ORDOVICIAN NEWS

SUBCOMMISSION ON ORDOVICIAN STRATIGRAPHY
INTERNATIONAL COMMISSION ON STRATIGRAPHY

Number 41 (for 2023)

Edited by Bertrand Lefebvre

Cover photo

Ogygiocarella debuchii (Llwyd, 1698): the first trilobite ever described in print. Llanfawr Mudstones Formation (Darriwilian, Middle Ordovician), Bailey Einon, Builth-Llandrindod inlier, Central Wales (UK). Original specimen reposited in the Radnorshire Museum (LLWLM2010:325) (courtesy of Joe Botting and Lucy Muir).

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CHAIRMAN'S MESSAGE

This year, I am particularly happy to introduce this issue of **Ordovician News** that is reflecting an exceptional year 2023. My warmest thanks go to our Secretary and Newsletter Editor, Bertrand Lefebvre, who compiled this issue of our newsletter, that is again rather large, reflecting the healthy situation of our subcommission.

The current subcommission voting membership and executive (**2020-2024**) is approaching the end of its term. At the next International Geological Congress (in August 2024 in South Korea) a new, modified team will take over. It is almost time to make the report of the four years of this term. So, what did we achieve since 2020?

After the Covid-19 pandemic and a period during which we were unable to meet on site during two years (but we had very successful online meetings: closing meeting of IGCP 653 in September 2020 organized in Copenhagen, Denmark; and the final meeting of IGCP 653 together with the opening meeting of IGCP 735 in September 2021 organized in Lille, France), Ordovician workers started to come together again in late 2021 (with a first small workshop in late November at Lyon) and during the annual meeting of IGCP 735 in Marrakech in late 2022.

However, 2023 was the year when we have seen the results of some previous meetings published. After the absolutely final meeting of IGCG 653 at Lille in September 2021, we launched two special issues that both have been published during 2023. You can find in this newsletter the reports on the two issues published in ***Palaeo3*** and ***Geobios***.

Last year, 2023, was again the year of our international congress (**International Symposium on the Ordovician System**: ISOS) that took place in July 2023 at Tallinn, Estonia (see report in this newsletter). The meeting was a huge success (https://isos14.org). Thanks to the organizing committee, in particular to Tonu Meidla (chair), Olle Hints (vice chair), and Oive Tinn (secretary), for a remarkable event!

Just before the ISOS in Estonia, another important congress took place at Lille, France: the international congress of the International Commission on Stratigraphy (ICS), of which the SOS is a subcommission. **STRATI2023** allowed 285 stratigraphers from all geological periods and from all around the world to come together. The Ordovician subcommission organized a scientific session and a business meeting (https://strati2023.sciencesconf.org). You will also find a report on this congress in this newsletter.

One of the major events of 2023 was clearly the publication of the long-awaited volumes **'A Global Synthesis of the Ordovician System'**. Both books, i.e. two issues of the *Geological Society of London Special Publications* series were published just before STRATI2023 and ISOS14, with presentations at both meetings with the four co-editors being present. But most participants will remember the official presentation ceremony of both books, following a champagne reception at Tallinn! You will find the contents of both publications in this newsletter. The cover of this edition of *Ordovician News* is actually also the cover of the first issue, volume 532. This image illustrates the trilobite *Ogygiocarella debuchii* (Llwyd, 1698). The co-editors of the Global Synthesis publication decided to illustrate on the cover of the volume on the European Ordovician the first trilobite ever described in print. The picture of this trilobite is from Joe Botting and Lucy Muir, who

photographed the specimen from the Llanfawr Mudstones Formation (Darriwilian, Middle Ordovician) in the Radnorshire Museum (Wales).

This *Ordovician News*, issue 41, is again full of information. Thanks for all those who contributed!

Please, continue to send us your contributions, by contacting our newsletter editor, Bertrand Lefebvre.

Please, visit also our website, http://ordovician.stratigraphy.org. And if you have useful information, please, send it to our webmaster Alycia Stigall.

With best regards,

Thomas Servais

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SECRETARY'S MESSAGE

In 2023, the Subcommission on Ordovician Stratigraphy (SOS) has been particularly busy, with two Zoom meetings (on May, 17 and December, 18), and two "in person" meetings at Strati2023 (in Lille) and ISOS14 (in Tallinn) in July. The publication of the two volumes of the *Geological Society of London Special Publications* on **A Global Synthesis of the Ordovician System** represents a major achievement of the SOS for the term 2020–2024 (see Chairman's message).

However, in 2023 and early 2024, the SOS has been also strongly involved in two other tasks: the preparation of elections for its partial renewal, which will become effective after the next IGC in Busan (Korea) in August 2024; and, after the very successful 14th International Symposium on the Ordovician System (ISOS14) in Tallinn (July 2023), the designation of the host city for the next ISOS in 2027.

Six Voting members will be leaving the Subcommission on Ordovician Stratigraphy next August: Matilde Beresi, André Desrochers, Mansoureh Ghobadi Pour, Daniel Goldman, Leon Normore, and Tatiana Tolmacheva. On behalf of the SOS and the whole Ordovician community, I would like to express our most sincere thanks to all of them for their strong involvement in the Subcommission and Ordovician stratigraphy over the years.

Elections for the new Executive board and the partial replacement of Voting Members for the term 2024–2028 took place in the second half of January 2024, with the clear objective to reach a better gender balance and the best possible global coverage. In accordance with IUGS recommendations, the two Voting members from Russia were excluded from the vote. All votes were online and anonymous. Participation rate was high (78 percent). Thomas Servais was reelected as Chair of the Ordovician Subcommission, Alycia Stigall was elected as Vice-Chair, Renbin Zhan was reelected as Vice-Chair, and six new Voting members were approved for the next term: Annalisa Ferretti (Italy), Yan Liang (China), Gabriela Mangano (Canada), Claudia Rubinstein (Argentina), Firuza Salimova (Uzbekistan), and Beatriz Waisfeld (Argentina).

On behalf of the Executive Board of the Subcommission on Ordovician Stratigraphy, a call for proposals to host the 15th International Symposium on the Ordovician System (ISOS15) in 2027 was sent out to all corresponding members of the Subcommission (over 600 scientists all around the world) on 13 January 2024, with a deadline on 1 March 2024. A single proposal was received. It was submitted by Renbin ZHAN, Vice-Chair of the Subcommission on Ordovician Stratigraphy. This proposal offers to hold the next ISOS in August 2027 at Northwestern University in Xi'an (central China). The proposal was evaluated by the current Voting members and was unanimously approved.

Ordovician News volume 41 is accessible online, along with all former volumes, on the Ordovician Subcommission web page, at: http://ordovician.stratigraphy.org. Please do not hesitate to share this newsletter with any colleague or student, interested in Ordovician-related studies and who might not be on the mailing list for *Ordovician News*. Finally, special thanks to Ian G. Percival (former Editor of *Ordovician News*) for his careful reading of this volume!

Stay safe and enjoy *Ordovician News*!

Bertrand Lefebvre

ANNUAL REPORT OF ORDOVICIAN SUBCOMMISSION FOR 2023

1. TITLE OF CONSTITUENT BODY

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2. OVERALL OBJECTIVES AND FIT WITHIN IUGS SCIENCE POLICY

The Subcommission promotes international cooperation on all aspects of Ordovician geology, specifically stratigraphy. Its global network involves academia, government institutions and industry.

Specific objectives are:

a. To delimit and subdivide the Ordovician System (and Period) as a part of the overall ICS mission to elaborate the standard global stratigraphic scale. This work aims to establish boundaries (GSSPs and ASSPs), correlation of major subdivisions (Stages and Series)

globally and regionally, and to periodically review the effectiveness and utility of these decisions.

b. To promote regular international meetings on all aspects of Ordovician geology, especially those devoted to clarifying stratigraphic procedures, nomenclature and methods for use in establishing a unified global time scale and to prepare correlation charts with explanatory notes (the main phase of this latter task is now completed).

c. To encourage, promote, and support research on all aspects of Ordovician geology worldwide and to provide outlets, including an annual newsletter (*Ordovician News*), international meetings, and a web page, for promoting discussions and reporting results of this research.

d. To encourage, promote, and support interdisciplinary research on the Ordovician global Earth system, addressing topics that require high-resolution, global correlation.

e. The ultimate goal of the Subcommission is to provide a high-resolution geological time scale that will be a critical foundation for interdisciplinary research on the global Earth system during the Ordovician Period. The work is broadly based and must include specialists in palaeontology, all subdisciplines of stratigraphy (bio-, litho-, chemo-, and magneto-), sedimentology, geochemistry, and tectonics. With a large network including active participants from more than 25 countries, the Subcommission thus involves much of the global geological community.

3. ORGANISATION - interface with other international projects / groups

Since mid-2020, the Subcommission on Ordovician Stratigraphy (SOS) comprises an Executive (Chair, Vice-Chair and Secretary), plus 17 other Voting Members (and >300 Corresponding Members). Since 2021, the Subcommission Executive includes, for the first time, a female member, appointed by the Chair, as Internet Officer.

The Subcommission includes a broad national representation and coverage of key fossil groups as well as specialists in interdisciplinary fields such as geochemistry, sequence stratigraphy and sedimentology.

The Subcommission on Ordovician Stratigraphy closely cooperates with the IGCP 735 project “Rocks ‘n’ ROL (Filling knowledge gaps in the Early Palaeozoic Biodiversification” (2021–2025). The co-leaders of IGCP 735 include four Voting Members of the SOS. The third Annual Meeting of IGCP 735 was held in Tallinn, Estonia, in coordination and collaboration with the Ordovician Subcommission.

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

Other than time allowed by employers of the Executive and Voting Members to carry out their duties and attend conferences, the Subcommission receives no support from sources other than IUGS.

5. CHIEF ACCOMPLISHMENTS IN 2023

- The 14th edition of the major congress of the Subcommission, which takes place every four years, the International Symposium on the Ordovician System (ISOS), was organized in Tallinn, Estonia, in late July. It included scientific sessions and excursions, and was attended by over 100 Ordovician specialists.

- The Subcommission organized a scientific session during the main meeting of the ICS, STRATI 2023, which was organized in Lille, France, in mid July.

- The second Auxiliary Boundary Stratigraphic Section and Point (ASSP) for the base of the Ordovician System at the Xiaouyangqiao section, Dayangcha area, Jilin (Northern China), has been accepted to be an official Standard Auxiliary Boundary Stratotype (SABS) by the Subcommission in 2023. The official inauguration of the stratotype was postponed a few times, but is now scheduled to take place in June 2024.

- In accordance with ICS Rules, the Voting Members of SOS were replaced in 2020, and the Voting Membership voted to select a new Executive and Voting Members for the term 2020–2024. The Voting Membership was increased to 20. During the covid pandemic, online meetings were organized. The second online business meeting was organized in late March 2022, and the third one in early May 2023, attended by most Voting Members.

- In accordance with ICS Rules, the SOS Executive started in late 2023 to prepare the replacement of the Voting Members. The objective is to reach a perfect gender balance and a best possible global coverage for the period 2024–2028.

- Two "in person" meetings of part of the Executive and Voting Members of SOS took place during the 4th International Congress on Stratigraphy in Lille (France, mid July 2023) and during the ISOS14 (Estonia, late July 2023). During the latter symposium, the Voting Members that were present took part at a business dinner organized by the Subcommission.

- A major accomplishment during 2023 was the publication of two volumes (532 and 533) of the *Geological Society Special Publication* series, dedicated to a global Ordovician synthesis. Launched by the Ordovician subcommission in 2021, all manuscripts for chapters have been deposited between January and November 2022. The publication was released in March (online) and in June (print) 2023. All participants of ISOS14 at Tallinn were invited at a reception organized by the Subcommission to celebrate the publication of the two volumes.

- Following the final meeting of the International Geoscience Programme (IGCP) 653 ‘The onset of the Great Ordovician Biodiversification Event’ and the kickoff meeting of the IGCP 735 “Rocks n’ ROL (Filling knowledge gaps in the Early Palaeozoic Biodiversification)” organized jointly as a videoconference congress in Lille (France) on September 13th-16th 2021, two thematic volumes were scheduled in *Palaeogeography Palaeoclimatology Palaeoecology* and in *Geobios*. Both special issues are focused on the Ordovician radiations, and are co-guest-edited by current and former executive officers of the Subcommission. During 2022, numerous contributions were submitted to these two volumes, which have been both published in 2023.

- The second Annual Meeting of the International Geoscience Programme (IGCP) 735 "Rocks n' ROL (Filling knowledge gaps in the Early Palaeozoic Biodiversification)", which took place in Morocco (Oct. 2022) gave rise to a thematic volume issued in 2023 in *Frontiers in Ecology and Evolution*.

- The 14th International Symposium on the Ordovician System in Tallinn (Estonia, July 2023), which coincided with the third Annual Meeting of the International Geoscience Programme (IGCP) 735 "Rocks n' ROL", was followed by a thematic issue in *Estonian Journal of Earth Sciences*, also published in 2023.

- *Ordovician News* 40 (for 2022) was published in April 2023 and is available from the SOS webpage (http://ordovician.stratigraphy.org/).

- The SOS webpage changed its host, and is now managed as a separate page of the webpage of the ICS (http://stratigraphy.org/).

6. SUMMARY OF EXPENDITURE IN 2023:

(all figures in USD, totals rounded due to exchange rates)

a) Support for T. Servais (Chair) to SOS meeting (preparation of *Ordovician News* and *Geobios* special issue), Lyon (France), February 2023: **600 US $**

b) Support for B. Lefebvre (Secretary) to SOS meeting (preparation of STRATI2023 and ISOS14), Lille (France), April 2023: **500 US $**

c) Support for B. Lefebvre (Secretary) to attend STRATI2023, Lille (France), July 2023: **1000 US $**

d) Support for T. Servais (Chair) to attend ISOS14 and IGCP 735 Annual Meeting, Tallinn (Estonia), July 2023: **1250 US $**

e) Support for B. Lefebvre (Secretary) to attend ISOS14 and IGCP 735 Annual Meeting, Tallinn (Estonia), July 2023: **1250 US $**

f) SOS-sponsored reception for all participants of ISOS14, to celebrate the publication of the two Ordovician special issues (*Geol. Soc. Sp. Publ*. 532 and 533): **500 US $**

g) SOS-sponsored business dinner for all titular members present at ISOS14: **400 US $**

TOTAL (a–g): 5500 US $

7. SUMMARY OF INCOME IN 2023

Same as next item (ICS was the sole source of income)

8. BUDGET RECEIVED FROM ICS IN 2023

5500 US $

9. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR (2024):

- Elections to select a new Executive board (2024–2028).

- Partial replacement of Voting Members for the term 2024–2028; the objective is to reach a perfect gender balance and the best possible global coverage.

- Official inauguration of the second Standard Auxiliary Boundary Stratotype (SABS) for the base of the Ordovician System at the Xiaoyangqiao section, Dayangcha area, Jilin (Northern China), June 2024.

- Participation of SOS to the 37th International Geological Congress (IGC37), Busan (Korea), August 2024.

- Support of the 4th Annual Meeting of IGCP 735 to be held in Cordobá, Argentina, October 2024.

- Data will be gathered for *Ordovician News* 41 (to be published in March 2024).

10. KEY OBJECTIVES AND WORK PLAN FOR THE PERIOD 2020–2024

For further advancement and increased precision in correlation we need to focus on regional stratigraphy, regional scales and regional chronostratigraphic schemes. We recognise that many biotic, chemical and physical changes are not always synchronous, and that local and regional signals may vary from trends evident in global compilations. This is especially true for the Ordovician, where strong provincialism can mask biostratigraphic-based correlation. Ordovician regional stratigraphy and geology will therefore be the main goal for the period 2020-2024.

- To compile and publish an updated summary on Ordovician regional stratigraphy and geology: *A Global Synthesis of the Ordovician System*. Special attention is paid to precise correlation of the Ordovician depositional sequences and sea-level curves as well as stable isotope and regional biodiversity curves. This project was launched in 2021, and manuscripts were deposited in 2022. Two volumes (*Geological Society of London, Special Publications*), with ~600-800 pages, were compiled during 2022 and were published in 2023. The realisation of this publication, originally initiated over ten years ago, was the major objective of the Subcommission (2020-2024). The official presentation of the volumes took place at ISOS14 in Tallinn, July 2023.

- To better correlate Ordovician depositional sequences throughout the World.

- To design and execute a program of radiogenic dating of key Ordovician horizons (using Pb-Pb isotopes and CA-IDTIMS dating of zircons).

- The Ordovician website will be updated including development of a database for GSSPs and ASSPs.

11. Budget and ICS component requested for 2024 (all figures in USD)

a) Support for T. Servais (Chair) to attend IGC37 in Busan, Korea, August 2024: **4000 US $**

b) Support for T. Servais (Chair) to attend the inauguration of the Standard Auxiliary Boundary Stratotype (SABS) of the Cambrian-Ordovician boundary, in Dayangsha, China, June 2024: **2000 US $**

c) Support for B. Lefebvre (Secretary) to attend the inauguration of the Standard Auxiliary Boundary Stratotype (SABS) of the Cambrian-Ordovician boundary, in Dayangsha, China, June 2024: **2000 US $**

d) Support for B. Lefebvre (Secretary) to SOS business meeting in Lille, France, March 2024: **$500**

e) Support for T. Servais (Chair) to SOS business meeting in Lyon, France, September 2024: **$500**

As in previous years it is envisaged that officers will supplement any aid from the ICS with their own research funds. We have not quantified this support.

TOTAL 2024 BUDGET: **9000 US $**

REQUESTED FROM ICS: **9000 US $**

Potential funding sources outside IUGS: None.

Subcommission officers are mainly supported by their research projects for most of their activities.

APPENDIX – Current Executive Officers and Voting Members (2020-2024) & contact details

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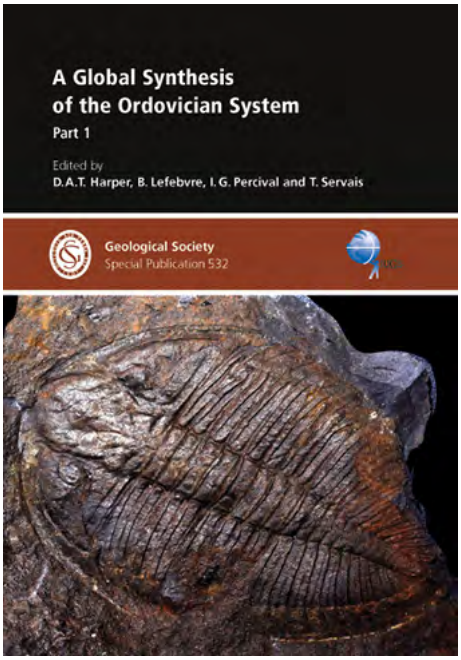
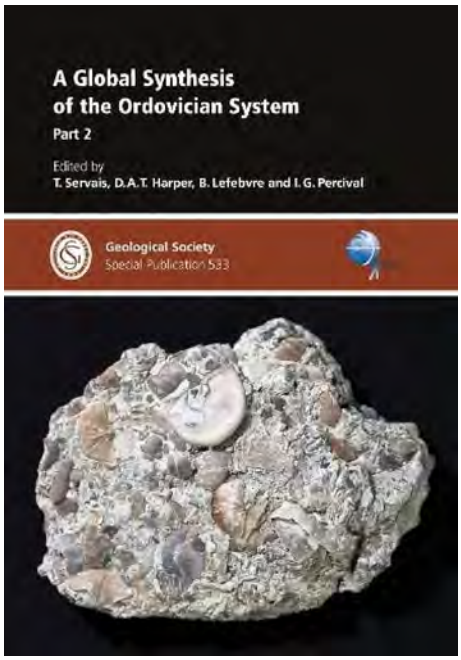
NEWS AND VIEWS

A Global Synthesis of the Ordovician System

Geological Society of London, Special Publications, vol. 532 & 533





The story of the "Global Synthesis of the Ordovician System" books goes back to August 2012. Dave Harper and Ian Percival (at that time Chair and Secretary of the Ordovician Subcommission) convened a session at the 34th IGC in Brisbane, Australia, sponsored by the Subcommission on Ordovician Stratigraphy. That session was designated Symposium *35.4 - Ordovician intercontinental correlations: developing global and regional chronostratigraphy.*

After the organization of this symposium the idea emerged about a publication of a global synthesis. Different potential authors have been contacted as early as 2013. The Chair of the Ordovician Subcommission (Dave Harper) contacted at that time the *Geological Society of London* as an editor (please, remember, that this was also the year of publication of the important monograph on early Palaeozoic palaeobiogeographies, published as the *Geol. Soc. Memoir* 38; eds. Harper & Servais). During the following years, the project was discussed at several moments. It is possible to trace back the history and the evolution of the project in previous issues of *Ordovician News*.

After a period of dormancy, the project of the publication of a 'global synthesis' was reinitiated by the new subcommission and its executive for the term 2020-2024. The Chair and Secretary of the previous term (Dave Harper and Ian Percival) agreed to work together with the new Chair and Secretary (Thomas Servais and Bertrand Lefebvre) to join their forces with this publication project.

After recontacting the editors of the Geol. Soc. London, it was agreed to present two separate issues of the *Geol. Soc. Special Publication* series. The four invited guest-editors proposed a publication in two volumes to provide a landmark synthesis from a global

perspective of the Ordovician Period, spanning 42 million years of Earth's history. The major project did finally involve international collaboration by over 150 specialists in Ordovician stratigraphy, palaeontology, palaeogeography, and other aspect of Ordovician geology. Most areas of the world with any significant Ordovician rocks were covered, many for the first time in an international publication in English.

The publications thus does fill a niche that no other global project on Ordovician geology had attempted to do since 1976.

We acknowledge the hard work of all authors. The majority of the chapters have actually been written or co-authored by current and past members of the Subcommission many of whom are acknowledged global experts/authorities in their specialities. The publication was also a result and a part of the activities of the two IGCP projects dedicated to the Ordovician, IGCP 653 (2016 - 2020, on extended term in 2021) and IGCP 735 (2021 - 2026).

The primary aims of the *Special Publication* volumes 532 and 533 were to provide an authoritative interpretation of the geology and historical development of one of the most crucial periods in Earth history. The volumes represent indeed a snapshot of knowledge accumulated over 140 years of international study of the Ordovician System, with particular emphasis on the great leaps in global correlation attained over the past several decades based on high-precision biostratigraphy and isotopic dating methods. By providing a detailed overview of Ordovician geology in the lesser known regions of the world where outcrops as well as much of the literature are unavailable or difficult to access, the *Special Publication* issues are designed to be a repository of accessible knowledge. We hope that these issues should remain as the standard reference on Ordovician geology for decades to come.

Thomas Servais and Bertrand Lefebvre, on behalf of all the co-guest-editors.

Meeting of the four editors of "A Global Synthesis of the Ordovician System" at the Geological Society of London, 13 May 2022 (from left to right: David Harper, Ian Percival, Bertrand Lefebvre and Thomas Servais).

Contents, volume 532

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Contents, volume 533

The radiations within the Great Ordovician Biodiversification Event

Palaeogeography, Palaeoclimatology, Palaeoecology, virtual special issue

Following the online congress, closing IGCP 653 and opening IGCP 735, organized at Lille, France, in September 2021, a special issue was proposed to the journal *Palaeo3*, to publish some of the papers presented during the congress. The papers resulting from this project, published in different issues of the journal, and assembled in a virtual special issue (VSI), were edited by Thomas Servais, David A.T. Harper, and Wenhui Wang.

The main objective was to provide various views to improve our understanding of the biodiversification of marine life that took place during the early Palaeozoic. The special issue features 16 selected papers that provide different perspectives on the Ordovician biodiversification events, illustrating a variety of radiations occurring during the Ordovician Period.

The special issue opens with an invited research article by Servais *et al*. (2023), who review the data on the early Palaeozoic radiation.

Two papers provide new insights into the Furongian Gap, i.e. the interval in the late Cambrian, where few data are available, between the Cambrian 'explosion' and the Ordovician 'event'. Whereas Deng *et al*. (2023) provide evidence that there is no gap in the Furongian in South China, Du *et al*. (2023) analyze the data from the PBDB and interpret the Furongian Biodiversity Gap as a collection failure.

Mángano *et al*. (2023) also investigate the upper Cambrian, by focusing on the trace fossils. They provide insights into the early steps of the colonization of brackish-water environments developing during the early phase of the Ordovician radiations.

The investigations of the upper Cambrian-Early Ordovician sections from the Argentine Cordillera Oriental of Serra *et al*. (2023) focus on the ecological dynamics of trilobite assemblages during the Furongian, Tremadocian and Floian. Their results suggest a context of higher ecological complexity than previously envisaged during these early stages of the Ordovician radiations.

Laibl *et al*. (2023) investigate the onset of the Plankton Revolution in the late Cambrian, by demonstrating that some trilobites developed planktic larvae during the Furongian and Early Ordovician. The authors show that Cambrian trilobites displayed exclusively benthic early post-embryonic stages, whereas, on the contrary, Ordovician trilobites display gradually one or more planktic stages.

Esteve and López-Pachón (2023) focus on the life modes of Ordovician trilobites, and in particular their swimming and feeding modes, using Computational Fluid Dynamic simulations (CFD).

A second study focused on Computational Fluid Dynamic simulations (CFD) constrain the morphological evolution of chitinozoans (Zhu *et al*., 2023), showing that several chitinozoans lineages evolved toward increased stability and a better ability to float during the Ordovician.

Toro *et al.* (2023) provide studies using CONOP9 for data from the Tremadocian to Dapingian of the Central Asian Basin to describe graptolite diversity trends, with a clear peak of graptolite diversity in the middle part of the Floian.

The heterochroneity of the Ordovician radiations is also documented by Kraft *et al.* (2023) who investigate the dendroid graptolites from one of the classical areas of Ordovician geology and palaeontology, the Barrandian, i.e. the Prague Basin in the Czech Republic. These authors point out that the diversity changes are primarily influenced by local environmental changes.

Lindskog *et al*. (2023) return to a key section for the Floian-lower Darriwilian (Lower-Middle Ordovician) in a classical region of Baltica, the Lanna area in south-central Sweden. The new study on coupled biostratigraphy and chemostratigraphy poses challenges for the use of 'carbon isotope excursions' (CIEs) because some of those recorded in Sweden are artefacts of local overprinting rather than indicative of changes in the global carbon cycle.

Stigall (2023) reviews the Richmondian Invasion, documenting in detail the dispersal and invasion dynamics. Some key implications for understanding both the Ordovician diversification and other intervals of Earth history are examined.

The sphinctozoan-bearing reefs of the Katian of South China are investigated by Li *et al*. (2023). The authors provide evidence for extensive synsedimentary cementation on the seafloor. The meter-scale reefs document the substantial increase of reef systems during the Late Ordovician, being an essential part of the long list of Ordovician radiations.

Hints *et al*. (2023) study paired carbon isotope chemostratigraphy across the Ordovician-Silurian boundary in the East Baltic region (northern Lithuania). This study also poses challenges for chemostratigraphic correlation, but essentially highlights the existence of global, basin-scale as well as probably local variations.

Sun *et al*. (2023) combine geochemical and palaeontological data from the Ordovician-Silurian interval in South China, presenting the data from a continuous sequence of seafloor redox records obtained from an interval spanning the upper Katian to middle Aeronian (Silurian) in the Changning region of South China.

The last chapter in the VSI investigates the nearshore warm-water biota that developed after the Late Ordovician Mass Extinction in the late Hirnantian of South China (Jeon *et al*., 2023) illustrating the post-extinction recovery with the developments of Silurian reefs.

Thomas Servais

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Ordovician of the World — Proceedings of the UNESCO/IGCP Project 653 absolutely final & Project 735 opening online meeting (13th–16th, September 2021)

Geobios, vol. 81

This thematic volume issued in *Geobios* in December 2023 gathers, in a stratigraphic order, a selection of Ordovician-related contributions providing a wealth of new data from various geographical areas, and thus contributes to filling knowledge gaps of Ordovician biodiversity. Most papers were originally presented at the Ordovician workshop, which was held in Lyon (France) from November 29th to December 1st, 2021. This workshop was the first indoor meeting of both IGCP 653 and 735, immediately after the covid pandemic.

Bertrand Lefebvre and Thomas Servais

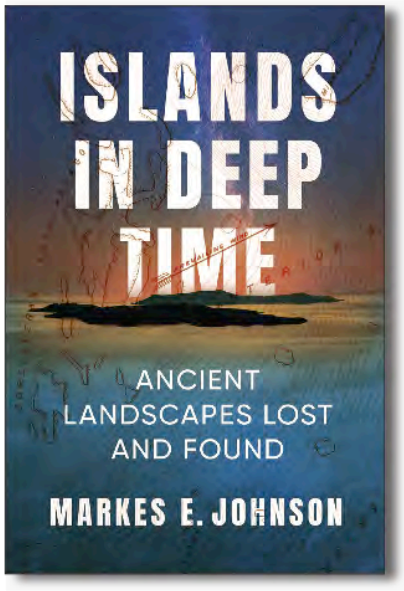
Editorial

Scientific contributions

Islands in Deep Time

Ancient Landscapes Lost and Found

Markes E. Johnson



Hilltops surrounded by farmland in southern Wisconsin turn out to be the eroded remnants of an ancient archipelago. An island in the Yellow Sea where Korean tourists flock is the peak of a flooded mountain rising from a drowned continental shelf. From a mountaintop shrine to Genghis Khan in Inner Mongolia, the silhouette of a Silurian seascape can be spotted. On the shores of Hudson Bay, where polar bears patrol the Arctic tundra, a close look unveils what was a tropical coastline encrusted with corals nearly 450 million years ago.

The geologist Markes E. Johnson invites readers on a journey through deep time to find the traces of ancient islands. He visits a dozen sites around the globe, looking above and below today's waterlines to uncover how landscapes of the past are preserved in the present. Going back 500 million years to the Cambrian through the Pleistocene 125,000 years ago, this book reconstructs how "paleoislands" appeared under different climatic conditions and environmental constraints. Finding vestiges of prehistoric ecologies, Johnson emphasizes the complexity of island ecosystems and the importance of preserving these significant sites.

Inviting and accessible, this book is a travelogue that takes readers through time as well as space. *Islands in Deep Time* shares the adventure of exploring striking locations across geologic eras and issues a passionate call for their conservation.

MARKES E. JOHNSON is the Charles L. MacMillan Professor of Natural Science Emeritus at Williams College. His most recent book is *Baja California's Coastal Landscapes Revealed: Excursions in Geologic Time and Climate Change* (2021).

