Tournaisan | Visean | Serpukhovian | Bashkirian | Moscovian | Kasimovian | Gzhelian

Newsletter on Carboniferous Stratigraphy

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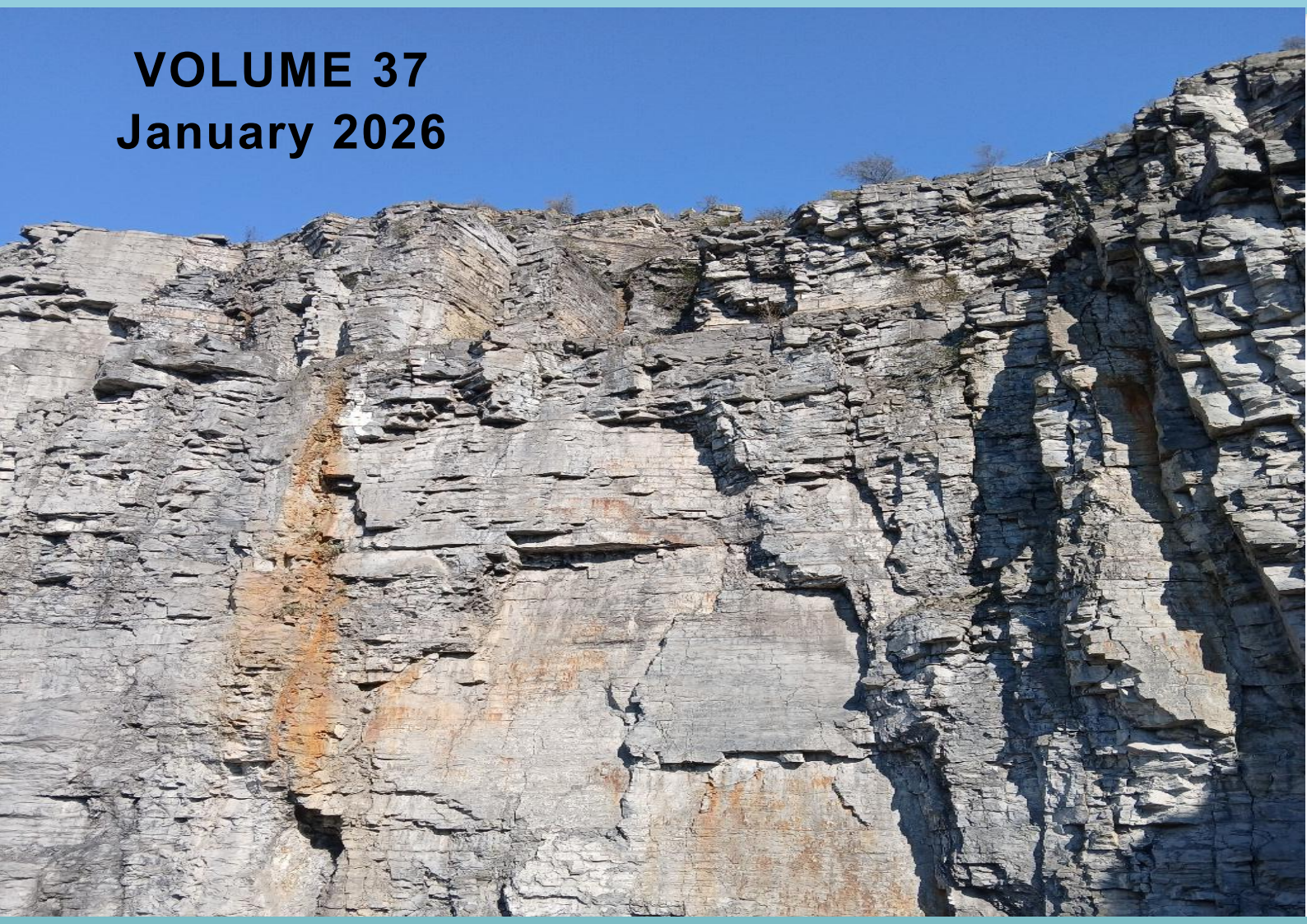

International Union of Geological Sciences
International Commission on Stratigraphy

Subcommission on Carboniferous Stratigraphy

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Newsletter edited by Julien Denayer.
January 2026
Thanks to all colleagues who contributed to this newsletter!

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Cover Illustration:
Horizontal Tournaisian limestone in the type locality of Tournai, Belgium.

EXECUTIVE'S COLUMN

Dear Members of the Subcommission on Carboniferous Stratigraphy,

I am very pleased that you are finally holding in your hands a new volume of the Carboniferous Newsletter, or more likely, viewing this document on your screen. We are well aware that a considerable amount of time has passed since the publication of volume 36. This delay was caused by a disrupted workflow due to time constraints, primarily on the part of the person writing these lines. I therefore apologize to all who have been waiting for this new edition, particularly for not keeping the announced dates; this is especially true for all those who send reports and contributions. However, I am very optimistic that this problem is now solved, because Julien Denayer has taken over as editor.

As you may all know, the **composition of the Subcommission has changed** after the last IGC in South Korea. Six colleagues–Silvia Blanco Ferrera, Nicolas J. Hogancamp, Mark W. Hounslow, Markus Pracht, Martin Salamon and Yukun Shi–replace as voting members, four members (Ondrej Babek, Zhong-Qiang Chen, Lance Lambert, Javier Sanz-Lopez), who reached the limit after serving three 4-years terms, the Chair of the last 8 years Xiangdong Wang, and unfortunately one member who passed away (Hans-Georg Herbig, see obituary below). All of the past members are thanked for their efforts and time dedicated to the work and duties of SCCS. This includes also the past-Vice Chair Svetlana Nikolaeva, who agreed to serve another term as voting member. The new officers for the term 2024-2028 are Markus Aretz (Toulouse, Chair), Jitao Chen (Nanjing, Vice-chair) and Julien Denayer (Liège, Secretary).

The past year was a busy and productive one for the SCCS. The most prominent event was undoubtedly **GeoTolosa 2025 – News from the Paleozoic Worlds**, the official title of the 20th International Congress on the Carboniferous and Permian. A report on this congress is available in the herein. The scientific sessions focused on the Carboniferous covered a broad spectrum of topics and questions, and—most significantly for the SCCS—featured major advances in Carboniferous stratigraphy and global correlation.

Of particular importance to the SCCS was also the business meeting held during the conference, marking it the first large in-person SCCS gathering since the COVID-19 pandemic. The well-attended meeting, involving SCCS members and interested colleagues, centered on two key issues: **SCCS membership and the communication channels used by the SCCS** (such as the newsletter and website). While these topics have already appeared on previous agendas, this time the discussions and subsequent work by the officers led to what we hope will be successful changes and outcomes.

The overall goal is to enhance communication within the subcommission and to increase efficiency and responsiveness. This also involves clearly outlining our expectations for members, as the relationship has too often been one-sided in the past. We recognize the time constraints faced by all of us, and our aim is not to create burdensome tasks for you and those carrying out responsibilities.

In November we informed you by email about the creation of a **new category of membership**. We add to the existing categories of Voting and Corresponding members, the **Observing members**.

Up to 20 **Voting members** form the **Voting Subcommission**. They have the duty to take part in the meetings of the Subcommission and to report on their scientific activities every year; they should represent the regional and methodological diversity of the stratigraphic interval. Voting members can serve 3 successive 4-year terms.

Corresponding members are invited to send a short report on their scientific activities at least every two years, though a yearly report is more than welcome. They have the possibility of becoming voting members and of presenting new corresponding members to the Subcommission. Their role is to advise the

voting members in achieving the scientific work, including in the working groups.

Observing members, do not report to the Subcommission, and they are not directly involved in the Subcommission's activities (e.g. working groups), but they are informed about them (mailing list, newsletter). They cannot become voting members or present potential new members.

During the Toulouse meeting, we discussed whether it was necessary to maintain the publication of an annual **Carboniferous Newsletter**. The majority of those present were in favour, as it constitutes an important reminder for SCCS activities and helps keep the community connected. The officers discussed ideas on how to make this task more efficient, and less-time consuming, especially for the editor, so that a **yearly publication** at the **end of January** can be ensured. Below, you will find some of the intended changes.

The reports submitted by members will be published annually in the newsletter. They constitute important content and provide an opportunity to learn more about the research activities and results of the global community and its members. All corresponding members are encouraged to contribute to this effort. As we are committed to keeping tasks reasonable, we do not expect long reports, but rather just short, bullet- style contributions of approximately half a page.

We also introduce some changes regarding member contributions to the Newsletter. In the past, we have observed a clear shift from short contributions briefly presenting new results or opinions to longer, paper-like submissions. We would like to reverse this trend. We should avoid creating the impression that these longer contributions are viewed and treated as full scientific papers. They are not peer-reviewed, and the newsletter editor has made, if any, only very minor editorial changes. Therefore, in the future, **we welcome short contributions, opinions, and statements from the members**, but we will discontinue the publication of long, paper-like contributions after this issue. Those included in the present volume were submitted before this policy change was communicated. We hope that this shorter format not only encourages more contributions, but also increases scientific discussion within our community, keeping the newsletter lively and interesting. We also encourage you to send us information, announcements and reports about upcoming or past meetings, field trips, special volumes, etc.

This leads to the next point: the **website of the subcommission**. We will use that information and announcements in the news section of our **revised website**. The officers have worked on a new website under the umbrella of the ICS website. A few final details remain to be solved, but the revised website should be accessible in the coming days. We therefore need input from all members to make our website a lively place, not only for a short period, but in the long term.

After writing about the work carried out over the past year, much of it was not always visible, I would like to highlight **SCCS activities in 2026**. The global stratigraphic community will meet at **STRATI 2026**, the 5th International Congress on Stratigraphy, to be held June 28 to July 3, 2026, in Suzhou, China. All subcommissions will be represented and will have dedicated sessions, ours is entitled *Journey to the Carboniferous*. But you will certainly find Carboniferous contributions in many of the other sessions such as *The Palaeozoic World: Events that Shaped Life*. Please consult the announcement for this congress in this volume and the conference website. We strongly encourage you to attend the congress and showcase our dynamic Carboniferous community, with its varied and exciting research questions.

The second event I would like to mention is an online event that SCCS will organize annually, starting this year. The idea is to reach out to Carboniferous researchers, which are not necessarily in contact with SCCS or who lack the resources to attend an ICCP or STRATI meeting. But it is also an opportunity for the SCCS community to bridge the time in between ICCPs, which are held only every 4 years. We

call this event "**Carboniferous around the clock**". Presentations will begin with contributors from East Asia and Oceania at lunchtime in those time zones, and then gradually move westwards across the globe, with presenters from successive time zones taking over. The event will end somewhere on the western coast of the Americas. While some participants may attend all or most presentations, most will select those scheduled at convenient time slots. The intended date for this event is **mid-October**. We are currently working on details, so please stay tuned over the coming months for more information. We hope that many of you will participate as attendees and/or presenters.

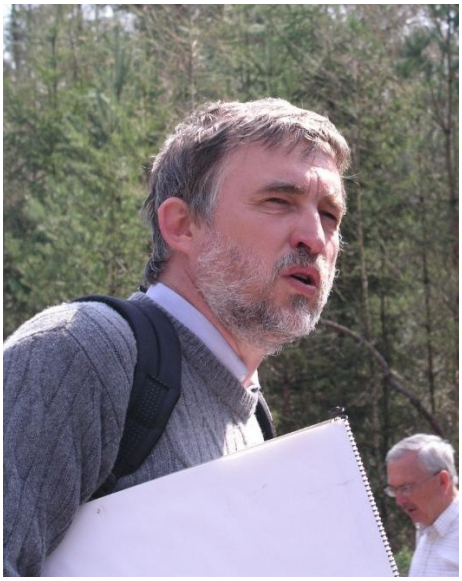
The final point of this editorial concerns the work of the **working groups** on the remaining GSSPs. For various reasons, this is a slow process, but we witnessed in 2025 some very important progress. The working group on the **base of the Gzhelian** has produced a proposal for a GSSP section (the criterion itself was already approved in 2009). We are currently adapting this proposal to the new GSSP template developed by ICS. This should be completed in the very near future, after which the formal voting process within our subcommission, and subsequently in ICS can be initiated. This represents a breakthrough for SCCS, as the last GSSP was defined two decades ago. The working group for the **revised base of the Carboniferous** has officially launched the search for a suitable GSSP section, with proposals due by June 30, 2027. Hopefully, by the end of next year another GSSP will be finalized. Progress in the other working groups has occurred at different speeds, but we are optimistic that another GSSP proposal (Tournaisian, Moscovian or Kasimovian) will be finalized before the next IGC in 2028 (Calgary, Canada).

On this positive note on our activities, I conclude this editorial. I hope you will agree that progress has been made, while we also recognize that there is still much room for improvement. Without the input, expertise and enthusiasm of its members, SCCS cannot succeed in its aim and role of being the voice of Carboniferous stratigraphy and global correlation. Therefore, if you have ideas, comments, or feedback, please do not hesitate to get in touch with the SCCS officers.

Markus Aretz

OBITUARY

HANS-GEORG HERBIG
(1955–2023)



Hans-Georg Herbig in the Wallau Quarry (Kulm Facies, eastern Rhenish Mountains) guiding the German Subcommission on Carboniferous Stratigraphy in 2004. Photo courtesy M. Piecha (Krefeld).

On August, 1st 2023, the SCCS voting member Hans-Georg Herbig lost his battle with cancer. He was born in March 1955 in the Franconian town of Würzburg (southern Germany), where he spent his youths and obtained in 1974 the Abitur at the Röntgen-Gymnasium. After the obligatory military service, Hans-Georg returned to his hometown and studied geology and palaeontology at the University of Würzburg from 1975 to 1980. During these years in Würzburg he laid the foundations for three characteristics that followed him throughout his entire scientific career: (i) field work, (ii) any topic related to the Devonian and

Carboniferous periods, and (iii) regional geology of Franconia.

His diploma thesis brought him to the Devonian and Carboniferous strata of the Cantabrian Mountains in northern Spain. This work supervised by Professor Josef Gandl already combined most topics of the following scientific career: sedimentology, stratigraphy, microfacies, palaeoecology, and taxonomy. The first publication (Herbig, 1982) is based on the fossil crinoid material collected during the diploma thesis period.

Afterwards, Hans-Georg moved to the University of Erlangen-Nürnberg, where Professor Erik Flügel supervised his doctoral thesis (defended in 1983). He continued his field work in Spain, but moved much further south into the Betic Cordillera (SE Spain). Here, based on pebbles found in Cenozoic conglomerates of the Malagides, he reconstructed a Devonian-Carboniferous shelf system (Herbig, 1984). During this time, a fruitful and lasting collaboration on carbonated microbiota started with Bernard Mamet (e.g. Herbig & Mamet, 1994). It is also the first time, Hans-Georg came in contact with SCCS during the '10th International Congress on the Carboniferous' in Madrid (1983). During his Erlangen time, Hans-Georg shared the office with several young scientists, who would later become professors at various German universities. This gang made the Erlangen Institute for Palaeontology in the Loewenichstrasse a very lively place.

After his PhD, Hans-Georg joined the research group of Volker Jacobshagen at the Free University of (West-) Berlin. It is during these years (1983–1990) that he became involved in teaching duties. The research groups in Berlin where engaged in a large project on the Atlas system in Morocco funded by the German Research Foundation. Hans-Georg's job was to carry out extensive field campaigns in often remote areas to study the Palaeogene strata of the High and Middle Atlas (e.g. Herbig, 1988). This work is brilliantly summarised in his habilitation thesis entitled 'The Palaeogene at the southern border of the central High Atlas and the Middle Atlas of Morocco: Stratigraphy, facies, palaeogeography and palaeotectonics (Herbig, 1991)'. In 1988, the German Geological Society awarded him the Hermann-Credner-Preis for his work.

Although the focus during the Berlin time was the Cenozoic, Hans-Georg never stopped his work on the Carboniferous. 'Herbig (1986)' is the first paper on Carboniferous corals and bioconstructors, a topic, which accompanied him through his career and is also the topic of his last manuscript he worked on before his death (El-Desouky et al., 2023).

In 1990, Hans-Georg moved to the University of Marburg, where he held one of the prestigious Heisenberg Grants. During the Marburg time he returned to his scientific roots in the Devonian and Carboniferous with a primary research focus on the German Kulm Basin. He studied the depositional environment and stratigraphy of its deeper water facies and the transition into the contemporaneous shallow-water platforms (e.g. Herbig & Bender, 1992). The paper, in which he presented his synthesis on the German Kulm (Herbig, 2016), was for years in the making and its foundations were largely laid during the Marburg time two decades before.

In early 1995, Hans-Georg was appointed Chair of Palaeontology and Historical Geology at the University of Cologne. He held this position for 26 years until his retirement in 2021. During those years, he has been an inspiring teacher for numerous generations of students in the classroom and the field. Hans-Georg trained and supervised a very large number of students on the diploma, bachelor, master, and PhD levels (in total 145 theses). You can talk to many former students, and all will have their own memorable event to tell.

Reefs and reef builders of the Palaeozoic (e.g. Aretz & Herbig, 2008) and basinal deposits of Devonian-Carboniferous times remained major fields of research (e.g. Hartenfels et al., 2016), but he continued to explore diverse research topics in very different stratigraphic intervals and disciplines; even venturing into

Recent genetical studies of barnacles (Schiffer & Herbig, 2016).

The list of all the positions and responsibilities Hans-Georg carried during his time in Cologne is long. The focus in this text are those in connection with the (Carboniferous) stratigraphy. From 2006 until 2015 he chaired the German Stratigraphic Subcommission on the Carboniferous (SKS), from 2016 until his death he was chairman of the German Stratigraphic Commission (DSK). At the time of his death, he was also serving his second term as voting member in the International Subcommission on Carboniferous Stratigraphy (SCCS). Many of us will remember him from his regular participation at field meetings of SCCS (e.g. Russia 2009, Spain 2010) or the International Congress on the Carboniferous and Permian. He organised two important meetings related to the Carboniferous at the University of Cologne. In 2006 together with Markus Aretz the 'Carboniferous Congress Cologne - From platform to basin', and in 2019 he chaired the team for the organisation of '19th International Congress on the Carboniferous and Permian'.

His stratigraphic knowledge and legacy of the Carboniferous period can be found in papers like the detailed correlation between the stratigraphic successions of shallow-water ('Kohlenkalk') and deep-water ('Kulm') successions in the German lower Carboniferous (Amler & Herbig, 2006) or the Chapter 'Carboniferous' of the Geological Time Scale 2020 (Aretz et al., 2020).

Three special volumes dedicated to the work and life of Hans-Georg Herbig have been published since 2023 (Paläontologische Zeitschrift vol. 97/4, Palaeodiversity and Palaeoenvironments vol. 104/3, and Zeitschrift der Deutschen Gesellschaft für Geowissenschaften vol. 176/3). The reader is kindly referred to the introductions of these volumes for more details, but we cite here some key phrases.

'Hans-Georg's retirement in March 2021 fell into the Covid-19 period with all its restrictions. Unfortunately, this did not allow to organise all the festive events normally associated with such important occasions. In fact, the 19th International Congress on the Carboniferous and Permian (ICCP) was the premature scientific and also celebratory event for his retirement and his scientific legacy, even if we did not know it at the time.' (Aretz et al., 2023)

'And so, we remember him as someone, who was humorous and warm-hearted, with a lot of energy and commitment to science and care for his employees, and also with a lot of creativity and infectious enthusiasm for new challenges, such as renovating an old farm or growing vegetables.' (Hartenfels et al., 2024)

'We all know people who seem at home in every field - those who not only have something to say, but who impress us with their broad and interdisciplinary knowledge. Hans-Georg Herbig was such a person. Whether in paleontology, geology, biology, art, geography, or regional history - his expertise was wide-ranging and deeply impressive.
But alongside all his scientific passion, Hans-Georg never lost sight of what mattered most to him: his family.' (Wotte et al., 2025)

Hans-Georg Herbig is survived by his wife, Isabel, whom he met during his student years in Würzburg, and by their two sons.

Markus Aretz, Michael R.W. Amler, Sven Hartenfels, Julia C. Friedel and Thomas Wotte

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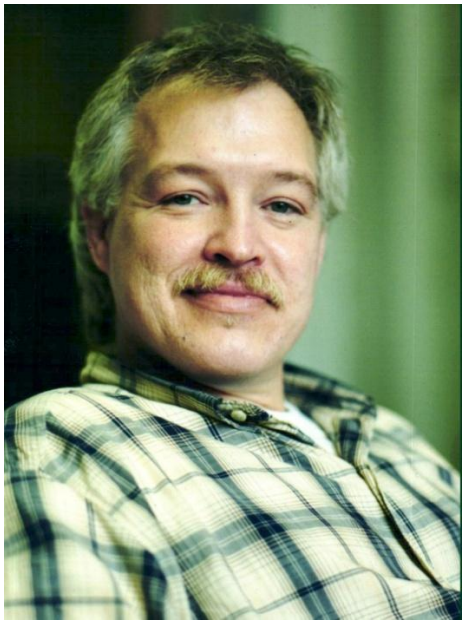
DAVID MICHAEL WORK
(1954–2023)



David M. Work was born and grew up in Evansville, Indiana. His father “Bill" worked night shift at Alcoa Aluminum Company while simultaneously attending school to work his way up to middle management. When his dad had free time he worked hard to help David pursue his interests, taking him to any available shows or programs in the local area. It was during one such excursion that David met Lloyd and Margaret Owen, who were members of the Evansville Lapidary Society. Lloyd and Margaret then included David on their numerous field

trips around the area so that he could collect the rocks and fossils, which became his passion. In fact, it was Margaret Owen who gave David his first ammonoid, which strongly focused him on his eventual career. My colleague, Norm King, who later taught geology at Southern Indiana University in Evansville, told me that when he was going through the departmental archives, he discovered a paper by David Work on fossils collected in that area that had a professional flavor to it, and was likely written when David was pursuing his interest in Geology while finishing up high school.

David went to the University of Missouri School of Mines and Mineral Resources in Rolla, where he received a thorough training in geology, petrology, and paleontology and received his B.S. degree in 1977. He then worked as a geologist for the Missouri Geological Survey in Rolla, field-mapping Missouri stratigraphy and denoting its paleontology. Because of his interest in ammonoids, he went to Ohio University in Athens to work under ammonoid specialist Royal Mapes, where he received his M.S. degree in 1991. There he met fellow graduate student Darwin Boardman, who later taught at Oklahoma State University, and the two of them collaborated on Pennsylvanian ammonoids of the Midcontinent Pennsylvanian succession for many years.

In 1990, David came to the University of Iowa to work under ammonoid specialist Brian Glenister, and this was where he met his wife Paula, who was in the Quaternary Studies program at Iowa but also trained in Museum Studies. David's Doctoral Dissertation focused on a Mississippian ammonoid locality in the Canadian Rocky Mountains brought to his attention by Walter Nassichuk (head of the Canadian Geological Survey), who added David in 1991 to the Survey's expedition to the Alberta Canadian Rocky Mountains, known for its difficult access and melting glaciers. This expedition, which included Barry Richards (later to become Chair of the SCCS in 2008), was reached by one Chinook and one 4-man helicopter. The Chinook let the main crew off on the surface of the glacial ice, while David and one of the helicopter's pilots were set down at a distance and told to move across the glacier to join the main crew. It was there that the bergschrund ice let go directly beneath David, bouncing him down the walls of a 7-meter-deep glacial crevasse, which fractured his leg in multiple places and injured his back. Rescue efforts involved paramedics who were lowered into the crevasse to strap David into a basket that was then pulled out and lowered along the side of the glacier to a point where a helicopter could pick him off safely (once the typically strong winds subsided), and carry him 150 km to the nearest hospital in Grande Prairie, Alberta. Although this accident did not dampen David's will to continue his work on ammonoids, the physical damage caused him continuing pain in his leg and back for the rest of his life.

After receiving his Ph.D. at Iowa in 1993, David was granted two successive NSF post-doctoral research associate positions with ammonoid specialist Bruce Saunders at Bryn Mawr College in the Philadelphia area, which involved travel to Spain and Russia to meet with ammonoid specialists there, and resulted in several important papers, including one in Science. In 2000, David accompanied Paula to the Cincinnati Museum Center of Natural History in Cincinnati, Ohio, as an adjunct curator and later briefly served as visiting Curator of Invertebrate Paleontology. Here he reconnected with Charles Mason of Morehead State University in nearby Kentucky, whom he had met when he was at Ohio University. Charles provided many ammonoid collections from the Mississippian and Pennsylvanian successions of the central Appalachian Basin, and they maintained fruitful collaboration throughout the rest of his career. In 2002, David and his wife Paula moved to the Maine State Museum in Augusta, Maine, where David became Curator of Geology. When I was Chair of the SCCS from 2000–2008, David served unfailingly as the Secretary of the SCCS during the time when the Newsletter of the SCCS was set up in printed form (with IT help from Paula)

and mailed out to all SCCS members each year. David's globally recognized research work on ammonoids and biostratigraphy is notable, and consists of 31 refereed publications, including 18 as senior or sole author.

Phil Heckel, Paula Work, and Charlie Mason

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DANIEL VACHARD
(1947–2024)

Daniel Vachard during a diner in the department. Photo courtesy T. Servais (Lille).

It is with great sadness that we announce the passing of Daniel Vachard, on June 23, 2024. A distinguished French micropalaeontologist, Daniel was one of the leading authorities on Palaeozoic carbonated microbiota, covering smaller foraminifers and fusulinids, calcareous algae and calcimicrobes in the broadest sense (e.g. his beloved Algosgongia), and various microproblematica. Over the course of a long and highly productive career, he made foundational contributions to biostratigraphy, palaeoecology, and palaeobiogeography. His work spans all geological systems, though he is most closely associated with the Devonian through Triassic periods.

Daniel Vachard was born on May 6, 1947 in Nanterre, on the western outskirts of Paris. After completing a DEA (Master's degree) in micropalaeontology at the University of Paris in 1970, he completed his doctoral dissertation in 1974 on Devonian–lower Carboniferous (foraminifers and algae) of the Montagne Noire (southern France) at the University Pierre et Marie Curie Paris VI (Vachard 1974). Daniel fondly recounted stories from the fieldwork during his thesis, which he did on a motorized bicycle he brought down from Paris by train for each field campaign.

In 1975 he began his career at the CNRS as an attaché de recherche at the Institut géologique Albert-de-Lapparent (IGAL) in Paris. Here his research focus shifted from southern France to Central Asia, and he brilliantly defended in 1980 his habilitation thesis entitled "Tethys and Gondwana in the late Paleozoic: Data from Afghanistan" at Dijon (Vachard, 1980). In 1984 he was appointed to a permanent position as *Chargé de Recherche*, and he later rose to *Chargé de Recherche, Première Classe*. In the late 1980s he left the IGAL and found a new home at the University of Lille I, where he remained in the palaeontological research unit – whose name evolved several times – until his retirement.

Daniel's devotion to his fossils was legendary; he could never truly stop studying them. His wife, Thérèse, often complained that he worked constantly, and that even his bedside table was always overflowed with reprints and manuscripts, and the house felt as though it had become a library. Although required to retire in 2014 at the age of 67½ — already 2½ years later than the official age — Daniel continued to work at full speed and never really slowed down, even in his final months while battling cancer. The only real change was that he worked from home in Gruson and, as his wife's health declined, rarely returned to the university.

It is impossible to fully summarise all research topics and questions Daniel Vachard covered throughout his career. He leaves behind an extraordinary corpus of more than 600 publications, including many extensive and detailed taxonomic revisions and evolutionary syntheses of entire fossil groups. Although he worked extensively on Middle Devonian to Triassic carbonated microbiota, his work covers the entire Phanerozoic and covers palaeobiological, palaeoenvironmental, stratigraphical, palaeogeographical and sedimentological topics.

