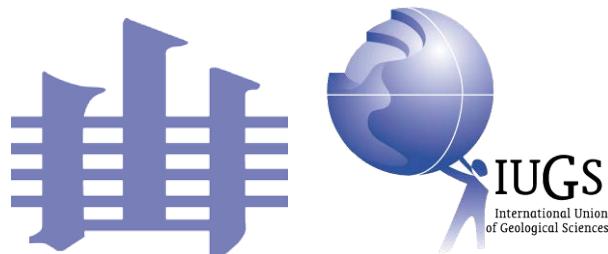


ORDOVICIAN NEWS

SUBCOMMISSION ON ORDOVICIAN STRATIGRAPHY
INTERNATIONAL COMMISSION ON STRATIGRAPHY

Number 35 (for 2017)

Edited by Ian G. Percival



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Cover photo

Part of the Maysville, Kentucky USA roadcut. This section is both vertically and laterally extensive and allows inspection of the Edenian through Richmondian Regional Stages (lower Katian). The units are extensively fossiliferous and range from offshore to nearshore environments. The roadcut will be visited during the mid-conference excursion of the Annual Meeting of IGCP 653 in June 2018 to be held at Athens, Ohio. For further details of this meeting, see pp. 19-24 of this newsletter. [photograph courtesy of Alycia Stigall]

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ORDOVICIAN NEWS Number 35 (for 2017)

Chairman's Message

Dear colleagues,

In recent years a huge amount of excellent regional research on biotic evolution and diversification, associated with tectonic, climatic, eustatic and environmental changes during the Ordovician Period have been undertaken in different parts of the world. Globalization and intensified international collaboration in earth sciences allow us to identify and trace local and regional biotic and abiotic events which were previously absent from global compilations. Further progress in precise stratigraphical correlation and our understanding of the mechanisms responsible for the evolution of the Ordovician earth system depends on regional studies. These studies, however, should be made within a global framework and now, with established global Ordovician series and stages, we have all the necessary prerequisites for that.

Detailed studies of the Global stage boundary intervals in the regions are very important and the concept of the Auxiliary Boundary Stratigraphic Section and Point (ASSP) could be useful in this respect. The Dayangcha International Workshop on the Cambrian-Ordovician Boundary (DIWCOP) which was held in Changchun, China 20-25 September 2017 (Organizer: Prof. Wang Xiaofeng) is a good example of such activity. The section in Dayangcha could be nominated (after publication) as a second ASSP for the base of the Ordovician System in addition to the previously-approved ASSP at Lawson Cove, Utah. The other important and highly successful meeting organized by the Chinese colleagues (Zhang Yuandong, Zhan Renbin) was the Annual meeting of IGCP 653 project in Yichang, China during October 2017. Proceedings of this meeting will be published in *Palaeoworld*.

At the beginning of this year (February 14-16, 2018) a regional workshop and field excursion was organized (thanks to K. El Hariri, B. Lefebvre, T. Servais and many others) in Marrakech, Morocco in a framework of the IGCP 653 project. The workshop demonstrated the amazing progress achieved during the last 10 years in paleontology, stratigraphy and Ordovician geology of the Moroccan Anti-Atlas. The main Ordovician event of the year, however, is still ahead of us. I hope to see many of you in June in Athens, Ohio (USA) for the GOBE meeting, organized by Alycia Stigall and her team (for details see the Second Circular on pages 19-24 in this issue). Ordovician paleontologists will also have an opportunity to meet during the 5th International Palaeontological Congress in Paris in July, 2018.

Finally I would like to highlight the important recent publication of Servais and Harper (2018) in *Lethaia* (DOI: <http://doi.org/10.1111/let.12259>) on the general concept of the Great Ordovician Biodiversification Event and draw your attention to the planned compilation on Ordovician regional stratigraphy and geology: *A Global Synthesis of the Ordovician System* (see announcement on pages 11-12 in this issue of *Ordovician News*).

With all good wishes,

Andrei Dronov

Chair, Subcommission on Ordovician Stratigraphy



**International Commission on Stratigraphy
Subcommission on Ordovician Stratigraphy**

ANNUAL REPORT 2017

ANNUAL REPORT 2017

1. TITLE OF CONSTITUENT BODY and NAME OF REPORTER

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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. It has a global network involving both academia 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 the boundaries (GSSPs and ASSPs), the correlation of the subdivisions (Stages and Series), the nomenclature of the subdivisions and 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, *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.
- d. 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 broad 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

3a. Nominated Officers for 2016-2020 period:

Chairman, Andrei Dronov (Russia)
Vice Chairman, Thomas Servais (France)
Secretary, Ian G. Percival (Australia)
15 other Voting Members
Over 100 Corresponding Members

The Subcommission not only includes a broad national representation and coverage of key fossil groups but also specialists in interdisciplinary fields such as geochemistry and sedimentology.

The Subcommission on Ordovician Stratigraphy works in close cooperation with the IGCP 653 project “The onset of the Great Ordovician Biodiversification Event”. The Annual meeting of IGCP 653 was held in Yichang, China during October 2017.

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

None

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

- Dayangcha International Workshop on the Cambrian-Ordovician Boundary (DIWCOP) was held in Changchun, China 20-25 of September 2017 (Organizer: Professor Wang Xiaofeng). It was suggested to nominate this section as a candidate for a second Auxiliary Boundary

Stratigraphic Section and Point (ASSP) for the base of the Ordovician System in addition to ASSP at Lawson Cove.

- Ordovician News 34 was published and is available from the ISOS webpage (<http://ordovician.stratigraphy.org/>).
- ISOS supported Annual meeting of IGCP 653 in Yichang, China during October 2017.

6. SUMMARY OF EXPENDITURE IN 2017:

USD 2500

Support for attendance of officers at main Ordovician meetings.

7. SUMMARY OF INCOME IN 2017:

USD 2500

8. BUDGET FROM ICS IN 2017:

USD 2500

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

- To compile a main body of an updated summary on Ordovician regional stratigraphy and geology: *A Global Synthesis of the Ordovician System*.
- A thematic set in *Palaeoworld* dedicated to the ‘Onset of the Great Ordovician Biodiversification Event’ will be published in 2018 supported jointly by IGCP 653 and ISOS.
- Data will be gathered for *Ordovician News 35*.

10. KEY OBJECTIVES AND WORK PLAN FOR THE PERIOD 2016-2020

For further advancement and increased precision in correlation we need to pay more attention to regional stratigraphy, regional scales and regional chronostratigraphic schemes.

There is a growing awareness that many biotic, chemical and physical changes are not always synchronous, and that there are strong local and regional signals that often depart from global compilations. Ordovician regional stratigraphy and geology will be the main goal for the period 2016-2020.

- To compile and publish an updated summary on Ordovician regional stratigraphy and geology: *A Global Synthesis of the Ordovician System*. Special attention is going to be paid to precise correlation of the Ordovician depositional sequences and sea level curves as well as stable isotope and regional biodiversity curves. Our target should be to compile and publish the book by the time of the 13th International Symposium on the Ordovician System in Novosibirsk in 2019.
- To correlate Ordovician depositional sequences throughout the World.
- To design and execute a Programme of radiogenic dating of key Ordovician horizons (using Pb-Pb isotopes).

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

11. Budget and ICS component requested for 2017-2018

1. Meetings for contributors and editors of “*A Global Synthesis of the Ordovician System*”.

2500 USD

2. Support for attendance and participation of Subcommission officers at ISOS/IGCP meeting in Athens, Ohio, USA (June 2018): 2500 USD.

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 2017-2018 BUDGET: 5000 USD

REQUESTED FROM ICS: **5000 USD**

Potential funding sources outside IUGS:

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

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Announcement

A Global Synthesis of the Ordovician System

David Harper, Andrei Dronov and Ian Percival (eds)

A proposed Geological Society London publication

It is now more than four decades since Alwyn Williams convened the Second International Symposium on the Ordovician System in Birmingham, followed two years later by the publication of *The Ordovician System* (Bassett, M.G. 1976). This 696 page volume contained regional synthesis of the Ordovician stratigraphy from almost every corner of the world, and for many years was a much-cited source of such information. Additional regional stratigraphic and biostratigraphic data were documented in a series of IUGS Publications featuring detailed correlation charts, which served as state-of-the-art guides to Ordovician stratigraphical hierarchy and correlation in many areas of the globe. However, this series (now ended), was unfortunately incomplete in its coverage. The past 20 years has seen arguably the most intense period of research into the Ordovician System (driven largely by a succession of highly successful IGCP projects involving global collaboration). Particularly important has been the rise of precise means of geochemical correlation using stable isotopes. Concurrently, international series and stages covering the entire Period have now been adopted and virtually all Ordovician researches are using this global chronostratigraphy in their studies.

The time is now optimal to not only update regional stratigraphic data covered by the earlier publications referred to, but also to place this new information in the context of the internationally accepted chronostratigraphic and biostratigraphic framework. It is critical for further advancement and increased precision in correlation that we align the many

excellent, workable regional stratigraphic schemes with the global standard. The proposed volume will focus on the Ordovician geology of the regions where data are captured and initially analysed, and will hopefully stand as the authoritative source of such information to a global audience for the next several decades, like its predecessors.

Each chapter will tie in any regional chronostratigraphic scheme and/or a typical lithostratigraphy with the global series and stages. There is a growing awareness that many biotic, chemical and physical changes are not always synchronous, and that there are strong local and regional signals that often depart from global compilations. In addition, therefore, any available stable isotope or other geochemical curves should be mapped onto the chronostratigraphy as should any regional biodiversity and sea-level curves. Our aim is to produce a series of comprehensive yet succinct summaries of each of the key regions of Ordovician geology, continuing to emphasize the great regional diversity of the Ordovician System but within a global framework. The highly successful IUGS correlation charts focused mainly on the lithostratigraphy of the regions. In the light of the huge amount of new excellent research on the biotas and changing climate and environmental conditions during the Ordovician Period it is now very timely and topical to review these new data and their significance and move to better understanding the Ordovician earth system.

The initial impetus for such a book was provided by an Ordovician Subcommission-sponsored symposium held as part of the International Geological Congress held in Brisbane, Australia in 2012. Preliminary discussions have been held with editorial staff of the Geological Society of London, exploring the possibility of publication in one of their series. We envisage that each regionally-focused chapter will not exceed 20-25 printed pages. The main idea is that these chapters will serve as an introduction to the Ordovician geology of the regions with updated summaries on regional stratigraphy, tectonics, palaeogeography, facies etc, accompanied by a listing of the most recent and significant publications on relevant topics. We also plan to have several overview chapters reviewing current approaches and best practice in the main areas of correlation methods, such as biostratigraphy of significant groups, stable isotope correlation methods, sea-level curves etc., as well as a chapter on palaeogeographic reconstructions. Our target is to compile and publish the book by the time of the 13th International Symposium on the Ordovician System in Novosibirsk in July 2019.

Potential contributors are kindly asked to send their Expressions of Interest to Andrei Dronov (avdronov@gmail.com) by April 15, 2018. In order to keep the review and publication process on track, manuscripts will be required before the end of October 2018.

CONFERENCE REPORTS

Macroevolution of Early Palaeozoic Faunas and IGCP653 Workshop, Nanjing

[report by Yuandong Zhang, Nanjing]

During May 16-17, 2017, the ‘Macroevolution of Early Palaeozoic Faunas and IGCP653 workshop’ was held at Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, China (chaired by Zhang Yuandong). Participants included some 65 graduate students and scholars from Nanjing Institute of Geology and Palaeontology (China), Nanjing University (China), Northwest University (China), Central South University (China), Institute of Geology (Chinese Academy of Geological Sciences), Erlangen-Nürnberg University (Germany), Brandon University (Canada) and Macquarie University (Australia). Co-leaders of IGCP653, Thomas Servais (Lille University, France) and David Harper (Durham University, UK), and Dr. Fan Junxuan (designer and master of Geobiodiversity Database, from NIGPAS) gave a series of lectures on the macroevolution of Ediacaran to Early Paleozoic benthos and plankton, with special reference to the onset of the GOBE, and taught the attendants in detail how to use and operate with the PAST Package and the GBDB Online System. The workshop was warmly welcomed and greatly appreciated by the attendants.

IGCP 653 Annual Meeting 2017 held in Yichang, China

[report by Yuandong Zhang, Nanjing]

The 2017 annual meeting of the IGCP 653 project - *The onset of the Great Ordovician Biodiversification Event* was successfully held from October 8–18, 2017 in Yichang City, Hubei Province, China. It was hosted and organised by Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences. The meeting, entitled ‘Filling the gap between the Cambrian Explosion and the GOBE’, included three days of indoor academic sessions, a full-day mid-conference field trip and a six-day post-conference field excursion in Hubei and Hunan provinces.

Sixty-five delegates from UK, France, Germany, Sweden, Estonia, Russia, Morocco, USA, Australia, South Korea, Vietnam and China, attended the meeting, including 18 foreign delegates and 20 graduate students. The domestic participants came from Peking University, Northwest University, Central South University, Guizhou University, Chinese Academy of Geological Sciences, Nature History Museum of Guangxi, Xi'an Center of Geological Survey, China University of Petroleum, and Nanjing Institute of Geology and Palaeontology. Dr. Rudy Leroey-Aubril from University of New England, Professor Zhu Maoyan from NIGPAS and Dr. Cole Edwards from Appalachian State University were invited to give keynote presentations on exceptional preservation fauna, evolution of important faunas and geochemical changes of ocean, respectively. 38 oral and 16 poster presentations were given at the meeting, covering a wide range of disciplines and research directions, such as paleontology, stratigraphy, sedimentology, geochemistry, paleogeography, paleoecology, fossil Lagerstätte and big data analysis, and also referred to various fossil groups, such as graptolites, conodonts, brachiopods, cephalopods, trilobites, sponges, trace fossils, radiolarians, and some exceptional preserved fossils of uncertain affinity.

A special volume including the conference programme and the 55 extended summaries and abstracts by 125 authors from 12 countries was published by the Zhejiang University Press & Elsevier. Three best oral presentations (by Zhang Yuchen, Ma Xuan and Fang

Xiang) and two best poster presentations (by Zhang Zhao and Deng Qiaoyan) by students were selected and awarded by the scientific committee.

Two workshops were organized during the meeting: (1) Dr. Fan Junxuan gave a comprehensive introduction to the Geobiodiversity Database (GBDB) and showed some new functions of data analyzing and visualization; (2) Dr. Zhu Xuejian introduced the Burgess Shale-type Guole Lagerstätte of the Jiangshanian (Furongian) age from Guangxi Autonomous Region, South China. Participants used microscopes to examine many unusual specimens of trilobites, non-trilobite arthropods, brachiopods, graptolites, cnidarians, echinoderms, hyoliths, palaeoscolecids worms and algae, and discussed the taxonomy, preservation conditions and other aspects of this biota.

During the one-day mid-conference field trip, delegates visited the GSSPs of the Dapingian (Huanghuachang section) and Hirnantian (Wangjiawan North section) stages near Yichang City. During the six-day post-conference field excursion (Oct. 13-18), delegates visited six Cambrian-Ordovician sections, i.e. Gudongkou section in Xingshan County, Xiangshuidong section in Songzi County (Hubei Province), Wentang section in Zhangjajie City, the Guzhangian GSSP section in Guzhang County, and the Paibian (Furongian) GSSP section in Huayuan County (Hunan Province).

The IGCP 653 Annual Meeting 2017 was financially supported by Nanjing Institute of Geology and Palaeontology, State Key Laboratory of Palaeobiology and Stratigraphy, CAS Key Laboratory of Economic Stratigraphy and Palaeogeography, National Natural Science Foundation of China and International Geoscience Programme Project 653.

