte des

Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **23**: 242–245.

SUTTNER, T. J., KIDO, E., CORRADINI, C., VODRÁŽKOVÁ, S., PONDRELLI, M. & SIMONETTO, L. (2017). Conodont diversity across the Late Eifelian Kačák Episode of the southern Alpine realm (central Carnic Alps, Austria/Italy). - Palaeogeography, Palaeoclimatology, Palaeoecology, **479**: 34-47, http://dx.doi.org/ 10.1016/j.palaeo.2017.04.015

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CARMICHAEL, S.K., WANG, Z.-H., WATERS, J.A., BATCHELOR, C.J., COLEMAN, D.S., SUTTNER, T. & KIDO E. (2017). Looking for the Kellwasser anoxia event in all the wrong places: the role of submarine groundwater flow (Junggar Basin, NW China). - Goldschmidt Conference, August 2017, Paris: 13-18.

MANCHUK, N., ENKH-AMGALAN, B., SUTTNER, T.J., KIDO, E. WATERS, J.A. & CARMICAHEL S.K. (2017). Late Devonian radiolarians from the Hebukehe Formation, Northwestern Xinjiang, China. – InterRad 07: 22-02.

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Editorials

SUTTNER, T.J., VALENZUELA-RÍOS, J.I., LIAO, J.-C., CORRADINI, C. & SLAVÍK, L. (Eds., 2017). International Conodont Symposium 4, Progress on Conodont investigation, Field Guide Book, Valencia, 25-30 June 2017 – Berichte des Institutes für Erdwissenschaften, Karl-Franzens-Universität Graz, **23**: 1–286.

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SIMONETTO, L., SUTTNER, T., KIDO, E., CORRADINI, C., KÖNIGSHOF, P. WATERS, J. and CARMICHAEL, S. (2016). IGCP 596 Closing Meeting, Udine, 10-12th October 2016.

CM Susan TURNER

I am still working on mid-Palaeozoic vertebrates and their biostratigraphy, concentrating on thelodonts, gracanths and 'sharks'. Various projects continue on the ORS fishes of Britain (Welsh Borders, S Wales and Ireland), and across Gondwana (Australia, Turkey, Pakistan). Sue is co-author on publications about thelodonts (with Michal GINTER) and other stem chondrichthyans (with Carole BURROW) for the AGP volume based on presentations at the Early Vertebrates/Lower Vertebrates conference in Poland in 2017, a symposium that was held in honour of Sue's 50 years of work. Several papers recently published (TURNER & BURROW 2018) and in progress deal with correlating Australian and other vertebrate microremain occurrences from assemblages previously unstudied or only superficially studied, with better known sequences in other regions.

Publications

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BURROW, C.J. & TURNER, S. (2018). Stem chondrichthyan microfossils from the Lower Old RedS andstone of the Welsh Borderland. - Acta Geologica Polonica, **68** (3).

TURNER, S. & GINTER, M. (2018). Middle Devonian thelodont *Australolepis* sp. from the Skaly Formation, Holy Cross Mts, Poland. - In: 14th E/LVS volume, Acta Geologica Polonica, **68** (3).

CM Charles VER STRAETEN

My ongoing larger focus on Devonian terrestrial strata continues, along with other work.

For the March 2018 meeting of the Northeastern Section of the Geological Society of America I, along with Devonian paleobotanist Bill STEIN and Pennsylvania Geological Survey geologist Rose-Anna BEHR organized a session on *The Devonian Terrestrial Realm: Current Perspectives and New Research*. Fifteen talks and two posters ranged broadly across geological and paleobiological topics from evolving fluvial landscapes to forests of tree-

size root trace fossils, freshwater bivalve habitats to dating detrital micas to constrain ages of fish-tetrapod assemblages, and insights into the identification and interpretation of Devonian paleosols. The session ran most of a day, followed by 3 hours of group discussions. Hallway discussions continued the next morning for a couple hours.

For several years, the New York Devonian group has been working at revising the 1975 Devonian stratigraphic chart (by L.V. RICKARD). Unlike RICKARD'S 1964 and 1975 charts, this version will be accompanied by a text volume on the stratigraphy, with additional information on their geology and paleontology of the strata. Co-editors Jeff OVER and I have set a deadline of early Fall for submissions. The Paleontological Research Institution will publish the volume and charts (digital format, with printing available). We plan to have the volume available prior to the SDS Meeting in New York in summer 2020. We also hope to digitally republish the guidebooks from the 1981 and 1997 New York SDS meetings.

For the volume I've prepared papers on the New York Pragian-Emsian, the Eifelian-lower Givetian (with Carl BRETT, Gordon BAIRD, Alex BARTHOLOMEW and Jeff OVER) and a broad overview of New York's Devonian terrestrial succession (lower Givetian-Famennian, with Frank FLETCHER).

Fieldwork in 2017 continued in the terrestrial strata of the Catskill Mountains, eastern New York. The object of the study is to, for the first time, systematically sample the apparent ca. 2.8 km-thick terrestrial succession. Samples are for petrography, XRF geochemistry, palynology (with John MARSHALL), and detrital zircon dating. Sample size is large enough for extra material, for additional analyses by other researchers now and in the future.

