INTERNATIONAL UNION OF
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COMMISSION ON STRATIGRAPHY

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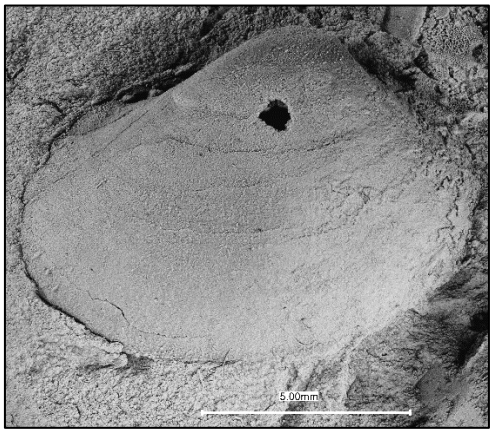
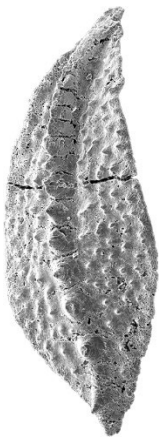
SUBCOMMISSION ON DEVONIAN STRATIGRAPHY

NEWSLETTER No. 40

R.T. Becker, Editor
Münster University,
Germany





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SDS NEWSLETTER 40

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, obituaries of Devonian researchers, original science contributions (SDS Documents), scientific reviews, Minutes of SDS Meetings, SDS reports to ICS, general IUGS information, information on past and future Devonian meetings and research projects, and summaries of new Devonian publications.

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end of August 2026.

Please ease the editing by strictly keeping the uniform style of references !

The Newsletter contributions should be quoted as: "SDS Newsletter, **40**: x-y."

Content:

Devonian Meetings

Devonian Publications

Membership News

CHAIRMAN´s Address

Dear SDS Members,

This year was the first year with the new ICS executive and renewed terms for all subcommission officers and voting memberships. The new executive team has started its work very actively and has set several initial goals and priority areas for the short and long term, including:

1. Establishing guidelines for the preparation of GSSP proposals (for internal use within working groups, subcommissions, and voting members of the ICS), 2. Considering the role of subcommissions and especially of the Timescale Calibration Subcommission on updating numerical ages, including compliance to GTS 2020, 3. Standardizing the web pages across the subcommissions, 4. Revising forms for the annual reports and initiating new ICS activities, such as workshops, summer schools, and distinguished lectures.

The ICS executive and subcommission chairs held two ICS ZOOM working meetings in autumn 2024 and in the spring of this year. Some of the objectives have already been achieved: Immediately after the autumn ICS ZOOM meeting, there was a discussion about numerical ages and problematic issues related to the update of the International Chronostratigraphic Chart (ICC), which led to the production of a new edition of the ICC in December 2024. As you can see, there are two significant age modifications in the Devonian timescale: for the base of the Pragian Stage and for the base of the Emsian Stage.

In November 2024, the Global boundary Stratotype Section and Point (GSSP) for the base of the Valanginian Stage (Lower Cretaceous) was approved by the ICS, and, after a discussion in spring, the ICS working group produced a new GSSP template that should serve as a unified model for further proposals for new GSSPs. It will appear soon on the ICS web page.

In June 2025, our Devonian community gathered in Toulouse (Geotolosa – News from the Palaeozoic Worlds, 20th ICCP Congress on Carboniferous and Permian, Variscan meeting 2025). The event was an amazing and lively gathering of many participants, perfectly organized by Markus ARETZ and his team. We had a rich Devonian session with 24 exciting talks and several posters. The session was followed by the annual SDS business meeting.

Besides several points of the agenda we discussed, the pending issues that have to be resolved by the SDS, especially the redefinition of the basal Emsian GSSP. We agreed that several specialists would meet via ZOOM meeting in spring 2026 to discuss the proposal from the Prague Synform and try to find the correlation markers/equivalents for the proposed *gracillis* boundary. During the SDS meeting, four early carrier Devonian workers were awarded by the SDS travel grants. For more details and the complete meeting agenda, see the Minutes of the SDS meeting in Toulouse in this Newsletter.

In recent years, many Devonian workers had been accepted as new CMs. At present, the SDS has 150 members (18 TMs, 129 CMs, 3 HMs). I would like to remind that every member should correspond to the Devonian community and report on all Devonian-related activities. Our Devonian Subcommission also encourages everyone actively working in the Devonian to join our Devonian family.

I wish you all enjoyable reading of the jubilee 40th issue of our SDS newsletter!

The plan for the next SDS meeting is STRATI (5th International Congress on Stratigraphy in Suzhou, June-July 2026). We hope to see many of you there or at IPC7 in Cape Town!

I wish you all the best and many exciting Devonian discoveries!

Ladislav SLAVÍK
(SDS CHAIRMAN, Prague, August 2025)

OBITUARIES

Frank LANGENSTRASSEN

(17.09.1937 – 26.05.2025)

by

Eberhard SCHINDLER, Ulrich JANSEN & Hans JAHNKE

Fig. 1. Frank (Frankie) LANGENSTRASSEN on a fieldtrip by the Göttingen 'GeoClub' to the Samland area (East Prussia – today Russia) in 2000 (photograph by H.J.).

Frank (Frankie) LANGENSTRASSEN passed away aged 87 in May 2025. Although he was not a member of the international SDS, he was, of course, for many years a member of the German SDS, and we think of him as a well-known researcher on Devonian matters. Frank was born in East Prussia (Ostpreußen), but – as with many others – had to leave his home due to the chaos of the Second World War. Together with his three sisters, he grew up in Sarstedt (Lower Saxony). There, Frank went to primary school; from 1951 until 1958/59 to high school in Hildesheim.

Due to his passion for rocks – and especially fossils – he started to study geology/palaeontology in Tübingen and soon changed to Göttingen University. Here, at the 'Institute for Geology and Palaeontology', he stayed for the entire rest of his career. Frank finished his diploma thesis in 1964 on Middle Devonian to lower Carboniferous beds in the Sauerland area (unpublished – for citation see publication list for the full title). In 1972, his doctoral thesis from 1969 was published in the '*Göttinger Arbeiten zur Geologie und Paläontologie*' series, entitled 'Zur Fazies und Stratigraphie der Eifel-Stufe im östlichen Sauerland (Blatt Schmallenberg)'. The Sauerland area became Frank's 'home', and one can certainly say that he was one of the best connoisseurs of the Sauerland geology. The 'extract' of his vast knowledge of the area resulted in the summary published in 2008 (Sauerland chapter of the volume on the Devonian of Germany by the German SDS). When Frank became a member of the Devonian Working group of Otto H. WALLISER, he worked in the frame of the 'Sonderforschungsbereich 48' "Entwicklung, Bestand und Eigenschaften der Erdkruste, insbesondere der Geosynklinalräume" installed during the 1970ies at Göttingen University. During this time – and especially in the thick proceedings volume entitled 'Intracontinental Fold belts' (edited by H. MARTIN & F. W. EDER) – Frank produced some remarkable papers on the Rheinisches Schiefergebirge. However, he partly also left 'his' area. For example, he took part in Hans Peter SCHULTZE's expedition to the famous fish localities of the Canadian Arctic, resulting in a joint paper to which Frank contributed by studying the sedimentology, facies, and palaeobiogeography. Other trips are documented in the respective figures of this obituary.

Publications were, however, not his main thing and he produced only a limited number of papers. But Frank was a gifted teacher; he supervised a bunch of students (including one of us – E.S.) during their diploma theses (which were officially supervised by Otto WALLISER), in their fieldwork, and for the presentation of results. Although his preferred group of fossils were the brachiopods, he knew other biota very well – and he had an eye for tiny, often overlooked (but spectacular and often rare) specimens (see, for example, the papers with his colleague Reimund HAUDE). He was also very skilled in terms of sedimentology and facies interpretation, including a distinct knowledge on trace fossils (both burrows and traces).

Fig. 2. Frankie LANGENSTRASSEN (second right) together with a bunch of Devonian workers at the famous monument for the first GSSP (Silurian/Devonian boundary) at Klonk, Prague Basin in 2000 – guided by Ivo CHLUPÁČ just right of the monument (photograph by E.S.).

Frankie was also a wonderful colleague and friend – and he was a character. There could be dozens of anecdotes to be told from field trips and from the 'institute life'. Just one example (from E.S.): Frankie was a great friend of well-formatted fossils to fit into collection boxes (whereby the boxes did not need to be super-professional ones – often boxes for soap, matches, pralines, and hundreds of other things would do). So, he often helped the students formatting the specimens, which could (and often did) result in the following soliloquy: "The piece can be made somewhat smaller, let me give it a smash – well another knock might be good – and another small one – and a last one, but I must be careful now --- oh, no problem, we can glue it!"

As we already mentioned, Frank was aware of a lot of things, not only in a limited sector. He knew much about many geological/palaeontological topics. As a consequence, after retirement he was predestined to become a very active member of the so-called 'GeoClub', i.e., the 'Freunde der Geowissenschaften der Universität Göttingen', an association of professionals and amateurs. He patiently looked at the specimens that the members (or their friends) brought home from hikes in the forests or from holiday trips – no matter if they were geological samples or fossil

remains, and mostly he could help to tell what was found.

We have lost an extremely friendly, unassuming and unselfish scientist and colleague – who became a friend to most of his contemporaries. His legacy shows this too: during his lifetime he created a foundation with the aim to support certain geological/palaeontological, ecological and biological organisations. The Devonian community has lost a man with great knowledge, who took all too much of this knowledge with him.

Taxa erected by Frank LANGENSTRASSEN

Family
Rotasacciidae HAUDE & LANGENSTRASSEN, 1976

Genera
Anguloserra HAUDE & LANGENSTRASSEN, 1976
Rotasaccus HAUDE & LANGENSTRASSEN, 1976
Tuberella VOGEL, XU & LANGENSTRASSEN, 1989

Species
Boucotia incognita LANGENSTRASSEN, 1972
Areostrophia ? *defracta* LANGENSTRASSEN, 1972
Anguloserra thomasi HAUDE & LANGENSTRASSEN, 1976
Rotasaccus dentifer HAUDE & LANGENSTRASSEN, 1976
Dalejina ? *minor* VOGEL, XU & LANGENSTRASSEN, 1989
Plectodonta (*Plectodonta*) *orientalis* VOGEL, XU & LANGENSTRASSEN, 1989
Nabarredia intermedia VOGEL, XU & LANGENSTRASSEN, 1989
Holynetes abnormis VOGEL, XU & LANGENSTRASSEN, 1989
Tuberella tangxiangensis VOGEL, XU & LANGENSTRASSEN, 1989
Septatrypa minor VOGEL, XU & LANGENSTRASSEn, 1989
Echinocoelia similior VOGEL, XU & LANGENSTRASSEN, 1989
Reticulariopsis luofuensis VOGEL, XU & LANGENSTRASSEN, 1989
Lanicella walliseri LANGENSTRASSEN, 1993

Taxa named in honour of Frank LANGENSTRASSEN

Frankiella RACHEBOEUF, 1983
Verneuilia langenstrasseni BLODGETT & JOHNSON, 1994 [excluded from *Verneuilia* today]
Rhenosquama franki HAUDE, 2004

Fig. 3. Frankie (in the middle, turning left) amidst colleagues during a cooperation fieldtrip to the Polish Holy Cross Mountains in 1991 (photograph by E.S.).

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Fig. 4. Frankie LANGENSTRASSEN about 2016/2017 in the GZG University of Göttingen

Richard H. LINDEMANN

(12.09.1950 – 05.08.2025)

by

Charles A. VER STRAETEN & Eberhard SCHINDLER

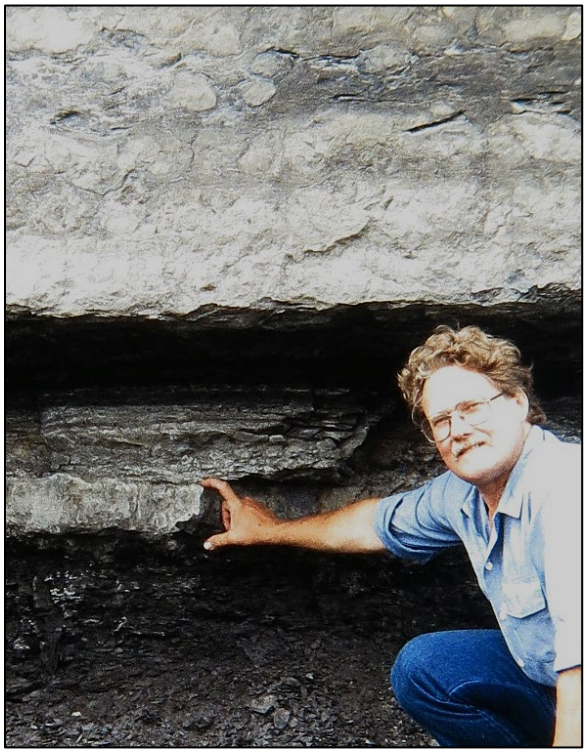

Fig. 1. Dick LINDEMANN at his beloved section at Cherry Valley, New York.

Dr. Richard (Dick) LINDEMANN, an important Devonian geologist and paleontologist, professor, and friend to many of us in the Devonian of New York community and broader communities, passed away suddenly in early August. Dick's career was as a professor at Skidmore College, Saratoga Springs, New York (1976 to 2016). His research focuses were largely on various aspects of the lower Middle Devonian Onondaga Limestone and lower Marcellus shales; and on Lochkovian through Frasnian dacryoconarids (this was his major group), homoctenids, and tentaculitids, which he was a world expert on.

Raised in western New York State, he collaborated with many from the New York Devonian community over the decades, from the long-gone Bill OLIVER and Ellis YOCHELSON to current researchers. He also reviewed and edited numerous papers for the New York Devonian community over the decades, including a number of chapters in the three-volume set, *Devonian of New York*.

It was always a treat to spend time around Dick, at meetings, in the field, and in other settings. He was always sensible and deep, knowledgeable and thoughtful, upbeat, and a great humorist. He liked to describe himself as a "simple country paleontologist". One of his peers wrote recently he was "a master storyteller with a zany sense of humor". His sometimes "zany-ness" led some of his friend to similar modes – well read in the "zany" fairy tale rewrite below.

Although an expert in tentaculitoids, Dick was a lone fighter in this field in North America. A label on the door of his office read "Center for North American dacryoconarid research". And his humor appeared when he said: "If I want to hold a dacryoconarid meeting/gathering, I pour myself a glass of wine."

Dick LINDEMANN received his B.Sc. in geology in 1972 at the State University of New York at Oneonta (where SDS member Jim EBERT taught until recently retiring). His M.Sc. (1974) and Ph.D. (1980) degrees were from Rensselaer Polytechnic Institute, in Troy, New York (see references below).

Quotes from his geo-paleo peers, including SDS members, include:

- "..a person of full of good humor and enthusiasm. Always uplifting."
- "I'll never forget the joint trips with Dick… and the benefit I had from his enormous knowledge of dacs…"
- "…such a big loss that this very kind peer and friend has left forever."
- Oh man, this is sad to hear! Dick was always a smiling face to find on an outcrop. One funny

story he told me was that he was a member of the International Ruben Sandwich Rating Society and that he always ordered one if they were on the menu when he was travelling.

- "He told me, and I quote to the best of my recollection, "When you have one fossil, you have one species. When you have two fossils, you have two species. When you have ten thousand fossils, you have one species!" That struck me a quintessential LINDEMANN."

Fig. 2. Younger folks (!) – again at Cherry Valley: Dick, Chuck VER STRAETEN, and Chuck's future wife Nancy ENGEL.

Another anecdote from one of us (Eberhard SCHINDLER) especially shows Dick's generosity: When during a research stay with Chuck Ver STRAETEN, I had the great pleasure to be hosted by Dick and his wife Eileen in their home. He showed me the small New York State Museum park with the famous Cambrian stromatolites, in the vicinity of Saratoga Springs. Back at home, he also showed me a few of them sitting on his garden wall. I admired them very much and said that they are indeed objects to be looked at by many people. A few weeks after my return to Germany, two big crates arrived with two beautiful stromatolites (each measuring at least 1 m) which Dick wished to be shown at the Senckenberg Museum. When I asked him what we owed him for the costs of the shipping, he insisted that they were a gift! So, they are still in the Senckenberg collections and have been shown in a number of exhibits.

Dick LINDEMANn's dacryoconarid-tentaculitid-homoctenid collections, along with large unprocessed samples, classic books and old publications, and his field and lab notebooks are being turned over to Jeff OVER, who is now also working on these taxa.

The zany text below dedicated to Dick LINDEMANN, by Chuck VER STRAETEN many years ago, is to be read in the rhythm of the nursery rhyme *Hickory Dickory Dock*.

****

The Dickery Dacryo Doc,
Tentacs around the clock,
At a million and one,
His head was quite spun,
The Dickery Dacryo Doc.

****

The Dickery Dacryo Doc,
Poking carefully through the rock,
When he'd processed a ton,
Of some species, none,
The Dickery Dacryo Doc.

****

The Dickery Dacryo Doc,
All his belongings in hock,
He'd bet all, but one,
On finding *N. elegan* (*s*),
The Dickery Dacryo Doc.

****

Although Dick was not the man to produce vast amounts of papers, he'll be remembered deeply as a wonderful colleague, teacher, and – not at least – friend. Generations of students will have good memories of a gifted and inspiring teacher who always had an ear for them. – Dick – we'll miss you!

Fig. 3. Dick and Eberhard SCHINDLER in northern Virginia, proximal to the Emsian-Eifelian boundary (ca. 2007).

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(out of many, many more over 40+ years; later ones first):

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Taxa erected by Dick LINDEMANN

Viriatellina proteri LINDEMANN & YOCHELSON,1992
Tentaculites simmondsi LINDEMANN & MELYCHER, 1997
Nowadia halihanensis LINDEMANN & KASPRAK, 2008
Styliolina robusta LINDEMANN & SCHINDLER, 2016
Striatostyliolina mima LINDEMANN & SCHINDLER, 2016
Striatostyliolina vitta LINDEMANN & SCHINDLER, 2016
Costulatostyliolina vestita LINDEMANN & SCHINDLER, 2016
Viriatellina manifesta LINDEMANN & SCHINDLER, 2016
Viriatellina exila LINDEMANN & SCHINDLER, 2016

Fig. 4. Dick and Bill KIRCHGASSER (RIGHT) in northern West Virginia, upper Emsian.

Denise BRICE

(4.7.1928 – 7.2.2025)

by

R. Thomas BECKER

With Denise BRICE, the international Devonian community and SDS lost in February this year on of their most outstanding and long-term members, and one of the few remaining world-renown specialists in Devonian brachiopods. She died at the age of 96 at Villeneuve-d´Ascq in the wider Lille region of northern France.

Denise was born as a farmer´s daughter in the village Ennevelin in northern France. After school time (Abitur), she first started to teach at a catholic school in Avelin children of widely different age. In 1963, she started to supervise the first-year students in a new farming school within the Catholic University at Lille (at the Institut Supérieur d´Agriculture, ISA). In parallel to her teaching position, she wrote her Ph.D. Thesis on the Devonian of Afghanistan under supervision of the well-known Palaeozoic specialist Dorothée LE MAÎTRE (BRICE 1970). Subsequently, she became researcher and professor in Lille. Even after joining the CNRS, she continued voluntary teaching at the ISA, where the atmosphere was like a family and where she had found an ideal place for team work and to combine basical research and education towards independence and responsibility of students. Besides her science and teaching, she joined organizations for human rights and French-Afghan friendship.

Loving the regional geology, Denise BRICE became a driving force of the Société Géologique du Nord, in which *Annales* she published many papers. She acted for many years as the president of the society and became honorary president in 2023.

Originally, she started with a focus on brachiopods from Afghanistan and Iran but she also contributed over many years intensively to the knowledge of the Devonian of the Boulonnais. She also worked on faunas from the Ardennes, Armorican Massif, Montagne Noire, southern Spain, the Meguma Terrane of western Canada, South China, and North Africa (Morocco, Algeria, Mauritania). Close collaborations with the many French colleagues covered not only brachiopods, but also dealt with corals and other reef builders, trilobites, microvertebrates, plant remains, palynology, and epizoans on brachiopod shells. Some papers were devoted to the Silurian and touched the Carboniferous. She would consider all aspects of brachiopods, from detailed taxonomy to palaeoecology and palaeobiogeography, always with some focus on their biostratigraphy and the lithostratigraphy and sedimentology context.

I met Denise for the first time at the second international Devonian Symposium at Calgary, in August 1987, which was my first international conference abroad and my first participation in a SDS meeting. There is no record of the SDS Corresponding Membership in its early years but it seems that Denise was part of it roughly from the beginning (see CMs listed in *SDS Newsletter,* **8**, from 1992). My best memory of her are from the splendid field meeting in Iran in 1999, when she had already passed her 70th birthday, and the equally enjoyable SDS meeting in Nevada in 2007, when she was already near 80 (Fig. 2). She sat with FRANCOISE BIGEY in the back of our 4WD and had to go through our young driver´s

favourite music program, The Doors, which was played loudly (to my great pleasure). Apart from her patience, I was always impressed by her extensive scientific expertise and determined, enthusiastic and warm, friendly personality, and an astonishing field mobility at rather old age. I had the pleasure to collaborate several times with her, mostly getting identifications for brachiopods from the Devonian-Carboniferous of the Anti-Atlas and from the Moroccan Meseta. She gave me the only known goniatite that she found in the Famennian of Afghanistan (see BRICE 1969) and I feel ashamed that I never found the time to do the planned small publication on it – but it will happen, eventually.

Some obituaries for Denise have appeared in French, which were partly used in this short re-appraisal of her scientific life. Other reviews of her outstanding achievements are probably still to come. This obituary is not thought to replace the vivid memories of joint adventures, friendship, and personal experiences of the many colleagues that worked much closer with her through the decades. The many co-authors and partly younger brachiopod workers can be seen in the impressive publication list. SDS will not forget Denise´s major contributions to Devonian stratigraphy.

Taxa named after Denise BRICE

Dendropora briceae MISTIAEN, 1991 (Tabulata)

Philippotia (Philippotia) briceae RACHEBEUF, 1987 (Brachiopoda)

Plexituba briceae Mistiaen, 1988 (Tabulata)

Polygnathus denisbriceae BULTYNCK in BRICE et al., 1979 (Conodonta)

Stenorhynchia briceae GARCÍA-ALCALDE in TRUYOLS-MASSONI & GARCÍA-ALCALDE, 1994 (Brachiopoda)

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Fig. 2. Denise BRICE, at the age of 79, in the middle of the "Devonia Barbeque Event" near the Nevada-Utah border at the end of the SDS Field Trip in September 2007 (left to her with Sven HARTENFELS, Catherine CRÔNIER, and Francoişe BIGEY, Jindra HLADIL in the back, Carl BRETT on the right, covering Alex BARTHOLOMEW, followed by John MARSHALL, and with Hanah MATYJA and Friedrich LUPPOLD in the right back). The served bear was either "Evolution Amber" or "The Polygamist".

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International Commission on Stratigraphy

Subcommission on Devonain Stratigraphy

ANNUAL REPORT 2024

1. TITLE OF CONSTITUENT BODY

Subcommission on Devonian Stratigraphy

Submitted by: **Ladislav SLAVÍK** *(Chair)*

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

The past year was an exceptional one because of the renewal of all subcommission officers and voting memberships (by new election and/or re-election). The main scientific activities in 2024 included the revision of the GSSPs (the basal Emsian and the Devonian-Carboniferous boundary). The efforts to redefine the Basal Emsian boundary continued in three key areas: the Prague Synform, the Spanish Central Pyrenees, and Morocco. In spring 2024 was published the first proposal for the basal Emsian redefinition. The proposal is based on biostratigraphy and supported by multiple chemo-physical proxies. The candidate section for the GSSP is in the Prague Synform and was presented both at the IGC 2024 and at the Joint ISSS and SDS meeting “Timeline of Silurian and Devonian environmental and biotic changes” in Sofia, Bulgaria, where all the main Devonian issues were discussed. The meeting included indoor sessions, regular SDS Annual Business Meeting, and two days of field trips to the Paleozoic of the Svoge Unit and the Iskar Gorge in western Bulgaria. There were also numerous proposals for new CMs.

Other SDS activities included the organization of the Devonian session at Geotolosa 2025, and the publication of the SDS Newsletter, which covers all major topics related

to the Devonian. During the SDS meeting in Sofia, the SDS grant committee was established, and the SDS grant system for early-career Devonian workers was launched. The grants are supported by an external source.

The main objectives of the Subcommission on Devonian Stratigraphy fit within IUGS science policy:

- to develop of an internationally approved chronostratigraphical timescale for the Devonian with maximum time resolution, as part of the ICS standard global stratigraphic scale;
- to produce a stratigraphic table displaying agreed subdivision to stage and substage level marking boundaries that are defined by a GSSP.
- to promote of new and modern stratigraphical techniques and their integration into Devonian multidisciplinary schemes.

3. ORGANIZATION – Interfaces with other international projects/groups

Actively supporting on-going IGCP programmes, national Committees for the IGCP projects, interfaces with national science foundations supporting the GSSP revisions. Close cooperation with the ISSS and SCCS/ICS.

3a. Current Officers for 2024-2028:

Chair: Ladislav SLAVÍK
Vice-Chair: José Ignacio VALENZUELA-RÍOS
Secretary: Ulrich JANSEN
Webperson: Sofie GOUWY

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

Münster University continue to support the staff costs of the SDS Newsletter production and the mailing. The IUGS support pays for the printing. The Newsletter has an ISSN and status as a publication. Since 2021 it is published and printed partly in colour; the pdf version is published on the SDS web page hosted by the ICS web.

We have regular annual meetings (this year face to face again). SDS members support their own attendance at these. The major part of SDS subprojects are supported from other sources (home institutes and national funding agencies).

The SDS grant system for early-career Devonian workers was launched this year. It is financially supported by the University of Geneseo on a one-off basis. The funding provided is sufficient to finance the individual grants for several years.

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2024 (bullet point each significant achievement; 3-6 bullets)

- **Annual business meeting of the SDS** was held on September 14th in the framework of the Joint ISSS and SDS meeting "Timeline of Silurian and Devonian environmental and biotic changes", Sofia, Bulgaria. The joint subcommission meeting included field trips to the Paleozoic of the Svoge Unit and the Iskar Gorge in western Bulgaria. It was the most important event for our community. The joint meeting supported close cooperation between the Silurian and Devonian Commissions. It was very successful, perfectly organized, and both indoor sessions and fieldtrips were highly attended.
- **Publications**: SDS Newsletter No. **39** (120 pp), and an extensive volume on Rhenish Massive: HARTENFELS, C. HARTKOPF-FRÖDER & P. KÖNIGSHOF (Eds.), **The Rhenish Massif: More than 150 years of research in a Variscan mountain chain, part II.** Current issue September 2024: *Palaeobiodiversity and Palaeoenvironment* **104** (3): 437-752. https://link.springer.com/journal/12549/volumes-and-issues/104-3
- **Formal election of the SDS executive** (officers and voting members) for 2024-2028. The elections took place in September and October 2023. During the SDS Business meeting, four new corresponding members were recruited from China.
- **Launch of the SDS grant system** for early-career Devonian workers. Two young Devonian specialists were awarded in 2024.

6. SUMMARY OF EXPENDITURE IN 2024 (in $USD):

SDS Devonian meeting in Sofia, Bulgaria – travel costs:

SDS Chair	500
SDS Vice-Chair	500
SDS Secretary	500

IGC Busan, Soth Korea – travel costs	
SDS Chair	500
SDS Newsletter	800
Bank Fees (total 2024)	50

7. SUMMARY OF INCOME IN 2024:

Total income from the ICS: $USD 2850

8. BUDGET REQUESTED FROM ICS FOR 2024

GeoTolosa 2025 - News from the Paleozoic Worlds – a joint International Congress covering Devonian, Carboniferous and Permian issues that will include also the "Variscan meeting 2025" is planned for June 2025 in Toulouse, France. The organization of the meeting is underway. This meeting will be a perfect opportunity for the Devonian Subcommission to hold a regular SDS business meeting. The main focus will be the discussion on the submitted proposal(s) for redefinition of the Basal Emsian GSSP. Also, a thematic Devonian Session: Life and Bioevents during Devonian time has already been proposed, SDS officers will be convenors.

We request contributions to travel costs for the above event.

SDS Chair travel costs	$700
SDS Vice-Chair travel costs	$700
SDS Secretary travel costs	$700
In addition, we request part support for the production of SDS Newsletter	$900
Total Sum requested from IUGS	$3000

9. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED IN 2025

- Submission of further proposals or progress reports from key areas for the revision of the basal Emsian GSSP. One proposal has already been published. Formal proposal for the discussion within the SDS will be ready in 2025.
- Revision of the D/C boundary with the D/C Boundary Task Group in close collaboration with the Carboniferous Subcommission.
- The regular SDS business meeting and Devonian symposium. Recruitment of new SDS members.

9a. Potential funding sources external to IUGS:

Possible funding of stratigraphic projects by national science agencies/foundations. Possible support from the scientific institutions and universities. Several projects have been submitted.

10. OBJECTIVES AND WORK PLAN FOR THE PERIOD (2024–2028)

- Redefine the base of the Emsian Stage.
- Redefinition of the Devonian/Carboniferous Boundary with the joint Task Group.
- Regular Annual Business meetings.
- Comprehensive publications on Devonian.
- Gradual renewal of the CMs membership.

APPENDICES

Names and Addresses of Current Officers for 2024-2028:

CHAIR

Ladislav SLAVÍK,
Department of Paleobiology and Paleoecology, Institute of Geology of the Czech Academy of Sciences, Rozvojová 269, CZ-165 00 Praha 6, Czech Republic, Tel.: 00420 233087247; slavik@gli.cas.cz

VICE-CHAIR

José Ignacio VALENZUELA-RÍOS
Geología, Universitat de València C/. Dr. Moliner 50, E-46100 Burjassot, Spain, Tel.: 0034 96 3543412; Jose.I.Valenzuela@uv.es

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Working groups and leaders

Emsian Working Group (EWG)

The Emsian Working group has been recently re-established (2021) in order to solve the problems with the correlation of the Basal Emsian boundary. The members are expected to present and evaluate proposals for the basal Emsian GSSP redefinition. The Working group, with rotating presidency, is open to other specialists involved in this task.

Members

Ladislav SLAVÍK (Czech Republic)
José Ignacio VALENZUELA-RÍOS (Spain)
R. Thomas BECKER (Germany)
Zhor Sarah ABOUSSALAM (Germany)
Maya ERINA (Uzbekistan)

Jindřich HLADIL (Czech Republic)
Nadya IZOKH (Russia) *temporarily suspended*
Olga IZOKH (Russia) *temporarily suspended*
Ulrich JANSEN (Germany)
Aleksey KIM (Uzbekistan)
Tomáš WEINER (Czech Republic)
Hedvika WEINEROVÁ (Czech Republic)

Devonian/Carboniferous Boundary Working Group (DCBWG)

The DCBWG was established in 2008, with the goal to redefine the GSSP for the Tournaisian (equivalent to base of the Carboniferous System), when problems both with the type section (La Serre E', Montagne Noire, France) and the index fossil (*Siphonodella sulcata*, conodont) arose. It includes members named by the Devonian (SDS) and Carboniferous (SCCS) subcommisions. Several meetings and workshop took place up to now. The new GSSP based on the definition of multiple criteria that would work in various environments for a safe recognition of the system boundary is expected to be proposed in the near future.

Members

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Carlo CORRADINI (Italy) – Vice-Chair
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R. Thomas BECKER (Germany)
Raimund FEIST (France)
Yuri GATOVSKY (Russia) *temporarily suspended*
Sandra I. KAISER (Germany)
Tomas KUMPAN (Czech Republic)
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Minutes of the Annual SDS Business Meeting

June 26th, 2025, Toulouse, France

Site: University of Toulouse III, Paul SABATIER, Auditorium Marthe Condat, Main University Building.

Attendance. The **Chairman** (Ladislav SLAVÍK), the **Vice-Chairman** (Nacho VALENZUELA-RÍOS), and the **Secretary** (Ulrich JANSEN).

TMs: Cathérine CRÔNIER, Sofie GOUWY (Webmaster), Sven HARTENFELS, Jau-Chyn (Teresa) LIAO, John E. A. MARSHALL.

CMs: Markus ARETZ, Julien DENAYER, Cathérine GIRARD, Christian KLUG, Kun LIANG, Tomáš KUMPAN, Svetlana NIKOLAEVA, Jun-Jun SONG.

HMs: R. Thomas BECKER (SDS Newsletter editor), Carlo CORRADINI.

Guests: Silvia BLANCO-FERRERA, Hubert ENGELBRECHT, Andrej ERNST, Julia FRIEDEL, Ethan GRASSMAN, Charles HENDERSON (ICS Secretary-General), Michael JOACHIMSKI, Pavel KABANOV, Héctor BARRERA LAHOZ, Mieke LÖW, Barry RICHARDS, Ivan RIVAS, Javier SANZ-LÓPEZ, Nina WICHERN, Jiayi YIN, Jin XIAOYU.

On-line: TM Claudia SPALETTA, TM Cameron PENN-CLARKE, TM Jay ZAMBITO, and CM Charles VER STRAETEN tried to attend on-line, but missed the meeting because the connection did not work.

Total attendance: 35 people.

Apologies for non-attendance had been received from TM Wenkun QIE, CM Z. Sarah ABOUSSALAM, CM Rainer BROCKE, CM David DE VLEESCHOUWER, CM Jim EBERT, CM Eberhard SCHINDLER, and CM Maurice STREEL.

Agenda: The business meeting followed the agenda distributed earlier per e-mail. It started at 17:00 p.m. (Central European Summer Time, CEST).

1. Introduction

The chairman Ladislav SLAVÍK welcomed the audience and thanked the organizers of GeoTolosa for the invitation of the SDS to join it.

The chairman reported sad losses of several SDS members and internationally recognized

Devonian workers in this year: Susana GARCÍA LÓPEZ (Spain, conodonts), Denise BRICE (France, brachiopods) and Frank ("Frankie") LANGENSTRASSEN (Germany, brachiopods). The audience held a minute of silence. Obituaries for these important Devonian workers and friends are expected for the next *SDS Newsletter* No. **40**.

2. Formal approval of 2024 Minutes

The minutes from the SDS Business meeting in Sofia were produced just after the meeting that took place in September. These have already been published in the Newsletter No. **39** in October.

3. Chair's Business – New GSSPs approved by the ICS and the upgrade of the ICC GSSP (and SABS)

The Global boundary Stratotype Section and Point (GSSP) for the **base of the Valanginian** Stage (Lower Cretaceous) has been approved by ICS in November 2024. It is placed at the base (19.23 m) of limestone bed VGL-B136 of the Vergol candidate section (Montbrun-les-Bains, Drôme, France). This layer is marked by the first occurrence of "*Thurmanniceras*" *pertransiens* (primary marker). The Cañada Luenga section (Cehegín, Spain) was approved as Standard Auxiliary Boundary Stratotype (SABS) for this boundary.