IGCP 653 Annual Meeting 2017 - Filling the gap between the Cambrian Explosion and the GOBE
October 8-12, 2017, Yichang, China



Group photo of the IGCP 653 Annual Meeting 2017, held at Yichang City, China



Visiting the Huanghuachang section - the GSSP of the Dapingian Stage (Middle Ordovician), mid-conference excursion of the IGCP 653 Annual Meeting 2017



Visiting the Paibi section - the GSSP of the Paibian Stage (Furongian), post-conference excursion of the IGCP 653 Annual Meeting 2017

Dayangcha International Workshop on the Cambrian-Ordovician Boundary: 20th–25th, September 2017, Changchun, NE China

[report by Wang Xiaofeng (Wuhan Center for China Geological Survey)]

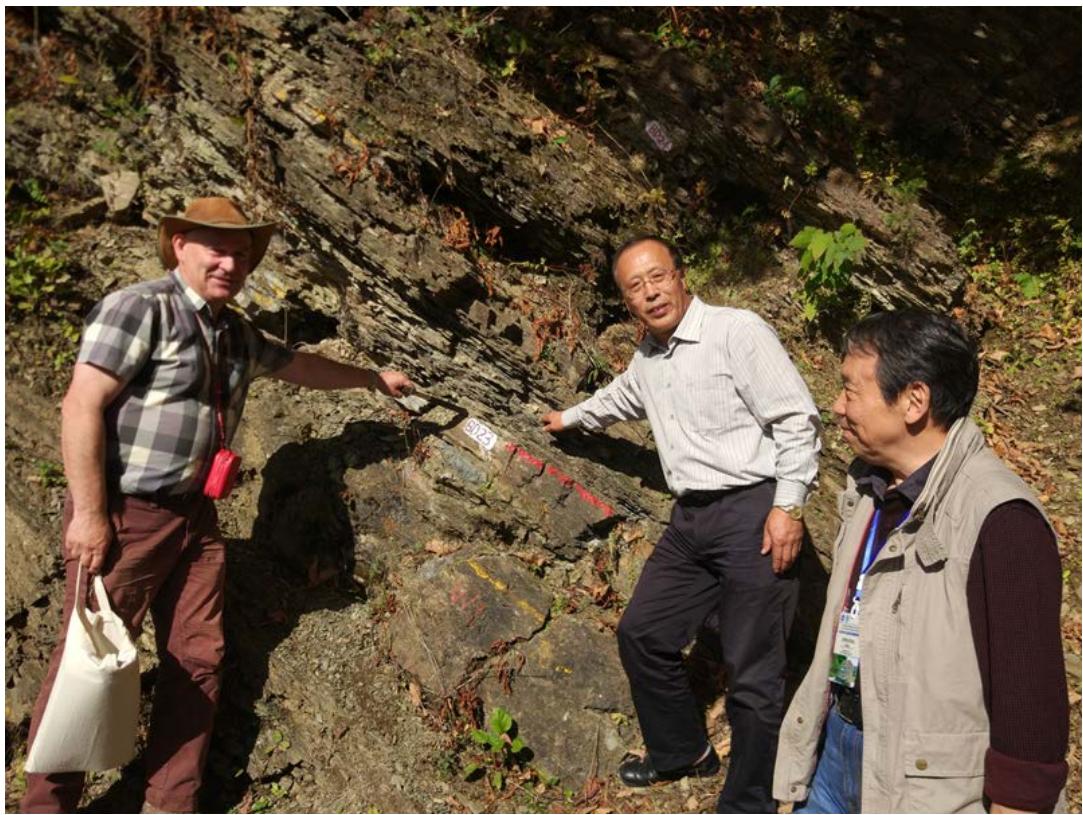
Wang Xiaofeng together with Svend Stouge, Jorg Maletz, Wang Chuanshang, & Yan Chunbo, with support of the Chinese Commission of Stratigraphy, organised this workshop to report their detailed re-study of the Xiaoyangqiao and other relevant sections in the Dayangcha area over the past 4 years. More than 40 colleagues from around the world gathered to discuss and exchange recent geological, geochemical and paleontological findings of relevance to the Cambrian-Ordovician boundary interval. The post meeting excursion offered an opportunity to visit the excellent Xiaoyangqiao section near Dayangcha, and further explored the feasibility of re-defining a set of criteria for subdivision and correlation of the Cambrian-Ordovician boundary, in China and beyond.



Group photo of all participants in the Workshop, including the local governor, in front of a monument for protection of the Xiaoyangqiao Cambrian-Ordovician boundary section, Dayangcha



Opening ceremony of Dayangcha International Workshop on the Cambrian-Ordovician Boundary



Inspecting Cambrian-Ordovician boundary interval of the Xiaoyangqian section, Dayangcha. Two colleagues, Prof. Andrei Dronov Chair of ISOS and Prof. Sun Chunlin (Director of the Center of Stratigraphy and Palaeontology, Jilin University), indicate the FAD of the conodont *Cordylodus intermedius* in the base of BD23; Prof. Wang Xiaofeng at right foreground.



Participants in the Workshop inspecting the Cambrian-Ordovician boundary interval of the Xiaoyangqian section, Dayangcha

REPORT OF MEETING: Ordovician Geodynamics: the Sardic Phase in the Pyrenees, Mouthoumet and Montagne Noire massifs

International Meeting
September 4-9th 2017, Figueres, Catalonia



ORDOVICIAN GEODYNAMICS:

The Sardic Phase in the Pyrenees, Mouthoumet and Montagne Noire massifs

J. Javier Álvaro, Josep Maria Casas and Sébastien Clausen (eds.)



Pyrenees, Mouthoumet massif and Montagne Noire (southernmost Massif Central). Abstracts are published in:

Álvaro, J.J., Casas, J.M. & Clausen, S. (ed.) 2017. Ordovician Geodynamics: the Sardic Phase in the Pyrenees, Mouthoumet and Montagne Noire massifs. *Géologie de la France* 1 (4), 83 p.

A special volume with proceedings will appear in 2018 in *Journal of Iberian Geology*.

The meeting was organized by J. Javier Álvaro (IGEO, Madrid), Josep Maria Casas (University of Barcelona), Sébastien Clausen (University of Lille I), Jorge Colmenar (Natural History Museum of Denmark) and Bernard Laumonier (University of Lorraine), and sponsored by BRGM, GFP, IGCOP 653, IGEO, IGME, SGE, SGF and Universities of Barcelona and Lille I. They were 30 participants from Andorra, Denmark, France, Italy, Portugal and Spain. Oral talks focused on major Cambrian and Ordovician unconformities, some of them related to rift-drift transitions, and geodynamic turnovers, such as the Toledanian (Iberian Massif) and Sardic (Eastern Pyrenees, Montagne Noire, Mouthoumet massif, Sardinia and Alps) phases in Northwest Gondwana. During the fieldtrip, participants visited some key outcrops in Catalonia (NE Spain) and Occitanie (southern France) with targeted Mid-Ordovician volcanism, angular discordances capped by continental to marine transitions, Katian carbonates and Hirnantian glaciogenic strata of the Eastern



Photo: Participants close to the discussion table, Figueres.



International Geoscience Programme Project 653 — Annual Meeting 2018



Trekking Across the GOBE: From the Cambrian through to the Katian

June 3-7, 2018

Athens, Ohio

Second Circular

Conference website: <https://igcp653athens2018.wordpress.com>

Sponsors

Ohio University Department of Geological Sciences
Ohio University Research Office

The annual meeting of the IGCP 653, entitled "**Trekking Across the GOBE: From the Cambrian through to the Katian**" will bring together international experts on all aspects of the late Cambrian through Late Ordovician earth system. The meeting in Athens will include three days of scientific sessions and a full day mid-conference field trip to explore the stratigraphy and paleontology of spectacular Ordovician outcrops.

We look forward to welcoming you to Athens!

Schedule and Deadlines

March 15, 2018	Deadline for registration, abstracts, and payments
May 15, 2018	Distribution of third circular
May 30-June 2, 2018	Pre-conference excursion
June 3, 2018	Arrival, registration, and opening reception in Athens
June 4, 5, 7, 2018	Technical sessions
June 6, 2018	Mid-conference excursion (included in registration)
June 7, 2018	Conference dinner (included in registration)
June 8-9, 2018	Post-conference excursion
September 1, 2018	Deadline submissions to Paleo3 special issue

*Part of Thursday, June 7th will include a special session on Cincinnatian stratigraphy and paleontology to connect the mid-conference and post-conference field trips.

Location

The meeting will be held on the campus of Ohio University. Established in 1804, OHIO is the oldest university within the Northwest Territories of colonial America (<https://www.ohio.edu>). Located in Athens, a quintessential college town of approximately 30,000 people in the scenic rolling hills of southeastern Ohio, Ohio University offers high-quality undergraduate and graduate education on one of the nation's most picturesque campuses. Geology courses have been offered here since 1826,

and today the Department of Geological Sciences (<https://www.ohio.edu/cas/geology/>) continues a strong tradition in training the next generation of geoscientists. Ohio University is located at the edge of the Appalachian plateau and is surrounded by Pennsylvanian outcrops. However, spectacular outcrops of the Cincinnatian (Katian) strata are less than two hours away. The universities within the state of Ohio have historically strong research foci in Paleozoic paleontology and sedimentary geology, often with a particular emphasis on the Ordovician.

Athens is known for its collegiate, environmentally friendly, and craft brew-loving culture (<http://athensohio.com>). Residents value diversity, inclusion, and progressive ideals. Weather in June is typically moderate. Average monthly temperatures range from low of about 13° C (56° F) at night to highs near 28° C (82° F) during the day.

Reaching Athens

Athens is located 120 kilometers (75 miles) southeast of the John Glen Columbus International Airport (CMH) (<http://flycolumbus.com>). Columbus receives flights from all major US gateway airports and airlines daily. GoBus, a regional bus service (<http://ridegobus.com>), also connects CMH and Athens.

Shuttles will be arranged to transport delegates from Columbus to Athens on June 3rd. Pickup from Cincinnati-Northern Kentucky Airport (CVG) may also be possible pending final field trip arrangements. **Please indicate on the registration form if you plan to use the shuttle service.**

Conference Venue

Technical sessions will be held at Grover Center on Ohio University's campus. This venue includes an atrium that can accommodate group gatherings of all sizes. The Department of Geological Sciences is a four-minute walk away, and requests for access to microscopes or other equipment can be accommodated. If there is a specific type of space that your research group needs for a meeting, please let us know and we can arrange it for you. Complementary Wi-fi access is available throughout Ohio University's campus.

The ice-breaker reception will be held at Jackie O's Brewpub (<http://jackieos.com>), an award winning local craft brewery only a few minutes walk from campus. The conference dinner will be held at the Dairy Barn Arts Center (<http://dairybarn.org>), a historic structure, which is now a regional arts venue. Shuttles will be provided for the dinner.

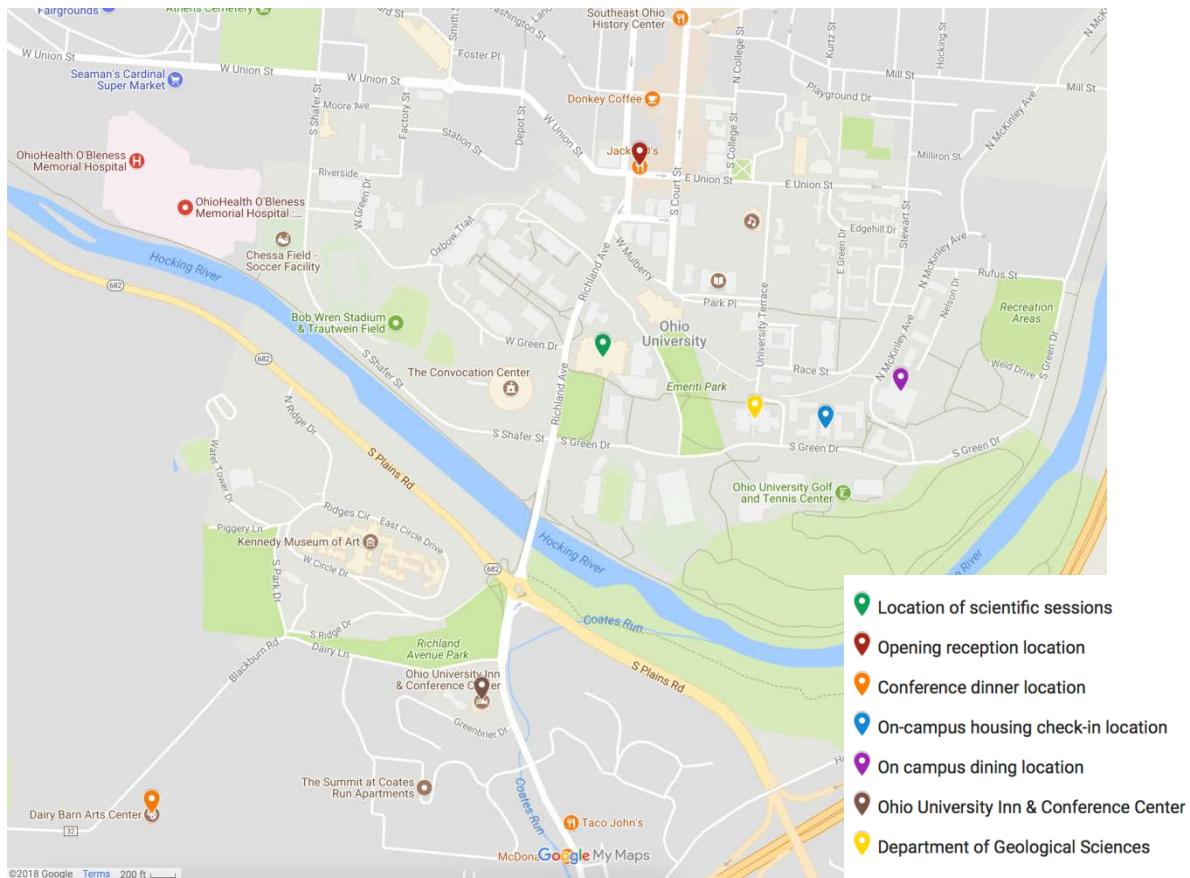
Meals and Accommodations

Lodging is available in university dormitories at a rate of \$27 per night for double occupancy. A university meal plan is available at a rate of \$9.00 breakfast and \$11.00 lunch per day. There is an additional charge of \$17 for linen service per person.

The Ohio University Inn (<http://www.ouinn.com>) is a full service hotel within easy walking distance of the conference venue. Athens is home to a number of other hotels located further from campus, a list is available here: <http://athensohio.com/category/where-to-stay/hotels/>. There are many restaurants within walking distance of campus.

If you plan to bring a vehicle and park on campus, contact Alycia Stigall (stigall@ohio.edu) in advance of the meeting to arrange a parking pass.

For participants with children, Ohio University hosts an excellent summer camp for children ages 6 through 12 from 8:30 am to 5:30 pm during the conference week (<https://www.ohio.edu/recreation/about/camp.cfm>). A list of early education majors with approved background checks that babysit can also be made available on request.



https://drive.google.com/open?id=1bh6eytr-vNLi8uJc-VuyIKH-XQEhL_cv&usp=sharing

Registration Fees

Conference Fee

The registration fee for the scientific sessions including opening reception, conference dinner, mid-conference field trip, coffee breaks, program and abstract volume, etc.

Professional participant (by March 15 th)	\$250
Student participant (by March 15 th)	\$125
Late registration (professional/student)	\$300/150

Accompanying Person Fee

Includes opening reception, conference dinner, and mid-conference field trip

Meal tickets - Optional (June 4, 5, 7), breakfast and lunch \$20/day

Meal Tickets - Optional (June 6, 8), breakfast only \$9/day

Lunch is included on the conference field trip

University housing, double occupancy - Optional Linen packet \$27/day
\$17

Pre-conference excursion: Great Basin (May 30-June 2) \$675

Includes transportation in the Great Basin (*participants responsible for their own transportation to/from Salt Lake City, Utah (SLC)*), guidebook, meals, and double occupancy lodging.

Post-conference Excursion: Cincinnati Arch (June 8-9)	\$225
Includes transportation, guidebook, meals and double occupancy lodging for the night of June 8. Excursion begins in Athens and ends in Cincinnati, Ohio.	

Payment: The online registration system can be accessed via the conference website: <https://commerce.cashnet.com/ohioemkt7>. The system accepts all major credit cards. If an alternate arrangement is necessary, contact Alycia Stigall (stigall@ohio.edu)

Cancellation

Refunds of 50% of the conference and excursion fees will be paid if the cancellation is received before May 1st, 2018. No refunds are possible after this date.

Support

IGCP 653 has limited funds available to support students, early career researchers, and participants from developing countries who are presenting research at the conference. Please send a free form application alongside the abstract submission. Note that only participants with presentations will be considered for support.

Abstracts

Abstracts should be submitted igcp653@gmail.com ("Abstract submission" in the heading of the e-mail), along with the receipt of the payment of the registration fee. The deadline for abstract submission is March 15th 2018. Detailed instructions and a template for abstracts are available on the conference website.