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"*Islands in Deep Time* is a deep dive into the logic of geology: how vanished land- and seascapes can be conjured back into existence from the raw rock record. All geologists collect old rocks, but Markes Johnson collects entire ancient islands. This book is an exhibit of a dozen particularly fine specimens, which Johnson holds up and rotates so they can be viewed from multiple perspectives.'

—Marcia Bjornerud, author of *Geopedia: A Brief Compendium of Geologic Curiosities* and *Timefulness: How Thinking Like a Geologist Can Help Save the World*

"Using his lifetime of experience in geology, Johnson illustrates how a landscape can be read as the results of millions of years of geological, biological, and climatological processes. A fascinating and imaginative work."

—Henry Hooghiemstra, emeritus professor in the Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam

"*Islands in Deep Time* takes readers on hikes to ancient shorelines, featuring possibly the best descriptions and visualizations of field locations I have ever read."

—Gordon Chancellor, coeditor of *Charles Darwin's Notebooks from the Voyage of the Beagle*

Anticosti: an outstanding Canadian fossil site, and now a UNESCO World Heritage Site

On September 19, 2023, at the 45th enlarged session of UNESCO's World Heritage Committee in Riyadh, Saudi Arabia, Anticosti Island was inscribed on the World Heritage List. Anticosti's nomination was essentially based on the value of its geology. For over a century, Anticosti Island has been world-renowned for its exceptional fossils from the Upper Ordovician to Lower Silurian period, which have no equivalent anywhere else on the planet. This period represents an important milestone in Earth's history, namely the first mass extinction of animal life on a global scale. Anticosti Island is home to one of the thickest stratigraphic successions and the most complete fossil record of marine life from the 10-million-year span of Earth's history, from 447 to 437 million years ago. This interval of the Earth's history was not represented before this UNESCO World Heritage nomination.

Anticosti Island, Quebec's largest, is in Canada's Gulf of St. Lawrence, and covers an area of almost 8,000 km^2. The new heritage site covers almost all the island's coastline over more than 550 km, except for the only permanent settlement, the village of Port-Menier with nearly 200 residents. It also includes the major riverbeds of two main rivers, Jupiter and Vauréal. The entire World Heritage site lies within a network of protected areas, which covers an area of over 1,000 km^2. From a scientific point of view, this international recognition will have the effect of stimulating research on Anticosti, which is an extraordinary laboratory for studying fossils and sedimentary layers from the first mass extinction of life on Earth.

A. Desrochers

Latest Katian strata exposed at Vauréal Fall and part of the newly nominated Anticosti UNESCO World heritage site (courtesy of René Bourque)

Ordovician trilete spores from Saudi Arabia

A spectacular and intriguing assemblage of trilete spores have been observed from the Qusaiba-1 shallow core hole, Qasim region, central Saudi Arabia (Steemans *et al*., 2009; Wellman *et al*., 2015).

It was the first time that an assemblage of trilete spores was observed below the Silurian except rare occurrences of *Ambitisporites avitus* in the Late Ordovician (e.g. Steemans, 1996). This discovery went against the hypotheses concerning the evolution of the first land plants put forward by certain authors, going so far as to "forget" the existence of these publications in the absence of having peremptory arguments to prove that it is a scientific mistake (e.g. Strother & Foster, 2021).

Let's go to the facts:

- The samples are collected from cores and not cuttings.

- "*They were prepared at the University of Liège, Belgium, using standard palynological HCl HF–HCl acid maceration techniques (...). Subsequently selected duplicate samples were independently processed at the University of Sheffield and prepared using standard HCl–HF–HCl palynological acid maceration techniques (...). The palynological characteristics of preparations from both laboratories were identical. All of the samples yielded rich organic residues including palynomorphs (miospores, acritarchs, chitinozoans) that are abundant, well-preserved and of low thermal maturity* » (Wellman *et al*., 2015).

- Acritarchs and chitinozoans display a normal biostratigraphic succession without any reworkings or contaminations.

- The cryptospores observed are all in situ, without biostratigraphic anomalies.

- The trilete spores show the same state of preservation as the other palynomorphs.

- Trilete spores are observed in 8 samples.

- Except for one species, none of them are known higher in the stratigraphy, which makes their contamination unlikely.

After reading those arguments and after 15 years of absences of publications, which would demonstrate that these trilete spores are artifacts, it seems to me that it is time to accept that there were indeed plants producing trilete spores in the Upper Ordovician and that the new theories on the evolution of the first plants must take this into account.

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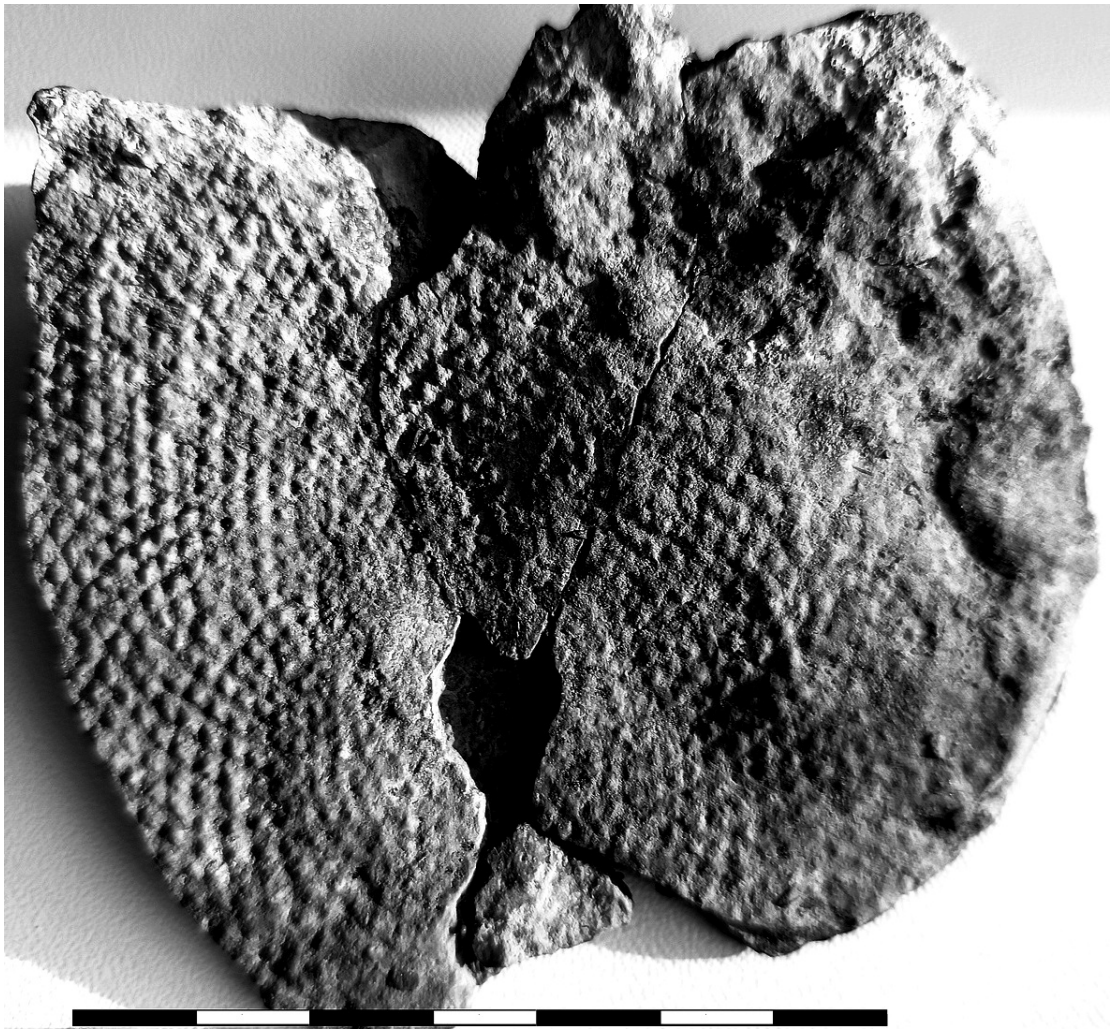

Receptaculites occidentalis from the Upper Ordovician Subich Formation, Dniester River, left bank Studenitsa Bay, Ukraine (courtesy of P. Grytsenko)

REPORT OF RECENT CONFERENCES

4th International Congress on Stratigraphy, Lille, France

11–13 July 2023

The fourth International Congress on Stratigraphy (STRATI2023, Lille, northern France) from July 11–13 has been celebrated as one of the most successful yet held. As for previous editions of STRATI, the Congress represents the main scientific meeting of the International Commission on Stratigraphy (ICS) that takes place every four years. STRATI meetings are specifically focused on all topics associated with improving and updating chronostratigraphy and geochronology together with the geological time scale.

The Organizing Committee of STRATI2023 was composed by members of the CNRS-Univ.Lille research unit "UMR 8198 Evo-Eco-Paleo" and of the French Geological Society "Société Géologique de France", having the main leaders in Thomas Servais and Borja Cascales-Minana (CNRS), Catherine Crônier, Sébastien Clausen and Claude Monnet (University of Lille) and Solange Chaimbault (French Geological Society).

STRATI2023 was attended by 285 participants from over 40 countries from all over the world. The sessions took place in the Congress Centre of Lille University at the Cité Scientifique of Villeneuve d'Ascq. The scientific program was intended to give space to all stratigraphic fields, methodologies and applications. Six magnificent key-note talks have explored a wide range of topics of great interest for every time-frame: biomineralization (Lucia Angiolini), chemostratigraphy (Michael M. Joachimski), paleogeography (Christopher Scotese), global events (Laia Allegret), astrochronology (Jacques Laskar) and fossils in stratigraphy (Steven Holland).

Welcome address by David Harper, Chair of the ICS

Six general plenary sessions ("Advances in cyclostratigraphy – reconstructing geological time, palaeoclimate, and the Solar and Earth-Moon systems", "From rock to time: evolutionary lineages and the calibration of the Chronostratigraphic Scale", "Quantitative stratigraphic analysis using databases", "Palynology as a tool in multidisciplinary research: advances and applications", "Integrated stratigraphy: methods and concepts", "Miscellaneous session"), 17 Sub-Commission sessions (including the one on "Ordovician: correlation of events") and two workshops ("OneStratigraphy Database and Constrained Optimization (CONOP) analysis" and "Radio-isotopic dating") document the variegated pattern of contributions that have enriched STRATI2023.

Six talks have comprised the Ordovician session (David Harper: "The Dawn of the Dapingian: the search for early radiations of Ordovician rhynchonelliform brachiopods"; Joshua B. Zimmt and co-authors: "A new framework for reinterpreting the Late Ordovician mass extinction on Anticosti Island (Québec, Canada): Sequence stratigraphic correlation within the eastern Ellis Bay Formation"; Qijian Li and co-authors: "Late Ordovician beachrock as far-field indicator for glacial meltwater pulse"; Bing Huang and co-authors: "Did the Late Ordovician mass extinction event trigger the earliest evolution of "strophodontoid" brachiopods?"; Timothy Paton and co-authors: "Paleovalleys preserve new insights into the genesis of Upper Ordovician REE-enriched phosphorites"; Ian Percival and co-author: "Biostratigraphic subdivision of the Ordovician System in Australia incorporating water depths and facies"), followed by the Sub-Commission business meeting. The extended abstracts for key-note talks, presentations and posters are available at:
https://strati2023.sciencesconf.org/data/pages/book_strati2023_en_vd.pdf

The excursions at STRATI2023 have been various and instructive, and they were heartily enjoyed by participants. Before the meeting, among a selection of excursions, a four-days trip focused on the "British classical" stratigraphy, including Paleozoic sections, and a post-congress four-day excursion was fully devoted to the Ordovician succession of northern and central Estonia. All-type of exposures (coastal cliffs, active quarries, opencast mines, and selected drill cores) have illustrated the full Ordovician sequence of Estonia.

The conference dinner at the magnificent "Salle des Hospices" in Lille, an ancient hospice of the late 15th Century, was an occasion to congratulate the Organizers for such a successful meeting.

Annalisa Ferretti

14th International Symposium on the Ordovician System & 3rd Annual Meeting of IGCP 735 Tallinn, Estonia

19–21 July 2023

The 14th International Ordovician Symposium, organized under the auspices of the International Union of Geological Sciences' Ordovician Stratigraphy Subcommittee, took place in Tallinn from July 15th to 21st, 2023.

It brought together over a hundred specialists in Ordovician-era geological studies from 20 countries from all continents except Antarctica. The conference presented a cross-section of ongoing research results from many research groups in a form of 81 oral presentations and posters.

A special issue of the *Estonian Journal of Earth Sciences* (2023, vol. 71, no. 1) was dedicated to the conference, featuring summaries of the proceedings. The conference also featured the presentation of a two-volume monograph titled *A Global Synthesis of the Ordovician System* (The Geological Society, 2023).

Group photograph (courtesy of Organizing committee, ISOS14).

The pre-conference excursion, attended by over 40 participants, lasted four days (15–18 July) and included visits to coastal outcrops and quarries in Northern Estonia, ranging from the Ristna and Põõsaspea peninsulas in Northwest Estonia to the Valaste waterfall and the Kiviõli II oil shale quarry in Northeast Estonia (see Hints & Toom, 2023).

Group photograph at Uuga Cliff on Pakri Peninsula, NW Estonia (courtesy of O. Hints).

A post-conference excursion, led by colleagues from Uppsala University and attended by 15 participants, spanned four days (23–26 July) and involved visits to Ordovician rock outcrops in Central and Southern Sweden (see Ebbestad *et al*., 2023).

Tõnu Meidla

Estonian Journal of Earth Sciences 2023, 72/1
Special issue Proceedings of the 14th International Symposium
on the Ordovician System
Guest Editors: Tõnu Meidla and Peep Männik

Short communications

Abstracts

14TH ISOS
ESTONIA 2023

11th European Conference on Echinoderms
Lyon, France

16–20 October 2023

Since the late 1970s, European echinoderm conferences have been held alternately with the International Echinoderm Conferences, providing an opportunity for scientific exchange between biologists and palaeontologists working on modern and extinct echinoderms. So far, various institutions and universities in Belgium, Italy, U.K., Germany, Poland and, most recently, Russia (Moscow 2019) have been selected as conference venues. The meeting in Lyon is only the second of its kind in France (after Banyuls-sur-Mer in 2001) and was the first directly after the COVID-19 pandemic that could take place in presence again.

Organised by the University of Lyon (Bertrand Lefebvre), the University of Burgundy (Thomas Saucède) and the CNRS/Sorbonne University Villefranche-sur-Mer marine biology station (Raffaela Cattaneo), the most recent *European Conference on Echinoderms* took place from 16-20 October 2023, with scientific sessions in the Géode building on one of the campuses of the University of Lyon 1.

Directly before the conference (11-15 October 2023), an excursion with almost 20 participants took place to the marine biological station in Villefranche-sur-Mer at the Mediterranean Sea, southwest of Monaco.

Day excursions on a common action day between the scientific sessions took the majority of the participants to the Ardèche (a department in Auvergne-Rhône-Alpes, southeastern France) to enjoy culinary specialities and visit the fossil treasures of the La Voulte fossil lagerstätte or enabled them to visit the zoological and palaeontological collections of the University of Lyon 1 or the Lyon aquarium.

In total, more than 120 participants from 27 countries, mostly from Europe, but also from North and Central America, Asia, Africa and Australia/New Zealand, accepted the invitation of the French hosts. Of the 7 keynote presentations, 85 talks and 59 posters, about 15 were related to the evolution, systematics, palaeobiology, stratigraphy or palaeobiogeography of Cambrian–Ordovician echinoderms, such as the Stylophora, Edrioasteroidea, Eocrinoidea, Diploporita, Soluta and Echinozoa.

The IGCP project 735 *Rocks and the Rise of Ordovician Life (Filling knowledge gaps in the Early Palaeozoic Biodiversification)* supported a palaeontological session of the conference dealing with Palaeozoic echinoderms and provided funding for travel grants for young, actively participating young scientists. Some contributions and discussions were related to the revision of the *Treatise on Invertebrate Paleontology (Part U, Echinodermata)*, which has been ongoing for several years. The results of the Lyon ECE11 will be published in the scientific journal *CBM-Cahiers de Biologie Marine* (CNRS – Station Biologique de Roscoff; https://cbm.sb-roscoff.fr/).

Overall, the organisers can only be congratulated for the very well organised conference, which took place in an almost informal atmosphere and also offered plenty of space for discussions, networking and shared culinary delights, among other things. The venue for the *12th European Conference on Echinoderms* has not yet been decided. The next *International Echinoderm Conference (IEC17)* will take place together with the *2nd International Hemichordate Meeting* in Puerto de La Cruz, Tenerife, Spain (15-19 July 2024).

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Most of the conference participants of the ECE11 in Lyon, posing for a group photograph (courtesy of Vincent Perrier)

CONFERENCE ANNOUNCEMENTS

6th International Conference of Palaeogeography, Nanjing, China

17–20 May 2024

Website: *https://www.isp2022.org/en/conferences/*

Description: The International Conference of Palaeogeography (ICP) is a biennial event that aims to foster international academic exchange and interdisciplinary collaboration in palaeogeography and related fields, including for example the prediction and exploration of energy and mineral resources worldwide. Since its inception in 2013, the ICP has been held five times, respectively in Beijing (2013), Beijing (2015), Chengdu (2017), Beijing (2019) and Wuhan (2022) in China. The International Society of Palaeogeography Council has decided that, based on the recommendation of the late honorary chairman of the International Society of Palaeogeography, Prof. Zengzhao FENG, the sixth ICP (ICP6) will take place in Nanjing, China in May 2024. ICP6 will be organized by Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences (NIGPAS), together with some co-organizing institutions. It will be co-sponsored by the International Society of Palaeogeography, the Palaeontological Society of China, China University of Petroleum (Beijing), the Editorial Committee of the Journal of Palaeogeography, and the Lithofacies Palaeogeography Professional Committee of the Chinese Society for Mineralogy, Petrology and Geochemistry. Sadly, Prof. Zengzhao FENG passed away in January 2023. We would like to commemorate his great contributions to the development of global palaeogeography by holding this ICP6.

Organising Committee: Renbin ZHAN and Zhidong BAO (chairs), Jun WANG, Bo WANG, Hairuo QING, Xiujuan ZHENG (vice-chairs).

Scientific Committee: Shenghe WU and David A.T. HARPER (chairs), Suping PENG, Maoyan ZHU and Ian D. SOMERVILLE (vice-chairs), Bo WANG, Santanu BANERJEE, Daidu FAN (general secretary)

Scientific sessions: The academic activities of the conference will cover the broad fields of palaeogeography and its related disciplines, including biopalaeogeography, lithofacies palaeogeography, tectonic palaeogeography, global palaeogeographic reconstruction, resource palaeogeography, Quaternary palaeogeography, and so on. Themes and sessions proposed by convenors are listed as below.

Please note that Session T2-2 is a joint IGCP700 and IGCP735 session proposed by Mongkol UDCHACHON, Clive BURRETT, Jitao CHEN, Wenhui WANG and Xiang FANG.

T1: Palaeogeography and major evolutionary events of life

- Session T1-1: Palaeobiogeography and major biotic transitions
- Session T1-2: Biological process in sedimentation ichnological applications in palaeoecology and palaeogeography
- Session T1-3: Systematics, paleoecology and palaeogeography of hypercalcified sponges
- Session T1-4: Sedimentology of mass extinctions and biotic crises
- Session T1-5: How do fossil data advance our knowledge of palaeoenvironments and palaeogeography?
- Session T1-6: Palaeogeography of bioliths: models and application in the exploration of petroleum and ore deposits
- Session T1-7: Current and fossil bioconstructions and reefs
- Session T1-8: Palaeobotany and palaeogeography

T2: Lithofacies palaeogeography and sedimentology

- Session T2-1: Carbonate sedimentation: from facies analysis to global changes
- Session T2-2: Carbonate platforms in Asia (IGCP700-IGCP735 session)
- Session T2-3: Non-marine carbonate sedimentology
- Session T2-4: Lacustrine depositional system and sequence stratigraphy
- Session T2-5: Marine siliciclastic sedimentation: from process to basin research
- Session T2-6: Sediment gravity flows and deep-water sedimentology
- Session T2-7: Aeolian depositional systems and desert basins
- Session T2-8: Fluvial and deltaic sedimentology
- Session T2-9: Small scale palaeogeography and sedimentary architecture
- Session T2-10: Mixed depositional processes in coastal to shelf environments
- Session T2-11: Volcanic activity: environmental impact and resource significance

T3: Tectonic palaeogeography and global palaeogeographic reconstruction

- Session T3-1: Global palaeogeographic reconstruction
- Session T3-2: Control of compressional tectonics on depositional systems and palaeogeography
- Session T3-3: Tectonic palaeogeography and sedimentation

T4: Resource palaeogeography and sedimentary mineral deposits

- Session T4-1: Deep-water deposition and petroleum geology
- Session T4-2: Deep and ultra-deep reservoir and hydrocarbon accumulation
- Session T4-3: Carbonate-evaporite paragenesis system: palaeogeographic reconstruction and resource implications
- Session T4-4: Siliciclastic reservoir geology and hydrocarbon exploration
- Session T4-5: Reservoir heterogeneity and hydrocarbon development
- Session T4-6: Unconventional petroleum and fine-grained sedimentology
- Session T4-7: Recent advances in the study of hydrocarbon activities under various palaeogeographic and tectonic settings
- Session T4-8: Organic-inorganic interactions in sedimentary basins
- Session T4-9: Organic matter enrichment and petroleum accumulation in continental saline lacustrine basins

- Session T4-10: Dolomitization and dolomite reservoirs
- Session T4-11: Palaeogeography in the exploration of coal and related mineral deposits
- Session T4-12: Sedimentary metal ore deposits and palaeogeography

T5: Quaternary and Holocene palaeogeography
- Session T5-1: Quaternary and Holocene palaeogeography

T6: Global change and event sedimentation
- Session T6-1: Reading the records of event deposits: processes, mechanisms and implications
- Session T6-2: Authigenic minerals and global changes: micro-archives of the big picture
- Session T6-3: Rapid climate changes and environmental crises during the Mesozoic-Cenozoic hyperthermals
- Session T6-4: Palaeogeography, palaeoclimate, and palaeoceanography of the Late Palaeozoic Ice Age
- Session T6-5: Carbon, nitrogen and sulfur cycles and Earth systems evolution

T7: New techniques and methods in palaeogeographic researches
- Session T7-1: Multi-scale digital geology and sedimentary simulation
- Session T7-2: Seismic sedimentology and its application in palaeogeographic reconstruction
- Session T7-3: Well-logging sedimentology and palaeoenvironment
- Session T7-4: Geochemical research and its application in palaeoenvironment and resource exploration
- Session T7-5: Palaeoclimate and palaeoceanographic research using novel isotopic approaches
- Session T7-6: Data and modeling of deep-time geography
- Session T7-7: Palaeogeographic reconstruction using multiple data
- Session T7-8: Astronomical forcing of palaeoclimate and palaeoenvironmental systems

Important dates:

- Deadline for abstract submission: March 15, 2024
- Deadline for early-bird registration: March 15, 2024
- Release of 3rd circular and conference program: April 30, 2024
- Deadline for registration of field trips: April 30, 2024
- Pre-conference field trip: May 13–16, 2024
- Onsite registration, ice-breakers: May 17, 2024
- Opening of the 6th International Conference of Palaeogeography: May 18, 2024
- Mid-conference field trip (half-day): May 19, 2024
- Closing ceremony: May 20, 2024
- Post-conference field trips: May 21–25, 2024

Registration and financial support: Participants are suggested to visit the conference website to register for the conference and the field trips, and to obtain invoices. If you have any problems with online payment, please contact the Secretariat or change to pay by bank transfer (note "The 6th International Conference of Palaeogeography" or "ICP6", names of participants, organization, title, and invoicing information). Different registration fees are categorized for ISP members and non-members, and all participants are encouraged to register as ISP members, with a membership fee of 200 CNY (50 USD) per year.

Conference registration fee:

	Before March 15, 2024	**After March 15, 2024**	**Onsite**
Member participant (professional)	2000 CNY (300 USD)	2500 CNY (380 USD)	2700 CNY (410 USD)
Non-member participant (professional)	2500 CNY (375 USD)	3000 CNY (450 USD)	3200 CNY (480 USD)
Student member	1500 CNY (225 USD)	1800 CNY (270 USD)	2000 CNY (300 USD
Student without membership	1800 CNY (270 USD)	2100 CNY (315 USD)	2300 CNY (345 USD)
Accompanying participant		1000 CNY (150 USD)	

The conference will provide some financial support to a limited number of participants who need supports to cover the expenses of travelling and accommodations. One of the available financial support is from the *Journal of Palaeogeography (English Edition)*. Scholars outside China who meet the following criteria may apply for financial support to attend the conference: (1) Contribute a full-length manuscript to the *Journal of Palaeogeography (English Edition)* (JCR: Q1; IF=2.9 (2023), journal website: https://www2.cloud.editorialmanager.com/jopal/default2.aspx) by January 15, 2024), which will be peer-reviewed, and in the case that the manuscript be eventually accepted by April 15, 2024; (2) Attend the conference and give an oral presentation.

Note: 1) The financial support may cover the conference registration fee, accommodation, and one return international airfare (economy class only); 2) Those who wish to apply for financial support to attend the conference should specify "Application for the 6th International Conference of Palaeogeography" in the manuscript submission e-mail or cover letter. Additional details on the fees and financial support will be provided in the Third Circular.


Venue and accommodation: Nanjing Hengda Hotel, No. 188 Yonghu Road, Lishui District, Nanjing, Jiangsu Province. Room price: Double bed room, 380 CNY; Single room, 380 CNY; Suite, 490 CNY. As quite a number of participants may participate in the conference, participants are suggested to make their reservations as early as possible. Reservations can be placed by scanning the WeChat QR code below or by contacting the Secretariat via e-mail.

Abstract and presentation format and requirement: An abstract volume (including oral and poster presentations) will be released at the conference. The deadline for submission of abstracts is March 15, 2024. The format of the abstracts is as follows: each abstract should not exceed one page of A4 paper, including one figure/table as maximum. The content of the abstract includes the title, author's name, author's institution, corresponding author's E-mail, body of the abstract, and keywords. Abstracts should be written in document format (.doc or .docx). The abstract format template and submission pattern are provided on the conference website https://www.isp2022.org/en/conferences/. The conference language will be English. The conference will invite a number of renowned scientists to make plenary presentations, and set up a number of themal sessions. The presentation types and their corresponding times are shown as follows (multimedia ratio type 16:9):

1. Plenary talk: 40 minutes, including 35 minutes for talk and 5 minutes for questions and discussions;
2. Keynote talk: 20 minutes, including 15 minutes for talk and 5 minutes for questions and discussions;
3. General oral presentation: 15 minutes, including 12 minutes for oral presentations and (participants may prepare their talks as recorded video and play the video at the conference, with a resolution of not less than 1920×1080) and 3 minutes for on-site questions and discussions;
4. Poster: the size of the poster is 90 cm × 120 cm (width × height), which needs to be posted in advance in the designated area by the authors themselves.

Field trips: The conference will organize four field trips: one pre-conference field trip (F1) and three post-conference trips (F2, F3, and F4). The deadline for registration of the field trips is April 30, 2024 (the feasibility of the field excursions will depend on the number of registrants; should the excursions be canceled, the Secretariat will contact the registered participants for refunds). Participants can visit the conference website to register and pay the fees for the field trips.

F1. Neoproterozoic–Palaeozoic marine deposits and geological events in Anhui, Jiangxi and Zhejiang provinces, South China

Introduction— Participants will visit several classic stratigraphic sections and biotas of Neoproterozoic and Palaeozoic in the border area of Anhui, Zhejiang and Jiangxi provinces, including the Lantian biota in Anhui Province, the Duibian section (GSSP for the Jiangshanian Stage, Cambrian) near Jiangshan City, the Huangnitang section (GSSP for the Darriwilian Stage, Ordovician) in Changshan County, the Lijia biota near Jiande City, and the Meishan section (GSSPs for both the base of the Changxingian Stage of Permian, and the Permian-Triassic Boundary) in Changxing County, Zhejiang Province.

Schedule— Participants will gather in Nanjing on the evening of May 13, 2024. On May 14, participants will depart for Anhui Province to investigate the sections and the Lantian biota in Xiuning County. On May 15, participants will go to Changshan County to investigate the Huangnitang section (GSSP for the base of the Darriwilian Stage, Ordovician), "Golden Spike" Museum, Changshan Museum of Curiosities in Changshan and the Cretaceous terrestrial stratigraphy of Jianglangshan Mountain in Jiangshan. On May 16, participants will visit the Duibian section (GSSP for the base of the Jiangshanian Stage, Cambrian) and the Carboniferous sedimentary cycles in Jiangshan, and will visit the Lijia biota and its sections in Jiande, and then head for Changxing County. On the morning of May 17, participants will visit the Meishan section (GSSPs for both the base of the Changxingian Stage of Permian, and the Permian-Triassic Boundary) in Changxing County, Zhejiang Province, and then back to Nanjing in the afternoon, where the delegates will register for the meeting.

Registration fee— 3000 CNY (450 USD) (Shared room) or 4000 CNY (600 USD) (Single room), limited to 20 participants.

Leaders— Jitao CHEN, Chengguo GUAN, Wenjie LI, Cheng JI, Quanfeng ZHENG
(Contact: Wenjie LI, +8613386328787, wjli@nigpas.ac.cn)

F2. Neoproterozoic–Palaeozoic successions and fossil records in the Middle–Upper Yangtze Region, South China

Introduction— Participants will investigate several classic stratigraphic sections and some exceptionally-preserved biotas of Neoproterozoic to Palaeozoic in Hubei, Hunan and Chongqing provinces/municipality, including the Shibantan biota (Ediacaran), Luoyixi section (GSSP for the base of the Guzhangian Stage, Cambrian), Paibi section (GSSP for the base of the Paibian Stage, Cambrian), Liexi biota (Ordovician) and Xiangxi Global Geopark (UNESCO) in Hunan Province, and the Huanghuachang section (GSSP for the base of the Dapingian Stage, Ordovician) and Wangjiawan section (GSSP for the base of the Hirnantian Stage of Ordovician, and the Ordovician-Silurian boundary) in Hubei Province, and possibly a few stratigraphic sections of Upper Palaeozoic.