Daniel collaborated with numerous colleagues around the world. A certainly incomplete list of countries whose rocks Daniel studied includes: Afghanistan, Algeria, Australia, Austria, Azerbaijan, Belgium, Bolivia, Canada, China, Egypt, France, Greece, Guatemala, Indonesia, Iran, Ireland, Italy, Kazakhstan, Laos, Libya, Malaysia, Mexico, Morocco, Nepal, New Zealand, Oman, Pakistan, Peru, Philippines, Russia, Spain, Sweden, Tajikistan, Thailand, Tunisia, Turkey, Ukraine, United Kingdom, and USA. Daniel Vachard enjoyed doing field work, even though health issues made it increasingly challenging in later stages of his career.

In the field of Carboniferous stratigraphy, Daniel Vachard has left a lot of footprints and made lasting impact across various regions around the globe. Just to name a few here: the Montagne Noire in southern France, the Moroccan Meseta, central Afghanistan, NE Thailand, Sonora region in Mexico, and New Mexico (USA). He systematically applied biostratigraphic frameworks developed by

colleagues he considered to be leading experts of specific time intervals, such as the schemes devised by Raphaël Conil for the Tournaisian and Visean. While using established zonal nomenclatures, he also contributed his own critical insights into the utility of particular taxa. This approach allowed him to adapt frameworks to local and regional differences, while maintaining consistency in overall terminology. By widely employing the same zonal names, his work has significantly enhanced super-regional and global correlations, underscoring the broader relevance of his contributions.

Daniel has been affiliated with SCCS as corresponding members for almost his entire career. He has served on several task groups, such as the one for the base of the Visean. He although contributed largely to the third volume of Carboniferous of the World series, which was an important SCCS project of the late 1980's and early 1990's initiated during the Carboniferous Congress at Madrid.

Daniel's vast publication record is not only a testament to his scientific curiosity but also to a defining personal trait: his generosity. He was always ready to assist others, and countless colleagues and students benefited from his expertise. Those who worked with him spoke not only of his deep knowledge and scientific rigour but also of his humility, kindness, and collaborative spirit. He was a supportive mentor, endlessly curious, and always eager to engage with young researchers. The door to his office or house – which became his office and library – was perpetually open; especially if one arrived with thin-sections. Many projects were undoubtedly saved by his willingness to help. Such a case is the synthesis of the Chinese Upper Famennian to Visean foraminifers and microproblematica (Hance et al. 2011) where his contribution on the systematics section was essential. Although he officially supervised seven PhD theses, he acted as an informal mentor or close collaborator for many more. His work capacity and speed were so remarkable that he sometimes began revising a new taxon - or even submitting a manuscript on it - before the preceding publication had formally appeared, as the publishing process could scarcely keep pace with the legendary "Vachard speed."

As CNRS researcher, teaching was not Daniel's primary responsibility, but over his career he taught courses in Lille and abroad (Mexico, Suisse, Turkey). He also provided training for professionals in the hydrocarbon sector, which frequently led to collaborations and publications.

For those interested in Daniel Vachard's complete bibliography, we refer readers to Antoine-Hennion & Cuvelier (2025). A small selection of references is provided below to illustrate some aspects of his work.

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ACTIVITY AND PROSPECTIVE REPORTS TO ICS 2025-2026

Here we introduce another change compared to previous volumes of our newsletter.

Each year, the SCCS reports on its past and planned activities and achievements to the International Commission on Stratigraphy (ICS). These annual reports also include details on the budget allocated by the ICS to support specific events or activities. Subcommission reports are incorporated into the ICS annual report submitted to the IUGS: selected highlights are included in the main report, while the full reports of the subcommissions appear in the appendix. The ICS annual report is a key document for securing funding from the IUGS.

Over the past two years, IUGS and ICS have significantly revised the requirements and instructions for these reports. Compared to the previous formats the new version is more condensed, but it also introduces additional sections and, overall, requires a greater amount of detailed information.

Readers who wish to consult the full report are kindly referred to the ICS website: https://stratigraphy.org/annual-reports

CURRENT OFFICERS AND VOTING MEMBERS

Markus Aretz (Chair)
Université de Toulouse, Geosciences Environnement Toulouse
14 Avenue Edouard Belin, 31400 Toulouse
France
E-mail: markus.aretz@utoulouse.fr

Jitao Chen (Vice-chair)
Nanjing Institute of Geology and Palaeontology
CAS State Key Laboratory of Palaeobiology and Stratigraphy
No. 39 East Beijing Rd., Nanjing, Jiangsu 210008
China

E-mail: jtchen@nigpas.ac.cn
Julien Denayer (Secretary/Editor)
Université de Liège, Palaeobiology, Evolution & Diversity Dynamics Lab,
Allée du Six-Août, B18, Sart Tilman, 4000 Liège
Belgium
E-mail: julien.denayer@uliege.be

OTHER VOTING MEMBERS

Silvia Blanco Ferrera
Departamento de Geología, Universidad de Oviedo
C/ Jesús Arias de Velasco s/n, 33005 Oviedo
Spain,
E-mail: blancosilvia@uniovi.es

Pedro Cózar
Instituto de Geociencias CSIC-UCM
Severo Ochoa 7, 28040 Madrid
Spain
E-mail: p.cozar@igeo.ucm-csic.es

Nicholas J. Hogancamp
The Bedrock and Earth History Research Organization
185 Johnson Road, Scott Township, PA, 18411
United States of America
E-mail: hogancampnj@gmail.com

Mark W. Hounslow
Lancaster Environment Centre, Lancaster University and Department of Earth, Ocean and Ecological Sciences
United Kingdom
E-mail: mark.w.hounslow@gmail.com

Keyi Hu
Nanjing University, School of Earth Sciences and Engineering
No. 163 Xianlin Avenue, Nanjing 210023
China
Email: kyhu@nju.edu.cn

Tomáš Kumpan
Masaryk University, Department of Geological Sciences
Kotlářská 2, 611 37 Brno
Czech Republic
E-mail: kumpan.tom@gmail.com

Spencer G. Lucas
New Mexico Museum of Natural History and Science
1801 Mountain Road N. W., Albuquerque, New Mexico 87104-1375
United States of America
E-mail: spencer.lucas@state.nm.us

Bernard Mottequin
Royal Belgian Institute of Natural Sciences, O.D. Earth and History of Life
Rue Vautier 29, 1000 Brussels
Belgium
E-mail: bmottequin@naturalsciences.be

Svetlana V. Nikolaeva
The Natural History Museum, Department of Earth Sciences
London, SW7 5BD
United Kingdom
E-mail: s.nikolaeva@nhm.ac.uk

Markus Pracht
Geological Survey Ireland, Dept. of the Environment, Climate and Communications
Blackrock, Co Dublin, A94 N2R6
Ireland
E-mail: Markus.Pracht@gsi.ie

Wenkun Qie
Nanjing Institute of Geology and Palaeontology CAS, State Key Laboratory of Palaeobiology & Stratigraphy
No. 39 East Beijing Rd., Nanjing, 210008
China
E-mail: wkqie@nigpas.ac.cn

Martin Salamon
Geologischer Dienst Nord-Rhein-Westphal
De-Greiff-Str. 195, 47803 Krefeld
Germany
E-Mail: Martin.Salamon@gd.nrw.de

Yukun Shi
Nanjing University, School of Earth Sciences and Engineering
No. 163 Xianlin Avenue, Nanjing 210023
China
Email: ykshi@nju.edu.cn

Katsumi Ueno
Fukuoka University, Department of Earth System Science
Fukuoka 814-0180
Japan
E-mail: katsumi@fukuoka-u.ac.jp

SUSPENDED MEMBERS

Alexander Alekseev
Lomonosov Moscow State University, Geology Faculty
119991 Moscow GSP-1
Russia
E-mail: aaleks@geol.msu.ru

Tatiana Isakova
Russian Academy of Sciences, Geological Institute
Pyzhevsky per. 7 109017 Moscow
Russia
E-mail: isakova@ginras.ru

Vera A. Konovalova
Russian Academy of Sciences, Geological Institute
Pyzhevsky per. 7 109017 Moscow
Russia
E-mail: konovalovavera@mail.ru

Georgy Mirantsev
Russian Academy of Sciences, Borissiak Paleontological Institute
Russia
E-mail: gmirantsev@gmail.com

REPORT ON MEETINGS AND CONFERENCES

This section is intended to include reports on formal meetings of SCCS and its task groups, but also about meetings and conferences related to Carboniferous stratigraphy and the activities of SCCS.

FIELD EXCURSION OF THE WORKING GROUP ON THE DEVONIAN-CARBONIFEROUS BOUNDARY - GERMANY AND BELGIUM, 8-9-10TH JULY 2023

By Julien Denayer and Markus Aretz

Before the International Congress on Stratigraphy held in Lille, ten members of the working group on the DCB met in the field in Germany and Belgium to visit key-sections and discuss the applicability of the criterium.

The group met in Eisborn, Germany, on Saturday 8th July 2023. Three sections were visited in this area, led by Thomas Becker and Sven Hartenfels who started their explanations by a general overview of the geology of the northern margin of the Rhenish Mountains.

First, the group visited the Borkewehr section near Balve, recently proposed as a potential future GSSP (Hartenfels et al., 2022). This section exposes on 3.4 m the uppermost Famennian to upper lower Tournaisian nodular limestone, shale and sandstone. The Wocklum Limestone consists of cyclic alternations of shale and nodular limestone which yielded a rich conodont fauna belonging to the *praesulcata* zone as well as some goniatites (*Wocklumeria* and *Parawocklumeria* spp.). The Hangenberg Shale and Hangenberg Black Shale forms a 20 cm-thick shaly unit strongly weathered in the upper part. The Hangenberg Sandstone is a 80 cm-thick silty sandstone devoid of conodont. The Hangenberg Limestone is typically an alternation of nodular limestone and marls. A rich conodont fauna was studied by Sven Hartenfels, including his

new species *Protognathodus semikockeli* that appears 8 cm below the highly variable marker *Pr. kockeli* (at least three morphotypes differing by the number of nodes on the platform). *Acutimitoceras* spp. also occur in these beds. Following the new criterium, the DCB would fall between the top of the Hangenberg Sandstone (bed 1b) and FOD of *Pr. kockeli* (bed 4b), i.e. in a 14 cm-thick interval.

After a quick distant view of the historical DCB type section at Oberrrödinghausen, the group moved to the Oese section. The section is nowadays overgrown by the vegetation, but several spots are still visible, notably the annulata event beds, the Hangenberg Shale and strata immediately below. The Hangenberg Sandstone crop out in a disused quarry and the overlying strata are discontinuously exposed above it. The section is referred in Becker et al. (2021). The Sandstone yielded an unexpected palaeoflora that Cyrille Prestianni collected for further analysis.

Thomas Becker pointing at the first bed with *P. kockeli* above the Hangenberg Sandstone, potential GSSP at Borkewehr, Germany.

The last section was the Drewer quarry where the DCB beds overlie a silicified mound of supposed Middle Famennian age. The Wocklum Limstone is typically an alternation of shale and nodular limestone with ammonoids but here, a 30 cm-thick sandstone bed occurs (Drewer Sandstone) that was interpreted as a short regression. The upper part of the Wocklum Limestone exposes a somewhat condensed succession of the Hangenberg Shale, Hangenberg Black Shale and Hangenberg Sandstone. The latter is a c. 40 cm-thick bed of silty sandstone with no fauna. The Tournaisian Hangenberg Limestone (including "Stockum Limestone" at the base) displays shale and nodular limestone alternation with an increasing condensation upsection *(kockeli* to *sandbergi* conodont zones in c. 2 m). Besides its interesting stratigraphy, the geometry of the sedimentary bodies along the quarry walls presents very rapid variations. It was interpreted as local effects of condensation. A complete description of the quarry and its succession is given by Becker et al. (2016). Moreover, the depositional history has many contradictions, notably the occurrence of detrital sand on top of a supposed isolated rise.

After this third stop, the participants thanked Thomas for his guidance and then the group moved towards Belgium.

On Sunday 9th July, the nine participants visited four sections in Belgium where they were guided by Julien Denayer, Cyrille Prestianni and Bernard Mottequin.

The renown Chanxhe I section was visited first. Julien presented the geological context of the Dinant Synclinorium and then the local stratigraphy. Anne-Christine Da Silva who joined the group provided useful explanations on orbital forcing and cyclostratigraphy on the section recently studied by her team. The >30 m-thick Strunian Comblain-au-Pont Formation, made of cyclic alternation of shale/siltstone and limestone displays a very well-marked transgressive trend where each alternation corresponds to a precession cycle. Those cycles form bundles of c. 100 ky obliquity cycle. The Hangenberg Black Shale event equivalent appears as two beds of dark shale with small paper pectens, separated by a crinoidal limestone bed. The section was abundantly studied for palynology but does not expose the

DCB as a fault cut the top of the Strunian. Cyrille explained the development of the *tener* event (Prestianni et al., 2016), a progressive increase of malformed spores within the palyno-assemblages, that has its acme between the Hangenberg Black Shale and Hangenberg Sandstone equivalents. The primary explanation for this event is the hydraulic stress endured by the plant. This is compatible with sedimentological data that indicate the passage of a dry Famennian (cf. arkosic sandstone) to a wetter Strunian (no more feldspars) to a dry uppermost Strunian to Tournaisian.

A second section (Chanxhe III) along the main road, c. 300 m eastwards, shows the boundary without any fault. There the Hangenberg Sandstone event is marked, at the base of bed 37 (first bed of the Hastière Formation), by a 20 cm-thick coarse-grained limestone horizon with clasts and quartz grains. Above, the sedimentation is mostly carbonate, up to the third order sequence boundary between sequences 1 and 2 of Poty (2016).

From bottom to top: Wocklum Limestone, Hangenberg Black Shale, Hangenberg Sandstone, Stockum Limestone and Hangenberg Limestone, in the famous Drewer disused quarry, Germany.

The group then moved to the Royseux section, where the DCB is exposed along the disused railroad. The 12 upper metres of the Strunian Comblain-au-Pont Formation displays the typical crinoidal limestone alternating with shale/siltstone. The Hangenberg Sandstone equivalent is there, particularly developed, appearing as calcareous sandstone and siltstone with intraclasts. Whereas this bed (104-105) is full of Devonian fauna (*Sphenospira julii, Quasiendothyra kobeitusana, Araratella spp., Omegops accipitrinus*), all disappear in the upper part of the bed. The overlying bed 106 contains no Devonian fauna but only foraminifers indicating the Tournaisian MFZ1. Typical Carboniferous fauna, including conodonts, progressively appear in the overlying beds. The sequence boundary lies between the lower and middle members of the Hastière Formation.

The last stop of the day was the Anseremme sections, potential GSSP. The renown section is situated along an active railroad, but a second section exists above the first one, along a small path. The Comblain-au-Pont Formation is exposed on c. 8 m and the Hastière Formation on 12 m. The Hangenberg Black Shale event is not marked here but evidence for dysoxic water (small flat pelecypods) exists in several shaly beds. The last shaly bed (158) yielded the last *Retispora lepidophyta*. The Hangenberg Sandstone equivalent appears a 20 cm-thick horizon (bed 159A) that yields intraclasts and a small proportion of quartz grains, in a crinoidal and bioclastic matrix. The last Devonian fauna (*Campophyllum* sp., *Omegops accipitrinus* and *Quasiendothyra kobeitusana*) are from that horizon. Immediately above (bed 159B), an oolitic horizon yielded an uncommon association of foraminifers, dominated by *Septaglomospiranella* spp., of Tournaisian affinity (Denayer et al., 2021). The section was sampled several times for conodonts (van Steenwinkel, 1984; Bouckaert & Groessens, 1976). Carlo Corradini indicated that the specimen of *Protognathodus kockeli*, figured by Bouckaert & Groessens (1976) is most probably an intermediate form between *Pr. collinsoni*

and *Pr. kockeli*; Sven indicated that he considered this specimen to be *Pr. semikockeli* in Hartenfels et al. (2002). The cylclostratigraphy and geochemical works undertaken by Da Silva, Denayer, and colleagues, is in progress.

Top of the Hangenberg Sandstone event equivalent (beds 104-105) in the Royseux section, Belgium.

On Monday, 10th July, the group went to the Spontin section, along a railroad only used for touristic purpose in summer, but unfortunately in use that day for a tv show, so the participants had less than an hour to study the section. The upper 6.5 m of the Comblain-au-Pont Formation are exposed, as well as the 10 lower metres of the Hastière Formation, in subhorizontal position. The Strunian is, as ever, made of cyclic alternations of shale and limestone. The Hangenberg Black Shale equivalent is a 60 m-thick bed of dark shale. The Hangenberg Sandstone equivalent is marked by a 1.2 m-thick unit (beds 23-26) of very coarse-grained bioclastic limestone with many intraclasts and ichnoclasts. The macrofauna is diverse and abundant but display no taphonomic evidence for reworking, suggesting that the organisms lived during the reworking events. Five fining-upwards sequences are observed in the Hangenberg Sandstone equivalent, suggesting that this regressive event was multi-pulsed. The oolitic limestone immediately above yielded the same foraminiferan assemblage than is Anseremme, with a clear Tournaisian affinity (cf. Denayer et al., 2021). The section was sampled for conodont some years ago, but Carlo identified only long-ranging taxa.

The last section, situated 2 km away from Spontin, is the Chansin section which exposes only the base of Hastière Formation and beds immediately below. The Hangenberg Sandstone equivalent is identical to what is exposed in Spontin and yielded a very abundant macrofauna. The last shale bed, immediately below, yielded *Retispora lepidophyta* and other abnormal forms that indicate the *tener* event. A thin shaly interbed (between beds 107-108) within the Hangenberg Sandstone equivalent yielded *Verrucosisporites nitidus*. As in Spontin, Royseux and Anseremme, these beds are very rich in macrofauna.

After these intensive three days in the field, the members of the working group agreed on the next steps:

1. It is necessary to precisely locate the successive event of the DCB calendar in the German sections.
2. The Belgian sections should be re-sampled for conodonts (Van Steenwinkel and Bouckaert & Groessens' collections could not be located and supposed lost). Julien and Cyrille proposed to re-sample Anseremme, Spontin and Chansin and send the samples to both Carbo and Sven for analyses.
3. A paper documenting all stratigraphical, sedimentological, and geochemical aspects of the Anseremme potential GSSP should be published.
4. The working group needs to write a proposal to officially re-define the DCB based on the Montpellier criterium approved in 2019 during the International Congress on Carboniferous and Permian in Cologne.

During the Carboniferous session of the International Congress on Stratigraphy in Lille,

Markus and Carlo presented the most recent development of the work accomplished by the working group on the DCB, with an emphasis on the potential GSSPs presented in Belgium and Germany. Many questions were raised concerning the validity of a pluri-elements criterium for the definition of a boundary, but Markus insisted on the fact that the criterium is a combination of events, not a selection of several criteria. The pragmatic aspect of the combined definition has been demonstrated both in neritic (Belgium) and bathyal (Germany) settings with a very good correlation potential between both realms but also with the continental realm.

Markus Aretz pointing at the DCB boundary (top of Hangenberg Sandstone equivalent) in the potential GSSP at Anseremme, Belgium.

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GEOTOLOSA 2025 – NEWS FROM THE PALEOZOIC WORLDS

By Markus Aretz

The 20th International Congress on the Carboniferous and Permian was held under the banner of GeoTolosa 2025 – News from the Palaeozoic Worlds in southern France. For the first time an ICCP explicitly included the Subcommission on Devonian Stratigraphy and colleagues of the VARISCAN Meetings. The conference benefited from financial support from the CNRS, the International Commission on Stratigraphy, and the University of Toulouse. The formal scientific sessions of the congress were organized from June 24th to 27th 2025 at the University of Toulouse. They were accompanied by in total five pre- and post-conference field trips (1-4 days-long), which illustrated the vast geological heritage of Late Palaeozoic age in southern France.

Conference photo in front of the main building of the University of Toulouse, ©GeoTolosa Committee

The 20th International Congress on the Carboniferous and Permian was held under the banner of GeoTolosa 2025 – News from the Palaeozoic Worlds in southern France. For the first time an ICCP explicitly included the Subcommission on Devonian Stratigraphy and colleagues of the VARISCAN Meetings. The conference benefited from financial support from the CNRS, the International Commission on Stratigraphy, and the University of Toulouse. The formal scientific sessions of the congress were organized from June 24th to 27th 2025 at the University of Toulouse. They were accompanied by in total five pre- and post-conference field trips (1-4 days-long), which illustrated the vast geological heritage of Late Palaeozoic age in southern France.

Overall, the conference brought together almost 180 participants from 30 countries from all continents, which braved the very hot, and also humid days in Toulouse during a very unusual heatwave for this period of the year. The high number of students, early and middle career scientists shows the attractiveness and renewal of the global community studying the late Palaeozoic.

Welcome speeches during the opening ceremony were given by the President of the University of Toulouse, Prof. Odile Rauzy, the general Secretary of ICS, Prof. Charles Henderson, and the deputy director of Geosciences Environnement Toulouse, Prof. Marc De Rafelis.

The program addressed a large spectrum of topics and disciplines including endogenic and exogenic processes, palaeontology, stratigraphy, basin evolution, palaeoclimate, tectonics, palaeogeography and mineral resources. Important anchor points of the program were three plenary lectures, which illustrated the interconnectivity between the different disciplines and approaches of the scientific communities present at GeoTolosa.

These lectures were given by Anne-Laure Decombeix (Montpellier, Reconstructing a green Antarctica: Permian polar forests under the microscope), Gabriel Gutierrez-Alonso (Salamanca, Late- or Post-Variscan? Linking magmatism and orogenic curvature in the core of a supercontinent, and Gerilyn S. Soreghan (Oklahoma, The Capital of Dust: Formation and Importance of Dust in Deep Time).

Overall, 129 oral presentations and 43 posters were presented in 10 formal sessions. Keynote lectures were given in each session (see table for details).

During the conference three ICS subcommissions, those for the Devonian (SDS), Carboniferous (SCCS) and Permian (SPS) held business meetings to advance their strategic activities and mobilise the broader community toward agreed milestones.

Half of the attendees joined pre- and post-conference field trips, which enabled hands-on investigation of the upper Palaeozoic rocks in southern France (Massif Central and Pyrenees), and were also an occasion to visit three global boundaries stratotypes. Especially, the participants of the three post-conference field trips showed a very high resilience to the very hot summer weather (>40°C).

Session Name	Orals	Posters	Keynote
Session A1: Reading the sedimentary record - environments, facies and basin analysis	7	2	Carniti, P., Guido, A., Wang, X.D., Yao, L., Shen, S., Angiolini, L.: Origin and role of the micrite in the Mississippian mud mounds: a basis for a reclassification of Mississippian buildups
Session B1: Life and Bioevents during Devonian time	24	6	Chen, Z.Y., Udchachon, M., Thassanapak, H., Lu J.F., Fang Xiang, Li, W., Burrett, C.: Late Silurian and earliest Devonian (Lochkovian) conodonts and co-occurrence faunas from biostromes and mud mounds, Indochina Terrane, NE Thailand
			Wichern, N., Bialik, O., Becker, T., De Vleeschouwer, D.: Climate and weathering trends on astronomical timescales in the run-up to Late Devonian anoxic bioevents
Session B2: Stratigrahic subdivision of the Carboniferous and its paleontological content	11	6	Cígler, V., Kumpan, T.: Lower Tournaisian Conodont Stratigraphy in the Moravosilesian Basin (Czechia) and New Insights into Lower Tournaisian Conodont Evolution
Session B3: Permian biota and stratigraphy	15	5	Henderson, C. M., Read, M., Angiolini, L., Beauchamp, B., Waldbott Von Bassenheim, D.: Near-global Correlation of the Sakmarian Stage (Cisuralian, Lower Permian): A Case Study
Session B4: Co-evolution of life and environments under high-resolution Pennsylvanian time scale	12	2	Yao, L., Wang, H., Shi, Y., Lin, W., Wang, Q., Huang, X., Qi, Y., Wang, X.D.: Coral reefs survived from the mid-Carboniferous crisis
Session C1: Geodynamics 1: Paleogeography, tectonics and sedimentary basins	20	5	Ballèvre M.: Non-marine bivalves as a proxy for the growth and collapse of the Variscan belt (Carboniferous - early Permian)
Session C2: Geodynamics 2: Petrochronology, igneous and metamorphic processes	12	6	Lotout, C., Tual, L., Bosse, V., Couzinié, S., Cochelin, B.: Challenges and pitfalls in turning ages into tectono-metamorphic stages: examples from the Variscan orogen
Session D1: Mineral and energetic resources (	16	3	Hauville, B., Delcourt, N.: West European Carboniferous-Permian basins, a favorable setting for helium exploration
Session E1: Global carbon cycling, paleoclimate changes and marine redox landscape during the late Paleozoic	9	2	Barney, B.B., Sharma, A., Nana, Y. L., Li, S., Zhang, S., Day, J.E., Joachimski, M.M., Zaton, M., Grossman, E.L.: Greenhouse to icehouse: A clumped isotope study of the Devonian-Mississippian Climate Transition
Session F1: Geoheritage and geoconservation of the Late Paleozoic	3	4	Monod, B., Baillet, L., Christophoul, F., Nardin, E., Aretz, M., Tabuce, R., Barraquet-Porte, F.: The geoheritage inventory process in Occitanie (southern France): The focus on Devonian to Permian sites

- Field trips FT1 – Late Orogenic collapse and Stephanian basins: Decazeville and Saint Perdoux (French Massif Central) – June, 22nd – 23nd;
- Field trips FT2 – Devonian-Carboniferous successions of the Barousse Area (central Pyrenees) – June, 22nd;
- Field trips FT3 – A geotraverse of the southern French Massif Central: from rifting of the Gondwana margin to Variscan orogeny – June, 27th–30th;
- Field trips FT4 – Late Carboniferous and Permian geology and palaeontology of the Lodève-Graissessac basin - June, 27th–July, 1st;
- Field trips FT5 – The Devonian and Carboniferous successions of the southern Montagne Noire - June, 28th–29th.

The mix of formal sessions and field experience and the very diverse program proved highly effective in generating new ideas and consensus around various topics, including stratigraphic boundary definitions.

Overall, GeoTolosa 2025 delivered a productive blend of scientific insight,

community engagement and field-based interactions, strengthening the global community in the understanding of the late Palaeozoic World. It also showed the necessity to continue the exchange between the different communities, and hopefully GeoTolosa 2025 was a first step to bring together on a regular basis the very different communities working in the late Palaeozoic.

Field trip in the central Pyrennes: Devonian and Carboniferous rocks of the Barousse area. ©GeoTolosa Committee.

MEMBERS' OPINIONS

This section is dedicated to contributions of the SCCS members, announcing or commenting their recent research and publications. These are not peer-reviewed papers and should not be cited as so, but it aims to provide a space for distributing ideas and opinions to the community.

THE CANTABRIAN SUBSTAGE SHOULD BE ABANDONED

By Spencer G. Lucas, W. John Nelson, William A. DiMichele and Hermann W. Pfefferkorn

Recently published articles (Nelson & Lucas, 2021; DiMichele et al., 2023; Lucas et al., 2023; Nelson et al., 2023; Pfefferkorn, 2023) have argued for abandonment of the Cantabrian Substage (Stephanian Stage, Pennsylvanian) and the succeeding Barruelian Substage. In counterpoint, Knight & Álvarez-Vázquez (2021) and Knight et al. (2023) (hereafter both papers are referred to as Knight et al.) have argued for retention of the Cantabrian (and Barruelian). Here, we summarize the reasons to abandon the Cantabrian (and Barruelian) and point out what we regard as flaws in the Knight et al. arguments for retention.