A new issue of the International Chronostratigraphic Chart has been published in December 2024. The Subcommission on Timescale Calibration (of the ICS) pointed to some systematic errors in the GTS 2020 spline fit age-modeling (AGTERBERG et al. 2020) and suggested considering the Bayesian age modeling for the Devonian Period by HARRIGAN et al. (2022). As regards the Devonian timescale, this implies two significant age modifications:

The **base of the Pragian Stage** at 410.8 (± 2.8 Ma) has now been shifted to **413.02 (± 1.91 Ma)** (following HARRIGAN et al. 2022) – now it is 2.2 Ma older.

The **base of the Emsian Stage** at 407.6 (±2.6) now shifted to **410.62 (±1.95)**, almost 3 Ma older.

Ladislav SLAVÍK had commented on these efforts in December and fully agreed with these, pointing to the fact that the calibration of the Lower Devonian is still complicated both due to the current basal Emsian GSSP and the poor biostratigraphic framework for some of the numerical ages. A better biostratigraphic control would be needed but is hardly feasible. The situation has not significantly changed since KAUFMANN (2006), when most authors still did not consider the very low position of the *kitabicus* boundary and confused the duration of the global Pragian with the duration of the Praha Formation, i.e., the "original Pragian". Until the redefinition of the basal Emsian boundary, the *kitabicus* boundary has to be used. According to the cyclostratigraphic study by Da SILVA et al. (2016), the duration of the present Pragian would be ca 1.7 my, so its reduction to 2.4 my as proposed by HARRIGAN et al. (2022) is a small step into the right direction.

Bundenbach museum petition

A petition was initiated by Susanne POHLER to rescue the famous Lower Devonian fossils from the Bundenbach Lagerstätte (Hunsrück Slate, lower Emsian, Germany) and to support a museum renovation in Bundenbach. In her last letter (May 19th, 2025), however, she was not optimistic as it seems that the politicians are not willing to support the museum financially.

Suspension of ICS activities in Deep Time Digital Earth (DDE)

The IUGS President informed in a letter all constituent groups (and affiliated organizations) that "the work of DDE will continue independently from IUGS support and contributions" for one year (starting in April 2025) at which time the decision will be reviewed by the IUGS Executive Committee at their next meeting.

No funding of DDE, no formal activities, "any DDE related activity must not be supported by the funds allocated to any commission/task

group or any individual working with any association with IUGS. No IUGS logo or name may be displayed with any DDE activity, promotional material, event etc. The bottom line is that there should be no formal relations between IUGS and DDE until all issues raised are solved to the satisfaction of IUGS EC and our members. So, as from the 7th April 2025, when our letter was posted, DDE is an independent program which has nothing to do with IUGS".

Following the above IUGS decision, the ICS Executive suspended ICS vice-Chair Shuzhong SHEN's activity as official ICS Delegate on the DDE Governing Council. Likewise, all ICS Members must suspend any formal activities with DDE that are supported by IUGS funds.

Of course, anyone may continue to work with and within DDE as an independent researcher.

4. ICS Matters: ICS ZOOM business meeting on November 27th 2024 and ICS ZOOM meeting on March 11th; new template for the GSSP proposals and other matters.

In autumn 2024, the new ICS officers identified several initial goals for both the short and long term, including:

- Establishing guidelines for the preparation of GSSP proposals (for internal use within working groups, subcommissions, and voting members of the ICS),
- Considering the role of subcommissions and especially Timescale Calibration Subcommission on updating numerical ages, including compliance to GTS 2020,
- Standardizing the web pages across the subcommissions,
- Revising forms for the annual reports,
- Initiating new ICS activities, such as workshops, summer schools, and distinguished lectures.

ICS ZOOM meeting, November 27, 2024

Main subjects: introduction by ICS Chair; brief introduction/report by SC chairs; demo of new web system including language variants, future; discussion on numerical ages in International Chronostratigraphic Chart (ICC); annual report for 2024; information on budget 2025; ICS program 2025.

ICS ZOOM meeting, March 11, 2025

ICS update and reminder of IUGS sanctions: The membership of Russian colleagues is suspended – this must be taken into account on the SDS web page. Information related to the ICS annual report; discussion on a new GSSP template; announcement of STRATI 2026. The new GSSP template was produced and distributed end of May.

5. Information about work on GSSPs alternative sections – discussion about future proposals and procedure

- L. SLAVÍK reported that the **Mramorka section** (Bohemia) was presented as candidate for the basal Emsian GSSP relocation (WEINEROVÁ et al. 2024, *Newsletters on Stratigraphy*, **57** (2): 171–201) and the **Požáry section** proposed as possible auxiliary stratotype (SABS) (SLAVÍK et al. 2025, *Palaeobiodiversity and Palaeoenvironments*, **105**: 61–82).
- Due to the slow progress and in contrast to the decision of last year that formal proposals would be expected until September 30, 2025, L. SLAVÍK proposed to put off the formal GSSP redefinition proposal for the STRATI congress in China next year.
- In the meantime, R. T. BECKER, Z. S. ABOUSSALAM and A. El HASSANI presented a detailed overview of **Pragian–Emsian sections in Morocco** (2024, *SDS Newsletter,* **39**: 47–65), suggesting to build a network of regional parastratotypes in different facies and palaeobiological realms. They described 10 successive events around the boundary. L. SLAVÍK remarked that the introduction of many SABS is welcomed but would delay the redefinition of the GSSP by many years again.
- R. Thomas BECKER suggested to hold a ZOOM meeting with several Devonian specialists to discuss the possibilities of correlation. After a short discussion, it was agreed to do this in spring 2026.
- In the **Pyrenees**, Nacho VALENZUELA-RÍOS and his working group collected magnetic susceptibility and palaeomagnetic data in Pragian–Emsian sections, but they still wait for geochemical data.
- As regards the **D–C boundary**, the discussion was skipped as the progress was already described

in the talk by ARETZ & CORRADINI (2025, see *Abstract book of GeoTolosa*, p. 48).

6. SDS Membership – new CMs

The chairman pointed out that a few TMs have to be replaced soon as they have served already for long. Any suggestions are welcome!

In recent years, many Devonian workers had been accepted as new CMs. Before this meeting, the SDS had 147 members in total. L SLAVÍK reminded that every member should correspond to the Devonian community. Moreover, SDS encourages everyone actively working in the Devonian to enter the Devonian family.

New CMs:

- Dr. **Li QIAO** (acceptance postponed from previous year, email contact to U. JANSEN), Nanjing, China (brachiopods),
- Dr. **Jiayi YIN** (proposed by L. SLAVÍK), Wuhan, China (conodonts, global correlation, Devonian macrofauna, trilobites, isotope geochemistry),
- Dr. **Nina WICHERN** (proposed by R. T. BECKER), Münster, Germany (orbital forcing, correlation of Devonian events, cyclostratigraphy).

In an email (June 24, 2025), TM Wenkun QIE had proposed four colleagues from China as new CMs. The SDS welcomes this proposal, however decided to postpone the decision until more Devonian research activity is shown and/or possible attendance at future SDS meetings. An exception is made for one colleague, who participated in the GeoTolosa and the SDS meeting:

- Dr. **Kun LIANG**, Nanjing, China (Devonian rugose corals, stromatoporoids, and reef paleoecology).

The four colleagues listed above were approved and welcomed as new CMs. At present, the SDS has 150 members (18 TMs, 129 CMs, 3 HMs). [shortly after the meeting, CM Tony WRIGHT, Wollongong, passed away].

7. SDS grants – information on the SDS grant system and 2025 prizes

The amount received from Jeff OVER last year was 5653 USD minus 42.76 USD (bank charge), in total: 5610.24 USD. The SDS Grant Committee (established in Sofia, 2024) consists of Ladislav SLAVÍK (President), Ulrich JANSEN (Secretary), Sofie GOUWY, and Jeff OVER (CM).

This year, a sum of 2000 USD was distributed among four awardees (500 USD each):

Xiaoyu JIN, Jiayi YIN, Nina WICHERN, and Junjun SONG (see Fig. at end of report).

The state of the account in 2025 is 2600 USD.

8. SDS Webpage

The web person is TM Sofie GOUWY (Calgary) – she is keeping the **SDS web site** updated, which is housed **at stratigraphy.org**. As an innovation, it is suggested to show photos from the meetings or fieldtrips on the website.

9. SDS and Devonian Publications

The last year was prolific as regards Devonian volumes:

- Special volume of *Palaeobiodiversity and Palaeoenvironments* (Vol. **104**, 2024): HARTENFELS, S., HARTKOPF-FRÖDER, C. & KÖNIGSHOF, P. (Eds), The Rhenish Massif: More than 150 years of research in a Variscan mountain chain, part II.
- Special volume of *Palaeobiodiversity and Palaeoenvironments* (Vol. **105**, 2025): MUNKHJARGAL, A., MENDE, K., LU L. & LINNEMANN, U. (Eds), Special contributions in honour to Peter KÖNIGSHOF, has been published early this year.
- Springer book *Geology of the Central European Variscides* (U. LINNEMANN, Ed.), 1,036 pages, will appear later in 2025 [has now appeared].
- A special volume of *Palaeobiodiversity and Palaeoenvironments* to honour Peter CARLS is scheduled for 2026. Nacho VALENZUELA-RÍOS commented on this volume; the deadline for submissions is August this year.
- John TALENT Memorial Volume, scheduled for *Palaeoworld* (commented by R. T. BECKER).
- R. Thomas BECKER reminded the audience that contributions to the forthcoming *SDS Newsletter* (No. **40**) must be submitted until end-August. At least, TMs and new CMs must contribute, the "older" CMs should. He also asks all members to let him know if they still want to receive a printed

copy or if the Newsletter pdf is sufficient. In order to bring down printing costs, the aim is to restrict the number of printed copies to < 100 in 2025, with further reductions subsequently.

- Special Volume of *Geologica Belgica* (Vol. **27** (3–4), 2024): DENAYER, J. & MOTTEQUIN, B. (Eds), Devonian lithostratigraphy of Belgium. [open access].

10. Future Meetings

- 2025: **ICOS 6** in Mafra City, Santa Catarina State, South *Brazil*, early December.
- 2026: **STRATI** China – Suzhou DDE Center in Jiangsu Province, China, June 28 – July 3, 2026. Including two days post-conference excursion to Upper Devonian to lowermost Carboniferous successions in the Guilin Karst area, Guangxi, South China. Includes Upper Devonian and Lower Carboniferous carbonate successions and karst landscapes in Guilin City, the metazoan and microbial reefs around the F–F boundary in Guilin, and the Nanbiancun auxiliary stratotype section for the Devonian-Carboniferous boundary.
- 2026: **IPC 7** in Cape Town, South Africa, November 30 – December 3, 2026, including fieldtrips to Devonian Ecosystems Fieldtrip (fly to Gqeberha), guided by CM Rob GESS; Cape Supergroup – Cedarberg localities, including Devonian strata, guided by TM Cameron PENN-CLARKE.
- **Comment:** It is necessary to decide whether the SDS should meet at one of these meetings in 2026. C. HENDERSON pointed out that the ICS urges all the subcommissions to meet at the STRATI congress. R. T. BECKER argued that it is unfortunate that STRATI and IPC 7 take place in the same year, in contrast to the original schedule (with STRATI in 2027).
- 2026: **ISELF 18**, International Symposium on *Early* and *Lower Vertebrates* in Morocco, *February 2026* (C. KLUG).
- 2027: Possible joint ISSS and SDS meeting, still to be discussed with Carlo CORRADINI.
- 2027: The **3rd Asian Palaeontological Congress** Bangkok, Thailand, March 2–5, 2027.
- 2028: **IGC Calgary**, C. HENDERSON & P. KABANOV commented on fieldtrips (e.g., NW Territories), details not finalized yet, website should be checked (https://www.igc2028canada.org).

11. Financial Report

In 2025, the SDS will receive 2100 USD (has not arrived yet). The funds will be spent for the SDS newsletter production and for travel support of the SDS officers. SDS grant account balance after Toulouse: 2600 USD (2,000 USD distributed to four awardees and 10 USD were the bank withdrawal charges).

12. Any other business

The chairman thanked again the members of subcommission and guests for the attendance of the SDS meeting and the organizers of the GeoTolosa. The SDS Business Meeting ended at 18.20.

SDS DOCUMENTS

Why not use palynology to reconsider the base of the Carboniferous System in the type region of the Tournaisian?

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Dedicated to the memory of Raphael CONIL and Charlie SANDBERG, protist and conodont micropaleontologists, who have encouraged palynological research in the Devonian–Carboniferous range.

Abstract. The miospore zonation of the Belgian Tournaisian Tn1a and Tn1b is reviewed and described in nearshore marine facies. The presently used Tournaisian spore zones being inappropriate to define the DCB, the LN and VI zones being poorly understood, the late Famennian limit LL/LE is easier to use and would have advantage of corresponding to the first Carboniferous type glacial episode interpreted from strata in basins of Brazil, Bolivia, and Peru where ice sheets and alpine glaciers reached coastal and marine settings. The cooccurrence of a new wall structure (the *Indotriradites* concept), better known during the Mississippian but present with *Siphonodella praesulcata* in the LE Zone of the Uppermost Famennian studied by Sandberg in the Sappington Member of the Three Forks Formation in Montana (USA), should give more reason to revise the Hangenberg Event and the delineation of the DCB.

1. Introduction

Spores (miospores), often with diameters around 50 µm, have the advantage, compared to other microfossils, of being produced by each individual terrestrial plant in thousands of specimens, which are transported into the sediments by wind and fluvial or marine currents. In this context, *Retispora lepidophyta* has the most widespread occurrence in the DCB range.

2. The Upper Tournaisian (Tn1b sensu CONIL 1964) microfossil zonations

Recent studies show that the microfossils conodonts and miospores do not provide so far unambiguous data to delimit a D/C boundary in the type area of the Hangenberg Crisis: different concepts of *Siphonodella* or *Protognathodus,* for instance (KAISER et al. 2019; KAISER & HUBMANN 2024); poor definition of the miospore zonation at the same level (DI PASQUO & STREEL 2022). Indeed, the successive zones LN/VI definition is ambiguous (STREEL & STEEEMANS 2020). CLAYTON et al. (1974), working in the South Munster Basin (the Cork beds) in Southern Ireland, subdivided the NV Zone of NEVES et al. (1972) into two subzones, the LN Subzone and the VI Subzone. They were proposed as a Concurrent Range Zone by HIGGS et al. (1988).

The **LN** *(Retispora lepidophyta-Verrucosisporites nitidus)* **Biozone** has most of the taxa of the preceding *R. lepidophyta-I. explanatus* (LE) Biozone. *Lophozonotriletes malevkensis*, *Vallatisporites verrucosus,* and *Densosporites spitsbergensis* appear close to the base of the LN Biozone. *Verrucosisporites nitidus* is rather sparse in the basal LN Zone, usually represented by the smaller verrucate forms (HIGGS et al. 1988).

In the Stockum trench II (HIGGS et al. 1993), the sandy part (Hangenberg Sandstone = HSst) contains an atypical LN assemblage of spores (**LN***), very rich in *Retusotriletes* spp., and where *R. lepidophyta* is rare (about 1 % - but a consistent element). The following taxa start in this LN* informal zone: *Cyrtospora cristifera* (HIGGS et al. 1993), *Bascaudaspora mischkinensis* (= ?*B. submarginata* PLAYFORD after HIGGS et al. 1988).

The LN-VI transition corresponds to the Middle and Upper Hangenberg Crisis intervals, ranging from the *Bi. costatus-Pr. kockeli* Interregnum (*ck*i) to the *Pr. kockeli* Zone, followed by the *Pr. kuehni-Si. (Eosi.) sulcata* Zone (CLAUSEN et al. 1994; ARETZ et al. 2021). No spore species starts at the base of the so-called **VI Zone**. *Vallatisporites. verrucosus, V. vallatus,* and *Retusotriletes incohatus* are known since the LN Zone in the Stockum trench II.

In contrast to the preceding LN assemblage, the basal VI Biozone assemblages are very restricted in composition, usually dominated by simple laevigate forms (HIGGS et al. 1988). *Vallatisporites vallatus* was originally considered by CLAYTON et al. (1974) as characterizing a *V. vallatus-R. incohatus* Zone. The VI (*V. verrucosus-Retusotriletes incohatus*) Biozone is marked by the disappearance of *R. lepidophyta, V. pusillites, Rugospora flexuosa,* and species of the genera *Ancyrospora* and *Hystricosporites*, *Diducites versabilis,* and *D. plicabilis.*

3. LN-LN*-VI sequence

A relevant contribution to the quantitative approach of the transitional Devonian to Carboniferous palyno-zonation is the descriptive and quantitative analysis at the generic level, with illustrations of miospores, in the Ballycrovane Harbour (VAN VEEN 1981, fig. 2; see also HIGGS et al. 1988) and Bantry Bay (VAN VEEN 1981, fig. 3) sections (County Cork, southern Ireland). It shows that the most distinct DCB palynological change is taking place between the *Retispora lepidophyta-Verrucosisporites nitidus* (LN) and the *Retispora lepidophyta-Cyrtospora cristifera* (LCr) phases in the basal part of a widespread mudstone unit: the Castle Slate Member of the Kinsale Formation (STREEL & STEEMANS 2020).

The reference section of the Ourthe Valley Chanxhe 1 (MAZIANE et al. 2002, 2007) is interrupted by a fault in its upper part. KUMPAN et al. (2014) studied a comparable section at Rivage, using the original log of CONIL (1964) and providing correlations with two positive carbon isotope excursions. In a similar Rivage Pont de Scay section (PRESTIANNI et al. 2016), an unusual LE zone is noted, where, however, the occurrence in their highest sample (Bed 94) of *Bascaudaspora mischkinensis* and a possible *Vallatisporites vallatus* could correspond with the first thick shaly beds of the Hangenberg Black Shale (HBS in LN Zone in Sauerland).

Based on many boreholes of Eastern Europe, an alternative spore zonation near the DCB has been established. The *Vallatisporites pusillites* (P) Zone has been divided into three Subzones (BYVSHEVA & UMNOVA 1993). The lower *Vallatisporites pusillites - Retispora lepidophyta - Hymenozonotriletes explanatus* Subzone (PLE) has abundant *Retispora lepidophyta*. The middle *Vallatisporites pusillites - Tumulispora malevkensis - Retispora lepidophyta* Subzone (PML) may include rare *Retispora lepidophyta*. The upper *Vallatisporites pusillites – Tumulispora malevkensis* Subzone (PM) does not contain *Retispora lepidophyta*. The PM Subzone has been changed subsequently into the *Vallatisporites pusillites - Bascaudaspora mischkinensis* (PMi) Subzone. The sequence PLE-PML-PMi corresponds to the LN-LN*-VI sequence (AVCHIMOVITCH et al. 2021).

4. The lower Tournaisian (Tn1a sensu CONIL 1964) microfossil zonations.

The three sections selected (see figs. 8 and 10 in MAZIANE et al. 2002) are from nearshore marine facies. These are: (1) the Chanxhe section (CONIL et al. 1964; STREEL 1966); (2) the Royseux section (STREEL 1966; AUSTIN et al. 1970); and (3) the Tohogne borehole (BOUCKAERT & DUSAR 1976; BOUCKAERT et al. 1978). The Chanxhe section is the most important because it is the reference section used by STREEL (1966) in the original biometric study compared with the Foraminifer stratigraphy of CONIL (1964). It is also the most Famennian complete section and possesses abundant mudrock levels. The Tohogne borehole also displays a complete late Famennian succession with some conodont data, but cores provided less productive material. The Royseux section is the

least satisfactory because it allows for the smallest number of productive samples with more limestone beds. Secondly, it does not extend down to the base of the latest Famennian. Two of these eastern Belgian sections display a continuous succession of late to latest Famennian miospore zones ranging from the *Diducites versabilis – Grandispora cornuta* (VCo) and *Apiculiretusispora verrucosa-Vallatisporites hystricosus* (VH) in which *Retispora lepidophyta* is absent, up into the overlying *Retispora lepidophyta-Knoxisporites literatus* (LL) and *Retispora lepidophyta-Indotriradites explanatus* (LE) Zones (MAZIANE et al. 1999). Indeed, CLAYTON et al. (1978) had proposed two new subzones within the *Vallatisporites pusillites-Retispora lepidophyta* (PL) Zone of NEVES et al. (1972). These are the LL and LE Subzones.

Some of these microspore zones in the studied sections were independently searched for conodonts (AUSTIN et al. 1970; BOUCKAERT et al. 1978), but did not record any significant results compared to more recent conodont research near the DCB.

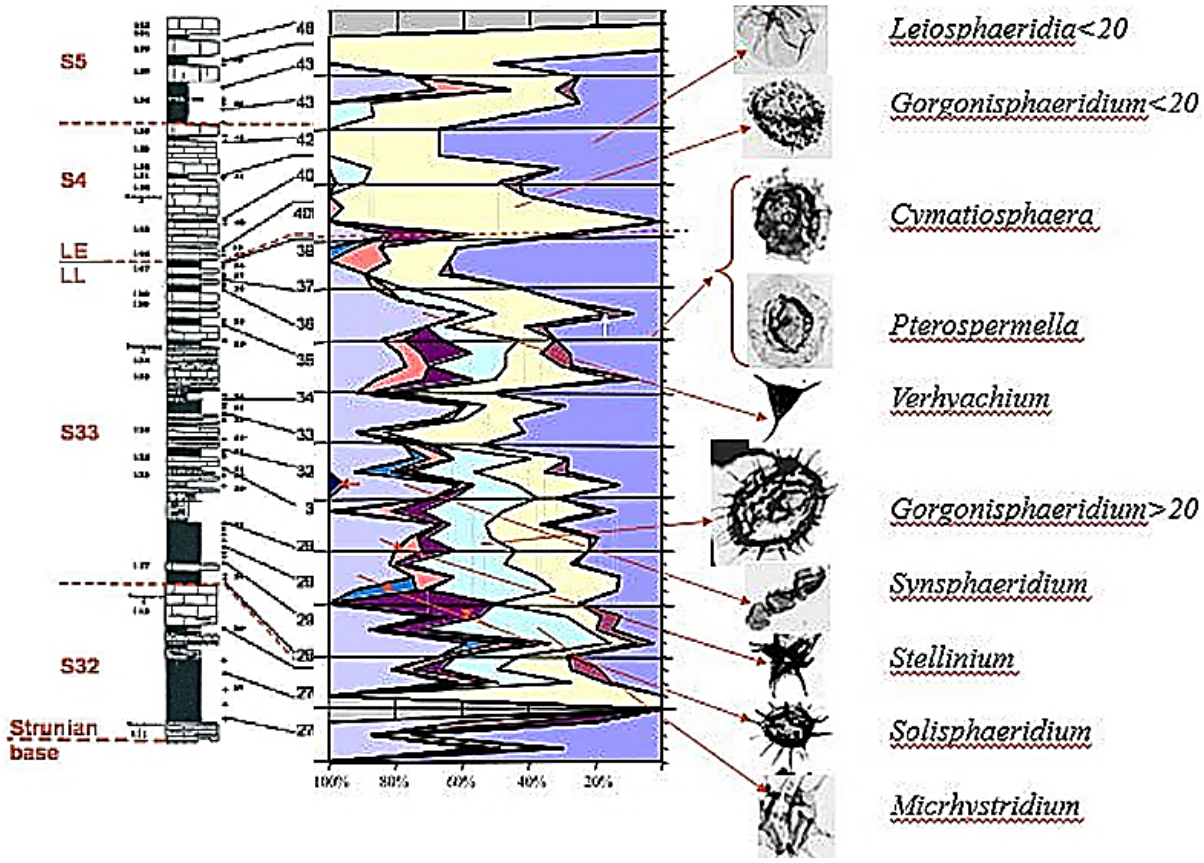

Fig. 1. Quantitative analysis of the distribution of miospores and acritarchs and comparison with the new sedimentary sequence in the Chanxhe section (S32, S33, S4, S5 = sedimentary sequence in MAZIANE et al. 2007).

All these sections were also examined by VANGUESTAINE (1978), MAZIANE & VANGUESTAINE (1997), and MAZIANE (1999), who allowed to demonstrate (Fig. 1) the almost coincidence of a noticeable change of the acritarch content (sudden dominance of *Gorgonisphaeridium* and small Leiospheres) and the LL/LE transition. This was interpreted by MAZIANE et al. (2007) as a shallowing sea level corroborated by the occurrence of shallow water ostracods (CASIER et al. 2005). This change occurs in the new biometric zone Z, where one can still observe a large proportion of *Retispora lepidophyta* when compared to all spores. Twenty acritarch species described in the Upper Devonian of Ohio (USA) in the Cleveland

Member of the Ohio Shale are identified in the Upper Famennian of Tohogne.

The late Famennian limit LL/LE is easier to use and would have the advantage of corresponding to the first Carboniferous-type glacial episode interpreted from strata in basins of Brazil, Bolivia, and Peru (CAPUTO & CROWELL 1985), during which ice sheets and alpine glaciers reached coastal and marine settings (Fig. 2).

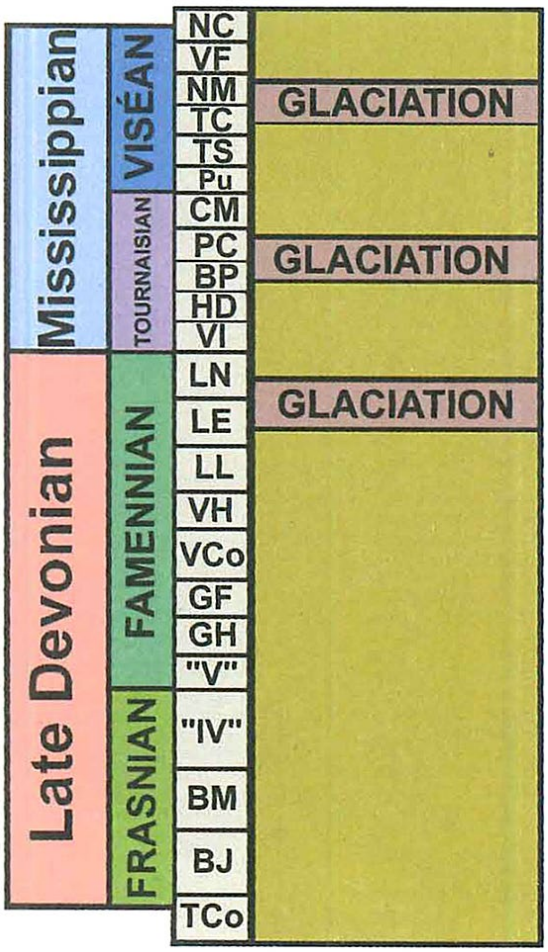

Fig. 2. Stratigraphic position of glaciation episodes in South America.

Retispora lepidophyta has the most widespread occurrence in the DCB range. Its extinction is observed in two steps. Initially, it is most often dominant, with more than 50 % of all spores counted, usually thousands per gram of sediment. A substantial decline of this species characterizes their **first extinction step,** but it persists in all samples, possibly exceeding 5 % of the total of all spores counted. The **second extinction step** (STREEL & DI PASQUO 2022) led to the complete absence of the species except in possible reworking conditions (STREEL & BLESS 1980; DI PASQUO & STREEL 2022a, 2022b; DI PASQUO et al. 2022).

To control the abundance of *R. lepidophyta*, we have tried to sample the LL/LE transition in the Royseux section and the Tohogne borehole again without success. At Royseux, 16 samples in the shaly contact between limestones contained only modern pollen grains. Also, we could not find shale samples again within the few materials that escaped the numerous former collectors of spores, conodonts, and forams (STREEL & DI PASQUO 2022). Therefore, taking advantage of the percentage of all spores calculated by MAZIANE (1999: appendix 6/4/B for Tohogne, appendix 6/4/C for Royseux), we can see that the first extinction step of *Retispora lepidophyta* starts before the LE Zone (Fig. 3), at least in the biometric zones, i.e., the Rlm subzone marking the base of the uppermost Famennian in AVCHIMOVITCH et al. (2021).

The extinction of *R. lepidophyta* might have at least two explanations: the rarefaction and progressive disposition of the mother plant (an herbaceous lycopod) and/or a reworking process expected from older sediment containing many specimens of this species (DI PASQUO & STREEL 2022a). Consequently, if the extinction of *R. lepidophyta* cannot mark the DCB, at least, its extinction steps may serve to characterize the Uppermost Famennian (DI PASQUO et al. 2021).

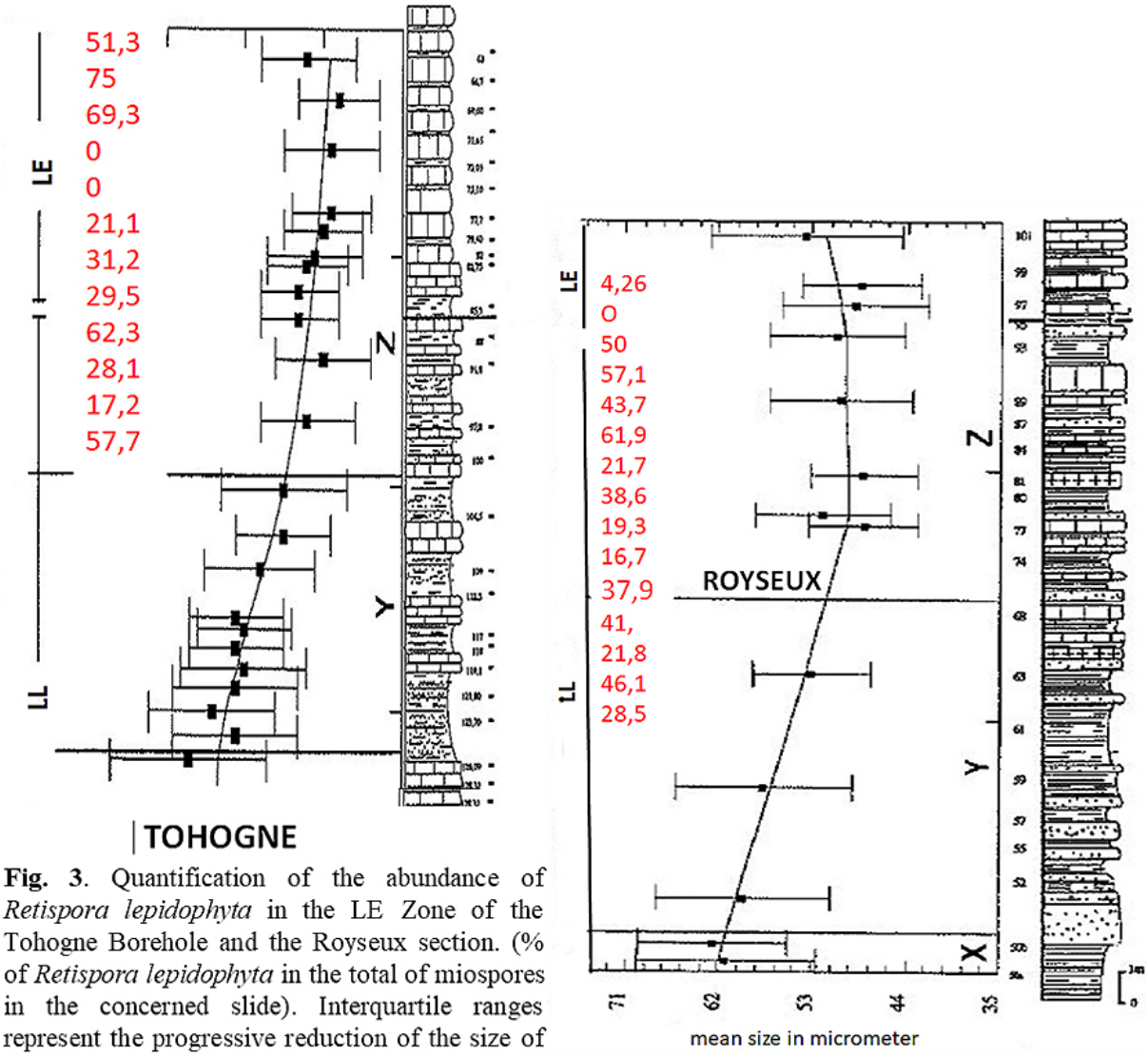

Fig. 3. Quantification of the abundance of *Retispora lepidophyta* in the LE Zone of the Tohogne Borehole and the Royseux section. (% of *Retispora lepidophyta* in the total of miospores in the concerned slide). Interquartile ranges represent the progressive reduction of the size of this species (Biometric zones Y, Z).

5. The *Indotriradites* Morphon and the *Vallatisporites* Group

Indotriradites TIWARI emend. FOSTER 1979 (=*Kraeuselisporites* in AZCUY & DI PASQUO 2005): spores radial, trilete, zonate, cavate. Amb circular to roundly subtriangular. The distal surface is hemispherical (lateral view), and the proximal face is low pyramidal to almost flat (in the same plane as the zona). Laesurae labrate, reaching the outer margin of the zona. Exine two-layered; intexinal layer thin, often folded, apparently unstructured, separated (at least distally and equatorially) from exoexine by a distinct, broad or narrow cavum, exoexine infrastructured, surface pattern appears scabrate or granulate; proximal face laevigate, distal surface (often including that of zona) bearing apiculate sculptured elements. Elements include coni, spinae, broad-based mammoid elements, low bacula, and verrucae; their bases may be partly vacuolate. Zona is distinct and broad; the inner margin is often markedly thicker than the remainder; it has a translucent appearance; the outer edge is continuous or notched.

Late Devonian (late Famennian) miospores have been found in the lowermost 7.3 m of the Horton Group on Harding Brook in the type area, Windsor Subbasin, Nova Scotia, below miospores of the *Indotriradites explanatus* Zone, extending the age of the Horton Group in the type area down into the latest Devonian (MARTEL et al. 1993).

Other *Indotriradites* species described from the Namurian of northern England, *I. ornatus,* also possesses connate sculptural elements more or less regularly distributed over the entire distal surface. But these elements are stouter and not confluent on or around the inner margin of the zona, as is seen in species belonging to the *Indotriradites dolianitii* Morphon (LOBOZIAK et al. 1999), commonly found in the late Visean Faro and Poti Formations of the Amazon and Parnaíba basins, respectively, in northern Brazil. This Morphon also occurs in the uppermost part of the Oriximiná Formation of late middle to early late Tournaisian age.

This Morphon could also be present in the Visean palynological zones M4 to the lower part of M6 of the Grand Erg occidental, Algerian Sahara (LANZONI & MAGLOIRE 1969).

The genus *Vallatisporites* is characterized by a two-layered exine; intexinal layer thin, separated (at least equatorially) from exoexine by a distinct, narrow cavum; vacuolae are also present around it. Differences in sculpture (anisopolar), variable sizes (ratio inner body-equatorial amb) are the main features used to define species. The nature of their parent plant(s) is still unknown. However, the spore structure resembles lycopods (RICHARDSON et al. in press).

New species of *Vallatisporites*, especially from the Uppermost Famennian or Strunian of New York and Pennsylvania States (USA), Western Europe, and Belarus, some still *nomen nudum,* are listed here in an appendix by AVCHIMOVITCH et al. (2021, described by RICHARDSON et al. in press). Diverse *Vallatisporites* species occur in the LE-LN Zones or those correlatable, with a variation from less abundant in LE to somewhat abundant in LN Zones (Fig. 4; AVCHIMOVITCH et al. 2021, fig. 3).