Schedule— Participants will depart for Yichang from Nanjing on the morning of May 21, 2024, by railway. Participants will investigate the Huanghuachang section (GSSP for the base of the Dapingian Stage, Ordovician) and Wangjiawan section (GSSP for the base of the Hirnantian Stage of Ordovician, and the Ordovician-Silurian boundary) in Hubei Province. On May 22, participants will visit the Shibantan biota (Ediacaran) and Qingjiang biota (Cambrian) in Yichang. On May 24, participants will depart for Yongshun County in Hunan Province, and visit the Liexi biota and Xiangxi Global Geopark (UNESCO). On May 24, participants will visit the Luoyixi section (GSSP for the base of the Guzhangian Stage, Cambrian) and the Paibi section (GSSP for the base of the Paibian Stage, Cambrian). On May 24, participants will return to Changsha to be dismissed at noon.

Registration fee— 4000 CNY (600 USD) (Shared room) or 5000 CNY (750 USD) (Single room), including the train ticket from Nanjing to Yichang on May 21, 2024, limited to 30 participants.

Leaders— Rongchang WU, Chuanshang WAGN, Qing CHEN, Wenhui WANG, Xiang FANG (Contact: Xiang FANG, +8618652964730, xfang@nigpas.ac.cn)

15th International Palynological Congress & 11th International Organization of Palaeobotany Congress Prague, Czech Republic

27–31 May 2024

Website: *https://prague2020.cz/*

Description: PC and IOPC have long traditions, that started in 1962 and 1980 respectively. Since the XII IPC and VIII IOPC 2008 in Bonn, the congresses have been organised together.

1820 – 2020: 200 YEARS OF MODERN PALAEOBOTANY IPC/IOPC Prague 2024. The XVth International Palynological Congress and XIth International Organization of Palaeobotany Congress, Prague, Czech Republic is dedicated to the 200th anniversary of Palaeobotany. 1820 saw the first use of binomial nomenclature for fossil plants by the Czech "Father of Palaeobotany" Caspar Maria Sternberg, who published *Flora der Vorwelt* in this year. Palynology and palaeobotany have a long tradition in the Czech Republic and Slovakia with several eminent pioneers including Kaspar Sternberg, Karl and Otakar Feistmantels, Augustin Corda, Dionyz Stur and Karel Bořivoj Presl. Well-known Czech and Slovak palynologists and palaeobotanists of the last and this centuries include Milada Kalibová, Magda Konzalová, Zlatko Kvaček, František Němejc, Blanka Pacltová, Eva Planderová, Milada Vavrdová and Jozef Vozár.

Organising Committee: Bek Jiří (chair; bek@gli.cas.cz), Kvaček Jiří (vice-chair; jiri.kvacek@nm.cz), Jana Votočková Frojdová (general secretary; frojdova@gli.cas.cz)

Scientific sessions: Please note that if there are not enough presentations in the symposium you choose, your presentation will be placed in another appropriate symposium. If there are too many lectures, your presentation may be changed to a poster. You will be informed in advance.

List of symposia:

- A01 Late Precambrian to early Paleozoic OWM (Organic-Walled Microfossils) and SCF (Small Carbonaceous Fossils)
- A02 Advances in Devonian palaeobotany
- A03 Permian plant succession and the global climate changes
- A04 Glimpses of the evolution of Fungi
- A05 Late Palaeozoic continental ecosystems of Gondwana
- A06 Palaeozoic palaeobotany: taxonomy, diversity and palaeoecology
- B01 From snowball to hyperthermals: Palaeobotanical and palynological signatures of Earth's extreme climate events
- B02 Permo-Carboniferous peat-forming tropical forests buried in situ by volcanic ash in the light of palaeobotanical and palynological research; results from the Czech Republic and China
- B03 CIMP sponsored symposium on Palaeozoic palynology
- B04 Gymnosperm cones across time and phylogeny

- C01 Paleo-evo-devo: reciprocal illumination between the fossil record and evolutionary developmental biology
- C02 The Legacy of Plant diversity and environmental background across the critical intervals of the Mesozoic
- C03 Vegetation history and evolution of terrestrial ecosystems in Southern Africa, from early land plants to modern vegetation
- C04 Mesozoic plant cuticles: implications for evolution and palaeoenvironment
- C05 Recent advances in the study of Cretaceous angiosperms
- C06 Early Cretaceous and Jurassic floras of Asia
- D01 In situ and adhered pollen from fossil flowers and animals and their associated paleofloras
- D02 Reproductive organs of fossil plants and their in-situ spores and pollen
- D03 Global insights into the evolutionary origin of Mediterranean-type ecosystems: taxonomy, palaeoecology, palaeogeography, and taphonomy
- H01 Quantitative reconstruction of Holocene land-use and land-cover change: advances and applications
- H02 Forward to the past-research development on quantifying land cover change and its implication for the biosphere
- H03 Application of palynological and palaeoecological information in conservation and restoration
- H04 Back to the Future? Sub-boreal vegetation and climate as a reference for future environmental dynamics
- H05 Changing Island Ecosystems
- H06 Long-term tropical forest dynamics; critical knowledge in a changing world
- H07 Mountain Palaeoecology on the move: The future of mountain ecosystems - perspectives through palaeoecology
- H08 Big events-Big Impacts. Success and adaptation strategies of ancient populations to climate changes
- M01 Modern pollen-vegetation studies for past land-cover reconstructions and calibration of the fossil pollen record
- M02 Recent advances in dinoflagellates and their cysts as environmental tracers
- M03 Extra microfossils in pollen slides: from environmental indicators to biotic interactions
- M04 Fire as an ecological and evolutional driver of terrestrial biota
- M05 Molecular proxies in palaeoecology: recent developments and their implications for understanding past environments and ecosystems
- M06 Morphological disparity and evolution in the plant fossil record
- M07 Applied palynology: methodological innovations
- M08 Open symposium on basic (LM, SEM, TEM) and applied palynology (melissopalynology, aeropalynology, forensic palynology)
- Q01 Biogeographical history of tree taxa: past trends and modern frameworks
- Q02 Exploring ecological concepts in the Quaternary
- Q03 Glacial-interglacial cycles as natural experiments
- T01 Challenges in studying Cenozoic vegetation history - In memoriam Zlatko Kvaček (1937-2020)
- T02 Cenozoic continental climate and vegetation patterns on both sides of the North Pacific-an open NECLIME symposium
- T03 Identifying Cenozoic fossil fruits and seeds: challenges and progress

- T04 The evolution of plant diversity under palaeoenvironmental changes in the Qinghai-Tibetan Plateau Region
- T05 Insights on Southern Hemisphere Cenozoic Paleobotany
- Z01 IAWA Fossil Wood Symposium
- Z02 Palaeobotany at the forefront of gender equality
- Z03 Phylogenetic Palaeobotany
- Z04 Palynology and palaeobotany in the digital era
- Z05 Plant insect interaction and their co-evolution during deep time
- CQ01 Botanical Nomenclature in Palaeobotany and Palaeopalynology, Colloquium
- W01 Estimating pollen productivity with R tools/disqover package
- W02 Whole-plant functional traits from the fossil record: a consortium for critical assessment and development

Important dates:
- Pre-early registration: November 15, 2023
- Early registration: December 20, 2023
- Abstract submission: January 24, 2024
- Abstract authors notification: February 14, 2024
- Abstract authors registration: February 29, 2024
- Regular registration: February 29, 2024
- Late/Onsite registration: May 31, 2024

Registration and financial support: Click here to register

All participants must Create an Account and register via the **Online Registration Form**. Please read the instructions below carefully. Please also consider using a personal email account if your work email is connected to an institute with high security and privacy settings as the email may be transferred to junk folders. Each participant will receive a registration number by email after submitting the **Online Registration Form**. The preferred method of payment is by online card payment. As for payments completed by bank transfer, please proceed with the payment transfer only after receiving your registration number. **Payment by bank transfer must include the registration number and participant's name in the payment details.** Please make sure to pay your registration fee before the deadline for the selected registration type. The late fee will be automatically applied if your payment is not received before the deadline date. Unpaid or partially paid registration will not be considered valid until fully paid. All registration deadlines are applicable considering the local time (CET/CEST).

Venue and accommodation: The congress will be held in the Clarion Congress Hotel Prague, Freyova 33, Prague 9. This is an international four-star hotel and a state-of-the-art conference center, providing high quality services. The hotel is 30 minutes by car from the International Václav Havel Airport and 10 minutes by metro from the historic city centre of Prague. The conference centre is directly on the metro B line, station "Vysočanská". The hotel offers accommodation in 559 rooms. All rooms and public areas are fully air-conditioned. Boarding is provided in 3 hotel restaurants, with total capacity up to 900 seats. Conference quarters are divided into 23 halls and meeting rooms, comfortably seating up to 2500 participants. The facilities are equipped with state-of-the-art audio-visual technology.

Abstract and presentation format and requirement: Abstracts MUST be submitted electronically via the online submission system by **24 January 2024**, according to the instructions below. Abstracts received by e-mail or after the deadline will not be accepted and therefore cannot be considered for the programme or publication. Abstracts may be submitted to the following symposia. Select a preferred presentation method upon submission: Oral presentation or: Poster presentation. Corrections to the abstracts can be made only before the deadline of 24 January 2024. Abstracts will be reviewed by conveners and selected for either oral or poster presentation. A preference for oral or poster presentations may be indicated when submitting the abstract. However, the final decision on how the abstract is presented will be made by the reviewers. Accepted abstracts will be published in the Abstract Book. Please have your abstract checked for correct spelling, punctuation, grammar, and formal structure. The organiser reserves the right to edit abstracts, if necessary, prior to publication in the Abstract Book. All submitters and presenting authors will receive an acceptance notification via e-mail on 14 February 2024. All presenting authors are required to register by 29 February 2024. Registration along with payment of the registration fee is required by this date for the abstract to be included in the conference programme and published in the Abstract Book. Should the author fail to comply with either of these items, the organiser reserves the right not to include the author's work in the conference programme or in the Abstract Book.

Abstract Formatting —

- All abstracts must be written in English. If your abstract is accepted for an oral presentation, you must be able to give your presentation in English and answer questions from the audience.
- When submitting your abstract, consider and select the scientific topic (see above) and the preferred presentation method. However, the Scientific Committee reserves the right to decide on the final topic assignment after abstract selection.
- One presenting author can present only one abstract.
- There is no limit to the number of co-authors per abstract. The order of co-authors can be changed, if necessary, by swapping the names in the list of co-authors.
- Maximum abstract length is 300 words. The system will automatically inform you whether you complied with the rules before accepting your submission.

Should you have any questions, please contact the IPC/IOPC 2024 Scientific Programme Secretariat for any assistance at abstracts@prague2020.cz .

9th 2024 IBC/CIB

INTERNATIONAL BRACHIOPOD CONGRESS
CONGRÈS INTERNATIONAL SUR LES BRACHIOPODES
St.Catharines, Ontario, Canada

Venue and dates: 9th IBC/CIB – 2024, June 24 – 27, 2024
Brock University, 1812 Sir Isaac Brock Way, St. Catharines, Ontario, Canada

Scientific program: The 9th IBC/CIB (International Brachiopod Congress / Congrès International sur les Brachiopodes) invites contributions covering all aspects covering Modern to Cambrian brachiopods. Topics may include everything from Systematics to Taphonomy, Evolution, Biostratigraphy, (paleo)ecology, (paleo)biogeography, Biomineralization to Biogeochemistry, and covering all types of events from Radiations to Mass Extinctions. The last Scientific Session of the IBC/CIB is dedicated to Early Career Researchers and scientists. It looks for submissions from this specific demographic on all aspects of brachiopod research and its contribution to the scientific community, general public and advancement of brachiopod research into the 21st Century. The Scientific Committee will assemble the submitted oral presentations and posters into their appropriate categories and sessions. Authors will be advised of their final assignment after the deliberations are completed in April by the Committee.

Field trips: The 9th IBC/CIB offers one major field trip to participants.

The Pre-Congress field trip to Anticosti Island (Quebec) is led by André Desrochers of the University of Ottawa. The trip starts and ends in Montreal. This trip is of particular interest to those in the Late Ordovician – Early Silurian and rocks loaded with brachiopods. The rock sequences on Anticosti capture the Late Ordovician (Hirnantian) Mass Extinction, the first and second-largest of the Phanerozoic. Collection of material will be possible with guidance by the leader. **CANCELLED**

The Post-Congress field trip to Friday Harbor, San Juan Island is led by Audrey Morrison of Brock University. The trip starts in Niagara Falls and ends in Seattle (Washington State). For more information about this field trip, you may contact the field trip leader at: am18wd@brocku.ca. **FULLY Subscribed**

Geologic history of Niagara: Niagara has a most interesting geologic history, with the latest event centering about the selection of Crawford Lake for the GSSP of the Anthropocene – spearheaded by a team of geoscientists from Brock University. If there is sufficient interest to visit Crawford Lake before or after the IBC/CIB then we can make that possible (please indicate so on the Registration form). For the presentation by Francine McCarthy on Crawford Lake click the QR code on the right:

Read more about the geologic history of the Niagara Region and Escarpment by scanning the following QR code.

Tourism activity: The go-to website for information about touristic activities and information is Niagara Falls Tourism. Their webpage provides a great overview of the multitude of activities available in the Niagara Region.

Registration: is **OPEN**.
Please respond with: Full name, Affiliation, Address, email address, preferred name on Name Tag; presentation of oral and/or poster submission(s) (and potential title[s]), preference of Paper version of Program and Abstracts (or USB stick or both). Participation in Field Trip(s), also indicate your interest in visiting Crawford Lake before or after the Congress (day trip-fee collected on site). Please send Registration information (with 'Registration-9IBC/CIB' in the email header) to: ubrand@brocku.ca

- Payment of Early Registration Fee is due by March 29, 2024.
- Payment of Late Registration Fee applies after April 1, 2024.

Abstract submission: Abstract submission is **OPEN** until April 30, 2024, for both oral presentations and posters (there is no extra fee associated with these). Please follow the instructions for abstracts: 9th ICB abstract template (attached). Submit abstracts to: ubrand@brocku.ca. Those interested in poster submissions may avail themselves of Printing Services (Brock University), for a fee, of printing of their posters. Please contact: ubrand@brocku.ca. We plan to publish the Congress proceedings in an open-access ISI journal. Manuscript submission deadline is set for January 31, 2025 for consideration by *Rivista Italiana di Paleontologia e Stratigrafia* (Scientific Committee members will act as editors/reviewers).

Congress registration fees: Registration fee includes the following: Ice Breaker & Opening Party (snacks and drinks); admission to workshops & scientific sessions; lunch during the Congress; morning and afternoon coffee/tea with some munchies; paper booklet and/or memory stick of Congress proceedings, program and abstracts.

	Early Registration Until March 29, 2024	Late Registration after April 1, 2024
Formal Participant	$725	$850
Student (UG, G, Post-docs)	$400	$500
Accompanying Person	$300	$400

All prices in Canadian Dollars (CAD$)

Congress gala dinner: June 25, 2024 – 7 pm
Gala Dinner: $110/person (all inclusive; at a leading local Niagara Falls Restaurant). Menu consists of the following: 5-course dinner with choice from 3 appetizers, choice from 4 entrees, choice of dessert, 2 alcoholic/other beverages.
Please advise of dietary restrictions and food allergies in your Registration form.

Field trip fees

Post-Congress Field Trip		
June 29 – July 2, 2024	Friday Harbor, WA, U.S.A.	
	Single room	$2360
	Double room (shared)	$1960

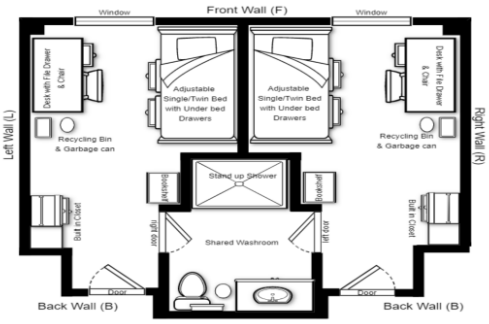
Post-Congress Field Trip fee is due now!

Post-Congress Trip: start point is Niagara Falls (Ontario) and end point of trip is Seattle (Washington State), single and double rooms are available, includes transportation from Niagara Falls to Buffalo airport (shuttle) to Seattle (air) to Friday Harbor (bus, ferry) and back to Seattle. It also includes a half day excursion on the Washington State University research vessel to collect modern marine invertebrates (including several species of modern articulated/inarticulated brachiopods) from Puget Sound. **TWO spots left as of March 8, 2024.**

Crawford Lake (Anthropocene)— A day excursion to Crawford Lake (proposed site for the Anthropocene GSSP) is available on the Sunday and/or Friday before/after the Congress. You all by now will have heard of the vote which was against naming the Anthropocene a new epoch and Crawford Lake as the GSSP. Its operation will be based on sufficient Interest; Please indicate such on the Registration Form as well as your choice of Day (Sunday: June 23; or Friday: June 28). Fee for this excursion will be about $70. Interested parties will be informed whether one of both will be offered based on subscription, with times of departure and departure point. All fees/costs are in Canadian Dollars.

Accommodation: We offer multiple choices for accommodation during the 9th IBC/CIB-2024. With option of accommodation at:

1) Brock University (University Residence -dorm rooms). The dorm options are limited to Residence 8 (one of our newest residence).



Residence Booking Procedure

Brock University Campus Accommodations — If you wish to reserve a room in Residence 8, please do so by contacting Conference & Event Services by emailing eventservices@brocku.ca with the following information, no later than June 3, 2024:

First Name:

Last Name:
Phone Number:
Check-In Date:
Preferred Check-In Time:
Check-Out Date:
Preferred Check-Out Time:
Number of Guests:
Preferred Style of Accommodations:
Reference: IBC 2024
**Please allow at least 2-3 business days for confirmation of booking.*

Residence rates are as follows— Residence 8:
$64.98 per person per night for shared accommodations (taxes included)
$129.95 per person per night for private accommodations (taxes included)

Residence 8 rooms are furnished with 1 single bed, desk, dresser and wardrobe. One 4-piece washroom is accessible from each of two adjoining single bedrooms. An elevator is in the residence lobby for convenient access to all floors.
A minimum 50 % deposit is required at the time of reserving your room. The balance to be paid at check in. We accept Visa and Mastercard as form of payment.

Cancellation policy — For a full refund, cancellations must be made 21 days prior to check in. Reservations cancelled after this time are subject to a cancellation fee of $10.55 per person per day. Within 14 days prior to arrival, there will be NO refunds for cancellations, releases, no-shows, late arrivals or early departures for guests who book their rooms.

2) Another option is the Four Points by Sheraton, Thorold (across from Brock University; please google them for availability and room rates).

3) Another option are the multitude of hotels and motels in Niagara Falls, Ontario. They are close to many restaurants and most touristic features and attractions in the area (see under Tours below). The following hotels in Niagara Falls are recommended venues for the 9th IBC/CIB - 2024 participants (in no particular order; room fee (1-2 people) plus tax (HST) and service charges):

Radisson Hotel & Suites $159, 6733 Fallsview Blvd; Hilton Niagara Falls $210, 6361 Fallsview Blvd; Marriott on the Falls $271, 6740 Fallsview Blvd; Comfort Inn $152; 6645 Fallsview Blvd; The Oakes Hotel $169, 6546 Fallsview Blvd; Wyndham Garden $129, 6141 Fallsview Blvd.

There are many other accommodation options available via search engines.

Transportation to and from Brock University and Niagara Falls, Ontario: There is a convenient bus service from the centre of the Brock campus to the Morrison/Dorchester Hub in Niagara Falls, from there it is easy walking to many hotels. Or your pass (ticket) is good for transfer to a local bus to get you closer to your hotel of choice.

Brock -> Morrison/Dorchester: Route 55; Morrison/Dorchester -> Brock: Route 50

The attached link gets you to Niagara Region Transit with their routes and times (am and pm) of service during the day and evening (nrtransit.ca).

Transportation to and from airport (Toronto or Buffalo): Niagara Airbus is the shuttle service of choice for the Congress. We have retained a **CODE (765)** to be used when making reservations to receive the Brock University discount. This CODE should be good whether you arrive at Pearson International Airport (Toronto) or at Buffalo-Niagara International Airport. Reservations are to be made online and five (5) days in advance of the travel arrangement. Colleagues going on the Friday Harbor Fieldtrip will not need to make a roundtrip reservation, since that trip starts in Niagara Falls and ends in Seattle, Washington State.

Tours: The following are a few examples of the many activities and tours that are available in Niagara Falls. Be forewarned Niagara Falls is a tourist trap with a multitude of activities and points of interest.

- Wine Tour $119.70 + Tax (HST)
- Niagara Falls Tour 164.70 + Tax

Search: a) Niagara Airbus for tours, and b) the many other options available to explore the Niagara Region and the Falls (www.niagarafallstourism.com; https://niagarafalls.ca)

Insurance: The conference organizers cannot accept liability for personal accidents or loss of, or damage to private property of participants, either during or indirectly arising from the 8th International Brachiopod Congress. Participants are advised to take out their own personal health and travel insurance for their trip and for their participation at excursions and field trips.

Invitation and visa: A formal letter of invitation for attending the 9th International Brachiopod Congress to help acquire visas or funding is available on request. This letter does not imply any financial obligation on the part of the Congress organizers. Participants who require a support letter for visa application are invited to contact the organizing committee (9brachiopodcong@brocku.ca; "Letter of invitation" in the heading of the e-mail). Please note for security purposes, letters of invitation can only be sent to individuals registered for the Congress. You are responsible for all travel arrangements, including procurement of visas and electronic travel authorizations, if necessary, and acquisition of sufficient local currency for your stay. Travelers are advised to apply for a visa/ETA as early as possible. It is imperative that you allow adequate time to process your paperwork.

Cancellation and refunds: The registration fee for the Congress and Field Trips will not be refunded except for cancellations in cases of force majeure. Fee will only be refunded if the notice of cancellation is received before April 30, 2024 and the fee will be refunded in part. The requested refund (50 % registration fee originally paid) will be sent to the registrant after the Congress. After May 1, 2024, no refund(s) will be possible even if the participant does not attend the Congress.

Grants-in-Aid: We are working on offering up grants to bona-fide undergraduate and graduate students who want to attend the 9th IBC/CIB. You must apply for these grants by filling out the Registration Form and supplying the following additional information:
Student status: Active
Year of study:
Degree sought:
Institution:
Department:
Supervisor's name:

Important: Applicants can defer paying their Registration Fee until they hear from the Grants-in-Aid Committee on their application in early April, 2024.

The Program with Abstracts will be emailed to all registered participants in late April/early May

Special Request: We are looking for photos, pictures of activities from past IBC/CIB Congresses and field trips and excursions to construct a video montage to be presented during the IceBreaker Party in the evening of June 24, 2024.

On behalf of the 9th IBC/CIB Organizing Committee, I look forward to welcoming all of you to Canada and St. Catharines/Niagara Falls for a stimulating time and experience,

Uwe Brand
General Chair
9th IBC/CIB
February 29, 2024

BrachNet
Our webpage

Sponsored, in part, by:

NSERC CRSNG

Brock University

Department of Earth Sciences,
Faculty of Mathematics & Science
& Conference Services

17th International Conference on Echinoderms & 2nd International Hemichordate Meeting Tenerife, Spain

15–19 July 2024

Website: *https://wp.ull.es/iec17tenerife/*

Description: The conference includes plenary sessions, scientific sessions, poster sessions, gala dinner, and a field trip. Scientific sessions will be held in parallel in two rooms. Poster sessions will be held in another extra room. The official language of the meeting is **English**.

Organising Committee: José Carlos Hernández (chair).

Scientific sessions: Oral and poster presentations dealing with any topic related to taxonomy, paleontology, biology, ecology, genetics, reproduction, physiology, effects of climate change, conservation and fisheries/aquaculture of echinoderms are welcome. The Hemichordate community communications will be mainly included in the thematic sessions related with development, phylogenetic, biomineralization and ambulacrarian paleontology.

Field trip: We will visit the third highest volcano in the world, El Teide, with a summit reaching an impressive elevation of 3,718 meters (12,198 feet) above sea level. The volcano along with its surroundings constitute the "El Teide National Park", an UNESCO World Heritage site known for its stunning landscapes, including volcanic cones, lava fields, and unique and memorable rock formations. There is a cable car to the summit of the peak, where visitors are rewarded with breathtaking panoramic views of Tenerife and surrounding islands. The park's vegetation zones change with altitude, from dry high shrublands, to pine forest, and eventually barren volcanic terrain. It is home to endemic plant species adapted to the arid and volcanic conditions. Birdwatchers can enjoy spotting various avian species including the Canary Islands blue finch and Tenerife goldcrest, while invertebrates like butterflies and unique beetles add to the park`s biodiversity. The park is also famous for its population of endemic reptile from the genus *Gallotia*. As part of the visit, participants can enjoy a delicious lunch featuring typical Canarian cuisine, which adds a taste of the local culture to the experience. The price of the activity will be included in the SC.

Important dates:
- November 11th, 2023 – Second circular and web site publication.
- November 11th, 2023 – Opening of abstract submission and early registrations.
- February 15th, 2024 – Deadline for abstract submission.
- March 1st, 2024 – Decision on abstracts.
- March 1st, 2024 – Deadline for early bird registrations.
- April 1st, 2024 – Third circular with full program and detailed field trip information.

Registration and financial support: The student and senior registration fee to the conference includes the abstract volume, the icebreaker reception, the coffee breaks, and the final gala dinner. The accompanying person fee includes the ice breaker cocktail and gala dinner. Online registration is open at the conference website (https://wp.ull.es/iec17tenerife/) at the "*Abstract submission & Registration*" section. Please note that it will not be possible to

register (or pay for registration) during the conference. Remember that before registration all participants must submit an abstract following the guidelines provided at the website. For abstract submission go to "*Abstract submission & Registration*" section at the website. Accompanying persons are also welcome to register to all social events and mid-conference activity.

Fees		
Early bird registration until March 1st, 2024		Late registration after March 1st, 2024
Student researcher*	200 €	300 €
Senior researcher*	300 €	400 €
Accompanying person*	90 €	130 €

Venue and accommodation: Do not wait too long before booking your accomodation because the dates for the 17thIEC & 2nd IHM joint meeting coincide with the festivities of Virgen del Carmen, the patron virgin of fishermen in Puerto de la Cruz. This is a traditional festival that is celebrated throughout the archipelago but in Puerto de la Cruz it reaches it maximum expression. Hence, we encourage you to book your accommodation in advance. There will be a specific offer of rooms and prices for the participants at the venue Hotel Best Semiramis, for details regarding accommodation at this Hotel, please contact: secretary17iectenerife@magnacongresos.es. Other options for accommodation, from various budgets, are available in the surrounding neighborhood of the conference venue. You can check for options at the regular web sites, for example: www.booking.com, www.tripadvisor.es, www.airbnb.es Puerto de la Cruz, Tenerife.

Abstract and presentation format and requirement: Abstract language: **English.** The maximum length of the abstract is one A4 page. Please follow the guidelines explained in the abstract template that you will find at the "*Abstract submission & Registration*" section of the congress website. The scientific committee reserves the right to propose a change of the communication type (oral or poster), depending on the number of each communication types registered. The submission of the abstract should be done through the following link **https://www.magnacongresos.com/abstracts-17iec/** provided at "*Abstract submission & Registration*" section of the website.

Deadlines — Deadline for abstract submissions: **15th February 2024**
Final notifications of acceptance for presentations: **1st March 2024**

Oral presentations — The length of one presentation (except for plenary one) is 15 min including questions and discussions, so please prepare your presentation to finish within 12 min so there are 3 minutes left for questions.

Poster presentations— Poster orientation: vertical. The maximum size allowed for the poster board is DIN A0 (approximately, 90 cm high x 120 cm wide). Thus, poster should be made higher than wider. Surface of the board is metal grid, so velcro does not work on this board. We will provide special adhesive material to hang your poster.

XI Baltic Stratigraphical Conference
Tartu, Estonia

19–21 August 2024

The 10th Baltic Stratigraphical Conference took place in Chęciny, Poland, in 2017. A plan was drafted to hold the next meeting in St. Petersburg in 2021, but this was disrupted by the COVID-19 pandemic and then by Russia's aggression war on Ukraine. However, the need for a regional geological conference – which also covers discussions of regional stratigraphy – has not disappeared in the Baltic region. Estonia, the following country in the sequence of conference locations, will organise the 11th Baltic Stratigraphical Conference in Tartu in August 2024. The conference will be followed by a geological excursion to the main geological sites in central and western Estonia.

Like in the case of previous Baltic stratigraphical conferences, this meeting is not restricted to stratigraphy, but contributions on a broad range of regionally relevant geological topics are welcome. Special sessions and workshops may also be organised depending on the interest of the participants. We try to keep the meeting simple and affordable, especially for students.

Olle Hints and Tõnu Meidla
Estonian Commission on Stratigraphy

Important dates:

May 1, 2024	Deadline for registration, payment, abstracts and short papers
August 18, 2024	Arrival in Tartu, Ice-breaker
August 19–21, 2024	Scientific Sessions, mid-conference field trip, and conference dinner
August 22–25, 2024	Post-conference field excursion (starts from Tartu, ends in Tallinn)

Registration and fees:
Please fill the registration form as soon as possible at https://stratigraafia.info/11bsc
Payment of the conference fee is due on May 1, 2024.

Regular conference fee	200 €
Student fee	100 €
Conference dinner	60 €
Excursion fee	300 €

The conference fee covers conference bag, lunches, coffee breaks, refreshments and the mid-conference field trip. It does not cover conference dinner. The excursion fee covers transport, accommodation (3 nights), breakfasts and lunches, and excursion guidebook.

Cancellation and full refunding of fees is possible until June 15, 2024.

Payment is possible by credit card or bank link on the conference website: https://stratigraafia.info/11bsc

Conference venue: The conference will take place in **Tartu**, the academic capital of Estonia. In 2024, Tartu is also the European Capital of Culture. The scientific sessions will be hosted in the **University of Tartu Omicum Building**, Riia 23b, Tartu: https://maps.app.goo.gl/Xu1SUZvBpuniaB8b9

Programme: Oral and poster presentations are welcome on diverse topics related to Baltic regional geology and stratigraphy. Scientific sessions are planned to cover the main time slices well represented in the region. In addition, special sessions / workshops are planned to discuss the state of stratigraphic service in different countries, demonstrate new features of digital geology (such as 3D geological mapping) and geological databases. Other ideas of workshops or demonstrations are welcome, please share your thoughts with the organisers.

Publications: One-page abstracts will be published in the conference volume. Download the abstract template from the conference website: https://stratigraafia.info/11bsc and submit your contribution by e-mail to 11bsc@ut.ee. In addition, manuscripts of short papers (4-8 printed pages) may be submitted for a thematic issue in the Estonian Journal of Earth Sciences, to be published in December. The deadline for both abstracts and papers is **May 1, 2024**.