A lengthy debate in the European literature focused on an alleged (or postulated) gap between the top of the Westphalian (Middle Pennsylvanian) type section, in the German Saar coal field, and the bottom of the Stephanian (Upper Pennsylvanian) type section in the French Massif Central. Both type sections are characterized by floral successions and lack marine biostratigraphic indicators. The Westphalian and Stephanian stages and their subdivisions have become standard currency among those who work with coal-bearing strata in Europe. They have been extended into North America where, however, stratigraphers rarely used either the Cantabrian or Barruelian, so different uses developed with regard to the base of the Stephanian, as discussed below. The resulting terminological confusion persists to this day.

Beginning in the middle 1960s, Robert Wagner (1927-2018), one of the great 20th Century students of Carboniferous macrofloras and their use in biostratigraphy, posited a large temporal hiatus between the Westphalian and Stephanian in Europe. A subtext to this is the existence of a significant floristic turnover at the Middle-Late Pennsylvanian boundary (Phillips et al., 1974, 1985; Gillespie & Pfefferkorn, 1979; Kosanke & Cecil, 1996; Peppers, 1996) that, from a gradualistic, uniformitarian perspective, had (to Wagner and some others) to be the result of a temporal gap rather than a rapid major reorganization in Euramerican wetland floras (Pfefferkorn, 2023). Wagner claimed that this hiatus was not present in northwestern Spain and proposed that floras there bridged the gap in a continuous succession. On this basis he proposed the Cantabrian Stage (now used as a substage) to fill the perceived gap (Fig. 1).

Thus, positioning this new chronostratigraphic unit between the Westphalian and Stephanian supposedly filled a gap existing elsewhere in Euramerica, and Wagner and associates initially equated the Cantabrian to the lowermost Stephanian. Later work by Wagner and his associates correlated the base of the Cantabrian with strata outside of Spain previously correlated with the type Westphalian in Europe and the Middle Pennsylvanian in the USA. These correlations demonstrated, prima facie, that there was no gap and, as a consequence of linking the Stephanian base to the base of the Cantabrian, the base of the Stephanian became disassociated from the base of the Upper Pennsylvanian, with which it had long been correlated in the USA (see, for example, the use of these terms in the palynological monography of Peppers, 1996, or the many papers written about the Middle-Late Pennsylvanian floristic turnover in North America, e.g., Phillips & Peppers, 1984).

Outside of northern Spain, strata within the proposed gap have been identified, not only in the USA, but in Central Europe and Great Britain (e. g., Falcon-Lang et al., 2011; Besly & Cleal, 2021). Thus, the Cantabrian did not fill a gap, because many of the plant-fossil-characterized time horizons thought unique to northwest Spain are present in other areas across the Euramerican part of Pangaea. Wagner also proposed the post-Cantabrian Barruelian and Saberian stages (substages) to be equivalent to the Stephanian A and B (Fig. 1).

We recommend abandonment of the Cantabrian because, as explained in the papers cited in the first paragraph:

1. The Cantabrian was defined and redefined several times, but never adequately defined by boundary stratotypes, so it should not have been formalized as a chronostratigraphic unit.
2. Correlations of the Cantabrian have been based solely on assemblages of plant fossils, the components of which have overlapping but different stratigraphic ranges, and different first and last appearances, some before, some after, and some within the substage. No megafloral signal corresponds uniquely to the base of the Cantabrian.
3. The Cantabrian was based on the assumption that floristic change occurs only gradually, leaving a record of continuous species turnover. Thus, the abrupt and substantial change in terrestrial floras, primarily a marked reduction in arborescent lycopods but also reflected in many other wetland groups, that characterizes the Westphalian-Stephanian boundary in Europe was thought to indicate a hiatus, that strata were missing. The resulting presumed "gap" had to be closed by finding strata representing this "missing" time elsewhere. This conclusion reflects unsupported assumptions about the nature of evolution and ecological change when thresholds are passed.

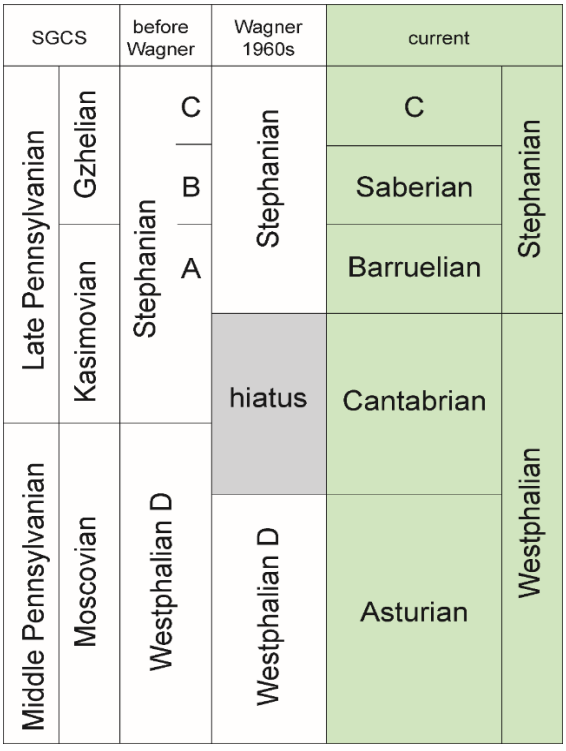

Fig. 1. Wagner's view of a hiatus between the Westphalian and Stephanian led to the current chronostratigraphy using the Cantabrian Substage based on macrofloras from northwestern Spain. We advocate a return to the Westphalian-Stephanian chronostratigraphy "before Wagner."

Thus, the Cantabrian corresponds to an assemblage zone of plant fossils in northern Spain, where the term is of local use. It does not serve as a chronostratigraphic unit with isochronous boundaries recognizable elsewhere and should be abandoned as a substage of the Carboniferous. The Barruelian should be abandoned as a substage for the same reasons. No formal definition of the Saberian has been proposed, so it can be abandoned as well.

We see the defense of the Cantabrian as a substage by Knight et al. as based on a fundamental misunderstanding of current chronostratigraphic practice. Thus, since the 1960s chronostratigraphic units have been defined by boundary stratotypes associated with one or more signals of value to correlation. The primary signal is usually a biostratigraphic datum that represents a biotic signal that can be widely correlated. The base of the Cantabrian Stage/Substage, as originally defined and redefined, lacks such a signal, as does the base of the overlying Barruelian Stage/Substage. The base of the Cantabrian as Knight et al. define it is a lithologic unit base—the base of the marine band of the Villanueva Formation in the Guardo Coalfield of northern Spain; the Barruelian base is similar—the base of the Carboneros Member of the Barruelo Formation about 20 km away from the location where the Cantabrian base was defined. A careful reading of Knight et al. reveals that both the Cantabrian and Barruelian are actually defined by unit stratotypes, not by boundary stratotypes associated with signals for correlation. Knight et al. claim that the Cantabrian is defined by boundary stratotypes, but these are just lithostratigraphic boundaries of only local value to correlation. There are no useful global-scale signals associated with the bases of the Cantabrian and the Barruelian.

Knight et al. represent the Cantabrian as corresponding to the *Odontopteris cantabrica* assemblage zone of plant macrofossils. However, the assemblage zone provides no biostratigraphic datums (lowest occurrences) that correspond to the bases of the Cantabrian or the Barruelian. Indeed, the range of the plant taxon claimed characteristic of the Cantabrian, *O. cantabrica*, does not match the substage boundaries, and the taxonomic validity of *O. cantabrica* is also questionable (Nelson & Lucas, 2021). *O. cantabrica* is uncommon, its description is based on incomplete specimens, and it closely resembles other species (e.g., Zodrow et al., 2020).

The base of the Cantabrian is a marine limestone (marine band of Villaneuva Formation) that contains late Moscovian (Myachkovian) fusulinids. In northern Spain, the base of the Kasimovian is indicated by the fusulinid *Protriticites* in a marine band just above the middle of the Cantabrian "stratotype" section. Numerical age data, numerical age estimates and biostratigraphic correlations by Opluštil et al. (2022; also see Opluštil & Schneider, 2023) indicate that the Cantabrian (= zone of *Odontopteris cantabrica*) is diachronous across Europe. Furthermore, the most substantial paleobotanical event across the Middle-Late Pennsylvanian boundary, the massive decrease in lycospores, is not evident in the Cantabrian section. This event can be correlated from the USA to Ukraine, so the apparent absence of a record of it in the Spanish section greatly diminishes the Spanish section as a standard for correlation.

At most, the Cantabrian corresponds to an assemblage zone of plant fossils in northern Spain, where the term is of local use. It does not serve as a chronostratigraphic unit with isochronous boundaries recognizable elsewhere in Europe, let alone outside of Europe. The Cantabrian Substage should be abandoned.

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Addresses of the contributors:

Spencer G. Lucas: New Mexico Museum of Natural History, 1801 Mountain Road N. W., Albuquerque, New Mexico 87104 USA; spencer.lucas@dca.nm.gov

W. John Nelson: Illinois State Geological Survey, 615 East Peabody Drive, Champaign, Illinois 61820 USA

William A. DiMichele: Department of Paleobiology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560 USA

Hermann W. Pfefferkorn: Department of Earth and Environmental Science, University of Pennsylvania, Philadelphia, Pennsylvania 19104 USA

THE CANTABRIAN AND BARRUELIAN SUBSTAGES: FACTS AND CONCEPTUAL MISCONCEPTIONS

By Christopher J. Cleal, John A. Knight and Carmen Álvarez-Vázquez

The Heerlen chronostratigraphical scheme was initiated during the early international conferences on Carboniferous stratigraphy, the first four (in 1927, 1935, 1951 and 1958) held in the city of Heerlen in the Netherlands (e.g., Wagner, 1989). Originally intended to be of general applicability, it rapidly became evident that it could only really be applied to the terrestrial sequences of Euramerica, and today is mainly used in Europe, north Africa and the Canadian maritime provinces.

The substages of the Namurian and Westphalian Stages of the Heerlen scheme are now well-established and widely used (e.g., Wagner, 1974; Wagner & Winkler Prins, 1994). The transition interval from the upper Westphalian to the lower Stephanian has been more problematic as it represents a time of significant climate change and orogenic activity, which together have disrupted depositional and biostratigraphical patterns. However, after extensive discussions within SCCS, the lower two substages of the Stephanian Stage (Cantabrian, Barruelian) have now been formally defined and ratified (Engel, 1989). Nevertheless, the conceptual and factual foundations of these substages continue to be questioned, especially by colleagues in North America (e.g., Nelson & Lucas, 2021; Bashforth et al., 2021; DiMichele et al., 2022; Nelson et al., 2022; Pfefferkorn, 2022). We contend that these views are fundamentally flawed on several fronts, which we address here.

Lack of clear definition

Nelson & Lucas (2021) and Bashforth et al. (20210 have suggested that neither the Cantabrian nor the Barruelian Substages are adequately defined and Nelson et al. (2022) state that they lack boundary stratotypes. This is factually incorrect. As chronostratigraphical units, these substages are defined exclusively by stratotypes located in the Cantabrian Mountains in northern Spain. Although there was some debate as to where to locate these stratotypes (as summarised by Knight and Álvarez-Vázquez, 2021), since 1989 their positions have been fixed at stratotypes and formally ratified by the SCCS: at the base of the Villanueva Formation in the Guardo Coalfield for the Cantabrian Substage, and at the base of the Carboneros Member in the Barruelo Coalfield for the Barruelian Substage (Knight and Álvarez-Vázquez, 2021). These geosites are freely accessible surface exposures and are in the process of geoheritage protection; all are registered as LIGs (Lugares de Interés Geológico – sites of geological interest), which constitutes the first step towards formal legal geoconservation protection.

Lack of biozonal classification

Nelson & Lucas (2021) also claimed that there was a lack of a coherent biozonal classification of these strata in Spain. As they are chronostratigraphical rather than biostratigraphical intervals, this is irrelevant to determining the formal legitimacy of the Cantabrian and Barruelian Substages. Nevertheless, there are extensive biostratigraphical analyses (e.g., Wagner & Winkler Prins, 1970, 1985; Wagner et al., 1983) which allow the macrofloras of these strata to be incorporated into the standard biozones (Wagner, 1984; Cleal, 1991; Opluštil et al., 2016, 2021) and to be correlated with successions elsewhere in Europe and eastern North America (e.g., Cleal et al., 2009).

The Cantabrian is based on a gap in macrofloral record

Pfefferkorn (2022) argued that the Cantabrian Substage is based on a significant break in the vegetation record between the Westphalian and Stephanian Stages; since such a hiatus in the vegetation was likely to be diachronous and of varying duration, it would be an unreliable basis for recognising a substage. There is

indeed a hiatus observed in the macrofloral record of the northern foreland of the Variscan Orogen, but on the southern foreland especially in the Iberian Peninsula, this macrofloral change is more gradual; the apparent abruptness of the macrofloral change in the more northern areas was due to a complex interaction of landscape and climate change, which had much more of an impact on the northern than the southern foreland. This is, anyway, totally irrelevant as to the formal definition and legitimacy of the Cantabrian Substage, which is a chronostratigraphical and not a biostratigraphical interval. Although the original, informal concept of the Cantabrian (Sub)Stage was indeed developed because of the observed differences in the macrofloras of the classic Westphalian D and Barruelian ("Stephanian A") successions (Wagner, 1966a, b, 1969) its upper and lower boundaries are now formally defined at stratotypes. Moreover, new radioisotopic evidence (Knight and Álvarez-Vázquez, 202; Knight et al., 2022) has allowed the lower and upper boundaries to be dated as ca. 307.5 Ma and ca. 304.9 Ma, respectively.

The base of the Cantabrian is time-transgressive

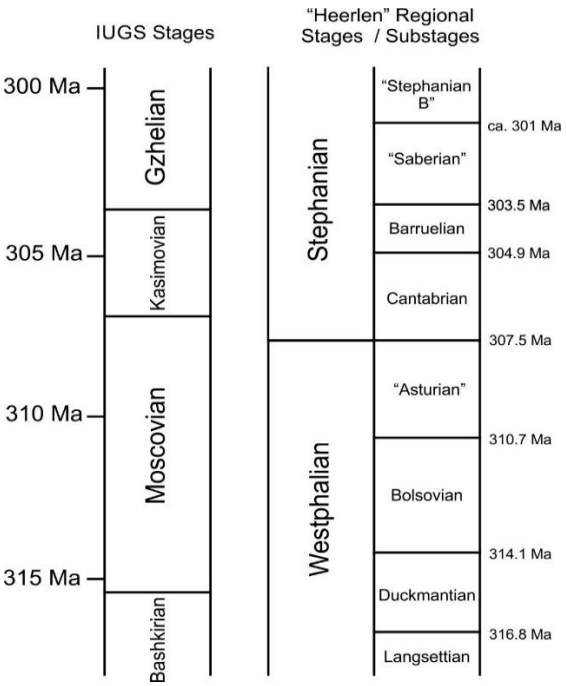
DiMichele et al. (2022) gave extensive evidence as to the dynamics of the vegetation change that occurred through the Westphalian – Stephanian transition, clearly demonstrating that the change was being affected by a range of ecological variables, and so the resulting fossil record of the change is diachronous ("time-transgressive"). They then argue that "…the floristic changes that define the Cantabrian base are step-wise, gradual, and difficult to recognize outside of the type area in Spain" (see also Nelson et al., 2022). But this is factually incorrect, as they are confusing biostratigraphy with chronostratigraphy. The Cantabrian Substage is a chronostratigraphical unit whose base is not defined by a biostratigraphical boundary or change, but at a stratotype representing a particular point in time (ca. 307.5 Ma) – it cannot, by definition, be time-transgressive.

Recognising the Cantabrian and Barruelian outside of Europe

Nelson et al. (2023) have argued that it is difficult to identify the Cantabrian and Barruelian outside of the stratotype areas, but this is also factually incorrect. Using the traditional, macrofloral biostratigraphical indices, the bases of the Cantabrian and Barruelian have been identified over large parts of Europe and the Canadian maritime provinces, which represent the main part of the Euramerican coal belt where the Heerlen scheme was intended to apply (e.g., Wagner & Winkler Prins, 1984; Zodrow & Cleal, 1985; Cleal et al., 2003, 2009; Cleal, 2007; Opluštil et al., 2021; Knight et al., 2022). As DiMichele et al. (2022) correctly point out, the evidence is less clear in the far western extremities of the Euramerica coal belt such as the Midcontinent coalfields of the USA but that does no invalidate the Cantabrian as a regional substage reflecting a particular interval of time. Even though the relevant biostratigraphical data are unavailable in the USA Midcontinent, the increasing refinement of the dating of the sequences using cyclothems (e.g., Heckel, 2022) allows the base of the Cantabrian to be identified there, probably in the upper Desmoinesian Regional Stage, at about the Upper Fort Scott cyclothem group; and the base of the Barruelian in the Missourian Regional Stage, at about the Dennis cyclothem group.

We should return to having the Westphalian D followed directly by the Stephanian A. Nelson et al. (2023) have argued that we should revert to the "traditional" situation where the Westphalian D ("Asturian") is directly overlain by the Barruelian. Although technically this could be done (chronostratigraphy is after all an artificial classification) it ignores the many practical drawbacks that this would introduce (as were discussed extensively by Knight et al., 2023). It is now known that the time gap between the Westphalian D and Barruelian

represents ca. 2.6 Ma (a duration comparable to most of the other substages in the Heerlen scheme (e.g., see Davydov et al., 2010). It would require that either the Westphalian D or the Barruelian to be expanded, making it much longer than any of the other Heerlen substages, or the substage boundary is placed somewhere in the middle of what is currently the Cantabrian and where there is no usable biostratigraphical index to aid correlation. In our view, none of these options make much sense.



Summary

- For nearly a quarter of a century, the Cantabrian and Barruelian Substages have been formally ratified intervals within the Heerlen regional chronostratigraphic scheme.
- The bases of these substages are formally defined at stratotypes at conserved geosites in northern Spain, and represent dates of 307.5 Ma and ca. 304.9 Ma, respectively.
- These boundary horizons have been correlated with levels in sequences across Europe and eastern North America where the appropriate coal-bearing facies are preserved, and even in some red-bed sequences.
- The Cantabrian and Barruelian Substages are ca. 2.6 Ma and 1.4 Ma long, respectively (based on current radioisotopic dates) and so are of comparable duration to most of the other substages in the Heerlen scheme.
- Being chronostratigraphical units, these substages cannot, by definition, be diachronous.

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Addresses of the contributors:

Christopher J. Cleal: School of Earth Sciences, University of Bristol, Life Sciences Building, Tyndall Avenue, Bristol BS8 1TQ, UK, chris.cleal@bristol.ac.uk

John A. Knight and Carmen Álvarez-Vázquez: Centro Paleobotánico, IMGEMA-Jardín Botánico de Córdoba, Avenida de Linneo s/n, 14004 Córdoba, Spain.

VISÉAN-SERPUKHOVIAN SECTION ON THE BELEUTY RIVER (ZHEZKAZGAN, CENTRAL KAZAKHSTAN)

By S. V. Nikolaeva, S.N. Mustapayeva, V.Ya Zhaimina, P.B. Kabanov, and A.B. Baibatsha

Introduction

Our current project run by the Satbayev University (Almaty, Kazakhstan) is to re-examine the stratotype sections of the regional stratigraphic units in Kazakhstan. Numerous Carboniferous successions in Kazakhstan are in remote locations that are difficult to reach, but they are largely fossiliferous and have a great correlation potential. In 2023 we visited several areas in Central Kazakhstan with the stratotype sections of the Mississippian regional units. These included the stratotype section of the Beleuty Formation and the Beleutian Regional Substage. The section on the Beleuty (Kalmakkyrgan) River in the Ulytau Region has been known from the mid-20th century, and some fossils were brought back to Moscow and Almaty by mapping expeditions. The Beleuty section has been previously reported to span the Viséan-Serpukhovian boundary based on foraminifers and ammonoids (Ruzhencev & Bogoslovskaya, 1971; Litvinovich et al., 1969; 1985; Zhaimina, 2022, 2007; Gridina et al., 2012, 2014), and is therefore important for the re-definition of this boundary. The project aimed at the re-examination of historic records in the view of present-day stratotype requirements using resampling for fossils and lithology, bed-by-bed re-description of the critical levels, and spectral gamma ray logs (SGR).

Stratigraphy and age

The definition of the base of the Serpukhovian (Mississippian, Carboniferous) has for many years been a focus of global stratigraphic research. The official Viséan-Serpukhovian boundary at the base of the *Eumorphoceras* (E1) ammonoid Zone in Europe (*Uralopronorites-Cravenoceras* ammonoid Genozone in Kazakhstan and the Urals) is difficult to precisely identify in many sections, and among other proposed markers, the FAD of the conodont *Lochriea ziegleri* has been shown to have the best correlative potential (Qi et al., 2018; Nikolaeva et al., 2020). Therefore, the first occurrences of *Lochriea ziegleri* need to be precisely documented, and sections with co-occurring conodonts, foraminifers and ammonoids are very important in this respect as they allow the conodont zonal successions to be calibrated relative to the foraminiferal and ammonoid scales.

Fig. 1. Map showing areas with the Beleuty section.

In the Carboniferous, the Beleuty basin was part of the shelf of the Kazakhstania Paleocontinent, which at the beginning of the Late Carboniferous began to collide with Baltica as the Palaeo-Uralian Ocean subducted beneath the margins of the latter (Puchkov, 2009). At present, the Beleuty section is located on the southern margin of the Ulutau Uplift, 120 km south of the town of Karsakbay (town near Zhezkazgan, in the Ulytau Region) (Fig. 1). The Mississippian monoclinal bEds crop out in a syncline, both on its west and east wings. In 2023 we studied the section spanning the Viséan-Serpukhovian boundary interval on the east wing (47°03'58.8"N, 66°41'24.4"E), which contains ammonoids, nautiloids, crinoids, solitary rugose corals, foraminifers, and conodonts (Field designation "3SM2023" on the Beleuty River, a few hundred meters E of the mouth of Sholak Creek) (Fig. 2). This is a natural outcrop composed of several mounds. The Upper Viséan beds in this section are assigned to the Dalnenskian Regional Substage and the Lower Serpukhovian are assigned to the Beleutian Substage. The V-S boundary in this section in various publications was drawn tentatively based on the occurrences of the foraminifers *Neoarchaediscus* or ammonoids *Cravenoceras*.

The foraminiferal-based Viséan-Serpukhovian boundary in Kazakhstan was traditionally drawn between the *Eostaffella ikensis - E. tenebrosa - Bradyina rotula - Howchinia gibba* and *Neoarchaediscus parvus-Kasachstanodiscus* Zones (Marfenkova, 1991; Zhaimina, 2002).

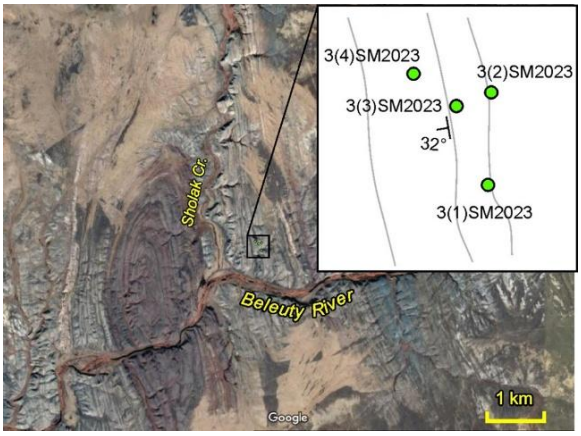

Fig. 2. Beleuty locality and field stations.

However, *Neoarchaediscus parvus* (Rauser-Chernousova, 1948) (= *Asteroarchaediscus parvus*) is known from the uppermost Viséan (e.g., Kulagina, 2017), while *Kasachstanodiscus* first appeared in the Middle Viséan, and none of its species seem to be restricted to the Serpukhovian. There are several reported levels with ammonoids in the Beleuty section, the lower one with *Pachylyroceras,* usually found in equivalents of the Brigantian P2 Zone (= *Hypergoniatites-Ferganoceras* Genozone in Kazakhstan) and upward in the section, several levels with *Cravenoceras*, usually restricted to the equivalents of the Namurian E1 Zone (*Uralopronorites-Cravenoceras* Genozone in Kazakhstan). The correlation the regional substages and the global zones in this section has largely remained unresolved.

The Dalnenskian uppermost unit in the Beleuty section includes limestones (dominant), sandy limestones, siltstones, and less commonly shales. The Dalnenskian fossils include Late Viséan ammonoids, foraminifers, conodonts, brachiopods and ostracods (ammonoids: *Pachylyroceras newsomi*, nautiloids: *Endolobus litvinovichae*; conodonts: *Gnathodus girtyi collinsoni*, *G. girtyi girtyi*; brachiopods: O*vatia jagovkini, Echinoconchus elegans, E. subelegans, Neospirifer nalivkini, Spirifer logani latus, Productus concinnus, Composita trinuclea*, etc.; ostracods: *Shishaella claytonensis, Healdianella darwinuloides*, etc.) (Litvinovich et al., 1985).

The base of the Beleutian was traditionally drawn near the earliest occurrence of *Cravenoceras* but was not precisely correlated with the foraminiferal zonation. We were able to locate the level with *Cravenoceras beleutense*, *C. arcticum*, *C. malhamense*, *Kazakhoceras hawkinsi*, *Sudeticeras varians karagandense, Neoglyphioceras litvinovichae*, and *Beleutoceras carinatum*. The Beleutian Regional Substage is composed of sandstones, siltstones, shales, various nodular, micritic and argillaceous limestones with ammonoids, foraminifers, corals, brachiopods, bryozoans, gastropods, bivalves, etc. (Litvinovich et al.,

1985; Zhaimina, 2007; Zhaimina et al., 2023). Foraminifers include *Eostaffella minuta, Eostaffellina* cf. *paraprotvae, Pararchaediscus tumidus, P. convexus, Archaediscus* cf. *krestovnikovi, Howchinia gibba, H. gibba longa, H. beleutensis, Monotaxinoides* aff. *subplanus*, etc.

Description of the V–S boundary beds

We have re-described and re-sampled the boundary beds of the section aiming to correlate the FODs of *Monotaxinoides* aff. *subplanus* and *Eostaffellina* cf. *paraprotvae* with occurrences of *Pachylyroceras* and *Cravenoceras* in the same section. An excerpt of the section description is below; the fossil samples are being processed.

Loc. 3(3)SM2023:

14.0–24.0 m. Mostly covered. A few low ribs of argillaceous limestone in basal ~ 1 m. Soil between these ribs indicates shaly intervals. Above there is soil with several small exposures/patches of soft, buff coloured shale weathered into small (0.5-2 cm) flakes. Original bedding in these patches is mostly lost. Poorly preserved bedding elements were only observed in one such exposure.

The overlying section was measured on the eastern slope of elevation with Loc. 3(4)SM2023 in about 30 m south along its crest, where the outcrop is slightly better.

24.0 – 27.6 m. Mostly covered. Shale with sandstone intercalations. Greenish grey, soft, fissile and weathered shale with lost bedding elements. A few ribs of fine-grained, greenish grey, fine-grained sandstone (the thickest at 25.0 m). The number of these sandstone beds is unclear as sandstone blocks are mostly slumped downslope.

27.6 – 27.8 m. Sandstone: coarse-grained, bluish grey, non-carbonate, subquartzose, with abundant admixture of lithic dark-coloured grains.