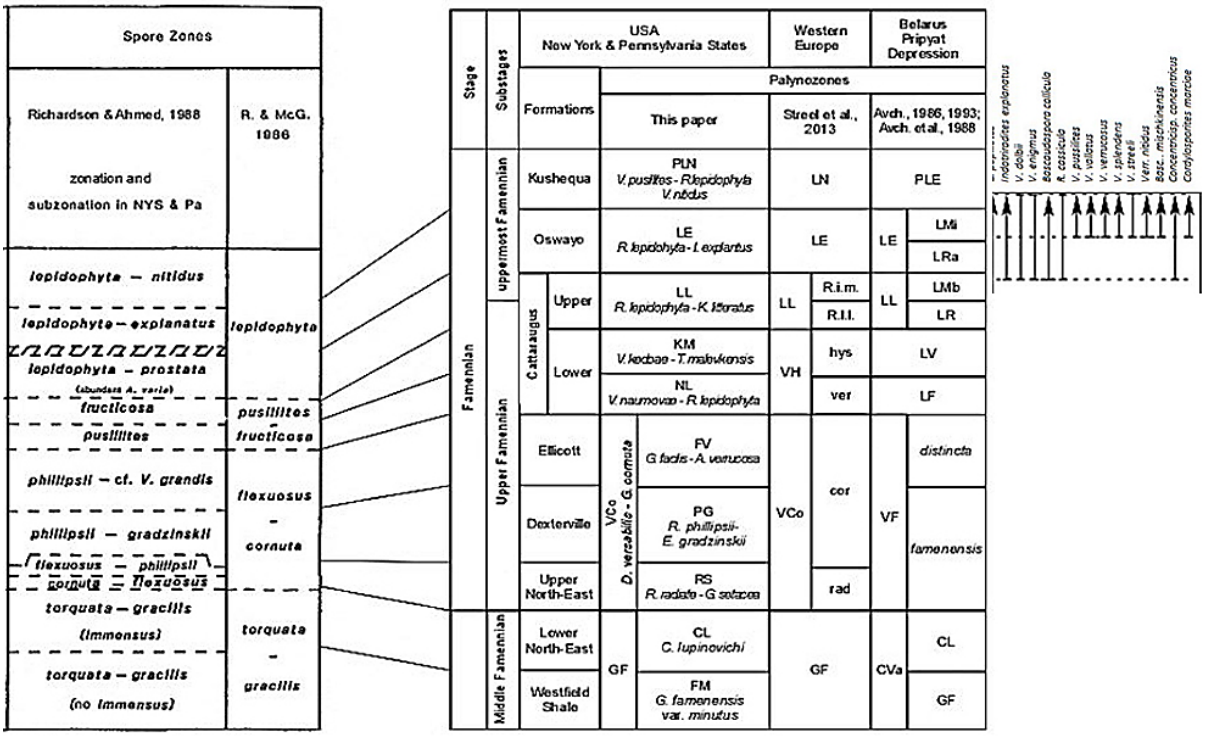

Fig. 4. A proposed correlation of the miospores in the middle, upper, and uppermost Famennian of New York State and Pennsylvania (USA), Western Europe, and the Pripyat Depression (Belarus). See AVCHIMOVITCH et al. (2021, fig. 3).

MATYJA et al. (2021) developed a multidisciplinary study based mainly on conodonts, ammonoids, and palynomorphs from the Devonian–Carboniferous boundary interval in pelagic successions of the Holy Cross Mountains and Sudetes and the ramp successions in the Western Pomerania region (Poland). Different published works were re-examined, and geochemical and mineralogical characteristics, as well as magnetic susceptibility measurements across the interval from the Famennian *B. ultimus* conodont Zone to the Tournaisian *S. duplicata* conodont Zone. The sedimentary successions recognized at the Devonian/Carboniferous boundary in Poland display a pattern similar to that observed in many areas in Europe during the Hangenberg Event (black bituminous shale horizon- HBS), with index taxa *Retispora lepidophyta, Vallatisporites verrucosus,* and *Verrucosisporites nitidus*, representing the *R. lepidophyta–explanatus* (LE), *R. lepidophyta–Verrucosisporites nitidus* (LN) miospore Zones (FILIPIAK 2004, 2005). Following MATYJA et al. (2021), the presence of *Vallatisporites vallatus* in this interval is sometimes abundant together with *Vallatisporites verrucosus,* and *V. pusillites* (43.5%), whereas others like *Retusotriletes incohatus* (15.5%) and *Apiculiretusispora verrucosa* (10.6%) are frequent (MARYNOWSKI & FILIPIAK 2007). Other taxa identified are *Apiculiretusispora verrucosa, Bascaudaspora submarginata, Cymbosporites minutus, Diducites versabilis, Grandispora echinata, G. lupata, Indotriradites explanatus, Kraeuselisporites mitratus, Pustulatisporites dolbii, Retusotriletes incohatus, Tumulispora malevkensis* (= *T. rarituberculata*)*, Umbonatisporites rarisetosus*.

Conodonts identified by MATYJA et al. (2021) just a few metres below the HBS, in the uppermost part of the nodular limestone unit, indicated the recognition of *Bispathodus ultimus* zone due to the presence of several *Bispathodus* and *Branmehla* species (i.e. *Bispathodus costatus, Bispathodus aculeatus aculeatus, Branmehla suprema*). They provide more precise age determinations for this relatively shallow water part of the DCB succession in relation to the pelagic succession uppermost Famennian *praesulcata* (lower part) Zone (BECKER et al. 2016).

The overlying deposits, above the cephalopod limestone with *Wocklumeria*, were assigned to the *sulcata* Zone and succeeding conodont zones belonging to the Tournaisian. The *V. vallatus-R. incohatus* Palynozone above the HBS is represented by the persistent species *Retusotriletes incohatus, Vallatisporites vallatus*, and *Vallatisporites verrucosus*. Still, it does not possess other typical upper Famennian markers like *R. lepidophyta*. This is relevant for the recognition of the DCB, the same as the documentation of an intense condensation of small acritarchs (*Micrhystridium, Unellium* from the "complex" together with *Veryhachium*), noted by FILIPIAK (2005) just above the DCB. Similarly, it was observed in the Stockum section of the Rhenish Slate Mountains in Europe by STREEL (1999) and in Wales by MCNESTRY (1988). This event could potentially correlate with the base of the lower Tournaisian.

Retispora lepidophyta is variably found in the Uppermost Famennian Sappington Formation of Montana, USA, along with some spore species (*I. explanatus, Vallatisporites* spp.) in LE and LN palynozones that are all recorded in the same deposits with *Siphonodella praesulcata* (SANDBERG et al. 1972; DI PASQUO et al. 2017; HU et al. 2024). This is not surprising if we accept that they could belong to their second step of extinction. However, new data from the Sappington in Montana (Fig. 5) show that *Siphonodella praesulcata* and *Siphonodella sulcata* coexist, and further work is needed to determine if they are morphotypes of the same species or a consequence of sedimentary mixtures due to reworking with Early Mississippian conodonts (DI PASQUO et al. 2021, 2022a, 2022b; DI PASQUO & STREEL 2022).

Similarly, the Devonian-Carboniferous boundary in the Eastern Taurides of Turkey at the Northern Gondwana Margin is characterized by *Retispora lepidophyta, I. explanatus,* and species

of *Vallatisporites* and *Densosporites variomarginatus*. They are documented in the latest Famennian *Bispathodus aculeatus aculeatus-Bi. costatus* conodont Zone. Overlying, a few Tournaisian spores, along with *Retispora lepidophyta* and with *S. sulcata* in the Lower Tournaisian, can probably be relevant to considering the recycling of latest Famennian taxa as well (ÖZBEK et al. 2024).

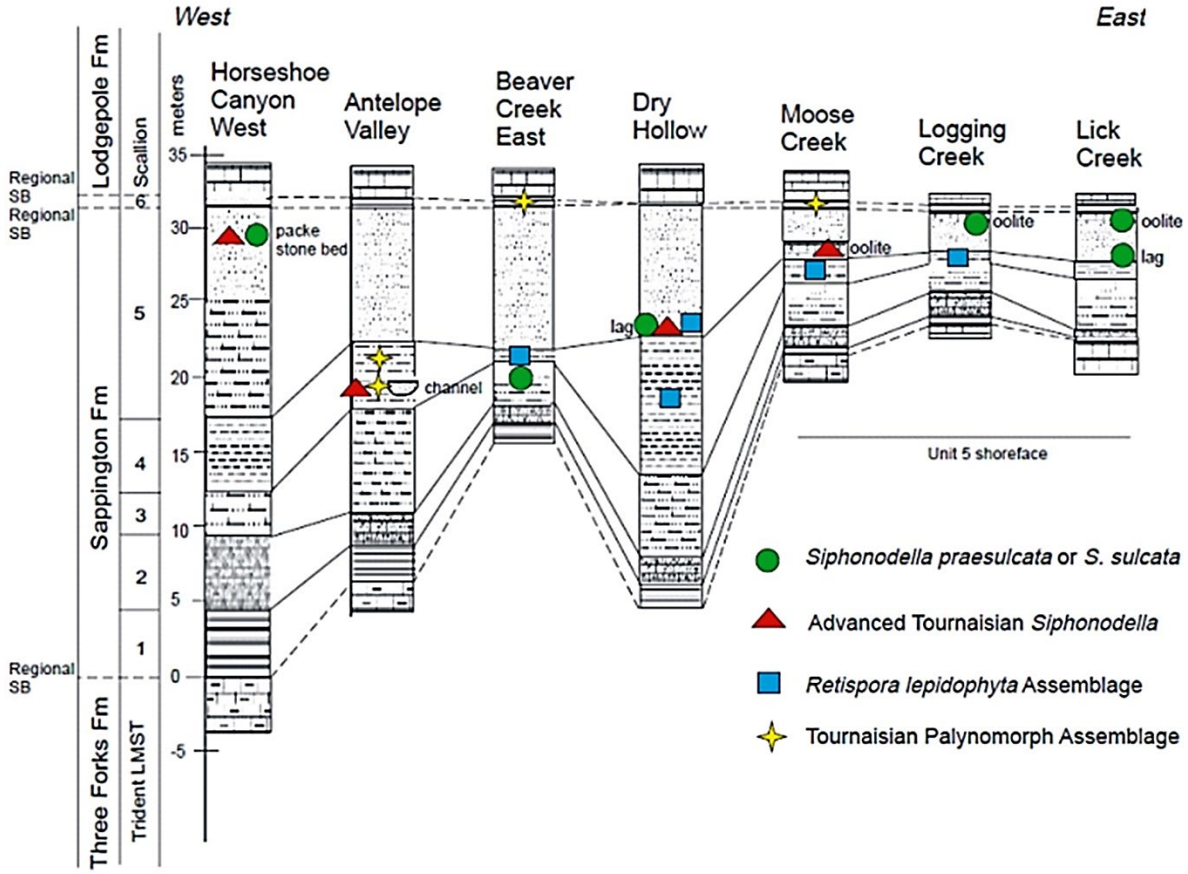

Fig. 5. Conodonts versus palynomorphs applied to establish the correlation of the Sappington Formation in Montana, USA (DI PASQUO et al. 2021, 2022; DI PASQUO & STREEL 2022b).

6. Conclusions

The present Tournaisian spore zones are inappropriate for defining the DCB, LN, and VI, and possible characteristics are poorly understood or rarely present (like, for instance, *Bascaudaspora mischkinensis*). The latest Famennian limit LL/LE is easier to use and would have the advantage of dating the first Carboniferous glacial episodes.

The first glacial period is of late Famennian age. It is interpreted from the strata of Brazil, Bolivia, and Peru, where ice sheets and alpine glaciers reached coastal and marine settings.

The co-occurrence of the reduction of size (minor subspecies of *Retispora lepidophyta* = biometric zone 7 of MAZIANE 1999), the reduction of percentage of *Retispora lepidophyta,* i.e., their first extinction step at least, and the "*tener* effect" with the first glacial episode suggests some relation of causal effects. The proximity of the first occurrence of the Foraminifer *Quasiendothyra kobeitusana* might be of great help for correlation with Russia and China, as well as the first occurrence of the Acritarch *Gorgonisphaeridium winslowii*, which is also used in North America.

The co-occurrence of a new wall structure (the *Indotriradites* concept), better known during the Mississippian, but present with *Siphonodella praesulcata* in the Uppermost Famennian Sappington Formation in Montana, USA, should give more argument to those who have proposed to define a new DCB within the Hangenberg Event. Further work is needed to determine if conodont morphotypes of the same species/lineages and key spore species, especially *R. lepidophyta*, are a consequence of sedimentary mixtures due to reworking the latest Famennian in Early Mississippian deposits.

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Lithologic and faunal changes in the upper Givetian (Middle Devonian) in Yunnan, South China

LI Qiao

1. Introduction

The Givetian (Middle Devonian) is recognized as a period of significant palaeoenvironmental perturbation and biotic turnover (HOUSE 2002; BECKER et al. 2020). The geological record from this interval contains increasing evidence of benthic anoxia and profound biotic crises, which resulted in substantial declines and turnovers within benthic faunas. A primary catalyst for these global changes was the top-middle Givetian Taghanic Crisis, a second-order bio-event driven by complex transgression-regression couplets (ABOUSSALAM & BECKER 2011). This crisis is understood as a multiphased event, commencing with a series of re-transgressive pulses at the end of the middle Givetian, including the well-documented Taghanic Onlap (JOHNSON 1970), and succeeded by the basal upper Givetian Geneseo Transgression (BAIRD et al. 2012; ZAMBITO et al. 2012). This global crisis, potentially triggered by an episode of climatic overheating (JOACHIMSKI et al. 2004), precipitated major, staged extinctions across various marine groups, including ammonoids, trilobites, ostracods, brachiopods, corals, and reef ecosystems (e.g., BECKER & HOUSE 2000; BRETT et al. 2018).

The sedimentological and palaeontological signatures of the Taghanic Crisis are documented in key sections worldwide. In eastern North America, for instance, the environmental and biotic shifts are exemplified by the lithological transition from the Tully Limestone to the Genesee Shale in New York (COOPER et al. 1942), with the associated faunal turnovers explicitly linked to the Taghanic and Geneseo transgressions (HOUSE 1985). Similarly, coeval successions in South China (Guangxi, Yunnan, and Hunan provinces) exhibit a comparable transition from fossiliferous limestones to organic-rich black shales (MA & ZONG 2010; MA et al. 2014). This biotic and lithologic transition is interpreted as the Taghanic-Geneseo events, with the latter corresponding to the Yidade Transgression in South China.

2. Lithologic and biotic changes

At the Panxi section in eastern Yunnan, the Givetian is represented by the Qujing Formation, a succession of shallow marine carbonates that records significant paleoenvironmental and biotic shifts. The main body of the Qujing Formation is composed of fossiliferous limestones, marls, and interbedded biostromes (Fig. 1). Its diverse benthic assemblage, characterized by abundant corals, the stromatoporoid *Amphipora*, and stringocephalid brachiopods, is indicative of a warm, shallow-shelf environment. Episodic disturbances during this period are suggested by localized accumulations of large, redeposited bivalves (Megalodontidae?; Fig. 1).

In the middle part of the Qujing Formation, a significant perturbation is marked by a distinct sequence of massive dolostone and dolomitic limestone. This early diagenetic dolomitization event, which is extensively developed across South China, is interpreted as the product of a Mid-Givetian regression associated with regional rift-platform development (MA et al. 2014) and is biostratigraphically correlated with the traditional Upper *varcus* conodont Zone (LI et al. 2009).

The top of the Qujing Formation marks the onset of a major biotic crisis. The uppermost limestone beds contain the final record of the rugose coral *Calceola*, alongside a still abundant stringocephalid fauna. This carbonate platform ecosystem collapses abruptly at the contact with the overlying Yidade Formation. The boundary is defined by a sharp lithological transition to black shales, which are largely barren except for rare plant debris, signifying a rapid shift to anoxic basin conditions. This faunal turnover is very remarkable.

Fig. 1. Rocks and fossils in the Middle Devonian at Panxi section, eastern Yunnan. **A-C.** Large, redeposited bivalves (Megalodontidae?) in the middle part of the Qujing Formation. **D-F.** Fossiliferous limestone and biostrome in the middle of the Qujing Formation, yielding very abundant branching stromatoporoid *Amphipora*, sringocephalid brachiopods, and others. **G.** Dolostone in the middle-upper part of the Qujing Formation. **H.** Black shales in the lower part of the Yidade Formation.

The last survivors of the platform fauna, including the final occurrence of *Stringocephalus*, are found in the basal bed of the Yidade shale, accompanied by a low-diversity fauna, comprising *Productella* sp., *Schizophoria* sp., *Athyris* sp., and atrypids. The occurrence of the conodont *Polygnathus hermanni* from these lower shales (ZHANG et al. 2018) dates this turnover as within the *hermanni* Zone. This provides a direct correlation with the global Geneseo Transgression, a well-documented episode of eustatic sea-level rise, widespread anoxia, and biotic crisis recorded in North America and Europe (e.g. HOUSE, 1985; BECKER & ABOUSSALAM 2013), and remarkably associated with major stable isotope excursions (see discussions below).

3. Givetian-Frasnian event stratigraphy and geochemical records

The upper Givetian was an interval of profound global change, marked by major bio-events, such as the Taghanic Crisis and the subsequent Geneseo Transgression/Event. These events are associated with widespread anoxia, sea-level fluctuations, and significant faunal turnovers (JOHNSON 1970; HOUSE 2002). To investigate the drivers and global synchronicity of these perturbations, stable isotope chemostratigraphy ($\delta^{13}C$, $\delta^{18}O$) serves as a powerful tool. Variations in $\delta^{13}C$ reflect changes

in the global carbon cycle and ocean productivity, while $\delta^{18}O$ trends in marine carbonates can provide insights into palaeotemperature and palaeosalinity. In order to reveal the faunal evolution and associated palaeoenvironmental background of the Givetian-Frasnian transition in South China, we present a new, high-resolution chemostratigraphic record based on 99 whole-rock carbonate samples from the Panxi section (84 samples of carbonate from the Qujing Formation, 15 samples of carbonate intercalation from the lower part of the Yidade Formation), and interprete these geochemical data in the context of coeval lithological changes, bio-events, and global climatic shifts.

The isotope data from Panxi reveal significant trends across the Givetian (Fig. 2). While both $\delta^{13}C$ and $\delta^{18}O$ values show general perturbations, the most prominent feature is a pronounced, progressive decrease in $\delta^{18}O$ values through the upper Givetian, reaching a minimum of -6.1‰ within the *hermanni* conodont Zone as observed in the $\delta^{18}O$ curve of the brachiopod shell (VAN GELDERN et al. 2006). This negative $\delta^{18}O$ trend is closely mirrored by negative excursions in the $\delta^{13}C$ record, suggesting a coupled response in the ocean-climate system. These isotopic trends from the Panxi section are remarkably consistent with global records from the same interval. The significant negative shift in $\delta^{18}O$ values during the upper Givetian (*hermanni* Zone) has been documented in both brachiopod shell calcite and conodont apatite (JOACHIMSKI et al. 2004, 2009) from other continents. This pronounced negative $\delta^{18}O$ excursion is widely interpreted to reflect a significant global warming event. Palaeotemperature reconstructions based on apatite $\delta^{18}O$ suggest a major climatic shift from relatively cool conditions (ca. 22 °C) in the upper Emsian to Givetian towards a much warmer "super-greenhouse" state, with average sea surface temperatures reaching 30–32 °C during the middle to late Frasnian (JOACHIMSKI et al. 2009).

The evidence from the Panxi section, when integrated with global data, supports a model of a coupled crisis driven by climate change. The late Givetian warming event, evidenced by the $\delta^{18}O$ decline, coincides with a significant eustatic sea-level rise documented in both South China and North America (BECKER et al. 2020). The prevailing hypothesis attributes this coupled warming and transgression to large-scale metamorphic CO_2 degassing, which triggered a greenhouse effect, leading to global warming and the subsequent transgression (CHEN et al., 2021). The catastrophic environmental consequences of this event are clearly recorded at the Panxi section. The global Geneseo Transgression is manifested locally as the Yidade Transgression (MA et al. 2014). This is marked by the abrupt lithological shift from shallow-water platform carbonates of the Qujing Formation to the anoxic black shales of the Yidade Formation, and the devastating faunal turnover that led to the extinction of the stringocephalid brachiopod community within the *hermanni* Zone (ZHANG et al. 2018). The negative $\delta^{13}C$ excursions during this interval likely reflect perturbations in the carbon cycle, possibly linked to enhanced stratification, changes in ocean fertility, and the widespread deposition of organic-rich black shales, as previously documented in Guangxi of South China (e.g. BAI et al. 1994).

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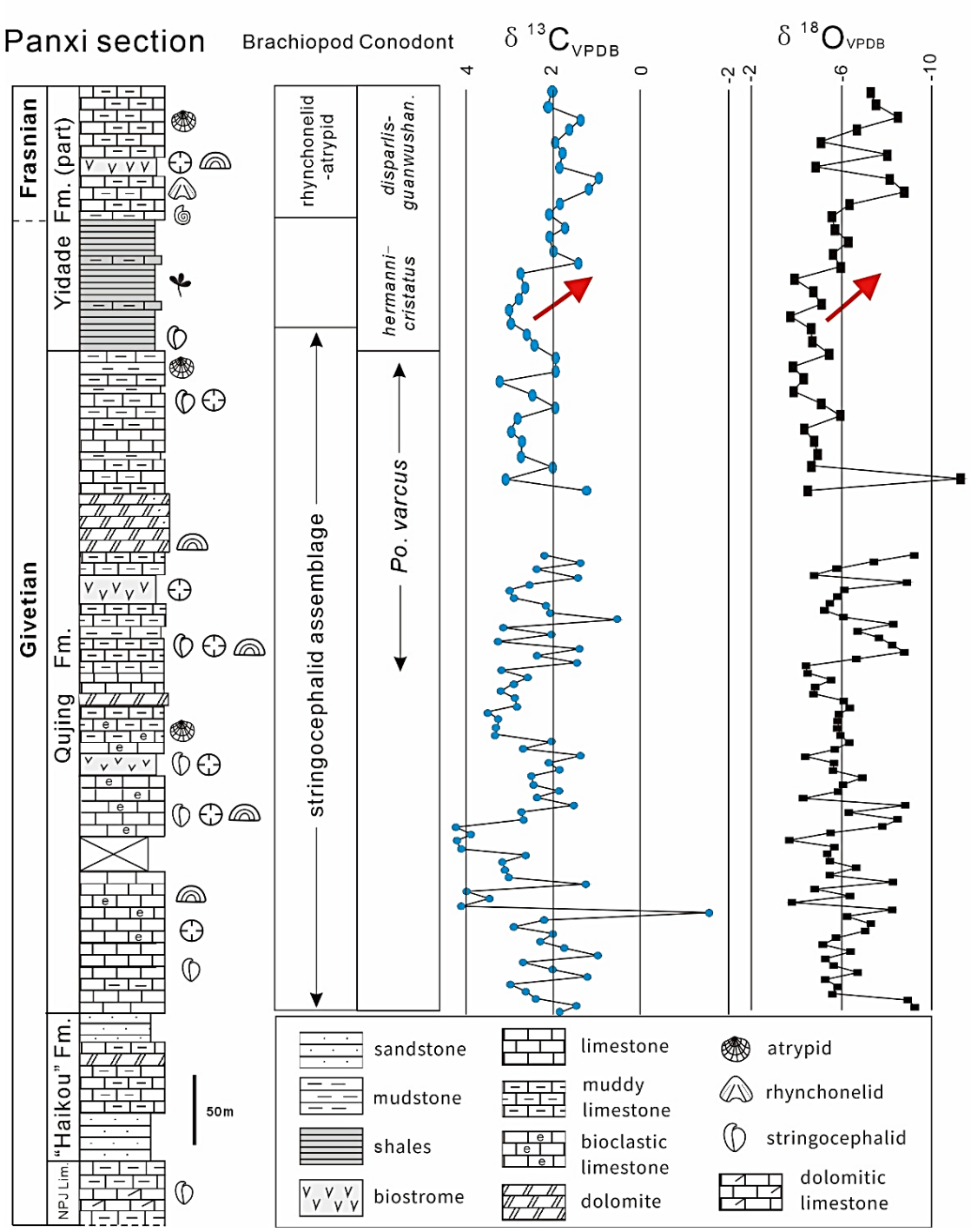

Fig. 2. Lithologic column of the Panxi section and ranges of main fossils in the Qujing Formation and lower Yidade Formation, integrated with carbon and oxygen isotope records in eastern Yunnan. Conodont data adopted from ZHANG et al. (2018).

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New Upper Devonian bio- and chemostratigraphy data from the south of West Siberia

Olga IZOKH & Nadezhda IZOKH

The Upper Devonian of the northern margins of the Kuznetsk Basin is represented by carbonate and terrigenous-carbonate deposits that are exposed in quarries and natural outcrops along the banks of the Tom' and Yaya rivers and their tributaries. These deposits contain numerous remains of benthic and pelagic fauna, characterizing the Frasnian and Famennian intervals. The identified conodont associations are represented by cosmopolitan taxa belong to the genera *Ancyrodella, Ancyrolepis, Icriodus, Mehlina, Palmatolepis, Polygnathus* and "*Polylophodonta"* suggesting a correlation with the *punctata–jamieae, rhenana–linguiformis*, *triangularis* and Lower *crepida* conodont zones. The largest conodont diversity occurs at the *triangularis*/*crepida* boundary (IZOKH et al. 2024).

A new conodont species, ***Polygnathus ovaliformis* sp. nov.** was described from the Kelbes Formation of the Frasnian Stage (IZOKH 2025). The studied conodont material was obtained from the Upper Devonian deposits, exposed in a canyon-like gully on the left bank of the Yaya River of the northeastern margins of the Kuznetsk Basin. This species is most closely related to the upper Frasnian *Po. brevis* MILLER & YOUNGQUISt and *Po. costulatus* ARISTOV. In the Kelbes Formation, the assemblage is dominated by species of the genus *Polygnathus*, in which, along with the new species *Po. brevilaminus* BRANSON & MEHL, *Po*. aff. *gracilis* KLAPPER & LANE, *Po. seraphimae* OVNATANOVA & KONONOVA, *Polygnathus* sp., and *Mehlina gradata* YOUNGQUIST were identified, characterizing the upper Frasnian *rhenana–linguiformis* zones.

Biofacies analysis of ostracod distribution has led to identification of characteristic associations and their restriction to certain parts of the palaeobasin in the Fransian and lower Famennian. Substage boundaries yielded ostracods with both smooth and ornamented shells. In the lower part of the substages, smooth forms predominate, whereas the middle and upper parts of the substages are characterized by forms with tuberculate and reticulated surface. *Hollinella valentinae* Beds were traced in the upper Frasnian Solomino Formation, and *Acratia granuliformis* Beds were traced in the lower Famennian Kosoy Utyos and lower Mitikha members (IZOKH et al. 2024; POPOV 2024).

Isotope geochemistry of the Upper Devonian sections on the south of the West Siberia reveals Frasnian global events – the Middlesex/*punctata* and the Upper Kellwasser, their stratigraphic position is confirmed by palaeontological data, as well as by the globally expressed negative carbon isotope anomaly. According to palaeontological and isotope geochemistry data, the Frasnian and Famennian boundary was established in the middle part of the Kosoy Utyos Beds of the Peshcherka Regional Substage on the northern margins of the Kuznetsk Basin (IZOKH et al. 2024).

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DEVONIAN MEETINGS

The 7th International Palaeontological Congress (IPC7)

30 November – 3 December 2026

Cape Town, South Africa

April 2025

Dear Colleagues,

We are excitedly looking forward to seeing you at IPC7. We hope you have been following our social media communications in which we have been giving more frequent updates about the conference.

Symposia

We are delighted to inform you that we currently have 31 themed symposia confirmed. In addition, we will have a General symposium to cater for those of you whose research does not fall into the symposia proposed. Note that although the symposium conveners have already identified possible speakers, if your work falls within the scope of any of the symposia, we invite you to contact the conveners directly to participate in the particular symposium.

Please view a detailed list of all our symposia and the conveners on the conference website. Here is the link: https://ipc7.site/programme.html

Travel Grants

We can also confirm that we will have some funding for travel grants for delegates from other parts of Africa, as well as for postgraduate students from around the world. Some of these will be targeted for particular symposia. The travel grants will be advertised shortly on our webpage.

Accommodation

On our website, we have also several different types of accommodation available that will suit all pockets. Most are walking distance to the venue, whilst a few are abit further out, but still easily accessible to the venue: https://www.ipc7.site/destination.html

Attention Palaeoartists!

We would like to extend a special invitation to palaeoartists to attend IPC7 to showcase their work. We are offering a stand/booth space (at no cost) for palaeoartists to display their artwork at the meeting. Details regarding how much of space is allocated per artist will be determined once we have some indication of how many people would like to participate in this endeavour.

Registration Costs (excluding fieldtrips)

Dates for registration will be announced shortly, but below are the registration costs (in South African Rands) to help you with your planning. Please check the website for updates.

REGISTRATION FEES (Includes Catering and refreshments)	
Early Bird Fee (IPA Members)	R5,500.00
Early Bird Fee (Non-Members)	R6,500.00
Regular Standard Fee (IPA Members)	R8,000.00
Standard Fee (non-Members)	R9,000.00
Developing country Fee (Professionals)	R3,500.00
Developing country student Fee	R3,000.00
Foreign Student reduced fee	R4,500.00
For the list of developing countries with HDI ≤ 0.85: https://hdr.undp.org/data-center/country-insights#/ranks	
Students should provide proof of registration for Hons, Masters or Phd.	

Preliminary registration for the conference: https://www.ipc7.site/registration.html. Signing up will allow you to directly receive any new circulars and updates.

Please visit our website for more information regarding the **pre- and post-conference trips** that are being planned: https://www.ipc7.site/fieldtrip.html

Convention Venue

Baxter Theatre Complex and the University of Cape Town

For further information and preliminary registration go to: ipc7.site

The 7th International Palaeontological Congress

Devonian stratigraphy, environments and palaeontology with focus on Gondwana

The Devonian Period marks a crucial point in Earth history marked by major evolutionary and ecological innovations that would indelibly change both terrestrial and aquatic environments; setting the foundations for our current biosphere. In the terrestrial realm, Devonian witnessed (among others) the afforestation of land as well as its concomitant invasion by animals, whilst in the aquatic realm jawed fish, ammonoids and reef-forming organisms (corals, brachiopods, bryozoans) arguably reached a pinnacle in their ordinal diversity. Interspersed among these major evolutionary events are a multitude of biocrises of varying intensity of which the Late Devonian mass extinctions are perhaps best known. Although much is known about the Devonian Period, the vast majority of knowledge from this time period is derived from former Laurussian regions. Over the last two-to-three decades, great strides have been made by researchers in the former Gondwanan regions of Africa, South America, Antarctica and Australia, revealing the importance of Devonian-aged strata and fossils from these areas. This has provided a far more complete global picture of this pivotal time period. This symposium covers a broad array of topics pertaining to Devonian stratigraphy, palaeoenvironments, and palaeontology with a special focus on former Gondwanan regions, however, presentations from other geographic areas are welcome. This symposium will be followed by a business meeting of the Subcommission on Devonian Stratigraphy.

Conveners:

- Cameron Penn-Clarke (Cameron.Penn-Clarke@wits.ac.za)
- Rob Gess (robg@imaginet.co.za)
- David Harper (david.harper@durham.ac.uk)

If you are interested in this symposium, please contact the conveners.

STRATI 2026

First Circular

Welcome to STRATI 2026 in China: A New Chapter in Global Stratigraphy

We are excited to invite the global stratigraphy community to STRATI 2026 – Exploring the Depths: Bridging Tradition and Innovation in Stratigraphy, taking place from June 28 to July 3, 2026, at the Suzhou DDE Center in Jiangsu Province, China.

The STRATI Congress has long served as a cornerstone of international stratigraphic research, fostering dialogue and innovation across continents with a legacy rooted in Europe. As Earth science challenges and opportunities become increasingly interconnected, STRATI 2026 represents a pivotal opportunity to enhance global cooperation. Hosting this edition in Suzhou reflects the International Commission on Stratigraphy's (ICS) dedication to promoting inclusive worldwide scientific exchange and addressing shared priorities in stratigraphic research.

This congress comes at a critical time for the Earth sciences. The rising demand for data integration, harmonized chronostratigraphic frameworks, and collaborative solutions to planetary-scale challenges, including climate archives and resource sustainability and calls for renewed global synergy. STRATI 2026 will act as a catalyst for these efforts, not only strengthening the traditional research in stratigraphy and high-resolution geochronology, but also leveraging advancements in open-access digital platforms that empower scientists worldwide.

Suzhou, a city renowned for its harmonious blend of heritage and modernity, provides an ideal backdrop for this global dialogue. The Suzhou DDE Center embodies the spirit of international scientific collaboration. As a hub for open-data initiatives and interdisciplinary cooperation, it will serve as a dynamic venue for showcasing global innovations in stratigraphy and facilitating hands-on engagement with cutting-edge tools.

We envision STRATI 2026 as a milestone in our collective progress. Over six days, participants will share knowledge through thematic sessions, workshops, and field excursions across iconic geological regions. We particularly encourage subcommissions, working groups, and early-career scientists to shape the program, ensuring that diverse perspectives inform the agenda. Together, we will explore how stratigraphy can bridge disciplinary divides, refine global standards and correlations, and illuminate Earth's history with unprecedented clarity.

In the spirit of unity and discovery, we warmly invite researchers, educators, and policymakers worldwide. Let us seize this moment to forge partnerships that transcend borders and advance stratigraphy as a truly global endeavor. Join us in Suzhou to write the next chapter of our planet's story—together.

Shuzhong Shen, Maoyan Zhu, Zhong-Qiang Chen

Chairs of STRATI 2026

STRATI 2026

General information

Congress dates: **June 28th-July 3rd, 2026**
Website: **https://www.strati2026.org/**
Contact: **strati2026@ddeworld.org**
Organizing Committee Chairs: Shuzhong Shen, Maoyan Zhu, Zhong-Qiang Chen
International Scientific Committee Chairs: Elisabetta Erba, Shuzhong Shen, Charles Henderson
See the full list on the website.

Congress Schedule

June 24th -28th	Pre-conference field excursions
June 28th	Onsite registration, workshops, icebreaker
June 29th -30th	Scientific symposia
July 1st	Mid-conference field excursion
July 2nd-3rd	Scientific symposia
July 4th-July 10th	Post-conference field excursions

Call for Sessions

We invite you to propose sessions for STRATI 2026. The session can be general session or subcommission session. Session proposal submission will be opened on **May 1st, 2025 through the STRATI 2026 website**, and due to **December 1st, 2025.** One current proposal is to have an open ICS business meeting that also includes various presentations in a plenary or roundtable session. In addition, subcommissions could be encouraged to include a business meeting in their dedicated sessions. All subcommissions should plan to conduct a business meeting. Please contact strati2026@ddeworld.org to book the meeting room.