Field trips: The conference includes a **short mid-conference field trip** in southern Estonia (Devonian and Quaternary) on August 20, 2023. The **four-days post-conference trip** will take participants from Tartu, across central Estonia, to Saaremaa Island and then to North Estonia, ending in Tallinn. The estimated excursion fee is 300€ and it includes accommodation for 3 nights, breakfasts and lunches, transportation and field guide. NB! The number of participants is limited to 20. More information on conference website: https://stratigraafia.info/11bsc. The localities to be visited during the excursion include several quarries and natural outcrops:

- Kalana quarry (Llandovery, Raikküla Regional Stage)
- Reinu quarry (latest Katian to Rhuddanian, Pirgu to Juuru regional stages)
- Päri outcrop (Llandovery, Raikküla Regional Stage)
- Pulli cliff (Wenlock, Jaani-Jaagarahu regional stages)
- Panga cliff (Wenlock, Jaani-Jaagarahu regional stages)
- Jaagarahu quarry (Wenlock, Jaagarahu Regional Stage)
- Soeginina cliff (Ludlow, Rootsiküla and Paadla regional stages)
- Kaugatuma cliffs (Přidoli, Kaugatuma Regional Stage)
- Ohessaare cliff (Přidoli, Ohesaare Regional Stage)
- Kaarma quarry (Ludlow, Paadla Regional Stage)
- Kaali meteorite craters (Quaternary)
- Vasalemma quarry (Katian, Keila to Rakvere regional stages)
- Pakri cliff (Cambrian to Middle Ordovician)

The following photos illustrate some of the localities (from top to bottom: Pakri cliff, Vasalemma quarry, Reinu quarry [x2], Panga cliff, Ohesaare cliff).

Social events:
Ice-breaker will take place on August 18, 2024, in the conference venue.
Conference Dinner will be on August 20, 2024, in the halls of the Natural History Museum.

European Capital of Culture 2024:

Tartu 2024
European Capital of Culture

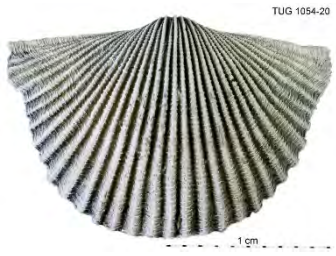
Tartu is the European Capital of Culture in 2024. This brings over 1000 events to individuals of all ages. The year-long programme in Tartu and Southern Estonia presents the story of the Arts of Survival – the knowledge, skills, and values that will help us lead a good life in the future. As a community, we want to share this information while also learning from others. Inspired by culture, we build a better tomorrow. There are various activites and events going on in Tartu in August, during the time of our conference. Please check the programme and other information on the Tartu 2024 website.

Travel and accommodation: Tartu can be easily reached by car, bus or train. Those arriving by plain to Tallinn or Riga would take a bus to Tartu. For international bus lines check https://eurolines.lt/en, domestic bus tickets can be booked online at https://www.tpilet.ee/en/. Booking accommodation in Tartu (and in Tallinn after the field excursion if needed) is the responsibility of the participants. Be sure to book accommodation early as the events of the European Capital of Culture in Tartu may increase demand and prices. A selection of hotels in city centre:

- Dorpat
- Lydia
- Antonius
- Barclay

Budget accommodation is arranged in Tartu Downtown Hostel from August 18-22, 2024. Price per double room (without breakfast): 30€ (single occupancy) / 35€ (double occupancy). Booking at tartuhostel.ee, using the keyword "11BSC". NB! The number of pre-booked rooms is limited.

Studying geological collections: Large collections of fossils and rocks from Estonia and neighbouring countries are kept at the Natural History Museum, University of Tartu, as well as at the Department of Geology, Tallinn University of Technology and the Estonian Museum of Natural History (both in Tallinn, 180 km from the conference venue). Participants of the conference are welcome to arrive earlier or leave later, in order to study these collections. Please contact the corresponding curators at your earliest convenience, but no later than June 1, 2024, to ensure the availability of the material. Data on many collection specimens, samples, localities etc have been digitised and made accessible online in the national geoscience data portal: https://geocollections.info. Collection managers in different institutions:



- Mare Isakar, Natural History Museum, Tartu University (mare.isakar@ut.ee)
- Ursula Toom, Department of Geology, TalTech (ursula.toom@taltech.ee)
- Karin Truuver, Estonian Museum of Natural History (karin.truuver@loodusmuuseum.ee)

Organisers and supporters:

- Estonian Commission on Stratigraphy
- Department of Geology, University of Tartu
- Department of Geology, TalTech
- Geological Survey of Estonia
- Estonian Land Board
- Geological Society of Estonia

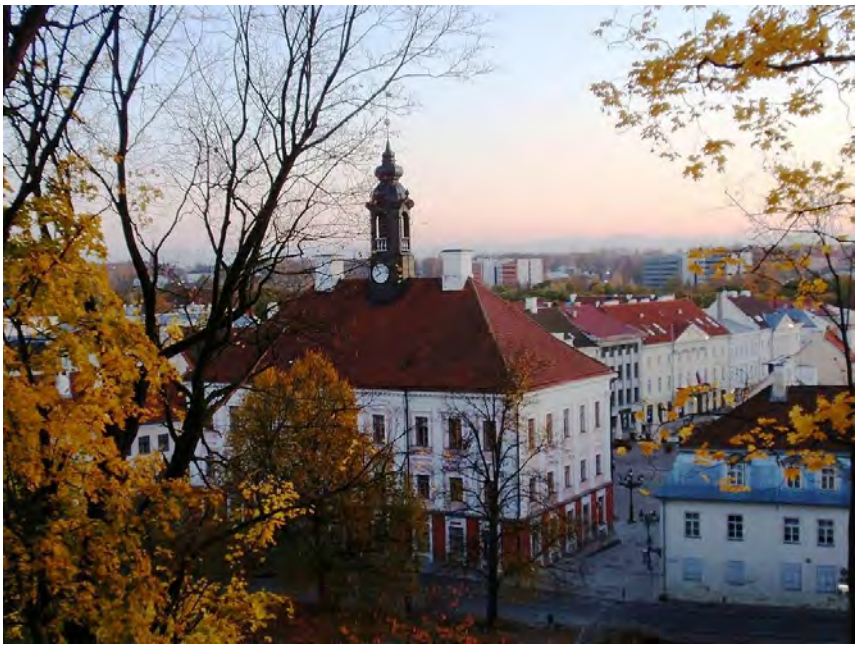
Organising Committee:

- Olle Hints (Chair, Tallinn University of Technology)
- Tõnu Meidla (Vice-Chair, University of Tartu)
- Tõnn Paiste (Conference Secretary, Tartu University)
- Peep Männik (Tallinn University of Technology)
- Leho Ainsaar (University of Tartu)
- Tavo Ani (Geological Survey of Estonia)
- Mare Isakar (University of Tartu)
- Siim Nirgi (Geological Survey of Estonia)
- Kairi Põldsaar (University of Tartu)
- Ivo Sibul (Estonian Land Board)
- Ursula Toom (Tallinn University of Technology)

Contact:

- Tõnn Paiste, Conference Secretary, 11bsc@ut.ee
- Olle Hints, olle.hints@taltech.ee
- Tõnu Meidla, tonu.meidla@ut.ee

Conference website: https://stratigraafia.info/11bsc



Tartu townhall

37th International Geological Congress (IGC2024) Busan, Republic of Korea

25–31 August 2024

Website: *https://www.igc2024korea.org/*

Description: **The Great Travelers: Voyages to the Unifying Earth.** The phrase "Great Travelers" reflects the passion, inspiration, and effort of past, present, and future geologists to unveil the origins, interactions, and evolution of the Earth's systems and emphasizes the participants at the IGC 2024 Busan who will advance our existing knowledge of the physical and chemical processes of the Earth's interior and surfaces, as well as other planetary bodies.

The phrase "Unifying Earth" refers to cutting-edge experiments, monitoring, observations, and theoretical endeavors to explore the fundamental nature and interaction of the atmosphere, hydrosphere, biosphere, and geosphere from the Hadean magma ocean covering the Earth in its early history to its current stratified structures, from that of a human lifetime to the billions of years of the geologic timescale. Such efforts contribute to revealing hidden signatures of the evolutionary path of the Earth's systems. As we stand on the threshold of what may be called the Anthropocene where an ecosystem is irreversibly influenced by human activities, the active discussions, discoveries, principal findings and development of knowledge during IGC 2024 Busan will assist us to better predict and solve anthropogenic global environmental changes, natural hazards, and changes in terrestrial and marine resources and ecosystems.

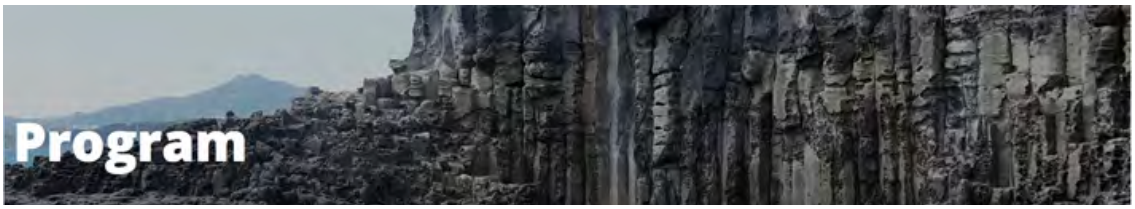
Particularly, IGC 2024 Busan will contribute to establishing a global network of "E-geology", such as a "Virtual Fieldwork Program" connecting important geological sites through the internet. Access to relevant information about important geological sites will be available online. This will lead to a new evolution in the future of geological science education. Finally, combining elements unique to the geological settings of East Asia and advances in electronics and internet technology in Korea, Busan IGC 2024 offers a exciting stage where geologists from all across the globe can celebrate new geological discoveries and scientific breakthroughs aided by one of the world's best web-based infrastructures.

Organising Committee: Daekyo CHEONG (chair), Se-Joon KIM and Min HUH (vice-chairs), Young-seog KIM (secretary general).

Scientific Committee: Roland OBERHAENSLI (chair)

Scientific sessions:

- T1: Sedimentary Geology
- T2: Quaternary geology
- T3: Earth history and stratigraphy
- T4: Tectonophysics
- T5: Planetary sciences
- T6: Metamorphism
- T7: Volcanology
- T8: Petrology
- T9: Structural geology
- T10: Geomorphology
- T11: Paleontology and paleoanthropology
- T12: Resource geology and economic geology
- T13: Mineralogy
- T14: Low temperature geochemistry
- T15: Paleoclimate and paleoceanography
- T16: Coastal, marine and lacustrine geosciences
- T17: Geosciences in alpine and polar regions
- T18: Groundwater and hydrogeology
- T19: Geobiology
- T20: Biogeochemical cycles
- T21: Environmental geosciences
- T22: GIS and remote sensing
- T23: Seismology
- T24: Geophysics
- T25: Geotechnology and geophysical exploration
- T26: Geoscience education
- T27: Geoheritage, geopark and geotourism
- T28: Forensic geology and medical geology
- T29: Engineering geology and geomechanics
- T30: Urban geology
- T31: Geohazards
- T32: Mitigation and adaptation in climate crisis
- T33: Big data and Artificial Intelligence (IA) in geoscience
- T34: Energy and carbon neutrality
- T35: Geoscience and policy
- T36: Management of radioactive resources and waste
- T37: Deep-time Digital Earth: IUGS DDE sessions
- T38: Anthropocene
- T39: Geoethics and societal relevance of geosciences
- T40: History of geological sciences
- T41: Mathematical and computational methods for the geosciences



Important dates:

- August 25, 2022–February 16, 2024: call for workshop, short course and business meeting proposal
- September 4, 2023–March 15, 2024: abstract submission
- September 4, 2023–April 25, 2024: early bird registration
- November 6, 2023–June 21, 2024: accommodation booking
- December 22, 2023: 3rd circular release
- January 8, 2024–April 26, 2024: field trip registration
- April 5, 2024: notification of acceptance to applicants (abstract, short course, seminar, workshop and business meeting, etc.)
- April 27, 2024–July 26, 2024: regular registration
- June 28, 2024: 4th Circular release – Preliminary program
- August 19–24, 2024: pre-congress field trips
- August 24, 2024: on-site registration

Registration and financial support: *registration@igc2024korea.org*

	Delegate	PhD student	Retired (+65)	Companion	One-Day Pass	Exhibitor	Conference Dinner
Early Bird	$700	$330	$450	$200	N/A	$200	$50
Regular	$900	$370	$600	$200	$450	$200	$50
On-site	$1,000	$400	$700	$200	$500	$200	$50
Reduced*	$350	$250	$300	$200	$250	$200	

**Reduced: for geologists from low income countries (Low Income Courtries: the classification of "low-income countries" is on the based on 2023 data provided by the World Bank, i.e. Afghanistan, Burkina Faso, Burundi, Central African Republic, Chad, Dem. Rep. Congo, Eritrea, Ethiopia, Gambia, Guinea-Bissau, Dem. People's Rep. Korea, Liberia, Madagascar, Malawi, Mali, Mozambique, Niger, Rwanda, Sierra Leone, Somalia, South Sudan, Sudan, Syrian Arab Republic, Togo, Uganda and Rep. Yemen).*

Student fee will be applied to undergraduate and postgraduate students, who are not employed full-time. A student ID must be sent to the online registration desk at registration@igc2024korea.org to qualify. Companions who wish to join on field trips must register separately. For those who wish to attend, please be aware that conference dinner tickets are priced at $50 per person. Tickets are non-cancelable and non-refundable, but are transferable to others.

Venue: BEXCO (#55 APEC-ro, Haeundae-gu, Busan 612-704, Republic of Korea, TEL + 82 51 740 7300 / FAX +82 51 740 7320 / http://www.bexco.co.kr).

In May 2001, BEXCO, a state-of-the-art conference facility and landmark in the globally renowned marine city of Busan, successfully attracted and hosted world-class international events. With years of expertise and differentiated operational strategies, BEXCO has been consistently breaking records for event hosting every year. It has successfully organized a wide range of exhibitions, conventions, conferences, and corporate events of various scales and nature, ranging from mega international exhibitions and conferences to smaller meetings and corporate functions. Building upon this foundation, BEXCO is solidifying its position as the "premier exhibition-convention hub in Asia."

BEXCO exhibition halls consist of a single-floor structure, with a total of 26,508 square meters of divisible space in the 1st exhibition hall and a completed 19,872 square meters in the 2nd exhibition hall, completed in May 2012. The total indoor exhibition area is 46,380 square meters, capable of simultaneously hosting multiple large-scale international events of over 20,000 square meters. Additionally, BEXCO is equipped with facilities to successfully host various types of events, including a convention hall capable of accommodating up to 5,340 people, 50 meeting rooms, and an auditorium completed in 2012 with a capacity of 4,002 seats, suitable for general assemblies, seminars, corporate meetings, and performances.

To date, BEXCO has successfully hosted numerous significant events, starting with the live broadcast of the 2002 FIFA World Cup Final Draw, witnessed by 1.3 billion viewers worldwide. Other notable events include the 2005 APEC Summit attended by leaders from 21 countries, the OECD World Forum with participation from 130 countries, the successful utilization of the 2nd exhibition hall and auditorium for the 2012 Lions Clubs International Convention, the 2014 Korea-ASEAN Special Summit, the 2018 African Development Bank (AfDB) Annual Meeting, the 2019 Korea-ASEAN Special Summit, and the 1st Korea-Mekong Summit. Following the COVID-19 pandemic, BEXCO hosted the 2022 League of Legends Mid-Season Invitational with an audience of 2.19 million. Currently, BEXCO is working towards the construction of the 3rd exhibition hall, aiming for its completion in 2027.

Accommodation: IGC 2024 provides discounted rates to a wide selection of hotels. The hotels below were selected as official accommodations after careful consideration of factors including security, price, convenience and ease of accessibility, among others. All participants can enjoy these special rates arranged by IGC 2024.

Abstract and presentation format and requirement: Abstracts may be submitted for either oral or poster presentations. Click here to see details for presentation guidelines. To submit an

abstract, you must create an account on this website, the official website of IGC 2024. Click here to create your account. You must be logged into your account to submit an abstract. Please note that the submissions must be made by the presenting authors. Authors are required to consent to the collection and use of personal information and the "Copyright Transfer Agreement" during abstract submission. Before submitting an abstract, you must select the most relevant theme for your abstract and the best session for its delivery. Click here to check themes and sessions for the 37th International Geological Congress 2024. The IGC 2024 Scientific Program Committee reserves the right to reassign presenters under a common theme or a given session, as deemed suitable based on abstract submissions and priority themes. The presenting author will be permitted to deliver up to two oral presentations and one poster presentation during the conference, but may be a co-author of multiple abstracts.

Abstracts must be clear, concise, and written in English. The length of the abstract text must be between 200 (minimum) and 500 (maximum) words, which will be automatically counted in the submission system. Three to five keywords must be provided. Tables, figures, references, and other graphics are not allowed. Please proofread your abstract carefully before submitting it. You will be able to modify your abstract in the submission system until the submission deadline.

To promote the sharing of ideas, the IGC 2024 Organizing Committee has decided to reduce the submission fee by 50%, from $40 USD down to $20 USD. You must pay a separate submission fee ($20 USD) for each abstract submission, by credit card only. Please note that abstract submission fees are non-refundable.

Abstract submission does not automatically guarantee acceptance without peer review. The presenting author may withdraw their abstract from the submission system before the submission deadline. After the deadline, please contact the IGC 2024 Scientific Program Committee (scicommittee@igc2024korea.org). Please note that abstract fees are non-refundable.

If you have questions about the abstract submission process, please contact the IGC 2024 Scientific Program Committee (scicommittee@igc2024korea.org) or the IGC 2024 Secretariat (info@igc2024korea.org).

Field trips:
Pre-congress field trips :

- Pr-K-01A: Neoarchean–Cretaceous rocks in northwestern coastal area of the Gyeonggi Massif, Korea (August 21–24, 2024)
- Pr-K-02: Tectono-metamorphism and geochronology of the northern Gyeonggi Marginal Belt (Imjingang Belt), Korea (August 22–24, 2024)
- Pr-K-04: Late Paleozoic metamorphism and deformation in the Okcheon Belt (August 22–24, 2024)
- Pr-K-06: Evolution of the Cretaceous basins in Korea (August 21–24, 2024)
- Pr-K-09: Tracking magmatic response recorded in Korean Cordillera (August 20–24, 2024)
- Pr-K-10: Phreatomagmatic volcanism and volcaniclastic sedimentation in basaltic volcanic field (Jeju Island, Korea) (August 22–24, 2024)
- Pr-K-11: DMZ, The Space of the Collision and Peace in the Korean Peninsular (August 23–24, 2024)

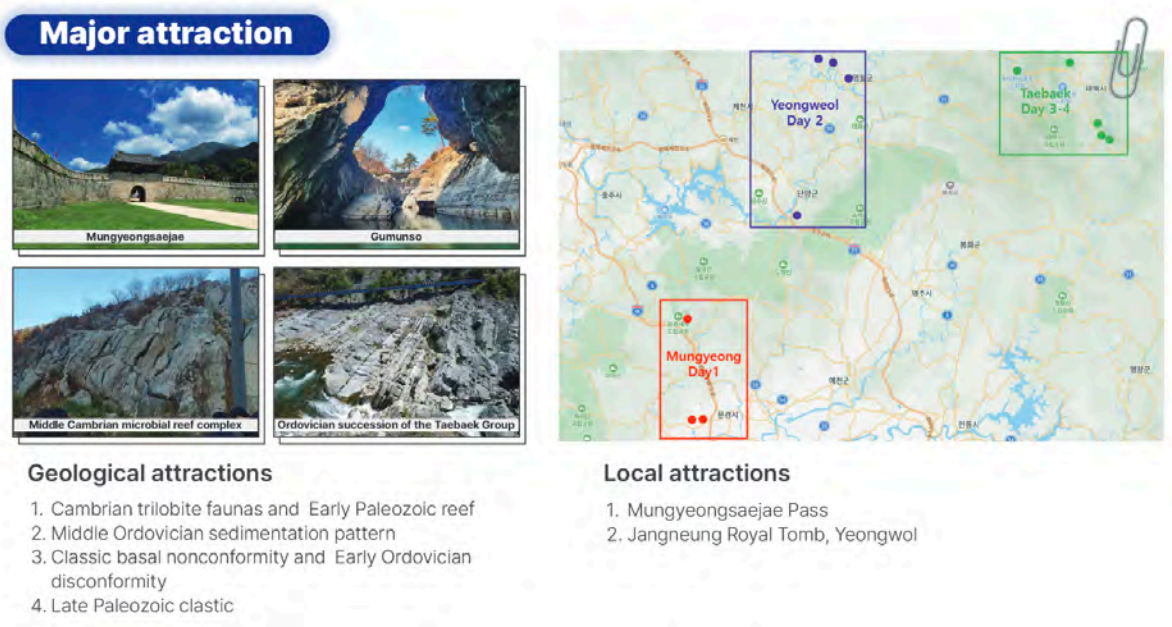
- Pr-K-14: A living underground river : the Baeng-nyong Cave, Pyeongchang, South Korea (August 22–23, 2024)
- Pr-K-20: Mudeungsan UNESCO Global Geopark (August 22–24, 2024)
- Pr-K-21: Geomorphic development of coastal features with sea level changes since the last interglacial: Coastal dunes, shore platforms, and tidal flats in the macrotidal shore (August 21–24, 2024)
- Pr-K-23: Geologic records of paleoearthquake and tectonic uplift in SE Korea (August 21–24, 2024)
- Pr-K-24: Journey through the life cycle of South Korea's nuclear power: from operating plants to decommissioning sites and radioactive waste disposal facilities (August 22–23, 2024)

Mid-congress field trips:

- Mi-K-15A: Late Cretaceous Vertebrate Tracks of South Korea (August 28, 2024)
- Mi-K-18: History and culture of Gyeongju, a thousand-year-old ancient capital of the Silla dynasty (August 27, and again, on August 29, 2024)
- Mi-K-19A: The Cretaceous Dadaepo Basin in the Songdo Peninsula Geosite of the Busan Geopark (August 27, and again, on August 28 and August 29, 2024)

Post-congress field trips:

- Po-K-01B: A journey to multiple geological events from the Paleoproterozoic to Neoproterozoic: Understanding of the old geological history of South Korea (August 31–September 4, 2024)
- Po-K-03: The multiple collision events in the Hongseong-Taean area, Middle western South Korea, from Neoproterozoic to Triassic (September 1–3, 2024)
- Po-K-05: **The new perspective of Cambro-Ordovician of the Taebaeksan Basin, Korea** (September 1–4, 2024): **IGCP 735 regional field excursion**. This trip will visit classic Cambro-Ordovician sites of the Taebaeksan Basin around Mungyeong, Yeongwol and Taebaek areas well known for their spectacular geologic features. Rocks, fossils, and landforms of varying ages from Precambrian to Permian are present in this trip from the basement Precambrian rocks overlain by Cambro-Ordovician formations, and the "great hiatus" at the base of Carboniferous-Permian deposits. We start the trip with a peek at the oldest trilobite of Korea at Mungyeong, then we will compare contrasting Cambrian trilobites between Yeongwol and Taebaek areas. There are numerous Early Paleozoic reefs including Middle Cambrian microbial-dominated reefs, Early Ordovician microbial-sponge reefs, Middle Ordovician stromatolite, and metazoan (stromatoporoid) reefs. Sedimentologic features will focus on the Middle Ordovician carbonate sediments deposited from the peritidal to subtidal conditions and outer platform fine-grained clastic depositional environment. A field guide will be supplied as well as numerous articles and resources related to each visited site. Several Korean geologists will be teaming to discuss the viewed geologic features. The uniqueness of these sites for their geologic- and paleontologic aspects, and their proximity to beautiful scenery and cultural heritage of the region make them ideal for remarkable trip.



- Po-K-07: Miocene crustal deformation and basin evolution in SE Korea (September 1–3, 2024)
- Po-K-08: Quaternary geology (tidal flats) and geoarchaeology of the southwest coast of the Korean Peninsula (September 1–3, 2024)
- Po-K-12: UNESCO Hantangang Global Geopark field trip (September 1–3, 2024)
- Po-K-13: Quaternary geomorphological evolution, mountains and coasts (September 1–4, 2024)
- Po-K-15B: Early – Late Cretaceous Vertebrate Tracks of South Korea (September 1–4, 2024)
- Po-K-15C: Vertebrate Fossils from Korean Cretaceous Dinosaur Coast (September 1–3, 2024)
- Po-K-16: Jeju Island UNESCO Global Geopark (August 31–September 3, 2024)
- Po-K-17: Exploring Gyeongbuk Donghaean Geopark and Cheongsong UNESCO Global Geopark (September 1–4, 2024)
- Po-K-19B: Tour of Busan Geopark (September 1–3, 2024)
- Po-K-25A: Hapcheon Impact Crater (August 31–September 1, 2024)
- Po-K-26: Magmatic-hydrothermal processes and W-Mo-Fe-Zn-Pb mineralization of Taebaeksan metallogenic region in NE Korea (September 1–3, 2024)
- Po-K-27: All about the managing groundwater resources in the volcanic Jeju Island (September 1–4, 2024)
- Po-K-30: Field evidences for hidden magmatic activity in continental margin settings (August 31, 2024)
- Po-K-31: Fault system and damage zones around active and fossil faults (September 1–3, 2024)
- Po-M-01: Khanbogd alkaline granite massif (August 31–September 4, 2024)
- Po-M-02: Unique settings of Shar tsav dinosaur footprints area massif and Tsagaansuvarga (August 31–September 4, 2024)

4th Annual Meeting IGCP 735
Córdoba, Argentina

14–21 October 2024

We are pleased to invite you to attend the 4th Annual Meeting of the IGCP 735 *Rocks and the Rise of Ordovician Life*, which will be held in October 2024 in the city of Córdoba, Argentina. The meeting includes 3 days of technical sessions, keynote conferences, workshops and social and touristic activities. As well, a post-meeting, 4 days field trip to the Argentine Precordillera will showcase outstanding Early Paleozoic outcrops and biotas of this celebrated basin.

Venue: Located at the centre of Argentina, Córdoba stands out as an outstanding choice for hosting the meeting. With its inviting climate, which embodies the essence of the austral spring, Córdoba boasts a unique identity, offering a rich tapestry of historical, cultural, and tourist attractions. The city presents a diverse spectrum of accommodations and culinary experiences, showcasing an extensive range of native foods and drinks, international cuisine restaurants, and a vibrant nightlife scene.

Direct flights to Córdoba from different cities of South and Central America and Europe are available.

The meeting will be held at the Academia Nacional de Ciencias, strategically located in the downtown area of the city. Its building was declared a National Historic Monument and is part of the Manzana Jesuítica, an UNESCO World Heritage site.

Preliminary program:

- October 14: Registration, welcome reception, keynote conference, oral sessions. Ice-breaker party.
- October 15: Keynote conference, workshops, social/touristic activities. Conference dinner.
- October 16: Keynote conference, oral sessions, poster session, closing ceremony.
- October 17–21: Post-meeting field trip to the Argentine Precordillera, San Juan Province.

Field trip: The 4-day post-meeting excursion will provide an overview of the Ordovician geology and paleontology of the Argentine Precordillera (western Argentina, San Juan Province). The Precordillera basin embraces one of the most striking Paleozoic outcrops worldwide. It encompasses more than 2,500 meters of Cambrian to Middle Ordovician carbonate rocks, rich in fossil remains.

Cambrian and Early Ordovician carbonate successions from Sierra de Zonda, Niquivil, and Talacasto sections

The trip will consist of an east-to-west transect across Lower to Upper Ordovician deposits, exhibiting a transition from shallow water, shoal-thrombolite, microbial-sponge bioherm, and platform carbonate facies, to mixed carbonate-clastic slope and basinal clastics, with stops at olistostromic units and impressive columnar basalts and pillow lavas. Additionally, we will explore Hirnantian glacial diamictites, followed by fossiliferous transgressive mudstones that house the typical Hirnantian Fauna.

Middle-Upper Ordovician outcrops at Quebrada de Ancaucha (left). Dique Cuesta del Viento at Rodeo area (right)

The field excursion involves the round trip from Córdoba to San Juan by bus, which takes approximately 7 hours. During the outbound journey, participants will have the opportunity to travel across stunning landscapes, including the Upper Proterozoic and Paleozoic granitoids and gneiss formations in the Córdoba hills, the continental Carboniferous red beds of the Paganzo Group in the La Rioja Province, and the world-renowned Triassic Ischigualasto Formation (´dawn of dinosaurs') in the San Juan Province.

- Departure to San Juan: October 17th in the morning
- Return to Córdoba: October 21st in the morning
- Minimum number of participants: 10
- Maximum number of participants: 18

Important dates:
- May 27th, 2024: Opening of abstract submission
- May 27th, 2024: Opening of registrations for the meeting and field trip
- June 28th, 2024: Field trip registration deadline
- June 28th, 2024: Abstract submission deadline. To submit the abstract, it is a requirement to be registered in the meeting

Registration: Meeting fee includes ice-breaker reception, coffee breaks, mid-conference social / touristic activities, abstract volume. Registration to post-meeting field trip includes round trip Córdoba – San Juan by bus, guidebook, lunches, dinners, accommodation, and a one-day field excursion conducted via 4x4 trucks.
- Regular Meeting Fee (until June 28th): 300 U$D
- Late Meeting Fee (after June 28th): 450 U$D
- Student Meeting Fee* (only until June 28th): 150 U$D
- Post Meeting field trip (paid until June 28th) 550 U$D

**PhD and postdoc students*

The IGCP 735 will provide some support for researchers that present their contributions in the meeting. Priority will be given to young researchers (under the age of 35) and/or female scientists, and/or colleagues from emerging countries. Additional information on the grants will be published soon.

Paleontological collections: The host institution, the Centro de Investigaciones en Ciencias de la Tierra (CICTERRA, CONICET, UNC) houses one of the most significant Paleozoic collections in South America. More than two-thirds of the collection is made up of Early Paleozoic fossils coming from the successions of the Precordillera, Sierra de Famatina, and Cordillera Oriental. Attendees are welcome to visit the collection before or after the meeting. Please contact coleccionpaleontologica@fcefyn.unc.edu.ar to schedule your visit.