27.6 – 28.2 m. Sandstone: coarse-grained, massive, fractured, penetrated by thick network of white hydrothermal veins. The sandstone matrix is calcareous, weathering rusty; grains are prevalently quartz and dark-coloured, sometimes black rounded lithic and/or mafic effusive fragments.

28.2 – 28.6 m. Limestone: dark grey, massive, fractured, fossiliferous, with sand admixture; poorly exposed. Identified as a "bed of fractured finely crystalline limestone in the upper part of unit 6" of Litvinovich et al. (1985).

28.6 – 32.0 m. Shale: calcareous, dark greenish grey, fissile.

32.0 – 34.5 m. Limestone: grey, medium to thick bedded; wackestone, locally packstone and floatstone composed of thin shells – mostly cephalopods?

34.5 – 37.4 m. Limestone: thick (0.2-0.45 m) beds of goniatite-rich grey limestone are separated by moderately recessive, thinner intervals of fissile marl. Very gradual transition to overlying limestone.

37.4 – 43.0 m. Limestone-marl alternation: grey, nodular, resistant ribs of limestone are interbedded with thicker (20-40 cm), more recessive intervals of fissile marls. The interval is fossiliferous, with crinoid fragments and cephalopods. This interval forms a crest. From this level we collected numerous ammonoids, including several species of *Cravenoceras*.

Gamma-ray spectrometry

In order to increase correlatability of Beleuty/Sholak section, we supplemented the bed-by-bed description with gamma spectrometry measurements. For this, the continuous stratigraphic intervals in Beleuty/Sholak section were surveyed with the RS-230 BGO scintillometer of Radiation Solutions Inc. Signal acquisition time was set to 120 seconds. Decomposition of gamma radiation into U, Th and K spectra is widely used to interpret lithology and depositional environments in pre-Cenozoic strata where presence of radioactive isotopes of other elements is diminutive due to decay (Ellis & Singer, 2007). Potassium and thorium are relatively stable and mostly bound in detrital siliciclastics, whereas uranium is generally more soluble, and much of U precipitates from seawater in the anoxic sulphidic setting (Tribovillard et al., 2006).

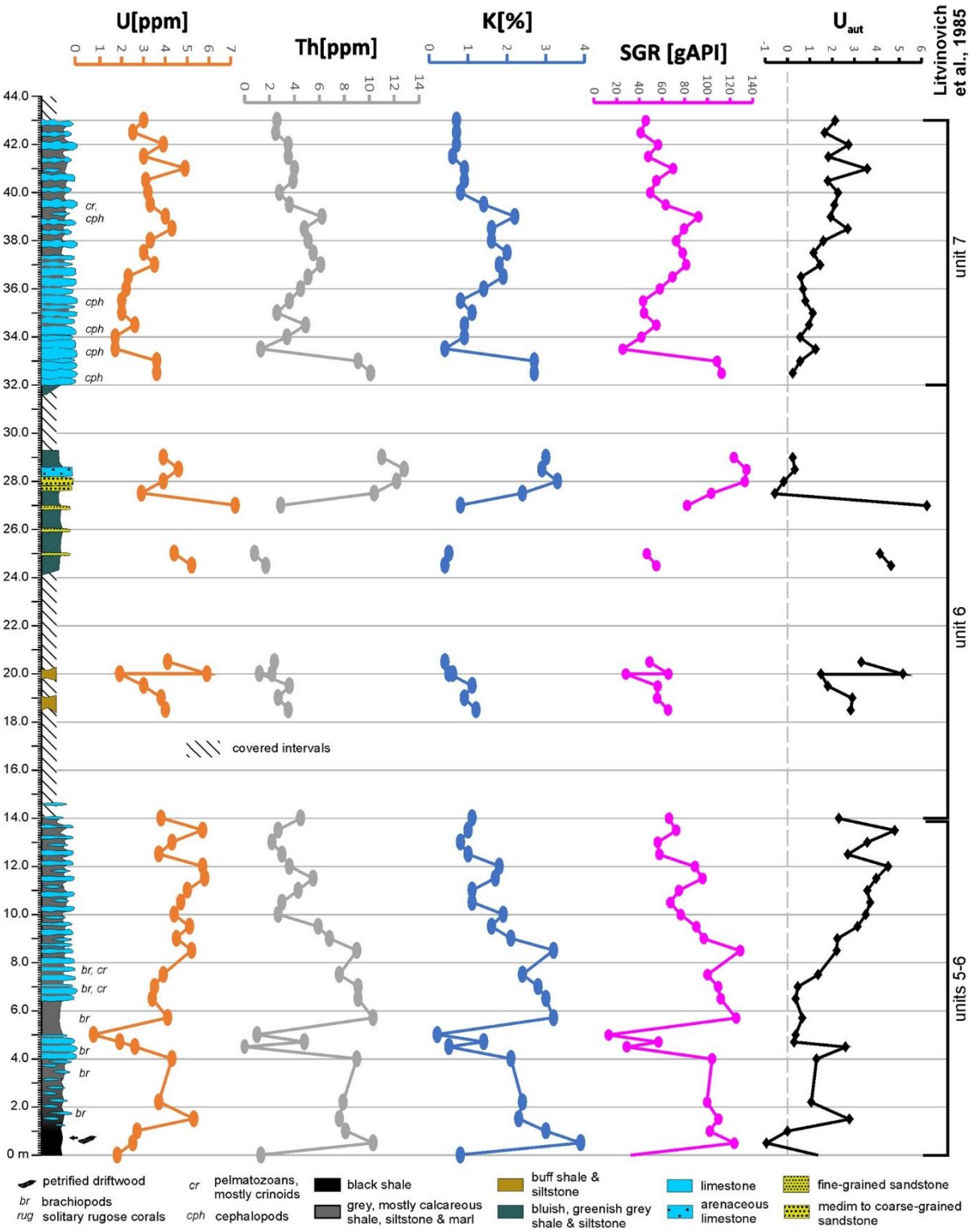

Fig. 3. Measured section at Beleuty with gamma spectrometry data and proxies.

Potassium and thorium are usually much better correlated to each other than to U and are often used together as K-Th gamma ray proxy for siliciclastic input. Authigenic uranium enrichment, and its isotope signatures are used for interpretation of redox conditions in the depositional basin. Alumina-normalized concentrations of uranium and some other trace metals are widely used as elemental proxies to interpret the degree of oxygen starvation of the depositional environment. We use the U_{aut}, or authigenic uranium – a popular

proxy to the excess of uranium (Fig. 3). Shales with U_{aut} >> 0 can in many cases be interpreted as those with the authigenic enrichment above the U content in detrital minerals (Myers & Wignall, 1987).

Concluding remarks

The new paleontological data from the Beleuty section support its potential for correlation of the regional and global stratigraphic units and combined with gamma-spectrometry results will be useful for the reconstruction of the paleoenvironmental and depositional settings in the Beleuty Basin.

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Addresses of the contributors:

S.V. Nikolaeva: Natural History Museum, London, UK, s.nikolaeva@nhm.ac.uk.
Mustapayeva S.N.: Satbayev University & Satbayev Institute of Geological Sciences, Almaty, Kazakhstan, Johns Hopkins University Baltimore, USA.
Zhaimina V.Ya.: Satbayev Institute of Geological Sciences, Almaty, Kazakhstan.
Kabanov, P.B.: Geological Survey of Canada, Calgary, Canada
Baibatsha, A.B.: Satbayev University, Almaty, Kazakhstan

ON SOME PENNSYLVANIAN CONODONTS NAMED FROM CHINA

By Keyi Hu and Yuping Qi

Introduction

Carboniferous carbonate deposits are widely exposed in China. Numerous studies on Chinese Carboniferous conodonts have been conducted since the 1980s. A total of ninety-nine new species of Carboniferous were then named and more than half of them are valid species (Hu et al., 2022). However, some of those species are not well known outside of China because they were originally described in Chinese and were not well circulated internationally. Here, we present some Pennsylvania species named in China in more detail by providing their original descriptions and illustrations, cooperating with conodont data from South China, to verify their taxonomic validity, and relationship with known species.

Species named from China

Declinognathodus longus Xiong, 1983 (Fig. 1A)

Original Description (translated from Xiong, 1983 with current authors' annotation in parentheses): Platform element long, lanceolate. Free blade long, consisting of ten base-confluent denticles, straight extending to the platform and forming a carina that continues to almost the dorsal end of the platform. Middle groove deep, extending almost to the dorsal end thus no dorsal transverse ridge appears. Rostral side of the platform bearing a short series of nodes; caudal side of the platform bearing a long series of nodes (caudal parapet); both parallel the carina. Expansion of the basal cavity smooth and narrow in both sides. Basal cavity deep, narrow and long. This species differs from D. lateralis by its carina extending to the dorsal end and no transverse ridges on the dorsal end of the platform.

Remarks: Although the original author (Xiong, 1983) only compared this form with *Declinognathodus lateralis*, it is clear that this form is more similar with *D. noduliferus* (Ellison & Graves) and *D. marginodosus* (Grayson). According to the original description (Xiong, 1983), limited illustrations (Xiong, 1983, pl. 76, fig. 19; Xiong & Zhai, pl. 1, fig. 20), and the examination of the faunas from the Naqing and adjacent sections by the current authors, this form probably represents an evolutionary stage between *D. noduliferus* and *D. marginodosus* because its semi-fused node series on the rostral side of the platform (not a node or short longitudinal ridge) is separated from the carina by a sulcus and also does not attach the carina dorsally. The straight extension of the carina does exist in some specimens (Fig. 1B) but is not so common in the whole fauna and maybe not a diagnosis of this form (Fig. 1C). Moreover, there are still a number of unnamed *Declinognathodus* forms from South China await to be done their taxonomic study.

Idiognathodus jingyuanensis Wang & Wang, 1983

Remarks: This form was named from the upper Jingyuan Formation (Bashkirian), Jingyuan, Gansu but was never been used again. Grayson et al. (1990, p. 370) included this species in *Idiognathodus sinuosus* Ellison & Graves based on that *I. jingyuanensis* has a longer caudal rostral ridge than rostral one, well developed caudal lobe, and weakly developed rostral lobe. Therefore, *I. jingyuanensis* is a junior synonym of *I. sinuosus.*

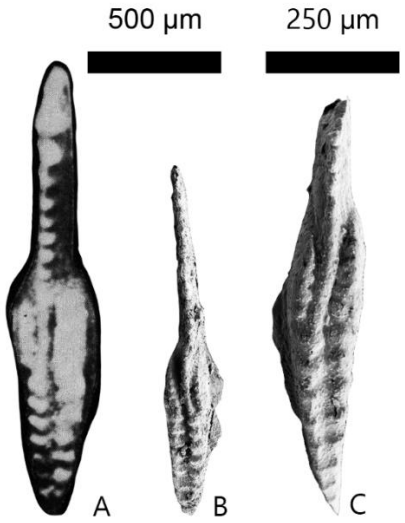

Fig. 1. *Declinognathodus longus* from; A, holotype of *D. longus*, Naqing section, Bashkirian (Xiong, 1983, pl. 76, fig. 19); B, *D. longus* form, Luokun section, LKC115.4; Bashkirian, *'Streptognathodus' expansus* M2 Zone (this study); C, *D. longus* form, Naqing section, sample NSC174; Bashkirian, '*Streptognathodus' expansus* M2 Zone (this study); A and B have the same scale, C has a larger scale.

Idiognathodus shanxiensis Wan & Ding in Zhao et al., 1984 (Figs. 2A, D)

Original description (translated from Wan & Ding in Zhao et al., 1984 with current authors' annotation in parentheses): Platform element slender, caudally incurved, overall sickle-shaped, widest at the middle point, ventral and dorsal parts narrow, dorsal end pointEd. Eight to twelve transverse ridges obliquely crossing the longitudinal axis. The platform slightly concaved along the longitudinal axis. Accessory lobes on both sides and separated from the platform with clear borders. The caudal lobe is larger than the rostral one and is separated from the platform by a shallow caudally concaved sulcus (convex to the carina). The caudal lobe decorated by two nodes of juvenile to twelve nodes of adult, forming lines parallel transverse ridges. The rostral lobe consisting of node series parallel to the longitudinal axis and can extend dorsally to the middle part of the platform. A number of nodes and rows of rostral lobe ranges from one to two nodes and one row of juvenile, six to eight nodes and one (to two) rows of subadult to adult, and more than fourteen nodes and three rows of gerontic. The adcarinal ridges and grooves are well-developed on the ventral part of the platform. The caudal adcarinal ridge curved, caudally convex, connected with the caudal rostral ridge forming a S-shaped ridge. Rostral adcarinal ridge is parallel to the carina and node row(s) of the rostral lobe. Free blade almost the same length as the platform, high ventrally and low dorsally, consisting of ten to twelve laterally compressed and basal confluent denticles. Denticles are larger at ventral part of the blade and smaller at the dorsal part. Carina short or almost missing. Laterally, the element slightly arched, highest at the middle to the ventral part of the platform. Basal cavity wide, asymmetry, extending to the free blade as a narrow furrow.

Remarks: *Idiognathodus shanxiensis* was first mentioned as "*I. shanxiensis* Wan & Ding, 1981 established in a monograph Atlas of Palaeontology in North China (3) Micropalaeontology" (Wan et al., 1983). However, the monograph with the description of *I. shanxiensis* was published later in April 1984 (Wan & Ding in Zhao et al., 1984). In this monograph, Wan & Ding in Zhao et al. (1984) illustrated eighteen specimens in which only one is sinistral (Fig. 2H). Despite their original description fits dextral element well, part of their dextral elements (Fig. 2B) processing a rather flat platform is more similar to *I. obliquus* Kossenko & Kozitskaya in Kozitskaya et al., 1978. Meanwhile, some sinistral specimens assigned to *I. delicatus* (Fig. 2E) were found together with *I. shanxiensis* from the Benxi Formation (Wan et al., 1983) are clearly belonging to the sinistral form of *I. podolskensis* Goreva, 1984, as well as the only illustrated sinistral *I. shanxiensis* (Fig. 2H). When Goreva (1984) named *I. podolskensis*, she described mainly based on sinistral elements and designated a sinistral element as holotype (Goreva, 1984, pl. 2, fig. 23) and also illustrated a dextral element with concaved platform (Goreva, 1984, pl. 2, fig. 25).

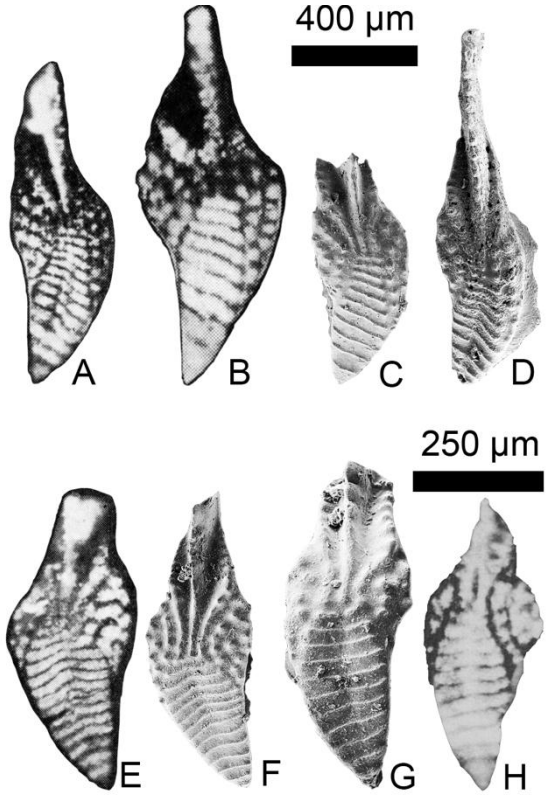

Fig. 2. *Idiognathodus shanxiensis, I. podolskensis*, and *I. obliquus* forms from China; A–F are the same scale; G and H have a different scale. A, holotype of *I. shanxiensis*, Benxi Formation, Dongshan, Taiyuan, Shanxi (Zhao et al., 1984, pl. 96, fig. 1; Wan et al., 1983, pl. 2, fig. 12); B, *I. obliquus* form, Benxi Formation, Dongshan, Taiyuan, Shanxi (*I. shanxiensis* of Zhao et al., 1984, pl. 96, fig. 2; Wan et al., 1983, pl. 2, fig. 11); C, *I. obliquus* form, sample NSC204.6, lower *I. podolskensis* Zone (Moscovian), Naqing section, South China (this study); D, *I. shanxiensis* form, sample NSC203.4, lower *I. podolskensis* Zone (Moscovian), Naqing section, South China (this study); E, *I. podolskensis* form, Benxi Formation, Dongshan, Taiyuan, Shanxi (*I. delicatus* of Wan et al., 1983, pl. 2, fig. 17); F, *I. podolskensis* form, sample NSC205.0, lower *I. podolskensis* Zone (Moscovian), Naqing section, South China (this study); G, *I. podolskensis* form subadult, sample NSC204.6, lower *I. podolskensis* Zone (Moscovian), Naqing section, South China (this study); H, *I. podolskensis* form, subadult (*I. shanxiensis* of Zhao et al., 1984, pl. 96, fig. 9), Benxi Formation, Dongshan, Taiyuan.

Alekseev & Goreva (2001, pl. 18, figs. 1-7, 17) illustrated more dextral specimens of *I. podolskensis*, which are very similar to *I. shanxiensis*. In South China, both dextral *I. shanxiensis* (Fig. 2C) and sinistral *I. podolskensis* (Figs. 2F, G) forms were recovered and share the same stratigraphic range, as well as *I. obliquus* (Fig. 2D) (Hu et al., 2021, 2023). The Chinese *I. shanxiensis* and Russian *I. podolskensis* are similar in morphology, asymmetrically paired P1 elements, and stratigraphic range. Thus, they are probably the same species.

If this assumption is correct, *I. shanxiensis* should be the valid species name for *I. podolskensis* because *I. podolskensis* was published in October 1984, half year later than *I. shanxiensis* was publishEd. Moreover, the dextral elements of *I. shanxiensis*/*podolskensis* and *I. obliquus* are very similar. The only difference between them seems to be whether the platform is concaved or not (compare Fig. 2D and 2C). The phylogenetic relationship between *I. shanxiensis*/*podolskensis* and *I. obliquus* is certainly needed further discussion.

Idiognathodus hebeiensis Zhao & Wan in Zhao et al., 1984 (Fig. 3)

Original Description (translated from Wan & Ding in Zhao et al., 1984): Platform tongue-like, slightly incurved, surface flat to slightly concaved, decorated by about eight slightly ventrally convex transverse ridges, ventral one or two transverse ridges commonly not complete. Caudal lobe located at middle-ventral part of the platform, decorated by one to seven nodes. Laterally, the free blade, decorated by ten denticles, getting narrower from ventral to dorsal. Platform slightly arched, highest at the dorsal end of the carina.

Basal cavity wide, expanded to both caudal and rostral sides, asymmetrical, extended to the blade as a narrow furrow.

Remarks: This species has been only found in North China and is regarded as a good biostratigraphic marker for basal Taiyuan Formation in Shanxi and Hebei provinces. However, Ding et al. (1991) also recovered this

species from the Benxi Formation in Hunjian, Baishan, Jilin Province.

Idiognathodus taiyuanensis Wan & Ding in Zhao et al., 1984 (Figs. 4A–D)

Original Description (translated from Wan & Ding in Zhao et al., 1984): Platform element small, narrow, lanceolate, widest at the middle, dorsal end pointed. Platform consisting of five longitudinal rows of nodes. Caudal and rostral sides both bear a row of ~4 nodes (simple lobes), located in middle of the platform. Carina about half the length of the platform and extending as nodes to the dorsal end. Other two rows of nodes parallel to the carina and are separated from the carina by sulci at the ventral part of the platform and are forming lines with extended carinal nodes (or fused with extended carinal nodes forming transverse ridges) at dorsal part of the platform. Free blade decorated by eight to ten basal confluent, almost equal-sized denticles. Free blade slightly shorter than platform. Laterally, platform slightly arched. Basal cavity narrow, deep, asymmetric.

Remarks: The same as *Idiognathodus shanxiensis, I. taiyuanensis* was also officially named in year 1984 (Wan & Ding in Zhao et al., 1984). *Idiognathodus taiyuanensis* is very similar to *I. nodosus* (Ellison & Graves, 1941, pl. 2, fig. 19) by its rows of nodes. In North China, *I. taiyuanensis* was found together with *I. shanxiensis*/*podolskensis* without *Idiognathoides corrugatus* from the Benxi Formation (Wan et al., 1983), thus suggesting the Moscovian age. In South China, *I. taiyuanensis* was recorded together with *I. podolskensis* Group in the upper Moscovian (Hu et al., 2023). Above the occurrence of *I. nodosus, Id. corrugatus* still occurs from the Dimple Limestone, Texas (Ellison & Graves, 1941), which suggests that *I. nodosus* was probably found in the Bashkirian to Moscovian, possibly the highest level in the *lower I. podolskensis* Zone which records the last representatives of Idiognathoides (Hu et al., 2016). The possibility that *I. taiyuanensis* is a junior synonym of *I. nodosus* cannot be excludEd. Another nodose species, *I. benxiensis* (Ding et al., 1991) was found together with *I. shanxiensis*/*podolskensis* and *I. taiyuanensis* from the Benxi Formation as well. *Idiognathodus benxiensis* differs from *I. taiyuanensis* by its wider platform and more rows of nodes. However, *I. benxiensis* was named based on only two specimens (Ding et al., 1991). Lang & Wang (2007) also mentioned that *I. benxiensis* was rare in the type Benxi Formation. Rare specimens of both species were also recovered from the *I. podolskensis* Zone in South China (Figs. 4D, 4G; Hu et al., 2023). By the sizes of those two species (Fig. 4), *I. benxiensis* may be an adult form of *I. taiyuanensis*. However, due to the small number of the nodose *Idiognathodus* elements found so far, it prevents us to make a conclusion currently. The relationship between *I. nodosus, I. taiyuanensis*, and *I. benxiensis* needs further discussion.

Idiognathodus huashigouensis Zhao, Yang & Zhu, 1986 (Fig. 5)

Original Description (translated from Zhao et al., 1986, 2001 with current authors' annotation in parentheses): Element wedge-shape, with one or two accessory lobes. Rostral lobe parallel rostral margin of the platform, consisting of several nodes arranged in a row.

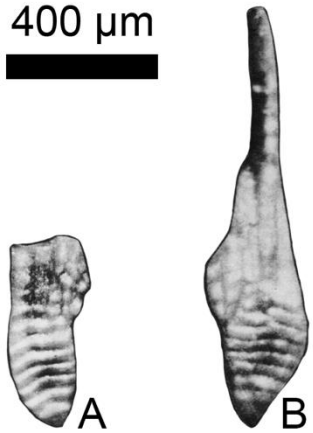

Fig. 3. *Idiognathodus hebeiensis* (Zhao et al., 1984, pl. 103, figs. 9, 1). A, basal Taiyuan Fm., Xishan, Taiyuan, Shanxi; B, holotype of *I. hebeiensis*, basal Taiyuan Fm., Fengfeng Minefield, Hebei.

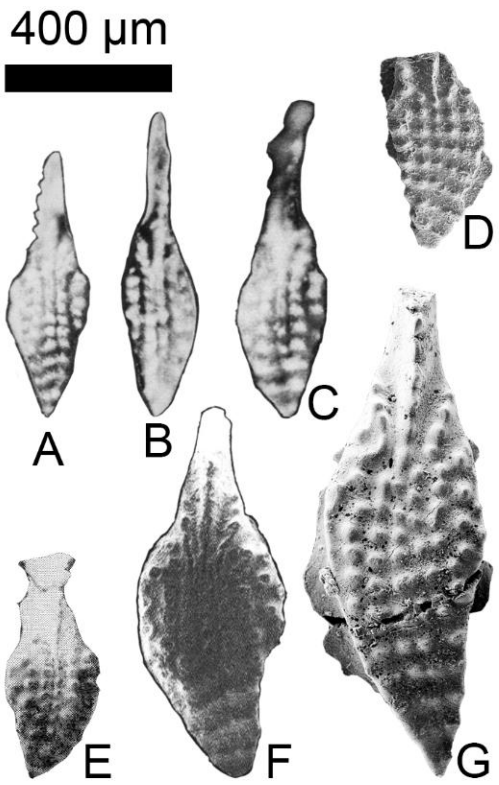

Fig. 4. *Idiognathodus taiyuanensis* and *I. benxiensis* forms from China. A. *I. taiyuanensis*, Benxi Formation, Xishan, Taiyuan, Shanxi (Zhao et al., 1984, pl. 100, fig. 7); B, *I. taiyuanensis*, Benxi Formation, Dongshan, Taiyuan, Shanxi (Zhao et al., 1984, pl. 100, fig. 8); C, holotype of *I. taiyuanensis*, Benxi Formation, Dongshan, Taiyuan, Shanxi (Zhao et al., 1984, pl. 100, fig. 4a); D, *I. taiyuanensis*, sample NSC194.7, lower *I. podolskensis* Zone, Naqing section, Guizhou, South China (this study); E, Holotype of *I. benxiensis*, Benxi Formation, Niuxintai, Benxi, Liaoning (Ding et al., 1991, pl. 1, fig. 24); F, *I. benxiensis*, Xiaoyu Limestone of Benxi Formation, Niumaoling, Benxi, Liaoning (Lang & Wang, pl. 1, fig. 11); G, *I. benxiensis*, sample LKC206, lower *I. podolskensis* Zone, Luokun section, Guizhou, South China (this study).

Caudal lobe consisting of node series convex to the carina. Platform flat or slightly arched (on lateral view). Transverse ridges all cut by carina (carinal nodosity). The ventral half of the carina consisting of fused nodes; the dorsal half of the carina consisting of discrete nodes located at the middle position of the transverse ridges.

Remarks: This species has distinct characteristics, but the original authors did not designate a holotype. Also, this species is currently only known from the Shiqiantan Formation, Kelamaili Mountain, eastern Junggar Basin, Xinjiang according to Zhao et al. (2000). By the co-occurred *Swadelina concinna* and *Mesogondolella* species, the age of this species could be assigned to early Moscovian, slightly older than *Idiognathodus shanxiensis*/*podolskensis*.

Idiognathodus benxiensis Ding, Ma & Wan, 1991 (Figs. 4E, 4F, 4G)

Original Description (translated from Ding et al., 1991): This species is very similar to *Idiognathodus taiyuanensis* but differs from the latter by its wider platform, and six to eight rows of nodes on the platform while the latter has only five rows of nodes. It differs from *I. claviformis* by the latter having irregularly arranged nodes and rows of nodes.

Remarks: see *Idiognathodus taiyuanensis*.

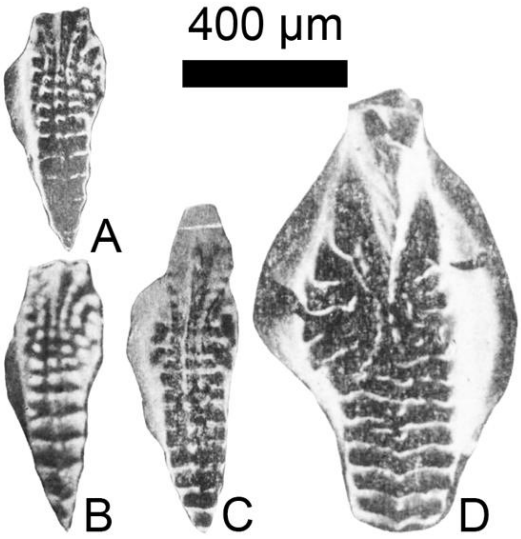

Fig. 5. *Idiognathodus huashigouensis* (from Zhao et al., 1986, pl. 2, figs. 23, 24, 22, 3). All specimens are from Shiqiantan Formation, Kelamaili Mountain, eastern Junggar Basin, Xinjiang, China.