Fieldwork in the thick terrestrial facies the last years indicate some problems, such as the inability to correlate any time-significant layers mountain to mountain along the long-distance of the Catskills transect. In addition, in many areas, soil and dense forest cover the bedrock. One-to two-meter resolution LiDAR imagery, however, clearly indicates areas of more extensive rock exposure going up mountain slopes. Following these areas will help with better sampling through the Devonian terrestrial succession.

Publications

Ver Straeten, C.A. (2018). Sedimentary Iron Ores of New York: An Overview. - In: PICKANDS, M. (Ed.), The New York State Museum Record, **8**: 59-78.

DANIELSEN, E., OVER, D.J., BAIRD, G. & VER STRAETEN, C. (2017). The Marcellus subgroup composite type section, in the type area, central New York State. - Stratigraphy, **13** (3): 155-162.

VER STRAETEN, C.A., OVER, D.J. & BAIRD, G.C. (2018 in press). Arc-to-Craton: Devonian Airfall Tephras in the Eastern United States. – In: AVARY, K.L., DIECCHIO, R. & HASSON, K (Eds.), Volume dedicated to John DENNISON, a leading 20th Century Appalachian Basin Devonian researcher, Geological Society of America Special Paper.

Abstracts

DA SILVA, A.C., BARTHOLOMEW, A., BRETT, C., HILGEN, F.J., VER STRAETEN, C. & DEKKERS, M.J. (2018). Exceptional Lower Devonian Milankovitch cycles recording from the Hudson Valley and corresponding magnetic susceptibility record, New York State (USA). – In: Fifth International Palaeontological Congress, Paris, France, Abstracts, 1 p.

DA SILVA, A.C., BARTHOLOMEW, A., BRETT, C., CORREIA, E., GABELER, G., HILGEN, F.J., JUAREZ, C.S., MARACEK, C., VER STRAETEN, C. & DEKKERS, M.J. (2018). Lower Devonian Milankovitch cycles from the Hudson Valley and corresponding magnetic susceptibility record, New York State (USA). – In: European Geosciences Union General Assembly 2018, Abstracts.

VER STRAETEN, C.A. (2018). Traversing the Catskills succession, bottom to top: Approaches and challenges. - Geological Society of America, Abstracts with Programs, **50** (2), doi: 10.1130/abs/2018NE-309922.

VER STRAETEN, C.A., STEIN, W.E. & BEHR, R.-A. (2018). Devonian terrestrial systems, eastern North America: Where we're at; what is next? - Geological Society of America, Abstracts with Programs, **50** (2), doi: 10.1130/abs/2018NE-309924.

VOLLMER, F.W., LUBICICH, E.J., CRADDOCK, T. & VER STRAETEN, C. (2018). Structures along the eastern margin of the Catskill Mountains and their relationships to the Hudson Valley Fold Thrust Belt, eastern New York. - Geological Society of

America, Abstracts with Programs, **50** (2), doi: 10.1130/abs/2018NE-311136.

CORREIA, E., BARTHOLOMEW, A.J., DA SILVA, A.-C., BRETT, C.E. & VER STRAETEN, C. (2017). Outstanding Lower Devonian Milankovitch cyclicities exposed in the Hudson Valley, New York State. – Geological Society of America, Abstracts with Programs, **49** (6), doi: 10.1130/abs/2017AM-308178.

CM Stanislava VODRÁŽKOVÁ (SV) & Jiří FRÝDA (JF)

In 2017 we finished a study focusing on the Zlíchovian/ Dalejan boundary interval (TONAROVÁ *et al*. 2017). The results of the study confirmed the importance of the base of *N. elegans* Zone, which was therefore suggested as a suitable candidate for the definition of the Emsian substage boundary.

SUTTNER *et al.* (2017) published a study on the Kačák Episode (Middle Devonian, Eifelian-Givetian) and its effect on the conodont diversity and species distribution of the southern Alpine realm.

After SV´s return from parental leave in May 2017, she focused on finishing the study on microbially induced sedimentary structures from Middle Devonian (Givetian) deep-water turbidites from the Prague Basin (VODRÁŽKOVÁ et al. *in press*). Currently, after longer break (2014-2017), SV is finishing together with Tom SUTTNER (Naturhistorisches Museum Wien) a manuscript on the Middle Devonian (Eifelian) conodonts from Jirásek quarry in the Prague Basin, which represents the only equivalent of the Kačák Shale in carbonate development in the Prague Basin. The study focuses on ontogenetic and intraspecific variability in *Polygnathus pseudofoliatus* group, which turned out to be truly remarkable.

JF is together with Pavel LUKEŠ and Lenka FERROVÁ finishing a study on dacryoconarid tentaculites taxonomy and biostratigraphy of the Pragian Stage boundary intervals.

Publications

LUKEŠ, P., FERROVÁ, L. & FRÝDA, J. (2018 in prep). Dacryoconarid tentaculites of the Pragian Stage boundary intervals from the Barrandian (Lower Devonian, Czech Republic). - Bulletin of Geosciences.