Meeting publications: All participants are invited to submit abstracts for oral and poster presentations. We welcome contributions on all aspects of Early Paleozoic biotas and earth system. An abstracts volume will be available at the meeting and on the meeting website with free access. The volume will be published as an Abstract Book of the Electronic Publication of the Asociación Paleontológica Argentina (PE-APA):
https://www.peapaleontologica.org.ar/index.php/peapa

We are considering the possibility of preparing a Special Volume with contributions to be presented in the meeting. The volume will be focused on different aspects of the rise of Ordovician Life. It will be published in *Ameghiniana*, the international peer-reviewed journal of the Asociación Paleontológica Argentina https://bioone.org/journals/ameghiniana

Local organizing team:

- Coordinators: Beatriz G. Waisfeld & María José Salas
- Ninon Allaire, Damián Aquino, Diego Balseiro, Neal Handkamer, Nexxys Herrera Sánchez, Fernando Lavié, Gerardo Lo Valvo, Enrique Randolfe, Fernanda Serra, N. Emilio Vaccari, Gustavo Voldman

Field trip organizers: Marcelo Carrera (Córdoba), Susana Heredia (San Juan), Fernando Cañas (Río Cuarto) and Juan José Rustán (Córdoba)

Scientific committee:

- Guillermo Aceñolaza (Tucumán, Argentina)
- Yves Candela (Edinburgh, United Kingdom)
- Marcela Cichowolski (Buenos Aires, Argentina)
- Susana de la Puente (Neuquén, Argentina)
- Khadija El Hariri (Marrakech, Morocco)
- Mansoureh Ghobadipour (Gorgan, Iran)
- Fernando Lavié (Córdoba, Argentina)
- Bertrand Lefebvre. (Lyon, France)
- Fernanda Serra (Córdoba, Argentina)
- Oive Tinn (Tartu, Estonia)
- Franco Tortello (Buenos Aires, Argentina)
- Wenhui Wang (Changsha, China)
- Carolina Zabini (Sao Paulo, Brazil)

Host institution: Centro de Investigaciones en Ciencias de la Tierra (CICTERRA), a research institute that belongs to the Consejo de Investigaciones Científicas y Técnicas (CONICET) and the Universidad Nacional de Córdoba (UNC), linked to the Facultad de Ciencias Exactas, Físicas y Naturales.

Webpage for complete information visit http://bit.ly/igcp735annualmeeting

Contact us at:
igcp735.argentina2024@gmail.com
fieldtripigcp735@gmail.com

22nd Argentine Geological Congress
"Avances y desafíos de la Geología en Argentina"
San Luis, Argentina

17–24 November 2024

Website: https://www.congresogeologico.org.ar/

Description: The Argentine Geological Association (AGA) is pleased to invite the geological community to participate in the "XXII Argentine Geological Congress", which will take place in the City of San Luis, November 17th to 22nd, 2024. The event will be based at the facilities of the National University of San Luis, located at Av. Ejército de los Andes 950. In 1981, the City of San Luis hosted the VIII Argentine Geological Congress; since then, the contributions in research have been outstanding in different fields of the scientific environment.

The province of San Luis is mentioned as the gateway to the Nuevo Cuyo region, with the city of San Luis as the capital of the province, known for its Spanish colonial architecture, which is reflected in many of its buildings and historic squares. It also has many parks and green spaces, which makes it an attractive place for lovers of nature and outdoor sports. The province stands out for showing a strategic location in the Argentine territory, connecting the central region of the country with the Andean regions of the west and the Patagonian regions of the south, which transforms it into an important transit area for land transport, with numerous routes and highways crossing it, highlighting mainly the bi-oceanic corridor of the National Route 7 (RNN° 7).

The climate of San Luis is temperate and dry, with a great diversity of natural environments, where we can highlight mountain areas and large plains, which in turn allows the development of various ecosystems. The region has important national parks and nature reserves such as the Sierra de las Quijadas National Park and the La Florida Provincial Reserve, which are popular tourist destinations due to their natural beauty. The geology of San Luis is extremely diverse, with a wide variety of rocks and geological formations that are the result of tectonic and volcanic activity that has taken place in the region for millions of years. In the mountainous areas, igneous and metamorphic rocks can be found, while in the flatter areas various sequences of sedimentary rocks are developed.

The infrastructure works and road networks allow to improve the connectivity and accessibility within the province and with other regions of the country. It should be noted that the province of San Luis has free internet access points in different public spaces, such as squares, parks, museums, and libraries. These internet access points allow the inhabitants of the province and the tourists who visit it to be able to connect to the service for free from their mobile devices, generating a positive impact and promoting access to information and education, as well as allowing new opportunities for economic development.

Organizing commitee: Daniel A. SALES (chair), Silvia I. CARRASQUERO (vice-chair), Dr. Carlos E. GARDINI (secretary), and María Belén ROQUET (treasurer).

Contact: congresogeologico2024@geologica.org.ar

Venue: The venue for the XXII Argentine Geological Congress will be the Universidad Nacional de San San Luis (UNSL), located at Avenue Ejército de los Andes 950, in the City of San Luis, capital of the province of San Luis, Argentina. The City of San Luis belongs to the Department of General Juan Martín Pueyrredón and is geographically located on the western foothills at the southern of the Sierra de San Luis.

Scientific program: The Scientific Program of the XXII CGA will be linked to the current advances and challenges of Geology in Argentina, being the theme of the congress. The Program will contain Technical Sessions, Symposiums and Round Tables.

- *Technical sessions* — In the development of the XXII CGA, general topics will be addressed in 17 Technical Sessions (TS) as detailed below:
- ST01: Stratigraphy and Sedimentology
- ST02: Structural Geology and Geotectonics
- ST03: Geomorphology and Soils
- ST04: Petrology of Igneous Rocks
- ST05: Petrology of Metamorphic Rocks
- ST06: Volcanology
- ST07: Mineralogy and Geochemistry
- ST08: Ore Deposits and Mining Resources
- ST09: Paleontology, Paleoecology and Biostratigraphy
- ST10: Geotechnics
- ST11: Geology of Water Resources
- ST12: Geology of Energy Resources
- ST13: Exploration and Development of Hydrocarbons
- ST14: Geophysics and Paleomagnetism
- ST15: Remote Sensing and Geographic Information Systems
- ST16: Geological Risk and Environmental and Urban Geology
- ST17: Teaching and History of Geology

Symposia — The Scientific Community is invited to propose Symposiums on specific topics that will fulfil with a minimum of oral presentations. For this purpose, we invite the conveners to send a note addressed to the President of the Executive Board of the XXII CGA to the email account: congresogeologico2024@gmail.com, containing the Title and the name of the Coordinator of the proposed symposium. Subsequently, the conveners will receive information on the regulations to be followed (editorial standards, deadlines, and other details to consider)

Round tables — The organization of the XXII CGA will hold the power to organize round tables on different topics: a) scientific diffusion, b) meetings of professional organizations or debate talks. In the case of Scientific Dissemination on a specific subject, they must have the same editorial standards that the Scientific Committee determines.

Abstracts: The contributions presented at the XXII CGA (Technical Sessions, Symposiums, Round Tables and Conferences) will consist of short and extended abstracts (including text, figures, tables, and references). The abstracts will be sent for evaluation to the Coordinator of the Session, Symposium or Round Table, who will oversee their acceptance. At least half of the authors of the work must be registered in the congress at the time of submitting the abstract. The accepted abstracts will be published in the Congress Proceedings (digital book).

For more information on the rules for submitting abstracts, visit the website of the XXII CGA (https://www.congresogeologico.org.ar/).

There will be two types of presentation: 1) Oral: 15 minutes of exposure, plus 5 minutes of questions and discussion; and 2) Poster: Dimensions will be reported in future circulars. At the time of submission of the abstract, the authors must indicate in the registration form, the modality of presentation, which will be subject to the availability of space in the respective rooms. The abstracts must be uploaded to the XXII CGA page, in Word format files (https://www.congresogeologico.org.ar/), named with the name of the first author of the two authors or of the first author followed by "et al." when there are 3 or more authors. If there is more than one abstract with the same authors, add a consecutive number for each abstract submitted.

The deadline for the reception of abstracts will be until April 1, 2024

La Polvorilla Viaduct in the Argentinian Puna, supported/lying on Ordovician volcaniclastic massflows of the lower part of the Puna Turbidite Complex. This is one of the most iconic places of the railway line projected to cross the Andes Mountain Range between Argentina and Chile, never completed but partly for current tourist use as "The Train to the Clouds", starting from the city of Salta. All the pieces that are part of this viaduct were imported from Europe by ship, and its construction began in 1929. It is 224 m long and the pilaster in the middle is 63 m high; the railway run at 4,220 m above sea level here (image by Guillermo Aceñolaza; Juan Carlos Gutiérrez-Marco with a black T-shirt serves a scale).

IGCP 735 virtual meeting
Prague, Czech Republic

18–21 November 2024

Description: **Rocks 'n' ROL is coming to Prague!**
The 3rd virtual meeting of IGCP 735 *Rocks and the Rise of Ordovician Life: Filling knowledge gaps in the Early Palaeozoic Biodiversification* is coming to Prague! Let's meet online in the heart of Europe and enjoy together four days of scientific discussions. All friends of the Ordovician are welcome to join this virtual conference for free. Please find below important dates and deadlines to book in your calendar. We are looking forward to welcome you to the city that stands on the Ordovician rocks.

Important dates:
- January 2024: Official webpage of the meeting and opening the registration
- 31st August 2024: Registration deadline for presenters
- 15th September 2024: Abstract submission deadline
- 10th November 2024: Final registration deadline for participants without presentations

Presentations: We plan to have several online keynote lectures as well as regular talks and short 'lightning' talks. All details will be soon available on the official webpage of the meeting. In addition to the **abstract volume**, we also plan to produce a **special volume** in the Bulletin of Geosciences.

Organizing committee:
- Martina Nohejlová (Czech Geological Survey)
- Marika Polechová (Czech Geological Survey)
- Lukáš Laibl (Czech Academy of Sciences, Insitutue of Geology)

If you have any questions, feel free to contact us at the email address:
igcp735prague@geology.cz

IGCP 735 regional meeting and field excursion
Llandrindod Wells, Wales (UK)

4–11 July 2025

Description: We are delighted to invite you to a regional meeting of IGCP 735 (*Rocks and the Rise of Ordovician Life*) in the beautiful Mid Wales spa town of Llandrindod Wells, on the edge of the Ordovician Builth–Llandrindod Inlier. The Inlier is a key area of historical geology that represents an ancient volcanic island system, and has been studied by Sir Roderick Murchison, John William Salter, Gertrude Elles, O.T. Jones, Alwyn Williams, Peter Sheldon, and many others. The first trilobites were described from this area by Edward Llwyd in 1699. In recent years, it has been shown to have several sites with exceptional preservation of organisms such as sponges, echinoderms and palaeoscolecid worms. These sites include Llandegley Rocks, Llanfawr and now the diverse Burgess Shale-type assemblage of Castle Bank.

In keeping with the theme of the project, we would like to focus on filling gaps in the fossil record: in this case, with an emphasis on exceptional preservation, total communities and neglected fossil groups. The meeting will have three days of talks interspersed with two days of field trips visiting local sites of exceptional preservation, and probably also an optional final day of workshops on important but poorly understood groups such as, potentially, bivalved arthropods and sponges.

Venue of the meeting : the Metropole Hotel, Llandrindod Wells

Llandrindod is the administrative centre of Powys, but is a town of only 5000 people, on the edge of the Cambrian Mountains. The town grew up around mineral springs, and around 1900 was famous; at one point, it had the largest hotel in Wales, catering for direct express trains from London. The conference will be hosted at the Metropole Hotel, which can also accommodate many of the visitors (but other accommodation is also available). We are currently working out the costs, in order to set the registration fee (which will be kept as low as possible, probably at around £150, depending on numbers), and we would therefore appreciate an expression of interest from those intending to come at this stage.

We aim to make this a relaxed, friendly and very rewarding conference, in an beautiful rural setting. Llandrindod is a small town with a strong local community, where everything is within walking distance; there is much to see, including diverse archaeology, history and nature. Further information will be available in the coming months. If you think at this stage that you want to come, or have questions, please email us on **igcp735wales2025@gmail.com**.

We hope to see you there!

Joe Botting, Lucy Muir, Michelle Thomas, Berwyn Powell, Lucy McCobb, Mansoureh Ghobadipour, Caroline Buttler and Steve Pates

Typical Builth Inlier scenery

15th International Symposium on the Ordovician System
Xi'an, China

August 2027

Introduction: The 15th International Symposium on the Ordovician System (ISOS) is planned to be held at Northwestern University in Xi'an (central China) in August 2027. The organizer of this symposium will provide a wonderful opportunity for the international Ordovician community to meet old and new friends and to exchange their recent progresses of research on the Ordovician System from a global and multidisciplinary perspective, which will obviously strengthen the communication and collaboration between Ordovician workers (such as experts, students, technicians, etc.).

It has been 20 years when ISOS comes back to China in 2027. Some of our friends may remember that, in July 2007, the Ordovician working group at the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences (NIGPAS) organized the 10th ISOS that contained a 3-day indoor meeting in Nanjing (capital city of Jiangsu Province, eastern China) together with a pre-conference field excursion to the border region between Zhejiang and Jiangxi provinces and a post-conference field excursion to Guizhou and Hubei provinces as well as Chongqing District (central and southwestern China). The 10th ISOS was chaired by Prof. Chen Xu and Prof. Rong Jiayu while Dr. Li Jun was the secretary-general and Dr. Zhang Yuandong and Dr. Zhan Renbin were serving as the deputy secretary-general of the meeting.

The proposed 15th ISOS will include a 3-day indoor meeting in Xi'an (with a half day cultural tour included) and a pre- and post-conference field excursion respectively. The indoor meeting will contain oral and poster presentations, key note talks, workshops, as well as some social events particularly for accompanies. The pre-conference field excursion will be arranged to visit those classical Ordovician sections in southern Shaanxi Province (palaeogeographically belonging to the northern Upper Yangtze Platform, South China palaeoplate). During the post-conference field excursion, participants will have opportunity to check several classical and well-studied Ordovician sections in northern Shaanxi Province and southwestern Inner Mongolia Autonomous Region (palaeogeographically belonging to the western North China palaeoplate and the Ordos block). Both excursions will visit complete Ordovician sequences within which there are many fossiliferous horizons yielding abundant fossils, such as trilobites, graptolites, brachiopods and others. Besides, there are many internationally famous scenery spots and historical sites that are going to be visited during the excursions because Shaanxi is famous for these.

Symposium Venue: Northwestern University (China) is located in Xi'an. Xi'an is one of the most famous cities in China where full of historical sites and scenery spots, such as the Terracotta Warriors Museum, Xi'an City Wall, etc. The city itself is over 3100 years old, and has served as the national capital for 13 dynasties in the history of China. Xi'an reached its prime during the Han (206 BC-AD220) and Tang (618-907) dynasties, when its influences extended far away to Europe owing to the opening of the ancient Silk Road. At present, Xi'an has already become a modernized and internationalized city in China with a population of over seven million.

The Terracotta Warriors

Xi'an City Wall-the most complete ancient city wall in China

The following individuals, together with their group, have agreed to constitute the organizing committee of the proposed 15th ISOS: Zhan Renbin (chair), Zhang Yuandong (vice chair), Wu Rongchang (secretary-general), Fang Xiang (deputy secretary-general). Both Academicians Rong Jiayu and Chen Xu will behave as consultants of the meeting.

Upon formal notification by the Executives of Ordovician Subcommission, the above proposed organizing committee will be formalized and a complete working group will be established including people from NIGPAS and Northwest University (Xi'an) to guarantee an impressive, wonderful and successful ISOS. Of course, some other relevant committees (such as the Scientific Committee and the Advisory Committee) will be fixed in due course.

As usual, the organizer will apply for some extra-supports from various sources as possible as possible to ensure a successful ISOS and to provide some financial support for those student delegates and those in need from developing countries. Detailed procedure for those intended application will be issued in time.

IN MEMORIAM

Enrico (Giulio) SERPAGLI (1936–2023)

Enrico “Giulio” Serpagli died 29 December 2023, aged 87. He was an outstanding palaeontologist, who devoted a substantial part of his professional life to marine faunas and biostratigraphy of the Ordovician to Lower Devonian.

Enrico was born in 1936 in Borgo Val di Taro, Parma, in the Apennine mountains of northern Italy; mountains where he asked to be buried. His interest in geology led him to university studies in Modena where he graduated in Geology in 1960. Later, in 1962 he was appointed Assistant Professor at the Institute of Palaeontology of the University of Modena. In 1975, he achieved a full-professor status in Palaeontology at the University of Turin and, two years later, he moved back to Modena. Upon the retirement of Eugenia Montanaro Gallitelli in 1977, Serpagli was elected to the directorship of the Institute of Palaeontology and remained in this office, with some breaks, until 1995. Under his guide the Institute developed as one of the most active palaeontological research centers in Italy and also gained a considerable international reputation. A large assemblage of Lower Palaeozoic faunas (conodonts, cephalopods, graptolites, bivalves, brachiopods, trilobites, echinoderms, ostracodes, etc.) was at the same time deposited in the collections of the Institute of Modena, thanks to a fruitful collaboration of Enrico Serpagli with major specialists on diverse fossil groups.

In the early years of his career, Enrico Serpagli mainly focused on the Cenozoic of the northern Apennines, but, as early as 1965, he underwent some research training on conodonts in the laboratory of M. Lindström, University of Lund. A postdoctoral stay at the Department of Geology, Ohio State University in Columbus, Ohio (1971-1972), with Walter Sweet and Stig Bergström, represented another milestone that influenced further scientific specialization of the young micropalaeontologist. Since then, Early Palaeozoic conodonts became his principal field of research.

Enrico Serpagli is the author or co-author of over 140 publications, mostly related to various Ordovician to Lower Devonian topics. The last one, regarding ichnology, was published in 2023 in the Proceedings of the National Academy of Sciences (PNAS). In the seventies he approached systematic conodont research. In 1967 and 1974 he published two papers that still stand as masterpieces for conodont workers: the monography on Late Ordovician conodonts from the Carnic Alps and, in 1974, that on Early Ordovician conodonts from the Argentine Precordillera. Since then, he devoted himself mainly to conodont taxonomy and biostratigraphy though some of his papers, largely those co-authored with students and fellow workers, were focused on nautiloid cephalopods, graptolites, bivalves, conularids, scolecodonts, algae, ostracodes, problematics and ichnofossils. A list of those

related to the Ordovician is provided below. His extensive collaboration with universities and research institutions in Italy, and abroad (*e.g.*, Argentina, Germany, Spain, Ireland, United Kingdom, Czech Republic) gave the Palaeozoic Modena research team an international dimension. Enrico was an enthusiastic field course leader, and he led numerous field trips in Sardinia with leading Palaeozoic scientists. In 1998 Serpagli organised the Seventh European Conodont Symposium (ECOS VII) in Italy and the successful pre-symposium excursion across the Palaeozoic formations of southern Sardinia.

Throughout his career Enrico Serpagli was a conscientious and well-liked teacher. He took great care in the preparation and delivery of his lectures, and prepared a text on palaeontology that has been for a long time the reference for many graduate students.

For many years, Enrico Serpagli was the Editor of the *Bollettino della Società Paleontologica Italiana*. He managed the journal's transformation to an increasingly internationally respected, multidisciplinary journal.

Since 2006 Enrico Serpagli retired from his full-time teaching and research duties, and acquired more time for his lifelong passion, photography, to accompany his continuing palaeontological investigations. He became a respected artistic photographer, and several public exhibitions of his sensitive artistic photographs were organized in various Italian cities. In 2007 the book of art photographs *Il senso dell'Ordine* (Sense of Order) came to light.

Enrico Serpagli was a world authority on conodont biostratigraphy and taxonomy. For conodont people, his monographs represent true milestones. In all his papers, the exactness of the scientific presentation of the facts and problems is greatly appreciated as well as the solidity of the conclusions. In addition, he has been celebrated and respected for his great professionality and usual friendliness. He also provided substantial contribution to the present, advanced state of knowledge on Ordovician sedimentary successions and fossil faunas of Sardinia.

He leaves behind a distinguished academic family in addition to his wife Giovanna, their children Federica and Paolo, their partners and his seven grandchildren, to all of whom he was devoted. His loss is felt keenly by all.

Annalisa Ferretti, Carlo Corradini, Petr Štorch

Ordovician genera established by Enrico Serpagli (his new species are not listed):

Genus *Bergstroemognathus* Serpagli, 1974 - conodont
Genus *Dichodella* Serpagli, 1967 - conodont
Genus *Juanognathus* Serpagli, 1974 - conodont
Genus *Nordiodus* Serpagli, 1967 - conodont
Genus *Reutterodus* Serpagli, 1974 - conodont
Genus *Walliserodus* Serpagli, 1967 - conodont

Fossil taxa dedicated to Enrico Serpagli:

Genus *Serpaglioceras* Gnoli & Serventi, 2008 - cephalopod, Silurian

Xenascus serpaglii (D. Corradini, 1973) - dinocyst, Cretaceous
Panderodus serpaglii Burrett, 1978 - conodont, Ordovician
Juanognathus serpaglii Stouge, 1984 - conodont, Ordovician
Polygnathus serpaglii Corradini, 1998 - conodont, Devonian
Sphaerochitina serpaglii Pittau, 2000 - chitinozoan, Silurian
Dedzetina serpaglii Villas et al., 2002 - brachiopod, Ordovician
Reticuloplectograptus serpaglii Kozlowska, Bates & Piras 2010 - graptolite, Silurian

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Dietmar ANDRES (1938–2023)

Dietmar Andres is well known in the graptolite community through his important contributions to the morphology and evolution of early graptolites and their phylogenetic connection to the extant Pterobranchia (Andres, 1977, 1980). He was born in Berlin and stayed there for the whole of his life. He finished Highschool in 1957 (Goethe-Gymnasium, Berlin) and studied geology and palaeontology at Free University (1957-1974), with a longer interruption due to health problems and financial shortage. From 1971 to 1974, Dietmar Andres did fieldwork for his diploma thesis in southern France and he defended his diploma thesis on January, 11th, 1974.

His first publication on *Mastigograptus* (Andres, 1961) was guided by Prof. W.G. Kühne and Prof. M. Richter. Andres defended his PhD thesis on the « Graptolithen aus ordovizischen Geschieben und die frühe Stammesgeschichte der Graptolithen » (Graptolites from Ordovician glacial boulders and the early evolution of the Graptolites) in 1976. This work (Andres, 1976, 1977) was one of the most important graptolite publications of the time, leading to the recognition of the graptolites as a group of the Pterobranchia (Hemichordata) and the extant *Rhabdopleura* as a living graptolite. A research grant from the DFG (Deutsche Forschungsgemeinschaft) supported the additional work on the phylogenetic relationships of the graptolites (Andres, 1980).

For his Habilitation thesis, Andres, however, concentrated on the phylogenetic relationships of early conodonts from the late Cambrian to early Ordovician of Västergötland, Sweden (Andres, 1986, 1988). In his last publication, Andres (1989) described some beautifully preserved, phosphotized microfossils from the late Tremadocian of Öland, Sweden. This material, comparable to the well known « Orsten-faunas » of Västergötland includes a number of exciting specimens, but has unfortunately never been published in total. These « Orsten-type » specimens have fortunately been deposited in the Bayerische Staatssamlung, Munich and will be investigated by Prof. J.T. Haug.

Dietmar Andres was employed as geologist/palaeontologist in the Naturwissenschaftlichen Sammlungen (Natural History Collections), Berlin, Charlottenburg from 1989 to his retirement in 2003.

Jörg Maletz

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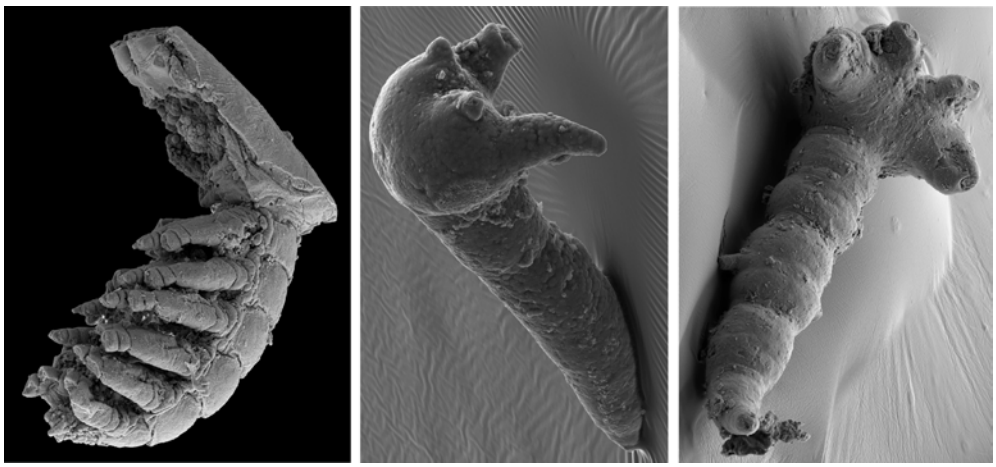

SEM photos of the Tremadocian « Orsten »-fauna from Öland (Dietmar Andres, unpublished; FU Berlin, Paläontologie).

ZHOU Zhiyi (1939–2022)

It is very sad to inform our international Ordovician colleagues that Prof. Zhou Zhiyi passed away on Dec. 30, 2022. As a renowned palaeontologist specialized in trilobites, he had dedicated his entire life to the study of this kind of animal and the Cambrian–Silurian stratigraphy. We deeply respect his outstanding contributions to the international palaeontology and stratigraphy.

Prof. Zhou was born in Shanghai and graduated from the Geology Department of Nanjing Unversity in 1962. In the same year, he entered Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences (NIGPAS) to continue his postgraduate study under the supervision of Prof. Lu Yanhao. In 1966, he graduated and started his career as a research assistant that was punctuated by the so-called cultural revolution for more than 10 years. Overcoming various difficulties, he was focusing on trilobite research and Cambrian–Silurian stratigraphy till Dec. 2022.

For about 60 years, Prof. Zhou had published more than 150 papers and monographs dealing with palaeontology, palaeoecology, palaeobiogeography, stratigraphy, plate tectonics and natural resources. He received a number of awards of national and provincial levels, such as the Science Conference Award of Jiangsu Province (1978), the Third Prize of National Natural Science (1987), the Second Prize of Science and Technology Progress, Chinese Academy of Sciences (1988), the First Prize of Natural Science Award, Chinese Academy of Sciences (1992), the First Prize of Science and Technology Progress, Jiangsu Province (2009) and the Science and Technology Progress Award of Ho Leung Ho Lee Foundation (2009). Besides, he had served as the Vice President of the Geological Society of Jiangsu Province (1998–2002) and the voting member of International Subcommission on Ordovician Stratigraphy for many years.

Among his academic achivements, some are really worthy being reiterated: 1) Biostratigraphy and geological evolution of Tarim (published in 1990 and 1992); 2) Research on stratigraphy, palaeontology and plate tectonics in northwest China (1995); 3) Trilobite Record of China (a huge English monograph published by Science Press in 2008); 4) Ordovician trilobite biogeography of China (2009); 5) Ordovician trilobites from North and Northeast China (1986); 6) Trilobite biofacies and palaeogeographic development in the Arenig (Ordovician) of the Yangtze Block, China (2011); 7) Ordovician (Darriwilian–early Katian) trilobite faunas of northwestern Tarim, Xinjiang, China (2014); 8) Uppermost Cambrian and lowest Ordovician trilobites of North and Northeast China (1984); 9) Patterns, processes and likely causes of the Ordovician trilobite radiation in South China (2007); 10) Trilobite faunas across the Late Ordovician mass extinction event in the Yangtze Block (2004); 11) The ontogeny of the Ordovician trilobite *Ovalocephalus* and its bearing on the affinity and evolution of the genus (2010); 12) Trilobite fauna from the Ordovician Pagoda Formation of central and western Yangtze Block, China (2016); 13) Early

Ordovician trilobites from Dali, west Yunnan, China, and their palaeogeographical significance (1998); 14) Arenig trilobites associations and faunal changes in Southern Shaanxi, China (2004).

Many cheerful memories and valuable experiences we had together with Prof. Zhou both in the field and the institute, and both during the research work and the daily life. Obviously Prof. Zhou Zhiyi will live in our hearts for good.

YUAN Wenwei, WEI Xin, ZHAN Renbin

List of Prof. ZHOU's major publications

ZHOU, Z.Y., ZHOU, Z.Q & YIN, G.Z. 2016. Ordovician trilobites from the uppermost Zhuozishan Formation (early Darriwilian) at Zhuozishan, Wuhai, Inner Mongolia. *Memoirs of the Association of Australasian Palaeontologists*, **49**, 289–328.

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Irina KIM (1946–2023)

It is with our deepest sorrow that we inform you of the passing of our colleague and friend, distinguished Uzbek geologist Irina Kim on the 8th of June 2023, after a short illness. She played a significant role in the Uzbek Ordovician, Silurian and Devonian stratigraphy and palaeontology. Legacy of her studies will last for years.

Irina Kim was born on November, 18th in the town of Bekabad, located in the south-eastern Tashkent region, in a family of Korean origins deported in 1937 from the Russian Far East. She was educated locally and, after completion of her school education, she was employed in 1976 as a geologist assistant in the highly successful research team of the Uzbek Geological Survey led by Alexey Kim, which during the 1960s-1970s performed important researches that laid foundations of the current understanding of Ordovician and Silurian geology and stratigraphy of Uzbekistan. At about that time, working under the supervision of Dr. N.M. Larin, Irina developed interest in palaeontology and, in particular, in brachiopods. Shortly after that, Irina Kim was enrolled at the Saint Petersburg (formerly Leningrad) Mining University, where she graduated with a M.S. degree in geology and exploration of ore deposits in 1973.

During her undergraduate education, Irina Kim received informal supervision from Dr. Olga Ivanovna Nikiforova, distinguished specialist on the Ordovician and Silurian brachiopods, who performed pioneering studies on the Silurian rhynchonelliform brachiopods of Central Asia in the 1930s.

After gaining her degree in 1973, Irina Kim was appointed as a head of a research team involved in a comprehensive study of the facial changes in the Ordovician and Silurian deposits of the Zeravshan Range, which was completed by 1981 in cooperation with her fellow colleagues Yu. N. Apekin and S.K. Piven. This job involved a significant amount of fieldwork, which was carried out in a high mountainous region only accessible by foot or horse.

Irina Kim undertaking a fieldwork in the Tamdytau mountains, Kyzylkum Desert, Uzbekistan, 2015.