Gondolella qiannanensis Xiong, 1983 (Figs. 6Aa, 6Ab)

Original Description (translated from Xiong, 1983 with current authors' annotation in parentheses): Element tongue-like, ventrally pointed and gradually getting wide and round dorsally, widest at about 4/5 dorsal part. Carina consisting of nine rounded, discrete nodes. Cusp located at the ventral (dorsal) part of the platform, slightly higher than other nodes. Platform smooth, undecorated. The basal cavity and keel both occur. Keel long, extending the whole platform length. On the small loop, a rounded basal cavity occurs and extends ventrally as a shallow furrow.

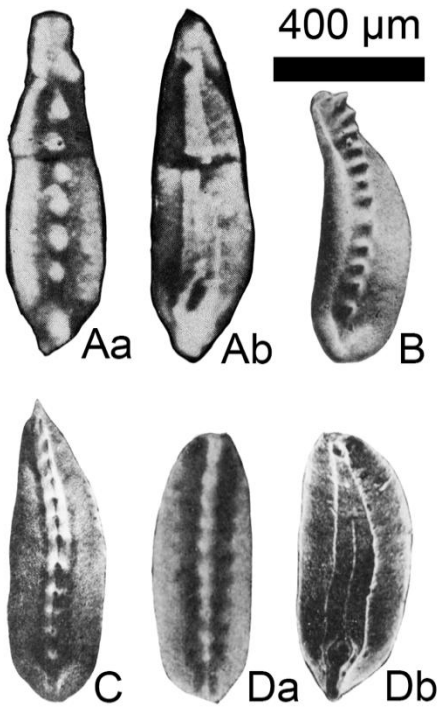

Fig. 6. *Mesogondolella qiannanensis* and *M. xinjiangensis*. Aa & Ab, Holotype of *Mesogondolella qiannanensis*, Naqing section (Xiong, 1983, pl. 75, figs. 10a, 10b); B, C, Da & Db, *M. xinjiangensis*, all from Shiqiantan Formation, Kelamaili Mountain, eastern Junggar Basin, Xinjiang, China (Zhao et al., 1986, pl. 1, figs. 24, 25, 27 & 28).

Remarks: The taxonomy of Carboniferous *Mesogondolella* forms is not well studied. The original description and illustration provide limited information. The overall shape with a dorsally projected cusp suggests that this form probably belongs to *Mesogondolella clarki* (Koike).

Gondolella xinjiangensis Zhao, Yang & Zhu, 1986 (Figs. 6B, 6C, 6Da, 6Db)

Original Description (translated from Zhao et al., 1986): On oral view, element long, oval-shaped, caudal, and rostral margins almost parallel each other. The ventral end of the platform converged, extending a short blade. Dorsal end wide and rounded. Carina consisting of eleven to thirteen denticulate nodes, located on the platform groove. Platform smooth, covered by alveoli-shaped microreticulations. Keel wide and flat. Furrow narrow, and abruptly expanded into a round basal cavity at almost the dorsal end.

Remarks: This form is similar with *Mesogondolella donbassica* (Kossenko) by its overall shape, carina formation, and position of cusp. The dorsal rim of this species is bigger than that of *M. donbassica*, suggesting this species is a different form. However, Zhao et al. (1986) did not designate a holotype for this species.

Streptognathodus junggarensis Zhao Yang & Zhu, 1986 (Fig. 7)

Remarks: This form was originally introduced as a new species (Zhao et al., 1986), and then was reassigned to *Swadelina concinna* (Zhao et al., 2000).

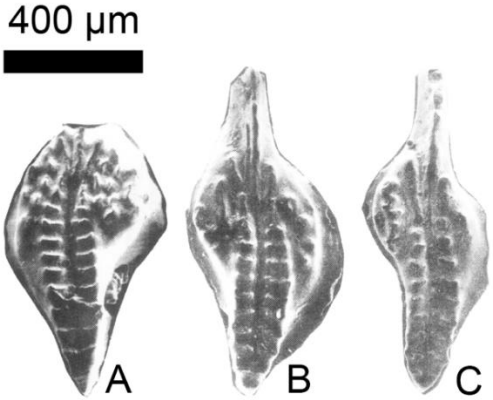

Fig. 7. *Swadelina concinna* from Shiqiantan Formation, Kelamaili Mountain, eastern Junggar Basin, Xinjiang, China (Zhao et al., 1986, pl. 1, figs. 12; Zhao et al., pl. 66, fig. 4, pl. 65, fig. 1).

Conclusion

A total of 10 Pennsylvanian species named from China are briefly discussed. Among them, *Idiognathodus jingyuanensis* and *Streptognathodus junggarensis* are not valid species names because they were reassigned to *I. sinuosus* and *Swadelina concinna*, respectively. *Gondolella qiannanensis* probably is a junior synonym of *Mesogondolella clarki*, while *G. xinjiangensis* probably represents a new species of *Mesogondolella*. *Declinognathodus longus* may be a valid species but its phylogenetic relationship with *D. noduliferus* and *D. marginodosus* needs further study. *Idiognathodus shanxiensis* is a valid species and probably is a senior synonym for *I. podolskensis*. *Idiognathodus taiyuanensis* and *I. benxiensis* may be related to *I. nodosus*. *Idiognathodus hebeiensis* and *I. huashigouensis* are distinct species, but the latter needs a holotype to be designated. A chart summarizing all those species is provided (Tab. 1).

Table 1. Chart summarizing species named from China; "*" indicating uncertain revisions.

Original species name	Revised species name	Age	Holotype	Occurrence	Original author(s)
Declinognathodus longus		Bashkirian	√	South China	Xiong, 1983
Idiognathodus jingyuanensis	*Idiognathodus sinuosus*	Bashkirian		North China	Wang & Wang 1983
Idiognathodus shanxiensis		early Moscovian	√	North & South China	Wan & Ding in Zhao et al., 1984
Idiognathodus hebeiensis		Kasimovian	√	North China	Zhao & Wan in Zhao et al., 1984
Idiognathodus taiyuanensis	*Idiognathodus nodosus**	early Moscovian	√	North & South China	Wan & Ding in Zhao et al., 1984
Idiognathodus huashigouensis		early Moscovian	X	Northwest China	Zhao et al., 1986
Idiognathodus benxiensis	*Idiognathodus nodosus**	early Moscovian	√	North & South China	Wan & Ding in Zhao et al., 1984
Gondolella qiannanensis	*Mesogondolella clarki*	early Moscovian		South China	Xiong, 1983
Gondolella xinjiangensis	*Mesogondolella xinjiangensis*	early Moscovian	X	Northwest China	Zhao et al., 1986
Streptognathodus junggarensis	*Swadelina concinna*	early Moscovian		Northwest China	Zhao et al., 1986

Acknowledgements

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Zhao, Z.X., Yang, X.H., Zhu, X.M., 1986. [Conodonts from the Shiqiantan Formation in Kelamaili Mts., Xinjiang and their geological age]. *Acta Micropalaeontologica Sinica*, 3(2), 193-204. (in Chinese, with English abstract)

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Contribution submitted on August, 17th, 2023

Addresses of the contributors:

Keyi Hu: Centre for Research and Education on Biological Evolution and Environment, Nanjing University, 163 Xianlin Avenue, 210023 Nanjing, PR China. kyhu@nju.edu.cn.

Yuping Qi: State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, and Center for Excellence in Life and Palaeoenvironment, Chinese Academy of Sciences, Nanjing 210008, PR China. ypqi@nigpas.ac.cn.

FUTURE SCCS ACTIVITIES AND MEETINGS

STRATI 2026

Exploring the Depths: Bridging Tradition and Innovation in Stratigraphy

June 28 to July 3, 2026, at Suzhou in Jiangsu Province, China.

The STRATI congress is the official meeting of the International Commission on Stratigraphy held between meetings of the International Geological Congress. STRATI meetings serve 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.

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

https://strati2026.org

19th Argentine Symposium on Paleobotany and Palynology (SAPP)
&
58th Annual Meeting of AASP – The Palynological Society (AASP-TPS)
September 8-11, 2026, in Trelew, Patagonia, Argentina.

We invite you to submit proposals for Thematic Sessions to provide a space for discussing specific topics, emerging areas, or innovative applications of well-established approaches in palynology and paleobotany. A session may focus on a particular subdiscipline or present the work of international collaborative groups.

Proposals must be submitted via the following Google Form:
https://forms.gle/aWUCndMPSWqcyxwU8
Deadline: February 15th, 2026

FIRST CIRCULAR with information herein
https://drive.google.com/file/d/16jvbmxwkISuuD4Q2NHyTbRjZI42mG9vC/view?usp=sharing

For questions or further information, please write to: trelew2026@gmail.com

Check our website https://events.mef.org.ar/ for the latest information regarding the event.

https://palynology.org/58th-aasp-tps-and-19th-sapp/

http://alpaleobotanicapalinologia.blogspot.com.ar

NEWS FROM THE MEMBERS

In this section voting and corresponding members report on their recent activities. There is no formal instruction for these reports, and reports can deal with past and ongoing projects; published and unpublished results, including references; and even short comments and views (longer contributions can be published in another section of the newsletter). Apart from the layout those reports are printed in this section as they were sent. Every member does it according how he/she feels it the best and most appropriate to be useful for our community. It is important that we improve the communication within the SCCS! The voting members (VM) send a report every year, the corresponding members (CM) are required to send a report at least every 2 years.

CM Melikan Akbaş

Konya Technical University, Türkiye

Ongoing projects:

• Foraminiferal biostratigraphy of Carboniferous blocks belongs to the Intra-Pontide Ocean.

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Akbaş, M. 2023. Microfacies and Biofacies Properties of the Lower-Middle Visean Succession of Hadim Nappe (Central Taurides, Southern Türkiye). *Konya Mühendislik Bilimleri Dergisi*, 11(3), 693-705. http://doi.org/10.36306/konjes.1211857

Akbaş, M. 2024. New data on the Early-Middle Viséan (MFZ10-MFZ13) foraminifers from the Hadim Nappe, southern Turkey: Biostratigraphic implications. *Micropaleontology*, 70(1): 61-82. http://doi.org/10.47894/mpal.70.1.04

Akbaş, M. 2025. Oncoidal Facies Across the Carboniferous-Permian Transition (Hadim Nappe, Southern Türkiye): Paleoenvironmental Implications and Correlations. *Geological Journal*. doi.org/10.1002/gj.70157

Akbaş, M., Okuyucu, C. 2025. Smaller foraminiferal assemblage of the Bashkirian Succession in the Hadim Nappe (southern Türkiye) and its Biostratigraphic Correlation. In Döyen, A. (Ed.), *Academic Studies in Geoscience*. Bidge, Ankara.

CM Thomas J. Algeo

University of Cincinnati, Cincinnati, Ohio, USA

Ongoing projects:

• Salinity variation in North American Carboniferous cyclothems.

• Productivity variation in Chinese Carboniferous cyclothems.

• Karst mineralization in Chinese Carboniferous limestones.

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Algeo, T.J., Wei, W., Sweet, D.E., 2025. Salinity variation in Carboniferous cyclothemic successions. *Chemical Geology*, 683, 122760.

Jiao, Y., Emmings, J.F., Zhou, L., Algeo, T.J., Feng, L., He, T., Liu, J., Zhang, D., Wang, J., 2025. Salinity-redox covariation in Mississippian Bowland Shale (Craven Basin, UK) controlled by eustasy and climate. *Chemical Geology*, 674, 122572.

Wang, Z., Li, Y., Algeo, T.J., Yu, W., He, X.F., 2024. Critical metal enrichment in Upper Carboniferous karst bauxite of North China Craton. *Mineralium Deposita*, 59(2), 237-254.

Xu, W., Li, Y., Algeo, T.J., Wang, Z., He, X.F., 2025. Stepwise aridification of the Late Paleozoic North China Craton. *Geoscience Frontiers*, 102114.

Zhong, Y., Chen, J., Liu, S.A., Yuan, C., Gao, B., Isson, T.T., Algeo, T.J., Sheng, Q., Chen, B., Luo, G., Wang, X.D., 2025. Zinc isotope perspective on global carbon cycling during the onset of the late Paleozoic icehouse. *Geology,* 53(2), 99-104.

Chair Markus Aretz

Géosciences Environnement Toulouse, Université de Toulouse, France

Accomplished projects:

• Organisation of GeoTolosa 2025 = 20th International Congress on the Carboniferous and Permien + VARISCAN Meeting.

• Rhenohercynian realm in Morocco: palaeo(bio)geography.

• Mid-Tournaisian anoxic event in the Montagne Noire.

Ongoing projects:

• Revision of the Devonian-Carboniferous boundary.

• Serpukhovian in the Pyrenees, especially in the type region of L. ziegleri, Belgium, and the global correlation of the lower boundary of this stage (collaboration with colleagues from NIGPAS, Berlin, Kiev, Oviedo).

• Corals from the Mississippian, especially of North Africa.

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Korn, D., Aretz, M., Franke, W., 2025. The continuation of the Rhenohercynian Realm into Africa. *Zeitschrift der Deutschen Gesellschaft für Geowissenschaften*, 176, 557-566.

Rakociński, M., Książak, D., Pisarzowska, A., Zatoń, M., Aretz, M., 2023. Weak and intermittent anoxia during the mid-Tournaisian (Mississippian) anoxic event in the Montagne Noire, France. *Geological Magazine,* 160, 831-854

Yao, L., Wang, H., Aretz, M., Lin, W., Wang, X., 2024. Upper Visean (Mississippian) coral biostromes during onset of the late Palaeozoic Ice Age: A record from the equatorial eastern Palaeotethys. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 642, 112148.

CM Ralph Thomas Becker

Institut für Geologie und Paläontologie, Universität Münster, Münster, Germany

Ongoing projects:

• Continuing efforts to install the Borkewehr section of the northern Rhenish Massif as the future basal Carboniferous GSSP (jointly with Sven Hartenfels, David De Vleeschouwer, Tomas Kumpan and others).

• New Tournaisian to middle Viséan ammonoid faunas from the Anti-Atlas (Tafilalt, Maïder) and Moroccan Meseta (Sidi Bettache Basin).

• Erdbach Limestone equivalent top-Tournaisian trilobites from the Jebel Begaa (eastern Tafilalt), with Peter Müller (as leading author).

• The Tournaisian Sidi Jilali Limestone of the Sidi Bettache Basin in the Moroccan Meseta (with Amine Talih and Zhor Sarah Aboussalam).

• Lithostratigraphy, conodont stratigraphy and carbonate microfacies of the shallow-water carbonate platform in the “An der Drucht” borehole, Ratingen-Lintorf, northwestern margin of the Rhenish Massif east of the Rhine (continuation of the M.Sc. project of Jonathan Schatz, jointly with Sven Hartenfels).

• New Lower Carboniferous ammonoids from Wulankeshun, Xinjiang, NW China (based on material collected by Wang Zhihong).

• Top-Mississippian (upper Serpukhovian) ammonoids from the Kubang Pasu Formation, Peninsular Malaysia (jointly with Meor Amir Hassan and Svetlana Nikolaeva).

• Revision of the Lower Carboniferous goniatite genus *Merocanites* (Prolecanitida) .

Accomplished projects:

• Palynological dating of youngest Carboniferous strata (Serpukhovian Tazlourt Formation) in the Tinerhir region of the Moroccan Sub-Meseta (lead by Amine Talih, see publications).

• Search for upper Viséan goniatites in the Al Gara region of the Moroccan Meseta (Sidi Mohamed nBen Abdallah locality of Termier & Termier 1951).

• Re-sampling at Oese and Borkewehr for D/C boundary palynomorphs (with Mercedes di Pasquo, no success at Borkewehr, as during previous attempts).

• New sampling of middle Tournaisian goniatites at Ain Aouda, south of Rabat (Moroccan Meseta).

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Becker, R.T., 2023. A unique pericyclid from the Viséan of the eastern Anti-Atlas (Morocco) and other Helicocyclinae n. subfam. (Goniatitida). *Paläontologische Zeitschrift*, 97(4), 807-819.

Becker, R.T., 2025. Devonian and Lower Carboniferous Global Events in the Central Variscan Orogen. In Linneman, U. (Ed.), *The Variscan Orogen of Central Europe, Geodynamics-Geochronology- Geobiology. Regional Geology Reviews*, Vol. II (Chapter 27), 1-90, Berlin (Springer).

Becker, R.T, Kaiser, S.I., 2023. The Devonian-Carboniferous Boundary in Morocco: Review and test of the “Devonian-Carboniferous Boundary calendar” of the International Working Group. *SDS Newsletter*, 38, 47-66.

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., Tminne, 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.

CM James E. Barrick

Texas Tech University, USA

Ongoing project:

• Mostly retired but finishing up a project on the Late Pennsylvania-Early Permian conodonts in north-central Texas.

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Barrick, J.E., Hogancamp, N.J., Rosscoe, S.J., 2023. Evolutionary patterns in Late Pennsylvanian conodonts. *Geological Society of London, Special Publications*, 535, 383-408.

Barrick, J.B., Nestell, M.K., 2025. *Ellisonia* Müller 1956 (conodont) does not occur in the Pennsylvanian or Early Permian: A reconstruction of the apparatus of *Boardmanites* n. gen. *conflexa* (Ellison, 1941). *Micro-paleontology*, 71, 295-304.

Barrick, J.E., Nestell, M.K., Wahlman, G.P., 2023. Conodont and fusulinid faunas across the Atokan-Desmoinesian boundary (Middle Pennsylvanian), upper part of the Sandia Formation and lower part of the Porvenir Formation, southern Sangre de Cristo Mountains, northern New Mexico, U.S.A. *New Mexico Museum of Natural History and Science, Bulletin,* 94, 1-47.

VM Silvia Blanco-Ferrera

University of Oviedo, Spain

• The research labour during the last year 2025, has mainly focused on the study of the Mississippian deep-water sections with ammonoids in several beds. The results confirmed the occurrence of *Declinognathodus bernesgae* and *D. praenoduliferus* in the late Serpukhovian. Two communications were introduced in the GeoTolosa 2025 at Toulouse (Sanz-López et al., 2025a, b). We were elaborating the results for a publication that can be printed in the next year.

• I was working some conodonts from the Tramaka Limestone (Belgium) collected by Dr. Markus Aretz and firstly obtained by Dr. Marie-France Perret-Mirouse. We hope that it will be soon published.

• We were working with Héctor Botella (University of Valencia) and a few students with chondrichthyan teeth from the Devonian-Carboniferous boundary to Viséan of the Cantabrian Mountains. A draft for a publication is in discussion time pre-submission. We are also elaborating a study on a tooth of *Carcharopsis* from the Serpukhovian.

• I collaborated as co-advisor in the Ph dissertation of Ramón Aaron Lara Peña, defended on November 4, 2024, at the National Autonomous University of Mexico (UNAM). Conodonts are mainly Permian in age, and the publication Lara-Peña et al. (2024) used methodology that combines conodont colour, texture, and microtexture on conodonts. Aarón Lara-Peña spent a stay in the University of Oviedo to acquire the terminology, descriptive methodology, and interpretations developed in the Cantabrian Mountains for apply to rocks from Sonora.

• The field trip focused on the search for the first species of *Idiognathoides* in deep water sections. We search for low abundance specimens in large samples to find the closet beds at its origination. We need good luck!

Work plans for 2026:

• The first is submitted publications of the work in 2005. The planned search is concerning to the collection of conodonts from the Serpukhovian and early Bashkirian in the Cantabrian Mountains. The collection of ammonoid specimens is priority close to the conodont samples. I think that a lot of works are in an advanced phase and publication is priority.

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Lara-Peña, R.A., Blanco-Ferrera, S., Torres-Martínez, M. A. & Navas-Parejo, P., 2024. CAI and microtextures of low-grade metamorphosed conodonts related to lithological and geological controls. *Palaeoword,* 33(4), 937-958.

Sanz-López, J., Nikolaeva, S.V. & Blanco-Ferrera, S., 2005b. New findings of Arnsbergian conodonts from the Cantabrian Mountains and the correlation of the GSSP of the mid-Carboniferous boundary. *Abstract book GeoTolosa 2025, News from the Paleozoic Worlds, 20th Intenational Congress on the Carboniferous and Permian, Variscan Meeting 2025 from the mantle to the biosphere*. 23-27 June 2025, Toulouse, 61-62.

Sanz-López, J., Nikolaeva, S.V., Zhuravlev, A.V. & Blanco-Ferrera, S., 2005a. Co-occurrence of the

Pennsylvanian conodont *Declinognathodus* with Serpukhovian ammonoids in the Mid-Carboniferous marine crisis Episode. *Abstract book GeoTolosa 2025, News from the Paleozoic Worlds, 20th Intenational Congress on the Carboniferous and Permian, Variscan Meeting 2025 from the mantle to the biosphere*. 23-27 June 2025, Toulouse, 63-64.

CM Alessandro Paolo Carniti
Nanjing University (School of Earth Sciences and Engineering), 210023 Nanjing, Jiangsu, China

Accomplished projects:

• "Mississippian mud mounds of Derbyshire (England, UK): facies architecture and biotic evolution". PhD Project developed at the Università degli Studi di Milano, Milano, Italy, under the supervision of Prof. L. Angiolini, Prof. G. Della Porta, Prof. M.H. Stephenson (BGS). The project was aimed to the fieldwork mapping, characterisation of lithofacies architecture, stratigraphic contexts and palaeontological study of brachiopod-rich mud mounds from the upper Visean (Brigantian) of Derbyshire. The mud mounds are decametre in size and consist of three lithofacies associations: basal bedded unit, massive core, inclined flank beds. Micrite dominates all three lithofacies associations, and derive both from transport by current (allomicrite) and in situ precipitation mediated the by microbial mats and decaying metazoan (sponge) tissues (Carniti et al., 2023). The skeletal association consist mostly of fenestellid bryozoans, brachiopods and calcified sponge spicules. The systematic study of the brachiopod fauna recognised a diversified fauna of 45 species, representing 36 genera and seven orders (Productida, Orthotetida, Orthida, Rhynchonellida, Spiriferida, Spiriferinida, and Terebratulida). The brachiopods are widespread in all lithofacies associations forming the mud mounds (mud mound basal unit, core, flank beds), and were contributing to the growth and stabilization of the mud mounds through their spines inserted in the mud and the accumulation of their shells (Carniti et al., 2022). Bivalves formed a minor component of the mud mound fauna (Carniti et al., 2025). The mud mounds developed below wave base after regional transgression, and their growth halted with regional regression and subaerial exposure.

• Brachiopods from the Tonka Formation, Serpukhovian, Carlin Canyon, Elko, Nevada, USA. The project was aimed to the study of a small but well-preserved brachiopod fauna collected from the Serpukhovian Tonka Formation near Elko, Nevada, USA. Systematic study of the brachiopod assemblage from the Tonka Formation revealed a rich association of 13 species, representing 12 genera and seven orders (Productida, Orthotetida, Orthida, Athyridida, Spiriferida, Spiriferinida, Terebratulida). The brachiopods are associated with a monospecific Vogegnathus postcampbelli conodont assemblage, and both prove a late Chesterian (Serpukhovian) age of the association. Comparison of the brachiopod association with similar faunas from the Chesterian of North America led to a review and update of the Upper Mississippian brachiopod biozonation in North America (Carniti et al., 2024).

Ongoing projects:

• "Variation of marine seasonality at low-latitudes during the Late Palaeozoic Ice Age: evidence from brachiopod sclerochemistry", funded by National Science Foundation China NSFC RFIS-I 2025 Grant W2533120.The project is aimed to the characterisation of the variation of $\Delta\delta^{18}O$ in thick-shelled brachiopods through the Mississippian to lower Cisuralian in successions in South China (Guizhou, Guanxi), e.g. *Gigantoproductus, Choristites*. The goal is to reconstruct the variation of marine ΔSST (Sea Surface Temperature) through the interval of initiation and waning of the main phase of the Late Palaeozoic Ice Age (LPIA), to understand how SST seasonality changes during times of greenhouse-icehouse and icehouse-greenhouse transition. Shell screening and collection of sclerochemistry data completed for Mississippian interval. Ongoing shell selection and screening for Pennsylvanian-Cisuralian interval.

• "Brachiopods across the Upper Mississippian – Lower Pennsylvanian: investigating the biotic response to the Late Palaeozoic Ice Age", funded by 76th China Postdoctoral Foundation 2024 Grant. The project is aimed to the systematic revision of brachiopod faunas from the Upper Mississippian to Lower Pennsylvanian interval in China, and their comparison with coeval faunas in the Western Tethys (Western Europe), to reconstruct the brachiopod faunal turnovers across the Serpukhovian-Pennsylvanian boundary, around the initiation of the main phase of the LPIA. Collection of Mississippian (Guizhou), Pennsylvanian (Xinjiang) and Cisuralian (Guizhou) brachiopod faunas on the field completEd. Systematic study ongoing.

• Revision of the brachiopod faunas from upper Visean (Asbian) "Cracoean" reefs in England and Belgium. The project is aimed to the systematic revision of the brachiopod fauna from the Asbian "Cracoean" reefs of North Yorkshire and Derbyshire in England and Visé in southern Belgium, which have a great value for the understanding of reef ecology and brachiopod evolution in the Mississippian. Despite a long tradition of studies, the faunas from Cracoean reefs are still in need of systematic and taxonomic revision. Visit to museum collections in the UK (NHM London, Sedwick Museum Cambridge) to investigate collections of brachiopods from the Cracoean reefs in England completed. One paper on linoproductids submitted. Study of productids ongoing.

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Carniti A., Della Porta G., Banks V., Stephenson M., Angiolini L., 2023. Revisiting the upper Visean mud mounds from Derbyshire (UK): the role of brachiopods in their growth. *Facies*, 69(3), doi.org/10.1007/s10347-023-00663-w

Carniti A., Henderson C., Angiolini L., 2024. Brachiopods from the Serpukhovian Tonka Formation of Carlin Canyon, Elko, Nevada (USA): systematics and biostratigraphy. *Palaeoworld*, 33(6), 1594-1619.

CM Xiaolin Chang

Chengdu University of Technology, P.R. China

Accomplished projects:

• We reconstruct variation of redox conditions using detailed analysis of size distributions and morphologies of framboidal pyrites collected from six sections spanning the uppermost Devonian through Middle Permian in the Baoshan Block, which is a part of the Cimmerian Continent that originated from Gondwana during the Late Paleozoic. Our research shows that the redox conditions in the Baoshan Block during the Early Carboniferous can be compared with those in various regions worldwide, whereas its biotic composition, including biodiversity and abundance, is primarily correlated with those of Eurasia. The redox condition during the middle and late Tournaisian was dominated by stable dysoxia. In contrast, the redox conditions during the Visean became a highly unstable, with frequent anoxic and euxinic events when pulses of the ice age began or expanded. Similarly, the Sakmarian, which is the peak of the Ice Age, experienced frequent anoxic/euxinic events, likely caused by glacio-eustatic sea-level fluctuations and intensified upwelling. The characteristic brachiopod-bryozoan-crinoid assemblages and low-diversity of biota appear linked to the anoxic/euxinic conditions during this age. Following the end of the glaciation during late Kungurian-Wordian, the Baoshan block once again experienced predominantly stable dysoxia that coincided with relatively abundant fauna. This study suggests that both global warming and cooling can trigger anoxic events via distinct pathways, thereby resulting in a spatially heterogeneous redox landscape on a global scale. The redox conditions of upper slope to platform settings, as exemplified by the Baoshan Block, show sensitivity to such environmental changes.