Presentations

Oral Presentations are limited to 15 minutes. Slides must be prepared in MS PowerPoint (.ppt, .ppx) or Portable Document Format (.pdf). The preferred aspect ratio for PowerPoint slides is 16:9.

Poster Presentations should be prepared in A0 format, preferably in portrait orientation.

Conference Publications

A program and abstracts volume will be available at the meeting and on the meeting website with free access. A thematic issue in "*Palaeogeography, Palaeoclimatology, Palaeoecology*" will be arranged to publish papers presented at the conference. Invitation for papers/call for papers for the special issue of *Palaeo3* is forthcoming.

International participants

Be aware of visa requirements for travel from your home country to the United States and plan ample time for processing of passports. Letters of invitation can be requested from the organizers when necessary. If you are an international student and have any questions regarding your visa status, please consult the office in charge of international students at your university.

Mid-conference Field Trip

A one-day mid-conference field trip will be organized to visit the famous Maysville, Kentucky locality. This roadcut is both vertically and laterally extensive and allows inspection of the Edenian through Richmondian Regional Stages (lower Katian). The units are extensively fossiliferous and range from offshore to nearshore environments.

This excursion is included in attendees' and accompanying person registration fees.

Pre-conference Field Excursion

A five-day pre-conference field trip will be organized to visit classic Cambro-Ordovician sections in the Ibex and House Range areas of Utah. This field trip will provide an overview of Upper Cambrian (pre-GOBE) strata including biotic events and long-term ecological trends through the Lower and Middle Ordovician strata that encompass the primary diversity changes associated with the GOBE. The field trip will start and end at the Salt Lake City airport (SLC). Registration fee is \$675 and includes all transportation, meals (except dinners), and lodging for four nights. *Flights to SLC and from SLC to CMH are not included in the registration fee. Flights that depart in the early morning and arrive in CMH by 4:00 pm are encouraged. Vans will be available to transport attendees from CMH to Athens departing at 4:30 pm.*

May 30: Arrive in Salt Lake City and drive ~4 hours to Delta, Utah, stopping at several points along the way to discuss the geological setting and history of the eastern Basin and Range Province.

May 31: We will examine exposures in the spectacular cliffs of the northern House Range. We will focus on Middle and Late Cambrian shallow-water carbonates of the Great American Carbonate Bank and Lagerstätte preserved in mudstones of the House Embayment (Wheeler, Marjum and Weeks Formations). We will return to Delta in the evening.

June 1: We will focus on classic Lower and Middle Ordovician sections in the Ibex area (southern House Range and Confusion range). We will discuss the onset of the GOBE and its relationship to biomere-like extinction events in the Early Ordovician, and examine ecological changes during the late Floian-Dapingian. We will then drive west to Ely, Nevada, crossing several ranges and Basin and Range National Park.

June 2: We will drive south to Upper Cambrian and Ordovician exposures in the southern Egan Range (Sawmill Canyon and Shingle Pass), and discuss the regional pattern of environmental and ecological changes during the GOBE. We will return to Salt Lake City in the evening.

June 3: Fly to Ohio. *Flights to SLC and from SLC to CMH are not included in the registration fee. Flights that depart in the early morning and arrive in CMH by 4:00 pm are encouraged. Vans will be available to transport attendees from CMH to Athens departing at 4:30 pm.*

Post-conference Field Excursion

This two-day trip will provide an overview of classic, highly fossiliferous Katian age (~453 to 444 MA, Mohawkian-Cincinnatian) strata along the eastern and southwestern parts of the Cincinnati Arch. Trip will be divided into two broad themes corresponding to the Cincinnatian and Mohawkian parts of the succession.

June 8: A distal to proximal (N-S) facies transect of Cincinnatian sequences. Starting at Athens, Ohio, this trip will proceed southward through rural scenery of Maysville, Flemingsburg, Owingsville, and

Winchester, Kentucky, along the east side of the Arch covering an offshore to peritidal facies transect; overnight in Winchester, Kentucky.

June 9: A survey of Sandbian-lower Katian facies, sequence stratigraphy and paleontology/paleoecology. Trip will commence with spectacular new cuts near Winchester and proceed northwest through the beautiful Bluegrass Region of Lexington and Frankfort ending in Owenton. In a series of stops the full exposed succession from Sandbian age peritidal facies through the entire lower Katian Lexington Formation and lower part of the Edenian Kope Formation.

Trip will conclude at the Cincinnati-Northern Kentucky airport (CVG). One vehicle will return to Athens. Participants who fly in are encouraged to arrange flight departures from CVG and to book a room for the night of Saturday June 9th near the airport. Registration fee is \$225 and includes guidebook, transportation, meals, and one night's hotel.

Organizing Committee

Alycia Stigall (Chair), Ohio University, USA
Carlton Brett (Field Trip Co-Chair), University of Cincinnati, USA
Seth Finnegan (Field Trip Co-Chair), University of California, Berkeley, USA
Chris Aucoin, University of Cincinnati, USA
Rebecca Freeman, University of Kentucky, USA
Robert Gaines, Pomona College, USA
Kyle Hartshorn, Dry Dredgers, USA
Daniel Hembree, Ohio University, USA
Sara Pruss, Smith College, USA
Matthew Saltzman, Ohio State University, USA
Allison Young, University of Cincinnati, USA

IGCP 653 Co-leaders

Thomas SERVAIS (Chair, Lille, France)
David A.T. HARPER (Durham, UK)
Olga T. OBUT (Novosibirsk, Russia)
Christian M.Ø. RASMUSSEN (Copenhagen, Denmark)
Alycia L. STIGALL (Athens, Ohio, USA)
ZHANG Yuandong (Nanjing, China)

Contact

Please direct questions to Dr. Alycia Stigall (stigall@ohio.edu)



Ohio University, Athens, Ohio, USA

Conference Announcement: Anticosti Island Field trip, August 2018

The Stratigraphic Record of the End-Ordovician Mass Extinction on a Storm-Dominated Carbonate Ramp, Anticosti Island, Eastern Canada

Quebec City welcomes the **20th International Sedimentological Congress** (ISC) to be held from 13 to 17 August 2018. A series of pre- and post-meeting field trips will be organized in several places of Canada and the USA including a 6-day field trip to Anticosti Island.



Chute Vauréal (Photo: ©René Bourque)

Carbonate sedimentary rocks like those superbly exposed on Anticosti Island in the Gulf of St-Lawrence are, if correctly ordered and interpreted, an inventory of considerable information for helping decipher the cause-and-effect relationships within the ocean-atmosphere-biosphere system in the deep geological time. The Upper Ordovician to lower Silurian Anticosti succession consists of approximately 900 m of undeformed fossil-rich limestone and minor siliciclastic rocks that were deposited on a storm-dominated tropical carbonate ramp. Thick, lithologically repetitive successions like those in Anticosti Island, however, present a challenge to a stratigrapher attempting high-resolution correlation of such units even at a regional scale. By integrating sequence sedimentology with species-based biostratigraphic packages and chemostratigraphic profiles, we are now able to produce high-resolution stratigraphic models and to provide insight into the End-Ordovician mass extinction.

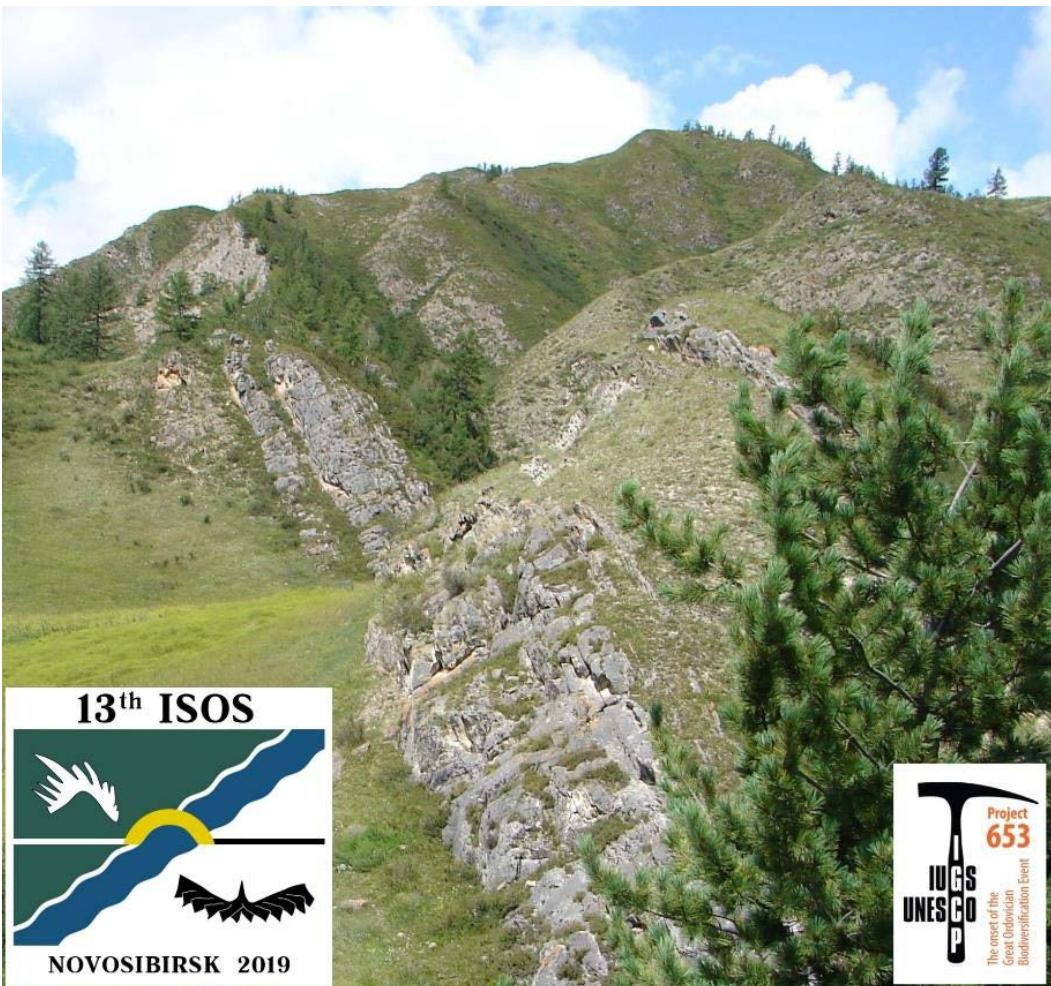
Field trip leader: André Desrochers (University of Ottawa, Canada)

Number of participants (Min/Max): 12 to 16

Departure/Return: Québec City

Duration & Date: 6 days, August 18th to 23rd, 2018

Cost: \$1975 CAD (includes charter plane Quebec City-Anticosti Island, cozy accommodation, all meals, transportation by 4X4 vehicles, field guidebooks). Funding is available to offset the cost of the field trip for young researchers (PhD, PDF); please contact André Desrochers directly.



13th INTERNATIONAL SYMPOSIUM ON THE ORDOVICIAN SYSTEM Novosibirsk, Russia (July 18-23, 2019)

SECOND CIRCULAR (**note corrected dates**)

We are delighted to announce that the **Thirteenth International Symposium on the Ordovician System** will be held from **July 18th to July 23th, 2019** in Novosibirsk (Russia). The 13th ISOS will be hosted at a most extraordinary district of Novosibirsk located about 30 km to the south of the city center on the shore of an artificial “Ob’ Sea”. Officially, it is called the Novosibirsk Scientific Center, but people call it simply Academy Town (Akademgorodok). Akademgorodok began its history in 1958 and now it is a world-renowned scientific center. At its core are buildings of Novosibirsk State University and scientific research institutes of the Siberian branch of Russian Academy of Sciences. Akademgorodok is an isolated district of Novosibirsk located in a natural forest in the outskirts of the city. Scientific sessions will be organized in the conference hall of the House of Scientists (“Dom Uchenykh”), the conference hall of the Trofimuk Institute of Petroleum Geology and Geophysics and the conference room of Novosibirsk State University as required. Hotel, conference halls, cafes, restaurants, shore of the Ob’ sea are all within a walking distance from any point of the Akademgorodok.

Significant and Important Dates:

March 2018: Second Circular appears in *Ordovician News*

September 2018: Registrations for the Symposium are expected to open

15 February 2019: Deadline for submission of abstracts

March/April 2019: Third Circular appears in *Ordovician News* with final Program and Arrival Instructions

Pre-Symposium field trip 1 (Ordovician of St. Petersburg): **July 13-15, 2019**

Pre-Symposium field trip 2 (Ordovician of the Altai Mountains): **July 10-17, 2019**

Scientific sessions, Novosibirsk: **July 18-23, 2019**

Mid-Symposium field trip (Ordovician of the Salair Range): **July 20-21, 2019**

Post-Symposium field trip (Ordovician of the Siberian Platform): **July 24-31, 2019**

Organizing Committee:

NIKOLAY V. SENNIKOV, Trofimuk Institute of Petroleum Geology and Geophysics, Siberian Branch of Russian Academy of Sciences, Novosibirsk. **Co-Chairman.**

ANDREI V. DRONOV, Geological Institute of Russian Academy of Sciences, Moscow. **Co-Chairman.**

ALEXANDR V. KANYGIN, Trofimuk Institute of Petroleum Geology and Geophysics, Siberian Branch of Russian Academy of Sciences, Novosibirsk. **Deputy Chairman.**

TATIANA Yu. TOLMACHEVA, All-Russian Research Geological Institute (VSEGEI), St. Petersburg. **Deputy Chairman.**

SERGEI V. ROZHNOV, Boryssia Paleontological Institute of Russian Academy of Sciences, Moscow. **Deputy Chairman.**

OLGA T. OBUT, Trofimuk Institute of Petroleum Geology and Geophysics, Siberian Branch of Russian Academy of Sciences, Novosibirsk. **Secretary.**

ALEXANDR V. TIMOKHIN, Trofimuk Institute of Petroleum Geology and Geophysics, Siberian Branch of Russian Academy of Sciences, Novosibirsk.

TARAS V. GONTA, Trofimuk Institute of Petroleum Geology and Geophysics, Siberian Branch of Russian Academy of Sciences, Novosibirsk.

ELENA G. RAEVSKAYA, FGUNPP “Geologorazvedka”, St. Petersburg.

ELENA V. LYKOVA, Trofimuk Institute of Petroleum Geology and Geophysics, Siberian Branch of Russian Academy of Sciences, Novosibirsk.

Supporting organizations, Universities & Institutions:

- International Subcommission on Ordovician Stratigraphy (ICS-IUGS)
- Interdepartmental Stratigraphic Committee of Russia
- Russian Academy of Sciences
- Russian Foundation for Basic Research
- Trofimuk Institute of Petroleum Geology and Geophysics, Siberian Branch of Russian Academy of Sciences, Novosibirsk
- Novosibirsk State University, Novosibirsk
- Geological Institute of Russian Academy of Sciences, Moscow
- Boryssia Paleontological Institute of Russian Academy of Sciences, Moscow
- Russian Research Geological Institute (VSEGEI), St. Petersburg

Sponsorship:

- Russian Academy of Sciences (RAS)
- Russian Foundation for Basic Research
- Novosibirsk State University

Accommodation:

Accommodation for all participants will be organized in a hotel “Zolotaya Dolina” (Golden Valley) in walking distance (10 min) from the House of Scientists (“Dom Uchenykh”) and the main building of the Trofimuk Institute of Petroleum Geology and Geophysics where scientific sessions are to be held.

- Deluxe – 130-100 Euro
- Single room 35-40 Euro
- Shared room 30-35 Euro
- Meals in Akademgorodok 30-50 Euro per day
- For student rooms at the Novosibirsk State University hostel - single room 15 Euro (breakfast is not included):

Please note that costs for accommodation, excursions etc. are estimates only. They could change in the next 2 years with inflation and the general economic and political situation. If necessary, revised costs will be notified prior to opening of Registration in September 2018.

Travel:

Buses departing every half an hour (100 min, 2 Euro) provide travel from Tolmachevo Airport (Tolmachevo-Novosibirsk city-Akademgorodok). Direct taxi from the Airport (50km) is the fastest way (45 min, about 30 Euro). A special minibus will also be organized from the Institute to meet participants of the Symposium arriving at Tolmachevo Airport.

Field Excursions:

Selection of Novosibirsk for the Symposium provides a good opportunity to learn more about the Ordovician geology of both the Siberian Platform and Altai Mountains. We also added to the program a pre-Symposium excursion to the St. Petersburg region. Therefore, participants who attend both the pre-Symposium and post-Symposium excursions on the platforms (Russian and Siberian respectively) will have a chance to compare the sea-level story, long-term lithological changes and faunal differences in the two Ordovician palaeocontinents.