Field excursions

8. Upper Devonian to lowest Carboniferous successions in Guilin Karst area, Guangxi, South China

Post-conference excursion, 2 days

Attractions:

- Upper Devonian and Lower Carboniferous carbonate successions and karst landscapes in Guilin City
- The metazoan and microbial reefs around the F-F boundary in Guilin
- The Nanbiancun auxiliary stratotype section for the Devonian-Carboniferous boundary GSSP

For more excursions and hotels see the First Circular of STRATI 2026

STRATI 2026

Location

Suzhou, located at the lower reaches of the Yangtze River in southeastern Jiangsu Province, eastern China and next to Shanghai City, is one of hottest tourism destinations in China. It is also a place celebrated for its Chinese traditional gardens, ancient canals, and cultural heritage. Several locations are stratigraphically and geologically significant within the city, including Taihu Xishan Geopark, Tiger Hill (Jurassic Volcanic Rock Layers), Archaeological Park of the Caoxieshan Site–Neolithic Period, Granite Landforms of Lingyan Mountain and Tianping Mountain and Two GSSPs and end-Permian mass extinction at the Meishan Section, Changxing nearby. Suzhou is also a historical city in the Yangtze delta area. Its Most Famous Historical Sites and Cultural Heritage of Suzhou include The Humble Administrator's Garden (Zhuo Zheng Yuan), Zhouzhuang, Kunqu Opera.

The weather in Suzhou in late June and early July is typically hot (30–34°C), humid, and rainy, as it falls during the plum rain season and transitions into summer. Congress attendees are advised to wear light, breathable clothing (quick-dry fabrics recommended), waterproof shoes, and bring umbrellas or raincoats (hotels typically provide umbrellas, but availability may be limited during peak demand).

Visa

Under China's current policies, citizens from 31 countries can travel to China visa-free for up to 30 days. Additionally, citizens from 28 countries, including several major European nations, can stay visa-free for up to 15 days. Furthermore, citizens from 54 countries are eligible for visa-free transit, allowing them to stay in China for up to 10 days (details on the website). Invitation letter will be provided upon request.

Registration and fees:

Early-bird registration:
2000 RMB/280$ (professional), 1600 RMB/210$ (retired professional), 1200 RMB/160$ (students)
Standard registration:
2900 RMB/400$ (professional), 2200 RMB/300$ (retired professional), 1500 RMB/200$ (students)
Onsite registration:
3300 RMB/450$ (professional), 2500 RMB/350$ (retired professional), 1800 RMB/240$ (students)

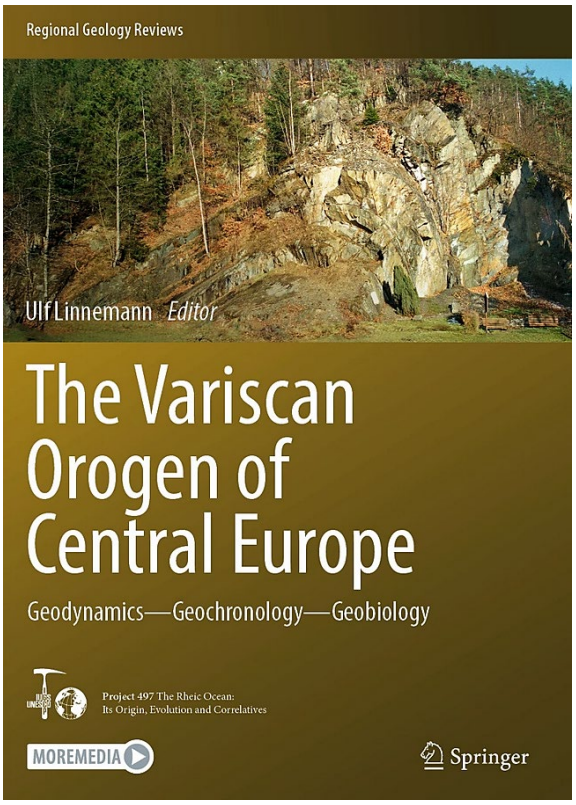
Registration fee including icebreaker, lunch, hard copy program, digital proceedings and a bag.

Accompanying person: 1000 RMB/150$, access to icebreaker, lunch and a bag (Organized accompanying persons' social activities on the website).

Important dates

Start of session proposal submission: May 1st, 2025
End of call for sessions: December 1st, 2025
Dispatch of second circular: December 31st, 2025
Opening abstract submission: December 31st, 2025
Opening registration: December 31st, 2025
Deadline for abstract submission: March 15th, 2026
Deadline for early bird registration: March 15th, 2026
Dispatch of third circular: May 30th, 2026

DEVONIAN PUBLICATIONS



LINNEMANN, U. (Ed.). The Variscan Orogen of Central Europe. Geodynamics – Geochronology – Geobiology. Regional Geology Reviews. – 1033 pp., Berlin (Springer), ISBN 978-3-031-82910-9 [price: 353,09 €]

(partially) **Devonian chapters**

LINNEMANN, U. Inside Pangea: A Brief Introduction to the Variscan Orogen in Central Europe. – pp. 1-14.

OBST, K. Terra Incognita – The Hidden Basement of Northern Central Europe Revealed by Deep Boreholes. – pp. 15-42.

HERBOSCH, A. & BOULVAIN, F. The Ardenne. – pp. 43-106.

KÖNIGSHOF, P., JANSEN, U., LINNEMANN, U. & MENDE, K. The Rhenish Massif (Rheinisches Schiefergebirge). – pp. 107-156.

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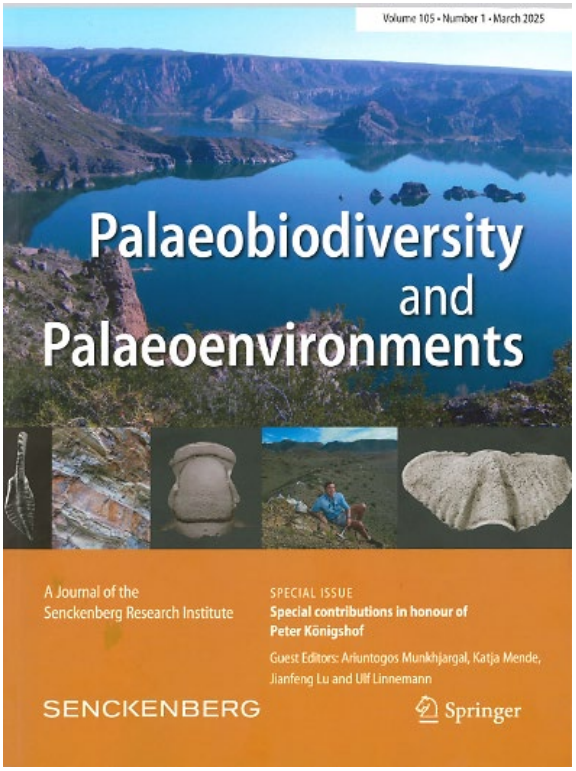
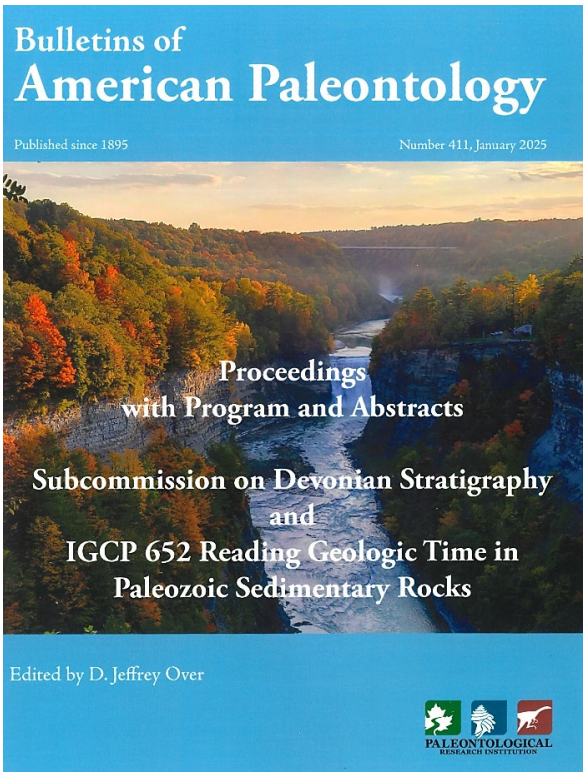


MUNKHJARGAL, A., MENDE, K., LU, J.-F. & LINNEMANN, U. (Eds.). Special contributions in honour of Peter KÖNIGSHOF. – Palaeobiodiversity and Palaeonenvironments, Special Issue, **105** (1): 1-334.

Content

[followed by a short contribution on a Miocene porcupine – the smallest and oldest species of *Hystrix* – but without Peter´s name on it]



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WATERS, J. A., WATERS, J. W., CARMICHAEL, S. K., KÖNIGSHOF, P., MUNKHJARGAL, A. & GONCHIGDORJ, S. The Central Asian Orogenic Belt (western China and Mongolia) was a biodiversity hotspot in the Late Devonian. – pp. 127-128.

WICHERN, N. M. A., BIALIK, O. M., NOHL, T., PERCIVAL, L. M. E., KASKES, P., BECKER, R. T. & DE VLEESCHOUWER, D. Deciphering the role of terrestrial/atmospheric interactions in Late Devonian Kellwasser black shale deposition: a high-resolution cyclostratigraphic study of the Winsenberg section (Rhenish Massif, Germany). – p. 129.

ZAMBITO, J. J. IV, WELDON, A. C., FARBARIK, O. B., BOLIN, D. L. & MCLAUGHLIN, P. I. Using $\delta^{13}C_{TOC}$ chemostratigraphy to recognize Devonian global events in the New Albany Shale (Illinois Basin, USA). – pp. 130-131.

ZAMBITO, J. J. IV, BRETT, C. E., DA SILVA, A.-C., FARBARIK, O. B. & WILLISON, M. J. Integrated stratigraphy of Middle Devonian strata in the Cargill Test #17 Core (Lansing Core) of New York State. – p. 132.

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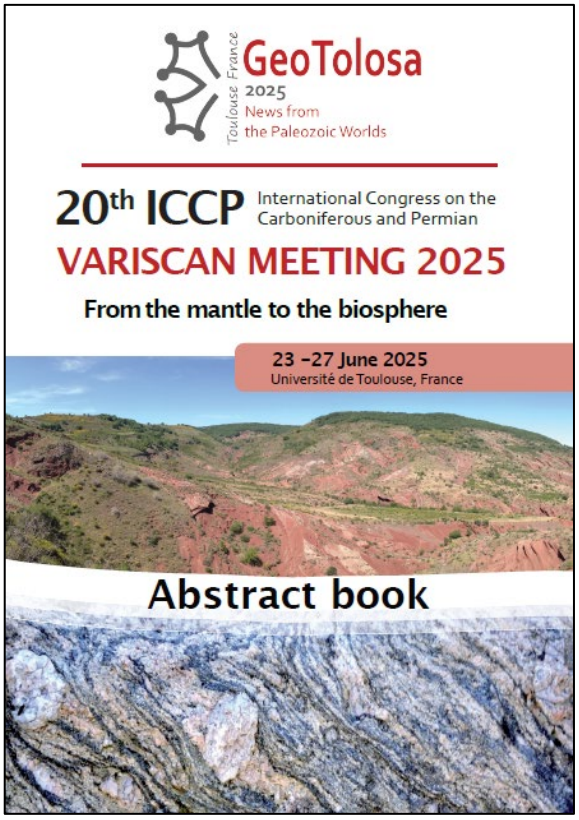

Devonian presentations

GUAN, Y.-F., CHEN, J.-T., ZHONG, Y.-T., GAO, B., SHENG, Q.-Y. & QIE, W.-K. Sedimentarty processes and carbon isotope records during the end-Devonian Hangenberg Crisis. – p. 7.

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NARDIN, E., MOYNIER, L., CHJAVAGNAC, V., SAILLOOL, M., ARETZ, M., DEKACOUR, A. & DENAYER, J. Mud mounds or not mud mounds? That is the question for the early Devonian red marbles of the Minervois (France). – pp. 10-11.

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BARRERA-LAHOZ, V., VALENZUELA-RÍOS, J. I. & LIAO, J.-C. Upper Frasnian to middle Famennian Global Bioevents in the Compte section (Upper Devonian, Central Spanish Pyrenees). – p. 15.

SONG, J.-J. Late Devonian benthic ostracods from South China and their response to the Frasnian-Famennian event. – p. 42.

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Geological Society of America, Abstracts with Programs, **56** (5).

Devonian abstracts

BLAKE, M., BUTLER, K. L., MUNK, L., BOUTT, D. F., MORRIS, N., KENNEDY, J., SAHA, P., IBARRA, D. E. & CUSTADO, M. J. Lithium sources and enrichment mechanisms for the lithium-rich oil field brines of the Devonian Nisku, Leduc, and Swan Hills Formations. – Paper 174-2.

BLODGETT, R. B. & FELDMAN, H. R. *Gypidula coeymanensis* SCHUCHERT, 1913, the widespread and commonly cited index brachiopod for Helderbergian (early Early Devonian) strata of southeastern Laurentia is really a member of the genus *Sieberell*a OEHLERT, 1887. – Paper 245-2.

BOWEN, A., MCLAUGHLIN, P., PATON, T., WELÖDON, A., MALONE, D. H., DAY, J. E., LASEMI, Z. & EMSBO, P. Far-field tectonic controls on the spatial distribution of critical mineral-enriched Devonian black shales in the central US. – Paper 100-3.

CHEN, J., MA, K.-Y. & LU, Y.-H. Cyclostratigraphic calibration of the Late Devonian and implication for bio-crisis and bio-event in Illinois Basin, eastern United States. – Paper 64-3.

COBBETT, R., COLPRON, M., BERANEK, L., PIERCEy, S. J. The western Laurentian continental margin in the Canadian Cordillera. – Paper 21-13.

HAUGHY, C., MITCHELL, L. & SCHWEICKERT, R. Devonian fossils in the Columbia Marble of the Calaveras Complex, Columbia, Tuolumne County, California. – Paper 245-3.

KERR, J. Skeletobiosis through extinctions: comparison of the effects of environmental change and host turnover on skeletobionts between the Late Devonian and end-Permian extinction events. – Paper 246-1.

JORDAN-BURMEISTER, K. Ecological shift in proetid and phacopid associations through the Devonian. – Paper 17-9.

MADILL, E. & DEMITROFF, M. Description of periglacial processes preserved in Appalchian Basin paleosols of Late Paloeozoic ice age onset. – Paper 92-3.

MAYER, P. & COOROUGH BURKE, P. Devonian IMLS digitization project at the Field Museum and Milwaukee Public Museum. – Paper 38-1.

MCCREARY, L. & RIDGWAY, K. Revisiting one of Terry Pavlis` first stomping grounds: detrital record of the Yukon-Tanana Terrane and Manley Basin of Central Alaska. – Paper 223-11.

PUTRI, T., GILL, B., LEROY, M. A., OWENS, J., GILLEAUDEAU, G. & REMIREZ, M. Exploration of marine desoxygenation using cycling of carbon and thallium during the Late Devonian extinctions across the Appalachian Basin. – Paper 3-4.

REGIER, N., HORTON, B. K., STARCK, D., FUENTES, F., DONAGHY, E., EDDY, M. & CAPALDI, T. Paleozoic basin evolution during tectonic and climatic transitions in the eastern Precordillera of Argentina. – Paper 202-1.

RIEMER, S., MOLLER, S. R., ELLEFSON, E., DEWING, K., MELCHIN, M., BLAKE, R. E., PLANAVSKY, N. J., SPERLING, E. A. & TARHAN, L. New insights into early vascular land plants as geobiological agents of phosphorus weathering. – Paper 2-9.

RIGGS, N., HANSON, R. E. & POWERMAN, V. HF-isotopes and trace element analysis of zircon from the Devonian Bowman Lake Batholith, northern Sierra Terrane, CA: implications for source compositions. – Paper 47-3.

ROSSELI, M., EVANS, S. D., OWENS, J., BAIRD, G. C. & SCOTT, E. A case study in exceptional preservation: evaluating the role of anoxia in a new example of soft-bodied preservation from the Middle Devonian (Givetian). – Paper 64-2.

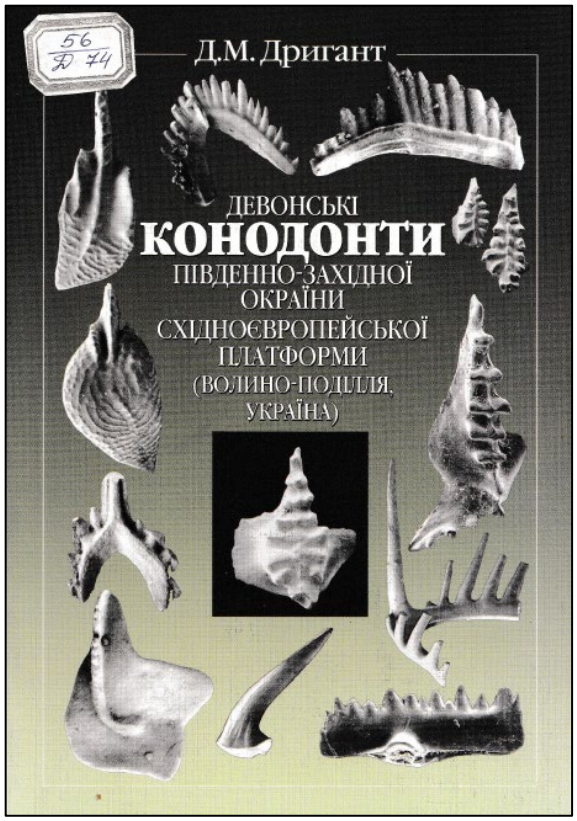
TERRY, D. jr. Challenges to interpreting Devonian terrestrial environments across the Catskill Mountains region: help wanted. – Paper 92-3.

WASHBURN, A., HICKMAN, J., LUKOCZKI, G. & ABSHIRE, M. Investigating spatial and temporal changes of trace element abundances in Devonian shales of Kentucky. – Paper 51-6.

WINTERS, G., SPERLING, E. A., ELLEFSON, E., MELCHIN, M., DEWING, K. & LOVE, G. Assessing early land plant impacts on the evolving Paleozoic marine biosphere. – Paper 112-5.

A little-known monograph on Devonian conodonts from the Ukraine

R. Thomas BECKER



DRYGANT, D. M. (2010). Devonian conodonts from south-west margin of the East European Platform (Volyn´-Podolian, Ukraine). – 156 pp. + 23 pls.; ISBN 978-966-360-137-3, Kiew (Academ Periodyka) [in Russian with English figure and plate explanations].

My attention to this hardly quoted or otherwise recognized monograph came through a recent paper on Famennian conodonts by MURASHKO (2025), who illustrated from Belarus a polygnathid that was not in my species lists published in this Newsletter. Unfortunately, the paper did not include a reference to the publication, where it was established. Clarity came from a review of Ukrainian conodont research by Tamara I. NEMYROVAKA (2017). With the help of Tamara and Dernov BITALIJ from the National Academy of Sciences of Ukraine, I received a pdf of the monograph. Since the work will not become easily accessible, and with the consent of the academy, I add here the photos of all holotypes of the 13 new species erected in the monograph (Fig. 1, sizes changed to fit on this plate):

a-b. *Caudicriodus ruthmawsonae*, x 50, lower Lochkovian

c-d. *Polygnathus brevilingulatus*, x 50, lower Famennian (a member of the *"Linguipolygnathus" semicostatus* Group)

e. *Polygnathus inaequilateralis*, x 58, Frasnian

f-g. *Polygnathus communis larysazimae*, x 58, Famennian, (a *Neopolygnathus*)

h-i. *Polygnathus communis solididentatus*, x 58, Famennian (a *Neopolygnathus*)

j-k. *Polygnathus lennarti*, x 58, lower Famennian

l. *Icriodus alternatus hemialternatus*, x 57, probably lower Famennian

m-n. *Polygnathus periculosus*, x 37, lower Famennian (a *Ctenopolygnathus*)

o-p. *Polygnathus praesemicostatus*, x 53, lower Famennian

q. *Polygnathus polylophodontiformis*, x 58, Famennian

r. *Polylophodonta talenti*, x 32, Famennian (to be added to the obituary for John TALENt from the last year)

s. *Pandorinellina formosa*, x 40, top-Pridoli to lower Lochkovian

t. *Zieglerodina podolica*, x 49, top-Pridoli to lower Lochkovian

In addition, there are taxa in open nomenclature, such as *Pandorinellina* nov. sp. (lower Lochkovian), *Icriodus* nov. sp. A (= *Icriodus* n. sp. of MAWSON & TALENT 1989), *Polygnathus* nov. sp. A-C, some *Polygnathus* sp., Famennian *Mehlina* sp., *Pandorinellina* sp., *Pelekysgnathus* sp., *Polygnathellus* sp., and *Apatognathus* sp., and *Alternognathus* sp. 1.

NEMYROWSKA, T. I. (2017). Paleozoic Conodont Studies in Ukraine. – Collection of Scientific Works of the Institute of Geological Sciences of the NAS of Ukraine: 124-136; Kiew.

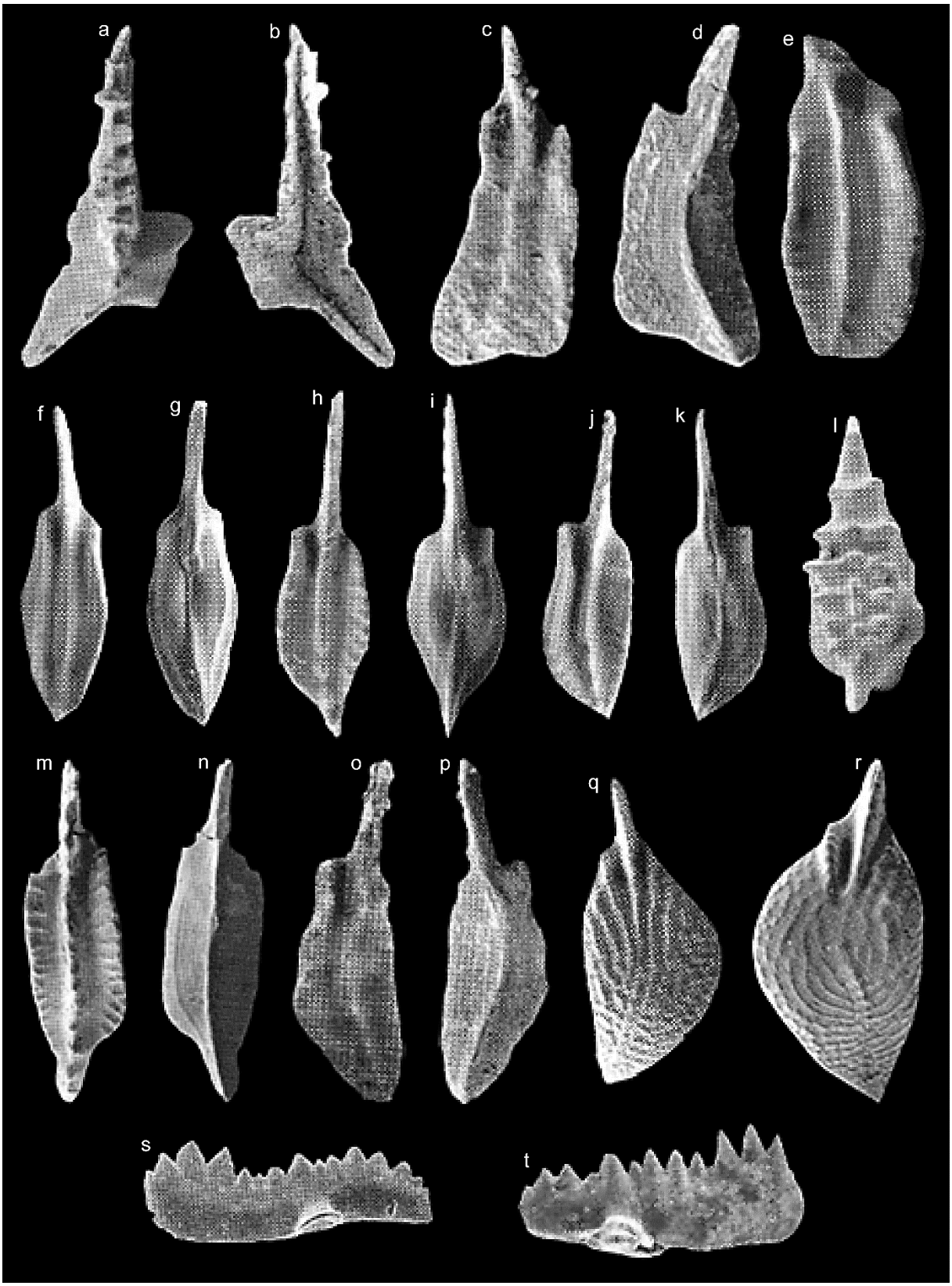


Fig. 2. Holotypes of new taxa established in DRYGANT (2010) based on scanned pdf illustrations; magnifications and ages see figure caption.

MEMBERSHIP NEWS

The Group Photo of Geotolosa 2025, supplied by CM Markus ARETZ

CM Gordon C. BAIRD

This past year has seen extensive collaborative work with curatorial staff at Paleontological Research Institute in Ithaca, NY to create an ordered, upward-younging sample succession for the Middle Devonian Hamilton Group and succeeding Tully and Gilboa Formations, involving nearly 1.000 samples. Since these samples will go into standardized boxes, the sample succession must be arranged into a predetermined box-order prior to the specimen move into the new storage facility. Completion of this work phase is anticipated ahead of creating similar numbered sample successions for the higher Genesee Group-through-end-Devonian interval. Part of this effort involves the careful insertion (merging) of both BAIRD and BRETT collection samples into a single P.R.I. collection.

Working with Carlton BRETT and Randy BLOOD, I wrote up and submitted a short paper, as a follow-up to the SDS Geneseo 2023 Summer Meeting paper presentation (BAIRD et al. 2025), although this new paper topic was an entirely different one than that presented at the conference. The new paper represents preliminary documentation of a widespread, but largely unreported and minimally characterized phenomenon of regional thermal-burial-related darkening of low TOC (total organic carbon) shales and calcareous mudrocks that appears to be covariant with the paleotemperature proxy conodont CAI (Color Alteration Index). With increased thermal-burial changes, this mudstone darkening effect coincides with strong monochromatic darkening in many fossils and conspicuous increase of light reflectance in graptolites. These changes are documented for certain Ordovician and Devonian shale units as they are traced from the craton into the Appalachian Basin across southern Ontario into New York State. Pending future quantification and calibration of these parameters with standing paleotemperature burial proxies, they will be useful in exploration as well as other aspects of sedimentary geology.

Award

Gordon BAIRD has been recently awarded the honor of **Fellow of the Geological Society of America** following successful nominations by Carlton BRETT, Tom HEGNA, and Randy BLOOD.

Publications

BAIRD, G. C., BRETT, C. E. & BLOOD, D. R. (2025). Regional mudstone darkening effect: Overlooked regional maturity measure in outcrop and cores. - Bulletin of American Paleontology, **411**: 13-21; doi: 10.32857/bap.2025.411.01.

BRETT, C. E., ZAMBITO, J. J. IV, WELYCH-FLANAGAN, M., BAIRD, G. C. & BARTHOLOMEW, A. (2025). Ecological Evolutionary Subunits

(EESUs) and their boundaries in the Middle Devonian of the Appalachian Basin: Toward a model for punctuated change in marine benthic communities. - Palaeodiversity and Palaeoenvironments, **105**: 101-128; /doi.org/10.1007/s12549-025-00647-4.

BRETT, C. E., IVANY, L. ZAMBITO, J. J. IV, WELYCH-FLANAGAN, M. & BAIRD, G. C. (2025 in press). Stasis and faunal overturn in ancient marine communities: Punctuation and evolution on the periphery. - Paleobiology.

HM R. Thomas BECKER, CMs Z. Sarah ABOUSSALAM, Till SÖTE, and the Münster Group

As in many previous years, the annual spring field work in Morocco was a highlight for 2025. From Münster, research assistant Mieke LÖW (see below) and M.Sc. student Max GROßKLAUS took part. Starting from Rabat, we were joined by Amine TALIH and our old friend CM Ahmed EL HASSANI. Purposes were multifold apart from collecting samples for Mieke´s Ph.D. and Max´s M.Sc. projects. We are intensively working on the third Meseta monograph in the *Frontiers in Science and Engineering* journal of the *Hassan II Academy of Science and Technology of Morocco*. The volume will deal with the Rabat-Tiflet Zone, eastern parts of the Western Meseta (Azrou to Khenifra regions), and possibly with the Oulmes Devonian. Publication (open access – as the first two monographs) is planned for spring 2026.

We also re-sampled Devonian and Lower Carboniferous outcrops in the Sidi Bettache Basin and Benahmed region. For example, a visit to the Lower Devonian of El Guelb west of Benahmed showed a strongly cyclic (Fig. 1) and completely decalcified sequence that is not suitable for conodont sampling and microfacies analysis but for cyclostratigraphy. In the Tafilalt, sampling of Kellwasser limestones for conodonts and geochemistry continued. These differ considerably from the classical German Kellwasser facies types of basinal highs but microbial *Stromatactis* limestones (Fig. 2) are significant in both regions. It is planned to continue our successful cooperation with the Greifswald group (Heiko HÜNEKE, Arwed GIBB etc.; see GIBB et al. 2025a, 2025b), with plans for joint field work in 2026 and a fresh approach towards the Kellwasser sedimentology.

Fig. 1. The strongly cyclic, mostly decalcified Lower Devonian (Pragian/lower Emsian) west of Benahmed (central Moroccan Meseta).

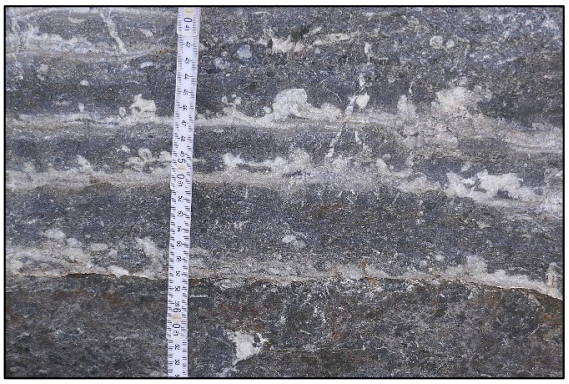


Fig. 2. Cyclic *Stromatactis* layers in the Upper Kellwasser Limestone at Rich Gaouz, central Tafilalt.

The study of Anti-Atlas Devonian ammonoids has been re-intensified in 2024/2025. Regional biodiversity overviews were presented at meetings in Berlin and Warsaw (BECKER 2024a, 2024b). Three papers have been published or are in press concerning missing links of early pharciceratids (BECKER 2025a) and the too much neglected Cyrtoclymenioidea (BECKER 2025a, 2025b,

2025c). Zonation principles were outlined at the Geo4Göttingen congress a few weeks ago (BECKER 2025e). It is hoped that two manuscripts on upper Frasnian tornoceratids can be finished eventually in the next year (see report by Till). During the post-PalGes Meeting excursion in September 2024, I was very pleased that it is still possible to collect Famennian ammonoids in some of the well-known Holy Cross Mts. outcrops, such as Kowala and Ostrowka.

Fig. 3. Prepared *Anetoceras obliquicostatum* on display in one of the Erfoud rockshops, showing first approximation of the last whorl (on the right), then its terminal cyrtoconic uncoiling.

As a contribution to a volume in honor of John TALENT, a study of new Emsian goniatites from central Victoria, Australia, was completed jointly with Clem EARP. In this context, the variability of lower Emsian Anetoceratidae, which can be abundant in the Anti-Atlas, had some significance. Many beautifully prepared specimens are on display in Erfoud rockshops, where one can see that some individuals of *Anetoceras* approach the *Erbenoceras* morphology, defined by advolute whorls that get in contact (Fig. 3). Such a transition questions the subdivision of the family into gyroconic and advolute subfamilies. Anetoceratids and their relatives (the Mimoceratoidea) shall be the first superfamily to be dealt with in a series of planned contributions to form a future revised Devonian ammonoid Treatise. Its history and problems are explained in a joint Treatise commentary paper (SELDON et al. in press).

In the Rhenish Massif, collecting during student field trips continues to yield new and interesting ammonoids, for example at Beringhausener Tunnel. Other specimens are made available by Hartmut KAUFMANN and partly will become holo- and paratypes. He was the first to discover that our best and strongly cyclic succession in the famous Effenberg Quarry (see WICHERN et al. 2025a, 2025b submitted) has been mostly removed and covered by quarry debris. There are plans to revise together in future the ammonoid fauna of the top-Eifelian Odershausen Limestone, deposited during the Kačák Crisis.

Work on the dating of Rhenish reefs has slowed down but is far from complete (see BUSCHHAUS et al. 2025). A joint field day with Carlo HERD at the Donnerkuhle Quarry produced some more upper Givetian goniatites from a currently very well-exposed post-reefal black shale and black turbiditic limestone succession (“Flinz”), time equivalent to the New York Geneseo Shale.

The cooperation with Amine TALIH from Morocco resulted in the participation in a Carboniferous palynology study (TALIH et al. 2025). Amine plans to continue in Carboniferous strata but he also may do more Devonian work in future – hoping that he gets a suitable, well-deserved position in Morocco. Another Moroccan project is the finalization of a paper, led by Peter MÜLLER, on new top-Tournaisian (Erdbach Limestone equivalent) trilobites associated with goniatites and conodonts from the eastern Tafilalt.

After a too long period of recurrent reviews and revisions, the paper on microbial structures in Lower Devonian siliciclastics of the southern Tindouf Basin finally appeared (ZEGHARI et al. 2025). As a next step, the new brachiopod faunas shall be published jointly with Uli JANSEN. There are good prospects for pelagic faunas in

the overlying Middle and Upper Devonian, to be dealt with in future collaboration.

I am very pleased that the monumental European Variscan book eventually appeared (see Devonian publications section), which includes my long review of Devonian and Lower Carboniferous events (BECKER 2025d), and with, in my opinion, important general comments on event causes and processes.

In my function as the Chairman of the German Stratigraphic Commission (DSK), I felt that the immense knowledge of German stratigraphy, Devonian and beyond, should become easier accessible to the international community. During the annual DSK meeting in Münster in spring 2025, German subcommissions were asked to prepare short summaries concerning traditional German chronostratigraphic units (such as the Siegenien or Hembergian in the Devonian), in a similar way as our Belgian colleagues have revised, defined and published their units. It will probably take a few years to assemblage all chapters, which shall be published in a special issue with the *ZDGG*. In parallel, all subcommisions were asked to revise their parts of the German Stratigraphic Chart, with the intention to publish revisions in English as a second volume, not as a poster. This will allow to show more regional Devonian successions and to enlarge intervals with a complex and very detailed lithostratigraphy.