Ongoing projects:

• Over the past two years, I have continued my research on paleoceanography of Carboniferous, with a particular focus on the magnitude and process of changes in the redox conditions and the evolutionary events on the

basis of continuous and precisely established stratigraphic framework of the Carboniferous sections in the South China. We aim to conduct a high-resolution reconstruction of paleo-oceanic redox conditions throughout the long-term intervals of the Carboniferous, as well as across key stratigraphic boundaries, including the Late Devonian–Early Carboniferous boundary and the Kasimovian–Gzhelian boundary. Particular attention will be given to the redox variations associated with major biotic evolutionary events.

• I am currently engaged in several ongoing research projects that focus on Carboniferous paleo–oceanic redox evolution, biotic events, and their stratigraphic significance in South China. These studies integrate sedimentological, geochemical, and paleobiological approaches and aim to improve our understanding of environmental dynamics during the Mississippian and Pennsylvanian, particularly in relation to the Late Paleozoic Ice Age (LPIA).

• Redox Conditions and Biotic Events of the Pennsylvanian in South China

• This project examines the magnitude and processes of redox changes and their links to evolutionary events during the Pennsylvanian. The research is based on a continuous and precisely constrained stratigraphic framework consisting of three slope-facies sections and one shallow-platform section in southern Guizhou.

• We apply statistical analyses of pyrite framboid size distributions, together with carbon and sulfur isotope geochemistry (δ^{13}Ccarb, δ^{34}SCAS, δ^{34}Spy), to establish a long-term, high-resolution reconstruction of Pennsylvanian redox conditions. In addition, we integrate paleobiodiversity patterns using existing global databases such as the GBDB, PBDB, and OneStratigraphy.

• By focusing on redox variations associated with three major evolutionary events during the Pennsylvanian, this study aims to clarify the temporal patterns of paleo–oceanic redox fluctuations and assess their relationships with biotic evolution under the climatic influence of the Late Paleozoic Ice Age.

• Redox Environment Changes During the Onset of the Late Paleozoic Ice Age in South China

• A second project investigates redox evolution during the Mississippian and early Pennsylvanian, corresponding to the onset of the LPIA. The study involves six Carboniferous sections in South China—three slope-facies and three shallow-platform sections—all of which possess continuous and well-constrained stratigraphic frameworks.

• This work integrates pyrite framboid statistics, in situ NanoSIMS δ^{34}Spy analyses, and biodiversity data from existing paleontological databases to reconstruct high-resolution redox histories for this critical climatic transition. A particular emphasis is placed on understanding redox environmental changes during the Mid-Carboniferous bioevent and exploring the connections among the initiation of the LPIA, ecosystem evolution, and paleo–oceanic redox dynamics.

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Chang, X.L., Wang, X.D., Shen, S., et al. 2025. Unraveling Permo-Carboniferous Redox Dynamics of the Gondwana-Originated Baoshan Block and Implications for the Late Paleozoic Ice Age. *Global and Planetary Change*, 255 (105109), 1-14.

Wang, H., Lai, J.K., Chang, X.L., 2025. Paleooceanographic Redox Environment from the Carboniferous to Permian in the Baoshan area, Western Yunnan. *Acta Sedimentologica Sinica*, 43(2), 439-452.

Vice-Chair Jitao Chen

State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing, China

Ongoing projects:

• Integrative stratigraphy of the Devonian-Carboniferous boundary in South China

• Progress on Kasimovian-Gzhelian boundary global warming and marine anoxia event. The global warming event across the Kasimovian-Gzhelian boundary (KGB) in the late Pennsylvanian was marked by prominent

perturbations of global biogeochemical cycles, accompanied by abrupt global warming, widespread marine anoxia, and a distinct biodiversity loss. However, the evolution of marine primary productivity and redox conditions during this short-lived warming event has not yet been explored from the perspective of marine nitrogen cycle. We reported high-resolution sedimentary δ15N, δ13Corg, and δ13Ccarb records from the Luodian Basin, South China during the KGB warming event. The dramatic negative δ15N excursion (by ~7‰) immediately below the KGB coincides with the previously reported negative shift in δ13Corg, δ13Ccarb, and δ238U, and continued increase in atmospheric pCO2 and SSTs suggesting the potential linkage among these proxies. The pronounced negative shift in δ15N most likely resulted from enhanced nitrogen fixation, which was promoted by increased nitrogen loss due to denitrification during the warming-associated marine anoxia. The dataset demonstrates the response of the marine nitrogen cycle to the warming episodes in the icehouse climate and provides a reference case for the future study of the ocean nitrogen cycle in an interglacial climate.

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Chen, J., Li, S., Zhang, S., Isson, T., Dahl, T. W., Planavsky, N.J., Zhang, F., Wang, X. D., Shen, S. Z., Montanez, I. P., 2025. Repeated occurrences of marine anoxia under high atmospheric O2 and icehouse conditions. *PNAS*, 122(26), e2420505122.

Yang, W.L., Chen, J., Yue, C.S., Zhang, J.P., Qi, Y.P., Wang, X.D., Shen, S.Z., 2026. Enhanced nitrogen fixation as a result of short-lived global warming and marine anoxia in the Late Pennsylvanian icehouse climate. *Global and Planetary Change*, 256, 105134.

VM Pedro Cozar

Instituto de Geociencias CSIC-UCM, Spain

Ongoing projects:

• The improvement of the chronostratigraphical scale in Britain is still a big challenge, integrating macrofauna, microfauna, glacioeustasy and other markers classically defined in the British literature, and to get precise international correlations with other substages defined elsewhere. In the past two years, most work has been focused on the definition of the boundary Chadian-Arundian regional substages, and in the recognition of the base of the Visean in Britain. The revision of multiple classical sections in order to get a continuous Visean succession without repetitions allowed so far, to get sections from the base of the Visean up to the upper part of the middle Visean, and from the top of the early Asbian to the lower Brigantian (late Visean). Biostratigraphical analyses have been carried out in successions from Northern Ireland, Scotland, and northern England. The establishment of a high-resolution biostratigraphy has been used as the basis for the study of the hyperactive geomagnetic field in the late Asbian in northern England, its relationship with the common subaerial exposure, as well as to propose an astrological duration for the late Asbian.

• Research in progress is also focused on other countries where I have previously worked, being mainly focused on the isotopes analyses and rare earth elements in China to compare with global climatic changes, Raman spectroscopy with organic matter in the Moroccan Meseta in order to decipher the Variscan evolution of this sector of Morocco.

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Cózar, P., Somerville, I.D., 2025. Upper Viséan foraminiferal and algal diversity at Benburb, Northern Ireland, as a tool of high-resolution biostratigraphy, and correlation of Late Viséan-Early Serpukhovian successions in Britain and Ireland. *Lethaia*, 58(1), doi.org/10.18261/let.58.1.8

Cózar, P., Somerville, I.D., 2025. Testing the correlation of marine bands of the Carboniferous Lower Limestone Formation (Midland Valley of Scotland) using foraminiferal quantitative biostratigraphy. *Earth and Environmental Science Transactions of the Royal Society of Edinburgh*, doi.org/10.1017/S1755691025100741

Cózar, P., Díaz-Martínez, E., Carlotto, V., 2024. Foraminiferal biostratigraphy of the Pennsylvanian Cerro Prieto Formation, Amotape Mountains, NW Peru: correlation with the Central Andean Basin.

Journal of the South American Earth Sciences, 146, 105086, doi.org/10.1016/j.jsames.2024.105086

Cózar, P., Hounslow, M.W., Somerville, I.D., 2025. Relocate the base of the Arundian?: a re-evaluation from south Cumbrian sections and implications for British and Irish Lower Carboniferous successions. *Journal of the Geological Society, London*, 182, jgs2024-124, doi.org/10.1144/jgs2024-124

Hounslow, M.W., Biggin, A.J., Cózar, P., Somerville, I.D. Kamenikova, T., Sprain, C.J., 2024. A hyperactive geomagnetic field in the late Visean (early Carboniferous), from the Late Asbian type section at Trowbarrow Quarry (northwest England), UK. *Geochemostry, Geophysics, Geosystems*, 25, e2023GC011282, doi.org/10.1029/2023GC011282

Hounslow, M.W., Cózar, P., Somerville, I.D., Biggin, A.J., 2024. Rock magnetic-based cyclic expression in late Visean ramp carbonates and an astrochronology for the late Asbian from northwest England. *Paleoceanography and Paleoclimatology,* 39, e2023PA004772, doi.org/10.1029/2023PA004772

Leprêtre, R., El Houicha, M., Schito, A., Ouchaou, R., Chopin, F., Cózar, P., 2024. Thermal studies on the Lower Carboniferous basins of Khenifra and Qasbat-Tadla, Morocco: what do they teach us about the pre-Variscan stages in NW Africa? *Journal of African Earth Sciences*, 219, 105406. doi.org/10.1016/j.jafrearsci.2024.105406

CM Vladimir Davydov

Boise State University (retired Emeritus Professor)

Ongoing projects:

• Carboniferous and Permian fusulinids from the Pantalassan Cache Creek Terrane.

• Method of estimating sea-surface paleotemperatures through biotic proxies: A case study in Upper Paleozoic paleoclimatic, paleogeographic, and paleotectonic reconstructions of Siberia.

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Davydov, V.I., Karasev, E.V., Popova, E.V., & Poletaev, V. I., 2024. Method of estimating sea-surface paleotemperatures through biotic proxies: A case study in Upper Paleozoic paleoclimatic, paleogeographic and paleotectonic reconstructions of Siberia. *Ecology and Evolution*, 14(11), e70265.

Secretary Julien Denayer

University of Liège, Belgium and Geological Survey of Wallonia, Belgium

Ongoing projects:

• Together with Svetlana Nikolaeva, we are describing the fauna from Serpukhovian sections in Kazakhstan; I worked on the rugose corals, among which several will soon be published as new species.

• Recent discovery of very early Tournaisian rugose corals with axial structure triggered new interest on the origin of these structures and ongoing revision of this group of corals.

• The work on the Devonian-Carboniferous Boundary in Belgium and neighbouring countries is ongoing, with cyclostratigraphic and orbital forcing approaches conducted by Anne-Christine da Silva and her team. Besides, a taphonomical approach on the fossil material from the Hangenberg Sandstone event equivalent (together with B. Mottequin, C. Crônier, M. Amler, J. Friedel, C. Corradini, L. Hance and E. Poty) has been submitted.

• Two PhDs, supervised by Anne-Christine (with me as referee), on the cyclostratigraphic and orbital forcing of the Tournaisian and Visean of Belgium started last years.

• With the Belgian commission on stratigraphy, the Lithostratigraphic scale of lower Carboniferous is being revised.

• Dinantian heritage stones are being investigated together with Francis Tourneur, in order to localise historical quarries that yielded the material present in prestigious old buildings.

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Aretz, M., Nardin, E., Christophoul, F., Denayer, J., 2024. Bassins sédimentaires et évolution du relief associés au cycle varisque en France et dans les pays limitrophes. In Denèle, Y., Berger, J. (Eds), *La chaîne varisque en France 2, évènements magmatiques, métamorphiques et tectoniques tardifs et enregistrement sédimentaire*. ISTE Editions, London, collection Encyclopédie Sciences, Géosciences, Dynamique de la lithosphère continentale, pp. 135-216.

Denayer, J., Mottequin, B., 2023. The Devonian and Carboniferous of southern Belgium. *Fourth International Congress on Stratigraphy – Strati*

2023, 14th-16th July 2023, Lille, France, Filed guide-book, 1-54.

CM Mercedes di Pasquo

CONICET, Argentina

Ongoing projects:

• I developed activities in collaboration with colleagues from Argentina and other South American countries, the USA, Mexico, India, and elsewhere, and publications on Paleozoic micro- and megafloras were also presented at several Congresses. Several works on Devonian-Carboniferous palynofloras are highlighted, including Streel et al. (2025); micro (including megaspores) and megafloras of Devonian to Lower Mississippian Strata, Northern Wyoming and Southern Montana, USA (Hu et al. 2024), Argentina (Milana & di Pasquo, 2023; di Pasquo & Milana, 2023), Bolivia (Quetglas et al., 2023; di Pasquo et al., 2024), Brazil (Iannuzzi et al., 2022, 2023), and Turkey (Özbek et al. 2024).

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Di Nardo J.E., di Pasquo, M., Martínez, M., 2024. The latest Carboniferous-earliest Permian palynological assemblage from the glaciogenic Sauce Grande Formation, Claromecó Basin, Argentina: Implications for the local palynostratigraphic scheme. *Review of Palaeobotany and Palynology*, 331, 105203.

di Pasquo, M., Cisterna, G.A., Calle Salcedo, A.A., López, S., Grader, G., Di Nardo, J., Kavali, P., Iannuzzi, R., Sterren, A.F., Gomez, J., Ticona, Y., Silvestri, L., 2024. The Apillapampa section (Bolivia): field trip accomplished in July 2023-a report of “Gondwana to Euramerica Correlations Working Group". *Permophiles*, 76, 29-33.

di Pasquo, M., Gómez, J., Ticona, Y., 2024. Palynostratigraphy of the Macharetí and Mandiyutí groups (Carboniferous), northern Argentina and southern Bolivia. Part 1: stratigraphy, biostratigraphy, and palynomorph rework. Part 2: Catalog of indigenous species. *Boletín ALPP*, 24, 31-419.

di Pasquo, M., Milana, J.P., 2023. New age, stratigraphic and paleoenvironmental interpretation of the Loma de los Piojos Formation (San Juan Province, Argentina) based on new palynologic and stratigraphic information. *Sedimentary Geology*, 454, 106471.

Hu, M., Myrow, P., Fike, D., di Pasquo, M., Zaton, M., Fischer, W., Coates, M., 2024. Depositional History of Devonian to Lower Mississippian Strata, Northern Wyoming and Southern Montana. *Bulletin of Geological Society of America, 4*54, 379983. doi.org/10.1130/B36728.1.

Iannuzzi, R., di Pasquo, M., Vesely, F.F., Scherer, C.M.S., Andrade, L.S., Mottin, T., Kifumbi, C., 2023. Pennsylvanian Glacial Cycles in Western Gondwana: an overview. In Lucas, S.G., DiMichele, W.A., Opluštil, S., Wang, X. (Eds), Ice Ages, Climate Dynamics and Biotic Events: the Late Pennsylvanian World. *Geological Society, London, Special Publications*, 535, 101–116. doi.org/10.1144/SP535-2022-342.

Iannuzzi, R., Matsumura, W., di Pasquo, M., 2022. Mississippian Plants from the Parnaíba. In Iannuzzi, R., Rößler, R., Kunzmann, L. (Eds), *Brazilian Paleofloras. From Paleozoic to Holocene*. Springer Nature Switzerland AG,doi.org/10.1007/978-3-319-90913-4_4-1

Milana, J.P., di Pasquo, M., 2023. Carboniferous marine deposits of the Tontal section suggest that no Protoprecordillera existed along the Western Gondwana margin. *Sedimentary Geology*, 454, 106458.

Mishra, A., Kavali, P.S., di Pasquo, M., Saha, O., 2025. Integrated Transmitted light microscope, Confocal Scanning Electron microscope, and SEM studies reaffirm the long-debated taxonomic status of Parasaccites Bharadwaj and Srivastava 1964 as a junior synonym of *Cannanoropollis* Potonié and Sah 1960. *Palaeontographica Abt B*. (in press).

Mishra, A., Kavali, P.S., di Pasquo, M., Saha, O., Mathews, R.P., 2025. Morphological re-evaluation of the morphogenera *Callumispora* Bharadwaj and Srivastava 1969 and *Punctatisporites* Ibrahim 1933 emend. Potonié and Kremp 1954 and their taxonomic implications. *Revue de Micropaleontologie*, 90, 100877. doi.org/10.1016/j.revmic.2025.100877

Quetglas, M.A., di Pasquo, M., Macluf, C., 2023. Taxonomy of Early Mississippian gulate megaspore assemblage from northern Bolivia. *Review of Palaeobotany and Palynology*, 318, 104971 doi.org/10.1016/j.revpalbo.2023.104971

Verde, M., Guimarães Netto, R., Azurica, D., Lavina, E.L., di Pasquo, M., 2022. Revisiting the supposed oldest bilaterian trace fossils from Uruguay: Late Paleozoic, not Ediacaran. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 602, 111158

CM Sarah Esteban Lopez

Geological Survey of North Rhine-Westphalia, Germany

Accomplished projects:

• Construction of a 3D-Modell of the northern part of the eastern Rhenish Mountains (model was integrated in the geothermal online-portal of the Geological Survey of NRW), the lower Carboniferous "Kohlenkalk" and the Devonian "Massenkalk" were modelled.

Ongoing Projects:

• Construction of a 3D-Modell of the subsurface of the eastern Rhenish Mountains, the model will be integrated in the geothermal online-portal of the Geological Survey of NRW, including the horizons Lower Devonian, Middle Devonian, Upper Devonian, Massenkalk/Flinz and lower Carboniferous .

• homogenization and simplification (where possible) for the stratigraphic/lithologic units of the Lower Devonian "Obere Siegen-Schichten" in Northrhine Westfalia in preparation for the "Generallegende".

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Esteban Lopez, S., 2024. The mid-Tournaisian Event in the Hörre Nappe – conodont fauna and sequence stratigraphy from the Gladenbach section (Gladenbach Formation, eastern Rhenish Massif). *Palaeobiodiversity and Palaeoenvironments*, 104, 735-752.

CM Jerzy Fedorowski

Adam Mickiewicz University, Poland (emeritus)

Ongoing projects:

• Two new genera of the dissepimented Rugosa from the Pennsylvanian and Permian of the Glass Mountains, SW Texas. The North American dissepimented solitary rugose corals from the strata mentioned are abundant and extremely variable, but remain almost unknown by comparison to their abundance. The paper now in progress is the third from the series published by Fedorowski and Chwieduk (Acta Geologica Polonica, 74:3, 2024 and 75:3, 2025). It deals with corals resembling both Aulophyllidae and Neokoninckophyllidae and we attempt to reconstruct their provenience and mutual relationships.

• The paper summarizing my long term studies on the Bashkirian Rugosa from the Donets Basin, Ukraine against a background of the general turnover of the Rugosa is published with the Palaeogeography, Palaeoclimatology, Palaeoecology 626 (2023) 111683.

CM Holger Forke

Geoservices for Wellsite Biostratigraphy/Biosteering, Berlin, Germany

I have been a former member of the Task Group to establish the Moscovian-Kasimovian. Boundary, and the Kasimovian-Gzhelian Boundary which was chaired by Katsumi Ueno. I was also a former voting member of the SCCS until 2016. Due to my commitments with the wellsite work (Late Permian to Jurassic), my Carboniferous research activities are minimised in the last years.

Accomplished projects:

• Previous projects were mostly concerned with the Geopark Karnische Alpen (Geoparco Alpi Carniche) at the Austrian/Italian border (https://www.geopark-karnische-alpen.at). My colleague Hans-Peter Schönlaub had initiated a critical review of published work since the late 1960s. The book summarises the major milestones in the research of this extraordinary geological heritage area covering a nearly complete succession of sedimentary sequences from Ordovician to Triassic. The book contains more than 400 figures, plates and graphics, and several renowned national and international researchers had contributed with fossil collections and short anecdotal stories. The book is not only aimed at geoscientists but also at the interested public. It also contains a detailed description of the established Geotrails in the region. More recently, I was asked to prepare a review of Devonian-Mississippian foraminifera in the Rhenohercynian Mts. in Germany, which is currently under review (editors: Sven Hartenfels, Christoph Hartkopf-Fröder, and Peter Königshof).

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Forke, H.C. (submitted). Devonian/Carboniferous foraminifera from the Rhenish Mts. (Germany): State of the art and outlook. *Palaeobiodiversity and Palaeoenvironments*.

Schönlaub, H.P., Forke, H.C., 2021. *Das Geologische Erbe der Karnischen Alpen – Forschungsergebnisse und Anekdoten zur Erdgeschichte.* Verlag des

Naturwissenschaftlichen Vereins für Kärnten, Klagenfurt am Wörthersee, 304 p.

CM Robert Gastaldo

Colby College, USA, emeritus

Ongoing projects:

• Bolsovian forests of the Clifton Formation, New Brunswick, Canada, with Matthew Stimson [NB Museum, Canada], and Michael Rygel and Page C. Quinton (SUNY-Potsdam, USA), and Cortland Eble (Kentucky Geological Survey), amongst others.

• Continental interior fluvial and interfluvial sedimentology of the Clifton Formation

• Petrographic characterization and palynological biostratigraphy of thin Clifton Formation coals, Bay of Chaleur, New Brunwick

• Taphonomy of successive, erect lycopsid forests rooted in coal and clastic paleosols

• Invertebrate and vertebrate fossil assemblages preserved in hollowed lycophyte trunks and bole

• Experimental sedimentology of sandstone-cast logs, Black Warrior Basin, Alabama

• Characterization of Carboniferous megafloral elements in the Mississippian of the Maritimes Basin, Canada, and Pennsylvanian of the Black Warrior Basin, USA.

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DiMichele, W.A., Gastaldo, R.A., Lucas, S.G., Pfefferkorn, H.W., 2025, Climate, not transport from "uplands" or "extrabasinal lowlands," is the cause of drought-tolerant terrestrial organisms in the late Paleozoic fossil record. *Palaeogeography, Palaeoecology, Palaeoclimatology*, 676, 113160, doi.org/ 10.1016 /j.palaeo.2025.113160

Gastaldo, R.A., 2025. *Sweetea milowensis* gen. et sp. nov., a Middle Mississippian (Viséan) pteridosperm preserved in a coastal marsh setting, Hartselle Sandstone, Alabama. *Review of Palaeobotany & Palynology*, 343, 105399. doi.org/ 10.1016/j.revpalbo.2025.105399

Gastaldo, R.A., Gensel, P., Glasspool, I., Hinds, S.J., King, O.A., Park, A.F., Stimson, M.R., 2024. To rush into the secret house of death; the fate of a Tournaisian plant. *Geology*, 52, 784-788. doi.org/ 10.1130/G52348.1

Gastaldo, R.A., Gensel, P., Glasspool, I., Hinds, S.J., King, O.A., McLean, D., Park, A.F., Stimson, M.R., Stonesifer, T., 2024. Enigmatic fossil plants with three-dimensional, arborescent-growth architecture from the earliest Carboniferous of New Brunswick, Canada. *Current Biology*, 34, 1-12. doi.org/ 10.1016/j.cub.2024.01.011

CM Charles Henderson

Department of Earth, Energy and Environment; University of Calgary, Calgary, AB, CANADA

Ongoing projects:

• Most of my Lower Permian projects include the Gzhelian as well. Such projects are centred in Nevada, Utah, Arizona, New Mexico, and West Texas in the USA and in Alberta and British Columbia, Canada. My role in these collaborative projects is conodont biostratigraphy.

• Wrapping up long-term projects in the Canadian Arctic on the Moscovian through the Lower Permian. Among other projects, I have been reviewing conodont material from the Hare Fiord Formation that I collected a long time ago as well as legacy material from Bender regarding the base-Moscovian.

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Beauchamp, B., Gonzalez, D.C., Henderson, C.M., Baranova, D.V., Wang, H.Y., Pelletier, E., 2022. Late Pennsylvanian-early Permian tectonically-driven stratigraphic sequences and carbonate sedimentation along northern margin of Sverdrup Basin (Otto Fiord Depression), Arctic Canada. In Henderson, C.M., Ritter, S., Snyder, W.S. (Eds), Late Paleozoic and Early Mesozoic Tectonostratigraphy and Biostratigraphy of western Pangea. *SEPM, Special Publication*, 113, 226-254. doi.org/10.2110/sepmsp.113.12

Beauchamp, B., Henderson, C.M., Dehari, E., Waldbott von Bassenheim, D., Elliot, S., Calvo Gonzalez, D., 2022. Carbonate Sedimentology and Conodont Biostratigraphy of Late Pennsylvanian-Early Permian stratigraphic sequences, Carlin Canyon, Nevada: new insights into the tectonic and oceanographic significance of an iconic succession of the Basin and Range. In Henderson, C.M., Ritter, S., Snyder, W.S. (Eds), Late Paleozoic and Early Mesozoic Tectonostratigraphy and Biostratigraphy of western Pangea. *SEPM Special Publication*, 113, 34-71. doi.org/10.2110/sepmsp.113.12

Huttenlocker, A.K., Henderson, C.M, Berman, D.S., Elrick, S.D., Henrici, A.C., Nelson, W.J., 2020. Carboniferous-Permian conodonts and the age of the lower Cutler Group in the Bears Ears National

Monument and vicinity, Utah, USA. *Lethaia*, 54(3), 330-340.

VM Nicholas J. Hogancamp

The Bedrock and Earth History Research Organization (BEHRO), Pennsylvania, USA; Binghamton University, Department of Earth Sciences, New York, USA

Accomplished projects:

• Morphometric analysis and taxonomy of the *Idiognathodus sagittalis* Kozitskaya, 1978 group and the *I. swadei–I. heckeli–I. turbatus* lineage.

• Conodont biostratigraphic analysis of Pennsylvanian marine units in the Black Hills, Williston Basin, North America.

• Summary paper discussing current ideas concerning the evolutionary patterns in Late Pennsylvanian conodonts.

Ongoing projects:

• Carboniferous conodont taxonomy and biostratigraphy. A suite of projects and collaborations focused on North American faunas and comparisons to other regions. Current focus on Moscovian, Kasimovian, and Tournaisian groups.

• Conodont biostratigraphy of the Appalachian Basin. Taxonomic and biostratigraphic review of faunas from the many marine units across the basin that supports chronostratigraphy and correlation efforts. Current projects on Moscovian and Kasimovian faunas and stratigraphy in Pennsylvania and Ohio.

• Conodont morphometrics. Collaborating and supporting research that incorporates morphometrics to help solve biostratigraphic and taxonomic problems in conodonts. Current projects on *Idiognathodus* species.

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Barrick, J.E., Hogancamp, N.J., Rosscoe, S.J., 2023. Evolutionary patterns in Late Pennsylvanian conodonts. *Geological Society, London, Special Publications*, 535, 383-408.

Hogancamp, N.J., 2024. Conodont biostratigraphy and biofacies of marine intervals in the Pennsylvanian middle Minnelusa Formation in the Black Hills region, South Dakota, U.S.A. *Stratigraphy*, 21(3), 243-276

Peng, Y., Hogancamp, N.J., Hu, K., 2025. Morphometric analysis and taxonomy of the *Idiognathodus sagittalis* Kozitskaya, 1978 group and the *I. swadei–I. heckeli–I. turbatus* lineage (Conodonta, early Kasimovian, Pennsylvanian). *Journal of the Geological Society*, 182(5), jgs2024-286.

VM Mark W Hounslow

Lancaster and Liverpool Universities, United Kingdom.

Ongoing projects:

• Jointly with Pedro Cózar and Ian Somerville we have been investigating recently the early Visean (Chadian and Arudian) carbonates of the south Cumbrian shelf (UK). This has involved an extensive study of sections to try and piece together a composite through this interval. Pedro has been working on the foraminifera succession through this interval. One outcome of this has been Cózar et al. (2025) which suggests a better way to define the base of the Arundian and a clearer international correlation of this regional stage. This work has also allowed a much better understanding of the chronostratigraphy of one magnetostratigraphic-study section (Meathop Quarry) which cover the late Chadian, through the base of the Visean and into the latest Chadian. In the coming year these datasets will be integrated and publishEd. These will complement the two existing published studies (as below) on the late Asbian.