Pre-Symposium field trip 1. July 13-15, 2019 (3 days). Ordovician of St. Petersburg region.

Co-leaders: T. Yu. Tolmacheva and A.V. Dronov.

Excursion starts and ends in St. Petersburg. Participants will have an opportunity to examine classical Ordovician sections connected with the names of R. Murchison, Ch. Pander, A. Volborth and many other famous scientists. We will study Cambrian and basal Ordovician (Tremadoc) siliciclastics including traces of permafrost on the Middle/Upper Cambrian boundary. The cool-water carbonate succession (Floian –Lower Sandbian) and warm-water carbonates (Upper Sandbian –Katian) including supratidal sabkha dolomites, unusual for the other parts of the Ordovician basin of Baltoscandia, will be demonstrated and discussed.

Ordovician limestones of St. Petersburg region are extremely fossiliferous. Rich fauna include trilobites, brachiopods, cephalopods, gastropods, bryozoans etc. Discussions at most stops will include summary findings from conodont, trilobite, brachiopod and graptolite biostratigraphic investigations as well as palaeoclimatic, sequence stratigraphic, facies and palaeobathimetric interpretations. Special attention will be made to trace fossils distribution and their potential for regional high-resolution correlation. Unique cool-water Middle Ordovician reefs (Hecker-type mud mounds) will be demonstrated and studied in detail.

The first and second days will be devoted to the Cambrian, Lower and Middle Ordovician of the eastern part of the St. Petersburg Region. The localities to be visited during the first day include Tosna River and Sablinka River canyons, Sablino caves, “Pander’s anticline” (Popovka River canyon), Putilovo quarry and Lava River canyon. The first night participants

will spend in the town of Volkov on the Volkov River in the eastern part of St. Petersburg Region. The localities to be visited in the second day include Volkov River valley, Babino quarry, Lynna and Says River valleys. Tourist stops during the excursion include Fortress in Old Ladoga (the first capital of Russia) and Viking burial mounds on the banks of Volkov River. At the end of the day participants return to St. Petersburg and spend a night there. The third day will be devoted to the Lower, Middle and Upper Ordovician of the western part of St. Petersburg region. Localities to be visited include Kaskovo quarry, Elizavetino quarry, Alekseevka quarry, Suma river canyon and Pechurki quarry. We return to St. Petersburg the evening of July 15, and on July 16th participants will fly to Novosibirsk. For the flight St. Petersburg –Novosibirsk participants need to make their own arrangements.

Field trip fee covers guidebook, transportation all meals and accommodation in hotels during the excursion. Registration is 300 Euro for a minimum of 8 and maximum 40 participants. In July, the day temperature in St. Petersburg region is usually between +17°C and +27°C. Occasionally there could be rain.

Pre-Symposium field trip 2. July 10-17, 2019 (8 days). Ordovician of the Altai Mountains.
Co-leaders: N.V. Sennikov, O.T. Obut and E.V. Lykova.

The field trip is planned to demonstrate the most important Ordovician localities of the Gorny Altai Mountains. Excursion starts and ends in Novosibirsk (Akademgorodok). The first and last days are mainly driving. Distance from Novosibirsk to the first field camp (tourist camping) in North-Western Altai is about 500 km. Transportation in the field will be by bus, 4WD tracks and jeeps. Altai is usually called the Siberian Switzerland for its beauty but it is not high mountains. Altitude on the route of the excursion will be between 500 m and 1500 m above sea level. Mountains are covered by taiga forest and mountain meadows. Exposures are mainly along the river banks, road cuts, on mountain slopes and in active quarries.

Participants of the excursion will have an opportunity to examine all the Ordovician succession of the Gorny Altai Mountains represented in different shallow to deep-water facies including: 1) delta front; 2) inner shelf (ramp); 3) inner slope of the carbonate platform; 4) central part and outer slope of the carbonate platform; 5) deep-water shelf; 6) continental slope; 7) open ocean deposits and sea mounts. Fossils are represented by graptolites, conodonts, chitinozoans, radiolarians, trilobites, ostracods, brachiopods, gastropods, crinoids, scolecodonts, tabulate and rugose corals, bryozoans and algae.

Tourist sites on the route include:

- 1) Kolyvan' stone factory founded in 1802 which is famous for its giant jasper vases now stored in Paris and St. Petersburg (Hermitage).
- 2) Denisova Cave which represents one of the most ancient dwelling places of humans in Siberia (more than 200 000 years B.C.).
- 3) Scyphian burial mounds (IV-II centuries B.C.).
- 4) Boat trip along Teletskoe Lake, which is known as "Altaian Baikal".

Typical temperatures for July in Gorny Altai are about +20-25°C, rarely +30°C during the day and +5-15°C at night. Occasional rain is possible. Heavy dew is typical in the mornings. It is planned to stay in four field camps (tourist campings) during the excursion with distances between camps of about 250-400 km. Participants are advised to bring field boots, warm sweaters, raincoats, umbrellas as well as caps and swimming suits. Tents, sleeping bags and other camp facilities will be provided by the organizers.

Field trip fee (800 Euro) covers guidebook, all meals, accommodation in field camps and campings and transportation during the excursion. This field trip is restricted to minimum 8 and a maximum 25 participants.

Mid-Symposium field trip. July 20-21, 2019 (2 days). **Ordovician of the Salair Range.** Co-leaders: N.V. Sennikov and O.T. Obut.

Beginning and end of the excursion is in Novosibirsk (Akademgorodok). The excursion will demonstrate Cambrian, Lower to Middle Ordovician (Floian, Dapingian, Darriwilian, Katian and Hirnantian) and Silurian (optionally Devonian) successions of the Salair Range (Gurievsk-Eltsovka and Berd' structural-facies zones) represented in shelf facies, including terrigenous and carbonate including carbonate with reef buildups. Fossils include brachiopods, trilobites, archaeocyathids, graptolites and corals. Field guide, transportation and accommodation for one night (in a hotel in Gurievsk town or Belovo/Maslyanino villages) are covered by registration fee. The weather and other natural conditions recall the pre-Symposium Altai excursion.

Post-Symposium field trip. July 24-31, 2019 (7 days). **Ordovician of the Siberian Platform: Podkamennaya Tunguska and Stolbovaya Rivers.** Co-leaders: A.V. Dronov, A.V. Timokhin and T.V. Gonta.

Excursion starts in Novosibirsk and ends in Krasnoyarsk. Late in the evening of July 23 we will take a night train Novosibirsk – Krasnoyarsk (800 km). On July 24, we will fly from Krasnoyarsk to the town of Bor (600 km) on the Yenisei River opposite the mouth of the Podkamennaya Tunguska River. The same day the flight by helicopter from Bor to the field camp (120 km) on the Stolbovaya River, tributary of Podkamennaya Tunguska will be organized. For transportation between the outcrops during the excursion, rubber boats and motorboats will be used. Accommodations are in a field camps. Motorboats will arrange the way back to Bor downstream to Podkamennaya Tunguska at the end of the excursion (July 29). Organizers will provide the flight from Bor back to Krasnoyarsk (July 30) but for hotel in Krasnoyarsk participants need to make their own arrangements.

Participants of the excursion will have an opportunity to visit important Ordovician localities of the Tungus Basin on the banks of Podkamennaya Tunguska and Stolbovaya Rivers. They will see the Lower Darriwilian tropical carbonates with stromatolite buildups and oolitic grainstone that represent the uppermost part of the “Great Siberian Carbonate Bank” an analogue of the Great American Carbonate Bank. The Upper Darriwilian shallow water quartz sandstones of the Baykit formation with *Skolithos*, *Kouphihnium* and giant Siberian *Rusophycus* trace fossils will be examined in several outcrops. The Lower Sandbian phosphate conglomerates of Ust’Stolbovaya formation overlying Baykit sandstone and marking the beginning of the Upper Ordovician transgression associated with upwelling of the cool-water oceanic waters into the epicontinental Tungus Basin, as well as the cool-water carbonate series (Sandbian –Katian), will be also examined in several localities. The Upper Ordovician K-bentonite layers within the cool-water tempestites of Mangazea and Dolbor formations will be traced and studied at several localities along the Podkamennaya Tunguska and Stolbovaya Rivers. These deposits are also rich in body fossils, which include trilobites, brachiopods, bryozoans, crinoids, ostracods, corals and gastropods etc, as well as trace fossils including *Rhizocorallium*, *Halopoa*, and *Balanoglossites* etc. At some of the outcrops, contact with the Lower Silurian deposits will be seen. Discussions at most stops will include summary on biostratigraphic investigations as well as palaeoclimatic, facial and palaeobathimetric interpretations. Sea-level changes and sequence stratigraphy will be discussed as well.

In July, the day temperature in this part of Siberia is usually between +17°C and +25°C. Occasionally could be rain. Participants are advised to bring field boots, warm sweaters, raincoats, umbrellas as well as caps and swimming suits. The tents, sleeping bags and other camp facilities including repellents against mosquitos will be provided by the organizers.

Field trip fee (1500 Euro) covers guidebook, all meals, accommodation in field camps and transportation during the excursion. This field trip is restricted to minimum 10 and maximum 20 participants.

Social and Cultural Highlights:

For accompanying persons during the Symposium a boat trip on the Ob' River could be recommended. The other tourist attractions are listed in the outlines of the field trips.

Publication:

A Proceedings volume of the Symposium and additional materials on the Ordovician Geology of Russia will be published in a monographic series of the Trofimuk Institute of Petroleum Geology and Geophysics, Russian Academy of Sciences. After the meeting, all the materials will be freely accessible through the web page.

Costing:

Registration fee covers costs of publication, conference bag, coffee breaks, symposium excursion (full accommodation and meals) and social activities.

- General participants: 350 Euro
- Student participants: 200 Euro

Conference Dinner: 50 Euro

Pre-Symposium field trip 1. Ordovician of St. Petersburg region (3 days); 300 Euro (covers field guide, transportation, all meals and accommodation).

Pre-Symposium field trip 2. Ordovician of Gorny Altai (8 days); 800 Euro (covers field guide, transportation, all meals and 6 nights' accommodation).

Mid-Symposium field trip. Ordovician of Salair Range (2 days); included in the registration fee; 150 Euro for accompanying persons.

Post-Symposium field trip. Ordovician of the Siberian Platform: Podkamennaya Tunguska and Stolbovaya Rivers (8 days); 1500 Euro (covers field guide, transportation, all meals and accommodation).

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RESEARCH REPORTS

Paulina ABRE (Uruguay) is Assistant Professor at Centro Universitario Regional Este (Treinta y Tres) of the Universidad de la República (Uruguay). Her main interest is on provenance studies (using petrography, whole-rock and isotope geochemistry, heavy minerals and detrital zircon dating), and she has studied several Ordovician to Devonian units of the Cuyania terrane of Argentina (PhD Thesis from the University of Johannesburg dealt with this topic). She is planning to deepen her knowledge on heavy minerals and is currently conducting provenance studies of several sedimentary sequences of Uruguay, although most of them are either older or younger than Ordovician.

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Guillermo ALBANESI (Argentina) studies conodonts from the lower Paleozoic of South America, including taxonomy, biostratigraphy, chemostratigraphy, events, and paleothermometry. Diverse projects from the Precordillera, Eastern Cordillera, Famatina, Sierras Subandinas, and Puna of northwestern Argentina are carried out with G. Ortega, his former PhD students G. Voldman, F. Zeballo, F. Serra, N. Feltes, and colleagues from Argentina and other countries. Graduate students M. Mango, G. Della Costa and F. Moreno are continuing investigations on conodont biostratigraphy, paleoenvironments and evolution from carbonate and siliciclastic sequences of the Argentine Ordovician System under his direction by means of CONICET scholarships.

Guillermo is Professor of Paleontology and the director of the “Centro de Investigaciones Geológicas Aplicadas” (CIGEA, <http://www.efn.uncor.edu/investigacion/CIGEA>) at the Facultad de Ciencias Exactas, Físicas y Naturales (FCEFyN), Universidad Nacional de Córdoba (UNC), which includes a laboratory of micropaleontology especially equipped for conodont works. His current place of work as CONICET researcher is at the CICTERRA (CONICET-UNC, <http://cicterra.conicet.unc.edu.ar/es/>) in the university campus, and maintains a repository space for the conodont collections at the Museo de Paleontología (FCEFyN, UNC).

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J. Javier ÁLVARO (Spain) was one of the organisers of the international meeting “Ordovician Geodynamics: the Sardic Phase in the Pyrenees, Mouthoumet and Montagne Noire massifs”, took place in Figueres (Spain), from 4 to 9th September, 2017. A report on the meeting appears elsewhere in this issue of *Ordovician News*.

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Chris Barnes (Canada) continues his conodont paleontology/stratigraphy/isotope geochemistry research. The main projects being: a) paleotemperature record and bioevents determined from SHRIMP oxygen isotope measurements from conodonts (with Trotter (UWA) and Williams (ANU)); b) Ordovician paleotemperature record for tracking the Argentine Precordillera across Iapetus Ocean determined from SHRIMP oxygen isotope measurements from conodonts (with Albanesi (CONICET, Cordoba), Trotter (UWA), Williams (ANU), and Bergström (OSU)); c) Ordovician and Silurian conodont biostratigraphy, bioevents, eustasy and thermal maturation, especially of the Canadian part of Laurentia; and d) participation in IGCP 653 Onset of GOBE.

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Juan L. BENEDETTO (Argentina) is working on the taxonomy and biogeography of Lower to Middle Ordovician brachiopods from the Central Andean and Famatina basins of NW Argentina. Jointly with doctoral student Fernando Lavié I am studying the first lingulate faunas from the Suri Formation of the Famatina Range. Together with Diego Muñoz and Arnaud Bignon I am finishing a work on the ontogeny of the plectorthoid brachiopod *Tarfaya purmamarcaensis* by using geometric morphometric methods.

Also underway is a joint paper with doctoral student Florencia Leone on brachiopod faunas from the Hirnantian/Rhuddanian boundary at the Precordillera basin (Cuyania terrane) in order to shed light on the end-Ordovician extinction in Gondwana. This study includes the taxonomic revision of taxa published many years ago as well as the description of some new forms, and also focuses the subsequent recovery during the Early Silurian and the emergence of the Afro-South American Realm. Finally, a taxonomic revision of the plectambonitoid *Ahtiella* from the three major Ordovician basins of Argentina (Precordillera, Famatina and Central Andes) has been accepted for publication in the *Journal of Paleontology*. This study attempts to reconstruct the phylogenetic lineage leading to the origin of the genus *Ahtiella* based on the excellent fossil record of the volcano-sedimentary succession of the Famatina Range. Contrary to previous assumptions, it is suggested that the plectambonitoid *Ahtiella* originated from the orthoid *Monorthis* through a series of minor transformations bridging the impressive morphological gap between orthides and strophomenides.

Juan L. Benedetto

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Matilde Sylvia BERESI (Argentina) I am continuing my work on Cambrian and the Middle Ordovician stratigraphy of the carbonate platform of the Precordillera, in western Argentina. A paper on a mid-Ordovician tempestite layer from Mendoza Precordillera was published in the *Boletín Geológico y Minero*, vol.128.

My paleontological studies focus on sponge faunas and chancelloriids from the Cambrian of the San Juan and Mendoza Precordillera and Mexico. The research is performed in collaboration with colleagues from the United Kingdom and Mexico (Universidad de Sonora –México- and Universidad Autónoma de México). New reticulosan sponges from the middle Cambrian of Sonora has recently been published in *Acta Palaeontologica Polonica*. Together with V. Luchinina (Russia), we have a paper in press in *Stratigraphy and Geological Correlation* on mid-Ordovician algae from diverse carbonate sections of the Precordillera. In collaboration with colleagues J. Botting and L. Muir (United Kingdom) I have also compiled fossil sponge data related to the great shifts in climate for the chapter ‘Lessons from the Past: Sponges and the Geological Record’ in the book *Climate Change, Ocean Acidification and Sponges*, recently published by Springer.

Dr. Matilde Sylvia Beresi

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Carlton E. BRETT (USA) continued to work on several projects related to Ordovician stratigraphy and paleoecology with present and former students, focusing on high-resolution stratigraphy, depositional cycles and paleoenvironments of the Upper Ordovician in the Cincinnati region and elsewhere. Major research projects continued as discussed below.