CM Zhor Sarah ABOUSSALAM

Sarah made in the last year an enormous effort to identify all conodont samples for the third Meseta volume, to take numerous SEM pictures, and to photograph and describe all thin sections of sampled beds. The fact that some sections were re-sampled in spring 2025 and that these were only picked in this summer did not make the task easier. The Azrou Devonian chapter alone, which she will lead as the first author, will have almost 90 pages.

In parallel, Sarah took part in a study on Frasnian conodonts in northwestern and southern Algeria (MAHBOUBI et al. 2025). In addition, there are recurrent conodont samples from Rhenish Massif sections. Unpublished data from the Kellerwald, mostly Blauer Bruch, will be important for the refinement of the lithostratigraphy of the Ense Rise.

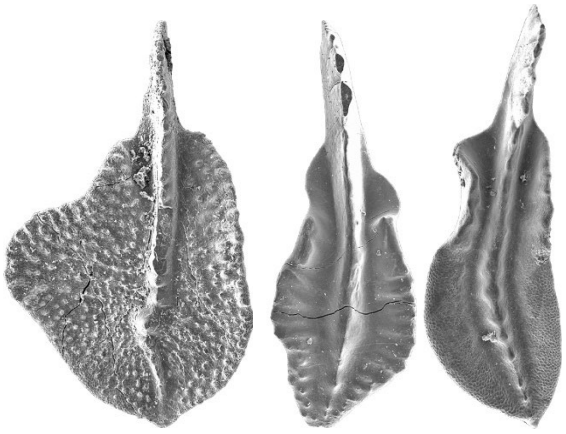


Fig. 4. Some Frasnian conodonts from the Bouwari section, Dechra-Aït-Abdallah region, eastern part of Western Meseta.

Another long-lasting but still unfinished project, waiting for Thomas, is the joint publication of new conodont species from the Wulankeshun section of Xinjiang under the led of WANG Zhihong (also with Sven HARTENFELS). Zhihong brought interesting lower Emsian faunas to Münster that include, apart from polygnathids, common *Criteriognathus* and subordinate icriodids that do not easily fall into established taxa.

CM Till SÖTE

Till is earning his salary outside palaeontology but is available as external reviewer for theses, especially when they deal with Devonian ammonoids (e.g. PAWELLEK 2025). He is impatiently waiting for the completion of two manuscripts on Frasnian tornoceratids from the eastern Dra Valley (Oued Mzerreb) and eastern Tafilalt (Ouidane Chebbi). Not to mention (to Thomas) the long-planned publication of his M.Sc. on the lower Famennian ammonoid radiation in the Canning Basin.

Bachelor Theses

Sarah PAWELLEK used shell form, ornament, sutures, and ontogenetic morphometry to document the unexpectedly

high regional and intraspecific variability in the lower Famennian goniatite genus *Polonoceras* (Tornoceratidae), based on material from the Rhenish Massif, southern France, and Tafilalt. She could prove a few new species that shall be named in a future publication.

Former B.Sc. student **Verena BUSCHHAUS**, who moved to Bonn university, published some results of her thesis on unusually rich palaeoniscid scales in the basal upper Givetian of the Hofermühle Reef (western Rhenish Massif). It is a popular science contribution (BUSCHHAUS et al. 2025); a more extensive paper is planned.

Master Theses

Based on samples taken in spring 2025, **Max GROßKLAUS** will study with highest precision the middle-upper Frasnian transition in a transect from the Moroccan Meseta (Mrirt region) through the Sub-Meseta (Bou Tisdafine Northeast section) to the northern (Bine Jebilet Northeast) and central Tafilalt (Bou Tchrafine). Apart from conodont and microfacies investigations, he will concentrate on stable isotopes and elemental geochemistry in order to identify the *semichatovae* Event. David DE VLEESCHOUWER is the co-supervisor. First results were shown on a poster at the Geo4Göttingen meeting (GROßKLAUS & BECKER 2025).

After a very long break based on work outside geology, **Lara HOLDERIED** will submit her thesis on the middle Frasnian ammonoids of the McIntyre Knolls region, sections 365 and 367 of the Canning Basin, in January. Her very detailed morphometric study enables the separation of several new taxa and will provide the base to characterize populations in comparison with more common upper Frasnian faunas, not only from the same region.

Simon GEORG accepted the offer to study the taxonomy and biodiversity of phacopid and proetid trilobites from the pelagic facies of southern Morocco in relation to Eifelian to Frasnian global events. There are available collections at Münster, which the late Stephan HELLING only just started to look at, and more collecting in the field is planned for next March.

Former M.Sc. student **Jonathan SCHATZ** also published main results of his thesis in a popular science contribution. It deals with the locally unexpectedly complete Kohlenkalk succession in a borehole in the Niederrhein near Duisburg (SCHATZ et al. 2025). Subsequently, a new set of conodont and microfacies samples was taken in order to close gaps in the upper Tournaisian biostratigraphy and facies development. The carbon isotope curve shows the famous TICE excursion.

Fig. 5. Slab rich in *Manticoceras* from the lower limestone cliff at Touchchent, southwest of Mrirt (eastern part of Western Meseta).

Ph.D. Thesis

Mieke LÖW continued in the frame of her Ph.D. project the revision of German Gephuroceratidae, the most common and widespread goniatite family, whose various members fell victim to the Lower or Upper Kellwasser Events. Taxonomic problems are unnervingly complex, including every mistake that one could have done in the last more than hundred years. But she fought her way through this jungle, giving presentation at three meetings (LÖW & BECKER, 2024, 2025a, 2025b) and winning the best poster award at Geotolosa. One question is still un-decided: can *Manticoceras*

intumescens and *M. cordatum* co-exist as two valid species?

As in 2024, Morocco provided good material for the second part of her Ph.D. (Fig. 5) But questions concerning Moroccan gephuroceratid taxonomy, biostratigraphy, biodiversity and palaeogeography will have to wait a little bit since Mieke and Till will become parents still in 2025.

Publications

Journal and book articles

BECKER, R. T. (2025a). New genera indicating the origin and early evolution of pharciceratoid ammonoids (Agoniatitida, Pharciceratoidea, Middle Devonian). – Zeitschrift der Deutschen Gesellschaft für Geowissenschaften, **176** (3): 517-531.

BECKER, R. T. (2025b). Ammonoids from the Dasberg Event Interval (upper Famennian) of Jebel Ouaoufilal (Tafilalt, Anti-Atlas, southeastern Morocco). – Palaeobiodiversity and Palaeoenvironments, **105** (4); doi.org/10.1007/s12549-025-00673-2.

BECKER, R. T. (2025c in press). New and revised Cyrtoclymenioidea (Clymeniida, Ammonidea, Famennian, Upper Devonian). – Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen.

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BECKER, R. T. (2025e in press**).** 10. Part L, The Devonian Ammonoids – History, Challenges, and Prospects. – In: SELDEN, P. A., HISTON, K., BECKER, R. T., CICHOWOLSKI, M., EVANS, D. H., HARTPER, D. A. T., KING, A. & MALETZ, J., Contributions to the history and heritage of the Treatise of Invertebrate Paleontology. Journal of Historical Geology.

BUSCHHAUS, M., BECKER, R. T. & ABOUSSALAM, Z. S. (2025). Ein Schwarm früher Knochenfische vom Hofermühle-Riff (Bergisches Land, Grenzbereich Mittel-/Oberdevon). – Archäologie im Rheinland, **2024**: 39-42.

MAHBOUBI, A., MAHBOUBI, S., ABOUSSALAM, Z. S., DJOUDER, H. & ZATOŃ, M. (2025). Frasnian conodont abundance and environmental control in northwestern Algerian Sahara. – Journal of African Earth Sciences, **230** (105740): 14 pp.

SCHATZ, J., BECKER, R. T. & HARTENFELS, S. (2025). Geothermie-Bohrung erschließt am Niederrhein einen unbekannten Abschnitt der Kohlenkalk-Plattform. – Archäologie im Rheinland, **2024**: 42-45.

TALIH, A., ŢABĂRĂ, D., SLIMANI, H., BECKER, R. T., TMIMNE, I., ABOUTOFAIL, S., EL ASMI, H. & JAYDAWI, S. (2025). Palynology, palynofacies and palaeoenvironment of the Serpukhovian Tazlourt Formation (Tinghir region, southern margin of the Variscan Zone, SE Morocco). – Review of Palaeobotany and Palynology, **342** (105396): 1-10.

WICHERN, N., BECKER, R. T., BIALIK, O. M., HARTENFELS, S. & DE VLEESCHOUWER, D. (2025a submitted). Cyclostratigraphic calibration of the rhythmically-bedded upper Famennian (Upper Devonian) in the Rhenish Massif, Germany. – Newsletters on Stratigraphy.

ZEGHARI, A., OUALI-MEHADJI, A. & BECKER, R. T. (2025). Microbially induced sedimentary structures (MISS) in early Devonian siliciclastic deposits (Gara Djebilet Formation, Tindouf Basin; Algerian Sahara). – Journal of Sedimentary Research, **95**: 627-642.

Abstracts

BECKER, R. T. (2024a). Devonian ammonoid palaeodiversity in the Anti-Atlas – impact of data base, global events, and palaeoclimate. – In: NEUMANN, C. & HAMPE, O. (Eds.), Mollusc palaeobiology, -ecology and evolution in a changing world. One-day symposium honouring the scientific contributions of Martin ABERHAN and Dieter KORN, Berlin, March 26, 2024: 7-8.

BECKER, R. T. (2024b). High-resolution biostratigraphy as the base for the analysis of ammonoid biodiversity in the Devonian of the Anti-Atlas (southern Morocco). - In: PalGes 2024 Warsaw, The 95th Annual Meeting of the Paläontologische Gesellschaft (PalGes), Abstract Book: 16.

BECKER, R. T. (2025f). Impact of the global Dasberg Crisis on ammonoid diversity in the Anti-Atlas (southern Morocco). - In: Geotolosa 2025, News from the Paleozoic Worlds, Abstract book: 16.

BECKER, R. T. (2025g). The complexity of biozonations, with Devonian ammonoid examples. – In: Geo4Göttingen 2025, Earth, Life, Climate, Resources, Material, 14. – 18. September 2025, Georg-August-Universität Göttingen, Book of Abstracts: 40.

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GIBB, A., HÜNEKE, H., MEHLHORN, P., GIBB, L. M., ABOUSSALAM, Z. S., BECKER, R. T., EL HASSANI, A. & BAIDDER, L. (2025b). Facies variability and depositional architecture of bioclastic bottom-current deposits formed on a Devonian contourite terrace (Tafilalt Plattform, Morocco). – In: Geo4Göttingen 2025, Earth, Life, Climate, Resources, Material, 14. – 18. September 2025, Georg-August-Universität Göttingen, Book of Abstracts: 163.

GROßKLAUS, M. & BECKER, R. T. (2025). The *semichatovae* Transgression (basal upper Frasnian) in Morocco. – In: Geo4Göttingen 2025, Earth, Life, Climate, Resources, Material, 14. – 18. September 2025, Georg-August-Universität Göttingen, Book of Abstracts: 176.

LÖW, M. & BECKER, R. T. (2024). Taxonomic revision of Frasnian Gephuroceratidae (Ammonoidea). – In: PalGes 2024 Warsaw, The 95th Annual Meeting of the Paläontologische Gesellschaft (PalGes), Abstract Book: 88.

LÖW, M. & BECKER, R. T. (2025a). A revised taxonomy of the iconic Gephuroceratidae (Ammonoidea; Upper Devonian). – In: Geotolosa 2025, News from the Paleozoic Worlds, Abstract book: 31.

LÖW, M. & BECKER, R. T. (2025b). *Crickites* – investigation of a unique extinction taxon of Palaeozoic goniatites (Ammonoidea). – In: Geo4Göttingen 2025, Earth, Life, Climate, Resources, Material, 14. – 18. September 2025, Georg-August-Universität Göttingen, Book of Abstracts: 343.

TALIH, A., EL HASSANI, A., DA SILVA, A.-C., BECKER, R. T. & SINGH, B. P. (2025): Late Viséan Turbiditic Deposition and Carbonate Inputs in the Tinerhir Formation, Southern Variscan Front, SE Morocco. – In: International Congress on Palaeontological Heritage IX, Septembre 24 to 28, 2025, Settat, Morocco, 1 p.

WICHERN, N., BIALIK, O., BECKER, R. T. & DE VLEESCHOUWER, D. (2025b). Climate and weathering trends on astronomical timescales in the run-up to Late Devonian anoxic bioevents. - In: GeoTolosa 2025, News from the Paleozoic Worlds, Abstract book: 44.

Devonian Thesis

PAWELLEK, S. (2025). Taxonomy und Morphometrie der Gattung *Polonoceras* (Ammonoidea) des frühen Famenniums. – B.Sc. Thesis, 87 pp.

CM Randy BLOOD

This year saw the expansion of ongoing research into the Upper Kellwasser Event (UKE) as represented by the Point Gratiot Bed (PGB) in the Appalachian Basin, USA. Centimeter-scale study of the PGB and adjacent strata in nearly every known outcrop in New York was extended southward to outcrops in Virginia and Tennessee, where candidate black shale beds for the UKE had been previously constrained by conodont biostratigraphy. Similarities in trace element profiles between candidate black shale beds in these outcrops and the New York sections strongly support the hypothesis that the PGB in New York may be linked to beds in the Java and Chattanooga shale to the south. To that end, core repositories in Pennsylvania, West Virginia, Ohio (with the help of CM's Erika DANIELSEN and Christopher WAID), and Kentucky were scoured to find drill cores preserving the Frasnian/Famennian (F/F) boundary interval. This work has resulted in the positive identification of the UKE/PGB in 14 subsurface cores. Further, the western limits of UKE/PGB deposition in the Appalachian Basin were constrained by evaluating an additional 17 cores where the F/F boundary is represented by an erosional surface with the UKE absent. Work is now beginning to expand this detailed analysis to adjacent basins by studying core and outcrop.

In parallel with this fieldwork, a paper titled "Redox conditions associated with organic matter accumulation in the Frasnian/Famennian Boundary Interval of the Upper Devonian Hanover and Dunkirk Formations, western New York State, USA: Insights from inorganic geochemical and pyrite framboid data", co-authored by Ashley DOUDS and Scott MCCALLUM, has been accepted for publication in the *Geological Society of London's Special Publication* volume on: Integrated Analyses of Carbon Burial in Marine Mudstones throughout the Phanerozoic. This paper details our collection and interpretation of centimeter-scale elemental and pyrite framboid data through the UKE in New York State.

Additionally, CMs Johnny WATERS, Sarah CARMICHAEL, Diana BOYER, and I recently completed a three-week expedition to the Gobi Desert in Mongolia with Ariuka MUNKHJARGAL and Sersmaa GONCHIGDORJ to measure and describe three long-overlooked outcrops within the Central Asian Orogenic Belt and produced the first detailed measured sections and descriptions of these intervals. Key findings include 1) the interplay between Lower Devonian brachiopod, mollusk, and coral/stromatoporoid communities and intense periods of volcanism, 2) the discovery of a large (>10 km long and 20 m tall) Middle Devonian reef growing off seafloor basalts; and 3) rock units that likely represent the Hangenberg Event.

Publications

Papers

BAIRD, G. C., BRETT, C. B. & BLOOD, D. R. (2025). Regional mudstone darkening effect: Overlooked regional maturity measure in outcrop and cores. - In: OVER, D. J. (Ed.), Proceedings with Program and Abstracts Subcommission on Devonian Stratigraphy and IGCP 652 Reading Geologic Time in Paleozoic Sedimentary Rocks, Geneseo, New York, 27 July – 06 August, 2023. Bulletins of American Paleontology, **411**: 13-21.

BLOOD, D. R., MCCALLUM, S. D. & DOUDS, A. S. B. (2025). Stratigraphy, sedimentology, and diagenesis of centimeter-scale black shale beds and associated strata in the uppermost deposits of the Upper Devonian (Famennian) Hanover Shale, western New York, U.S.A. – In: OVER, D. J. (Ed.), Proceedings with Program and Abstracts Subcommission on Devonian Stratigraphy and IGCP 652 Reading Geologic Time in Paleozoic Sedimentary Rocks, Geneseo, New York, 27 July – 06 August, 2023. Bulletins of American Paleontology, **411**: 23-41.

Guidebook

HEGNA, T. A., BATEMAN, H. & BLOOD, D. R. (2025). Going back in time through the Upper Devonian Frasnian-Famennian mass extinction in Western New York. - 2025 Joint Northeastern and North-Central Section Meeting, pre-meeting fieldtrip, March 27th, 2025.

Abstracts

BLOOD, D. R. (2025). The Point Gratiot Bed Geochemical Paradox: Evidence for a Global Ocean Metal Sink? - Geological Society of America 2025 Joint Northeastern and North-Central Section Meeting, Erie, Pennsylvania, March 27th – 30th, 2025.

BLOOD, D. R., MCCALLUM, S. D. & DOUDS, A. S. B. (2025). Geochemical and sedimentological analysis of the uppermost deposits of the Upper Devonian Hanover Shale in western New York State. – In: OVER, D. J. (Ed.), Proceedings with Program and Abstracts, Subcommission on Devonian Stratigraphy and IGCP 652, Reading Geologic Time in Paleozoic Sedimentary Rocks, Geneseo, New York, 27 July – 06 August, 2023. Bulletins of American Paleontology, **411**: 74-75.

HM Carlton E. BRETT

Collaborative Research with Ohio Geological Survey: Lower Middle Devonian sequence stratigraphy and evolutionary paleoecology of Ohio, Indiana and adjacent areas: I have continued to study Middle Devonian through research with graduate students, Martin WELYCH-FLANAGAN, and Thomas VAN TASSELL, as well as Christopher WAID, and with Erika DANIELSON at the Ohio Geological Survey (OGS). Martin and I have begun collaboration with the OGS on mapping and improved correlations for the Middle Devonian (Eifelian to lowest Givetian) Columbus Limestone and Delaware Formation. To this end, we have studied a series of drill cores bridging central

Ohio with the northern Sandusky region on the rim of the Michigan Basin. We will attempt to extend high resolution correlations into the Onondaga and Marcellus black shales of the eastern Ohio subsurface and thence into Pennsylvania and western New York using a combination of available drill cores and a network. We have also begun re-examining and correlating outcrops in the Columbus area. We hope to continue the effort northward and to tackle the issue of the upper Eifelian Dundee Formation of northern Ohio, which has long remained poorly understood.

In tandem with this effort, we are working with Benjamin DATTILO of the Purdue University Fort Wayne and Indiana Geological Survey on the equivalent Jeffersonville and Sellersburg-North Vernon succession in southern Indiana. To date, we have made a reconnaissance survey some ten outcrops and are working toward a finer subdivision and higher resolution correlation with the Columbus and Delaware formations of Ohio and to examine faunal turnovers recorded in this interval.

As a part of this overall effort, Martin WELYCH-FLANAGAN, Thomas VAN TASSEL, and I have been working on a compiling a database on the Eifelian-Givetian stratigraphy and faunas of the eastern mid-continent and comparing these biotas with those of better-known New York and Pennsylvania. This effort is helping to test several aspects of sequence stratigraphy and its relationship to ecological-evolutionary subunits (EESUs) that CM Gordon BAIRD and I have proposed nearly three decades ago (BRETT & BAIRD 1995, coordinated stasis paper); the research also builds upon work by Mike DESANTIS and myself (Ph.D. UC 20). In 2025 we have co-authored papers *Paleobiology*, and in a special issue of *Palaeobiodiversity and Palaeoenvironments*. Thus far, we have compiled data on megafauna from Eifelian-lower Givetian units In New York, Pennsylvania, Ontario, Michigan, north and central Ohio, southern Indiana, Missouri, and Alabama. These data compiled from a few papers by the principal workers in in each region, show a remarkable degree of lateral continuity of faunas, with 80-90 % of brachiopod, mollusk and coral genera being shared with those in New York though lower proportions in some other groups, notably ostracods. In addition, our preliminary results show approximately coincident turnovers among the three previously identified major faunas of the Eifelian-Givetian interval: (i.e. the Onondaga, Stony hollow, and Hamilton faunas of our earlier papers) throughout much of the region. We are working with Gordon BAIRD, CM Alex BARTHOLOMEW, TM Jay ZAMBITO, George MCINTOSH (Emeritus Curator of Rochester Museum and Science Center), Gerry KLOC of University of Rochester, and others to assemble more detailed local occurrence, and paleonvironmental data on brachiopod, trilobite, cephalopod, and crinoid faunas and also to examine the provenance of various faunal elements that appear abruptly at the beginnings of Eifelian-Givetian EE Subunits and to extend that work upward through the Givetian. With new M.Sc. student Thomas VAN TASSEL and his former undergraduate advisor CM Judith NAGEL-MEYERS, we are hoping to extend more detailed studies on the regional and temporal distribution of mollusk faunas, especially bivalves, and the timing and sources of invasion of new taxa.

In addition, I have continued to work with TM James ZAMBITO and TM Anne-Christine DA SILVA and her Ph.D. student, Jarno HUYGH, on time-series analysis of magnetic susceptibility and high-resolution gamma ray, as well as elemental profiles to examine cyclostratigraphy of the Eifelian-Givetian interval powders have been drilled through all calcareous units (most of the core) at 0.6 to 0.1.5m intervals for analysis of $\delta^{13}C_{carb}$, C/S, and XRF for major and trace elements. Thomas ALGEO (Cincinatti) is analyzing B/Ga ratios of the samples as a proxy for paleosalinity.

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; this project has moved slowly as Jonathan HENDRICKS, formerly of PRI, who had spearheaded the project has moved to the

Milwaukee Public Museum. However, nearly 200 species have been photographed, and we are planning to continue the effort of providing documentary information on these taxa with input from University of Cincinnati graduate students Martin WELYCH-FLANAGAN and Thomas VAN TASSEL.

Gordon BAIRD, Randy BLOOD and I have worked to complete a preliminary project started years ago on color/hardness gradients in shales and fossil color (especially trilobites) in the Devonian and Ordovician of the Appalachian Basin. Darkening and hardening of shale as well as convergence of more varied light brown colors in calcitic fossils toward a monochromatic dark gray to black, appears to parallel change in conodont color alteration indices and other indicators of differential heating of the strata from western to central New York localities. Thus, the simple metrics of coloration, slakeability of shale may provide useful and relatively inexpensive means of evaluating thermal histories in basins. A paper has just been published in *Bulletins of American Paleontology*.

Publications

BAIRD, G. C, BRETT, C. E. & BLOOD, D. R. (2025). Regional mudstone darkening effect: overlooked regional maturity measure in outcrop and cores. - Bulletins of American Paleontology, **411**: 1-21; doi: 10.32857/bap.2025.411.01.

BRETT, C. E. (2025). Review: "The Rhenish Massif: More than 150 Years of Research in a Variscan Mountain Chain", parts I and II (*Palaeobiodiversity and Palaeoenvironments*. V. 102 (3) 2022 and v. 104 (3) 2024). - Priscum: Newsletter of the Paleontological Society.

BRETT, C. E., ZAMBITO, J. J. IV, WELYCH-FLANAGAN, M., BAIRD, G. C. & BARTHOLOMEW, A. (2025). Ecological Evolutionary Subunits (EESUs) and their boundaries in the Middle Devonian of the Appalachian Basin: Toward a model for punctuated change in marine benthic communities. - Palaeobiodiversity and Palaeoenvironments, **105**: 101–128; doi.org/10.1007/s12549-025-00647-4.

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CM Sarah K. CARMICHAEL

This year I have been trying to finish old projects, all while being distracted by new projects. I am finalizing some work with groundwater modelers to model Paleozoic groundwater flow in island arc systems to see if submarine groundwater discharge can meaningfully influence paleotemperature calculations in coastal systems, particularly in the Central Asian Orogenic Belt. I have also started a new collaboration with paleoclimate modelers at UC Louvain in Belgium. I also traveled with CMs Randy BLOOD, Diana BOYER, Johnny WATERS, Ariuka MUNKHJARGAL, and Peter KÖNIGSHOF (in addition to non-SDS members) to do additional fieldwork in the Namur Dinant basin of Belgium and a new area on the border of the Dundgovi and Ömnögovi regions of Mongolia in 2025. My ongoing projects include the Late Devonian rocks of Vietnam to western China to Mongolia to Belgium to Germany to the Great Basin of the western US to the Appalachian Basin of the eastern US. The goal is to develop a series of best practices for detecting oxygen loss in a variety of paleoclimate environments using techniques that are widely available to most universities.

Publications

Papers

KÖNIGSHOF, P., CARMICHAEL, S. K., WATERS, J. A., MUNKHJARGAL, A. & GONCHIGDORJ, S. (2025). Depositional history of Devonian and Mississippian rocks from southern Mongolia: Stratigraphic and sedimentologic framework of a volcanic arc system. - Palaeobiodiversity and Palaeoenvironments, **104**: 1-22.

CARMICHAEL, S. K. & WATERS, J. A. (2025). Fieldwork with Peter KÖNIGSHOF. - Palaeobiodiversity and Palaeoenvironments, **105** (1): 19–22; doi.org/10.1007/s12549-025-00648-3.

Abstracts

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GOODRIDGE, B., CARMICHAEL, S. K. & ANDERSON, W. (2025). How does submarine groundwater discharge affect paleotemperature calculations? A case study from Devonian island arcs in the Central Asian Orogenic Belt. - Geological Society of America Abstracts with Programs Southeastern Section, **57** (2); DOI: 10.1130/abs/2025SE-407653.

HM Carlo CORRADINI

My research is mainly devoted to conodont biostratigraphy from the Silurian to Lower Carboniferous in several regions. The Carnic Alps represents my main research area. Geology and stratigraphy of several sectors are investigated (together with several colleagues).

Main research in progress focuses on (1) Lower Devonian stratigraphy; (2) the evolution of the sedimentary basin during the Lower and Middle Devonian; (3) older pelagic limestones above main reefal bodies are in study in order to understand the process that caused the disappearance of Devonian reefs; (4) the sedimentary evolution of the eastern part of the Carnic Alps, where the lower and middle Devonian units are slightly different than in the other parts of the chain. A paper on the Lochkovian/Pragian boundary was published.

Joint-research with colleagues from various institutions continue: in the Montagne Noire (France); research deals with conodonts, stratigraphy and facies in the Famennian and lowermost Tournaisian (with C. GIRARD, and others); studies on conodonts from some sections in the Ardennes are in progress (with J. DENAYER).

Taxonomic studies on Lower (with Maria G. CORRIGA) and Upper Devonian (with C. SPALLETTA, C. GIRARD, and others) conodonts are in progress. The work on the Devonian/Carboniferous Boundary continues, with the International Task Group established in this topic (led by M. ARETZ, Toulouse).

Xiaoyu JIN is concluding her Ph.D. on the Frasnian/Famennian boundary in the Carnic Alps and Sichuan (China).

Publications

Papers

CORRADINI, C., CORRIGA, M. G., PONDRELLI, M, SPINA, A. & SUTTNER, T. J. (2024). The "Lochkovian-Pragian Event" re-assessed: new data from the low latitude shelf of peri-Gondwana. - Palaeogeography, Palaeoclimatology, Palaeoecology, **656** (12580): 20 pp.; doi: 10.1016/j.palaeo.2024.112580.

CORRADINI, C., CORRADETTI, A., CORRIGA, M. G., DEVOTO, S., DORIGO, L., PONDRELLI, M. & SPALLETTA, C. (2024). A Ovest di Passo di Monte Croce Carnico. Le guide del Geoparco delle Alpi Carniche, **6**: 48 pp. (Comunità di montagna della Carnia; ISBN: 978 88 96546 15 4).

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CORRIGA, M. G., CORRADINI, C. & PONDRELLI, M. (2025). The Lochkovian of the Carnic Alps (Italy and Austria): conodont fauna and biostratigraphic correlations. – In: GeoTolosa 2025, Abstract book: 19.

JIN, X., CORRADINI, C. & SPALLETTA, C. (2025). First discovery of the Frasnian-Famennian (F-F) boundary with black shale deposition in the Carnic Alps. – In: GeoTolosa 2025, Abstract book: 26.

ARETZ, M. & CORRADINI, C. (2025). Moving forward with the redefinition of the Devonian/Carboniferous Boundary. – In: GeoTolosa 2025, Abstract book: 48.

CM Maria G. CORRIGA

My research is mainly devoted to Silurian and Devonian conodonts and biostratigraphy in several regions (mainly the Carnic Alps and Sardinia).

In the Carnic Alps, I'm studying several classic and new sections of Silurian and Early Devonian age, mainly in the central sector of the chain. A paper on the Lochkovian/Pragian boundary is published, and research in progress focuses on Lochkovian conodont taxonomy and biostratigraphy. In Sardinia, I am revising the conodont fauna of the classical Mason Porcus section (Silurian-Lower Devonian).

Studies on Silurian and Devonian conodont taxonomy continue, mainly focusing on late Silurian and Early Devonian ozarkodinids (with Carlo CORRADINI).

Publications

CORRADINI, C., CORRIGA, M. G., PONDRELLI, M, SPINA, A. & SUTTNER, T. J. (2024). The "Lochkovian-Pragian Event" re-assessed: new data from the low latitude shelf of peri-Gondwana. - Palaeogeography, Palaeoclimatology, Palaeoecology, **656** (12580): 20 pp.; doi: 10.1016/j.palaeo.2024.112580.

CORRADINI, C., CORRADETTI, A., CORRIGA, M. G., DEVOTO, S., DORIGO, L., PONDRELLI, M. & SPALLETTA, C. (2024). A Ovest di Passo di Monte Croce Carnico. Le guide del Geoparco delle Alpi Carniche, **6**: 48 pp. (Comunità di montagna della Carnia; ISBN: 978 88 96546 15 4).

CORRIGA, M. G., CORRADINI, C. & PONDRELLI, M. (2025). The Lochkovian of the Carnic Alps (Italy and Austria): conodont fauna and biostratigraphic correlations. – In: GeoTolosa 2025, Abstract book: 19.

TM Catherine CRÔNIER

My work focuses on Devonian trilobites, their diversity and morphological disparity, as well as broader macroevolutionary questions across mass extinction events.

Devonian trilobites and ammonoids. With Valentin VAULT (Lille), we conducted a comparative study of trilobites from Morocco and Algeria, focusing on diversity, disparity, and palaeobiogeographic relationships. This research clarified the evolutionary history of Phacopidae (*Historical Biology* 2023; *Palaeontology* 2023). In parallel, with Ninon ALLAIRE and colleagues, we examined ammonoid disparity from Morocco (*Acta Palaeontologica Polonica* 2023; *Earth-Science Reviews* 2025).

Argentinian collaboration. In partnership with Argentinian and French colleagues, I helped develop *TriloMorph*, the first open morphometric database for trilobites, including dedicated R functions. This effort produced new insights into disparity patterns (*Scientific Data* 2023) and reinforced macroevolutionary research in both groups.

3D shape quantification. Using 3D models of cephala and pygidia, I compared morphometric patterns with 2D datasets. While both approaches produced congruent taxonomic signals, 3D revealed critical details at the genus level (*Paleobiology* 2024).

Mongolia (ongoing project). As part of an international team, I contributed to new descriptions of the Central Asian Orogenic Belt faunas. Fieldwork in 2022 provided detailed sedimentological, stratigraphic, and palaeontological data, with first results published in *Palaeobiodiversity and Palaeoenvironments* (2024). Work on trilobites continues.

Upper Paleozoic of Armenia. I co-led a project on the stratigraphy and geodynamics of Upper Paleozoic successions in Armenia. These Gondwanan margin deposits provided new insights into palaeobiogeographic affinities and organismal responses to crises (*Rivista Italiana di Paleontologia e Stratigrafia* 2023).

Late Devonian trilobites (*Omegops*). My recent review focused on the last Phacopidae trilobites, which are key for understanding Upper Famennian (Strunian) biostratigraphy and the recovery phases following the Frasnian–Famennian crisis. This work was presented at the

GeoTolosa Congress and partly published in *Geologica Belgica* (2025).

Publications

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KÖNIGSHOF, P., CARMICHAEL, S.K., WATERS, J.A., WATERS, W., MUNKHJARGAL, A., GONCHIGDORJ, S., CRÔNIER, C., NAZIK, A., DUCKETT, K., FORONDA, J., ZIEGER, J. & LINNEMANN, U. (2024). Devonian to Mississippian strata of the Shine Jinst region revisited: Facies development and stratigraphy in southern Mongolia (Gobi Altai Terrane). - Palaeobiodiversity and Palaeoenvironments, **105**: 601-632; DOI:10.1007/s12549-024-00608-3

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SERRA, F., BALSEIRO, D., MONNET, C., RANDOLFE, E., BIGNON, A., RUSTAN, J.J., BAULT, V., MUNOZ, D.F., VACCARI, N.E., MARTINETTO, M., CRÔNIER, C. &WAISFELD, B. G. (2023). A dynamic and collaborative database for morphogeometric information of trilobites. - Scientific data, **10**; DOI:10.1038/s41597-023-02724-9.

TM Anne-Christine DA SILVA

In the SediCClim group in Liège, Belgium, different projects related to the Devonian are ongoing:

DevoCarBG – Devonian-Carboniferous in Belgium and Germany. We have been sampling with J. DENAYER the Devonian Carboniferous boundary records of Chanxhe and Anseremme in Belgium. We measured magnetic susceptibility, portable XRF, and carbon and oxygen isotopes at high resolution and we are building a cyclostratigraphic age model. A couple of ash beds have been dated and are being measured (U-Pb dating). In this framework, the Chanxhe record was also sampled by researchers from Vrije Univ. Brussels to collect micrometeorites. After dissolution, a total of 1222 micrometeorites (MMs) from the Late Devonian were extracted, making it one of the largest fossil micrometeorite collection (KRÄMER-RUGGIU et al. in press). The Drewer section in Germany was also sampled at high resolution for similar measurements in the framework of the Ph.D. thesis of **D. BOUKHALFA**.

WarmAnoxia - The project funded by the National Belgian Science foundation (FNRS) started (in June 2022) in collaboration with Michel CRUCIFIX (PI) from Louvain-la-Neuve University, called WarmAnoxia. The aim is to evaluate how astronomical climate forcing can have an impact on anoxia development during the Devonian with three parallel Ph.D.'s. **Justin GÉRARD** will focus on testing the physical and

biogeochemical consistency of different hypotheses through modelling, with a focus on the deep ocean and the impact of orbital forcing on anoxia (GÉRARD et al. 2025); while **L. SABLON** focusses on the atmosphere and shallow ocean (Louvain-La-Neuve; SABLON et al., 2025). The Ph.D. candidate **Jarno HUYGH** (Liege university) will be working on reassessing existing data and producing new data to highlight the link between astronomical forcing and key Devonian anoxic events, with a focus on the Eifelian, Givetian and Frasnian. Jarno HUYGH has been working with Carlton BRETT, I. FORSYTHE, and T. ALGEO (University of Cincinnati) on the Lansing core record (Givetian), producing Gamma Ray Spectrometry record. We also did an exploration field work in Morocco and decided to sample at high resolution the Oued Ferkla record (Eifelian-Givetian). He submitted a paper on the Frasnian-Famennian boundary focusing on the West Valley Core record (submitted to *Global and Planetary Changes*).