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Cózar, P., Hounslow, M.W., Somerville, I.D., 2025. Relocate the base of the Arundian? A re-evaluation from south Cumbrian sections and implications for British and Irish Lower Carboniferous successions. *Journal of the Geological Society*, 182(1), jgs2024-124. doi.org/10.1144/jgs2024-12

Hounslow, M.W., Biggin, A.J., Cózar, P., Somerville, I.D., Kamenikova, T., Sprain, C.J., 2024. A hyperactive geomagnetic field in the late Visean (Early Carboniferous) from the late Asbian stratotype section in northwest England, UK. *Geochemistry, Geophysics, Geosystems*, 25(4), e2023GC011282. doi.org/10.1029/2023GC011282

Hounslow, M.W., Cózar, P., Somerville, I.D., Biggin, A.J., 2024. Rock magnetic-based cyclic expression in late Visean ramp carbonates and an astrochronology for the late Asbian from Northwest England. *Paleoceanography and Paleoclimatology*, 39(3), e2023PA004772. doi.org/ 10.1029/2023PA004772

VM Keyi Hu

Nanjing University, P.R. China

Ongoing projects:

• Over the past two years, I have continued my research on Carboniferous conodonts and integrated stratigraphy, with a particular focus on the Moscovian–Kasimovian boundary (MKB). Several conodont species including *Idiognathodus sagittalis, I. heckeli, I. turbatus*, and *Swadelina subexcelsa* have been proposed as potential markers for the MKB, and their species concepts, evolutionary pathways, and geographic distributions have been discussed previously. To further assess their utility and identify additional correlation proxies, my research group conducted a multi-proxy study of the MKB interval in the Naqing, Shanglong, and Narao sections in southern Guizhou, South China. Our work integrated conodont biostratigraphy, high-resolution strontium and oxygen isotope analyses of conodont apatite, and bulk-rock carbon isotope stratigraphy. This approach led to the recognition of *Sw. subexcelsa* and *I. turbatus* in all three sections, with *I. heckeli* identified in the Naqing and Narao sections (Wang Y.X. et al., 2025). Moreover, we identified chemostratigraphic evidence that supports the use of isotopic shifts as supplementary markers for the MKB: minor positive excursions in $\delta^{13}C$ and $^{87}Sr/^{86}Sr$ coincide with the First Appearance Datum (FAD) of *I. heckeli*, while a distinct negative $\delta^{13}C$ shift accompanied by a minor $\delta^{18}O$ negative shift aligns with the FAD of *Sw. subexcelsa*. In collaboration with Nicholas J. Hogancamp, my student and I applied morphometric methods to investigate taxonomic distinctions between *Idiognathodus sagittalis* and the *I. swadei–I. heckeli–I. turbatus* lineage (Peng et al., 2025). Our findings indicate that *I. sagittalis* comprises four distinct morphotypes that exhibit platform developmental trends analogous to those observed in the I*. swadei–I. heckeli–I. turbatus* lineage. Given that the taxonomy and evolution of both *I. sagittalis* and *Sw. subexcelsa* require further clarification, we propose *I. heckeli* as the most suitable species for defining the global MKB, based on its broad geographic distribution, well-documented evolutionary pathway, and clear diagnostic characteristics. The results have been presented by Xiangdong Wang at the Carboniferous Congress held in Toulouse in June 2025.

• Beyond GSSP-related research, I collaborated with colleagues from Nanjing University to systematically compile and synthesize data on Carboniferous strata and biota from the Tibetan Plateau and adjacent regions (Hu et al., 2024). This work is critical for constructing an integrated stratigraphic framework that supports regional correlation and paleogeographic reconstruction, thereby improving our understanding of the Gondwana breakup and the evolution of the Paleo-Tethys Ocean during the Late Paleozoic. In a separate study with Yuping Qi, we described several new Moscovian species of *Idiognathodus* from the Naqing section, offering new insights into the evolutionary trajectory of this genus (Hu et al., 2025). Additionally, in cooperation with Nicholas J. Hogancamp, our team employed quantitative approaches, including morphometrics and cladistics, to investigate the Mississippian genus *Gnathodus*. These analyses revealed spatiotemporal evolutionary trends within the genus and helped refine the species concept of *G. pseudosemiglaber* (Wang W.Q. et al., 2025a, 2025b). Relatedly, we also studied Lower Mississippian conodont biostratigraphy and biofacies of the Baoshan Block (Wang W.Q. et al., 2024). I have also collaborated with Alexander O. Ivanov on a study of new Carboniferous fish assemblages from South China and Western Kazakhstan, which documents the first reliable record of Pennsylvanian fishes in China (Ivanov and Hu, 2025).

• I am currently engaged in several ongoing projects, including studies of Bashkirian–

Moscovian conodonts from both N and S China, the development of a Carboniferous stratigraphic standard for China, and research on Pennsylvanian fusulinids from slope sections in South China. My work on Bashkirian–Moscovian conodonts focuses on the *Streptognathodus expansus* group, the *Idiognathodus podolskensis* group, and several new morphotypes, all of which display considerable morphological diversity but remain taxonomically ambiguous. Together with Lance L. Lambert, Nicholas J. Hogancamp, and Yuping Qi, I plan to conduct a detailed taxonomic and phylogenetic analysis of these forms to solve their taxonomy and to enhance their biostratigraphic correlation potential in the Bashkirian and Moscovian, in which a global standard conodont zonation is yet to be established.

• The "Carboniferous Stratigraphic Standard of China" project, initiated by the All China Commission of Stratigraphy, involves comprehensive compilation, review, and revision of litho-, bio-, chemo-, and chronostratigraphic data from Chinese Carboniferous sequences. This effort is part of a broader national initiative to establish standard stratigraphic frameworks for the Archean, Proterozoic, and Paleozoic of China. In addition, I am working with Yukun Shi and a jointly supervised student to investigate Pennsylvanian fusulinids from the Narao, Shanglong, and Naqing sections. Our goal is to develop a correlation scheme between deep-water conodont zones and shallow-water fusulinid zones, with particular emphasis on refining stage boundaries within the Pennsylvanian. Preliminary results from this fusulinid research were presented by Xinyi Ma at the Carboniferous Congress held in Toulouse in June 2025.

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Hu, K.Y., Qi, Y.P., Wei, S.Z., 2025. New Moscovian *Idiognathodus* (conodont, pennsylvanian) species from the Naqing section, Guizhou, South China. *Acta Micropalaeontologica Sinica*, 42(1), 30–41.

Hu, K.Y., Wang, X.D., Wang, W.Q., Song, Y.F., Ye, X.Y., Li, L., Shi, Y.K., Yang, S.R., Li, Y., 2024. Integrative Carboniferous stratigraphy, biotas and paleogeographical evolution of the Qinghai-Tibetan Plateau and its surrounding areas. *Science China Earth Sciences*, 67(4), 1071-1106.

Ivanov, A.O., Hu, K.Y. 2025. New fish assemblages from the Carboniferous deep-water sections of South China and Western Kazakhstan. *Journal of Paleontology*, 99(4), 959-974.

Peng, Y.J., Hogancamp, N.J., Hu, K.Y., 2025. Morphometric analysis and taxonomy of the *Idiognathodus sagittalis* Kozitskaya, 1978 group and the *I. swadei-I. heckeli-I. turbatus* lineage (Conodonta, early Kasimovian, Pennsylvanian). *Journal of the Geological Society*, 182(5), 1–19.

Wang, Y.X., Hu, K.Y., Ye, X.Y., Wang, X.D., 2025. The Middle–Late Pennsylvanian event: Timing and mechanisms. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 667, 112893.

Wang, W.Q., Hu, K.Y., Wang, X.D., 2025a. Temporal and spatial evolution of Mississippian conodont: A case study. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 661, 112701.

Wang W.Q. Hu, K.Y., Hogancamp, N.J. Wang, X.D., 2025b. Morphometric analyses of *Gnathodus pseudosemiglaber* (Conodonta, Mississippian) and implications for its taxonomy, phylogeny and biostratigraphy. *Journal of Paleontology*, 99(1), 163–176.

Wang, W.Q., Wang, X.D., Hu, K.Y., 2024. Zonation and biofacies of the Early Mississippian conodonts from Baoshan, Yunnan, Southwest China. *Palaeoworld*, 33, 636-649.

CM Xing Huang

Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, China

• Stratigraphic division and correlation of the Carboniferous to Permian in the southwestern Tarim Basin, NW China. The Carboniferous to Permian stratigraphic framework in the southwestern Tarim Basin was preliminarily established about thirty years ago. Less effort was devoted to the stratigraphy, especially the biostratigraphy in this region since then. This project will systematically update the Carboniferous to Permian stratigraphic framework in the region in light of the integrated biostratigraphy, including rugose coral, foraminifera, conodont and sporopollen, together with radiometric dating. This will enable precise stratigraphic correlations with others, particularly with the international standard.

VM Tomáš Kumpan

Department of Geological Sciences, Masaryk University, Czechia

Accomplished projects:

• Integrated biostratigraphy and chemostratigraphy of the Lower Tournaisian Líšeň Formation, Moravian Karst, Czechia (Cígler et al., 2025). Three positive $\delta^{13}C$ excursions were documented and correlated between upper- and lower-slope facies of the Líšeň Formation and with equivalent excursions from the Ardennes (Belgium), South China, the Urals (Russia), and Iowa (USA).

• Microbially mediated clay-mineral authigenesis was documented in Silurian, Devonian, and Lower Carboniferous coated grains and peloids (Vodrážková et al., 2025). These results highlight the importance of biomineralization processes in element sequestration within marine environments.

• Supervision of the M.Sc. thesis of Marek Bernhauser, defended in June 2025. The thesis focused on conodont biostratigraphy and gamma-ray spectrometry of a unique section in the Líšeň Formation (Mokrá Quarry). The study documented the Lower Alum Shale Event and overlying anoxic intervals.

Ongoing Projects:

• Trace- and rare-earth-element analyses of Tournaisian calciturbidites have revealed open-marine and pore-water signatures, providing material for paleoenvironmental interpretation.

• Microfacies and conodont-stratigraphic analysis of new Famennian–Tournaisian sections of the Líšeň Formation.

• Supervision of the Ph.D. project of Marek Bernhauser (beginning September 2025). Work on the lower–upper Tournaisian section in the Mokrá Quarry continues; preliminary documentation of the Tournaisian Isotopic Carbon Excursion (TICE) has been achieved, and further studies on elemental geochemistry and higher-resolution conodont biostratigraphy are planned.

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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, 71-98.

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.

VM Spencer G. Lucas

New Mexico Museum of Natural History, Albuquerque, New Mexico USA

Accomplished projects:

• Pennsylvanian System in Sandia Mountains, New Mexico.

• Publication of Early Mississippian ichnofossils from Blue Beach (Nova Scotia, Canada), and the origin and early evolution of tetrapods: New Mexico Museum of Natural History and Science, Bulletin 99, 221 p. (S. G. Lucas and C. F. Mansky).

Ongoing projects:

• Carboniferous stratigraphy and biostratigraphy of New Mexico.

• Pennsylvanian Laguna Tinajas sedimentology and paleontology.

• Revision of Carboniferous tetrapod footprint record.

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DiMichele, W.A., Gastaldo, R.A., Lucas, S.G., Pfefferkorn H.W., 2025. Climate, not transport from “uplands” or “extrabasinal lowlands,” is the cause of drought tolerant terrestrial organisms in the late Paleozoic fossil record: *Paleogeography, Palaeoclimatology, Palaeoecolopgy*, 676, 113160.

Lucas, S.G., Stimson, M.R., 2024. Carboniferous tetrapod footprints. In Lucas, S.G., Hunt, A.P., Klein, H. (Eds), *Vertebrate ichnology: tetrapod tracks and trackways*. Elsevier, Amsterdam, pp. 39-86.

CM Duncan McLean

MB Stratigraphy Limited, United Kingdom

Ongoing projects:

• Miospore biozones of the Carboniferous (Mississippian, Pennsylvanian) of the British Isles.

• Miospore biostratigraphy of the Carboniferous of New Brunswick, Canada.
• Stratigraphy of the Oxfordshire Coalfield, UK.
• I continue to act as the president of the Commission Internationale du Microflore du Paléozoïque (CIMP).

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Gastaldo, R.A., Gensel, P., Glasspool, I.J., Hinds, S.J., King, O.A., McLean, D., Park, A.F., Stimson, M.R., Stonesifer, T., 2024. Enigmatic fossil plants with three-dimensional, arborescent-growth architecture from the earliest Carboniferous of New Brunswick, Canada. *Current Biology*, 34, 1-12. doi.org/ 10.1016/j.cub.2024.01.011

Mamontov, D.A., McLean, D. & Gavrilova, O.A., 2024. *Maiaspora*: hallmark of gleichenioid ferns (Gleicheniales) from the early Carboniferous. *Papers in Palaeontology*, 10. https//doi.org/10.1002/spp2.1561

VM Mottequin Bernard

Royal Belgian Institute of Natural Sciences (RBINS), Belgium

Accomplished projects:

• Description of some insect species from the Belgian Coal Measures Group.
• Re-assessment of Mathieu's insect collections, deposited at the RBINS, from the Pennsylvanian–Cisuralian (Moscovian–Asselian) succession of the Zhaogezhuang colliery (Hebei Province, China).

Ongoing projects

• Visean brachiopods from the Saïda area (north-western Algeria).
• Visean brachiopods from the North Staffordshire Basin (England).

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Nel, A., Sendi, H., Robin, N., Delcambre, B., & Mottequin, B., 2024. Late is not too late: redescriptions of some Carboniferous insects from Western Europe studied by Daniel Laurentiaux (Palaeodictyoptera, Paoliida). *Palaeoentomology*, 7(3), 364-376. doi.org/ 10.11646/palaeoentomology.7.3.6

Santos, A. A., McLoughlin, S., Mottequin, B., Robin, N., & Nel, A., 2025. Old collections, new taxa: late Carboniferous (Moscovian) roachoids (stem group Dictyoptera) among plants with insect interactions from the Benxi Formation, China, stored in European museums. *Palaeoentomology*, 8(1), 47-72.

CM Pilar Navas-Parejo

National Autonomous University of Mexico (Universidad Nacional Autónoma de México), Mexico

Ongoing projects:

• Carboniferous conodont biostratigraphy of northwestern (Sonora and Chihuahua) and southern (Oaxaca and Puebla) Mexico.
• Mississippian and Pennsylvanian paleogeography of northwestern Mexico.
• Carboniferous conodonts from the Cordillera Oriental, Colombia.

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Casas-Peña, J.M., Navas-Parejo, P., Jenchen, U., Ramírez-Fernández J.A., 2024. Pennsylvanian conodonts and microfacies from northeastern Mexico (Tamatán Group, Ciudad Victoria Block). *Rivista Italiana di Paleontologia e Stratigrafia*, 130(2), 231-258. doi.org/10.54103/2039-4942/22324

Navas-Parejo, P., Botella, H., Olive, S., Pradel, A. & Martínez-Pérez, C., 2024. Conodontos del Carbonífero de la Cordillera Oriental de Colombia: resultados preliminares. XVIII Congreso Nacional de Paleontología, 2024. *Paleontología Mexicana, Memorias de congreso*, 7, 107. doi.org/10.22201/igl.05437652e.2024.0.7.387

VM Svetlana Nikolaeva

The Natural History Museum, United Kingdom

Ongoing projects:

• New data have been obtained on the stratigraphy of the Serpukhovian Stage, the lower boundary of which requires revision. To this end, the stratotype of the Beleutian Regional Substage of the Serpukhovian in Central Kazakhstan is being re-examined to establish the precise levels of marker fossil occurrences near its lower boundary and to correlate these with the global scale. So far, ammonoids have been identified from the boundary deposits of the Dalnenian and Beleutian Horizons in the Beleutian stratotype and correlated with data on foraminifers and crinoids from the Beleutian. Corals were previously identified from the stratotype (J.

Denayer) as well as brachiopods (L. Angiolini) and are these results need to be correlated with the new conodont data. We hope to be able to publish the results in 2026. Analysis of ammonoids and foraminifers from the stratotype suggests that the original base of the Beleutian, drawn along the bed with ammonoids of the *Uralopronorites-Cravenoceras* genozone, is younger than the base of the Serpukhovian stage in the Serpukhovian type region in the Moscow Basin and in the Urals drawn by the appearance of the foraminifers *Neoarchaediscus postrugosus* and *Monotaxinoides subplanus*, as these foraminifers are found 30 m below the bed with ammonoids in the Beleutian stratotype.

• The ammonoid fauna from the Beleutian stratotype has been revised. The location and precise level of ammonoid occurrences in the section lower part of the Beleutian Formation were recorded. The composition of the assemblage suggests Lower Serpukhovian *Uralopronorites-Cravenoceras* (E1) Genozone, but younger that its basal level. The shell morphology of species of the genera Cravenoceras and *Neoglyphioceras* found in the section suggests that the ammonoids are somewhat younger than the assemblage of the E1a Zone, along the base of which the Viséan-Serpukhovian boundary is currently drawn. The composition of the assemblage suggests a correlation with the upper Pendleian Stage of Western Europe, at the level of the E1c Zone (ca. *C. malhamense* Zone). A re-examination of the type material of *C. malhamense* and new collections allowed us to identify a new species of the genus *Cravenoceras* (*C. ulytauense*) based on material from Kazakhstan.

• On the eastern slope of the Middle Urals, in the Iset section near the city of Kamensk-Uralsky, an ammonoid assemblage typical of the late Serpukhovian *Deleshumardites–Delepinoceras* (E2) Genozone was studied. It was found alongside the conodonts *Declinognathodus inaequalis* (a marker for the base of the Bashkirian Stage) near a level with a U-Pb date of 320 ± 3 Ma, indicating the lower part of the Bashkirian Stage. These results suggest that the global stratotype standard (GSSP) of the Bashkirian Stage will require revision.

CM Matevž Novak

Geological Survey of Slovenia, Slovenia

Ongoing projects:

• Long-term ongoing project of updating the Upper Paleozoic (Upper Carboniferous to Lower Permian) biostratigraphy and fusulinoidean zonation of the Karavanke Mts. (Southern Alps, Slovenia) and correlation with type sections in the Carnic Alps (Austria/Italy) in cooperation with dr. Holger Forke and prof. dr. Karl Krainer.

• Study of a new succession of Stephanian fossil flora from paralic Carboniferous deposits of the Jesenice area (Karavanke Mts., Slovenia) in cooperation with dr. Josef Pšenička and dr. Václav Kachlík. It is a follow up on the publication from 2014 (Pšenička et al., 2014) with a new detailed study of one of rare outcrops.

Accomplished projects:

• Monitoring of the construction of second tube of a double-lane road tunnel through Karavanke Mts. (Slovenia-Austria border crossing) with biostratigraphic and sedimentologic analysis of the Upper Paleozoic formations.

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Milošević, A., Alekseev, A.S., Zaytseva, E., Novak, M., Kolar-Jurkovšek, T., Jurkovšek, B., 2021. Poznokarbonska biota z območja rudnika železa Ljubija v Bosni in Hercegovini. [Late Carboniferous biota from the Ljubija iron mine area, Bosnia and Herzegovina]. *Geologija*, 64(1), 65-80.

Sudar, M., Novak, M., Korn, D., Jovanović, D., 2018. Conodont biostratigraphy and carbonate microfacies of the Late Devonian to Mississippian Milivojevića Kamenjar section (Družetić, NW Serbia). *Bulletin of Geosciences*, 93(2), 163-183. ISSN 1214-1119. doi.org/10.3140/bull.geosci.1690

CM Cengiz Okuyucu

Ankara Hacı Bayram Veli University, School of Land Registry and Cadastre, Department of Land Registry and Cadastre, Ankara, Turkiye

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Okuyucu, C., Boncheva, I., Sachanski, V., Saydam-Demiray, D.G., Göncöğlu, M.C., 2025. The development of the Middle Devonian-Mississippian carbonate platform in Zonguldak Terrane (NW Anatolia, Türkiye) with special emphasis on Devonian-Carboniferous boundary. In Munkhjargal, A., Mende, K., Lu, J., Linnemann, U. (Eds), Special contributions in honour of Peter Königshof. *Palaeobiodiversity and Palaeoenvironments*, 105(1), 147-178.

Okuyucu, C., Tekin, U.K., Güzgün, Ç., Sayit, K., 2024. Latest Carboniferous–Early Permian Rifting of the Northern Gondwanan Margin and the Opening of the Northern Neotethys: New Evidence from the Carboniferous and Permian Foraminiferal Assemblages from the Beyşehir-Hoyran Nappes, Central Taurides (Southern Turkey). *Journal of Earth Science*, 35(2), 394-415.

CM Edouard Poty

University of Liège, Belgium

Ongoing project:

• In 2025, research was mainly focused on the skip marks due to fossils in the exceptional fossil deposit from the lowermost Visean "Black marble" (Molignée Formation, Belgium), resulting in a submitted paper in collaboration with Bernard MottequIn Unusual skip and groove marks from the Denée Konservat-Lagerstätte (Visean, Belgium)

• In addition, sections in the formations of the Belgian Upper Tournaisian were studied in order to clarify their lithology and thickness, within the framework of an updated revision of the lithostratigraphy of the Belgian Carboniferous.

• On the other hand, an attempt to date the units of the Tournaisian and Visean based on orbitally-forced cycles is still underway.

VM Markus Pracht

Geological Survey of Ireland

Accomplished projects:

• IGRM 2025: Martin, T. et al.: Deep geothermal Research in Tullamore, Co. Offaly.

• Participation at ICCP 20 (Toulouse) followed by field trip to the southern Montagne Noir. The title of our (in co-authorship with R. Rogers) presentation was: Hyperspectral facies and stratigraphy in boreholes from the lower Carboniferous (Viséan) of Ireland.

Ongoing projects:

• Hyperspectral: Ongoing work using hyperspectral analysis of core held by the Geological Survey Ireland with main focus on Devonian and Carboniferous stratigraphy.

• Geothermal: Data gathering and analysis of boreholes drilled in Devonian and Carboniferous stratigraphy. Lithological and micro-palaeontological analysis. Interpretation of geophysical downhole data with reference to the Devonian and Carboniferous stratigraphy for the first time in GSI.

• Carboniferous Stratigraphy: Work on facies pattern and Early Viséan foraminiferal biostratigraphy of the Irish Carboniferous Northwest Midlands area, Ireland.

• IUGS Heritage program: Participate ('Lower Palaeozoic rocks') on the site selection for the IUGS Heritage program.

CM Barry Charles Richards

Geological Survey of Canada-Calgary

Ongoing projects:

• Since I submitted my previous report for corresponding members to the SCCS secretary Markus Aretz in January 2023, I continued to work for the Geological Survey of Canada (GSC) out of Calgary, Alberta in southwestern Canada (3303 33 St NW, Calgary Alberta Canada T2L 2A7; e-mail barry.richards@NRCan-RNCan.gc.ca). My main assignment with the GSC has been the study the upper Famennian and Carboniferous succession in the Western Canada Sedimentary Basin (WCSB). The Carboniferous in the WCSB extends from the Canada-United States border at 49O00'N to the Beaufort Sea in the Arctic and from southwestern Manitoba to the easternmost allochthonous terrane (Slide Mountain Terrane) in the Canadian Cordillera.

• The Canadian Energy Geoscience Association [formerly the Canadian Society of Petroleum Geologists (CSPG)] recently decided to revise the version of the lithostratigraphic Atlas of the WCSB published by the CSPG in 1994. One of my current assignments at the

GSC is the revision of the Carboniferous chapter in the atlas (Richards et al. 1994). Several colleagues are co-authoring the chapter with me. We plan to revise the isopach maps of the three regionally developed map units illustrated in the 1994 atlas and update the compulsory and discretionary regional stratigraphic cross sections.

• Since the onset of the COVID 19 pandemic, my other main project at the GSC has been a stratigraphic/geochronologic study of the Devonian-Carboniferous transition in the Western Canada Sedimentary Basin (WCSB) with geochronologist Cory Wall at the Department of Earth, Ocean, and Atmospheric Sciences at the University of British Columbia in Vancouver.

CM Sergio Rodríguez

Universidad Complutense de Madrid, Spain

Accomplished projects:

• Palaeogeography of the Western Palaeotethys during the Mississippian based on corals

• *Donezella-Girvanella-Chaetetes* mounds in the Valdeteja Formation (Bashkirian) at Truébano (SW Cantabrian Mountains.

Ongoing projects:

• Serpukhovian corals from the Guadiato Basin, SW Spain. Extension of the studies by Gomez-Herguedas & Rodríguez, 2005. Together with I. Rodríguez-Castro.

• Kasimovian corals from Cantabrian Mountains. Study of the corals from several previously unknown coral localities. Together with J. Fedorowski and I. Rodríguez-Castro.

• Review of the subfamily Palaeosmilinae. Based on new finds, museums checking and bibliographic data. Together with I. Rodríguez-Castro.

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Rodríguez, S. Coronado, I., Rodríguez-Castro, I., 2021. Corals from the Asturian substage in Cantabrian Mountains: A review. *Episodes*, 45(1), 87-95.

Rodríguez-Castro, I., Rodríguez, S., 2024. Rugose coral biogeography of the Western Palaeotethys during the Mississippian. *Geosciences*, 14(11), 282.

VM Martin Salamon

Geological Survey of North Rhine-Westphalia, Germany

Accomplished project:

• Core drilling Krefeld, 957 m depth, Dinantian limestone as geothermal target rock (Geowärme NRW).

Ongoing project:

• Exploration- and Drilling Program on Geothermal Energy (Geowärme NRW), financed by the Ministry of Economic Affairs of North Rhine-Westphalia (MWIKE). The program started in 2024 and will continue until end of 2028. Dinantian carbonates are one of the main targets in the program, explored by Seismic acquisition and research drillings.

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Arndt, M., Salamon, M. (Eds), 2021. DGE-ROLLOUT - Deep Geothermal Energy potential of Carboniferous carbonate rocks in NW Europe. *Zeitschrift der Deutschen Gesellschaft für Geowissenschaften*, 172(3), 205-379.

Arndt, M., Fritsche, T., Salamon, M., Thiel, A., 2020. Das Rhenoherzynische Becken – ein hydrothermales Reservoir für NRW und Nordwesteuropa? *Scriptumonline*, 16, 1-11.

CM Matthew Saltzman

Ohio State University, Colombus, United States of America

Accomplished project:

• Last year we published a paper in Geology on the d44Ca from 3 of our sections, which shows the primary nature of the KOBE/TICE. Although the d13C excursion is not a diagenetic artifact, and the coincidence with cooling indicates a carbon burial event, we still don't know the true magnitude of the excursion because it varies significantly in different regions. So we continue to examine the role of facies in spatial variability of the KOBE/TICE, in particular the notable abundance of oolite and coated grains in some widely separated North American sections (Briggs Woods, Confusion Range, US and Canadian Rockies).

Ongoing project:

• Matthew Saltzman (USA) is working on Early Mississippian isotope stratigraphy. In particular,

the carbon isotopic excursion known as the Kinderhookian-Osagean Boundary Excursion (or KOBE) or the mid-Tournaisian Carbon Isotope Excursion (or TICE). Current work is aimed at pairing d13Ccarb with calcium isotopes (d44Ca) and clumped isotopes, and we are analyzing sections in North America (Pahranagat Range, NV; Funeral Mountains, CA; Confusion Range, UT; Briggs Woods core, Iowa; Strawberry Creek, WY) and one in Europe (Dinant Basin composite section, Belgium). This is a collaborative project with Kristin Bergmann at MIT, and this year we published a paper in Earth and Planetary Science Letters on the clumped isotope work from Briggs Woods, Iowa. This study shows a temperature drop during the KOBE/TICE and places the data set in a detailed facies context.