A) Integrated Stratigraphy of early Katian Platform to Basinal Sediments in Eastern North America.

In 2017 several different projects continued to focus on the uppermost Sandbian-lower Katian (453-450 MA) interval. This is a critical time because it includes the prominent Guttenberg C isotope excursion, the most widespread K-bentonite beds in the Ordovician, signaling the onset of the later tectophase of the Taconic Orogeny, a major sequence boundary (M4/M5 boundary), and biotic turnover. We intend to showcase these rocks during the IGCP 653 Meeting in June of 2018.

1) PhD student Allison Young and I are continuing to work with researchers from Hess Corporation on linking gamma ray, chemo-, C-isotope and sequence stratigraphy of outcrops of the Sandbian-Katian (Chatfieldian-Edenian in North American terminology) Lexington Formation and subsurface cores from the "Point Pleasant-Utica" oil and gas field in the deeper water Sebree Trough and Point Pleasant Basin of eastern Ohio. Newly studied drill cores from Ohio and Indiana are providing new stratigraphic and isotopic data on submarine erosion and filling of this feature. We have sampled these sections for C-isotopic stratigraphy and preliminary results suggest that platform units were miscorrelated as a result of a previously undetected unconformity that removed a major highstand unit over portions of the later basin. This also suggests inversion of topography, such that a relatively uplifted and truncated area became a deep basinal area within perhaps 100 Kyr. Our future work will focus on testing this pattern.

2) Research was continued with UC Masters student Tim Paton, funded by a National Geographic Society grant, to document spectacular hardgrounds (cemented sea floors) spectacularly encrusted by intact fossil communities. Perhaps most important, the hardgrounds also appear to provide regional markers that we have integrated into a broader regional stratigraphic framework and the probably record key sequence stratigraphic surfaces. Carbon isotope chemostratigraphy documented the occurrence of these encrusted surfaces in relation to the famed GICE (Guttenburg isotope) excursion. The hardgrounds fall between two parts of the GICE excursion, allowing detailed correlation with those in Kentucky. We intend to submit a second proposal to *National Geographic Society* to support a substantially larger project to test some of the preliminary hypotheses regarding taphonomy, paleoecology and paleobiology developed during the course of our work.

B) Research on Silurian Sequence and Chemostratigraphy: Ohio-Kentucky-Indiana-Tennessee, Canada. (Funding by NSF (now completed) and Ohio Geological Survey)

This year my efforts were largely focused on measuring and sampling spectacular new exposures in the area of Nashville, TN and in eastern Tennessee north of Knoxville. Our objectives include regional correlation of Ordovician sequences from the Cincinnati Arch to the Nashville Dome as well as the Appalachian region of Tennessee.

I spent two days with Pat McLaughlin and colleagues in southern and southeastern Tennessee and in this time found important linkages of depositional sequences and bioevents between the Cincinnati Arch, Nashville Dome and southern Appalachian Basin successions. Ongoing work will include carbon isotopic analyses to confirm paleontological and sequence based correlations. This work is critical to understanding the major bioevents that preceded and culminated in the second largest extinction in the Phanerozoic during latest Ordovician.

C) Revised Correlations and Sequence Stratigraphy of the North American Cincinnati Series (upper Katian).

As noted in 2016, I am working with graduate students Christopher Aucoin (PhD pre-candidate) and Cameron Schwalbach, as well as Kyle Hartshorn (Cincinnati engineer and avocational paleontologist), Dr. Patrick McLaughlin (Indiana Geological Survey) and Dr. Ben Dattilo (Indiana Purdue University, Fort Wayne) on sequence and event stratigraphy of the Upper Ordovician Richmond Group.

During summer of 2017, Cameron Schwalbach brought several years of study on the Upper Ordovician of the eastern side of Cincinnati Arch to a culmination with completion of an extensive MS thesis. This work details the correlations of strata in the interval of the lower-middle Waynesville Formation (sequence C5 of Holland and Patzkowsky's 1996 synthesis). He was able to demonstrate the lateral equivalence of very disparate facies in southern Ohio and east central Kentucky. In addition, Schwalbach did faunal analyses of a series of proximal to distal transects in different time slices. These studies revealed a persistence of biotas in proximal, upramp facies with a significant shift in deeper subtidal to offshore settings during the Richmondian invasion.

Dr. Ben Dattilo, Dr. Rebecca Freeman (University of Kentucky) and I have submitted a major grant proposal to NSF investigate the hypothesis that phosphatic enrichment in the Cincinnatian is the result of multiple episodes of storm reworking and enrichment of organic-derived phosphates. Dattilo has made extensive reference collections of polished slabs and thin sections to further document phosphate diagenesis.

I am also working with Prof Alycia Stigall of Ohio University (OU) to develop both mid-meeting and post-meeting (2-day) field trips for IGCP to be held at OU in Athens, OH in early June, 2018. In these field studies we will highlight results of several years of study on the upper Sandbian-Katian interval in the classic Cincinnati Arch region. Our results building on the seminal work of Holland and Patzkowsky are being synthesized in a revised Upper Ordovician Cincinnatian sequence stratigraphy for eastern North America. We will subdivide the entire Mohawkian-Cincinnatian into a number of new high-resolution sequences. I am working on a new volume of papers resulting from several recent field conferences on the Katian of the Cincinnati Arch region that we hope to publish this year.

Comparative Sequence and Event Stratigraphy: South China

A new initiative begun in 2016 involved comparative studies of stratigraphy and facies in southern China. To this end, I collaborated with Dr. Zhan Renbin (NIGPAS Nanjing) and graduate student Luan Xiaocong on examination and interpretation of sections and drill core covering the Dapingian through Hirnantian in Hubei, Sichuan, and eastern Yunnan provinces. A purpose of this project was to examine strata of similar biostratigraphic positions for common patterns of sequence stratigraphy and carbon isotopic signatures. This work includes studying outcrop and cores, with sample collection of carbon isotope chemostratigraphy, and graptolite biostratigraphy, which are being placed in a sequence stratigraphic context. Two manuscripts resulting from our work were accepted for publication.

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Yves CANDELA (Scotland) is still working with David Harper (Durham University) on the Lower Ordovician brachiopod faunas of the Fezouata Lagerstätte (Morocco). I am also working with Farid Saleh, Bertrand Lefebvre and Bernard Pittet (ENS Lyon and Université de Lyon), and David Harper on taphonomic processes in the Fezouata. Work is still continuing with David Harper on the description of brachiopod (linguliforms) and associated faunas from the Glenkiln Shales (Sandbian) and the Raven Gill Formation (Floian), along the

Wandel Burn and its tributaries, SE Scotland. This year I have published on matters regarding the Silurian, and am continuing working on this period too.

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Josefina M.T. CARLOROSI (Argentina) is still working on biostratigraphy and taxonomy of Lower and Middle Ordovician conodonts from different areas of Northwest Argentina (Cordillera Oriental and Sierras Subandinas) and Famatina Ranges. Besides, I am collaborating with the taxonomical investigation of the Ordovician conodonts from Peru with the Drs. Juan Carlos Gutierrez Marco and Graciela Sarmiento. Currently in collaboration with the Dr. Ana Mestre conducted a research project granted by CONICET for studying Lower Ordovician conodont biostratigraphic correlations between the Eastern Cordillera and Precordillera. I am part of Laboratorio de Micropaleontología (CONICET – CIGEOBIO - UNSJ) a working group focused on Ordovician conodonts of Argentina composed by Dr. Susana Heredia, Dr. Ana Mestre, Geol. Cintia Kauffman and María José Gómez. At the moment I participate of projects that studying different Ordovician fossil groups of Northwestern Argentina in collaboration with Drs. Franco Tortello, Susana Esteban and María del Milagro Vergel. At the same time I am part of the INSUGEO staff and carrying out the task of Editor of the magazine *Serie Correlación Geológica (SCG)*.

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Marcelo G. CARRERA (Argentina) is actively working on the evolutionary history of Paleozoic sponges, and the taxonomy, paleoecology and paleobiogeographic significance of the bryozoan fauna of the Argentine Precordillera. In particular he has two projects:

- Lower Ordovician reefs from western Argentina
- Devonian and Carboniferous sponges and bryozoans from western Argentina

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Borja CASCALES-MIÑANA (France) has been appointed as CNRS researcher at Lille University where he attempts to provide new insights into the origin and diversification of earliest plants. Ongoing studies involve plant megafossils as well as microfossils, including cryptospores, based on collaborations with several specialists. A recent paper discusses land plant macrofossil evidence discovered from the Hirnantian Stage (uppermost Ordovician, ~445 Ma) of Poland and its implications. This new plant assemblage includes macroremains consisting of dichotomously branched slender stems with terminal sporangia. These plants are closely comparable to younger plant macrofossils, including *Cooksonia*-type specimens, which suggests a very low evolutionary rate for basal land plants and a faster dispersal of the earliest Gondwanan floras than expected. Most importantly, the observed diversity of the reproductive structures found at the assemblage parallels that seen in the microfossil record. This evidence provides further support for existence of diverse Late Ordovician floras.

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Carlos CINGOLANI (Argentina) continues working on sedimentary provenance and tectono-stratigraphic evolution of Lower to Middle Palaeozoic sequences from the Argentine Precordillera-Cuyania terrane and Paraná basin. Isotope geology and geochronology on detrital minerals (mainly zircons) are the main tools used for provenance analysis in documented stratigraphic sequences. During 2017 his research activities focused on the San Rafael Block (southern sector of Cuyania terrane) and a book was edited for Springer.

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Roger COOPER (New Zealand) with James Crampton, Peter Sadler, Michael Foote and Steve Meyers has been using the CONOP global composite sequence of graptolite stratigraphic ranges for two papers, currently in review. The first (Crampton et al.) reports the first record of Milankovitch cycles determined from evolutionary rates in Paleozoic fossils; this implies that climatic factors have significantly influenced evolution in the Paleozoic plankton. The second (Foote et al.) reports the dependency of species diversification on diversity in graptolites; this implies biotic interactions also drive evolution and supports the ecological limits hypothesis of diversity.

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Helena COUTO (Portugal) is working on the study of Palaeozoic stratigraphy, palaeontology and gold and antimony mineralizations in Baixo-Douro area (North Portugal). These studies aim contributing for a better knowledge of the Palaeozoic stratigraphy and to define prospecting guides for gold and antimony deposits. Geological mapping, petrographic, geochemical and stratigraphic studies go on being developed on the Cambrian-Ordovician transition (including rifting processes), Lower Ordovician oolitic ironstones bearing volcanogenic prints with organic matter, hydrocarbons, fossil algæ and bryozoa (that exert a control of gold mineralization), on the Upper Ordovician deposits related to the Late Ordovician glaciation and on Silurian-Devonian transition.

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Ian DALZIEL (USA) continued his work on pre-Pangea paleogeography. The Ordovician is a particularly critical time interval because it included the ‘docking’ of the Laurentian Cuyania (greater-Precordilleran) terrane along the proto-Andean margin of Gondwanaland, thereby providing critical evidence regarding the relative positions of the two continental entities. Together with John Dewey of the Natural History Museum, London and the University College, Oxford he has recently published a paper on early Paleozoic paleogeography: “The classic Wilson cycle revisited”, now available through the Geological Society, London, Special Publications (see Ordovician Research Publications below; URL for e-prints available from the first author on request).

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Tim DE BACKER (Belgium) has just finished his Masters dissertation on Katian chitinozoans from the Midcontinent (Maquoketa Group, USA) at Ghent University. Currently I have started my PhD project, also at UGent, which is supervised by Thijs Vandenbroucke, Poul Emsbo and Patrick McLaughlin, and which will focus on aspects of the palaeoclimate and palaeo-environment of the Devonian.

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André DESROCHERS (Canada) is working on Upper Ordovician to Lower Silurian strata from the Anticosti Basin in Eastern Canada. My research program focuses on high-resolution stratigraphic studies integrating carbonate sedimentology, sequence stratigraphy, biostratigraphy, and chemostratigraphy. Two current M Sc projects (Marili Vincent-Couture, and Matthew Braun) are examining different stratigraphic segments of the Anticosti succession. A number of collaborative projects are also in progress including: i) testing global anoxia an alternative cause for the Hirnantian mass extinction (with Julie De Weirdt and Thijs Vanderbrouke), ii) time-series analyses derived from high-resolution stable isotope data of the Upper Ordovician Anticosti succession (with Matthias Sinnesael and Thijs Vanderbrouke), and iii) various biostratigraphic studies across the O/S boundary on Anticosti Island (chitinozoans with Aicha Achab, Esther Asselin, and Thijs Vandenbroucke; ostracods with Tonu Meidla). Anticosti Island was recently placed on the Canada's Tentative List for World Heritage Sites on the basis of its outstanding record of fossil life through the upper Ordovician and lower Silurian time interval. This time period represents a milestone event in the history of the Earth, the first global mass extinction of animal life. The local and provincial governments are planning to build an interpretation centre with accommodation facilities available for visiting geoscientists in the near future. Other current research projects include: i) the significance of widespread transgressive oolitic limestones preserved at the basin margin of the Yangtze Platform in South China (with Guangxu Wang and Renbin Zhan) and ii) the multi-order stratigraphic record of the classic Lower Cambrian sandstones and limestones in South Labrador (with Jean-François Ghienne).

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Andrei DRONOV (Russia) continued his work on facies, sea-level changes, biotic and abiotic events on the Siberian and Russian platforms during the Ordovician. In the year 2016, we started a 3- year project “Major biotic and abiotic events of regional and global scale in the Ordovician of Siberian and Russian platforms”. The project’s team includes Alexander Kanygin, Alexander Timokhin, Taras Gonta, Olga Maslova, Veronica Kushlina, Alexey Zaitsev, Elena Raevskaya and Tatiana Tolmacheva. Under umbrella of this project, we continue investigations of the Siberian K-bentonite beds conducted in collaboration with Warren Huff and studies of carbon isotope chemostratigraphy of the Ordovician of Tungus basin in cooperation with Boris Pokrovsky, Oliver Lehnert and Peep Männik. Studies of extraterrestrial chromates in the Darriwilian sections of St. Petersburg region and Siberia together with Birger Schmitz are also in the agenda as well as investigation of the Ordovician

trace fossils in cooperation with Radek Mikuláš and Dirk Knaust. Paper on specific trace fossils made by columnar stromatoporoids in the Upper Ordovician of Siberia is in preparation (with Veronica Kushlina and David Harper). Together with Axel Munnecke, we are also working on the unique Middle Ordovician Moyeronia-Angarella buildups from the Tungus basin. For the year 2018, we are planning an expedition to the Moyero River in order to study this classical Ordovician section with the special emphasis on the Lower Ordovician part.

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Jan Ove R. EBBESTAD (Sweden) continues working on Ordovician gastropods and tergomyans from peri-Gondwana settings (Morocco, Spain, South America, Iran), collaborating mainly with Juan Carlos Gutierrez-Marco (Madrid), Mansoureh Ghobadi Pour (Gorgán), and Leonid Popov (Cardiff). Continued work on the molluscan fauna of the Ordovician Boda Limestone of the Siljan area is developing in collaboration with Alexander Gubanov (Uppsala), Anette Högström (Tromsø) and Yutaro Suzuki (Shizuoka). Exquisite material of rostroconchs and gastropods from erratics in the Netherlands is being studied in collaboration with Freek Rhebergen (Emmen), Percy van Keulen (Harderwijk) and Alexander Gubanov. A project involving Ordovician biota (trilobites, molluscs) of the Taimyr peninsula, Arctic Russia will finish this year, in collaboration with Richard Fortey (London) and Alexander Gubanov.

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Cole EDWARDS (USA) is working on Ordovician stable and radiogenic isotope stratigraphy. Ongoing projects with David Fike at Washington University in St. Louis continue to explore sulfur isotope methodology as applied to a high-resolution stratigraphic record of the Lower-Middle Ordovician. Collaborations with Matt Saltzman (Ohio State), Page Quinton (SUNY Potsdam), and David Fike continue on $d^{18}O$ study of Ordovician conodonts using the Cameca 7f/geo Secondary Ion Mass Spectrometer (SIMS). Modeling work on oxygenation as a driver of the Great Ordovician Biodiversification Event was published in *Nature Geoscience*. Based on the success of the two modeling approaches used in this study, new collaborative work with Sarah Carmichael (Appalachian State University) will apply these techniques in studying whether global anoxia was a cause of the Late Devonian mass extinction. This new research direction will incorporate trace elements

(iodine) as a direct proxy for seawater anoxia with Zunli Lu (Syracuse). This proxy was used to show global and local evidence for marine anoxia as a cause of a Tremadocian extinction of trilobites and conodonts, which was published in early 2018 in the journal *Earth and Planetary Science Letters*.