Between 1984 and 1989, Irina Kim conducted a study of the Palaeozoic reefal complexes, which are widely developed in the Zeravshan – Hissar and Turkestan – Alai mountainous regions. In 2001-2008, this study was followed by the detailed study of the lithostratigraphy and brachiopod biostratigraphy of the Ordovician, Silurian and Devonian deposits of the Dzhyndy-Dariya River basin. Significance of these studies is emphasised by the selection of the Devonian section, exposed along the Zinzilban Gorge, as the GSSP for the base of the Emsian Stage, formally ratified by ICS.

This section is located within the area of the Kitab National Natural Park, at first established as a state natural reserve in 1979. Extensive brachiopod collections assembled during that time were the major subject of the monographic studies in the following years.

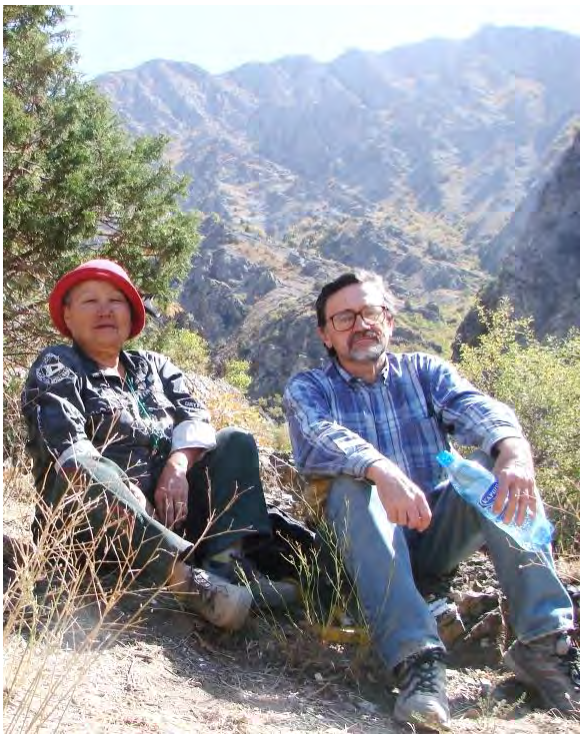
Irina Kim and Svetlana Nikolaeva. Annual Business Meeting of the SDS\IGSP 499 (Kitab State Geological Reserve, Uzbekistan, 2008)

The last decade of the previous century, when Irina Kim was promoted to the Head of the Stratigraphy division of the Uzbek Geological Survey 'Tashkentgeologiya' Branch, mainly coincided with the first ten years of the Uzbek independence, gained after the collapse of the former USSR. During these uneasy years, characterised by a decrease in funding of the geological research and exploration programs, and decline of previously built research connections outside Uzbekistan, she was able to keep a core of the research team intact and secure support for a young generation of geologists. These years, geologists of 'Tashkentgeologiya' (subsequently transformed into 'Regionalgelologiya') focused on the comprehensive study of the Palaeozoic geology and stratigraphy of the strongly tectonically dislocated and economically important areas in the Kyzylkum Desert, notorious for its harsh environmental conditions. This job resulted in the completion of high-resolution correlation charts supported by the upgraded conodont and graptolite biostratigraphy, which nowadays are highly applied in the geological mapping and exploration of the entire region.

In 2001, Irina Kim spent two months on the research visit to the National Museum of Wales, Cardiff, supported by the Royal Academy and National Museum of Wales. It resulted in a long-term scientific cooperation between Uzbek and British palaeontologists, which is still ongoing. Irina Kim was deeply involved in the preparation and editing of the 'Palaeontological Atlas of Phanerozoic faunas and floras of Uzbekistan', which was published in two volumes and in three authentic Uzbek, English and Russian versions. It gives encyclopaedic overview of current knowledge of the Uzbek Phanerozoic palaeontology and stratigraphy accumulated over the period of a century. As a leading researcher in the Ordovician, Silurian and Devonian stratigraphy of Uzbekistan, Irina Kim was involved in the supervision of the Kitab National Natural Park, which represents a unique stratigraphical and paleontological site of outstanding significance. It plays an important role in the development of the international research cooperation for the Uzbek

geologists and palaeontologists as a location for international conferences, workshops and field meetings.

Irina Kim was associated with the Uzbek Gelogical Survey for 55 years and for the last 30 years, she was the only brachiopod researcher working on the Palaeozoic brachiopods across entire Central Asia. The last paper she co-authored was published in August 2023. It is a chapter in the volume dedicated to a global synthesis of the Ordovician System published by Geological Society, London. Shortly before she deceased, she completed together with some colleagues another paper, dedicated to a comprehensive revision of the Late Ordovician brachiopod fauna of the Zeravshan Range. It will be published posthumously. The mid-Cambrian trilobite genus *Irakimaspis* Ghobadi Pour was named after Irina Kim. It is endemic to the Turkestan Range. The ostracod species *Silenis irinae* Mikhailova from the Lower Akkaya Formation (Ludlow) of North Nuratau Range was also named after her.



Irina Kim and Leonid Popov in the field trip on the Upper Ordovician exposures at the Zeravshan Range, Uzbekistan, September, 2008.

Irina Kim is sorely missed by her colleagues for who she will stay forever as an outstanding specialist in Uzbek geology and palaeontology, and as a beloved friend.

Firuza Salimova, Nodirzhon Davlatov and Nuriddin Abdiyev

Irina Kim in the field observing Lower Devonian exposures at the Sangruntau mountains, Central Kyzylkum, April, 2018

Tarmo KIIPLI (1951–2023)

On November 19th, 2023, Estonian geologists and friends of the Ordovician and Silurian systems lost a good colleague and productive scientist, Tarmo Kiipli. After finishing geology studies at the University of Tartu in 1975, Tarmo worked on various topics at the Estonian Academy of Sciences, Geological Survey of Estonia, and Tallinn University of Technology. He was involved in marine geology, environmental geochemistry and economic geology, but his main scientific interests were always related to Ordovician-Silurian geochemistry, paleoenvironments and traces of volcanism within the Baltoscandian sedimentary succession. Tarmo studied dolomitisation processes of Estonian bedrocks and co-authored some of the pioneering works on stable carbon isotopes in the Baltic region. However, since the late 1990s, his main passion were the K-bentonites. The series of more than 70 publications on volcanism and Baltic Ordovician and Silurian K-bentonites continued until his last paper in 2022. He used geochemical and mineralogical fingerprinting of individual ash layers based on pyroclastic sanidine, as well as trace elements. Additionally, he created a system for referring to individual bentonite layers that had not been given formal names. Tarmo's research also contributed to a better understanding of the diagenesis of volcanic ash in marine settings as well as reconstructing environmental conditions in different parts of the Ordovician-Silurian Baltic paleobasin. The bentonite-based chronostratigraphic framework has helped to improve the regional correlations and cross-check biostratigraphic data, and the invaluable bentonite geochemistry database and sample collection continue to serve researchers today. The complete list of Tarmo Kiipli's publications can be found online at *https://kirjandus.geoloogia.info/en/library/118.*

During his career, Tarmo supervised many undergraduate theses and several PhD projects and was also a valued teacher for geology and mining students at Tallinn University of Technology. I was lucky to publish my first scientific paper together with Tarmo Kiipli in 1997, discussing the mineralogy and micropalaeontology of the Ordovician Kinnekulle K-bentonite in a unique subsurface outcrop in the outskirts of Tallinn that we had explored together a year earlier. Since then, I have known Tarmo as an open-minded scientist, always seeking answers and fascinated by Earth's history. His contributions to Ordovician and Silurian research will remain important in Estonia and beyond.

Olle Hints, together with colleagues from Estonia

ORDOVICIAN RESEARCH REPORTS & CONTACTS

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Guillermo L. ALBANESI (Argentina) works on Lower Paleozoic conodont faunas from South America. Diverse projects from the Precordillera and northwestern Argentina follow on with G. ORTEGA, former PhD students, and a number of colleagues. Doctoral plans are developed by G.M. DELLA COSTA, F.E. LÓPEZ, and E.K. RUEDA under his direction. Likewise, he follows the supervision of M. J. MANGO as CONICET assistant researcher. Research programs include conodont taxonomy, biostratigraphy, paleoenvironments, and evolution from carbonate and siliciclastic sequences of the Ordovician System in Argentina.

He is professor of Paleontology and director of the Centro de Investigaciones Geológicas Aplicadas (CIGEA) at Facultad de Ciencias Exactas, Físicas y Naturales (FCEFyN), Universidad Nacional de Córdoba (UNC), which includes a micropaleontology laboratory especially equipped for conodont preparation. Office located at the CIGEA (https://fcefyn.unc.edu.ar/facultad/secretarias/investigacion-y-desarrollo/centros/centro-de-investigaciones-geologicas-aplicadas-cigea/), and the conodont collections are housed at the Museo de Paleontología of the university (https://fcefyn.unc.edu.ar/facultad/general/museos-fcefyn/museo-de-paleontologia/).

He is also Chief of the Pander Society (the international society of conodont specialists) for the period 2022–2026: (https://dxy.cug.edu.cn/dxyen/THE_PANDER_SOCIETY/About_the_Pander_Society.htm).

Guillermo L. Albanesi

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Martina AUBRECHTOVÁ (Czech Republic) works in Prague as a postdoctoral researcher at the Czech Academy of Sciences. She cooperates with Dieter KORN (Museum für Naturkunde Berlin) to study Ordovician tarphyceratid cephalopods from Baltoscandia and erratics in Germany and Poland. With Vojtěch TUREK (National Museum Prague), she continues to update the knowledge on the diversity of Ordovician cephalopods of the Prague Basin, including by application of the micro-CT scanning.

Martina Aubrechtová

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Chris BARNES (Canada) is slowly continuing / completing his conodont paleontology / stratigraphy / isotope geochemistry research. The main projects being: a) Ordovician conodonts and paleotemperature record for tracking the Argentine Precordillera across Iapetus Ocean (with ALBANESI (CONICET, Cordoba), TROTTER (UWA) and colleagues); and b) Ordovician and Silurian conodont biostratigraphy, bioevents, eustasy and thermal maturation, mainly for Laurentia.

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Juan L. BENEDETTO (Argentina) is continuing studies on taxonomy, phylogeny and biogeography of Ordovician brachiopods from the Precordillera**,** Central Andean and Famatina basins of Argentina. Together with Diego MUÑOZ and Arnaud BIGNON, he finished a work on the ontogeny and paleoecology of the plectorthoid brachiopod *Tarfaya purmamarcaensis* by using geometric morphometric methods. Together with Fernando LAVIE, he published a new linguliform fauna from the Tremadocian of NW Argentina, which displays biogeographical affinities to Bohemia and Avalonia. Currently, Juan is studying the biostratigraphical significance of the Tremadocian genus *Kvania* based on phylozones.

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Matilde Sylvia BERESI (Argentina) is currently focusing on Ordovician stratigraphy and faunas, with a particular emphasis on sponges, and Cambrian chancelloriids.

M. BERESI has collaborated with F. CUEN, R. MONTREAL, B. BUITRÓN-SÁNCHEZ, and other colleagues to integrate the chapter "*Ordovician rocks and biotas from Mexico"* into the volume "A Global Synthesis of the Ordovician System" (Part 2), a Special Publication of the Geological Society of London.

A paper on Hirnantian sponge spicules discovered in the Eastern Precordillera of San Juan has been published in collaboration with Dr Jessica C. GÓMEZ.

M. BERESI is involved in collaborative research of Cambrian faunas, specifically chancelloriids, and sponge spicules from carbonate sequences in the Precordillera and Sonora, Mexico. Collaborative research with Dr Silvio PERALTA, Dr Jessica GÓMEZ, and other colleagues at the Institute of Geology (INGEO), San Juan University, aims to examine the correlation of Ordovician-Silurian Transition (OST) deposits in central and eastern Precordillera of San Juan Province, western Argentina. The project involves an integrated study of high-resolution stratigraphy, biostratigraphy, paleoenvironmental, paleoclimatic, and paleogeographic implications.

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Carlton E. BRETT (USA) was recipient of the Paleontological Society Medal in 2023. Although heavily involved in research on the Devonian of New York associated with the SDS meeting in summer 2023, Carlton and his students have also continued substantial research in the Ordovician of eastern North America. The following topics again occupied much of his research effort in the past year and form the major research programs for the next two to three years.

A) *Late Ordovician Cincinnatian Stratigraphy and Paleoecology: Tennessee-Ohio-Indiana-Kentucky* — Research on Upper Ordovician (Katian-Hirnantian) of the Cincinnati Arch region was continued and extended on several fronts. Major research projects included lower Katian integrated stratigraphy of outcrop and subsurface in Kentucky and central Ohio, high resolution studies of the "Richmondian invasion" of taxa during the late Katian, sequence stratigraphy and paleoecology of the Nashville Dome in central Tennessee, and cyclostratigraphy/astrochronology of the Richmondian Stage.

In June, 2023 PhD, student Allison YOUNG completed a dissertation on integrated stratigraphy of the lower Katian Lexington Limestone and Point Pleasant formations in the surface and subsurface of the Cincinnati Arch (Young, 2023). Allison calibrated carbon isotope curves with pre-existing conodont and graptolite data in drill cores from shelf-basin transitional facies north of Cincinnati to provide a more robust chronostratigraphy for the lower Katian. She was then able to synthesize data on C isotope chemostratigraphy to define new carbon isotopic stages that can be correlated regionally from the best-known sections in the Cincinnati Arch and into basal regions to the northeast and the upper Mississippi Valley. Allison also provided important new data on the timing of subsidence and filling history of the Sebree Trough and Point Pleasant Basin of the Ohio subsurface, widely known as a target for petroleum and natural gas production. Papers on these subjects are in preparation.

At the same time, graduate student Sam LITTLE (now enrolled as a PhD student at University of Southern California) completed his MS thesis (Little, 2023) with two very significant chapters that are now being prepared for publication. These provide much more detailed data on faunal occurrences during the so-called Richmondian Invasion cast in a high-resolution sequence stratigraphic background. Using a very comprehensive presence-absence dataset for many specific horizons at several localities in the Cincinnati Arch region (Wm. H. Shideler, 1994, Ohio Geological Survey Open File Report). Sam showed that the invading invertebrate taxa arrived in at least three discrete short-lived pulses but were only abundant at certain levels that were separated by thicker stratigraphic interval largely devoid of these exotic forms and highly dominated by long-ranging incumbents. In a detailed study of bulk samples, he provided data on relative abundance through a major portion of the upper Waynesville and Liberty formations, which show, even more clearly, the partitioning between intervals of incumbent and invader dominance. This synthesis suggests that the long-standing view that the influx of invading taxa caused significant permanent re-structuring of local communities requires re-evaluation. Rather Sam LITTLE's analyses suggest that, during certain intervals, associated with times of probable warming (possibly related to the Boda events) taxa from adjacent provinces particularly to the northwest (lower latitude) were able to expand their ranges into the Cincinnati region, while incumbents were somewhat modified in abundance distributions. Alternatively, during other, perhaps cooler times, the presumably warmer water taxa were greatly reduced or absent locally, and incumbent taxa then dominated.

Research with PhD student, Ian FORSYTHE, in spring 2023, resulted in further documentation of Katian sections east of Nashville, Tennessee that provide important insights into the sequence stratigraphy and correlation, and identify a number of stratigraphic markers that can be traced northward into the Cincinnati Arch. Ian has also made and processed bulk samples of fossils, collected at regular intervals in the

Richmondian (upper Katian) strata of the Nashville area. This work also, demonstrates near synchroneity of the early main pulse of Richmondian incursion of warmer water taxa in the Cincinnati and Nashville sub-basins, and similar patterns to those documented by Sam LITTLE.

In his work on astrochronology, advised in part by Dr. Anne Christine DASILVA (University Liége, Belgium), Ian generated time series based on total gamma ray and hand held XRF-generated elemental data time series of geochemistry and gamma ray in a well-preserved drill core from the Cincinnatian in west central Ohio. Cyclostratigraphic analysis of these data is leading to development of a high-resolution astrochronology that is providing a much more detailed temporal framework for the upper Katian-Richmondian local Stage.

This work will form the basis of Ian's PhD study on paleoenvironments, sequence stratigraphy paleoecology of the first pulse of the Richmondian Invasion. We are also planning collaborative research with Dr. Alycia STIGALL (University of Tennessee, Knoxville, TN) on regional paleoecology and biogeography of a coordinated immigration: the Richmondian Invasion in the Nashville and Cincinnati Basins.

Collaborative research with graduate students Ian FORSYTHE, Cole FARNAM, Sam LITTLE and, several earlier students aims to improve correlations and examine patterns of sea level, climate, and faunal change during the entire Katian-Hirnantian stage interval in eastern North America. Carlton and his students, together with Cameron SCHWALBACH and Glenn STORRS of the Cincinnati Museum, and independent stratigrapher and technical report specialist Kyle HARTSHORN, are completing editing for some 12 chapters for an anticipated book on Cincinnati Arch stratigraphy and paleontology to be published by Cincinnati Museum. The aims of this project and its scope have been expanded to include sections on astrochronology, carbon isotope stratigraphy and implications for eustasy and climatic change. They hope also to include a chapter with Dr. Charles MITCHELL (emeritus, SUNY Buffalo) outlining efforts to link the graptolite biostratigraphy of the thick Katian-Hirnantian succession of Anticosti Island with coeval Richmondian succession of the Cincinnati Arch, using carbon isotopic profiles and general sequence stratigraphy of McLaughlin *et al*., 2016, *Canadian Journal of Earth Sciences* and Sinesael et al., 2021, *Geology*).

B) Research on Ordovician-Silurian Boundary Sequence and Chemostratigraphy — PhD student, Cole FARNAM, and Carlton published a detailed review and update of the upper Hirnantian Whirlpool-Manitoulin succession in Ontario, Canada and the correlation of unconformities with substantial new isotopic evidence supporting the results of Bergström *et al.* (2011, *Canadian Journal of Earth Sciences*). Cole is completing two papers on the Ordovician-Silurian boundary transition in eastern North America and on a new exceptionally preserved fauna ("Centerville Lagerstätte") from a newly discovered site in southern Indiana as part of his dissertation. They are collaborating with Dr. Jin JISUO, (University of Western Ontario), who is describing the brachiopods, and Dr. Robert ELIAS (University of Manitoba) is studying the rugose corals. They also intend to work with the discoverer of this fossiliferous locality, Mr. Lincoln SHOEMAKER on a new very well-preserved echinoderm fauna including at least four species of crinoids, as well as ophiuroids and an asteroid. The new faunal assemblage is completely different from immediately underlying Cincinnatian (uppermost Katian) and similar to the Edgewood and early Silurian faunas, which persist upward for some 5 million years. This unique occurrence will provide important insights into the post-extinction recovery in this critical interval.

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Yves CANDELA (Scotland) is continuing the study of Ordovician and Silurian brachiopods from Belgium in collaboration with Bernard MOTTEQUIN (Royal Belgian Institute of Natural Sciences -RBINS, Brussels) and David HARPER (Durham University, UK). Thanks to the EU-funded SYNTHESYS+ program, Yves has undertaken two visits to the RBINS. Three papers so far have been published and a fourth is in preparation. Our work on the brachiopod faunas from the Fezouata Shale (with David HARPER [Durham University] and Michal MERGL [University of West Bohemia, Pilsen] is completed and has been submitted for review. The manuscript (co-authored with Consuelo SENDINO (NHM London)) on Scottish machaeridians from the Sandbian is now published. Projects started with Juan Carlos GUTIÉRREZ-MARCO (Institute of Geosciences, Madrid) on Ordovician brachiopods from Spain are still on-going.

Yves is also continuing working on Silurian brachiopods with Bing HUANG: a new paper on early Silurian brachiopods from South China has been accepted for publication in *Journal of Paleontology*.

As curator of invertebrate palaeobiology at the National Museum of Scotland, most of Yves' time is dedicated to the curation and care of the invertebrate palaeontology collection, as well as welcoming research visitors.

Yves is still editor of the *Earth and Environmental Science Transactions of the Royal Society of Edinburgh* (EESTRSE) and editor of the *Scottish Journal of Geology*.

IGCP project 735 "Rocks and the Rise of Ordovician Life: Filling knowledge gaps in the Early Palaeozoic Biodiversification" led by Bertrand LEFEBVRE (France) and also comprising Mansoureh GHOBADI POUR (Iran), Khadija EL HARIRI (Morocco), Beatriz WAISFELD (Argentina), Oive TINN (Estonia), Wenhui WANG (China), Elena RAEVSKAYA (Russia) and Yves is in its fourth year now and has attracted so far 217 colleagues representing 42 countries. The full list of publications mentioning IGCP735 is available on our website. If you are interested in joining this project, please check our website: *https://rocksnrol.wordpress.com/* or drop us a line directly. Do not forget to send us a line when a paper acknowledging the project is published; we will add it on our website to our list of papers. The website also lists future meetings in which IGCP735 is organising or involved.

Please check our website for news about the next IGCP735 annual meeting: to be held in Córdoba, Argentina.

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Marcelo G. CARRERA (Argentina) is actively working on the evolutionary history of Paleozoic sponges and bryozoans (taxonomy, paleoecology and paleobiogeographic significance). In particular, I'm currently studying new findings related to Lower Ordovician reefs from western Argentina.

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Zhongyang CHEN (China) is working on the Early Palaeozoic conodonts and stratigraphy. His research interest is currently focused on the Early Palaeozoic conodonts in China and other tropical Gondwanan regions, especially on the biostratigraphy and biogeography.

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Helena COUTO (Portugal) is working on the study of Paleozoic stratigraphy, paleontology and on associated gold and antimony mineralizations in Dúrico-Beirã area (North Portugal). These studies aim contributing for a better knowledge of the Paleozoic stratigraphy and paleontology of the Valongo Anticline and to define prospecting guides for gold and antimony deposits.

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G. Susana DE LA PUENTE (Argentina) continues to work on chitinozoans and stratigraphy of Paleozoic basins from Argentina, including the northwest of Argentina (Central Andean Basin), Precordillera, Patagonia and Tandilia regions, in collaboration with paleontologists and sedimentologists. In this period, her Ordovician chitinozoans results from the Central Andean Basin have been published. She has advised two undergraduate students, and started with two PhD students on palynological topics. Susana was in charge of organizing the Palinofacies postgraduate course for the Doctorate in Geosciences (Doctorado en Geociencias) at the university, which was taught by specialists Marcelo MARTINEZ and Daniela OLIVERA (Argentine).

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Gisella M. DELLA COSTA (Argentina) is a biologist and professor graduated at the National University of Cordoba (UNC), Argentina. She is currently finishing her PhD thesis in Biology on biostratigraphy and taxonomy of Ordovician conodonts from the Argentine Precordillera. Her main research interests are focused on an integral vision of the conodont group, including biostratigraphic, palaeoecological, palaeoenvironmental and evolutionary aspects. She is really interested in improving the quality of conodont studies through increased sampling efforts, and review of determined conodont species using advanced statistical criteria to reduce the subjectivity of taxonomists when identifying species.

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André DESROCHERS (Canada) is working on the Upper Ordovician to Lower Silurian strata of Anticosti Island in Eastern Canada. His research program focuses on high-resolution stratigraphic studies integrating carbonate sedimentology, sequence stratigraphy, biostratigraphy, and chemostratigraphy. A number of collaborative projects are in progress including i) The Upper Ordovician-Lower Silurian strata of Anticosti Island as a natural lab to unravel chitinozoan paleoecology and to track global Ordovician and Silurian biovents (with Thijs VANDENBROUCKE and several of his graduate students), ii) stratigraphy and timing of the End Ordovician mass extinction (with Joshua ZIMMT, Steve HOLLAND and Seth FINNEGAN), iii) sedimentology and paleoecology of Telychian encrinites (with Bill AUSICH, Selina COLE, and David WRIGHT), and iv) sediment dynamics on latest Ordovician carbonate ramps (with Jean-François GHIENNE).

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Jan Ove R. EBBESTAD (Sweden) continues working on Ordovician gastropods and other molluscs from Baltica, Avalonia, Laurentia and peri-Gondwana settings. A field guide to the Ordovician of Västergötland and Dalarna for the Ordovician meeting ISOS 14 was published for the post-meeting excursion. A study on Early Ordovician cheirurine trilobites from Baltoscandia is being finalized in collaboration with Helje PÄRNASTE, Magne HØYBERGET, Arne T. NIELSEN and Maximo A. ROJO. A further study on Lower Ordovician molluscs from South Wales with John COPE was finished. The oldest species of

the platyceratid gastropod *Orthonychia* was described from the Katian Boda Limestone in Dalarna, Sweden, in collaboration with Alexander NÜTZEL and others. Work on the Wahlenberg (1818) type catalogue continued during 2023, in collaboration with Vivianne BERG-MADSEN (Uppsala).

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Cole EDWARDS (USA) continues to work on Ordovician stable and radiogenic isotope stratigraphy. Collaborations with Matt SALTZMAN (The Ohio State University) continue, along with his former Ph.D. students (Christopher CONWELL, Datu ADIATMA, and Teresa AVILA), on conodont biostratigraphy and radiogenic isotope chemostratigraphy of the Middle–Late Ordovician. A review chapter on Ordovician seawater signatures and climate was published in the *Special Publication* on the Ordovician by the *Geological Society of London* with Seth YOUNG, Leho AINSAAR, Anders LINDSKOG, Matt SALTZMAN, and myself. Collaborative work with Sarah CARMICHAEL (Appalachian State University), Phoebe COHEN (Williams), Diana BOYER (Winthrop University), and Xiao-Ming LIU (University of North Carolina Chapel Hill) continues to build on our work on studying "best practices" for identifying periods of anoxia during the Late Devonian in relation to causes for mass extinctions.

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Robert ELIAS (Canada) and Roger HEWITT (England) completed their study of corals and a cephalopod from the Whirlpool Formation in southern Ontario, Canada (published in *Journal of Paleontology*). The occurrences of *Streptelasma rutkae* and *Gorbyoceras* sp. support other evidence suggesting that the Whirlpool Formation is latest Ordovician, rather than earliest Silurian as traditionally thought. They also indicate paleogeographic connection between the area of Whirlpool deposition and the Edgewood Province and Cincinnati Arch region in the east-central United States. Robert is currently studying corals from latest Ordovician to earliest Silurian strata in the Cincinnati Arch region, with Carlton BRETT and Cole FARNAM (USA).

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Frank R. ETTENSOHN (USA) continues his work with Chinese colleagues from Yunnan University in understanding the nature of Upper Ordovician platform carbonates on the Yangtse Platform of south China. He also continues his work on the Upper Ordovician Lexington Limestone and is working with graduate students and colleagues from the Kentucky Geological Survey on the three-dimensional mapping of facies in the unit. It is our hope to use 3-D mapping to further understand likely structural control on facies development throughout the unit.

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Xiang FANG (China), Associate Researcher in NIGPAS, Nanjing, is still working on the Early Palaeozoic cephalopods and relative stratigraphy, as well as the exceptionally preserved fauna in Ordovician and Silurian. Currently, his research interest is focused on the Early Palaeozoic cephalopods in China and other tropical Gondwanan regions, especially on their palaeobiological and macroevolutionary patterns.

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Oldřich FATKA (Czech Republic) continues his research on Cambrian and Ordovician trilobites together with Petr BUDIL, Radek MIKULÁŠ and several hobby-collectors. With Jakub VODIČKA, Lucy MUIR and Joe BOTTING, Olda continues research on Middle/Late Ordovician chitinozoans. With Vojtěch KOVÁŘ and Matěj Šilinger, he studies clustering of acritarchs, ultrastructure of arthropod exoskeletons and Small Carbonaceous Fossils of the Barrandian area.

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Annalisa FERRETTI (Italy) continues her work on Ordovician conodont faunas from Europe and elsewhere, in collaborations with other conodont specialists.

Ferretti *et al.* (2023) examine possible similarities between the conodont genus *Pseudooneotodus* (Drygant, 1974), widely distributed from the Middle Ordovician to the Early Devonian throughout the world, and *Eurytholia* (Sutton *et al*., 2001), an *incertae sedis* genus of enigmatic plates with a phosphate composition and a similar stratigraphic

distribution. Through an investigation that combines the use of optical and electron microscopy (including focused ion beam scanning electron microscopy), X-ray microdiffraction, and trace element (HFSE) analysis by mass spectrometry, differences between these fossil groups were observed and compared with data resulting from typical conodonts (*Dapsilodus obliquicostatus*, *Panderodus unicostatus* and *Wurmiella excavata*) recovered from the same samples. The same analytical protocol was applied by Malferrari *et al.* (2024) to investigate the Rare Earth Element (REE) and other High-Field-Strength Element (HFSE) composition of euhedral crystals formed on the surface of conodont elements compared with that of crystal-free surfaces in order to decipher any possible relation to fossilization/diagenesis. Late Ordovician (*Amorphognathus ordovicicus* Zone) conodonts from two localities in Sardinia and the Carnic Alps (Italy) were investigated. The experimental results indicated a substantial contribution of diagenetic imprinting for all the analyzed material, although more evident on euhedral crystals that are significantly enriched in middle and, subordinately, in heavy REE with respect to smooth surfaces, supporting the hypothesis that the neoformed euhedral crystals grew also by depleting the pristine bioapatite of the conodont elements. Nevertheless, the occurrence of two types of apatite cannot be ruled out: euhedral crystals as neoformed products of diagenetic processes and smooth surfaces as remains of the pristine conodont bioapatite after diagenesis.

Co-authored papers have reviewed the Ordovician of south-eastern Europe (Ferretti *et al*., 2023) and Sardinia, Italy (Loi *et al*., 2023). Well-preserved ferruginous laminated structures were described within the Upper Ordovician of the Cellon section in the Carnic Alps, Austria to suggest a biomediated genesis (Ferretti *et al*., 2023).

Annalisa FERRETTI has co-edited with Guillermo ALBANESI, Xavier CROSTA and Rick JORDAN the thematic Issue of *Marine Micropaleontology* "Beyond biostratigraphy: Conodont matters in evolving planetary scenarios", resulting from the homonymous Session at the 5th International Conodont Symposium "ICOS 5" held in Wuhan, China (June 24–27, 2022). The issue includes several Ordovician contributions. Finally, Annalisa FERRETTI is involved in the guest-editing (with Marco BALINI, David A.T. HARPER and Thomas SERVAIS) of the Thematic Issue of *Palaeogeography, Palaeoclimatology, Palaeocology* "From rock to time: evolutionary lineages and the calibration of the Chronostratigraphic Scale", resulting from the General Plenary Session at the 4th International Congress on Stratigraphy STRATI 2023 held in Lille, France (July 11–13, 2023). The issue includes several Ordovician contributions.