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Anderson, N.T., Bergmann, K.D., Braun, M.G., Griffith, E.M., Saltzman, M.R., 2025. High-resolution record of global cooling during a large Mississippian positive carbon isotope excursion. *Earth and Planetary Science Letters*, 668. doi.org/10.1016/j.epsl.2025.119557

Braun, M.G., Anderson, N.T., Bergmann, K.D., Griffith, E.M., Saltzman, M.R., 2024. Early Mississippian global δ13C excursion is not a diagenetic artifact. *Geology*, 52(9), 641-645. doi.org/10.1130/G52109.1

CM Sascha Sandmann

Geological Survey of North Rhine-Westphalia (Geologischer Dienst NRW), Germany

Accomplished projects:

• Mapping project Düsseldorf 1: 50 000: field mapping, lithostratigraphic structuring, and 3D-modelling of Devonian and Carboniferous strata in the northern Rhenish Massif and in the subsurface of the Lower Rhine Embayment

Ongoing projects:

• Mapping project Wuppertal 1: 50 000: field mapping, lithostratigraphic structuring, and 3D-modelling of Devonian and Carboniferous strata in the northern Rhenish Massif

• Coordinating an update of the Carboniferous in the stratigraphic table of Germany (within the national Subcommission on Carboniferous Stratigraphy)

• Coordination of new contributions to the Carboniferous chapter in the lithostratigraphic online lexicon of Germany (within the national Subcommission on Carboniferous Stratigraphy)

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Sandmann, S., 2025. The Namurian (Carboniferous) sedimentary record on the northern flank of the Velbert Anticline (Rhenish Massif, Germany). *Zeitschrift der Deutschen Gesellschaft für Geowissenschaften*, 176(3), 567-577.

CM Mark Schmitz

Boise State University, Boise, Idaho, USA

Accomplished projects:

• Studies of Late Paleozoic Ice Age sedimentary successions in the southern Paraná Basin with principal investigator Joice Cagliari (Unisinos University, Brazil).

Ongoing project:

• Studies of terrestrial to paralic sedimentary successions of the Carboniferous throughout central Europe, including integrated sedimentology, paleobiology, geochronology, and cyclostratigraphy/astrchronology with principal investigators Stanislav Oplustil (Charles University), Jiri Laurin (Academy of Sciences of the Czech Republic), Jakub Jirasek (University of Ostrava), Alain Izart (University of Nancy), and Pierre Pellenard (University of Bourgogne).

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Cagliari, J., Schmitz, M.D., Tedesco, J., Trentin, F.A. & Lavina, E.L.C., 2023. High-precision U-Pb geochronology and Bayesian age-depth modeling of the glacial-postglacial transition of the southern Paraná BasIn Detailing the terminal phase of the Late Paleozoic Ice Age on Gondwana. *Sedimentary Geology*, 451, 106397, doi.org/10.1016/j.sedgeo.2023.106397.

Izart, A., Opluštil, S., Michels, R., Voigt, S., Hartkopf-Fröder, C., Barbarand, J., Blaise, T., Laurin, J., Schmitz, M., Allouti, S., Hemelsdael, R. & Pironon, J., 2025. Reassessment of the Pennsylvanian bio- and chronostratigraphy of the Saar-Lorraine Basin using high-precision UPb ages of volcanic ashes. *International Journal of Coal Geology,* 302, 104724. doi.org/10.1016/j.coal.2025.104724.

Opluštil, S., Laurin, J., Hylova, L., Jirasek, J., Schmitz, M.D. & Sivek, M., 2022. Coal-bearing fluvial cycles of the late Paleozoic tropics; astronomical control on sediment supply constrained by high-precision

radioisotopic ages, Upper Silesian Basin. *Earth Science Reviews*, 228, 103998. doi.org/10.1016/j.earscirev.2022.103998

CM Qingyi Sheng
Nanjing Institute of Geology and Palaeontology, China

Accomplished projects:

• By studying specimens of *Biseriella* and *Globivalvulina* from the Fenghuangshan and Dianzishang sections in South China, taxonomic definitions of the foraminifera *Biseriella parva*, *Globivalvulina moderata*, and *Globivalvulina bulloides* were revised. Stratigraphic correlation indicates that *G. moderata* appeared first in the Mississippian throughout the Paleo-Tethys and Arctic North America, and then can be found in other areas of North America from early Pennsylvanian, suggesting that the first appearance of *G. moderata* in the world was diachronous.

• A high-resolution foraminiferal biostratigraphy from the Dianzishang carbonate slope succession in the South China Blocks has been established. The foraminifers can be identified into four zones: the *Paraarchaediscus koktjubensis* Zone, *Bradyina modica* Zone, *Globivalvulina moderata* Zone, and *Postmonotaxinoides* Zone, which are correlated with zonations of Iran, the East Europe Platform, and West Europe. The combined foraminiferal and conodont data in the Dianzishang section suggest the FOD of *Lochriea ziegleri* here is likely younger than the base of the Serpukhovian. Foraminifera, widely present in both shallow-water carbonate platforms and deep-water slope sequences, offer a more globally applicable tool as index fossil than conodonts as for the stratigraphic correlation of this period, partly due to conodonts' facies-dependent occurrence.

• Cooperated with Dr. Paul Brenckle, foraminifers and algae from type Mississippian outcrops of the Midcontinent, North America are studied. Globivalvulinid foraminifers recovered from the Upper Mississippian Menard Limestone in southern Illinois are described as a new genus and species, *Pseudobiseriella menardensis*. The taxon, although morphologically similar to its likely precursor *Biseriella*, contains an agglutinated-microgranular wall structure in contrast to the completely microgranular wall found in the latter genus. Including *P. kipshakensis*, the other species assigned herein to the genus, *Pseudobiseriella* occurrences thus far are limited to Upper Mississippian locations in North America and Kazakhstan.

• The first documentation of Serpukhovian (Upper Mississippian) calcareous algae from type Mississippian strata at the Southern Illinois Stone Company Quarry, located in Johnson County, Illinois, U.S.A. is illustrated. The red algal microflora within the lower part of the Kinkaid Limestone includes *Vachardia multigena* gen. et sp. nov. and *Masloviporidium crassimuri* sp. nov., as well as a diverse assemblage of stacheiins. The algae were found in fossiliferous packstone/grainstone and ooid/coated-grain grainstone deposits. The morphological features of *Vachardia* are close to those of *Masloviporidium*, but further research is required to confirm evolutionary relationships. Additionally, the stacheiins include various morphologies that do not align closely with established species, highlighting the complexity and diversity of the algal community.

• We characterized Cretaceous foraminiferal fossils from different stratigraphic layers using optical microscopy, X-ray diffraction (XRD), scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS), and Raman spectroscopy to identify organic remnants in foraminiferal specimens. Our analyses reveal an unconventional orthorhombic phase of graphite in some samples, suggesting exposure to extreme conditions—such as high temperature and high pressure—during the mid-Cretaceous. These findings not only provide valuable insights into the geological history of that period but also offer a promising avenue for understanding the chemical synthesis of novel carbon materials through polymorphic transformations. This method could be used in Carboniferous

specimens later. In addition, I have been co-authors in two articles, contributing to foraminiferal biostratigraphy.

Ongoing project:

• Recently, research on Devonian-Carboniferous foraminifers from South China, Baoshan, Tibet, and Tarim blocks, Midcontinent and western North America, are continuing. Part of these outcome have been reported on the GEOTOLOSA 2025 Congress in Toulouse.

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Sheng Q., 2024. The biostratigraphic significance of the Carboniferous foraminifera *Globivalvulina moderata*. *Journal of Stratigraphy*, 48(1), 100-108.

Sheng Q., Chen J., Wang X.D., 2025. Middle to Late Mississippian and Early Pennsylvanian foraminifers from the Dianzishang section, South China: Constraints on the Visean-Serpukhovian boundary and implications for biostratigraphic correlation across the Paleo-Tethys Ocean. *Journal of Asian Earth Sciences*, 287, 106601.

Sheng, Q., Brenckle, P., 2025. *Pseudobiseriella menardensis*, a new genus and species of globivalvulinid foraminifer from the Serpukhovian Stage (Upper Mississippian) of southern Illinois, U.S.A. *Journal of Foraminiferal Resear*ch, 55(3), 336-340.

Sheng, Q., Brenckle, P., 2025. Serpukhovian (Upper Mississippian) red algae from the type Mississippian region of southern Illinois, U.S.A. *Review of Palaeobotany and Palynology*, 340, 105362.

Sheng, Q., Xu Y., 2025. Unconventional Orthorhombic-Phase Graphite in Cretaceous Foraminiferal Fossils. *Nano Research*, 18(4), 94907262.

VM Yukun Shi

School of Earth Sciences and Engineering, Nanjing University, China

Ongoing projects:

• Driven by the robust advantages of quantitative stratigraphic techniques and composite sequences that can be established using extensive datasets from regional sections or cores, my recent research focuses on investigating bioevents and their potential drivers via quantitative stratigraphic approaches. Specifically, we have constructed a high-resolution global dataset of fusuline foraminifera from the Carboniferous to the Permian with an unprecedented temporal resolution of c. 45 thousand years. From this dataset, we identified that long-term cooling consistently facilitated fusulinid biodiversification whereas warming events were closely associated with the decline in their diversity. At the ICCP conference held in Toulouse this July, we introduced our section-based database, the OneStratigraphy Database (https://onestratigraphy.ddeworld.org/), and presented our newly constructed high-resolution morphospecies richness curve of vascular plants, which covers the Carboniferous to Middle Permian intervals in the North and South China blocks. Further work is still in progress.

Ongoing projects:

• High-Resolution Global Biodiversity Evolution from the Carboniferous to the Permian (NSFC).

• Quantitative Reconstruction of Biological Evolution and Its Environmental Context During the Tethys Evolution (NSFC). Popular Science Practice on Late Paleozoic Ice Age (NSFC).

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Lai, M., Shi, Y., Lu, Z. B., Shi, Y., Huang, H., 2024. [Two quantitative methods for constructing biostratigraphic composite sequence: A case study of Carboniferous biostratigraphy in South China]. *Journal of Stratigraphy*, 48(1), 172-182. (in Chinese with English abstract).

Zhang, S., Zhao, Y., Shi, Y., Fang, F., Wang, X. D., Fan, J. X., Zhang, Y., Yuan, D.X., Wang, Y., Zhang, F.F., Wu, H. C., Erwin, D.H., Marshall, C.R., Shen, S., 2025. Global cooling drove diversification and warming caused extinction among Carboniferous-Permian fusuline foraminifera. *Science Advances*, 11(25), eadv2549.

CM Paulo Alves de Souza

Rio Grande do Sul Federal University (Universidade Federal do Rio Grande do Sul), Brazil

My main focus is on palynology and its various applications in geosciences, mainly paleoecology, paleoclimatology, and biochronostratigraphy of Brazilian intracratonic basins, with work also conducted in other basins of Gondwana.

Ongoing projects:

• BIOCRONOCARTAS: Biochronostratigraphy of the Pennsylvanian and Permian sections of the Brazilian intracratonic basins and its impact on stratigraphic charts. The main objective is to improve the characterization and ages of the biozones erected for the main Brazilian intracratonic basins (Paraná, Amazonas, Parnaíba, Solimões, Acre), considering groups from the international stratigraphic column (e.g., foraminifera, conodonts), as well as other fossil groups of correlation within the Gondwana, such as palynomorphs, marine horizons well marked by invertebrate fauna, and radiometric datings. This research project is supported by grants awarded by CNPq (Ministry of Science and Technology of Brazil, under number 421013/2023-0), with duration from 2023 to 2026.

• BIOCRONORTE: Biochronostratigraphy of the Amazonas, Parnaíba and Solimões Basin. Pennsylvanian and Permian deposits of the main Brazilian intracratonic basins were analyzed, considering the succession of benthic foraminifera, conodonts, and palynomorphs, in order to provide well-calibrated biozonations with the international stratigraphic column. New biostratigraphic schemes have been erected for the Amazonas and Solimões basins, which are currently being finalized and submitted for publication. This research project was supported by grants awarded by PETROBRAS S.A., with duration from 2019 to 2024.

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Souza, P.A., Boardman, D.R., Premaor, E., Félix, C.M., Bender, R.R., Oliveira, E.J., 2021. The *Vittatina costabilis* Zone revisited: New characterization and implications on the Pennsylvanian-Permian icehouse-to-greenhouse turnover in the Paraná Basin, Western Gondwana. *Journal of South American Earth Sciences*, 106, 102968. doi.org/10.1016/j.jsames.2020.102968

Souza, P.A., Boardman, D.R., Premaor, E., Félix, C.M., Bender, R.R., 2024. Paleogeographic records of glacial and terminal glacial palynozones related to the Late Paleozoic Ice Age in the Brazilian portion of the Paraná Basin, Western Gondwana. *Sedimentary Geology*, 459, 106559. doi.org/10.1016/j.sedgeo.2023.106559

CM Maurice Streel

University of Liège (emeritus), Belgium

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Streel, M., Paproth, E., Reitlinger, E.A., 1978. Working group on the Devonian-Carboniferous boundary. Unpublished report on the field meeting from Germany to Ireland (27th August - 8th September 1978), 8 p.

Streel, M., Maziane-Serraj, N., & Di Pasquo, M., 2025. Why not use palynology to reconsider the base of the Carboniferous System in the type region? *Subcommission on Devonian Stratigraphy Newsletter*, 40, 31-43.

CM Rudy Swennen

KU Leuven (emeritus), Belgium

Accomplished projects:

• Report on the "Sedimentology and diagenesis of the deep geothermal Beerse wells". This report will soon become available at the VPO website (Flemish geological Survey).

Ongoing projects:

• Study of the sedimentology and diagenesis of the deep geothermal Beerse wells (N-Belgium).

• Participation in the geological reconnaissance of the potential Einstein Telescope are in the EMR region (Belgium, the Netherlands and Germany).

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Wei W., Littke, R., Swennen, R., 2022. Geochemical and facies study of Namurian Shale in the Namur Syclinorium and Campine Basin (Belgium and S-Netherlands): Implication for paleo-redox reconstruction and organic matter characteristics. *International Journal of Coal Geology*, 265, 104150.

Wei W., Swennen, R., 2022. Sedimentology and lithofacies of organic-rich Namurian Shale, Namur Synclinorium and Campine Basin (Belgium and S-Netherlands). *Marine and Petroleum Geology*, 105553.

VM Katsumi Ueno

Department of Earth System Science, Faculty of Science, Fukuoka University, Japan

Ongoing project:

• Fusuline biostratigraphy and faunal development of Panthalassan atoll-type carbonates in late Paleozoic-Mesozoic

accretionary complexes in Japan; Carboniferous-Permian platform carbonate evolution along the Indochina Block (mainland SE Asia).

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Kelly, P.R., Sano, H., Ueno, K., Davydov, V.I., Heavens, N.G., Hunt, L.E., Gleason, J.D., Soreghan, G.S., 2025. Volcanism and climate recorded in giant grains from dust of the late Paleozoic Panthalassic Ocean. *Journal of Sedimentary Research*, 95, 532-542.

CM Gregory P. Wahlman
Wahlman Geological Services, LLC, Austin, Texas, USA

Ongoing projects:

• Late Pennsylvanian-Early Permian (Virgilian-Wolfcampian) fusulinids, Sacramento Mts., New Mexico, USA.

• Middle and Late Pennsylvanian (Desmoinesian-Missourian) fusulinid biostratigraphy, Eastern Shelf of Permian Basin, West Texas, USA.

• Middle Pennsylvanian (Desmoinesian) fusulinid biostratigraphy, San Juan Mts., Colorado, USA.

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Barrick, J.E., Nestell, M.K., Wahlman, G.P., 2023. Conodont and fusulinid faunas across the Atokan-Desmoinesian boundary (Middle Pennsylvanian), upper part of the Sandia Formation and lower part of the Porvenir Formation, southern Sangre de Cristo Mountains, northern New Mexico. In Lucas et al. (Eds), Fossil Record 9. *New Mexico Museum of History and Science Bulletin*, 94, 1-47.

Wahlman, G.P., Nestell, M.K., 2024. Middle Permian (Guadalupian) fusulinids from subsurface Midland Basin, West Texas USA, including paleoenvironmental microspheric *Parafusulina*. *Journal of Foraminiferal Research*, 54(2), 117-142.

Wahlman, G.P., Rendall, B., 2023. Middle Pennsylvanian (Desmoinesian) fusulinids of the Bug Scuffle Limestone Limestone Member of the Gobbler Formation, Sacramento Mountains, south-central New Mexico. *Stratigraphy*, 20(2), 73-108.

CM Qiulai Wang
Nanjing Institute of Geology and Palaeontology, CAS, China

Ongoing projects:

• Since the last report, my research mainly remains on the conodont biostratigraphy and its assistance in reconstructing the paleoclimate and paleoecology.

• Work on the late Devonian to early Carboniferous in South China and east Tibet. With our Chinese team, we studied this interval among several sections of different facies in South China and east Tibet. In the Naqing section, the conodont-barren siliciclastic beds represent the loss of several standard zones. Work in the other sections is ongoing.

• We continue to work on the Visean to Serpukhovian boundary. We resampled the sections Rhena, Herdringen and Tentes for conodont, in collaboration with Dieter Korn and Aretz Markus. In South China, we newly finished the resampling work of conodont and foraminifera in two slope-facies sections in Guangxi and will see the results in the next year.

• Work on the Kasimovian to Gzhelian boundary. We found the boundary index conodont in the North China section, and added a section discussing the correlation between marine and nonmarine settings to the newly finished GSSP proposal. To make an integrated correlation, we resampled the Usolka section, in collaboration with Guzel Sungatullina. This work is ongoing.

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Huang, Y.Z., Guo, W., Lin, W., Zhaxi, P.C., Yao, L., Hu, K.Y., Wang, Q.L., Qi, Y.P., 2024. First record of the late Famennian conodonts in Qamdo, Tibet and their biostratigraphic implications. *Palaeoworld*, 33, 624-635.

Huang, Y.Z., Qi, Y.P., Wang, Q.L., Yao, L.,Chen, J.T., 2024. Latest Devonian- Early Mississippian conodont biostratigraphy in the Naqing section, Guizhou, South China. *Palaeoworld*, 33, 307-327.

Wang, H., Yao, L., Lin, W., Wang, Q.L., 2025. Corals from the middle Visean (Mississippian) coral biostrome in the Yashui section, Guizhou, South China: Palaeogeographical implication. *Palaeoworld*, 34, 200934.

CM Xiangdong Wang
Nanjing University, China

Ongoing projects:

• Continued research on Carboniferous GSSPs, and co-submitted the candidate proposal for the Gzhelian Stage. Currently working on the Kasimovian Stage and preparing to write its GSSP proposal.

• South China preserves relatively continuous shallow-water successions across the Middle Carboniferous boundary. Detailed field work has been carried out to collect rugose corals, brachiopods, and high-density samples for isotope geochemistry, with the aim of conducting an in-depth study of the Serpukhovian crisis event.

• In collaboration, long-term redox evolution along the northern Gondwana margin (Baoshan Block) has been investigated based on statistical analysis of framboidal pyrite size distribution; the results were published in Global and Planetary Change (GPC).

• Extensive high-precision geochronological studies of Carboniferous–Permian strata have been carried out in North China, as well as in the Tarim and Junggar basins of northwestern China, yielding significant achievements. And numbers of studies focused on the Carboniferous–Permian paleoenvironmental reconstruction have also been conducted with cooperation with colleagues using isotope geochemistry.

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Chang, X.L., Wang, X.D., Shen, S., Qi, X.J., Wei, B., Sheng, Q.Y., Wang, W.Q., Ye, X.Y., Hou, M.C., 2025. Unravelling Permo-Carboniferous Redox Dynamics of the Gondwana-Originated Baoshan Block and Implications for the Late Paleozoic Ice Age. *Global and Planetary Change*, 255 (105109), 1-14.

Fang, Q., Wu, H., Montañez, I.P., Shen, S., Zeeden, C., Wang X.D., Zhang, S., De Vleeschouwer, D., 2025. Synchronizing climate-carbon cycle heartbeats in the Phanerozoic vegetated icehouses. *Nature Communications*, 16(1), 9196.

Hou, Z.S., Wang, X.D., Zhi, D.M., Tang, Y., Wu, Q., Zhang, H., Cao, J., Xiao, D.S., Fu, G.B., Zheng, M.L., Qi, X.F., Cai, Y.F., Feng, Z., Zhang, B., Zhou, C.M., Li, Y., Ye, X.Y., Huang, X., Zhang, S.H., Shen, B.H., Ramezani, J., Zhang, S.C., Shen, S.Z., 2026. High-resolution chronostratigraphic framework and spatiotemporal evolution of Carboniferous-Permian source rocks in the Junggar Basin and its periphery. *Science China Earth Sciences*, 69(1), 1-25, doi.org/ 10.1007/s11430-025-1748-3

Li, Y., Wang, X.D., Yan, W., Wei, G., Hu, Y., Zhang, F., Shen, S., 2025. The effects of mineralogy and early diagenesis on the Cenozoic carbonate Ca and Mg isotopic records from the South China Sea. *Global and Planetary Change*, 248, 104757.

Zhang, S.H., Zhao, Y.Y., Shi, Y.K., Fang, Q., Wang, X.D, Fan, J., Zhang, Y., Yuan, D., Wang, Y., Zhang, F., Wu, H., Erwin, D.H., Marshall, C.,Shen, S.Z., 2025. Global cooling drove diversification and warming caused extinction among Carboniferous-Permian fusuline foraminifera. *Science Advances*, 11, eadv2549.

Zhang, F.F., Pohl, A., Elrick, M., Wei, G., Cheng, K., Crockford, P., Fakhraee, M., Lin, Y., Li, N., Wang, X.D., Shen, S., 2025. Enhanced marine biological pump as a trigger for the onset of the late Paleozoic ice age. *Science Advances*, 11, eadv2756.

Zheng, Q.F., Wang, Y., Huang, X., Chen, B., Wu., H., Yuan, D.X., Wang, X.D., Shen, S., 2025. Artinskian great deglaciation: Glacioeustasy evidence from South China. *Palaeogeography Palaeoclimatology Palaeoecology*, 679, 113310.

CM Colin N. Waters

University of Leicester, United Kingdom

Accomplished projects:

• Work on the Brigantian Yoredale Group mixed carbonate-siliciclastic succession on the southern part of the Askrigg Block involving combination of geological mapping, lithostratigraphy and detailed foraminifer analysis, in submission. Colin N. Waters, Richard B. Haslam, Pedro Cózar, Dave Millward, Ian D. Somerville (in submission). The Brigantian transition from the Askrigg Block to Craven Basin between Grassington and Greenhow, North Yorkshire, UK. Proceedings of the Yorkshire Geological Society.

Ongoing projects:

• Collaboration with Andy Morton investigating the provenance of Arundian to Asturian (Visean to Moscovian) sandbodies in South Wales, extending research previously carried out and published in North Wales and the English Midlands.

• In my position of President of the Yorkshire Geological Society, I will be acting as editor and major contributor to a 4th edition of 'Yorkshire Rocks & Landscape' providing detailed

descriptions of field itineraries, many in the Carboniferous of the Yorkshire Dales and South Pennines. Much of the fieldwork has been carried out in 2025 and publication is due for end 2026.

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Brettle, M.J., Waters, C.N., Davies, S.J., 2023. An integrated sequence stratigraphic analysis of the early Marsdenian substage of the Millstone Grit Group, Central Pennines, UK. *Proceedings of the Yorkshire Geological Society*, 64 (3-4), 149-189. doi.org/ 10.1144/pygs2021-014

Waters, C.N., Haslam, R.B., Emmings, J.F. & Riley, N.J., 2024. Chapter 23: Guide to key Bowland Shale Formation outcrop localities in Craven and Edale Basins. In Emmings, J., Parnell, J., Stephenson, M. & Lohdia, B. (Eds), New Insights on Processes and Resources in Fine-Grained Sedimentary Rocks: a Synthesis of Recent Research on a UK Mississippian Giant. *Geological Society, London, Special Publications*, 534 (1). doi.org/10.1144/SP534-2021-17

CM Le Yao

Nanjing Institute of Geology and Paleontology, Chinese Academy of Sciences, China.

Ongoing projects:

• Based on the support from the National Natural Science Foundation of China, I focus on the studies of reef and biotic evolution during the mid-Carboniferous (late Visean to Bashkirian stages), when the onset of major phase of the Late Paleozoic Ice Age (LPIA) occurred associated with an extinction event. Recent two years, I and my colleagues conducted several field campaigns in southern and northwestern China and found rich rugose corals and coral reefs during the mid-Carboniferous. Especially, abundant late Serpukhovian coral reefs were discovered in the Qaidam Block, indicating that these reefs may have been survivors from the Serpukhovian extinction. Further palaeoecological and palaeontological works will be conducted on these coral reefs and coral taxonomy, to put insights into the evolutionary pattern of rugose corals and coral reefs under the mid-Carboniferous global climatic cooling.

• Several Carboniferous papers were published in last two years, such as the late Visean coral biostromes in South China (Yao et al., 2024), and size variation of colonial corals from late Visean to Serpukhovian (Yao et al., 2023).

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Yao, L., Lin, W., Aretz, M., Bottjer, D.J., Wang, X.D., 2023. Colonial coral resilience by decreasing size: reaction to increased detrital influx during onset of the late Palaeozoic Ice Age. *Proceedings of the Royal Society B: Biological Sciences*, 290, 20230220.

Yao, L., Wang, H., Aretz, M., Lin, W., Wang, X.D., 2024. Upper Visean (Mississippian) coral biostromes during onset of the late Palaeozoic Ice Age: a record from the equatorial eastern Palaeotethys. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 642, 112148.

NEW MEMBERS

In 2025, we welcome the following new corresponding members of SCCS:

- Ana Karina Scomazzon (Federal University of Rio Grande do Sul, Brazil), working on conodonts, proposed by Keyi Hu & Paulo de Souza.
- Rafael Reis Bender (Federal University of Rio Grande do Sul, Brazil), working on palynomorphs, proposed by Paulo de Souza.
- Marcelo Carrera (Universidad Nacional de Córdoba, Argentina), working on poriferan and bryozoan, proposed by Julien Denayer.
- Gabriella Cisterna (Universidad Nacional de La Rioja, Argentina), working on brachiopods, proposed by Julien Denayer.
- Anne-Laure Decombeix (AMAP, Montpellier, France), working on palaeobotany, proposed by Julien Denayer and Markus Aretz.
- Heba El-Dessouky (University of Mansoura, Egypt), working on Pennsylvanian cnidaria, proposed by Julien Denayer and Markus Aretz.
- Carlo Corradini (Università degli Studi di Trieste, Italy), working on conodonts, proposed by Markus Aretz.

CONTRIBUTIONS TO THE NEWSLETTER

The Newsletter on Carboniferous Stratigraphy is published annually by SCCS. It is composed of written contributions from its members and provides a forum for:

- reports on work in progress and / or reports on activities in your work place
- news items, conference notices, new publications, reviews, letters, comments
- opinions of the members

Contributions for each issue of the Carboniferous Newsletter should be timed to reach the Editor before Decembrr 31st in the year of publication. Manuscripts have to send as attachments to Email messages. Word processing files should have no personalized fonts or other code. Maps and other illustrations are acceptable in .tiff, .jpeg, or .pdf format. When preparing your manuscript for the newsletter, please check how the contributions were formatted in the latest newsletter. **Please pay special attention to the style of the references because it is a time-consuming task to format them!**

The authors have to follow common instructions for stratigraphical and palaeontological nomenclature. Manuscripts not respecting the guidelines will be returned to the corresponding author.

Please send contributions before 31st of December, by email to:

julien.denayer@uliege.be