SyncDev – a new Ph.D. candidate was funded (**Mélina MAURICE**) on a project aiming to quantify the relative timing and rates of expansion of oxygen depletion through Late Devonian anoxic events across various basins. It will focus on determining whether these events were synchronous across basins and it will also determine the state of orbital forcing around the anoxia spread. This project is in collaboration with CM D. DE VLEESCHOUWER, S. K. SAHOO (Equinor, USA), G. J. GILLEAUDEAU (George Mason Uni., USA), A. J. KAUFMAN (Univ. Maryland, USA), D. PAS (Lausanne Univ.), and L. PERCIVAL (VU Amsterdam).

Publications

KRÄMER RUGGIU, L., VILLENEUVE, J., DA SILVA, A. C., DEBAILLE V, DECRÉE S, LUTZ, H., KAUFMANN, F. E. D. & GODERIS S. (2025 in press). Diversity among fossil micrometeorites in the late Devonian. - Cosmochemica Geochemica Acta; doi.org/10.1016/j.gca.2025.07.016.

GÉRARD, J., SABLON, L., HUYGH, J.C., DA SILVA, A. C., POHL, A., VÉRARD, C. & CRUCIFIX, M. (2025). Exploring the mechanisms of Devonian oceanic anoxia: impact of ocean dynamics, palaeogeography and orbital forcing. - Climate of the Past, **21** (1): 239–260; doi.org/10.5194/cp-21-239-2025.

SABLON, L., MAFFRE, P., GODDÉRIS, Y., VALDES, P. J., GÉRARD, J., HUYGH, J. J. C., DA SILVA, A. C. & CRUCIFIX, M. (2025 sudmitted). An Emulator-Based Modelling Framework for Studying Astronomical Controls on Ocean Anoxia with an Application on the Devonian. - Geoscientific Model Development; doi.org/10.5194/egusphere-2025-1696.

CM David DE VLEESCHOUWER

In 2025, the "Earth System Science" research group in Münster continued its efforts to refine the geochemical and cyclostratigraphic framework of Late Devonian successions.

Jakob QUABECK completed the pXRF, Total Inorganic Carbon, Total Organic Carbon, and Total Nitrogen analyses of all samples from the Spontin and Royseux sections (Belgium), which span the Devonian–Carboniferous boundary. A cyclostratigraphic interpretation of these records is currently underway. Particularly in the Spontin section, an intriguing pattern emerged in which elevated sulfur concentrations occur within the limestones rather than in the shales, contrary to the usual organic-matter association of sulfur in shales. This unexpected finding is being investigated further by M.Sc. student **Inga GRAUTHOFF.**

In addition, Jakob QUABECK analyzed the Pipe Creek and Angola Shale drill core (New York State, approximately 9 meters long), which was drilled by Randy BLOOD at Walnut Creek and later sent to Münster. These micro-XRF data were complemented by TOC and TN measurements conducted by B.Sc. student **Jelte SCHRADER** to evaluate whether nutrient recycling in the water column was enhanced during intervals of oxygen deficiency. Together, these efforts strengthen our understanding of the geochemical dynamics and orbital pacing of environmental change during the latest Devonian.

CM James R. EBERT

Revision of a paper that deals with the production of biogenic sediments by the invasive quagga mussel (*Dreissena rostriformis bugensis* ANDRUSOV) in the eastern Laurentian Great Lakes (Erie and Ontario) has slowed temporarily progress on Devonian projects. However, progress does continue.

Our summary (EBERT & MATTESON 2025) of the Silurian-Devonian boundary interval in the Green Vedder Member of the Manlius Formation has been published in *Newsletters on Stratigraphy*. I was a co-author on a paper in "*Palaeo x 3"* (STOCK et al. 2025) that has been very well received. The paper deals with the apparent decline in stromatoporoid abundance and diversity in the Pragian.

Petrographic examination of acetate peels from the Lansing core from the Finger Lakes region of New York State is ongoing. One of the most interesting aspects of the core is that it penetrates a bioherm/buildup that is comprised mainly of the colonial rugosan *Aphyllum* (formerly *Tryplasma*) *fascicularium* OLIVER (Fig. 1). This facies has prompted me to initiate fieldwork in the outcrop belt of the Helderberg Group where similar facies in the Bishop Brook (SMITH 1929), Deansboro (OLIVER 1961) and Mosquito Point formations (EBERT & MATTESON 2023) are exposed. A new goal of the core study is to link the stratigraphy of the Lansing core with units of the Helderberg Group.

Initial samples from the upper Helderberg formations (Port Ewen, Deansboro, Mosquito Point and Buckley Mill) in central and eastern New York State have been digested and will be searched for conodonts and chitinozoans. A few chitinozoans have been extracted from samples of the Buckley Mill Formation and await imaging and identification.

I continue to build synthetic gamma ray profiles for outcrops of the Helderberg Group, with the ultimate goal of improving the level of detail in correlations. Thus far, the most significant result has been better correlation of tephra beds in the New Scotland Formation.

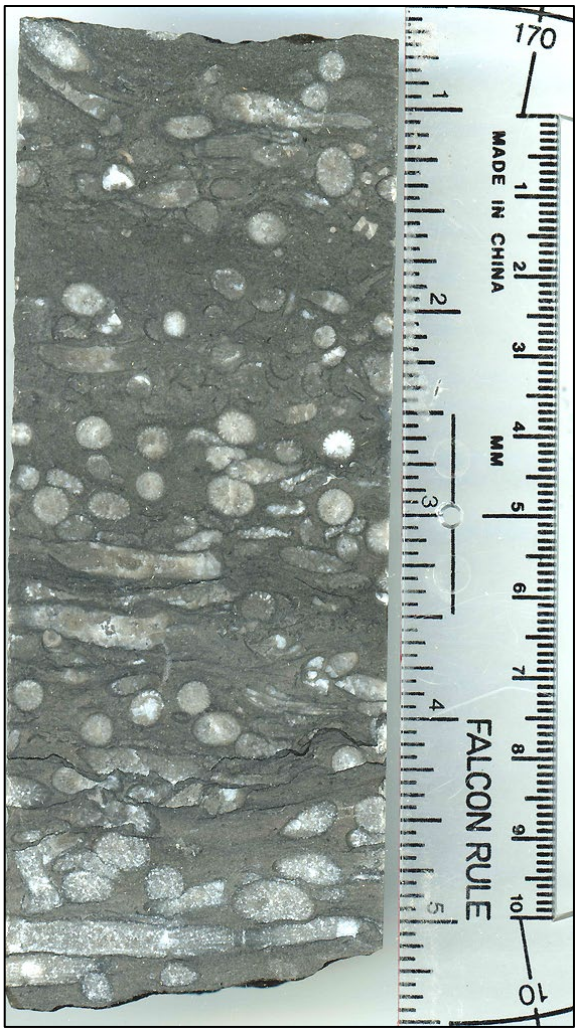

Fig. 1. Buildup made of *Aphyllum fascicularium* in the Lansing core, New York State.

Publications

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STOCK, C., MAY, A., EBERT, J. R., SCOTESE, C. & HAGADORN, J. (2025). Early Devonian (Pragian) decrease in global generic diversity of stromatoporoids, and their extreme decrease in paleogeographic distribution in North America. – Palaeogeography, Palaeoclimatology, Palaeoecology, **663** (112719): 14 pp..

CM Jiří FRÝDA

In 2024 and 2025, our team consisting of CM Stanislava VODRÁŽKOVÁ, Petra TONAROVÁ, Michal KUBAJKO, CM Michal MERGL, CM Lenka FERROVÁ, and CM Jiří FRÝDA from the

Laboratory of Micropaleontology and Chemostratigraphy (Czech Geological Survey) and the Czech University of Life Sciences in Prague focused on completing the interpretation of data and preparing publications on: (1) chemostratigraphy and sedimentology of the Kačák and Choteč events (VODRÁŽKOVÁ, FRÝDA, MERGL), (2) chemostratigraphy and sedimentology of the several Silurian/Devonian sections (Australia and Czech Republic, FRÝDA and VODRÁŽKOVÁ), (3) the evaluation of the $\delta^{18}O_{apatite}$ records to complete temperature curve for the Barrandian area from the Mid-Ludfordian glaciation to middle of Lochkovian (together with Oliver LEHNERT), and (4) dacryoconarid tentaculite biozonations of the Pragian and lowermost Zlichovian from the Barrandian area with focus on the redefinition of the for the basal Emsian GSSP (LUKEŠ, FERROVÁ and FRÝDA).

Publications

VODRÁŽKOVÁ, S., KOUBOVÁ, M., MUNNECKE, A., KUMPAN, T., VODRÁŽKA, R., POUR, O. & FRÝDA, J. (2025). Clay mineral authigenesis as an example of organomineralization in Paleozoic coated grains and peloids. – Sedimentary Geology, **484-485** (106912): 1-15.

CÍGLER, V., KUMPAN, T., FRÝDA, J., KALVODA, J. & DAMBORSKÝ, Š. (2024). Refinement of the lower Tournaisian (Mississippian) conodont, foraminiferal and carbon isotope stratigraphy of the Moravosilesian Basin (Czech Republic) and implications for global correlation. - Newsletters on Stratigraphy, **58** (1): 71-98; DOI: 10.1127/nos/2024/0870.

TM Sofie GOUWY

My research is mainly focused on Devonian conodont biostratigraphy with excursions to the Ordovician and Silurian and comprises several ongoing projects:

1. Upper Devonian-Lower Carboniferous west of Great Slave Lake (NW Territories, Canada) with Martyn GOLDING; I'm leading the Devonian sub-activity for this project, in collaboration with Jed DAY and GSC colleague Daniel CALVO GONZALEZ (carbonate sedimentology). Over the winter, we concentrated on sampling and studying mainly the Imperial Island River #1 core for conodonts and sedimentology; summer 2025 we are targeting fieldwork along the Mackenzie Highway and river cuts (Trout, Bouvier, Redknife, and Wallace).
2. Conodont biostratigraphy of the Pragian to Middle Givetian of central and southern Illinois (collaboration with Jed DAY).
3. Integrated stratigraphy of the Ordovician-Silurian Mount Kindle Formation (NW Territories, Canada) based on fieldwork in the Mackenzie Mountains and Colville Hills combined with archival material, collaboration with Sandy MCCRACKEN.
4. Devonian conodont biostratigraphy on the Northern Mackenzie Mountains (NW Territories, Canada) based on fieldwork in combination with Tom UYENO's extensive conodont collection at GSC Calgary.

TM Sven HARTENFELS

My work continued to focus mainly on the bio- and lithostratigraphic dating of drill cores, which were sunk by the Geological Survey of North Rhine-Westphalia. Furthermore, I am deeply involved in coordinating the Devonian contributions to the German lithostratigraphic encyclopaedia (LithoLex, https://litholex.bgr.de).

In the course of the ongoing deep geothermal characterisation of the subsurface of North Rhine-Westphalia, an almost 1.000 m deep drilling was carried out in the city centre of Krefeld. The aim of this project was to penetrate the entire sedimentary succession of the Mississippian "Kohlenkalk Platform" as well as the underlying uppermost Famennian Etroeungt Formation. Ultimately, the drilling ended in the siliciclastic upper Famennian Evieux Formation of the Condroz Group. As detailed geological and palaeontological data on the deeper subsurface in the Krefeld area are scarce, cores were taken for the entire Palaeozoic succession. A detailed section log is currently being

compiled under the direction of Sören STICHLING and preliminary results (core descriptions, geophysical well logging, biostratigraphy) were presented by STICHLING & BECKER (2025, both Krefeld) at the international conference Geo4Göttingen in September 2025. An initial biostratigraphic (corals) dating was carried out in cooperation with our Belgian colleagues Julien DENAYER and Edouard POTY.

The Master Thesis of Jonathan SCHATZ (at that time Münster, now Krefeld), which was produced in collaboration between the Geological Survey of North Rhine-Westphalia and the University of Münster, has now been completed (compare *SDS Newsletter*, **39**). It includes a detailed investigation of the bio- and lithostratigraphy, fossil record, and carbonate microfacies of shallow water limestones related to the Mississippian "Kohlenkalk Platform". The drill core "An der Drucht 1", which reached a final depth of 130 m, consists in its approximately upper 11 m of Quaternary and Tertiary sediments. The underlying sedimentary deposits, roughly 106 m in thickness, are dominated by crinoidal remains and can be assigned despite local peculiarities to the Heiligenhaus Formation of the neighbouring Velbert Anticline. The faunal assemblages indicate repeated deposition of different crinoidal debris flows on a carbonate ramp characterised by changing sea levels and bottom currents. For most of the time, the palaeoenvironment fluctuated between intertidal and shallow subtidal conditions. However, an admixture of shallow water organisms and those from the open sea, namely conodonts and goniatites, is common. In particular, the conodont faunas enabled a high-resolution biostratigraphy. The underlying approximately 12 m of organic-rich marls and limestones represent an equivalent of the Pont d'Arcole Formation. The base of this unit is associated with the rapid global transgression of the Lower Alum Shale Event. The lowermost meter of the drill core represents the oolitic Laupen Member of the Hastière Formation. The precise conodont dating of the local Heiligenhaus Formation and the evidence of a complete sedimentary succession stand in sharp contrast to the previous knowledge of the "Kohlenkalk" in the Ratingen region. Until now, a long-lasting stratigraphic gap between the top of the Pont d'Arcole Formation and a reworking horizon at the base of the local Richrath Member of the Heiligenhaus Formation of basal Viséan age has been postulated. Thus, just a few kilometres to the Northwest, this zone of non-sedimentation and reworking disappears and the "Kohlenkalk" succession becomes complete. First results are published by SCHATZ et al. (2025).

Fig. 1. Compiled photograph of the newly cleaned Vennbahn railway cut in early May 2025.

Together with Sarah ESTEBAN LOPEZ and Sascha SANDMANN (both Krefeld), participants of the joint annual meeting of the German Subcommissions on Proterozoic to Silurian, Devonian, and Carboniferous Stratigraphy were guided to uppermost Famennian stromatoporoid buildups in the Aachen region (section along the former Vennbahn railway route, Figs. 1-2). These occurrences preserve the youngest stromatoporoid buildups of the world and offer an excellent opportunity to study the delayed recovery of a stromatoporoid reef ecosystem after the dramatic Kellwasser Crisis, which was followed by a complete, long disappearance from the geological record. The section possibly supplied one of the very rare specimens of *Omegops cornelius* (Fig. 3). Our Belgian colleagues Julien DENAYER and Edouard POTY

then guided the group to Cambrian (black shales of the La Gleize Formation) to middle Viséan (Lives Formation) sections of eastern Wallonia, Belgium.

Fig. 2. Laminar stromatoporoid from Bed 58b, section along the former Vennbahn railway route.

Fig. 3. Possible *Omegops cornelius* from Bed 9 of former Vennbahn railway route.

Publications

Papers

KÖNIGSHOF, P. & HARTENFELS, S. (2025). Conodont Research: An Important Tool Applied to the Central European Variscides. - In: LINNEMANN, U. (Ed.), The Variscan Orogen of Central Europe. Geodynamics – Geochronology – Geobiology, Chapter 28: 979 – 996 (Springer).

SCHATZ, J., BECKER, R. T. & HARTENFELS, S. (2025). Geothermie-Bohrung erschließt einen bisher unbekannten Abschnitt der Kohlenkalk-Plattform. – Archäologie im Rheinland, **2024**: 42–45.

Abstract

HARTENFELS, S., SALAMON, M. & HEß, O. (2025). Borehole Gressenich BK1: Lithostratigraphy as a tool for dating a conodont-poor succession of the early Mississippian Kohlenkalk Platform in the Aachen region, Germany. - In: ARETZ, M. & CHARDON, D. (Eds.), GeoTolosa 2025. News from the Paleozoic Worlds – 20th International Congress on the Carboniferous and Permian. Variscan Meeting 2025. From the mantle to the biosphere. Abstract book: 8; Toulouse.

Field Guide

HARTENFELS, S., ESTEBAN LOPEZ, S. & SANDMANN, S. (2025). Kornelimünster, cycle path along the former Vennbahn railway route – a preliminary report. - In: SANDMANN, S. (Ed.), Exkursionsführer zum Jahrestreffen der Subkommissionen für Karbonstratigraphie, Devonstratigraphie und Proterozoikum bis Silur, 23. bis 25. Mai 2025, Pepinster, Belgien, östliche Wallonie und Region Aachen, Stop 1: 4-14.

CM Heiko HÜNEKE

Present ongoing studies focus mostly on the sedimentology of Devonian cephalopod limestones in the eastern Anti-Atlas and in the High Atlas of Morocco. This work is in collaboration with Moroccan colleagues Ahmed EL HASSANI (Rabat), Lahssen BAIDDER (Casablanca) and German colleagues Zhor Sarah ABOUSSALAM, and Ralph Thomas BECKER (both Münster). The Eifelian-Frasnian Tafilalt Platform was recognized as part of a contourite depositional system, more specifically a contourite terrace at the uppermost slope that connected the epicontinental sea of Gondwana with the Meseta domain further north. Of particular interest with regard to evolutionary events in the Devonian are contourites formed by anoxic bottom currents caused by periodic shelf-water cascading. Currently, we are focusing on the facies and stratigraphic architecture of Emsian bioclastic contourites recognized in the eastern Anti-Atlas.

The identified Devonian bioclastic contourites are one of the rare fossil analogues of modern bottom-current deposits that was formed under greenhouse climate conditions. The contourite interpretation is based on a comprehensive biostratigraphic data base and independent lines of sedimentological evidence at the microfacies, bed, drift and basin scale.

Publications

GIBB, M. A., HÜNEKE, H., JADHAV, J, GIBB, L. M., MEHLHORN, P., MAYER, O., ABOUSSALAM, Z. S., BECKER, R. T., EL HASSANI, A., BAIDDER, L. (2024). Contourite-drift archive links Late Devonian bioevents with periodic anoxic shelf water cascading. - Geology, **52**: 807-812; doi.org/10.1130/G52117.1.

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HÜNEKE, H., GIBB, M. A., MAYER, O., KNIEST, J.F., MEHLHORN, P., GIBB, L.M., ABOUSSALAM, Z. S., BECKER, R. T., EL HASSANI, A., BAIDDER, L. (2023). Bioclastic bottom-current deposits of a Devonian contourite terrace: Facies variability and depositional architecture (Tafilalt Platform, Morocco). – Sedimentology, **70**: 1413-1471; doi.org/10.1111/sed.13089.

TM Ulrich JANSEN

The last year was marked by the acquisition of the large research collection of our colleague and friend Peter CARLS (1937–2020) from the Technical University of Braunschweig (Germany). The collection was donated by Peter's widow Leveke to my section at the Senckenberg Museum in Frankfurt am Main. It contains a huge number of largely Devonian rocks and fossils (mainly brachiopods, conodonts) which had to be transported from Braunschweig to Frankfurt am Main. Then, all the specimens were transferred into ca. 1,200 Senckenberg drawers (supported by the Paul UNGERER Foundation). Now the collection is prepared for a curatorial upgrade. A separate report on the transport and the collection details will be given soon.

Apart from the collection work, taxonomic studies on latest Silurian to earliest Mid-Devonian brachiopods from the Rhenish Massif have been continued. Some recent stratigraphic results on the basal Emsian boundary were presented at the GeoTolosa 2025 in Toulouse. Two contributions have been published in *Palaeo2* (Peter KÖNIGSHOF Special Volume), one deals with a new species of *Cyrtina* (*C. koenigshofi*), a spiriferinide genus that is represented by several species in the Rhenish Massif, but is still poorly known. The second is a revision of Lower Devonian spiriferide and spiriferinide brachiopods from the Ardennes (MOTTEQUIN & JANSEN 2025).

Publications

Papers

JANSEN, U. (2025). A new species of *Cyrtina* from the upper Emsian (Brachiopoda, Lower Devonian) of the Rhenish Massif (Germany). - Palaeobiodiversity and Palaeoenvironments, **105** (1) [Peter KÖNIGSHOF Volume]: 217–227.

MOTTEQUIN, B. & JANSEN, U. (2025). Revisiting the Silurian–Lower Devonian spiriferide and spiriferinide brachiopods from the Condroz Inlier and Ardenne Allochthon (Belgium): current data and perspectives. - Palaeobiodiversity and Palaeoenvironments, **105** (1) [Peter KÖNIGSHOF Volume]: 229–264.

JANSEN, U. (2025 submitted). A species of *Fulcriphoria* (Orthida, Brachiopoda) from the Siegenian of the Rhenish Massif (Lower Devonian, Germany). - Palaeobiodiversity and Palaeoenvironments [Peter CARLS Volume].

Abstract

JANSEN, U. (2025). Brachiopods, stratigraphy and bioevents near the traditional basal Emsian boundary (Rhenish Massif, Germany). - In ARETZ, M. & CHARDON, D. (Eds.), GeoTolosa 2025, Abstract book: 25; Toulouse.

CM Christian KLUG

I hired **Amin EL FASSI EL FEHRI** as a Ph.D. student to work on Late Devonian bony fish remains from Morocco. Together with Prof. Abdelouahed LAGNAOUI, Wahiba BEL HAOUZ, and several international early vertebrate workers, he is currently setting up the International Symposium Early and Lower Vertebrates 18 to be held in Berrechid, Morocco, from the 30th of January 2026 to the 14th of February 2026.

Publications

BURKARD, G.-A., FUCHS, J. M. & KLUG, C. (2025). *Scyphocrinites* und *Camarocrin*us - die Seefahrerinnen des späten Silur und frühen Devon. – Fossilien, **42** (2): 20-27.

EL FASSI EL FEHRI, A., CLEMENT, A. M., MONDÉJAR FERNÁNDEZ, J., GREIF, M. & KLUG, C. (2025 submitted). Taxonomic porosity between Devonian and Carboniferous lungfishes revealed by a new origin of the modern dipnoan dentition. – PeerJ, **13** (e19389): 1-21; doi.org/10.7717/peerj.19389.

EL FASSI EL FEHRI, A., SUAREZ PEREZ, G., GREIF, M. & KLUG, C. (2025). Die Mudmounds von Hamar Laghdad und die grünäugigen Trilobiten. – Fossilien, **42** (3): 4-17.

GREIF, M., CALANDRA, I., LAUTENSCHLAGER, S., KAISER, T., MEZANE, M. & KLUG, C. (2025). Reconstruction of feeding behaviour and diet in Devonian ctenacanth chondrichthyans using Dental Microwear Texture and Finite Element analyses. – Royal Society Open Science, **12** (240936): 1-22; doi.org/10.1098/rsos.240936.

HERTER, S., EBERLE, G., GREIF, M. & KLUG, C. (2025). Devonische Knorpelfische aus dem marokkanischen Anti-Atlas. – Fossilien, **42** (1): 4-13.

KLUG, C., POHLE, A., BOLLIGER, T., HAGDORN, H. & LEHMANN, J. (2025). Taphonomic and reworking processes isolating cephalopod septa and chamber fillings. – Lethaia, **58** (2): 1-18; doi.org/10.18261/let.58.2.1.

ZAMORA, S., GARCÍA-PENAS, A., KLUG, C., PLOTNICK, R. E. & BÁDENAS, B. (2025). Early Devonian non-trilobite arthropods from the Iberian Chains (North East, Spain). – Historical Biology: 1-12; doi.org/10.1080/08912963.2025.2492356.

CM Peter KÖNIGSHOF

Present studies focus mostly on sedimentology, facies, geochemistry, and biostratigraphy in the southern Gobi (Shine Jinst region, Mongolia, Gobi Altai Terrane, Central Asian Orogenic Belt). This work is done in collaboration with an international working group. Conodont findings of the studied Shinejinst section confirm the occurrence of time-equivalent strata of the Choteč Event, the Dasberg Crisis, and the Hangenberg Event found elsewhere in the world, which have been described from Mongolia for the first time.

Other activities concerned field work in Thailand, Iran and in the Rhenish Massif. In that respect some publications are work in progress while others have been published already. After my retirement from August 1st 2025 I will continue to work on the above topics as long as I have access to the lab and my office in the Institute. My e-mail address (peter.koenigshof@senckenberg.de) is still valid, which will be checked frequently. Thank you all for your friendship, vivid discussions, and much fun for decades!

Publications

ERNST, A, KÖNIGSHOF, P. & WYSE JACKSON, P. (2025 in press). Bryozoan fauna from the Samnuuruul Formation (Upper Devonian, Famennian) of the Hushoot Shiveetiin gol section, southwestern Mongolia. - Palaeobiodiversity and Palaeoenvironments.

NAZIK, A., KÖNIGSHOF, P., MUNKHJARGAL, A., GONCHIGDORJ, S., WATERS, J. A. & CARMICHAEL, S. K. (2025 in press). Middle Devonian (Eifelian) ostracods from the Tsagaankhaalga Formation (Shinejinst region, southern Mongolia). - Palaeobiodiversity and Palaeoenvironments.

KÖNIGSHOF, P. (2025) The conodont collection at Senckenberg – Research Institute and Natural History Museum, Frankfurt, Germany. - In: FOREL, M. B., COTTON, L. & MILLER, G. (Eds.), Micropaleontology collections: From history to curation. Revue de Micropaléontologie, **89**

(100853, Special Issue); doi.org/10.1016/j.revmic.2025.100853.

KÖNIGSHOF, P., JANSEN, U., LINNEMANN, U. & MENDE, K. (2025). The Rhenish Massif. - In: LINNEMANN, U. (Ed.), The Variscan Orogen of Central Europe: Geodynamics – Geochronology – Geobiology: 107–156; doi.org/10.1007/978-3-031-82911-6_4; Heidelberg, New York (Springer).

KÖNIGSHOF, P. & HARTENFELS, S. (2025). Conodont research: An important tool applied to the Central European Variscides. - In: LINNEMANN, U. (Ed.), The Variscan Orogen of Central Europe: Geodynamics – Geochronology – Geobiology: 981-998; doi.org/10.1007/978-3-031-82911-6_4; Heidelberg, New York (Springer).

DE BOER, R.A., VAN DER BOON, A., DEKKERS, M. J., KÖNIGSHOF, P. & DE GROOT, L.V. (2025). A missing palaeomagnetic signal in Middle Devonian pillow lavas. - Geophysical Journal International, **242**: 1–25; doi.org/10.1093/gji/ggaf151.

KÖNIGSHOF, P., CARMICHAEL, S. K., WATERS, J. A., MUNKHJARGAL, A. & GONCHIGDORJ, S. (2025). Depositional history of Devonian and Mississippian rocks from southern Mongolia: stratigraphic and sedimentologic framework of a volcanic arc system. - Palaeobiodiversity and Palaeoenvironments **105** (3); doi.org/10.1007/s12549-025-00649-2.

KÖNIGSHOF, P., CARMICHAEL, S. K., WATERS, J. A., WATERS J. W., MUNKHJARGAL, A., GONCHIGDORJ, S., CRÔNIER, C., NAZIK, A., DUCKETT, K., FORONDA, J., ZIEGER, J. & LINNEMANN, U. (2025). Devonian to Mississippian strata of the Shine Jinst region revisited: Facies development and stratigraphy in southern Mongolia (Gobi Altai Terrane). - Palaeobiodiversity and Palaeoenvironments **105** (3); doi.org/10.1007/s12549-024-00608-3.

HARTENFELS, S., HARTKOPF-FRÖDER, C. & KÖNIGSHOF, P. (Eds, 2024). The Rhenish Massif: More than 150 years of research in a Variscan mountain chain, part II. - Palaeobiodiversity and Palaeoenvironments, **104** (3): 437–752.

HARTENFELS, S., HARTKOPF-FRÖDER, C. & KÖNIGSHOF, P. (Eds., 2024). The Rhenish Massif: More than 150 years of research in a Variscan mountain chain, part II. Editorial. - Palaeobiodiversity and Palaeoenvironments, **104** (3): 437–444; doi.org/10.1007/s12549-024-00625-2.

KÖNIGSHOF, P., LOOS, S. & RUTKOWSKI, J. (2024). Lithofacies variability and facies analysis of a Givetian reef in the southwestern Lahn Syncline (Rhenish Massif, Germany). - In: HARTENFELS, S., HARTKOPF-FRÖDER, C. & KÖNIGSHOF, P. (Eds.), The Rhenish Massif: More than 150 years of research in a Variscan mountain chain, part II. Palaeobiodiversity and Palaeoenvironments, **104** (3): 461–492; doi.org/10.1007/s12549-023-00585-z.

KÖNIGSHOF, P. & FLICK, H. (2024). Fringing reef growth in the Mid-Devonian: An example from the southern Rhenish Massif, Germany). - In: HARTENFELS, S., HARTKOPF-FRÖDER, C. & KÖNIGSHOF, P. (Eds.), The Rhenish Massif: More than 150 years of research in a Variscan mountain chain, part II. Palaeobiodiversity and Palaeoenvironments, **104** (3): 493–510; doi.org/10.1007/s12549-023-00591-1.

STRIBRNY, B., KORN, D., KÖNIGSHOF, P., ERBACHER, J. & BLUMENBERG, M. (2024). Die Kupfererzlagerstätte Marsberg. - Geologisches Jahrbuch, Reihe A, **166**: 1-88.

SATTARI, E., BAHRAMI A., KÖNIGSHOF, P., VAZIRI-MOGHADDAM, H. & TAHERI A. (2024). Biostratigraphy and facies around the D/C boundary interval of the Tuye-Darvar section, Eastern Alborz Range, NE Iran. - Boletín de la Sociedad Geológica Mexicana, **76** (1), A280224: 1-36; doi.org/10.18268/BSGM2024v76n1a280224.

CM Tomáš KUMPAN

In the past year, my research continued on several Devonian topics, in addition to sedimentological and geochemical research on Permian, Jurassic and Cretaceous deposits of the Bohemian Massif.

The study on carbon isotope chemostratigraphy of the upper Famennian to lower Tournaisian Líšeň Formation, Moravian Karst, Czechia, was published (CÍGLER et al. 2025). Three small-scale positive $\delta^{13}C_{carb}$ anomalies were documented in the lower Tournaisian above the Hangenberg Crisis positive excursion. The three excursions

correlate with anomalies documented by previous authors at sections deposited in the Paleotethys Realm (Namur-Dinant Basin, South China Block, Ural Mts.), and more problematically with the Panthalassa Realm sections (Burlington Shelf, Iowa). The study was also focused on Tournaisian conodont (new *Siphonodella*, *Pseudopolygnathus* and *Polygnathus* species in open nomenclature described) and foraminiferal biostratigraphy.

Investigation continued on the microbial project led by CM Stanislava VODRÁŽKOVÁ. A study on microbially mediated clay minerals in coated grains and peloids from the Silurian of Gotland, Sweden, the Lower and Middle Devonian of the Barrandian, Czechia, and the Upper Devonian and lower Carboniferous of the Moravian Karst, Czechia was published (VODRÁŽKOVÁ et al. 2025a). A significant volume of clay minerals precipitated via microbially mediated processes was found in all these grain types, indicating the importance of microbes in the cycling of many elements in the oceans. In addition to the Devonian material, as part of the microbialite project, my work also included the elemental geochemistry of unique terrestrial Permian stromatolites from the Krkonoše Piedmont Basin, Czechia. These results supported paleoenvironmental and diagenetic reconstructions and complemented mineralogical, petrological, and paleontological findings, published in VODRÁŽKOVÁ et al. (2025b).

Newly excavated walls in the eastern quarry at large Mokrá Quarry, Moravian Karst, Czechia exposed two unique sections with black limestone intervals. A major work on these sections was carried out as part of research projects by M.Sc. students I have supervised. Both M.Sc. theses were successfully defended in June 2025. The section with Devonian black limestones was studied by **Sára KOZÁKOVÁ**, who focused on the analysis of conodont fauna and microfacies. She identified a condensed lower-middle Famennian hemipelagic and tempestite succession of the Křtiny Limestone with record of Nehdenian and Lower Condroz events, documented for the first time from the Bohemian Massif. In addition to the Devonian material, the new sections in the Mokrá Quarry also provided lower Carboniferous material. **Marek BERNHAUSER** studied conodonts and gamma-ray spectrometry of the section exposing the lower to upper Tournaisian hemipelagic and calciturbiditic Křtiny and Hády-Říčka limestones with a record of middle Tournaisian anoxic events. Marek will start his Ph.D. studies under my supervision in the fall semester 2025 and will continue studying this section (geochemistry, sedimentology) and other Tournaisian sections with anoxic intervals in the Moravian Karst.

The research of Ph.D. student **Štěpán DAMBORSKÝ** continued under my supervision. He is studying conodont biostratigraphy, facies and microfacies, and gamma-ray spectrometry of more than 120-meter-thick sequences of Hády-Říčka Limestone of the Líšeň Fm in the Moravian Karst, Czechia, which record a carbonate turbidite system deposited during nearly the entire Famennian. The aim of the study is to refine depositional model of the Líšeň Formation and trace changes in the depositional style related to global events.

Publications:

Papers

CÍGLER, V., KUMPAN, T., FRÝDA, J., KALVODA, J. & DAMBORSKÝ, Š. (2025). Refinement of the lower Tournaisian (Mississippian) conodont, foraminiferal and carbon isotope stratigraphy of the Moravosilesian Basin (Czech Republic) and implications for global correlation. – Newsletters on Stratigraphy, **58** (1): 71-98; doi:10.1127/nos/2024/0830.

VODRÁŽKOVÁ S., KOUBOVÁ K., MUNNECKE A., KUMPAN, T., VODRÁŽKA, R., POUR, O. & FRÝDA, J. (2025a). Clay mineral authigenesis as an example of organomineralization in Paleozoic coated grains and peloids. – Sedimentary Geology, **484–485** (106912); doi10.1016/j.sedgeo.2025.106912.

VODRÁŽKOVÁ, S., VODRÁŽKA, R., KUMPAN, T., FRANCŮ, J., HOLÁ, M. & SLAVÍČEK, K. (2025b). Early Permian Freshwater Silicified Stromatolites and Oolites from the Krkonoše Piedmont Basin (Bohemian Massif): Paleobiology, Environmental

Setting and Early Diagenesis. – Bulletin of Geosciences, **100** (2): 159–186; doi:10.3140/bull.geosci.1915.

M.Sc. Theses

BERNHAUSER, M. (2025). Lower Carboniferous stratigraphy of the Moravian Karst. – M.Sc. Thesis, Department of Geological Sciences, Faculty of Science, Masaryk University, Brno, 77 pp.

KOZÁKOVÁ, S. (2025). Depositional environments of the Křtiny Limestone. – M.Sc. Thesis, Department of Geological Sciences, Faculty of Science, Masaryk University, Brno, 86 pp.

Fig. 1. The Frasnian-Famennian section on Heintzbjerg. The poorly cemented white sandstones that form the middle slopes of the mountain were deposited by a very active fluvial system during times of LIP eruption.