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Barry FORDHAM (Australia) hopes to get back to a small collection of Ordovician conodonts one day ...

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Mansoureh GHOBADI POUR (Iran) continues her work on the Early Ordovician trilobites from North Tien Shan, Kazakhstan, and Late Ordovician trilobites from Kitab Natural Reserve, Uzbekistan. She also completed a review of the Tremadocian trilobites of Alborz Mountains in northern Iran, and a revision of the Late Ordovician brachiopods from the Kitab Natural Reserve in Uzbekistan (jointly with Leonid POPOV and some Uzbek colleagues), which are now in press.

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Jessica Carolina GÓMEZ (Argentina). Over the past year (2023), she has been working on the stratigraphy of the Ordovician-Silurian transition in the San Juan Precordillera, Argentina. Jessica started a post-doctoral research project with CONICET, focusing on palynostratigraphic and palynofacial studies in the same area, under the guidance of Dr. Mercedes DI PASQUO (CICYTTP –CONICET, ENTRE RÍOS-UADER) and Dr. Jimena TROTTEYN (CIGEOBIO-CONICET, San Juan-UNSJ). Their primary objective is to conduct a detailed palynological study to identify the establish the floristic changes that occurred during the Hirnantian-Llandovery succession of the Precordillera, and to establish a biostratigraphic scheme. Additionally, they will analyze the relationship between the palynomorph associations of the Ordovician-Silurian transition, compare them with other associations, and correlate them with the biostratigraphic schemes of the Precordillera.

Jessica participated in various projects related to the Ordovician-Silurian boundary. One of them was "High-Resolution Stratigraphy and Events in the Ordovician-Silurian Transition of San Juan Precordillera, Argentina: Correlations and Significance in the Evolution of the Western Margin of Gondwana. Part 2", directed by Dr. Silvio PERALTA at CIGEOBIO-CONICET (Code: 21/E1224). Another project she was involved in was "Ni and Hg Isotope Chemostratigraphy as Proxies for Coeval Volcanism in the Cretaceous-Paleogene, Permian-Triassic and Ordovician-Silurian transitions", directed by Dr. Alcides SIAL at NEG-LABISE in Brazil. The results of these projects will contribute to the reconstruction of paleogeography, paleoenvironment, and paleobiogeography in Gondwana.

In 2023, studies on the Central and Eastern Precordillera of San Juan Province provided a preliminary association of palynomorphs, which consisted of species of acritarchs, chitinozoans, and cryptospores from the basal strata of the La Chilca Formation (Hirnantian-Wenlock) in the Central Precordillera. Additionally, Jessica collaborated with Dr. Matilde BERESI (IANIGLA-CONICET) on a manuscript that details a collection of sponge spicules. These spicules were found in the bedding planes of fine sandstone lenses in the Don Braulio Formation (Hirnantian-Llandovery) at the Villicum Range. All of this led to an analysis of the timeline of events in the Ordovician-Silurian (Hirnantian-early Llandoverian) Transition based on stratigraphic relationships, diagnostic deposits, sedimentary, paleobiologic, and isotope data.

Jessica Carolina Gómez

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Sophie GRAUL (Estonia) is working on the REE resources and geochemistry of Tremadocian phosphorites of the Baltic Paleobassin. Her studies cover the origin and mechanism of mineralisation and REE enrichment of phosphatic brachiopods as well the reconstruction of the ores paleoenvironment based on REE proxies and textural analyses. The studies are under the projects RESTA23 (2020-2023) 'Quality and properties of Estonian shelly phosphorite as a potential source for phosphorus and rare earth elements and its complex processing technologies' and TK228U3 (2024-20230) 'Centre of Excellence in Circular Economy for Strategic Mineral and Carbon Resources' and are being conducted in collaboration with Oulu University, Finland and Trinity College Dublin, Ireland.

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Volodymyr GRYTSENKO (Ukraine), Head of the Geological Department and curator of invertebrate palaeontology at the National Museum of Natural History of National Akademy of Science of Ukraine, is continuing the study of Ordovician and Silurian cnidarians from western slope of Ukrainian Shield (open for collaboration with colleagues). He presented a poster at the 14th ISOS, Estonia annual meeting, which took place in Tallinn (Estonia) in July 2023.

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Juan Carlos GUTIÉRREZ-MARCO (Spain) continues working in various papers in collaboration with Jörg MALETZ and Blanca A. TORO (graptolites from several peri-Gondwanan countries), Beatriz WAISFELD, Emilio VACCARI and Franco TORTELLO (Peruvian trilobites), Josefina CARLOROSI and Olle HINTS (Peruvian conodonts and scolecodonts), John MALINKY (Spanish hyoliths), Olev VINN (cornulitid tubeworms), Samuel ZAMORA (Spanish echinoderms) and Sara ROMERO, Isabel RABANO and Sofía PEREIRA (trilobites from various localities of Morocco and SW Europe), among others.

New results on Ordovician trilobites from Morocco and Spain have already been published "online first" in *Journal of Paleontology* and *Geogaceta* (co-authored with Melanie HOPKINS, Sofia PEREIRA, Isabel RABANO and Sara ROMERO, among others).

Some manuscripts sent for publication deal with Lower Ordovician cephalopods from Peru (with Björn KRÖGER), Peruvian brachiopods (with Jorge COLMENAR and César CHACALTANA: some results were advanced in the last ISOS), the discovery in Morocco of the first Ordovician Emucaridid arthropod (with Diego GARCIA-BELLIDO) and several interesting graptolites from the Fezouata biota, among them a mass occurrence of planktic dendroid graptolite synrhabdosomes (with Jörg MALETZ).

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Neal M. HANDKAMER (Argentina) is continuing work on his PhD project, investigating the phylogeny and evolutionary history of raphiophorid trilobites, with a special focus on collections from the Middle Ordovician formations of the Argentine Precordillera. Silicified material of both juveniles and adults of several species, from the San Juan, Gualcamayo, Las Aguaditas, and Las Chacritas formations, will allow for high-resolution ontogenetic trajectories to be reconstructed. This can characterize if, and how, modifications to ontogeny played a role in the success of Raphiophoridae during the GOBE. This project is advised by N. Emilio VACCARI and Emilia SFERCO.

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David A.T. HARPER (Scotland). Research continues, on a range of Ordovician brachiopod and other faunas. An extensive and focussed study on the pentamerides from North Greenland with JIN Jisuo, Peter SHEEHAN and Christian RASMUSSEN has been published in *Papers in Palaeontology*. Collaboration continues with Yves CANDELA and Michal MERGL investigating the Lower Ordovician brachiopod fauna of the Fezouata Lagerstätte (Morocco) and a monographic study of these faunas has been submitted to *Papers in Palaeontology*. Together with Bernard MOTTEQUIN, Yves CANDELA and Thomas SERVAIS, Upper Ordovician brachiopods from Belgium are under study and DH has contributed to a monograph on the highest Ordovician and lower Silurian geology of the Condroz Inlier, Belgium (Mortier *et al*.). After many years in gestation, description of the Middle Ordovician brachiopod from SE Ireland with Denis BATES was published in *Geobios* (see references) including a discussion of Dapingian brachiopod diversity. Investigation of the phylogeny of plectambonitoid brachiopods (with Yves CANDELA and ZHEN Guo) continues. A similar study is planned for the orthide brachiopods. Various studies with Thomas SERVAIS and others continue on the Great Ordovician Biodiversification Event and the putative Furongian Gap. Collaboration with ZHANG Yuchen together with RONG Jiayu and ZHAN Renbin has begun on the Katian brachiopod faunas from Tarim and South China. A manuscript on Irish Middle Ordovician conodonts led by Svend STOUGE together with the late Matthew PARKES has been submitted to a volume to celebrate the life of George SEVASTOPULO in the *Irish Journal of Earth Sciences*. Editorial work on and contributions to, two special Geological Society publications on the Global Ordovician has occupied a significant amount of time during 2022/2023; both volumes are now published (see references). DH was involved in chapters on South Africa, the UK and Ireland, Greenland, Scandinavia, palaeobiogeography and the history of the system. DH has co-edited a semi-popular science book, with Ole SEBERG on 'The Origin of *All* Things'; this was at last published in 2023 (see references). A number of

the 28 chapters include Ordovician topics. Finally the second edition of *Paleontological Data Analysis* is now out containing some Ordovician case histories.

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Olle HINTS (Estonia) is continuing studies on Ordovician–Silurian microfossils, geochemistry and Baltic regional geology and stratigraphy. In collaboration with Jaak NÕLVAK and Yan LIANG, he is studying chitinozoans and other organic-walled microfossils from the Ordovician worldwide. In collaboration with Petra TONAROVÁ and Mats E. ERIKSSON, Olle is studying Palaeozoic scolecodonts to provide new insights into the taxonomy, paleobiogeography and diversification history of jaw-bearing polychaetes. At present, the Ordovician collections from the Himalayas, Prague Basin and Baltoscandia are being examined. Some papers have been published, and several are submitted or in preparation.

Olle is involved in studies on geochemistry and chemostratigraphy together with Peep MÄNNIK, Tõnu MEIDLA, Leho AINSAAR, Aivo LEPLAND and numerous other colleagues across the world. A new national project on Ordovician climate history started in 2023, targeting regional paleotemperature trends and biotic turnovers. New paired carbon isotope records from the Ordovician of East Baltic were published and additional work is in progress. Together with Peep MÄNNIK, Alicja WUDARSKA, Michael WIEDENBECK and other colleagues, work started on oxygen isotope records from Baltic Ordovician based on SIMS analysis of conodont apatite.

Olle is responsible for developing the national geological collection and related e-services as part of Estonia's research infrastructure (various data are accessible at https://geocollections.info). In 2023, two new PhD students started Ordovician research at TalTech: Thibaud LIEFFROY on conodonts and Oge MOGHALU on trace fossils.

The year 2023 was significant for Estonian geologists due to the opportunity to host the 14th ISOS in Tallinn on July 15–18 (information and photos available at https://isos14.org). The event went well and, by surprise, was recognised by the City of Tallinn as one of the most important international conferences in 2023.

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Lars HOLMER (Sweden) is mainly continuing his joint work with J.J. ÁLVARO, L. POPOV, and P. AHLBERG investigating the distribution of Cambro-Ordovician glendonites and associated possible hydrothermal deposits and phosphorites in Baltoscandia, with support from the Geological Survey of Sweden.

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Markes E. JOHNSON (USA). Field work was conducted in the Oslo region of southern Norway in July on Ordovician–Silurian strata in support of B. Gudveig Baarli's ongoing study of brachiopods. No other activities *per se* were devoted to things Ordovician during 2023, except for the preparation of the book's index (*Islands in Deep Time - Ancient Landscapes Lost and Found*; see p. 25 herein). Chapters 2 to 5 cover paleoislands of Cambrian, Ordovician, Silurian, and Devonian age that are described as "fossil" monadnocks. The first chapter covers the iconic Mount Monadnock in New Hampshire (USA) that stands as the geographical term for erosion-resistant "monadnocks" all around the world. Like Mount Monadnock, itself, many of the Paleozoic "islands" are formed by quartzite, but surrounded by sedimentary rocks. The Ordovidian chapter reviews the story of the "Jens Munk archipelago" near Churchill in northern Manitoba on Canada's Hudson Bay. The locality was originally described in several research articles published earlier.

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Petr KRAFT (Czech Republic) continues his studies on various aspects of Ordovician fossil associations mainly from the Prague Basin with emphasis on graptolites and graptolite stratigraphy. In graptolites, the recent focus is not only on graptoloids, but also on dendroids and their paleoecological significance.

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Lukáš LAIBL (Czech Republic) continues to work on the morphology, evolution, and development of various euarthropods from the Cambrian and Ordovician strata worldwide, mainly with his colleagues from the University of Lausanne, Lyon 1 University, University of Lille, Royal Belgian Institute of Natural Sciences, University of Brest, Charles University, and the National Museum, Prague. During 2023, he worked mostly on trilobite development, early euchelicerates, and marrellid euarthropods. He also wrote several popular science articles and did a considerable amount of palaeontological outreach, mostly with kids.

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Bertrand LEFEBVRE (France) continues working on the systematics, palaeoecology and palaeobiogeography of Ordovician echinoderms. Last year, he supervised Thomas BOISSET's internship on exceptionally preserved soft parts in a mitrate stylophoran from Beechers' Trilobite Bed Lagerstätte (Lorraine Group, Upper Ordovician; New York, USA). With Martina NOHEJLOVÁ, Bertrand is supervising Christophe DUPICHAUD's PhD thesis on the anatomy and phylogeny of Cambro-Ordovician echinoderms. As part of this PhD thesis, two field campaigns were organized last year in the Lower Ordovician of the Montagne Noire (southern France) with Eric and Sylvie MONCERET, and Daniel VIZCAINO, with a particular focus on Lower Ordovician levels yielding exceptionally preserved assemblages. The description of these faunas was initiated with colleagues from Brest (Muriel VIDAL) and Lausanne universities (Allison DALEY, Pierre GUERIAU, Gaëtan POTIN, Farid SALEH).

Since 2022, Bertrand is leading a four-year project funded by the French Research Agency (ANR), alongside colleagues from Dijon (Alexandre POHL), Lille (Thomas SERVAIS) and Wimereux (Grégory BEAUGRAND). This project, entitled 'Evolution of the Cambrian-Ordovician Biodiversification Onset Over Space and Time' (ECO-BOOST), aims to combine empirical palaeontological data with palaeoclimate and (macro-)ecological modelling, in order to analyze the onset of Cambro-Ordovician radiations through time and space. As part of this project, Pauline GUENSER was recruited in Lyon for a two year post-doctoral research project focused on the diversification of conodonts and echinoderms in the Early Palaeozoic.

Last year, Bertrand participated extensively to the preparation of the 11th European Conference on Echinoderms, which was held in Villefranche-sur-Mer (Oct. 12–15) and Lyon (Oct. 16–20). He also spent two weeks at the Natural History Museum of Brussels (EEC-funded Synthesys project) to collaborate with Bernard MOTTEQUIN on the systematics and palaeoecology of echinoderms from the Upper Ordovician of Belgium. Finally, with Yves CANDELA, Khadija EL HARIRI, Mansoureh GHOBADI POUR, Elena RAEVSKAYA, Oive TINN, Beatriz WAISFELD and Wenhui WANG, Bertrand is one of the co-leaders of the IGCP project 735 'Rocks and the Rise of Ordovician Life: Filling knowledge gaps in the Early Palaeozoic Biodiversification' (Rocks n' ROL).

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Lixia LI (China) continues to work on the Paleozoic sponges and Ordovician graptolites from China. Her research activities in 2023 were still mainly on taxonomy and macroevolution of sponges from Ordovician-Silurian boundary sections in South China. There is a good progress in the study of systematic paleontology of the demosponges and a remarkable new halichondrid demosponge from the latest Ordovician Beigong Biota, South China was published in *Estonian Journal of Earth Sciences*. She carried out a project about sponge biodiversification during the Ordovician-Silurian boundary interval in South China

and its implication, cooperated with Prof. Joachim REITNER (Göttingen University). Furthermore, she is also working on the Early-Middle Ordovician graptolites from both South and North China, mainly focusing on graptolite taxonomy and biostratigraphy. One paper about Tremadocian (Ordovician) reclined graptolites from Baishan, North China has been published in *Estonian Journal of Earth Sciences*.

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Ming LI (China) continues her work on Early Ordovician (Tremadocian) graptolite phylogeny and biostratigraphy. Last year, her main working areas were South China and North China, with a focus on graptolite taxonomy and stratigraphic division in Tremadocian.

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Qi-jian LI (China) primarily focuses on Ordovician-Silurian reefs and hypercalcified sponges (such as calathids, stromatoporoids, and sphinctozoans). Throughout 2023, he continued his research in sedimentology and paleoecology concerning Ordovician reefs. Alongside analyzing fossil materials, he maintained collaborations for quantitative paleoecological studies of reefs during the Ordovician-Silurian transition with various colleagues, largely drawing from several databases. As a member of the advisory board for the Geobiodiversity Database (GBDB), Qi-Jian has been collaborating with Dr. NA Lin to enhance the database functionalities, and he is currently leading a project focused on unraveling the fundamental biogeographic structure and its transformations across the Ordovician/Silurian boundary. Feel free to reach out if you're interested in the GBDB. Furthermore, Qi-Jian is currently engaged in an ongoing project investigating the feeding ecology of archaeocyaths and calathids using computational fluid dynamics techniques.

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Yan LIANG (China) continues her work on Ordovician chitinozoan, primarily on the taxonomy, biostratigraphy, morphological function and biological affinity. Several works have been published with colleagues from China, Estonia and America, mainly focusing on Ordovician chitinozoans of South China and Baltica.

Last summer, she attended the wonderful 14th ISOS in Tallinn and had two more weeks discussing chitinozoans and life with Prof. Olle HINTS and Jaak NÕLVAK at Taltech after the meeting. It's great to meet old friends and get to know some new friends after four years. She is looking forward to meeting such an amicable Ordovician union this year!

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Thibaud LIEFFROY (Estonia). Since September 2023, Thibaud is working as a PhD student under the supervision of Olle HINTS and Peep MÄNNIK in Tallinn University of Technology (TalTech). The aim of this work is to fill gaps of Ordovician Baltoscandian biostratigraphy and use conodonts as geochemical archives to deciphering (1) Ordovician climate history in this region and (2) environmental and ecological trends across the baltoscandian basin. In 2023, Thibaud and his colleagues from the Universities of Montpellier and Poitiers have published a study on conodont elements 3D topography across the Devonian/Carboniferous boundary (*doi :10.1016/j.marmicro.2023.102292*). Thibaud will try to expand this study to Ordovician specimens, with the aim to determine the crisis impacts on physical and feeding habits evolutions through this period.

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Jianbo LIU (China) continues research on the sedimentary and geochemical changes in the Lower and Middle Ordovician and their relationship with the GOBE in South China with Renbin ZHAN (Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences) and other members in his research group. The studies on the Precambrian and Phanerozoic microbialites are still in progress with Yoichi EZAKI, Natsuko ADACHI (Osaka Metropolitan University).

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Monika LUPTÁKOVÁ (Czech Republic) is a PhD student at the Charles University. She works on paleoecology of the Ordovician dendroid graptolites from the Prague Basin, Czech Republic and currently also from the collection of B.-D. ERDTMANN originated from Newfoundland, which is housed in the Museum of Bohuslav Horák in Rokycany. She is also working on fossil associations of the Dobrotivá Formation (Prague Basin, Czech Republic) with emphasis on dendoid graptolites.

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Jörg MALETZ (Germany) is still working on late Cambrian to Silurian graptolites worldwide. A project on the graptolite evolution of the Furongian (late Cambrian) Guole Biota with ZHANG Yuandong and ZHU Xuejian (NIGPAS, Nanjing, China) should offer new insight into the origin of the basal Ordovician planktic graptoloids (cf. Anisograptidae: *Rhabdinopora*). A project on the Miaolingian benthic graptolites from the Marjum Formation with Rudy LEROSEY-AUBRIL provides insight into the tubarium construction of the Dithecodendridae and their connection to the extant Rhabdopleuridae.

The new "Graptolite Treatise" was published in autumn 2023, now called the Hemichordata Treatise, covering also the extant members of the Hemichordata (Enteropneusta, Pterobranchia) in more details than before. Important works also include the monograph on the Floian graptolites from its GSSP section at Hunneberg, Västergötland (Sweden) that was published in *Fossils and Strata* vol. 69, providing essential biostratigraphic and taxonomic data for the understanding of the Floian graptolites.

Jörg is also working with Juan Carlos GUTIÉRREZ-MARCO (Madrid, Spain) on Ordovician graptolite faunas from Colombia, Bolivia and Morocco.

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Peep MÄNNIK (Estonia) is working on evolution, taxonomy and palaeoecology of conodonts, conodont-based high-resolution stratigraphy, bioevents and palaeogeography. He is also interested in sequence stratigraphy, palaeoclimatology and evolution of sedimentary basins. Studies under the project PRG1701 “From Greenhouse to Icehouse: Reconstructing Ordovician Climate Transitions and Biotic Responses in Baltica” (2023-2027) are in progress. Also, joint studies together with colleagues from Estonia, Germany, Poland, Sweden, U.K. and USA on evolution and high-resolution stratigraphy of the Early Palaeozoic faunas and sedimentary basins on different palaeocontinents continue.

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Tim McCORMICK (UK) continues to design and maintain key digital data sets for the British Geological Survey, and to teach digital data management and database design in the UK and internationally. Notable among the data sets he manages are the BGS Lexicon of Named Rock Units, which includes definitions of c. 1,100 British Ordovician lithostratigraphic and lithodemic terms, and the BGS Rock Classification Scheme whose publication as 'linked data' he has recently described in a paper with Rachel HEAVEN published in *Applied Computing and Geosciences*. His recent international collaborations include work with geological surveys and government agencies in Kenya, Nigeria, and Zambia.

Tim also continues to be Treasurer and Membership Secretary of The Palaeontographical Society. Nearly the entire run of *Monographs of the Palaeontographical Society* from 1847 to 2023 is now available online from *https://www.tandfonline.com/journals/tmps20* and *https://www.palaeosoc.org/,* including many describing Ordovician faunas from the British Isles.

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Alexander (Sandy) D. McCRACKEN (Canada) is periodically working on good Ordovician-Silurian collections from Hudson Bay and Moose River basins, and Arctic Islands. He retired from the GSC in September 2017 and works from his Nanaimo BC home. He is a part-time volunteer with the GSC Calgary office, having moved his microscope and some samples with him to British Columbia. This could be his last year of volunteering. Sandy is not in contact with the Calgary office very often, and so may be a bit slow to respond to emails to the GSC email address. Regular mail does not get forwarded so please send only emails or email attachments.

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Tõnu MEIDLA (Estonia) is holding the position of Professor of Palaeontology and Stratigraphy at the University of Tartu (Institute of Ecology and Earth Sciences) and is working on different aspects of litho-and biostratigraphy, ostracods and stable isotopes in the Ordovician of Estonia, Latvia and Lithuania (together with L. AINSAAR, A. LEPLAND, O. TINN, O. HINTS, P. MÄNNIK, T. PAISTE, S. PETRUKONĖ and S. RADZEVIČIUS). He is also a member of the scientific committee of 10th European Ostracodologists' Meeting which will be held in the Catania University, Italy, in September of 2024, and the vice chair of the organising committee of the 11th Baltic Stratigraphic Conference which will be held in Tartu, Estonia, in July of 2024.

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Ogechukwu Ann MOGHALU (Estonia) started a PhD project which focuses on Early Palaeozoic trace fossils in the Baltic region at Tallinn University of Technology, under the supervision of Ursula TOOM and Olle HINTS. The study aims to fill the existing gaps in ichnofossil taxonomy within the region, and understand the effect of environmental factors such as regional climate on ichnodiversity and ichnodisparity in the shallow-marine carbonate environments of the Baltoscandian palaeobasin.

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Stewart MOLYNEUX (UK). Last year (2023) was taken up with work on Silurian sections in Wales and the Middle East.

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Diego Fernando MUÑOZ (Argentina) has changed laboratories. He is now a researcher at the Instituto de Geología de Costas y del Cuaternario (IGCYC - Universidad Nacional de Mar del Plata and CIC-PBA) and continues to investigate Paleozoic deposits in Argentina. He is mainly devoted to the study of marine siliciclastic trace fossils, in particular cruzianids. He is particularly interested in the relationship between trace fossil occurrences and their probable producers and in studying the ichnological record from a paleobiological perspective. He published with colleagues an evaluation of early stages of colonization of brackish waters during the lower Tremadocian (Mángano *et al*., in *Palaeogeography Palaeoclimatology Palaeoecology*). In recent years, he began to study the Ordovician-Silurian transition with collaborations in Argentina (Balcarce Formation) and Brazil (Río Ivaí Group). He also collaborates with colleagues in the study of Ordovician biostratigraphy of graptolites and trilobites from the "Central Andean Basin".

Together with Arnaud BIGNON and Juan L. BENEDETTO, he published in *Geobios* a work from his PhD dealing with the ontogeny and palaeoecology of the brachiopod *Tarfaya purmamarcaensis*.

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Elise NARDIN (France) is currently working on Ordovician echinoderms (eocrinoids, rhombiferans, diploporitans) focusing on systematics, palaeoecology, and phylogeny. She collaborates with Bertrand LEFEBVRE, Martina NOHEJLOVÁ, Chris PAUL, Christophe DUPICHAUD, Samuel ZAMORA and Yamouna MAKLHOUF on the systematics, morphology, and phylogeny of 'cystoids' and eocrinoids. New projects about the paleogeographic dynamics of Cambrian-Ordovician echinoderms are being undertaken with Bertrand LEFEBVRE, Martina NOHEJLOVÁ, and Gilles ESCARGUEL. Ongoing projects also focus on reef palaeoecology.

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Mawo NDIAYE (Estonia) is focused on Estonian Tremadocian black shales and the genesis of Vanadium and Uranium enrichment. He currently studied specific relations between organic matter, clays and particulates compounds as well as isotopic signatures of metalliferous argillites, in relation with the RESTA18 (2020-2023) project 'Vanadium distribution and compounds in Tremadocian black shale and potential extraction technologies'. He is also interested in geochemical modelling and clay sciences.

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Martina NOHEJLOVÁ (Czech Republic) continues her work on Ordovician echinoderms (eocrinoids, solutans, stylophorans) focusing mainly on systematics, palaeoecology, palaeobiogeography and phylogeny. She was mainly working on the material from the Morocco (Fezouta Biota), Czech Republic and France (Montagne Noire). She continued collaboration with Bertrand LEFEBVRE on several projects (e.g. Barrande project) and she is co-supervising PhD thesis of Christophe DUPICHAUD. During the last year, she collaborated with Farid SALEH (soft-tissue preservation in echinoderms from Fezouata), Chris PAUL (revision of *Rhombifera*) and others.

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Jaak NÕLVAK (Estonia) is continuing studies on Ordovician chitinozoans from Baltoscandia and elsewhere focusing on taxonomy and biostratigraphy.

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Alan OWEN (UK). A paper with colleagues in Wales on a new Upper Ordovician species of the trilobite *Staurocephalus* has been accepted for publication in *Acta Palaeontologica Polonica*. The description of the very diverse (50+ species) trilobite fauna of the upper Katian Slade and Redhill Mudstones of South Wales with Lucy McCOBB (National Museum of Wales, Cardiff) and Patrick McDERMOTT (Carmarthen, Wales) is almost complete. Work on several other projects on British and Irish Upper Ordovician trilobite faunas is continuing and Alan is working through the many files on the cyclopygid and other trilobites from the Girvan district, south-west Scotland, left by the late Keith INGHAM with a view to helping ensure that the results of his decades of work on the Upper Ordovician there see the light of day.

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Scott PARRY (Argentina). His PhD is on the morphological disparity and taxonomic diversity of trilobites during the Middle Ordovician, within the Great Ordovician Biodiversity event. It is a study to evaluate morphospace trends on different lattitudinal belts (the terranes of the Precordillera, Armorica, Baltica, and the palaeocontinent of Laurentia), and then compare them with taxonomic trends on regional and global scales. Scott is still in the first year of his project, so he is thoroughly into the data collection and compiling stage.

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Ian PERCIVAL (**Australia**) is an Honorary Research Associate at the Geological Survey of New South Wales. He participated in two international conferences in Europe during 2023. The first of these was the 4th International Conference on Stratigraphy (STRATI 2023) held in Lille, France in early July, closely followed by the 14th International Symposium on the Ordovician System (14th ISOS), which took place in Tallinn, Estonia. Ian presented talks (co-authored with Yong Yi ZHEN) at both meetings and also attended the book launch of *A Global Synthesis of the Ordovician System* (Geological Society of London Special Publications 532 & 533) of which he was one of the four co-editors, as well as contributing to four chapters. He continued a productive collaboration with Yong Yi ZHEN at the Geological Survey of NSW, completing further papers on Ordovician conodont

biostratigraphy of the Lachlan Orogen. Currently Ian is co-editing the latest volume (*Cambro-Ordovician Studies VII*) of the *Australasian Palaeontological Memoirs* series.

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Gian Luigi PILLOLA (Italy) occasionally manages to work on topics relating to the Ordovician. However, in 2023 he participated to an article on the Ordovician tectonics of Sardinia (Cocco *et al*., 2023), which was conducted in parallel with the chapter on the Ordovician of Sardinia (Loi et *al*., 2023) in volume 532 of the *Geological Society of London, Special Publications*. With Muriel VIDAL, he finally managed to publish their work on trilobites from the Floian of Sardinia (Pillola & Vidal, 2023). Gian Luigi is currently resuming his studies on *Taricoia arrusensis*, in particular on the taphonomic aspects.

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Marika POLECHOVÁ (Czech Republic) currently working on the Late Ordovician bivalves of the Czech Republic focusing on systematics, palaeoecology, palaeobiogeography, and early diversification. She is completing a revision of the Lower Ordovician bivalves from the Montagne Noire and their impact on the early evolution of bivalves.

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Leonid POPOV (United Kingdom) is currently working on the Late Ordovician brachiopods of the Ishim Region in northern Central Kazakhstan and the early Ordovician brachiopods of South Urals. Apart from that, he is working on several other projects dedicated to the early Ordovician atrypides jointly with RONG Jiayu and ZHANG Yuchen.

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Brian PRATT (Canada) has renewed his efforts on the sedimentology of Upper Ordovician carbonates of the Williston Basin of central North America, specifically in the outcrop belt of southwestern Manitoba. This past year saw the publication of a comprehensive description of Canada's famous building stone, the Tyndall Stone, which is quarried near Winnipeg. Besides reviewing the lithofacies, paleontology and its architectural uses over the past more than a century, it provides new observations on the bioturbation, which led to a revised understanding of the striking burrow fabrics. Brian and Graham YOUNG, late of the Manitoba Museum, also successfully nominated the stone for heritage stone status with the IUGS. It is Canada's first and only stone to be recognized. Ordovician workers in Germany can go admire it on the exterior walls of Kanada Haus, the embassy in Berlin.

Brian and his brachiopod colleague Colin SPROAT reinterpreted some unusual argillaceous, intraclastic beds in a younger formation in the latest Ordovician as having been deposited by a tsunami. Probably few sedimentologists suspect that it would be possible to generate a tsunami in a shallow epicontinental sea, but the evidence seems to fit and at the time there was differential subsidence and likely accompanied by movement on basement faults. Tsunamis should be considered a plausible alternative to sea level fall or storms in low-energy settings given the appropriate tectonic context and paleoclimate.