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Bob ELIAS (Canada), together with colleagues, is continuing to study the Upper Ordovician and Ordovician-Silurian boundary interval in the Williston and Hudson Bay basins. In particular, carbon isotope curves and conodonts are being used to identify Hirnantian strata and the position of the O-S boundary.

Papers on various aspects of Ordovician tabulate corals and coral-like fossils are in preparation with Dong-Jin Lee (Andong National University, Korea), Mirinae Lee (Korea Polar Research Institute), Kun Liang (Nanjing Institute of Geology and Palaeontology), and Ning Sun (China University of Geosciences). A paper by Liang, Elias and D-J Lee on “The early record of halysitid tabulate corals, and morphometrics of *Catenipora* from the Ordovician of north-central China” has been accepted for publication in Papers in Palaeontology.

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Annalisa FERRETTI (Italy) continues her work on Ordovician conodont faunas from Europe and elsewhere, focusing with Stig Bergström on conodonts from different localities in UK, the Carnic Alps (with Hans Peter Schönlaub) and the United Arabian Emirates (with Giles Miller). A study on new conodont material from the Late Ordovician Kalkbank unit (Germany) with Peter Königshof and Ulf Linnemann is going on.

A revision on the significance of conodonts in Ordovician chronostratigraphy (with Stig Bergström) has been recently published (Bergström & Ferretti) within a Thematic Issue (Balini, Ferretti, Finney & Monechi, eds, *Lethaia*) exploring the significance of fossils in modern chronostratigraphy, 150 years after the death of Albert Oppel.

Peculiar apatite overgrowths observed on the oral surface of Late Ordovician conodonts from the Vaux Limestone exposed in Normandy have been described (Ferretti *et al.*).

Exceptionally preserved conodont apparatuses with hyaline elements are described from the middle-upper Darriwilian (Middle Ordovician, Whiterockian) Winneshiek Konservat-Lagerstätte in northeastern Iowa (Liu *et al.*). Apparatus structures for *Archeognathus primus* Cullison, 1938 and *Iowagnathus grandis* new genus new species are proposed and the new family Iowagnathidae in Conodonta is introduced.

A study on a conodont collection from Anglesey (northwestern Wales) and its geological implications is in press (Bergström & Ferretti). The fauna documents the *Baltoniodus variabilis* Subzone of the *Amorphognathus tvaerensis* Zone, and aims to be of some help in deciphering the geology of some Darriwilian–Sandbian (Ordovician) ‘ghost’ formations in the UK and North America using olistoliths in marine debris flows.

An updated conodont biostratigraphy of the Rauchkofel Boden Section, a classical reference section for the Carnic Alps, is presented (Schönlaub *et al.*). Twenty-five conodont Zones are documented, spanning from the Katian (Upper Ordovician) to the Pragian (Lower Devonian), following latest developments in conodont taxonomy and biostratigraphy, as well as in chronostratigraphy, and the recent introduction of a new lithostratigraphic outline of the Carnic Alps.

A review of geological evidences, including several Ordovician ones, highlights a set of properties that make traces and ichnofabrics important for the search of potential extraterrestrial life: trace fossils preserve the activity of soft-bodied organisms; biogenic structures are resilient to processes that obliterate other biosignatures; traces are very visible biosignatures; traces indicate environment and behaviour; traces can be universal biosignatures, i.e., biosignatures ideally suited for detecting any type of life. A model of organism-substrate interactions beyond Earth is proposed by Baucon *et al.* Expected extraterrestrial traces are those that manifest behaviours that allow to maintain homeostasis: excavations, meandering traces and biodeposition structures.

Finally, she is co-guest editing with Alyssa Bancroft and John Repetski a Special Issue of *Palaeogeography, Palaeoclimatology, Palaeoecology* focusing on “GECKO: Global Events impacting COnodont evolution”. The GECKO Issue will seek to take the concept of conodont animals beyond the simple idea that their primary utility is to serve as biostratigraphic markers and geochemical archives and to again begin looking at their temporal complexity and their potential to reflect events that occurred at a global scale. Several Ordovician papers are scheduled.

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Barry FORDHAM (Australia) hopes to get back to a small collection of Ordovician conodonts from the Yarroll province of eastern Queensland, one day ...

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Richard FORTEY (UK) continues to pursue research in my emeritus position at the Natural History Museum, London. Work on the Ordovician trilobites of the Taimyr Peninsula, with Jan Ove Ebbestad, is now well advanced, We have been able to clarify little-known genera like *Taimyraspis* Balashova, as well as recognising two distinct trilobite biofacies – a shallow water one typified by Siberian endemics, and a ‘basinal’ one with widespread “Appalachian” faunas. Work on Ordovician Moroccan trilobites continues. Further projects are jointly with Nigel Hughes revisiting the old works of F.R.C. Reed on Myanmar, as part of Nigel’s ongoing work on the tectonic assembly of S E Asia. This fauna includes the type species of widely known genera such as *Birmanites*.

Prof Richard A Fortey

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G. Robert GANIS (USA) is working on graptolite fauna from the Martinsburg Formation (Sandbian- Katian) in Pennsylvania and unusual associated problematic fossils in collaboration with Mike Meyer, Jan Zalasiewicz, Jacalyn Wittmer, & Kenneth DE Baets . In January (2018) a paper discussing the problematica was published in PALAIOS (v.33, p.36-46). Publication of General Geology Report in which I participated for Dauphin and Lebanon counties, Pennsylvania, describing Ordovician strata, structure and fossils (graptolites and conodonts) is anticipated for 2018 by the Pennsylvania Geologic Survey.

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Mansoureh GHOBADI POUR (Iran) continues work on various aspects of biostratigraphy, lithostratigraphy, palaeontology and biofacies of the Ordovician System with a special attention to Iran. A comprehensive revision of the Ordovician lithostratigraphy of North Iran is on schedule. There is a good progress in the study of the Ordovician (Tremadocian and Darriwilian) trilobites from Deh-Molla section (Alborz; North Iran). These faunas show strong affinities to the contemporaneous faunas of South China. Most of the last year I spent on a sabbatical leave in Uppsala University, working together with Lars Holmer, Leonid Popov, Zhifei Zhang and Zhiliang Zhang on various aspects of the Ordovician palaeontology of Baltoscandia and South China. An updated review of the Silurian of Central Iran was recently published in *Acta Geologica Polonica*. This paper, written in cooperation with Vachik Hairapetian, Leonid Popov, Peep Männik and Giles Miller, also has some relevance to Ordovician studies.

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Daniel GOLDMAN (USA) is working with Peter Sadler and Stephen Leslie on the new Ordovician Chapter for the upcoming Geologic Time Scale 2020. Our primary goals are to recalibrate the Ordovician time scale using the many new radiometric dates that have been published since 2012; to construct more precise ties between graptolite and conodont biozones; and to summarize the advances in chemostratigraphy that have been made in the last 8 years. I am also continuing to work with Chuck Mitchell, Dave Sheets, Wu Shuang-Ye, Mike Melchin, and James Boyle on a National Science Foundation funded project to study the relationship between graptolite biogeography and species longevity in the Ordovician and Early Silurian. Our research involves building a biogeographic database that includes detailed taxonomic, stratigraphic, geographic, and ecological information for Ordovician and Silurian graptolites. We intend to employ this database to test hypotheses regarding the relationship between graptolite species geographic ranges and their evolutionary dynamics (species longevity, speciation and extinction rate) including consequences for latitudinal gradients in species richness and macroevolutionary response to paleoenvironmental change.

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David A.T. HARPER (U.K.) reports that research continues on a variety of Ordovician brachiopod faunas. In particular he is collaborating with Yves Candela in investigating the Lower Ordovician brachiopod fauna of the Fezouata Lagerstätte (Morocco).

A thematic issue of *Lethaia* (edited by David Harper and Thomas Servais) arising from the successful initial meeting of IGCP 653 in Van Mildert College, Durham University in 2016 has recently appeared online (print version scheduled for this year), including 12 manuscripts on global aspects of the Great Ordovician Biodiversification Event. Two contributions to the study of Ordovician brachiopods from Ireland were published in 2017, one a substantial monographic work in *Fossils and Strata* on the brachiopods of the Tramore Limestone and related units (by Maria Liljeroth, David Harper, Hilary Carlisle and Arne Nielsen), the other a shorter paper on the younger Raheen brachiopods (with Matthew Parkes and Zhan Renbin) in the *Irish Journal of Earth Sciences*.

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Susana HEREDIA (Argentina) is working on Darriwilian conodonts (taxonomy and biofacies) from the Central Precordillera. Ordovician conodonts from Eastern Cordillera (NW Argentina) are being studied with Dr. Josefina Carlorosi. Ana Mestre and I are working on taxonomy of certain conodont species evaluating their biostratigraphical values. Susana shares interests on Ordovician matters with Blanca Toro, Estefania Asurmendi, Cintia Kaufmann, Tatiana Soria, Guillermo Aceñolaza, Juan Pablo Milana, and Graciela Sarmiento.

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Alain LE HÉRISSÉ (France): My interests continue to involve Ordovician to Permian palynology, and specially study of acritarchs and allied. The main contributions on the Ordovician this year have been devoted to the Middle Ordovician from Saudi Arabia. The characteristics of the assemblages seems to be in favor of the hypothesis of an “Early Paleozoic Ice Age” during this period. The extreme polymorphism of some forms, associated to the good representativity of tiny forms (picoplankton and ultraplankton), and variations in terrigenous delivery (cryptospore signal) could be indicative of changing salinity. In complement, the importance of triapsidate forms among acritarchs and the frequency of abnormal forms, could be correlated to environmental stress and possibly a glacial event.

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Linda HINTS (Estonia) continues part time work with the database of the Ordovician samples and specimens at our institute (Tallinn University of Technology). I also continue the study of the Ordovician stratigraphy and brachiopod faunas in the East Baltic.

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Olle HINTS (Estonia) is continuing studies on Ordovician–Silurian microfossils (especially scolecodonts and chitinozoans), geochemistry and Baltic regional geology and stratigraphy. In collaboration with Petra Tonarová and Mats E. Eriksson he is studying Ordovician and Silurian scolecodonts to provide new insights into taxonomy, paleobiogeography and

diversification history of Palaeozoic jaw-bearing polychaetes. In 2017 new material from Argentina was published together with Claudia Rubinstein, and work on collections from Siberia, Prague Basin and Baltoscandia is in progress. In collaboration with Jaak Nõlvak, Liina Antonovitš and Garmen Bauert he is continuing compilation and analysis of Baltoscandian chitinozoan database (available at <http://chitinozoa.net>). A summary of this work was published in *Lethaia*. A joint project started with Yan Liang (postdoc in Tallinn for 2017–2019), on the early diversification and biogeography of chitinozoans. Olle is also involved in a project with Tõnu Martma (Estonia), focusing on carbon isotopes of the Ordovician–Silurian succession. Work is in progress to obtain and interpret new high-resolution combined carbon and sulfur isotope records from Baltoscandia.

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Warren HUFF (USA) continues to work on K-bentonites of all ages. As an overview of K-bentonites in the geologic record I summarized much of their history in a review paper published in *American Mineralogist* in 2016. For the Ordovician, much of what we have learned about these deposits began with work by Allen and Ross and Nelson and others in the 1920s. But even their work was preceded by Ulrich in the 1880s who described a thick bed of clay of uncertain origin in the upper part of what is now known as the Tyrone Limestone, near High Bridge, Kentucky. Once the volcanogenic nature of these deposits was established a substantial body of literature began to appear proposing tectonic and stratigraphic models that attempted to explain their occurrence and distribution.

One of the great pleasures of my academic career is that every spring I offer a seminar in clay mineralogy where we do a research project. For 2018 we are studying samples from the Dolborian Regional Stage (middle to upper Katian) from the outcrop on Bolshaya Nirunda River, the tributary of Podkamennaya Tunguska. It is about 300 km to the east from Yenisei River. The continental margin during the Ordovician was about 200 km to the west from the position of the Yenisei River and the volcanic arc was probably even further to the west. So we estimate the minimal distance from the source of volcanic ash was no less than 500–600 km. Zircon crystals from the uppermost K-bentonite bed within the Baksian regional stage provide a $^{206}\text{Pb}/^{238}\text{U}$ age of 450.58 ± 0.27 Ma. We suggest that the Taconic Yenisei volcanic arc was continuous along the western margin of Siberia. Our results will be presented at the annual fall meeting of the Geological Society of America.

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Markes JOHNSON (USA) continues to make progress on studies in collaboration with B. Gudveig Baarli on the nature of the Ordovician-Silurian transition in the Oslo region. A major review publication under the senior authorship of Johan Fredric Bockelie (deceased, November 2016) was published in the *Norwegian Journal of Geology* in August of 2017 (see bibliography). We continued fieldwork in the Oslo region in August 2017 and subsequently completed a follow-up paper on the effect of Late Ordovician hurricanes across the paleocontinent of Baltica, which has now been accepted for publication in 2018. I have started work on a new book manuscript under the working title “Islands Lost and Found in Deep Time.” The book will include a chapter on Upper Ordovician (Hirnantian) strata in Churchill, Manitoba (Canada).

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Dimitri KALJO (Estonia) continued in a slow manner studies on the Ordovician and Silurian bio- and chemostratigraphy of Baltica as a part time emeritus member at the institute and as the editor-in-chief of the *Estonian Journal of Earth Sciences*.

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Cintia KAUFMANN (Argentina) is a PhD student at Facultad de Ciencias Exactas, Físicas y Naturales of National University, San Juan, Argentina, under direction of Drs Susana Heredia and Gladys Ortega. Middle Ordovician graptolite associations from Villicum range, Eastern Precodillera, are being studied. The fossil associations come from siliciclastic units from the Cecilia, Don Braulio and La Pola sections. Biostratigraphic aspects and taxonomy are included in this study. Changes in faunal associations throughout biozones were observed and a correlation of the regional biozones with the global ones was made. Also, other fossils organisms were found in this succession, including conodonts which were collected from calcareous sandstone and as casts on shale bedding planes with graptolites.

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Tarmo KIPLI (Estonia) and colleagues have recently published two articles including trace element studies on Ordovician and Silurian materials.

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Petr KRAFT (Czech Republic) finished a project on the Late Ordovician ostracods together with Karolína Lajblová and continues his research of paleontological localities in the Ordovician of the Prague Basin, Czech Republic under the project of the West Bohemian Museum.

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David M. KROECK (France) is a PhD student at the University of Lille, currently working on the palaeoecology, palaeogeography and palaeobiostratigraphy of Palaeozoic phytoplankton. He is investigating a sequence from the Llanos Orientales Basin in Colombia, in which certain diagnostic acritarch taxa could be found that allow an assignment not only to an Early Ordovician age but also to the peri-Gondwanan acritarch province, extending its geographical distribution to the north-western part of South America. He is also working on a revision of the Cambrian–Ordovician acritarch genus *Vulcanisphaera* Deunff 1961. In another study on samples from Öland, Sweden, he examined the possible influences of changing ecological conditions on the morphological variability within the peteinoid acritarch plexus, in order to find evidence for ecophenotypism in Ordovician acritarchs.

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Stephen LESLIE (USA) is primarily working on Middle and Late Ordovician conodont biostratigraphy and integrating the biostratigraphy with studies of Ordovician paleoclimate change. It's been a rather slow year with many obligations related to department administration. Steve is working with Dan Goldman (University of Dayton) integrating graptolite and conodont biostratigraphy in dark shale successions and also on the GTS 2020 Ordovician chapter. Steve continues to work with Achim Herrmann (Louisiana State University), Ken MacLeod (University of Missouri), and Page Quinton (SUNY Potsdam) testing the early Late Ordovician cool water carbonate hypothesis in the North American Midcontinent using oxygen isotopes from conodont apatite.

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Lixia LI (China) continues to work on the palaeozoic sponges from South China. My research activities in 2017 were on various aspects of taxonomy, palaeoecology and taphonomy of sponges from Ordovician-Silurian boundary section in South China. Now, I am a research assistant at the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences. There is a good progress in the study of systematic palaeontology of the sponges we have found last year. This work will be carried out in cooperation with Prof. Joachim Reitner from Göttingen University. The manuscript will be submitted by early of this year. I attended the IGCP653 Annual Meeting in Yichang, China and whilst worked with colleagues there on palaeozoic sponges.