TM John E. A. MARSHALL & the Southampton Group

This last year has been busy as regards fieldwork. We have been to the Cantabrian Mountains and coastal sections in Asturias in Spain for the final visit. This is a NERC funded grant led by Charlie WELLMAN from Sheffield and includes David BOND (Hull) on the stable isotopes and geochemical indicators of extinction together with Gilda LOPES as the post-doc focusing on the acritarchs and chitinozoans. Some of these sections are very well-known having been studied by CRAMER in the 1960's at the very beginning of palynology. We have been greatly assisted in our sample collection by our local Project Partners Javier SANZ-LÓPEZ and Silvia GARCÍA-LÓPEZ, who some of you may remember from various conodont meetings.

For a month in July and August of 2024, I was back to East Greenland (Figs. 1-2) on a Swedish expedition led by Grzegorz NIEDZWIEDZKI from Uppsala and focusing on tetrapods and fish at the D-C boundary. This is funded by the ERC awarded to Per AHLBERG. Many new and interesting tetrapod specimens (about which I know nothing) were found at a high level in the Devonian. I did some repeat sampling through the D-C boundary terrestrial extinction lake on Celsius Bjerg together as a continuous series of large blocks. These will continue to be analysed at sub-centimetre level for palynology, $\delta^{13}C_{TOC}$, $\delta^{15}N_{TOC}$, TOC%, BSEM fabric, and Itrax XRF

analysis to better understand the terrestrial extinction and spore malformation. Interesting results are being revealed. I was also accompanied by Chris BERRY from Cardiff University (Wales), who is engaged on a parallel palaeobotanical study and particularly the reconstruction of the tetrapod environment.

Conference attendance included the XVI IPC and XI IOPC held concurrently in Prague, Czech Republic; the Palaeontological Association Annual Meeting in Cambridge, and the *Life and the Planet* Earth System meeting in London. I also attended a workshop on the ORS of Greenland held at GEUS in Copenhagen.

The publication highlight is the *Old Red Sandstone* chapter in the 5th edition of the *Geology of Scotland*. A completely revised chapter on the Old Red Sandstone that is now full colour and will be available digitally from the Geological Society of London. This took forever, especially the 36 figures. Although sadly, a kilted and bag-piping Alex BARTHOLOMEW was removed from Siccar Point by the editors. It has also been a useful opportunity to better integrate the stratigraphy of the onshore and offshore Old Red Sandstone.

Publications

SMART, M. S., FILIPPELLI, G., GILHOOLY III, W. P., OZAKI, K., REINHARD, C. T. MARSHALL, J. E. A. & WHITESIDE, J. H. (2023). The expansion of land plants during the Late Devonian contributed to the marine mass extinction. - Communications Earth & Environment, **4** (1): 449.

MARSHALL, J. E. A. (2024). Old Red Sandstone: continental sedimentation on the eroding Caledonian Orogen. - In: SMITH, M. & STRACHAN, R. (Eds.), The Geology of Scotland. Geological Society, London; doi.org/10.1144/GOS5-2022-43.

Fig. 2. Camping at the base of Heintzbjerg in 2006.

CM Neo McAdams

I spent most of 2024 adjusting to parenthood but have now gotten back into the swing of research. My student **Gavin LONG** successfully defended his M.Sc. thesis on the geochemistry of pathological morphotypes of *Palmatolepis* from the Lower Kellwasser Event interval of the Sweetland Creek Shale which was supported by collaboration with CM Jed DAY. Gavin will continue this work as my Ph.D. student with the focus likely expanding to insights from ontogeny, histology, and element function.

I am finishing work on an American Chemical Society-Petroleum Research Fund grant focused on correlating the Silurian and Lochkovian of the Permian Basin using integrated conodont biostratigraphy and carbon isotope chemostratigraphy. **Emily HAUF** (Ph.D. student), Gavin LONG, and I recently sampled two long cores that hopefully will provide a high-resolution record of the ~upper Llandovery to lower Lochkovian including a second record of the Klonk excursion from the basin.

I published a paper with Jim BARRICK on three small conodont faunas (Llandovery/Wenlock, Pragian, ~late Middle Devonian) from the Siluro-Devonian outcrop belt of New Mexico and I continue collaborative work with CM Jed DAY on the Frasnes Event interval in North America.

Publications

Paper

BARRICK, J. E. & MCADAMS, N. E. B. (2025) Devonian conodonts from the upper part of the Fusselman Formation and the Canutillo Formation, Florida Mountains, southern New Mexico. – In: LUCAS, S. G. et al. (Eds.), Fossil Record 10, New Mexico Museum of Natural History and Science Bulletin, **100**: 19-23.

Abstract

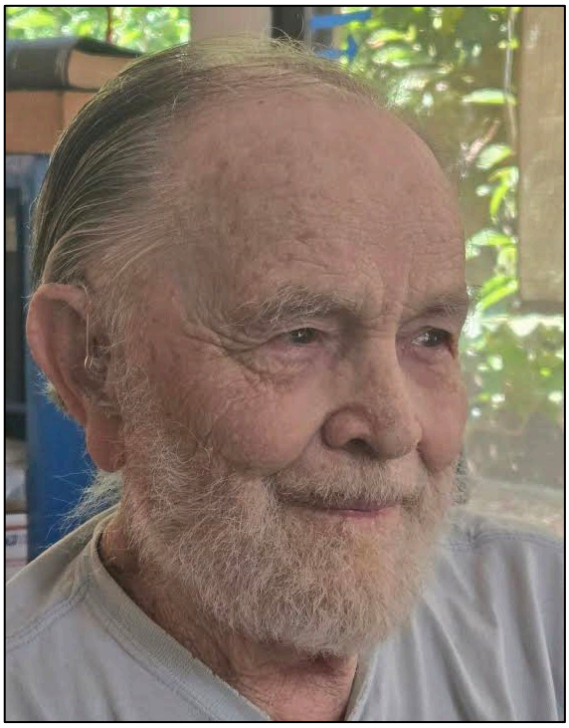
LONG, G. & MCADAMS, N. E. B. (2025). Pathological *Palmatolepis* From the Late Devonian Sweetland Creek Shale. - Geological Society of America Abstracts with Programs, **57** (3); doi: 10.1130/abs/2025NE-408751.

CM Michael A. Murphy

HAPPY BIRTHDAY

100 YEARS

on 11th March 2025



SDS is very pleased that Devonian research can have such a life enduring effect – or at least that it does not prevent one from getting so old. Go on Mike – we are proud of you and wish you all the best for the next ca. 100 years.

Mike is still active both in the Devonian and Cretaceous. He is writing a paper on the Silurian-Devonian boundary and, jointly with Stana VODRÁŽKOVÁ; on the Belodellida:

TM Jeffrey D. OVER

Studies continue on Upper Devonian strata in the North American cratonic basins, as well as a new project in south central Bolivia investigating conodonts, geochemical cycles, and astrochronology. For publications see the edited proceedings and abstract volume of the 2023 Geneseo Meeting, published in *Bulletins of American Paleontology*, **411** (see Devonian publications).

TM Cameron R. PENN-CLARK

I have been awarded a substantial grant from the National Research Foundation to continue my research on Early-Middle Devonian extinction events in South Africa and their links with the Silurian-Devonian Terrestrial Revolution, the Great Devonian Interchange and correlations with events in Laurussia and greater Gondwana. I will have several new students over the next three years of funding, who will be working on various facets of this research as M.Sc. and Ph.D. projects.

A couple publications from my research group are out for review and will most likely appear later this year. These cover topics on geochronology, biogeography as well as longer length review papers.

Ph.D. students

In July 2025, **Christopher HARRIS** (co-supervised by Rob GESS and I) received his Ph.D. degree for a thesis entitled: *Stratigraphy and depositional setting of the Witpoort formation (Witteberg Group, Late Devonian) in the Eastern Cape, South Africa*. It has greatly advanced our understanding of the latest Devonian (Fammennian) environments and ecosystems in South Africa. His research has revealed a more diverse and complex environmental setting for these deposits (mixed estuarine-fluvial) and helps to contextualise the (many) important fossil discoveries from these strata

B.Sc./M.Sc. students

In March 2025, **Cole NAAMDHEW** (supervised by me) received his B.Sc. Hons degree (with distinction). Part of it comprised an independent research project, entitled: *Spatiotemporal distributions of Devonian benthic communities in South Africa.* It looked into the creation of a GIS database of Devonian fossil occurrences in South Africa to establish any changes in fossil assemblages through time as well as identification of areas where additional discoveries may be found. He is now doing an M.Sc. (registered at Wits University and co-supervised by David HARPER and I) which looks into the biogeography of Devonian brachiopods across Gondwana and their bearing on the Great Devonian Interchange.

Abstracts

PENN-CLARKE, C. R., VORSTER, C. & HARPER, D. A. T. (2024). End of Days at the End of the World: U-Pb detrital zircon geochronology of high-latitude Devonian regions suggest extinction events were globally extensive. - 22nd Biennial Meeting of the Palaeontological Society of South Africa (Graaf Reinet, South Africa, 8-14 September 2024).

PENN-CLARKE, C. R., BAMFORD, M. K. & WAGNER, N. (2024). Earliest coal beds from the Silurian-Devonian Terrestrial Revolution at high-latitudes: Evidence from the Middle Devonian of South Africa. - 22nd Biennial Meeting of the Palaeontological Society of South Africa (Graaf Reinet, South Africa, 8-14 September 2024).

GROENEWALD, D. P., DAY, M. O., PENN-CLARKE, C. R., VORSTER, C. & RUBIDGE, B. S. (2024). Hiatus in the Free State: an updated mid-to-late Permian basin development model for the main Karoo Basin. - 22nd Biennial Meeting of the Palaeontological Society of South Africa (Graaf Reinet, South Africa, 8-14 September 2024).

NAAMDHEW, C. & PENN-CLARKE, C. R. (2024). Spatiotemporal distributions of Devonian benthic communities in South Africa. - 22nd Biennial Meeting of the Palaeontological Society of South Africa (Graaf Reinet, South Africa, 8-14 September 2024).

HARRIS, C., JINNAH, Z. A. & PENN-CLARKE, C. R. (2024). A transgressive model for the Waterloo Farm black shale lagerstätte (Late Devonian Period), - 22nd Biennial Meeting of the Palaeontological Society of South Africa (Graaf Reinet, South Africa, 8-14 September 2024).

HARRIS, C., PENN-CLARKE, C. R., GESS, R. W. & JINNAH, Z. A. (2025). Late Devonian Sedimentary deposits of the Witpoort Formation (Witteberg Group). - Geocongress 2025 (Bloemfontein, 23-27 June 2025).

CM Dmitry P. PLAX and the Belarusian Devonian Group

In 2024–2025 members of the Belarusian Devonian group continued research concerning various aspects of the Devonian deposits of Belarus, such as isotopic chemostratigraphy, paleontology and biostratigraphy, study of volcanism in the territory of Belarus, etc. The members of the Group participated in scientific and practical conferences and published the results of their work in peer-reviewed journals. Publications are listed below.

Publications

Journal papers

MAKHNACH, A., POKROVSKY, B. & MURASHKO, O. (2024). Carbon and Oxygen isotopes in the Upper Eifeian deposits of Belarus. – Litasfera, **60** (1): 69–79 [in Russian, with English summary].

MAKHNACH, A., POKROVSKY, B., STRELTSOVA, G., LAPTSEVICH, A. & MURASHKO, O. (2024). C-, O-, S-Isotopic Chemostratigraphy of the Lower and Middle Devonian deposits within the Orsha depression – Voronezh anteclise junction (the Klimovichi parametric borehole). – Litasfera, **60** (1): 80–94 [in Russian, with English summary].

BIBIKAVA, A. (2024). Oil-source and hydrocarbon-bearing rock formation processes in the Lower Famennian deposits of the central part of the Bujnovichska-Naraulyanskaya stage of the Pripyat trough. – Litasfera, **60** (1): 102–112 [in Russian, with English summary].

KUZMENKOVA, O., MOISEEV, E., KULIKOV, A., BELYASHOV, A. & VOSKOBOINIKOVA, T. (2024). The Late Devonian volcanic structures of the North-Uvarovichy area (Belarus) in geophysical fields. – Litasfera, **61** (2): 41–54 [in Russian, with English summary].

IVANOV, A. O. & PLAX, D. P. (2024). New Chondrichthyan Assemblages from the Upper Devonian – Carboniferous of Belarus. – Paleontological Journal, **58**: 391–402; DOI: 10.1134/S0031030124601749.

PLAX, D. P., LEBEDEV, O. A. & BEZNOSOV, P. A. (2024). Vertebrate Assemblages of the Rechitsian Time (Beginning of the Late Frasnian, Late Devonian) in the East European Platform. – Paleontological Journal, **58**: 329–357; DOI: 10.1134/S0031030124601725.

MURASHKO, O. V. (2025). Conodonts from the sediments of the Lower Famennian Kuzmichi and Tonezh horizons of the Pripyat trough (Belarus). – Litasfera, **62** (1): 47–60.

MAKHNACH, A., POKROVSKY, B., LAPTSEVICH, A., KUZMENKOVA, O., STRELTSOVA, G., YAKOVLEVA, N. & MURASHKO, O. (2025). Comparative analysis of isotopic (C, O) variations in deposits of the Lower and Middle Devonian horizons in the Latvian and Zhlobin saddles, North Pripyat shoulder and Voronezh anteclise (Belarus). – Litasfera, **62** (1): 117–134 [in Russian, with English summary].

PLAX, D. P., BAKAEV, A. S. & NAUGOLNYKH, S. V. (2025). A new species of the Devonian actinopterygian fish *Moythomasia* from Belarus. – Rivista Italiana di Paleontologia e Stratigrafia, **131** (1): 25–38.

PLAX, D. (2025). On the findings of redeposited remains of the Devonian ichthyofauna in the Quaternary deposits in the vicinity of Stariye Dorogi (Minsk region, Belarus). – Litasfera, **62** (1): 205–211.

NEWMAN, M. J. & PLAX, D. P. (2025). Late Devonian (Famennian) acanthodians (Acanthodii) from Belarus and their correlation elsewhere in Laurasia. – Fossil Record 10. New Mexico Museum of Natural History and Science Bulletin, **100**: 153–166.

NEWMAN, M. J. & PLAX, D. P. (2025). A new articulated Upper Devonian (Upper Famennian) groenlandaspidid fish (Arthrodira) from Belarus. - Journal of Vertebrate Paleontology; DOI: 10.1080/02724634.2025.2529916.

Abstracts

MURASHKO, O. V. (2024). Conodonts from the deposits of the Kuzmichi horizon of the Lower Famennian of the Pripyat trough. – In: Trends and problems of development of Earth sciences in the modern world: Proceedings of the II International scientific and practical conference, Gomel, 25 Apr. 2024: 115–120 [in Russian].

OBUKHOVSKAYA, V. & SACHENKO T. (2024). Biostratigraphic characteristics of the Devonian deposits in the section of the parametric well 4P Klimovichskaya. – In: Proceedings of the I Belarusian Geographical Congress: to the 90th

anniversary of the Faculty of Geography and Geoinformatics of the Belarusian State University and the 70th anniversary of the Belarusian Geographical Society, Minsk, 8–13 Apr. 2024: 338–343 [in Russian].

DANKINA, D., ŠEČKUS, J. & PLAX, D. P. (2024). The importance of fossils re-evaluation in museum collections: Devonian ichthyofauna of Belarus and Lithuania as a case study. – In: Programme Abstracts of the Palaeontological Association 68th Annual Meeting, Erlangen, 9–13 Dec. 2024: 113–114.

IVANOV, A. O. & PLAX, D. P. (2024). Chondrichthyan assemblages from the Upper Devonian – Carboniferous of Belarus. – In: Abstract volume of Kazan Golovkinsky Stratigraphic Meeting 2024 "Modern Stratigraphy: methods and applications" and Eighth All-Russian Conference "Upper Palaeozoic of Russia", devoted to the 190th anniversary of the Nikolai A. GOLOVKINSKY birth, Kazan, 28–30 Oct. 2024: 23.

CM Eberhard SCHINDLER

Almost for the entire year, a slipped disc in my backbone slowed me down significantly, but long-lasting projects were nevertheless put forward (e.g., results from our Turkish–German cooperation projects). Work on the Eifel area is continuing together with colleagues from Germany and the US.

A chapter in Ulf LINNEMANN's 'monster volume' on the Variscan Orogen in Central Europe, dealing with various aspects of the famous Hunsrück-Schiefer, authored by Uli JANSEN and myself has just been published (see Devonian publications section).

Studies on a probable leftover of the Ediacara Biota in Lower Devonian rocks of the Mosel area are still ongoing.

A study on coral photosymbiosis in Mid-Devonian reefs (Devonian corals from the Sauerland and Eifel areas, the Moroccan Tafilalt, and West-Sahara have been compared with Recent corals using N isotopes) together with colleagues from the Max Planck Institute in Mainz, the University of Frankfurt, and others was published (JUNG et al.). After all, it's not in a 'hidden journal'.

Publication

JUNG, J., ZOPPE, S.F., SÖTE, T., MORETTI, S., DUPREY, N.N., FOREMAN, A.D., WALD, T., VONHOF, H., HAUG, G.H., SIGMAN, D.M., MULCH, A., SCHINDLER, E., JANUSSEN, D. & MARTÍNEZ-GARCÍA, A. (2024): Coral Photosymbiosis on Mid-Devonian Reefs. – Nature, **636** (8043): 647-653; doi.org/10.1038/s41586-024-08101-9.

TM Ladislav SLAVÍK and colleagues

In 2025 our team consisting of CM JINDRA HLADIL, CM HEDVIKA WEINEROVÁ, CM TOMÁŠ WEINER and LS of the Institute of Geology of the Czech Academy of Sciences was still involved in the "Pragian/Emsian boundary project" in the Prague Synform. Although the project has already ended, the load of data that were obtained during last years enabled work on various topics. The main focus was on the interval of the upper parts of the Praha Formation in the Pod Barrandovem section, where the presence and position of the Bohemian Graptolite Event (BGE) remained up to now enigmatic. The paper on the biostratigraphy and correlation of BGE and multiproxies is before submission. Another study on ichofabrics and sedimentology from the Pod Barrandovem section is almost finished.

The paper on the possible SABS (Standard Auxiliary Boundary Stratotype) for the Basal Emsian boundary, the Požár 3 section was finalized and published in spring this year.

Together with Jiayi YIN, Yangtze University, who acccomplished her fellowship in Prague in autumn 2024, and Chinese colleagues ZONG, R. W. and GONG, Y. M. we have finished and published a paper on Silurian–Devonian Boundary in Northern Xinjiang, NW China.

Fig. 1. Pod Barrandovem Section: Sampling of the Praha Formation near the Bohemian Graptolite Event (BGE).

Publications

Papers

YIN, J. Y., SLAVÍK, L., ZONG, R. W. & GONG, Y. M. (2025). Silurian–Devonian boundary in Northern Xinjiang, NW China. – Palaeogeography, Palaeoclimatology, Palaeoecology, **659** (112636): 1-19; doi.org/10.1016/j.palaeo.2024.112636.

SLAVÍK, L., WEINEROVÁ, H., WEINER, T. & HLADIL, J. (2025). The Požár 3 section in the Prague Synform – a possible candidate auxiliary section for the basal Emsian GSSP redefinition. - Palaeobiodiversity and Palaeoenvironments, **105**: 61-82; doi.org/10.1007/s12549-024-00638-x.

Abstracts

SLAVÍK, L., WEINEROVÁ, H., WEINER, T. & HLADIL, J. (2025). Pragian-Emsian sections in the Prague Synform – their aspects and questions of stratigraphic correlation. – GeoTolosa 2025, Abstract book: 41; Toulouse.

YIN, J. Y., SLAVÍK, L., ZONG, R. W. & GONG, Y. M. (2025). Silurian–Devonian boundary in Northern Xinjiang, NW China. – GeoTolosa 2025, Abstract book: 46; Toulouse.

CM SONG Jun-Jun

During 2025, I am continuing research on Devonian ostracods and biostratigraphy of the Devonian-Early Carboniferous sequence of South China, mainly working with TM QIE Wenkun. In a recent study (SONG et al., 2025), we reconstruct the paleoenvironmental and paleoecological framework of a Middle Devonian (c. 387 Ma) fluvial-delta plain complex from Wuding, eastern Yunnan, South China, for the first time using a combined approach of sedimentology, geochemistry, and paleontology. The lower part of the Haikou Formation deposited in a meandering fluvial environment. While the middle-upper part of the Haikou Formation is interpreted as a brackish-fresh water setting (i.e., delta plain-swamp) based on facies analysis, stable isotope composition ($\delta^{18}O$, $\delta^{13}C$) of biogenic (ostracods) and authigenic carbonates, as well as paleosalinity proxies (Sr/Ba). Biota with a variety of fossil organisms, including ostracods (29 species belonging to seven superfamilies), charophytes (one species), chondrichthyans and antiarch fishes (at least two taxa), gastropods (one taxon), bivalves, and spores (20 species

belonging to 19 genera) have been recognized and identified in the delta plain-swamp facies. Ostracods are categorized into three distinct assemblages. Assemblage 1 (Leperditicope-Palaeocope Assemblage) and Assemblage 3 (Paraparchitoidean Assemblage) display high diversity and abundance, and characterize a brackish lower delta plain and a delta plain-swamp environment, respectively. Whilst Assemblage 2 (Leperditioidean Assemblage) has relatively low diversity and inhabited in fresh water probably an upper delta plain setting. Leperditioideans are pioneers colonized fluvial-delta plain setting and might be the earliest fresh water ostracods. Additionally, a special fresh water species of the Cypridoidea, *Carbonita* sp., which has never been reported prior to the Carboniferous Period, was discovered in the Haikou Formation. Abundant rhizomes of vascular land plants, as well as vertically arranged traces fossils (i.e., *Scoyenia beerboweri*) are observed from the flood plain facies, representing the development of an underground soil ecosystem. The biota, especially those of the ostracods and charophytes, comprise a complex ecosystem spanning the marginal marine to terrestrial settings, allowing a well-structured reconstruction of the eco-pyramid of brackish-fresh water ecosystem during the Middle Devonian. The results shed light on the co-evolution of the environment and organisms in the Devonian non-marine system.

I attended the GeoTolosa-2025 and SDS Meetings in Toulouse, France, and was honored to receive the SDS Prize 2025. Also, I will help to prepare the 5th International Congress on Stratigraphy-STRATI 2026 that will be held at June 28-July 3, 2026 in Suzhou, China. I will lead one of the post-conference excursions, namely, No. 5: *Upper Devonian to lowest Carboniferous successions in Guilin Karst area, Guangxi, South China.* I hope that plenty SDS Members will attend STRATI 2026.

In 2025, Ms. **Yucong SUN** finished her master thesis entitled *Study on microbialites and their sedimentary features at the Frasnian-Famennian boundary of Upper Devonian in Guangxi*, and obtained her M.Sc. from University of the Chinese Academy of Sciences. She will continue her doctoral studies at Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences under the guidance of TM QIE Wenkun and me.

Publications

SUN Y.-C., SONG, J.-J. & QIE, W.-K. (2025). Research status and progress on microbialites: taking the microbialites near the F-F boundary in South China as an example. - Journal of Stratigraphy, **49** (2): 1-36.

SONG J.-J., ZHANG, X.-L., LI, S., QIE, W.-K., WANG, Y. & XU, H.-H. (2025). A Middle Devonian fluvial-delta plain complex from eastern Yunnan, South China: Insights into co-evolution between environments and organisms in an early non-marine system. - Earth-Science Reviews; doi.org/10.1016/j.earscirev.2025.105223.

TM Claudia SPALLETTA

Despite being retired since the end of 2019, I continue research on biostratigraphy and taxonomy of Middle-Late Devonian to Early Carboniferous conodonts, mainly from the Carnic Alps. These studies are carried out with the analysis of lithostratigraphy and sedimentology and of the late Palaeozoic sequence of the Carnic Alps in collaboration with colleagues and friends of several institutions. Recently we found new evidence of some worldwide and local events. I was also involved by Annalisa FERRETTI (University of Modena and Reggio Emilia) on the re-study of Ordovician conodonts from one of the classical Ordovician locations of the Carnic Alps that I studied dozens of years ago. More recently Annalisa and Manuel RIGO (University of Padova) proposed a collaboration on geochemical analysis of conodont at the Frasnian-Famennian boundary of the stratigraphic section Pramosio A. The initial results of this study seem interesting and productive.

Publications

CORRADINI, C., CORRIGA, M. G., PONDRELLI, M., SPALLETTA, C., ZOCCHI, C. & CORRADETTI, A. (2025). Record of a sea level drop in the lower Mississippian limestones near Passo di Monte Croce Carnico (Carnic Alps, Italy). - Geologica Acta, **23** (14): 1-15; doi:10.1344/GeologicaActa2025.23.14.

FERRETTI, A., BERGSTRÖM, S.M., SPALLETTA, C. (2025). A Late Ordovician conodont fauna from the Uqua Section, Carnic Alps. - Bollettino della Società Paleontologica Italiana, **64** (2): 395-407.

JIN, X., CORRADINI C. & SPALLETTA C. (2025). First Discovery of the Frasnian-Famennian (F-F) Boundary with Black Shale Deposition in the Carnic Alps, Italy. – In: GeoTolosa 2025, 23-27 June Toulouse, France, Abstracts.

CMs Thomas J. SUTTNER and Erika KIDO

Work on the Late Devonian coral material from the Harz Mountains together with Dieter WEYER and Tomasz WRZOŁEK continued also in 2024/25. Coral accompanying conodont faunas, extracted and picked by Dieter some years ago, were scanned by our friends Michal KUBAJKO and Stana VODRÁŽKOVÁ from the CGS in Prague just recently. The nearly finalized identification of conodonts shall provide a high-resolution stratigraphic frame for the phillipsastreid coral taxa.

Publication

SUTTNER, T. J., UUGANTSETSEG, B., ARIUNCHIMEG, Y A., MANCHUK, N., KIDO, E., BUYANTEGSH, B., ENKHBAATAR, B. & ZORIG, E. (2024). Case study on Hangenberg Crisis equivalent deposits and associated conodont faunas including *Siphonodella* progenitors from late Devonian island arc settings (Indert Formation, Shine Jinst area, southern Mongolia). – Newsletters on Stratigraphy, **57** (1): 65-88; doi: 10.1127/nos/2023/0760.

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

Activities in the last year have been mainly focused on participation in relevant professional meetings, publication of results either as abstracts or as professional papers (see attached list), field work in several of the research areas, attracting a new student to the Devonian community, and be the Guest Editors of the special *Palaeobiodiversity and Palaeoenvironments* volume honouring the late Peter CARLS.

Regarding the first aspect we have attended two national meetings with Devonian presentations (Spanish Paleontological Society and Spanish Geological Society) and two International SDS meetings (Sofia and GeoTolosa). Additionally, we have continued with the compilation of biostratigraphic and geophysical data pertaining to the Pragian/Emsian boundary in two selected sections in the Pyrenees (Fig. 1). Geochemical samples from the same two localities have been processed and we hope to elaborate preliminary results by the end of this year. We have continued with the study on lower and middle Famennian conodonts in the Spanish Pyrenees.

Fig. 1. Geomagnetic sampling around the P/E boundary in the Pyrenean section Isábena 1. Collaboration with Belén OLIVA and Antonio CASAS; Geotransfer Research Group; University of Zaragoza.

As in previous years, Nacho and Teresa have concentrated their efforts on Lower, Middle and Upper Devonian conodont biostratigraphy, Middle Devonian conodont biofacies, and the analysis of Lower and Middle Devonian microfacies in selected Pyrenean sections. Recently, and together with Héctor BARRERA-LAHOZ, we have started the analysis of Upper Devonian conodont biofacies as well. This year,

a new student -**Ivan RIVAS**- has joined the team and we have started to analyse the Eifelian strata of the Moyuela Fm in the Iberian Chains. He has already presented preliminary results at the GeoTolosa meeting.

Figs. 2-3. Eifelian strata at the Camino Molino section in the Iberian Chains.

Fig. 4. Teresa analysing the Eifelian-Givetian transition at Camino Molino, guarded by Ingrid.

In the fall of 2024 Teresa obtained a UCM one year-grant to study Middle Devonian strata from selected Spanish and French sections with a multidisciplinary perspective.

We keep processing samples and analysing sequences from the Pyrenees and the Iberian Chains (Figs. 2-4). This year our focus has been on Lochkovian, Eifelian, upper Frasnian, and Famennian sections. Specifically, we are supervising Ph.D. student **Héctor BARRERA-LAHOZ** from the University of Zaragoza, whose primary conodont research is focused on a diachronic stratigraphic unit spanning the F/F boundary in the Pyrenees (Fig. 5). First taxonomic results and their biostratigraphic analysis have already been published in the *Spanish Journal of Paleontology* (2024), and in *Paleobiodiversity and Paleoenvironments*, respectively. Preliminary biofacies interpretation were presented in the SDS meeting in Sofia and a specific paper is under revision in the *Journal of Iberian Geology*. Two presentations dealing with middle Lower and middle Devonian conodonts are scheduled for the upcoming Spanish Paleontological Society meeting (October 2025, Aracena). Cooperation with Portuguese colleagues (mainly Gonçalo SILVÉRIO, Noel MOREIRA, and Gil MACHADO) continues and resulted in an almost finished Ph.D. dissertation (**Gonçalo SILVÉRIO**).

Fig. 5. Hector BARRERA-LAHOZ sampling Famennian strata in the Pyreneen Orden-Talltendre section.

As previously reported, we have started multidisciplinary studies on Devonian sections and outcrops in both the Spanish Central

Pyrenees and the Iberian Chains. This year, geochemical samples in two selected Pyrenean sections (Isábena-1 and Baliera-6), which include the Pragian-Emsian transition, have been treated. The results will be combined with the paleomagnetic ones that were already presented in the past Strati and MagIber meetings in collaboration with Spanish colleagues from the GEOtransfer Research Group at the University of Zaragoza. The geochemical analysis will be accomplished at the National Research Centre (CSIC), Geochemical Lab in Granada.

Our long-term project involving the detailed analysis of Bohemian conodont faunas around the S/D interval, initiated in collaboration with Mike MURPHY and the late Peter CARLS, is progressing slowly.

Our cooperation with paleobotanics, which began in the Lower Devonian strata of the Iberian Chains, continues to expand. We aim to augment the palaeontological characterization of Lower Devonian strata in the Iberian Chains by including the palynological record, extending this on-going project to Middle and Upper Devonian strata. A paper dealing with the first evidence for land plants in the Frasnian of the Iberian Chains will be submitted to the *Paleobiodiversity and Paleoenvironments* special volume dedicated to Peter CARLS.

We have also started to focus on the identification of "Events" in the Spanish Pyrenees, to study them from a multidisciplinary point of view, and to analyse their effects on the conodont populations. A first paper submitted to *Palaeo x 3* is under revision.

Teresa continues her Middle and Upper Devonian revisiting of selected localities in the Cantabrian Mountains. This project was initiated in cooperation with the late Susana GARCÍA-LÓPEZ (University of Oviedo). Teresa is currently concentrating in the Kačák Event in several Spanish and French sections.

Our collaboration with the late friend Xiuquin CHEN (Suzi) and our former Ph.D. student Jianfeng LU continues to yield results, mainly related to Pragian and Emsian outcrops in South China. These efforts mark the initial steps in the envisaged long-term Chinese-Spanish cooperation. Regarding this cooperation, Jianfeng paid a visit to Valencia last July and we will visit him at the end of the year. Currently, we are preparing a joint paper on Pragian conodonts.

In terms of heritage protection actions in Spain, and as we reported in previous years, we are actively involved in a project affecting Devonian outcrops in the Spanish Pyrenees. A company has proposed extending the current sky-resort near Cerler by connecting two valleys. Given that this action necessitates the construction of a new road at high elevation (over 2.200 m), where Devonian rocks crop out, we were called upon to assess the impact of this road. Preliminary results confirm the presence of Pragian, Emsian, Givetian and Frasnian rocks. In the initial phase, we recommended the preservation of these outcrops, and both the Company and the Government accepted our proposal. The road will be deviated to avoid affecting the outcrops, and we were able to collect a variety of Devonian microfossils, including conodonts. Preliminary results will be presented in the upcoming Spanish Paleontological Society meeting in Aracena (October 2025).

Other important actions in relevant Spanish outcrops include 1) the stratigraphical and palaeontological study of Lower Devonian outcrops in Ossa-Morena and Central-Iberian areas in south-western Spain, in collaboration with other Spanish colleagues (Miguel PARDO and Esperanza FERNÁNDEZ). This project entails large field-campaigns and mapping in rough areas. 2) The continuation of our long-term collaboration with the late Peter CARLS on the Devonian of the Iberian Chains, a classical and key area for "Rhenish" (neritic) facies.

CM Jenaro L. GARCÍA-ALCALDE continues to publish comprehensive monographs on brachiopods from the Cantabrian Mountains. This year, he has also submitted a paper for the special volume honouring Peter CARLS.

Fig. 8. Members of the Spanish-Portuguese Devonian Research Group at GeoTolosa 2025. From left to right: Teresa LIAO, Héctor BARRERA-LAHOZ, Nacho VALENZUELA-RÍOS, Noel MOREIRA, and Ivan RIVAS.

Publications

Papers

BARRERA-LAHOZ, H., VALENZUELA-RÍOS, J. I. & LIAO, J.-C. (2025 submitted). Frasnian - Famennian (Upper Devonian) conodont biofacies and globalevents in the Compte section (Central Pyrenees, Spain). - Journal of Iberian Geology.

GARCÍA-ALCALDE, J. L. (2025 submitted). Brachiocyrtininae, a new widespread distributed, Devonian cyrtinid Subfamily (Brachiopoda). - Palaeobiodiversity and Palaeoenvironments.

LIAO, J.-C. & VALENZUELA-RÍOS, J. I. (2025 submitted). Late Eifelian (Middle Devonian) to Early Frasnian (Upper Devonian) Conodonts and Strata in the Spanish Central Pyrenees: Global Correlations and Effects of Climatic Fluctuations in the Biota. – Palaeogeography, Palaeoclimatology, Palaeoecology; doi.org/10.2139/ssrn.5186897.

BARRERA-LAHOZ, H., VALENZUELA-RÍOS, J. I. & LIAO, J.-C. (2025). Lower and middle Famennian (Upper Devonian) conodont biostratigraphy from Compte section (Central Pyrenees), Spain). - Palaeobiodiversity and Palaeoenvironments, **105**: 129–146; doi.org/10.1007/s12549-025-00642-9.

BARRERA-LAHOZ, H., VALENZUELA-RÍOS, J. I. & LIAO, J.-C. (2024). Lower and middle Famennian conodonts of the CP section (Spanish Central Pyrenees): A taxonomic study. - Spanish Journal of Paleontology, **39** (1): 33-70; doi.org/10.7203/sjp.28695.

OLIVA-URCIA, B., PUEYO MORER, E. L., GIL IMAZ, A., GIL PEÑA, I., BRUSSET, S., SOUQUET, P., VALENZUELA-RÍOS, J. I. & LIAO, J.-C., (2025). What the magnetic information in sedimentary and igneous rocks tells us about the kinematics of the Pyrenean Axial Zone? – GEOGACETA, **77**: 91-94.