TONAROVÁ, P., VODRÁŽKOVÁ, S., FERROVÁ, L., DE LA PUENTE, G., HINTS, O., FRÝDA, J. & KUBAJKO, M. (2017). Palynology, microfacies and biostratigraphy across the Daleje Event (Lower Devonian, lower to upper Emsian): new insights from the offshore facies of the Prague Basin, Czech Republic. – Palaeobiodiversity and Palaeoenvironments, **97** (3): 419-438, DOI 10.1007/s12549-017-0274-3.

SUTTNER, T.J., KIDO, E., CORRADINI, C., VODRÁŽKOVÁ, S., PONDRELLI, M. & SIMONETTO, L. (2017). Conodont diversity across the late Eifelian Kačák Episode of the southern Alpine realm (central Carnic Alps, Austria/Italy). – Palaeogeography, Palaeoclimatology, Palaeoecology, **479** (1): 34-47, DOI 10.1016/j.palaeo.2017.04.015.

VODRÁŽKOVÁ, S., VODRÁŽKA, R., FRANCŮ, J., AL-BASSAM, K., HALODOVÁ, P. &TONAROVÁ, P. (2018 online). Microbially-induced wrinkle structures in Middle Devonian siliciclastics from the Prague Basin, Czech Republic. – Lethaia, https://doi.org/10.1111/let.12280.

Michael T. WHALEN

Our research on Devonian rocks continues despite little funding. We are still mining the dense magnetic susceptibility (MS) data set generated from western Canada and published one paper dealing with the timing of the F-F events there (WHALEN et al. 2016). We have also incorporated that MS data with other proxy data from around the world to develop a global chronology for the F-F events. DE VLEESCHOUWER et al. (2017) demonstrated that 600 ka separate the Upper and Lower Kellwasser events and that the upper is paced by obliquity and coincides with a minima in the 2.4 ma eccentricity cycle. One of my graduate students is continuing work on the *punctata* zone event in western Canada and presented a poster at the Geological Society of America annual meeting (LABOUNTY & WHALEN, 2017). Another paper on which I was a co-author, while not specifically dealing with the Devonian, has relevance to Palaeozoic palaeoceanography by exploring the development of a well oxygenated upper ocean (LU et al. 2018).

Publications

DE VLEESCHOUWER, D., DA SILVA, A.C., SINNESAEL, M., CHEN, D., DAY, J.E., WHALEN, M.T., GUO, Z. & CLAEYS, P. (2017 online). Timing and pacing of the Late Devonian mass extinction event regulated by eccentricity and obliquity, - Nature Communications, **2018** (8): 2268, DOI: 10.1038/s41467-017-02407-1.

LU, W. et al. (including WHALEN, M.T.; 2018). Late inception of a resiliently oxygenated upper ocean. - Science, 10.1126/science.aar5372.

WHALEN, M.T., DE VLEESCHOUWER, D., PAYNE, J., DAY, J.E., OVER, D.J. & CLAEYS, P. (2016). Pattern and timing of the Late Devonian biotic crisis in western Canada: Insights from carbon isotopes and astronomical calibration of magnetic susceptibility data. - In: New Advances in Devonian Carbonates: Outcrop Analogs, Reservoirs, and Chronostratigraphy, SEPM Special Publication, **107**, doi.org/ 10.2110/sepmsp.107.02.

LABOUNTY, D. & WHALEN, M.T. (2016). Microfacies and trace element variation across the Frasnian *punctata* event within the Bear Biltmore drill core (Alberta, Canada). - Geological Society of America Abstracts with Programs, **49**.

CM James J. ZAMBITO

In August 2018 I left the Wisconsin Geological Survey and began a position as Associate Professor in the Department of Geology at Beloit College, a small liberal arts school near the Wisconsin-Illinois state border. I am excited about this move, and anticipate that it will provide me more opportunities to work on Devonian strata than I had in my previous position. My Devonian activities in late 2017 to mid-2018 continue to be focused on projects in the Michigan Basin (U.S.A.) with TM J. DAY. In addition, work with TM C. BRETT and others on the Middle Devonian succession in the southern Appalachian Basin (Kentucky, U.S.A.) and on global Devonian volatility has reached the point of publication (see below).

Publications

BRETT, C., ZAMBITO, J., MCLAUGHLIN, P.I. & EMSBO, P. (2018 online). Revised biozonation and environmental volatility in the wake of recent time-scale revisions. - Palaeogeography, Palaeoclimatology, Palaeoecology, doi.org/10.1016/j.palaeo.2018.06.037.

BRETT, C., ZAMBITO, J., BAIRD, G., ABOUSSALAM, Z.S., BECKER, R.T. & BARTHOLOMEW, A. (2018). Litho-, Bio-, and Sequence Stratigraphy of the Boyle-Portwood Succession (Middle Devonian, Central Kentucky, U.S.A. - Palaeobiodiversity and Palaeoenvironments, **98** (2): 331-368, doi.org/10.1007/s12549-018-0323-6.