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Qi-jian LI (China) is mainly working on Ordovician reefs and hypercalcified sponges (e.g. calathids, stromatoporoids and sphinctozoans). In 2017, I continued my systematic and paleoecological work on calathids. Apart from the materials from South China and Tarim, I carried out a new project with Dr. Masatoshi Sone, targeting the Ordovician reefs in Malaysia. Moreover, I am now working on some Early Silurian reefs of South China, in collaboration with Prof. Axel Munnecke, Dr Stephen Kershaw and Dr. Andrej Ernst. I also continue my collaborations focused on quantitative paleoecological analyses of reefs at the Ordovician-Silurian transition with several colleagues.

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Yan LIANG (China), an Assistant Researcher in NIGPAS, Nanjing, is continuing work on Early and Middle Ordovician chitinozoans of South China. Updated chitinozoan biostratigraphic sequences in the Tremadocian and the uppermost Darriwilian to the lower Sandbian in the Upper Yangtze Platform of South China were published recently. Since September in 2017, she started her two-year's post-doc program in Tallinn University of Technology with Prof. Olle Hints under the auspices of the Estonian Research Council. Together with Dr. Jaak Nõlvak, they are trying to figure out the early emergence of chitinozoans on Baltica.

Yan Liang

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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. Studies continue with my students and other cooperative researchers on geochemistry of the Ordovician carbonate and terrigenous siliciclastic and the Ordovician biostratigraphy and cyclostratigraphy in South China (in progress). Studies on the Phanerozoic microbialites are still in progress with Yoichi Ezaki, Natsuko Adachi (Osaka City University), and Zhen Yan (Chinese Academy of Geological Sciences).

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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 and evolution of sedimentary basins. Joint studies together with colleagues from Estonia, Germany, Iran, Japan, Poland, Russia, Sweden, U.K. and USA on evolution and high-resolution stratigraphy of the Early Palaeozoic faunas and sedimentary basins on different palaeocontinents are ongoing.

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Alexander (Sandy) D. McCracken (Canada) is periodically working on good Ordovician-Silurian collections from Hudson Bay and Moose River basins, Ontario and Manitoba. I retired in September 2017, and am a part-time volunteer with the GSC Calgary office. I work at my Victoria home (not in the GSC Sidney office), having moved my microscope and samples with me. I am in contact with the Calgary office weekly, and so may be a bit slow to respond to emails.

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Tõnu MEIDL (**Estonia**) is working on different aspects of litho- and biostratigraphy, ostracods and stable isotopes in the Ordovician-Silurian boundary interval of the Baltic States, Sweden, Latvia and Lithuania (together with L. Ainsaar, O. Tinn, L. Lang, K. Truuver, T. Paiste, T. Ani, K. Kungla, V. Perrier, S. Radzevičius) and Anticosti (together with A. Desrochers, Z. Taha, V. Perrier, M. Williams, D. Siveter).

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Ana MESTRE (**Argentina**) continues working on biostratigraphy, taxonomy and biofacies of the Lower – Middle Ordovician conodonts from the Precordillera. Also, I'm studying the stratigraphy and evolution of Ordovician and Silurian sedimentary Precordillera basin. I'm still working on taxonomy and evolution of Middle Ordovician conodonts from the Precordillera. All these topics are developed in collaboration with Dr. Susana Heredia. Lower Ordovician conodonts are under study together with the Dra Josefina Carlorosi, through the collaborative project about comparison and correlation of the Floian conodonts from Argentine Precordillera and Eastern Cordillera. Also under my guidance are developed several thesis projects on the study of microfacies and conodont biostratigraphy of the Lower Ordovician from the Precordillera.

Dr. Carlo Corradini is collaborating (2014-2016) with the Micropaleontology Lab on developing Silurian conodonts from the Central Precordillera, as result Lic. María José Gómez started with a Silurian conodont Ph.D project.

Dra. Ana Mestre

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Jim MILLER (United States) continues to work with the Cambrian Stage 10 Working Group on defining the base of the highest stage of the Cambrian. He and a number of co-authors who study conodonts, trilobites, brachiopods, carbon-isotope stratigraphy, and sequence stratigraphy have proposed three potential GSSP sections in the Ibex Area of western Utah, USA. They have proposed to place that boundary at the base of the *Eoconodontus* conodont Zone, at the lowest occurrence of *Eoconodontus notchpeakensis* (Miller, 1969). That conodont is cosmopolitan and is known from a wide spectrum of depositional environments, including abyssal radiolarian cherts (in thin sections) to many carbonate facies to nearshore sandstones.

Jim attended the International Symposium on the Ediacaran–Cambrian Transition in Newfoundland and presented a talk titled: *The Auxiliary Boundary Stratigraphic Section and Point (ASSP) for the base of the Ordovician System at Lawson Cove, Ibex Area, Utah, USA*. He also gave an invited keynote address at the 50th anniversary of the Pander Society in Valencia, Spain. His talk there was: *Upper Cambrian to Lower Ordovician conodont research in southern Laurentia, 1933–2017: Branson & Mehl, Furnish, Müller, Miller, Ethington & Clark, and Repetski*.

James F. Miller

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Tatiana L. MODZALEVSKAYA (Russia) continues to work on the Upper Ordovician-Silurian-Lower Devonian brachiopods and stratigraphy in thematic projects connected with analysis of regional scales of Eurasian Russian regions. My manuscript on Upper Ordovician and Silurian brachiopods from Kotel'ny Island (Novosibirsk Islands, Arctic Russia) will be published at the end of 2018. The paper “Fauna communities, lithology peculiarities and paleogeographical conditions of Ordovician conditions of the Gorny Altai Pritelets Zone” (in Russian) by N.V. Sennikov, O.T. Obut, A.V. Timokhin, T.L. Modzalevskaya, T.V. Gonta & E.V. Lykova will be released in April 2018.

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Stewart MOLYNEUX (UK) is undertaking research in Lower Palaeozoic palynology as an Honorary Research Associate of the British Geological Survey, from which I retired in February 2014. Projects since then have included work on the biostratigraphy and palaeoenvironmental distribution of Cambrian, Ordovician and Silurian acritarchs and chitinozoans of Oman, and on the (Ordovician) provenance of the Lower Palaeozoic sandstone debitage of Stonehenge (with Richard Bevins, National Museum of Wales, Cardiff, and Rob Ixer, UCL Institute of Archaeology, London). Other work in 2017 included contributions to papers on latest Tremadocian chitinozoans from the English Lake District (with Chloé Amberg, Thijs Vandenbroucke and Thomas Servais), a review of the FADs of selected Lower and Middle Ordovician acritarch taxa and their use in correlation (with Thomas Servais, Jun Li, Hendrik Nowak, Claudia Rubinstein, Marco Vecoli, Wen Hui Wang and Kui Yan), a review of the Ordovician acritarch genus *Barakella* (with Kui Yan, Jun Li, Elena Raevskaya and Thomas Servais), and a paper on Late Ordovician to Silurian oceanographic events on the margin of Baltica (with Nicholas Sullivan, David Loydell, Paul Montgomery, Jan Zalasiewicz, Kenneth Ratcliffe, Elaine Campbell, James Griffiths and Gavin Lewis). Future plans include papers on Lower to Middle Ordovician acritarchs from the English Lake District and North Wales.

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Diego Fernando MUÑOZ (Argentina) is a postdoc student at Centro de Investigaciones en Ciencias de la Tierra (CICTERRA - CONICET and Universidad Nacional de Córdoba) on Lower Ordovician deposits of NW Argentina. He was studying Systematics, Taphonomy, Diversity and Palaeogeography of Brachiopods and he's begining to study trace fossils in the same deposits. Muñoz had published with colleagues about linguloidean and orthid brachiopods. A revision of the *Lipanorthis* genus, which is present in Tremadocian and Floian deposits of the Santa Victoria Group, is in the final stages of preparation. More results (Taphonomy, Diversity, Palaeogeography, Ontogeny) from his PhD will be send to publication in the near future. Regarding the ichnology studies, Muñoz has been working in the last year with radial to rossete trace fossils. A first study has been sent recently to a journal for publishing and a second one is close to be send.

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Arne Thorshøj NIELSEN (Denmark): In 2017 I have mainly worked on the Cambro-Ordovician Alum Shale Formation of Scandinavia, notably on Bornholm (Denmark). Wells and outcrops have been correlated based on gamma ray logging. This work will now be extended to include Scania (southern Sweden) and deep wells in western Denmark. Together with students I have also worked on various Ordovician faunas.

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Olga T. OBUT (Russia) continues studies of the Ordovician sedimentary strata of the Altai-Sayan Folded Area and Central Asia focusing on microfossils (radiolarians, conodonts) and biostratigraphy.

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Gladys ORTEGA (Argentina) continues working on taxonomy and biostratigraphy of graptolites from Ordovician successions of western and northwestern Argentina (Precordillera, Famatina System, Cordillera Oriental, Puna). Now she is studying Tremadocian-Floian faunas from the Eastern Cordillera and Puna, and Darriwilian-Sandbian faunas from the Western, Central and Eastern Precordillera, together with colleagues from Argentine and other countries, as well as doctoral students under her supervision.

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Alan OWEN (UK) is editing an issue of *Fossils and Strata* with David Bruton (Oslo) arising from the very successful 6th International Conference on Trilobites and their Relatives held in Tallinn in July 2017. There has been some progress on the description of Upper Ordovician trilobites from South Wales with Lucy McCobb (National Museum of Wales) and Patrick McDermott (St Clears, South Wales), including a paper on the taphonomy of the trilobites in an echinoderm Lagerstätte which is now in press in the Tallinn conference volume. Work on the trilobites of the Tramore Limestone in SE Ireland has been slow but is picking up as is the description, with Keith Ingham (Glasgow), of the trilobites from the Hirnantian of Dob's

Linn and elsewhere in the Scottish Southern Uplands. Further papers on trilobite eyes with Martin Lee (Glasgow) and former research student Clare Torney (now Historic Environment Scotland) are still in preparation.

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Ian PERCIVAL (Australia) will now be retiring from the Geological Survey of New South Wales in July 2018, leaving his palaeontological responsibilities in the capable hands of Yong Yi Zhen. Ian's current research remains focussed on brachiopod research spanning the Cambrian to Silurian, as well as continuing collaboration with Yong Yi Zhen on Ordovician conodonts with several manuscripts at various stages of preparation, submission and revision. In 2017 he participated in the 4th International Conodont Symposium held in Valencia, Spain, where he and Yong Yi organised a themed session on conodonts through the late Cambrian to the end-Ordovician as part of IGCP 653. Ian also attended the Annual Meeting of IGCP 653 held in Yichang, China in October. Initial results from an ongoing collaborative research project between the Geological Surveys of New South Wales and Western Australia, investigating Early and Middle Ordovician conodonts and microbrachiopods from the Canning Basin of WA, were presented at those meetings. During September, Ian hosted Guangxu Wang from the Nanjing Institute of Geology & Palaeontology for a brief but very productive visit to Sydney with several papers either being finalised or commenced. Ian remains in an editorial role for *Australasian Palaeontological Memoirs*, and continues as Secretary for the Subcommission on Ordovician Stratigraphy; editing *Ordovician News* remains his responsibility for the next year or two.

Ian Percival

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Teresa PODHALAŃSKA (Poland) and her group work on the Ordovician and Silurian prospective black shale formations to locate the areas and stratigraphic horizons of the unconventional hydrocarbon resources in Poland. It is a continuous program of recognition, investigation and evaluation of the potential prospective hydrocarbon zones in the lower Paleozoic shales. The results of the first stage of the program are maps of prospective zones in lower Paleozoic and regional correlations between boreholes. I work also on the biostratigraphy, chronostratigraphy and lithostratigraphy of the Ordovician in Poland.

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Leonid E. POPOV (United Kingdom) is presently working together with Robin Cocks on the Arenig (Floian) brachiopods of Wales and completing a large monographic study of the Darriwilian to Sandbian brachiopods from the West Balkhash Region. This work will conclude a comprehensive revision of the Ordovician brachiopods of the Chu-Ili terrane started with publication of the review of the latest Ordovician brachiopods from Chu-Ili by Nikitin et al. in 1980. We also published a substantial review of the Early Palaeozoic palaeogeography and biogeography of Kazakh island arcs and microplates with a special attention to the Late Ordovician biogeography of brachiopods in *Acta Geologica Polonica*. I continue also my work on the Ordovician biostratigraphy and faunas of Iran together with Mansoureh Ghobadi Pour and various aspects of Baltoscandian early Palaeozoic palaeontology, biostratigraphy and palaeoenvironments together with Lars Holmer.

Dr Leonid Popov

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G. Susana DE LA PUENTE (Argentina) continues to focus on chitinozoan studies. I am a scientific researcher for CONICET of Argentina, and a Professor in the Geology Department at the Universidad Nacional del Comahue in Neuquén, Argentina. In the past two years, I have collaborated on Ordovician chitinozoan and geological data for publications from Argentina.

Graciela Susana de la Puente

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Page QUINTON (USA) completed collaborative research with Stephen Leslie, Kenneth MacLeod, Achim Herrmann, and John Haynes to test the early Late Ordovician cool-water carbonate hypotheses. That research resulted in a publication in *Geological Magazine*. I am currently working on a collaborative project (with Kenneth MacLeod, James Miller, and Ray Ethington) using conodont oxygen isotopic trends to constrain Early Ordovician sea surface trends. Once that project is complete I plan to shift my Ordovician related research to questions about the paleoecology of the conodont animal. While the Ordovician remains an

area of active interest, I have also begun to work on a collaborative project with Michael Rygel (SUNY Potsdam) documenting carbon isotopic trends in Mississippian carbonates from Montana.

Page C. Quinton

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Jan Audun RASMUSSEN (Denmark) has moved to a brand new position as a researcher and curator of palaeontology and geology at Museum Mors, Denmark. Although Museum Mors is surrounded by lagerstätte sediments of the Fur Formation that contain extremely well-preserved fossils from the basal Eocene, he continues to spend some of his time on conodonts from Baltica and Greenland (with Svend Stouge and others) and trilobites from Scandinavia (with Bo Rasmussen, Morten Lunde Nielsen and Arne Thorshøj Nielsen) as well as various Cambrian arthropod groups. Disciplines include taxonomy, palaeoecology, palaeoclimatology, evolution/diversity and stratigraphy.

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John E. REPETSKI (USA) reports that his Ordovician work continued to be chiefly on conodont biostratigraphy, CAI and systematics, USA and elsewhere, with numerous colleagues: compiling CAI maps and biostratigraphy of [oil- & gas-rich] black shales in eastern U.S. basins; biostratigraphic support for USGS and other mapping projects; paleobiogeographic studies relating North American Lower Paleozoic faunas to those of other paleocontinents; conodont studies of impact structures; also age-dating of faunas and studies of Cambrian and Ordovician phosphatic problematica.

During 2017, with John Taylor and Justin Strauss, we continued refining the biostratigraphy for the Cambro-Ordovician section in easternmost Alaska using conodonts and trilobites. New data presented at ICOS-4 (Valencia) and GSA (Seattle).

I retired in early January 2018 and ‘morphed’ to Emeritus status with USGS. The plan is to continue running the conodont labs and spend relatively more time in research, hopefully addressing numerous “left over” projects from previous years (=“Lazarus projects”?), and to help curate and protect the conodont legacy of the USGS, e.g., collections, literature, etc., from Ulrich & Bassler through Hass, Huddle, Harris, & Wardlaw.

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John RIVA (Canada) has been helping several people who are working in the Ordovician and Silurian with their graptolites, one recent example being Shunxin Zhang, who is involved in reviewing the Ordovician of the Canadian Arctic. A paper revising and re-interpreting the Upper Ordovician of this vast region has just been accepted by *Canadian Journal of Earth Sciences*.

John Riva

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David ROHR (USA) continues to work with Ordovician gastropods, with studies recently completed on snails from eastern Alaska and western Newfoundland.

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RONG Jiayu (China) is pleased to report that after 10 years effort by himself as editor-in-chief and a dedicated team of associate editors from the Nanjing Institute of Geology & Palaeontology, the book on *Phanerozoic Brachiopod Genera of China* (vols. 1-2. Beijing: Science Press, 1090 pp) was finally published in November 2017.