SILVÉRIO, G., LIAO, J.-C., VALENZUELA-RÍOS, J. I., MACHADO, G., BARRETO, P., & MOREIRA, N.

(2024). Middle Devonian reef-derived calciturbidites of western Ossa Morena Zone (Portugal): conodont biostratigraphy of the Eifelian Pedreira da Engenharia Limestone. - Journal of Iberian Geology, **50** (4): 731-750; doi.org/10.1007/s41513-024-00242-0.

VALENZUELA-RÍOS, J. I. & LIAO, J.-C. (2024). Biodiversity and Evolutionary phases of Lochkovian (Lower Devonian) Conodonts in the Pyrenees: A Comparative Study. - Marine Micropaleontology, **187**; doi.org/10.1016/j.marmicro.2023.102326.

Abstracts

BARRERA-LAHOZ, H., VALENZUELA-RÍOS, J. I. & LIAO, J.-C. (2025). Upper Frasnian to middle Famennian Global Bioevents in the Compte section (Upper Devonian, Central Spanish Pyrenees). – GeoTolosa 2025, 20th ICCP Variscan Meeting, Abstract book: 15.

BARRERA-LAHOZ, H., VALENZUELA-RÍOS, J. I. & LIAO, J.-C. (2024). Frasnian-Famennian conodont biofacies from the Compte section (Pyrenees, Spain). - Geologica Balcanica, **53** (3): 95.

LIAO, J.-C., GIRARD, C., FEIST, R. & VALENZUELA-RÍOS, J. I. (2024). Conodontos en las proximidades del límite entre Devónico Medio y Superior en la sección estratotípica de Col du Puech de la Suque (Montaña Negra, Francia). - Palaeontological publications, **5**: 123

LIAO, J.-C., NESME, F., GIRARD, C., VALENZUELA-RÍOS, J. I. & FEIST, R. (2024). The Taghanic evidence (Middle Devonian) at the Col du Puech de la Suque section (Montagne Noire, France). - Geologica Balcanica, **53** (3): 103.

LIAO, J.-C. & VALENZUELA-RÍOS, J. I. (2025). Did the Global Events have an effect on the Givetian Conodont Bioevents? A study case from the Spanish Pyrenees. – GeoTolosa 2025, 20th ICCP Variscan Meeting, Abstract book: 29.

LIAO, J.-C. & VALENZUELA-RÍOS, J. I. (2025). Avances paleontológicos en secuencias estratigráficas del Devónico en el Sector Collado de Basibé-Castanesa (Pirineo Oscense). - XL Jornadas Spanish Palaeontological Society October 7-10 (Aracena).

RIVAS DE JESUS, I., BARRERA-LAHOZ, H., VALENZUELA-RÍOS, J. I. & LIAO, J.-C. (2025). Advances studies on the Middle Devonian sequence in the eastern Iberian Chains. – GeoTolosa 2025, 20th ICCP Variscan Meeting, Abstract book: 39.

RIVAS DE JESUS, I., BARRERA-LAHOZ, H., VALENZUELA-RÍOS, J. I. & LIAO, J.-C. (2025). Nuevos registros paleontológicos en secuencias estratigráficas del Devónico Medio de la Cordillera Ibérica. - XL Jornadas Spanish Palaeontological Society October 7-10 (Aracena).

SILVÉRIO, G., MACHADO, G., VALENZUELA-RÍOS, J. I., MOREIRA, N. & PEREIRA, S. (2024). Paleontologia de conodontes em Portugal: estado da arte. - Livro de resumos do XI Congresso Nacional de Geologia, Portugal.

VALENZUELA-RÍOS, J. I. & LIAO, J.-C. (2025). Innovation and Radiation Events of Ancyrodelloides in the Spanish Pyrenees; some thoughts for placing the base of the middle Lochkovian (Lower Devonian). – GeoTolosa 2025, 20th ICCP Variscan Meeting, Abstract book: 43.

VALENZUELA-RÍOS, J. I. & LIAO, J.-C. (2024). Global comparison on Lochkovian (Lower Devonian) conodont evolution dynamics. - Palaeontological publications, **5**: 125.

CM Charles (Chuck) VER STRAETEN

The bulk of my research continues to focus on the Devonian terrestrial strata of the Catskill Mountains in eastern New York. This covers a very large area of the State of New York (approximately 12,019 km^2/4641 mi^2) and is estimated to be on the order of 2.4 km/1.5 mi thick. Extensive soil and forest cover and the rarity of distinctive, unique marker beds in terrestrial strata make it difficult to correlate strata even along the same, largely covered mountainside.

Rotatable 3d lidar imagery is finally permitting visualization of terrestrial strata on mountain sides in the Catskill Mountains. The lidar passes through the vegetative cover and thin soils on the mountainsides. Accompanying this report (Fig. 1) is a 3d, side-view lidar image from the Catskill Mountains. For the first time, we can see the sedimentary rock layers on the mountain sides. One can see that some layers can be correlated mountain to mountain to mountain.

There are some distortions visible (the "wiggly" character of some layers). I'm not trained in GIS; this image is done in Google Earth, so there are some distortions to the layers. However, even with the Google Earth imagery, one can see that some layers can be correlated mountain to mountain to mountain. A few important points: The image has a 3x vertical exaggeration. This permits better viewing of details in the layering. The lighter colored bands are channel sandstones; the darker layers are flood plain deposits. With enough work, it is hoped a time-rock/allostratigraphic stratigraphy for the terrestrial strata can be established; and correlations with the marine strata in central to western New York can be recognized.

At this time, there are only two clear correlations between terrestrial and marine strata in New York State. There is a small amount of palynologic biostrat data, again "a small amount." And we have no one in North America, that I know of, who is doing microvertebrate analyses. In the recent years, I have been finding apparent airfall volcanic tephras (also called bentonites, and other terms, which really only tell their diagenetic history). Dating zircons from some of these layers from the terrestrial succession would help constrain time and ages, especially if combined with the lidar work. Partway through the last fiscal year, spending was frozen in New York State, and dating zircons with Mark Schmitz at Boise State University, Idaho, was delayed. I hope to date zircons from four terrestrial tephras this year.

At the Southeastern Section, Geological Society of America meeting in March 2025, I and Dennis TERRY, an expert in Cenozoic and Devonian paleosols, led a theme session, *From the Land to the Sea: Devonian Depositional Systems of the Appalachian Region*. The 2-day meeting, held in Virginia, was followed by a day-long fieldtrip to the Devonian of eastern West Virginia, visiting sites from Givetian basinal black shales through increasingly shallower facies, ending at two sites with Famennian terrestrial redbeds with fluvial channel sandstones.

Stepping away from the terrestrial… Pragian through Emsian strata across central New York State have long been a mystery of presence/absence, and very different development where present, site to site to site. However, at least one locality across central New York clearly preserves a very highly condensed but undisturbed succession through the strata of the Oriskany, Esopus, and Schoharie formations. These units are interpreted to represent uppermost Pragian to upper or top of the Emsian. The Esopus and Schoharie, correlated basinwide along the Appalachian Basin outcrop belt (VER STRAETEN 2007, 2009, 2023), clearly outline five Emsian 3rd order depositional sequences. Very little biostratigraphic data is available for these strata; however, I have a lot of Emsian rock from across the Appalachian Basin, with a number of useful biostratigraphic taxa. These include conodonts, dacryoconarids and associated forms, goniatites (Thomas BECKER and Gerry KLOC claims these), along with bactritids, brachiopods, ostracodes, palynological taxa, and others. Specialists are very welcome to work on this large collection. Some of these occur proximal to airfall volcanic tephras ("bentonites," etc.), of which I have a large collection from around the basin, and could be dated. Please join in and help.

Fieldtrips

Southeastern Section, Geological Society of America, March 2025. Co-leader of fieldtrip.

- Exploring the Catskill Clastic Wedge in West Virginia: Transitions in Life, Environments, and Climate. Leaders: William E LUKENS, Dennis TERRY, Charles VER STRAETEN, and Lynn S. FICHTER.

2025 New York State Geological Association meeting: Co-leader of two fieldtrips.

- The Devonian on Land, and Earth's Oldest Known Fossil Forest, Catskill Mountains. New York State Geological Association, 100th Annual Meeting. Fieldtrip led by myself and Bill STEIN.
- Devonian (Pragian-Givetian) Stratigraphy and Paleontology of central New York State: Classic Sections f The North American Standard. New York State Geological Association, 100th Annual

Meeting. Fieldtrip led by Alex BARTHOLOMEW, Carl BRETt, myself, and Linda IVANY.

Dennis TERRY, paleosols expert at Temple University, and I are starting a Devonian Terrestrial Research Group, examining all and any geological and paleobiological aspects of the system. We plan to run 2 to 3 day **field meetings** annually, examining different Appalachian Basin Devonian terrestrial areas, **beginning Summer 2026**. In later years, field meetings may extend into Maine and beyond. Initial emails indicate a number of researchers (> 25) look forward to participating.

Finally, I invite collaborations with SDS paleontologists/biostratigraphers. I have a lot of Emsian to Eifelian faunal material for biostratigraphic work from the Appalachian Basin, eastern United States (the states of New York, Pennsylvania, Maryland, Virginia and West Virginia). Samples include: 1) goniatites (Thomas BECKER and Gerry KLOC), conodonts, palynology, brachiopods, dacryoconarids and more. Some of the material is in small samples, others in larger rocks. A few portions of this have been examined (e.g., BROCKE et al. 2016)

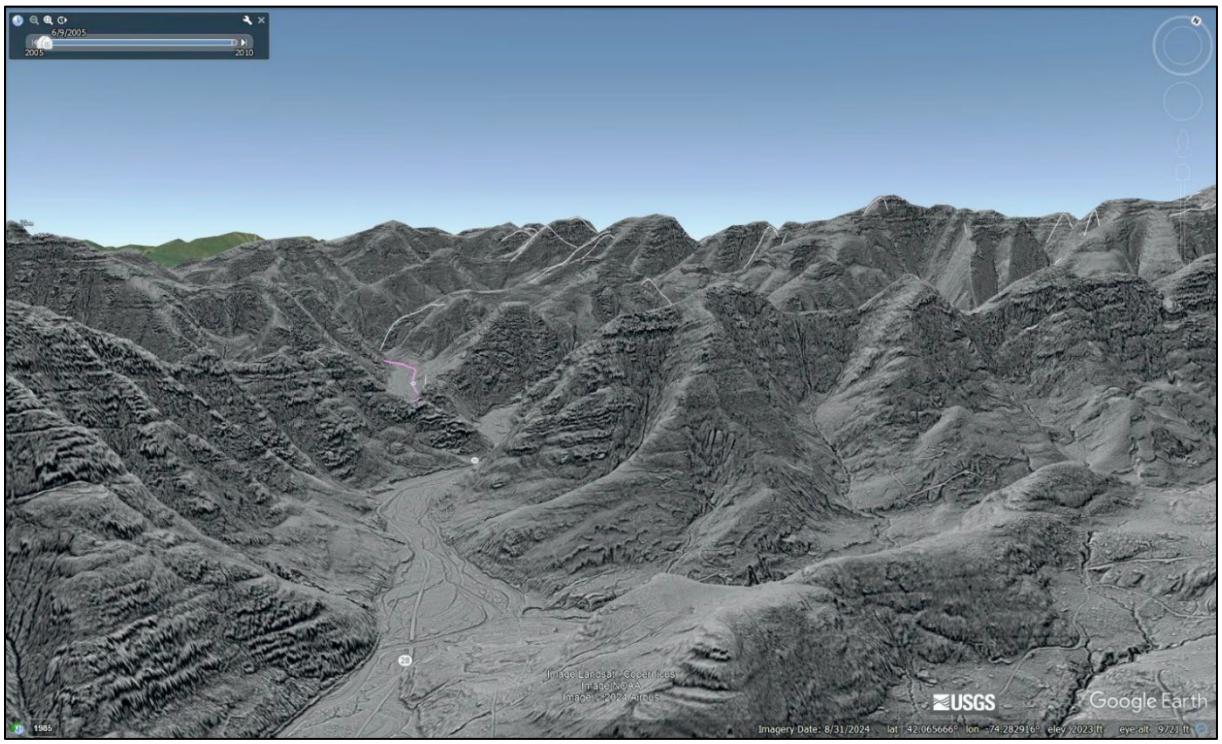


Fig. 1. Lidar image, side view of the Catskill Mountains, near Mount Tremper, Ulster County, New York. Note the 3x vertical exaggeration. The peak at center, middle ground, in Mount Tremper. Some layers can be correlated mountain to mountain, even is this somewhat distorted image.

Publications

Guidebooks

VER STRAETEN, C. & STEIN, W. (2025). The Devonian on Land, and Earth's Oldest Known Fossil Forest, Catskill Mountains. - New York State Geological Association, 100th Annual Meeting Guidebook: B4-1 to B4-49; Clinton.

BARTHOLOMEW, A., BRETT, C. E., BAIRD, G., IVANY, L. & VER STRAETEN, C. (2025). Devonian (Pragian-Givetian) Stratigraphy and Paleontology of central New York State: Classic Sections of The North American Standard. - New York State Geological Association, 100th Annual Meeting Guidebook: A1-1 to A1-54; Clinton.

Abstract

VER STRAETEN, C. (2025). Devonian Terrestrial Strata, New York, Appalachian Basin, and Eastern North America. - Geological Society of America, Abstracts with Programs. **57** (2); doi: 10.1130/abs/2025SE-408545 .

CM Stanislava VODRÁŽKOVÁ

We focused on clay mineral authigenesis documented in association with microbial structures from coated grains and peloids spanning the Silurian through Middle and Upper Devonian (VODRÁŽKOVÁ et al. 2025). Together with Tomáš KUMPAN we resubmitted a project proposal (for the Czech Science Foundation) examining Emsian chronostratigraphy and environmental changes associated with the Daleje Event. This proposal focuses on Prague Basin sections that provide a comprehensive bathymetric transect ranging from shallow-water carbonate facies to transitional carbonate/calcareous shale facies. In collaboration with Ondřej BÁBEK, Tomáš KUMPAN, and Catherine GIRARD, we studied the Upper Devonian Coumiac and Col des Tribes sections in the Montagne Noir, with an emphasis on petrological, geochemical, and colour records of palaeoredox conditions. Most recently, our research has focused on the Hlubočepy section in the Prague Basin, where we are conducting integrated studies of microfossils, petrology, and geochemistry of the Choteč Limestone and Kačák Member, reflecting the global Kačák Event.

Publication

VODRÁŽKOVÁ, S., KOUBOVÁ, M., MUNNECKE, A., KUMPAN, T., VODRÁŽKA, R., POUR, O. & FRÝDA, J. (2025). Clay mineral authigenesis as an example of organomineralization in Paleozoic coated grains and peloids. - Sedimentary Geology, **484-485** (106912); doi.org/10.1016/j.sedgeo.2025.106912.

CM WANG Jia-Shu

In 2024, I completed my Ph.D. in the School of Earth and Space Sciences at Peking University. My doctoral thesis, titled *Early Devonian coastal zone environments and ecosystems in South China: Sedimentological and ichnological evidence from the Lower Devonian of Qujing, Yunnan, China*, examined paleoenvironmental and ecological conditions through integrated sedimentological and ichnological analyses. Following my graduation, I joined the Geological Museum of China as a researcher.

My research from 2024 to 2025 has primarily focused on two areas: 1. sedimentology and ichnology of the Lower Devonian in Qujing, Yunnan, China; and 2. the study of eurypterid and basal euchelicerate (synziphosurid) fossils from the same strata. My long-term project focuses on the impact of the early land plant expansion on sedimentary dynamics in coastal zones during the Silurian/Devonian transition.

Over the past year, I have contributed to several published studies related to the Devonian period. These include:

- Research on zosterophyllopsids from the Lower Devonian of Duyun, Guizhou Province, China (HUANG et al. 2025), in which we described *Zosterophyllum baoyangense*, the smallest known species of this group, and used morphometric data of *Zosterophyllum* species from the Late Silurian to Early Devonian to reveal differentiation in their life-history strategies.
- A study on a new seed plant, *Zaijunia biloba*, from the Upper Devonian of Changxing, Zhejiang Province, China (LI et al. 2025), in which we used computational fluid dynamics to assess pollen capture efficiency in early ovules, offering new insights into wind pollination and morphological evolution among the earliest seed plants.

- Collaborative work on two lycopsid species, *Lepidodendropsis zhanyiense* and *Minarodendron cathaysiense*, from the Middle Devonian of Qujing, Yunnan Province, China (ZHENG et al. 2025), which enhanced the understanding of floral diversity in South China and suggested possible paleobiogeographic isolation between the South China Block and other regions during this period.
- Participation in a broader investigation of the Silurian–Devonian radiation of vascular plants and its potential effects on terrestrial carbon stocks (XUE et al. 2025).
- Involvement in a systematic study of trace fossils from Middle to Late Paleozoic (Silurian–Permian) strata across major Chinese tectonic blocks (ZHANG et al. 2025), which revealed for the first time the response mechanisms of benthic fauna to the process of Paleozoic plant terrestrialization and outlined their behavioral strategies, environmental expansion, and ecosystem engineering.
- Collaboration on a study examining microconchid dispersal that quantitatively links their transoceanic distribution to the evolution of early land plants, identifying two major expansion peaks, including a significant event during the Early Devonian (YUAN et al. under review). This work highlights the crucial role of plant-driven rafting in shaping marine biogeography, particularly during the Early Devonian, a period characterized by significant diversification of early land plants.

Finally, please allow me to provide a brief introduction to the Geological Museum of China (Fig. 2). As one of the first National First-Grade Museums in China, it is the country's earliest independently established public natural science museum. It houses over 550.000 geological specimens spanning various subdisciplines, with a particularly notable Devonian collection that includes vertebrate and invertebrate fossils, as well as early vascular plant fossils. The museum was home to two renowned researchers in Devonian fish fossils, the late Prof. PAN Jiang. and Prof. LU Li-Wu. They both worked at the museum until retirement. I extend a warm invitation to all SDS members to visit the museum. Researchers interested in our collections are welcome to contact me at jiashuwang1996@163.com.

Fig. 2. Geological Museum of China

Publications

HUANG, P., WANG, J.-S., WANG Y.-L., LIU, L., ZHAO, J.-Y. & XUE, J.-Z. (2025). The smallest *Zosterophyllum* plant from the Lower Devonian of South China and the divergent life history strategies in zosterophyllopsids. - Proceedings of the Royal Society B: Biological Sciences, **292** (20242337).

LI, B.-X., HUANG, P., LIU, L., WANG, J.-S., NIKLAS, K., WANG, D.-M. & XUE J.-Z. (2025). New novel early seed plant reveals a modification strategy of earliest cupulate ovules and their adaptation to wind pollination. - Proceedings of the Royal Society B: Biological Sciences, **292** (20242940).

XUE, J.-Z., ZHONG, T., WANG, H., LI, B.-X., YANG, Q.-Q. & WANG, J.-S. (2025). The Silurian-Devonian radiation of vascular plants and the potential effects on terrestrial carbon stocks. - Journal of Palaeogeography (Chinese Edition), **27**.

ZHANG, L.-J., WANG, Z.-Y., LI, Y., CHAI, H.-Y., FAN, R.-Y., WANG, J.-S. & WANG, Z. (2025). How benthic animals responded to the Paleozoic plant terrestrialization: Evidence from trace fossils and their ecosystem engineering reconstruction. - Earth-Science Reviews, **270** (105236).

ZHENG, G.-F., WANG, J.-S., LI, B.-X., LIU, L. & XUE, J.-Z. (2025). Two lycopsid plants from the Middle Devonian Haikou Formation of Qujing, Yunnan, China and their evolutionary and paleogeographic implications. - Journal of Palaeogeography (Chinese Edition), **27**.

CM Johnny A. WATERS

My research this year focused on two topics: the taxonomy and evolutionary paleobiology of blastoids and the Devonian of the Central Asian Orogenic Belt in Mongolia. The principal outcome of the blastoid research was a re-evaluation of the Devonian blastoids from Germany, Spain, and France highlighted by publication of "A critical interval in blastoid evolution: The respiratory transition and palaeogeographic dispersion of the spiraculate blastoids in the Devonian" by BOHATÝ, WATERS and MACURDA in *Papers in Palaeontology*. During this research, we realized that specimens from Germany provided key evidence of the presence of mutable collagenous tissue in blastoids with more sophisticated nervous control of the brachiolar feeding network than had previously been realized. This research was published in *Nature: Communications Biology* in November 2024.

Research on the Devonian of the Central Asian Orogenic Belt in Mongolia included the publication of a paper on the Depositional history of Devonian and Mississippian rocks from southern Mongolia based on our fieldwork in Shine Jinst, Mongolia, in 2022. This summer, I returned to Mongolia with a team including CMs Sarah CARMICHAEL, Diana BOYER and Randy BLOOD along with Ariuka MUNKHJARGAL, Sersmaa GONCHIGDORJ, and John W. WATERS. During three weeks of fieldwork in the Gobi, we examined sections with Lower and Middle Devonian biostrome / reef complexes. At one locality, Lower Devonian coral stromatoporoid biostrome development was interrupted by repeated subaerial volcanic activity. At a second locality we studied a massive coral stromatoporoid reef complex measuring >10 km long and 20 m high sitting directly on basaltic seafloor (pillow basalts indicated subaqueous eruptions). Ultimately reef development was impacted by repeated subaerial volcanic eruptions. At a third locality we observed a Late Devonian sequence that we interpret to represent the Hangenberg interval. We currently lack detailed information on biostratigraphy, sedimentology, and geochemical proxies because samples are still in transit.

Publications

Papers

BOHATÝ, J., MACURDA Jr., D. B. & WATERS, J. A. (2024). A critical interval in blastoid evolution: the respiratory transition and palaeogeographic dispersion of the spiraculate blastoids in the Devonian. - Papers in Palaeontology, **10** (4), e1584.

WATERS, J. A., BOHATÝ, J., BRADFORD, D. & MACURDA Jr., D. B. (2024). Feeding postures as indicators of mutable collagenous tissue in extinct echinoderms. - Communications Biology, **7** (1): 1516.

NOIRIT, F., WATERS, J. A., BAUER, J. E. & LEFEBVRE, B. (2024). Devonian eublastoids (Echinodermata) from the Armorican Massif (NW France): a brief review of 150 years of investigation. - Cahiers de Biologie Marine, **65** (4): 517-524.

KÖNIGSHOF, P., CARMICHAEL, S. K., WATERS, J. A., MUNKHJARGAL, A. & GONCHIGDORJ, S. (2025). Depositional history of Devonian and Mississippian rocks from southern Mongolia: Stratigraphic and sedimentologic framework of a volcanic arc system. - Palaeobiodiversity and Palaeoenvironments, **105**: 1-22.

CARMICHAEL, S. K. & WATERS, J. A. (2025). Fieldwork with Peter KÖNIGSHOF. - Palaeobiodiversity and Palaeoenvironments, **105**, 19–22 (2025); doi.org/10.1007/s12549-025-00648-3.

Abstract

CARMICHAEL, S. K., CYWINSKI, C., KÖNIGSHOF, P., WATERS, J. A., HAGEMAN, S. & TA, P. (2024). Ocean anoxia signatures can be preserved in ultrapure, altered carbonates-new data from the Late Devonian Xom Nha Formation (Vietnam). - In: AGU Fall Meeting Abstracts, **2024** (587): 33E-0587.

CM Nina WICHERN

I joined the SDS as a corresponding member during the SDS meeting at GeoTolosa (Toulouse, 23-27 June 2025).

In September 2024, I successfully defended my Ph.D. thesis on the link between

astronomical forcing and Late Devonian anoxic events, titled "*Astronomical signatures of the Late Devonian Kellwasser, Annulata, Dasberg, and Hangenberg bioevents and Crises: Insights from the German Rhenish Massif*" at the University of Münster, Germany, with the support of my supervisor David DE VLEESCHOUWER. The thesis itself is not available online, but a PDF version can be requested via email. The first three chapters are published, and are available under the following DOIs:

- https://doi.org/10.1038/s43017-023-00505-x (DE VLEESCHOUWER et al. 2024)
- https://doi.org/10.5194/cp-20-415-2024 (WICHERN et al. 2024a)
- https://doi.org/10.1029/2024GL109392 (WICHERN et al. 2024b)

Two further manuscripts on the Devonian based on this thesis are currently underway: one on the cyclostratigraphy of the Upper Famennian (*Annulata*-Dasberg-Hangenberg sequence; conodont biozones *Pa. granulosus – S. (Eo.) praesulcata* s.l.), which is in review; and another one on weathering trends in the same interval, which will be submitted later this year.

2025 Publications

WICHERN, N., BECKER, R. T., BIALIK, O. M., HARTENFELS, S. & DE VLEESCHOUWER, D. (2025 submitted). Cyclostratigraphic calibration of the rhythmically-bedded upper Famennian (Upper Devonian) in the Rhenish Massif, Germany. – Newsletters on Stratigraphy.

WICHERN, N., BIALIK, O. M., BECKER, R. T. & DE VLEESCHOUWER, D. (2025). Climate and weathering trends on astronomical timescales in the run-up to Late Devonian anoxic bioevents. - In: Geotolosa 2025, News from the Paleozoic Worlds, Abstract book: 44.

WICHERN, N. (2025). Cyclostratigraphy in deep time: lessons from Devonian strata in the Rhenish Massif. - In: Geo4Göttingen 2025, Earth, Life, Climate, Resources, Material, 14. – 18. September 2025, Georg-August-Universität Göttingen, Book of Abstracts: 611.

TM XUE Jin-Zhuang

We have been mainly focusing on Devonian plant fossils of South China and, more broadly, Paleozoic plant terrestrialization and its effects on Earth's environments.

Concerning the plant fossil record, we reported a new species of *Zosterophyllum* from the Lower Devonian of Guizhou, two lycopsids from the Middle Devonian of Yunnan, and a new seed plant from the Upper Devonian.

I had the privilege of convening specialized sessions with colleagues at three international conferences: (1) "Biosedimentary Processes During the Development of Terrestrial Systems" at the First International Conference of Biosedimentology (Wuhan, October 25-29, 2024); (2) "Life-Mineral Interactions During Plant Terrestrialization" at the Fifth International Conference of Geobiology (Wuhan, June 10-13, 2025); and (3) "Paleozoic Evolution of Coastal Ecosystems" at the 8th Conference on Earth System Science (Shanghai, July 2-5, 2025). Each session featured numerous insightful presentations that advanced our understanding of these topics.

Currently, I am serving as editor for a special issue titled "The Colonization of Land by Plants and Its Effects on Earth's Environments and Resources" (https://www.sciencedirect.com/special-issue/10KHV6RPKKK). The collection has already published three papers, with approximately 15 additional manuscripts currently under peer review.

Publications

CAI, J., JU, P., LIU, M., XUE, J.-Z., ZHAO, M.-Y. (2025) Environmental effects of land plants evolution in the phanerozoic. - Chinese Science Bulletin; doi: 10.1360/TB-2025-0173 (in Chinese with English summary).

HUANG, P., WANG, J.-S., WANG, Y. L., LIU, L., ZHAO, J.-Y., XUE, J.-Z. (2025). The smallest *Zosterophyllum* plant from the Lower Devonian of South China and the divergent life history strategies in zosterophyllopsids. - Proceedings of the Royal Society, B: Biological Sciences, **292**: 20242337.

LI, B.-X., HUANG, P., LIU, L., WANG, J.-S., NIKLAS, K.-J., WANG, D.M., XUE, J.-Z. (2025). New ovulate cupule further informs the relationships among early seed plants and their adaptation to wind pollination. - Proceedings of the Royal Society B: Biological Sciences, **292**: 20242940.

XUE, J.-Z., ZHONG, T., WANG, H., LI, B.-X., YANG, Q.-Q., WANG, J.-S. (2025). The Silurian-Devonian radiation of vascular plants and potential effects on terrestrial carbon stocks. - Journal of Palaeogeography (Chinese Edition); doi: 10.7605/gdlxb.2025.078 (in Chinese with English abstract).

ZHENG, G.-F., WANG, J.-S., LI, B.-X., LIU, L., XUE, J.-Z. (2025). Two lycopsid plants from the Middle Devonian Haikou Formation of Qujing, Yunnan, China and their evolutionary and paleogeographic implications. - Journal of Palaeogeography (Chinese Edition); doi: 10.7605/gdlxb.2025.068 (in Chinese with English abstract).

CM YIN Jia-Yi

In 2024, I spent several months as a joint Ph.D. researcher at the Czech Academy of Sciences with Ladislav SLAVIK (Fig. 1), working on Silurian–Devonian boundary (SDB) successions and conodont biostratigraphy. In collaboration with him, I completed the submission of two papers: one focusing on a review and perspectives of the SDB in China, and the other dealing with the subdivision of the SDB in the northern Xinjiang region of the Central Asian Orogenic Belt. It is worth noting that *Caudicriodus hesperius* (Fig. 2), the index fossil of basal Devonian, has been recognized in the Junggar, representing the first documentation of this conodont species in China and the Northern Hemisphere. At the end of 2024, I joined Yangtze University as a faculty member.

Publications

YIN, J.-Y., SLAVÍK, L., WANG, Z.-H., SHEN, Z., ZHANG, X.-S., LI, Y.-L., MA, J., GONG, Y.-M. & ZONG, R.-W. (2025). Silurian–Devonian Boundary in Northern Xinjiang, NW China. - Palaeogeography, Palaeoclimatology, Palaeoecology, **659** (112636).

YIN, J.-Y., SLAVÍK, L., WANG, Z.-H., SHEN, Z., ZHANG, X.-S., LI, Y.-L., MA, J., GONG, Y.-M. & ZONG, R.-W. (2024). The Silurian–Devonian Boundary of China: Review and perspectives. - Earth-Science Reviews, **254** (104805).

Fig. 1. Jiayi YIN and Ladislav SLAVÍK at an Early Devonian section in the Prague Basin.

YIN, J.-Y., LIU, Y.-L., HUANG, L.-B., ZONG, R.-W. & GONG, Y.-M., (in press). Brachiopods from the Silurian "Lower Red Beds" of Wuhan E. Hubei, South China: paleoecological and paleogeographical implications. - Journal of Earth Science.

ZONG, R.-W., YIN, J.-Y., MA, J., DU, X.-Q., LIU, Y.-L. & LIU, S.-B. (2023). Lower Devonian sequence and Silurian–Devonian boundary in northern Xinjiang, NW China: a preliminary study. - SDS Newsletter, **38**: 67-71.

YIN, J.-Y., SLAVÍK, L., LU, J.-F., MA, J., LIU, Y.-L., ZONG, R.-W., GONG, Y.-M. (2023). Discovery of the earliest Devonian conodonts from Xinjiang, Northwest China. – Palaeoworld; **33**: 1256–1267.

MA, J., YIN, J.-Y., LIU, Y.-L., DU, X.-Q., LIU, S.-B. & ZONG, R.-W. (2023). The latest encrinurid trilobites from the Lower Devonian of Xinjiang, Northwest China. - Geological Magazine, **160**: 1578–1585.

YIN, J.-Y., ZONG, R.-W., LIU, Y.-L., HUANG, L.-B. & GONG, Y.-M. (2022). New material of bivalves from the Upper Devonian Wutung Formation in Wuhan, Hubei and their palaeoenvironmental significance. - Journal of Stratigraphy, **46** (2): 154–162 [in Chinese with English abstract].

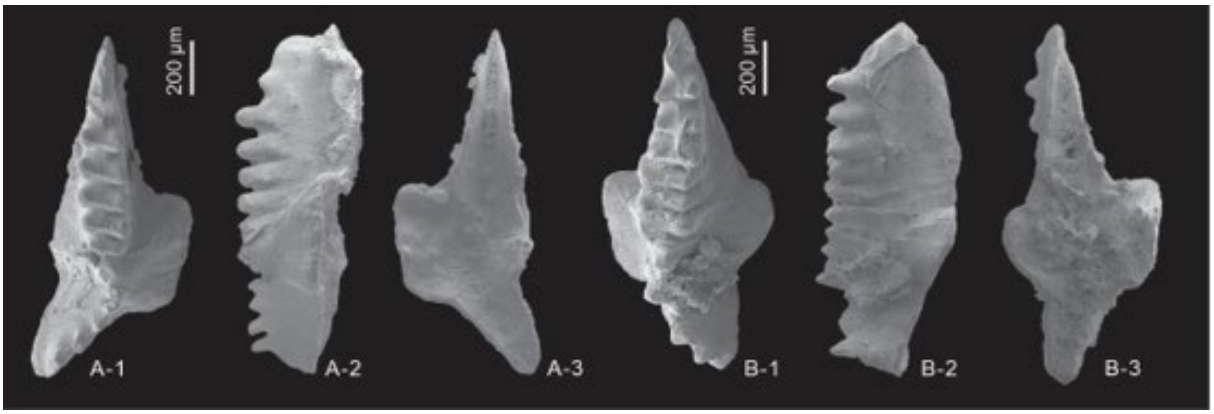


Fig. 2. *Caudicriodus hesperius* from Northern Xinjiang, China.

CM ZHANG Li-Jun

Over the past year, my graduate students and I have focused on the trace-fossil record response to the Silurian-Devonian plant terrestrialization process in China. This work has been successively funded by the National Natural Science Foundation of China (#42472037, 2025-2028) and the Key Project of the Natural Science Foundation of Henan Province (#252300421289, 2025-2027). In January of 2025, we conducted some fieldwork in the Nanning area of Guangxi, South China, and discovered a series of invertebrate trace fossils in the Early Devonian Lianhuashan Formation. This provides excellent data for understanding the terrestrialization process of benthic animals. One of my master's students will write her thesis based on the new founding materials.

In addition, during the present year, my research team and I have systematically collected trace fossil data from the major tectonic plates in China. It is evident that, upon the basis of paleontological and paleoecological data reflected by trace fossils, a feedback mechanism of benthic animals to the Paleozoic plant terrestrialization process has been constructed. This achievement has recently been published online in Earth-Science Reviews.

Furthermore, the International Symposium on the Tethys Evolution and Biotic and Environmental Responses is to be held in Beijing from September 20th to 23th, 2025. I, in collaboration with some SDS members (Jinzhuang XUE, Jiashu WANG, Junjun SONG) and international colleagues, proposal a session "Ecosystem evolution and biotic-environmental interactions of the marine-continental transition during the mid-late Paleozoic". Moreover, at the 18th National Conference on Palaeogeography and Sedimentology to be held in Xinjiang, China from August 22nd to 25th, 2025, Jinzhuang XUE and I have applied for a session on bio-paleogeography. In April, 2025, I had the privilege of attending the 7th National Sedimentology Conference, where I had the opportunity to deliver a keynote talk on the subject "*Potential and problems in evaluating secular changes in the diversity of animal-substrate interactions at ichnospecies rank*".

Publication

ZHANG, L.-J., WANG, Z., LI, Y., CHAI, H., FAN, R., WANG, J.-S. & WANG, Z. (2025). How benthic animals responded to the Paleozoic plant terrestrialization: Evidence from trace fossils and their ecosystem engineering reconstruction. - Earth-Science Reviews, **270** (105236); doi.org/10.1016/j.earscirev.2025.105236.