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Enrique Alberto RANDOLFE (Argentina) has completed his doctoral thesis on the development of spines in trilobites, using the Family Dalmanitidae as a first approximation. This included a phylogenetic reconstruction of this family with Ordovician roots. He began a postdoctoral project under the direction of Dr. Juan José RUSTÁN and Dr. Diego BALSEIRO, focused on improving this phylogenetic reconstruction and resolving the basal relationships of Dalmanitidae with other members of the Infraorder Dalmanitiformes. One of the long-term objectives is to study the changes in the disparity of this infraorder in the Ordovician-Devonian interval using geometric morphometrics.

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John E. REPETSKI (USA). As Emeritus, continuing to work on conodonts and biostratigraphy of late Cambrian and Ordovician conodonts and biostratigraphy of North America and elsewhere, especially currently with colleagues J.F. TAYLOR, J.D. LOCH, J.F. MILLER, Justin STRAUSS and others on the Cambrian/Ordovician boundary interval. Also, histological and morphological studies with colleagues D. MURDOCK, P. SMITH, and others. With Rob RAINE and Paul SMITH, a large MS on the Cambrian-Ordovician of northern Scotland is in press, as is a MS on stratigraphy and correlation of Cambrian and Lower Ordovician rocks of eastern Nevada, USA, with MILLER and others. With Randy

ORNDORFF and Steve LESLIE, work continues on Ordovician successions in the Appalachians. Continuing work on conodonts from some impact structures, and conodont-based stratigraphic support for several USGS mapping projects. With colleagues Julie DUMOULIN (USGS-Anchorage) and Justin STRAUSS (Dartmouth College), John is happy to have completed the chapter on 'Ordovician Rocks of Alaska' for the Geol. Soc. London volume on *A Global Synthesis of the Ordovician System*. Currently splitting work between home and office.

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Sara ROMERO (Spain) has recently obtained a predoctoral contract at the Complutense University of Madrid (Spain). Her PhD thesis is focused on the study of trilobites from the Middle and Upper Ordovician of the Iberian Range (Spain), supervised by Juan Carlos GUTIÉRREZ-MARCO, Sofia PEREIRA and Fernando GARCÍA JORAL. Her research also covers the study of other Ordovician trilobite assemblages from SW Europe and Morocco in collaboration with Juan Carlos GUTIÉRREZ-MARCO, Isabel RÁBANO and Sofia PEREIRA.

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Jiayu RONG (China) focused recently on brachiopod faunas through the Late Ordovician Mass Extinction and published several papers covering the *Hirnantia* Fauna (early-middle Hirnantian) and the Edgewood-Cathay Fauna (late Hirnantian-Rhuddanian) with Dr. HUANG Bing (Nanjing Institute) and Dave HARPER (Durham University, UK). Most recently, Jiayu and his colleagues from his institute and Institute of Vertebrate Palaeontology and Palaeoanthropology, Chinese Academy of Sciences worked on the Silurian rocks of eastern part of South China and published a paper of revised age of several famous units (Tangchiawu, Kangshan and Jukeng formations) in this region based on a comprehensive analysis of the fossil evidences, such as chitinozoans, fishes, arcritarchs, brachiopods, trilobites and few others. These units have been reassigned to upper Aeronian to lower Telychian, not Upper Silurian as previously thought.

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Claudia V. RUBINSTEIN (Argentina) continues working on marine and terrestrial palynomorphs from the early to middle Paleozoic, with a primary focus on biostratigraphy, biodiversity, paleobiogeography, and paleoenvironments. Her collaboration with colleagues from the Colombian Institute of Petroleum led to the identification of global stages of the Ordovician in the Llanos Basin, as well as the first record of cryptospores in Colombia. The palynological analysis of the Ordovician and Silurian from various boreholes in the basin is ongoing.

Working alongside Vivi VAJDA (Swedish Museum of Natural History), they have documented the oldest cryptospores from Baltica, dating back to the Darriwilian. Additionally, they recorded the world's oldest trilete spores in the Sandbian, and the first appearances of acritarchs in the late Darriwilian and Sandbian, which were not previously recorded in strata older than the Hirnantian or Silurian. These findings challenge previous models regarding the origin and radiation of terrestrial plants and the evolution of marine phytoplankton.

Research on Ordovician and Silurian palynomorphs in Sweden continues, with new articles being prepared on productivity and its relationship to volcanism. In Argentina, investigations in the Paleozoic of the Central Andean Basin and Precordillera in partnership with Blanca Toro (CICTERRA) and collaborators, focus primarily on high-resolution biostratigraphy using graptolites, palynomorphs, and conodonts.

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Ehimar Kristal RUEDA (Argentina) is currently Ph.D student at Universidad Nacional de San Juan with a scholarship at the National Council of Scientific and Technical Research of Argentina (CONICET). She is working on conodont and graptolite biostratigraphy of the Lower Ordovician from the Cordillera Oriental Argentina, supervised by Dr. Guillermo ALBANESI (FCEFyN, Universidad Nacional de Córdoba), and Dr. Gladys ORTEGA (Museo de Paleontología, Córdoba-CONICET).

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Firuza A. SALIMOVA (Uzbekistan) completed a review of the Ordovician geology and stratigraphy of Uzbekistan, made in cooperation with A.I. KIM, I.A. KIM, Z.M. ABDUAZIMOVA, M.V. ERINA, N.H. DAVLATOV, M.V. ABDIYEV, O.Ya. KOLDYBEKOV, Sh.T. RUSTAMOV and Sh.B. YANGIBOEV and later published in GSL volume. Now her research interests is focused on the various aspects of taxonomy, biostratigraphy and palaeobiology of the Late Ordovician, Silurian and Devonian tabulate corals of the Zeravshan-Hissar mountainous region and Kyzylkum Desert, as well as on the study of paleoecological, climatic and biotic changes at the Ordovician-Silurian boundary.

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Matthew SALTZMAN (USA) is working on Middle to Late Ordovician strontium (Sr), lithium (Li) and calcium (Ca) isotopes. Currently on sabbatical in South Korea and looking at Cambro-Ordovician outcrops in the Taebaek Basin with colleagues here. Former PhD student Chris CONWELL has a manuscript on use of conodont apatite for Sr isotope stratigraphy, and Datu ADIATMA has a manuscript submitted on Ca isotopes from Meiklejohn Peak, Nevada that examines carbonate diagenesis through the MDICE interval. Datu also is finishing up a manuscript on Ordovician Li isotopes.

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Birger SCHMITZ (Sweden) continues his research on mid-Ordovician events in the inner solar system and on Earth. Focus is on the sequence of events leading up to the breakup of the L-chondrite parent body (LCPB) in the asteroid belt 466 Ma ago, and the effects of the breakup and the resulting dust-dispersal on climate and biota on Earth. Studies deal with the possible relation between sea-level changes as recorded in mid-Ordovician limestone sections in Baltoscandia and China and the dust flux from the LCPB breakup event.

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Thomas SERVAIS (France) continues working on early Palaeozoic acritarchs, and, connected to this, on the 'Plankton Revolution' and the evolution of the marine microphytoplankton. The year 2023 was particularly busy, with the organization of STRATI2023 at Lille, and the publication of five special issues and books, most of them related to the Ordovician (see elsewhere in this newsletter). International collaboration with a number of colleagues continues. Several projects with colleagues from the Nanjing Institute are in progress, among them a study focused on the C/O boundary of Dayangsha (SHAN Longlong finished his PhD on these sections); other investigations concern biostratigraphical and palaeoecological studies from the Yangtze Platform and other areas in China. Ordovician research also continues in collaboration with WANG Wenhui (Central South University, Changsha), Navid NAVIDI (Teheran, Iran), and Houcine BENACHOUR (Tlemcen University, Algeria). Regional studies on the Ordovician of Belgium continue with Lukas LAIBL (Prague, Czech Republic), Yves CANDELA (Edinburgh, Scotland), Muriel VIDAL (Brest, France) and others. In 2023, two ANR-funded research projects started, the first with Bertrand LEFEBVRE (PI) and coworkers on the spatialization of the

early Palaeozoic radiation. The second project is focused on the research of the ancestors of the dinoflagellates among the acritarch group.

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Husain SHABBAR (India) recently assumed the role of Assistant Professor at Parul University, Vadodara. His ongoing research focuses on the Palaeodiversity of the Early-Middle Palaeozoic in the Spiti region of the Tethyan Himalaya, India. Two papers on the Palynomorphs of the Devonian and Carboniferous periods in Spiti have been published, while two additional papers concerning the Ordovician strata are currently undergoing review. These pending publications address shallow marine ichnofossils and putative cryptospores, respectively.

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Yuefeng SHEN (China), lecturer in Hefei University of Technology after his PhD from Université Laval (Québec, under co-supervision of Dr. Fritz NEUWEILER and Dr. Bingsong YU) is working on the Cambrian-Ordovician carbonate biosedimentary systems in Tarim Basin, southern part of Anhui Province as well as North China Block. Now he continued his study on the Cambro-Ordovician biosedimentary systems as well as some Triassic carbonate successions (mainly reefs/mounds) after the PTME from South China.

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Matthias SINNESAEL (France) will be starting a tenure-track Assistant Professor position at Trinity College Dublin (Ireland) from March 2024. Matthias stays interested in better understanding Ordovician (and more generally speaking Paleozoic) paleoclimate and stratigraphy - especially cyclostratigraphy and astrochronology. He is looking forward to discover Irish geology, and is open for future collaborations. In 2023, he published a review chapter on 'Ordovician cyclostratigraphy and astrochronology' in the Ordovician *Geological Society London, Special Publication*.

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Patrick Mark SMITH (Australia). A wide range of research streams focused on the biostratigraphy of Cambrian and Ordovician trilobites, brachiopods and other fossil groups from Australia. Currently his work is exploring the biostratigraphy of western New South Wales and Western Australia in partnership with Yong Yi ZHEN, Ian PERCIVAL at the NSW Geological Survey, and Heidi ALLEN at the Western Australian Geological Survey, respectively. This includes papers describing the trilobite and conodont fauna from the Tremadocian aged Florina Formation (NT), Nootumbulla Sandstone (NSW), Bynguano Quartzite (NSW), and Scropes Range Formation (NSW). Patrick has also recently been involved in several publications on other arthropod groups (including: crustaceans, eurypterids and xiphosurids), as well as trilobite injuries with Russell BICKNELL at the American Museum of Natural History.

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Colin SPROAT (Canada). Colin has been continuing his work on the Ordovician atrypide brachiopods of Laurentia but has also been working to describe some understudied Canadian brachiopod faunas. He is currently working on a very low diversity strophomenide brachiopod fauna associated with the jellyfish and unusual arthropods of the William Lake Lagerstätte in Manitoba with Graham YOUNG, and making progress towards describing a long understudied silicified brachiopod fauna from the Upper Ordovician of the Mackenzie Mountains in conjunction with his grad students. He is also investigating the paleoenvironmental and paleoecological factors affecting benthic faunas in the epicontinental seas of Ordovician Laurentia, publishing a paper with Brian PRATT this past year looking at an unusual intraclastic bed that may represent the aftermath of a tsunami that washed over the continental shelf. He continues to collaborate with Yuchen ZHANG, Xiaocong LUAN, and Renbin ZHAN in Nanjing looking at the shallow-water Ordovician brachiopod faunas of China and the paleoenvironment of the Yangtze Platform on the South China plate.

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Alycia L. STIGALL (USA) is continuing to focus on Ordovician projects involving the GOBE and Richmondian Invasion from a biogeographical, palaeoecological, and phylogenetic framework. She published several significant papers including a review of the Richmondian Invasion in Cincinnati region, a paleoecological analysis of the Clarksville Puslse of the Richmondian Invasion, two contributions to the Ordovician of the World series, and a paper investigating Laurentia speciation patterns during the GOBE. Along with Carl BRETT and his PhD student Ian FORSYTHE, her current grad students (Noel HERNANDEZ GOMEZ and Shymah BEEGAM KUNDLADI) have been working on constraining the impacts of the Richmondian Invasion in the Nashville Dome region. Within the larger project, Alycia's group is focused on ecological niche modelling and systematics at the moment.

Alycia is also working on a phylogenetic and biogeographic revision of the anazygid brachiopods *Zygospira, Catazyga,* and *Anazyga* with her grad student Mariana VILELA DE ANDRADE, Colin SPROAT, and Davey WRIGHT. Her last Ohio University MS student, Sarah HENNESSEY, graduated and they are working to get her thesis research on drivers of biodiversity change across the GOBE interval in Oklahoma published in the upcoming year. Last year Alycia and her students participated in the ISOS in Estonia and the Annual GSA meeting in Pittsburgh, and are very much looking forward to continuing and expanding collaborations in the global Ordovician community over the next year. Alycia is looking forward to working with the rest of the SOS executive to further our understanding of this exciting interval of earth history over the next four years as a Vice Chair of the Ordovician Subcommission.

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Svend STOUGE (Denmark) continues to work on Cambrian and Ordovician conodonts from Baltoscandia (Baltica), western Newfoundland and Greenland (Laurentia) and South China.

Main projects include conodont systematics of the Dapingian Stage, South China (with Zhihong LI – in prep); Svalbard conodonts based on own and older collections (with Oliver LEHNERT and Hubert SZANIAWSKI); Middle and Upper Ordovician conodont biostratigraphy, western North Greenland and Northeast Greenland (with Peter ALSEN) and (4) Lower and Middle Ordovician stratigraphy based on sections and drillcores from Öland, Sweden (with G. BAUERT, H. BAUERT, and G. BAGNOLI).

New activities include investigation of the transition from 'Fauna C to 'Fauna D' in deep water setting, western Newfoundland, Canada (with G. BAGNOLI) and detailed investigation of the base of the Aseri/Segerstadian regional stages.

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Petra TONAROVÁ (Czech Republic) works for the Czech Geological Survey and continues in the research of Ordovician to Devonian of the Prague Basin, with a focus on scolecodonts. In 2023, a cooperation with Micro & Nano X-ray CT Laboratory, CEITEC (Brno) has started and brings interesting results on 3D structures of microfossils. She continues cooperation with Olle HINTS and Thomas SUTTNER and studies microfossils from various regions. Studies on Katian and Hirnantian scolecodonts from the Prague Basin (Tonarová *et al*. 2023), Late Ordovician microfossils from the Spiti Valley, and on the Ordovician/Silurian scolecodonts from Estonia (Hints & Tonarová 2023) were published.

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Ursula TOOM (Estonia) continues studies on the bioerosion of Baltica in collaboration with Dirk KNAUST, Olev VINN, Mark A. WILSON, Michal STACHACZ, Weronika ŁASKA, Björn KRÖGER, Juwan JEON, Andrei ERNST, Leho AINSAAR, Stana VODRÁŽKOVÁ and Imre Andreas MARTIN. In 2024, she will finish her postdoctoral studies in Krakow under the supervision of Professor Alfred UCHMAN, but cooperation on trace fossil studies continues. Joint studies together with colleagues from Estonia, Poland, Finland, Germany, Sweden, the U.K., the USA, China, and Korea on the evolution and taxonomy of the Early Palaeozoic faunas are going on, including cooperation on Late Ordovician stromatoporoids with Juwan JEON. With Luis A. BUATOIS, Ogechukwu A. MOGHALU, and Olle HINTS, she started work on the trace fossils of Ordovician-Silurian boundary beds.

Ursula is responsible for the geological collection at Tallinn University of Technology.

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Thijs VANDENBROUCKE (Belgium) remains interested in reconstructing the Ordovician palaeoclimate and palaeo-environment. Julie DE WEIRDT continues her PhD research project on the geochemistry and palynology of the Upper Ordovician - lower Silurian in N. America. PhD student Cristiana ESTEVES continues her research project on the chitinozoan biostratigraphy of the Katian of the Midwest USA. Nick VAN FAALS joined the lab to pursue a PhD project on chitinozoan ecology and will partly be working on Ordovician sections. Himadri HALDAR just started his PhD project with us and will focus on stable carbon isotope geochemistry in the Ordovician and Silurian. These are projects in collaboration with Poul EMSBO (USGS), Patrick McLAUGHLIN (Illinois Geol. Survey), Appy SLUIJS (UUtrecht), Mark WILLIAMS (ULeicester), Jean-François GHIENNE (UStrasbourg) and André DESROCHERS (UOttawa). Mathilde BON is a joint PhD student between UGent and ULille, co-supervised by Kevin LEPOT, and investigates the organic geochemistry of, amongst others, Ordovician palynomorphs.

The other members of the lab, including PhD students Iris VANCOPPENOLE, Carolina KLOCK, Joana ROSIN, Synnove SAUGEN and Tim DE BACKER and MSc student Fien JONCKHEERE are pursuing projects that are not specifically focussed on the Ordovician.

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Olev VINN (Estonia) is working on the evolution of symbiosis, predation, bioerosion, and encrustation in the Ordovician. He is also working on the palaeontology of problematic tubeworms from the Palaeozoic (e.g., cornulitids, tentaculitids, microconchids, *Sphenothallus*, etc.) and the evolution of tubeworm biomineralization. His other research interests include trace fossils of the Ordovician of Estonia and beyond. He is currently the editor of the *Journal of Paleontology*, and all your papers on Ordovician paleontology are very welcome at the journal.

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Rongchang WU (China) is working on the Ordovician integrated stratigraphy and conodonts. Currently, in collaboration with Profs. Mikael CALNER, Oliver LEHNERT and colleagues from NIGPAS, his research is focused on Ordovician carbon isotope stratigraphy, conodont biodiversification, Ordovician palaeoclimate & palaeoenvironment based on the integrative study of geochemistry, palaeontology, sedimentology and stratigraphy.

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Kui YAN (China). Last year, he still focused on the Palaeozoic phytoplankton in China, especially the late Cambrian and Early Ordovician. His student, Longlong SHAN, graduated and got his PhD degree in the summer. Yan attended a meeting on microfossils and fossil algae in Tibet and a field trip in May. In July, he also attended the 14th ISOS in Estonia and visited the Ordovician sections of Estonia and Sweden. Yan still worked on the Late Ordovician acritarch palaeogeography implication with statistic analysis.

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Graham YOUNG (Canada) is retired from the Manitoba Museum in 2023 but is now Curator Emeritus at the Museum, and has also become a Research Associate at the New Brunswick Museum. Graham is continuing to study Paleozoic paleoecology and the diversity of Ordovician Cnidaria. Substantial progress has been made with detailed studies of Ordovician cnidarian medusae (jellyfish) from the Late Ordovician William Lake site (central Manitoba), and he continues to collaborate on other elements of that biota. In 2022-23, he worked with Brian PRATT (University of Saskatchewan) to nominate Manitoba Tyndall Stone (Selkirk Member, Red River Formation) as a Global Heritage Stone Resource.

Graham Young

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Beatriz G. WAISFELD (Argentina) is continuing her work on Lower Paleozoic trilobites from South America mainly focused on taxonomy, biostratigraphy, and paleoecology. She is involved in a long-term study of Late Cambrian – Early Ordovician diversification patterns and ecosystems structure in the Central Andean Basin. During the year results of collaborative projects with different research groups has been published. Among them, the morphospace analysis of Furongian - Early Ordovician trilobites from the Central Andean Basin with Fernanda SERRA and Diego BALSEIRO (CICTERRA) that outlines the decoupling between diversity and disparity as well as intrinsic and extrinsic controlling factors; the study of trilobites and trace fossil in Furongian estuarine deposits from NW Argentina with Gabriela MÁNGANO and Luis BUATOIS (University of Saskatchewan) and colleagues from CICTERRA (Emilio VACCARI, Diego MUÑOZ). As well, along with several colleagues from CICTERRA and from the University of Lille we published a dynamic, open and collaborative database for morphogeometric studies of trilobites that we expect will function as a complement for current occurrence-based data sets for large-scale evolutionary and ecological analysis. Other ongoing projects involve the study of Early-Middle Ordovician from west Argentina and Floian to Darriwilian trilobite fauna from southwest Perú together with Juan Carlos GUTIÉRREZ MARCO (Spain) and Emilio VACCARI (CICTERRA) that shows interesting connections with the fauna from the Argentine Cordillera Oriental. Hopefully results will be published this year.

Along with colleagues from the Centro de Investigaciones en Ciencias de la Tierra (CICTERRA) she is involved in the organization of the 4th Annual Meeting of the IGCP 735 'Rocks and the Rise of Ordovician Life: Filling knowledge gaps in the Early Paleozoic Biodiversification' to be held in Córdoba (Argentina) in October 2024. We expect active participation of the Ordovician community!

Beatriz G. Waisfeld

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Guangxu WANG (China). A special issue of *Palaeoworld* entitled "Ordovician in the Western Yangtze Region, South China Palaeoplate" was formally published in collaboration with colleagues from NIGPAS in 2023, focusing on thus far little-known shallow-water Ordovician rocks and fossils in the western Yangtze region, South China. Guangxu also finished a monographic paper on the systematics and evolution of agetolitid tabulate corals with Yunong CUI, which has now been submitted for publication in *Australasian Palaeontological Memoirs*.

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Wenhui WANG (China) and her colleagues continued their work on biostratigraphy and chemo-stratigraphy around the Cambrian-Ordovician boundary and Ordovician-Silurian boundary.

Wenhui is interested in the End Ordovician aftermath recovery in South China when she notices that many sponge-dominated community in have been found thriving immediately after the LOME and into the early Silurian. In order to explore the ecological effects of benthic recovery during this critical interval, her group coupled the findings of sponges and geochemical analyses, which will reveal the bottom water redox conditions in two new localities in South China. Combined with more published data, they find that the distribution of early Silurian sponge assemblages in South China demonstrates a gradual expansion towards deeper regions when ocean redox conditions ameliorated. The pioneering colonization of sponges in low-oxygen environments after the LOME may have set the stage for the subsequent recovery of other benthic organisms.

Wenhui and her student ZHU Ge also used computational fluid dynamics (CFD) analysis to study Ordovician planktons like grapotolites and chitinozoans. They found that the evolution of graptolite tubarium structure and overall shape of chitinozonas towards improved hydrodynamic properties, which means the hydrodynamics is a hidden natural selection power.

DU Minghao is a doctoral student of Wenhui, who made a systematic investigation of the relationships between fossil sampling intensity, spatial extent, and biodiversity during the Cambrian and Ordovician, using data from the Paleobiology Database (PBDB) to gain a better understanding (biased) of Furongian lowstand in biodiversity.

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Xiaofeng WANG (China). In 2023, the Ordovician-Silurian Group of Wuhan Center for China Geological Survey, including WANG Chuanshang, WANG Jianpo, YAN Chunbo Wei-kai and WANG Xiaofeng mainly engaged in the Ordovician and Silurian Stratigraphic Lexicon of China (in English) and the manuscripts for the two systems are basically completed under the organization of Chinese Committee on Stratigraphy. In addition, the group started a new project to re-study of the Late Ordovician-Early Silurian sedimentary and graptolite series for the classic section distributed in the western Hubei and Hunan provinces, China.

An unveiling ceremony for the Xiaoyangqiao Standard Auxiliary Boundary Stratotype (SABS), as a program of the Chinese Commission on Stratigraphy project seminar is scheduled to be held in Dayangcha, Jiangyuan District, Jilin Province in Late June this year. Please contact with Xiaofeng you are interested to join the ceremony.

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Charles WELLMAN (UK) continues his research on the earliest terrestrial vegetation (the earliest land plant vegetation and the microbiota that existed on the continents before the appearance of land plants). He is currently involved in collaborative work on Ordovician palynomorph assemblages from Oman, Saudi Arabia and South Africa (concentrating on glacial deposits associated with the End Ordovician Gondwanan ice sheet). In January 2023 Charles undertook further fieldwork on the Cape Supergroup in the northernmost part of the Cape Basin of South Africa (in collaboration with Cameron PENN-CLARKE and Claire BROWNING).

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Seth A. YOUNG (USA) continues working on environmental and climatic reconstructions in the early Paleozoic, that include marine oxygen levels at both local and global scales from late Cambrian, Ordovician, and Silurian stratigraphic successions. Current and ongoing projects are focused on intervals just prior to, during, and after the Ordovician Radiation of marine life and the Late Ordovician Mass Extinction (LOME); and throughout multiple intervals of biotic extinction and recovery within the Silurian. This work continues in multiple basins from around the globe including: the Great Basin (Nevada, USA), Appalachian Basin (Tennessee/Virginia, USA), USA Midcontinent (Tennessee), Sweden, Estonia, Latvia, and Czech Republic. These various projects in the early-mid Paleozoic are ongoing collaborations with Jeremy OWENS (FSU), Benjamin GILL (VTU), Sara PRUSS (SC), Per AHLBERG (LU), Mats ERIKSSON (LU), Tim LYONS (UCR), Olle HINTS (TUT), Dimitri KALJO (TUT), Tonu MARTMA (TUT), Matthew R. SALTZMAN (OSU), Cole EDWARDS (ASU), Leho Ainsaar (TU), Emma HAMMERLUND (LU), Paula NOBLE (UNR), Mu LIU (IGG-CAS), and Jiri FRYDA (CGS).

In the last year, Seth published two papers with his former PhD student, Nevin KOZIK (currently Visiting Professor at OC). The *Geobiology* paper is a multiproxy shale investigation of marine redox conditions from Baltoscandia that provide some of the first

direct paleoredox evidence for an increase in marine oxygen concentrations as a key mechanism for the early onsets of the Ordovician Radiation of marine life across the Cambrian-Ordovician boundary. The *Global Planetary Change* paper is a multiproxy study of a Middle Ordovician shale succession from the Baltic basin that provides evidence of locally anoxic conditions in this part of the basin throughout the Darriwilian, and provides the first global redox proxy (Tl isotopes) evidence increased oxygenation coinciding with a large pulse of marine biodiversity.

A synthesis of the last two decades of work on reconstructing Ordovician climate and environment via direct geochemical proxy datasets and/or numerical modelling approaches was published as a chapter in the *Geological Society London, Special Publication* on the Ordovician System this past year. Finally, Seth published two papers with his former postdoc (Anders LINDSKOG, research scientist at LU), one in *Palaeogeography, Palaeoclimatology, Palaeoecology* that provides a new detailed biostratigraphic and carbon isotope chemostratigraphic study of a very complete Lower-Middle Ordovician carbonate succession from Sweden that demonstrates local–regional $\delta^{13}C$ gradients throughout the Middle Ordovician. The *Nature Geoscience* paper provides the first ever comprehensive local redox (I/Ca) dataset documenting progressive oxygenation of an Ordovician paleoshelf that coincided with pronounced increases in biodiversity and ecosystem reorganizations.

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Carolina ZABINI (Brazil) recently received funding for a new project, entitled "Late Ordovician paleodiversity of Brazil: a study of the Amazonas and Paraná Basins" (2024-2026) FAEPEX 3417/23.

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Renbin ZHAN (China) was paying his attention, during 2023, mainly on the Great Ordovician Biodiversification Event (GOBE) in China and in the world. Together with his group members, he was trying to investigate such a biotic event in some remote areas of South China palaeoplate, such as the mountainous areas of northern Yunnan and southwestern Sichuan provinces, because the Ordovician sequence in these remote regions was unclear for a long time, not to say how the major biotic event (like GOBE) behaved there. During the past few years, a working group including Renbin and his team members at NIGPAS has conducted a lot of investigations, particularly on the Ordovician stratigraphy and palaeontology. Based on this, a special issue in *Palaeoworld* has been compiled including about ten individual papers summarizing the Ordovician lithological sequence developed in that particular region and documenting various fossil groups as well as their palaeobiogeographical and macroevolutionary significances. Besides, together with his

colleagues, Renbin has also published a thorough revision on the Ordovician stratigraphy of China in the *Geological Society of London Special Publication* series.

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Yuandong ZHANG (China) is continuously working on:

(1) An integrated stratigraphy of graptolites, conodonts, chitinozoans, acritarchs, radiolarians, and carbon isotope chemostratigraphy, and cyclostratigraphy of the Ordovician in China. This work aims at a refined stratigraphic correlation of the Ordovician in China based mainly on biostratigraphic and chemostratigraphic records. Among the latest and most significant products is the published chapter "*Regional synthesis of the Ordovician geology and stratigraphy of China*" (Chapter 13 of book *A Global Synthesis of the Ordovician System (Part 2)* in 2023.

(2) Hirnantian Konservat-Lagerstätte in Anji, Zhejiang Province, China—Anji Biota, in cooperation with Dr. Joseph BOTTING and Dr. Lucy MUIR of UK, financially supported by President's International Fellowship Initiatives (PIFI) program and recently by National Key Research and Development Program of China (2023-2028). This sponge-dominated Conservat-Lagerstätte, discovered in late 2012, is typified by the abundant and highly diverse articulate sponges (over 100 species) often with soft tissues, in association of graptolites, nautiloids, arthropods, echinoderms, etc. The Anji Fauna is preserved within a 9-meter-thick black shale, and is of latest Hirnantian age as constrained by the associated graptolites. A preliminary study indicates that this extraordinarily diverse, sponge-dominated community thrived in the aftermath of the Hirnantian Mass Extinction.

(3) Origination of the Palaeozoic Evolutionary Fauna: a case study in South China. This work, financially supported by an initiative fund from CAS and a major grant from the National Natural Science Foundation of China (NSFC, *Origination of Palaeozoic Evolutionary Fauna*, 2021-2025), is derived of IGCP Project 653 "The Onset of the GOBE", and now in close correlation with the undergoing IGCP735 "Rocks and Rise of Ordovician Life". This work brings together some world-class palaeontologists on Ordovician and Cambrian fossil groups, along with some sedimentologists and geochemists, including Thomas SERVAIS, Axel MUNNECKE, Timothy W. LYONS, Yongyi ZHEN, etc., to focus on the early occurrence records of graptolites, conodonts, chitinozoans, cephalopods, radiolarians, and the potential coincident changes of geochemical proxies for redox and oxygenations in South China.

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Yong Yi ZHEN (Australia) has been working on several projects this year documenting the geology and biostratigraphy of NSW, jointly with Ian PERCIVAL, Patrick SMITH (Australian Museum), Yuandong ZHANG (NIGPAS) and others. These include three publications documenting the Ordovician fossils from various parts of the Junee–Narromine Volcanic Belt in central New South Wales and a report on the fossils from the southern Cobar Superbasin. He has also been working on the taxonomic revisions of several Early Ordovician conodont taxa based on the material from the Canning Basin and other parts of Australia and on a project documenting Ordovician and Silurian-Devonian faunas recovered from the northern Cobar Superbasin in central-western NSW.

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RECENT ORDOVICIAN RESEARCH PUBLICATIONS

A

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