In addition, I have been studying the *Hirnantia* Fauna of Northern Shan States of Myanmar and have found more than 20 genera from the Burmese material which was collected by our team in January of 2017. Meanwhile, Huang Bing is working with me on the *Hirnantia* Fauna from southwestern Yunnan which belonged to the Sibumasu palaeoplate in the Hirnantian, latest Ordovician. The systematic palaeontology of this fauna will be presented and the diagnostic aspect of the *Hirnantia* fauna of Sibumasu (including Myanmar, Thailand and Yunnan) will be discussed in detail in the two papers.

Rong Jiayu

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Matthew SALTZMAN (USA) continues to work on stable carbon and radiogenic (strontium and neodymium) isotope chemostratigraphy. Work was completed this year on a *Nature Geoscience* paper on Ordovician oxygen and biodiversity with former PhD student Cole Edwards as first author, and co-authors myself, Dana Royer and Dave Fike. I also published the results of an integrated carbon and strontium isotope study of the Clear Spring, Maryland Ordovician section in *Earth and Planetary Science Letters* with Cole as co-author, which shows the MDICE in expanded form in North America. Correlations of the MDICE to Baltoscandia using Sr isotopes integrated with C-isotopes and conodont biostratigraphy

reveal an offset in the magnitude of the C-isotope excursion. Also published this year in *Geology* was a Research Focus paper offering my perspective on the new publication by Swanson-Hysell and Macdonald about the relationship between Appalachian weathering and climate cooling (offering support for the previous work published by Seth Young, Lee Kump, myself and others in *Geology* – Young et al. 2009).

In addition to these published works, another successful oral session was organized at the GSA annual meeting in Seattle by Erik Sperling, Steve Leslie, and myself. The session was titled, "Life and Times in the Early Paleozoic". New graduate student Datu Adiatma from Indonesia continues his study of Ordovician chemostratigraphy in relation to the Knox unconformity interval in the central Appalachians (study of Arc Hollow section in West Virginia and Rocky Gap, Virginia). In the Fall two new students, Chris Conwell and Teresa Avila arrived at Ohio State. They are still formulating ideas but both will utilize the new Triton Thermal Ionization Mass Spectrometer installed at Ohio State (PI Elizabeth Griffith).

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Nikolay V. SENNIKOV (Russia) continues investigation of the geological structure, sedimentary environments and biostratigraphy of the Ordovician strata of the Altai-Sayan Folded Area.

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Thomas SERVAIS (France), research director of the CNRS, is still busy with IGCP 653. He and his colleagues continue looking for the onset of the Great Ordovician Biodiversification Event (GOBE), that is actually not an event, but the sum of many events! A synthetic study on the palaeobiogeography of Ordovician organisms is in construction with Dave Harper (Durham University). Collaboration with several PhD students (and colleagues) include the study of Ordovician acritarchs of Algeria (with Houcine Benachour), Morocco (with Mustapha Akodad), Iran (with Navid Navidi Izad) and Columbia (with Andres Pardo Trujillo). The PhD project of David Kröck (Lille) also includes the study of acritarch ecophenotypism from the classical section of Öland (Sweden), together with colleagues from Lund (Anders Lindskog, Mats Eriksson) and Erlangen (Axel Munnecke). And the search of the first land-plants is programmed with Borja Cascales-Miñana (CNRS, Lille University).

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Lawrence SHERWIN (Australia) remains affiliated with the Geological Survey of New South Wales as an Honorary Research Associate. He is preparing a description of a normalograptid dominated fauna from the Late Ordovician (Bolindian/Katian) Cotton Formation near Forbes and a Late Ordovician (Eastonian/Katian) graptolite fauna from Gunningbland. He is joint author of a publication on Ordovician-Devonian rocks from the Captains Flat district in south east New South Wales.

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Paul SMITH (UK) is working with James Wheeley on oxygen isotopes in Floian conodonts from Cow Head, Newfoundland, as a test of models for conodont ecology and as water mass indicators. He has resumed work with Rob Raine and John Repetski on conodonts from the Durness Group, NW Scotland, and on Ordovician conodont natural assemblages.

Professor Paul Smith

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Alycia L. STIGALL (USA) is studying Late Ordovician brachiopod diversity, ecology, and phylogenetic patterns with an emphasis on clades with North American members. I am particularly interested in teasing apart speciation and biogeographic patterns during the GOBE and Richmondian Invasion intervals. Within that context, I am a co-leader of the IGCP 653 project on the GOBE. I oversee the website for that project, so please email me with any posts, information, or opportunities that you would like to share with the group or your related articles when they are published so I can include them.

Alycia Stigall

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John TAYLOR (USA) saw 2017 pass by with alarming speed as he continued his work on Furongian and Tremadocian faunas from several areas of North America with fellow trilobitologist James Loch, conodont specialists John Repetski and Jim Miller, and sedimentologists Paul Myrow and Justin Strauss.

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Thijs VANDENBROUCKE (Belgium) remains interested in reconstructing the Ordovician palaeoclimate and palaeo-environment, using fossil proxies.

Julie De Weirdt continues her PhD research project with me at UGent, focussing on geochemistry and palynology of the Upper Ordovician - lower Silurian in N. America (in collaboration with Poul Emsbo, USGS, Patrick McLaughlin, Indiana Geol. Survey and André Desrochers, UOttawa). Tim De Backer started his PhD research project and will focus on similar topics in the Devonian. Three MSc students also joined the group and are also working on related topics: Charlotte De Boodt, Pjotr Meyvisch and Yared De Waele, each focussing on the chitinozoans from a single Ordovician core or section in the midcontinent. Cecile-Marie Lissens will work on the chitinozoans from the Katian Penwhapple Formation in the Scottish Girvan District for her Ba project. I also co-supervise Matthias Sinnesael, who continues his PhD project with Philippe Claeys at the VUB (Belgium) on astronomical forcing during the Late Ordovician. With an international team coordinated by Mark Williams (University of Leicester, UK) and funded by the Leverhulme Trust, we have been re-investigating the early Palaeozoic strata of Japan, and our results will soon be published in a special issue of *Island Arc*.

Thijs R. A. Vandenbroucke

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Marco VECOLI (Saudi Arabia): My main activity is concentrated on Early Paleozoic palynostratigraphy (acritarchs, chitinozoans, cryptospores/miospores) in Saudi Arabia in support of Hydrocarbon exploration. I am working together with my colleagues in Saudi Aramco on several projects all over the Arabian Plate in order to document the taxonomy, stratigraphic ranges and palaeoenvironmental distribution of palynomorphs to develop/refine a robust biozonation which can be used to validate key stratigraphic concepts in the various phases of hydrocarbon exploration (conventional and unconventional). These studies also include the optical characterization of kerogen (i.e., palynofacies analysis) and organic maturity assessment. Together with my colleagues, we have developed a high-resolution

palynostratigraphy in the Late Ordovician (Katian-Hirnantian) of Northwestern Saudi Arabia, which is at the base of sequence-stratigraphic models used for predicting hydrocarbon potential of sandstones bodies in the study areas.

I am the coordinator of the “Saudi Aramco – CIMP Joint Project” which gives me the possibility to interact with colleagues from the Academia and stay informed on the latest developments of Paleozoic palynology research.

I am still involved in the investigation of the “Terrestrialization Process”, in an attempt to understand the evolution of earliest terrestrial ecosystem and the origin of land plants, as Ordovician cryptospore assemblages of Saudi Arabia are among the oldest and best preserved assemblages in the world.

Marco Vecoli

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Olev Vinn (Estonia) is working on the palaeontology of problematic calcareous tubeworms from the Palaeozoic (e.g. cornulitids, tentaculitids, microconchids etc.) and evolution of tubeworm biomineralization. I am also working on the evolution of symbiosis, predation, bioerosion and biofouling in the Ordovician of Baltica and beyond. My current research interests include trace fossils.

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Gustavo G. VOLDMAN (Argentina) is working on taxonomy, biostratigraphy, and thermal alteration studies of lower Paleozoic conodonts. He is currently a visiting researcher at the Geology Department of the Oviedo University, where he is collaborating with Susana García-López and Juan Luis Alonso in deciphering the thermal evolution of the Precordillera Basin of Argentina and the Cantabrian Zone of Spain.

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WANG Guangxu (China) continues working on the end-Ordovician mass extinction event. Currently I am concentrating on a refined stratigraphic framework of Hirnantian rocks in South China, where superb record of glacioeustatic sea-level fluctuations and benthic faunal turnover has been confirmed in recent years. The new correlation provides new insights into evolutionary patterns of shelly faunas through this time interval. Some of these results have already been published. I am also working on Upper Ordovician corals from the Trelawney beds and Malachis Hill Formation of central New South Wales, Australia, in collaboration with Ian Percival and Yong Yi Zhen (Geological Survey of NSW).

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WANG Xiaofeng (China) in 2017 mainly conducted two research projects. One was convening the Dayangcha International Workshop on the Cambrian-Ordovician Boundary, China and field trips held **in 20th-25th**, September 2017, Changchun, NE China, together with Svend Stouge, Jorg Maletz, Wang Chuanshang, Yan Chunbo etc

Another project, along with Jorg Maletz and Wang Chuanshang, was dealing with the late Ordovician to the lower Silurian black shale gas and its correlation with the graptolite zones between ground exposed section and underground drillcore samples on the basis of the past long-term research in the Yangtze Gorges area and the Shenlongjia area, west Hubei. A preliminary result is about to be published.

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Charles WELLMAN (UK) continues his research on early land plants, including spores and fragments from the Ordovician. He is currently involved in collaborative work on Ordovician spore assemblages from Oman and Saudi Arabia. He is also working on the enigmatic palynomorph *Moyeria*, that is purported to be a euglenid, from Ordovician terrestrial deposits from North Wales.

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David Wright (USA) is new to the *Ordovician News* list. He is based at the National Museum of Natural History at the Smithsonian Institution, where he studies echinoderms. Recently he has collaborated with Ursula Toom (Estonia) working on Ordovician crinoids of the Baltic region.

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Rongchang WU (China) is working on Ordovician stratigraphy and conodonts. Currently, my research is focused on the Early and Middle Ordovician conodonts and carbon chemostratigraphy in South China. Another project has been focusing on the Ordovician-Silurian palaeoclimatic and palaeoenvironmental changes by use of conodont apatite oxygen isotope, carbon isotope and microfacies analysis.

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ZHAN Renbin (China) is working on the major biotic events and their dynamics happened in Ordovician and Silurian, i.e. the Great Ordovician Biodiversification Event (GOBE) and the end-Ordovician mass extinction and the survival and recovery afterwards. Some new progresses had been achieved in 2017, e.g. the discovery of the *Foliomena* fauna from the Zatupo Formation (lower Katian) in the Querqueke Mountains of Kuruktag region, northeastern Taklamakan Desert, Tarim. Such tiny *Foliomena* fauna (with only 5 brachiopod genera and each of them around 1-2 mm or even smaller in size) indicates the relationship between Tarim and South China palaeoplates. Together with tens of my colleagues and with the help from many of my domestic and international friends, I have finished another major work in 2017: we have finished compiling and published the <Phanerozoic Brachiopod Genera of China>. Such huge monograph contains two volumes, 9 chapters and 1096 pages. Being one of the associate editors-in-chief, together with Prof. Rong Jiayu, I am in charge of the chapter Ordovician as well as some of the work dealing with the entire monograph. Besides, as the vice chair of the organization committee, I also helped Zhang Yuandong organize the annual meeting for the IGCP project 653 in Yichang China during the early to middle October 2017, which was a great success.

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Shunxin ZHANG (Canada) has carried out the following projects in the Arctic area in 2017:

1) the Late Ordovician biostratigraphy on Akpatok Island in Ungava Bay, in which she has used her field collection in 2015 to try to improve the Upper Ordovician stratigraphy and biostratigraphy on Akpatok Island; 2) the Late Ordovician–Early Silurian biostratigraphy, bio-events, and sea-level changes on Cornwallis Island by using the conodont collection of D.M.S. Jowett and C.R Barnes; 3) the Late Ordovician–Early Silurian conodonts from carbonate xenoliths preserved in the kimberlites on the Hall Peninsula, southern Baffin Island to understand the kimberlite emplacement history; 4) field work on the Upper Ordovician stratigraphy and biostratigraphy on Boothia Peninsula in order to establish a conodont stratigraphic framework; and 5) the age and stratigraphic position of the Late Ordovician petroleum source rocks in Hudson Bay, Foxe Basin and Hudson Strait areas by using her graptolite collections over that last 10 years.

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Yuandong ZHANG (China) is continuously working on:

(1) An integrated stratigraphy of graptolite, conodont, chitinozoan, acritarch, radiolarians, and carbon isotope chemostratigraphy, and cyclostratigraphy of the Ordovician in China (a NSFC grant and a grant from the Ministry of Science and Technology of China, 2014-2019). This work aims at a refined stratigraphic correlation of two critical transitions (late Darriwilian to early Sandbian, and late Katian to Hirnantian) in South China and Tarim blocks. The integrated graptolite and conodont biostratigraphy has been based on an international cooperation with Zhen Yongyi (Australia) and Stig Bergström (USA) and Dan Goldman (USA), while the chemostratigraphic work has been conducted with Axel Munnecke (Germany) and the cyclostratigraphy with specialists from University of Geosciences in Beijing.

(2) Geological characteristics of Palaeozoic black shales in China. This has been the main tasks of a project supported by the Chinese Academy of Sciences (2014-2018) and one of the recently launched National Science and Technology Major Projects (2017-2019). As results of the projects, over 5000 m long of drill cores of the most potential gas shale in China have been accumulated in the past years. In 2017, four wells, i.e. the Jiache-1 (Early Cambrian), the Huangge-1, the Shuanghe-1, and the Yijie-1 (Upper Cambrian to Lower Silurian) were drilled and continuous cores of the targeted intervals have been obtained for

multi-disciplinary analysis. The cores are opened to global scientists for study and sampling, and from which some samples have been collected for geochemical and microfacies analysis. Those who are interested in this work or aim at some other related approaches, please contact the project leader (Zhang Yuandong).

(3) Hirnantian Conservat-Lagerstätte in Anji (Anji Fauna), Zhejiang Province, in cooperation with Joe Botting and Lucy Muir of UK, financially supported by President's International Fellowship Initiatives (PIFI) program and a recently approved NSFC grant. This sponge-dominated lagerstätte, discovered in late 2012, is typified by the abundant and highly diverse articulate sponges (over 75 species) often with soft tissues, in association of graptolites, nautiloids, arthropods, echinoderms, etc. The Anji Fauna is preserved within a 9-meter-thick black shales, underlain and overlain by siltstone and sandstones, in the Wenchang Formation of clastic facies. Up to date, over 5000 specimens have been collected from seven sections in the Anji County. As constrained by the associated graptolites, the fauna is of latest Hirnantian age. A preliminary study indicates that this extraordinarily diverse, sponge-dominated community thrived immediately after the Hirnantian mass extinction in South China.

(4) IGCP Project 653 "Onset of the GOBE". Following the schedules of the project in 2017, we organized successfully a workshop in Nanjing (May, 2017) on "Macroevolution of Early Palaeozoic Faunas and the Onset of the GOBE" and the annual meeting in Yichang on "Filling the gap between the Cambrian Explosion and the GOBE" (October, 2017).

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Yong Yi ZHEN (Australia) continues work on various projects in research of Ordovician conodonts and their biostratigraphic and palaeobiogeographic applications. During 2017, he attended 4th International Conodont Symposium in Valencia, Spain and the pre-conference field excursion in Spanish Pyrenees and post-conference field excursion in Prague Synform and Carnic Alps in June and July, and the IGCP653 Annual Meeting in Yichang and post-conference excursion in central China (Hubei and Hunan provinces) in October. Jointly with colleagues from Australia, China and South Korea he presented four talks and two posters at these meetings, focusing on Ordovician conodont biostratigraphy, palaeogeography, palaeobiogeography, and integration with CA-IDTIMS geochronology. Prior to the IGCP653 Annual Meeting in Yichang, he also visited the Nanjing Institute of Geology and Palaeontology in September, and worked on a number of projects with colleagues there.

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ORDOVICIAN RESEARCH PUBLICATIONS 2017-early 2018

[note that while the following compilation predominantly lists papers concerned solely with Ordovician topics, for completeness and comparison it also includes some publications dealing with studies of Furongian and Llandovery biota and stratigraphy]

A

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