

# SILURIAN TIMES

NEWSLETTER OF  
THE INTERNATIONAL SUBCOMMISSION ON SILURIAN STRATIGRAPHY (ISSS)  
(INTERNATIONAL COMMISSION ON STRATIGRAPHY, ICS)

**No. 21 (for 2013)**

Edited by ZHAN Renbin



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## **Cover photo**

Group photo of the Lund meeting sponsored by the Lund University as a joint meeting of IGCP 591, ISSS, ISOS and ISCS. Nearly 200 participants from 23 countries and regions took part in the 3-day indoor academic exchanges (103 oral and over 70 poster presentations) and a wonderful field excursion to southwestern Sweden and the Oslo region Norway.

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# SILURIAN TIMES Number 21 (for 2013)

## Chairman's Corner

Dear Silurian Colleagues,

2013 was an active year for the ISSS. Our joint meeting with the Cambrian and Ordovician subcommissions and IGCP 591 in Lund, Sweden June 9-19, 2013, was an outstanding success. I wish to thank Mikael Calner, Oliver Lehnert, Per Ahlberg and their team for organizing and hosting this excellent meeting and its associated field trip. A conference volume of papers from this meeting is being published in *GFF* and many of these papers are already available online, thanks again to the efforts of Mikael Calner and his team of guest associate editors and, of course, the authors.

Through our association with IGCP 519, Silurian Subcommittee members participated in several other conferences in 2013:

- STRATI 2013, 1st International Congress on Stratigraphy, Lisbon, Portugal, July 3-5, 2013, IGCP 591 project workshop at STRATI 2013: Chemostratigraphy versus biostratigraphy: reuniting micropalaeontology and geochemistry
- 3rd International Conodont Symposium and IGCP 591 regional field meeting, Mendoza, Argentina, July 15-19, 2013
- IGCP 591 session at GSA Meeting, Denver, United States, 27–30 October 2013, Biological and environmental feedbacks in the colonization of the water column (T236)

The planned highlight of ISSS activities for 2014 will be the field meeting in Kunming, China, once again held jointly with IGCP 519 and the Cambrian and Ordovician Subcommissions. Its formal theme will be 'Global Events and their relationships in the Early to Middle Paleozoic'. The indoor meeting is scheduled for August 13-15, 2014, which will include two days of indoor scientific sessions for delegates to present their most recent research, and a day trip to the world-renowned Chengjiang Biota site, about 60 km east of Kunming. The scientific sessions in Kunming will be followed by a field excursion from northeastern Yunnan (western South China paleoplate) to western Yunnan (Indochina and Sibumasu paleoplates).

In case you have not received it, the second circular for the Kunming meeting can be found at: <http://www.igcp591.org/meetings.php>, and at the websites of ICS, ISSS, ISOS and ISCS.

Prior to the Kunming meeting, we are planning a trip for the working group restudying the Base of Aeronian, as well as ISSS voting members, to visit a potential GSSP candidate section in western Hubei Province (central China), in the Shennongjia District. This area also has a potential GSSP candidate section for the Base of Telychian and the trip will visit both of those sections. We have applied to ICS for funds to support this trip. There will also be a workshop at the Kunming meeting to present results of study of GSSP candidate sections for these boundaries and discuss these results.

This year, in addition to the Kunming meeting, Silurian Subcommittee members will be participating in the IGCP 591 4th Annual Meeting, Estonia, June 10-19, 2014: Evolutionary paleoecology and paleobiogeography.

I would also like to update you on the plans for a Silurian meeting in 2015. At the ISSS business meeting in Lund, members voted unanimously in favour of holding a Silurian Symposium in Ottawa in 2015, in association with the IGCP 591 Annual Meeting, including a field trip to Anticosti Island. Since then, André Desrochers, in consultation with me, Jisuo Jin and Aicha Achab, has been working hard to get this meeting and trip organized, given the logistical difficulties involved in launching a conference field trip to Anticosti. Our plans have now evolved and we are pleased to present our revised plans to hold the 5<sup>th</sup> International Symposium on the Silurian System and 5<sup>th</sup> Annual Meeting of IGCP 591 in Quebec City, July 8-10, 2015, with a pre-meeting field trip to visit excellent Silurian and other early-mid-Paleozoic exposures in Gaspé, Quebec, and post-conference excursions to Anticosti and the St. Lawrence Lowlands. There will also be a short-course on sequence-stratigraphic analysis of black shales. The first circular for this meeting is included in this newsletter. We are planning publication of the conference proceedings in a special issue of Canadian Journal of Earth Sciences.

The move to Quebec City was to partly facilitate the linkages with the various field trips, and particularly to reduce the costs of those linkages. We thank Aicha Achab and her group at INRS-ETE for their willingness to take on the roles related to local organization.

I would also like to encourage ISSS members to continue research efforts toward a better understanding and revision of our Silurian GSSPs. I think that we built a strong momentum of interest in this at the Ludlow meeting and I and the ICS executive would like to see this momentum continue toward successful updating of our understanding and definitions of our series and stage boundaries. A working group for the Base of the Aeronian, being led by Petr Štorch has been active. There were several talks and posters dealing with the restudy of the Base of Aeronian at the Lund meeting and a full workshop for discussion of this boundary and potential new candidate sections is planned for the meeting in Kunming in August, as noted above. At that same meeting I will be proposing creation of a working group to restudy the Base of Telychian and we will be presenting information about a potential candidate section for that boundary in China. Let me know if you are interested in working on this boundary. If you are interested in participating in work on the Base of Aeronian you should contact Petr Štorch. Of course, any advances in the work on any of the other problematic boundaries would also be welcome. We have limited funding from the ICS to assist with work on our GSSPs so if you are interested, please contact me.

Looking forward to seeing you in Kunming.

Michael J. Melchin  
Chair, Subcommittee on Silurian Stratigraphy

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**International Commission on Stratigraphy  
Subcommission on Silurian Stratigraphy**

**ANNUAL REPORT 2013**

**1. TITLE OF CONSTITUENT BODY**

**International Subcommission on Silurian Stratigraphy (ISSS)**

*Submitted by:*

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**2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY**

**Mission statement**

The objectives of the Subcommission relate to three main aspects of IUGS policy:

- (1) The development of an internationally agreed scale of chronostratigraphic units, fully defined by GSSPs at Series and Stage levels and related to a hierarchy of units (Substages, Standard Zones, Subzones etc.) to maximize relative time resolution within the Silurian Period;
- (2) Establishment of frameworks and mechanisms to encourage international collaboration in understanding the evolution of the Earth during the Silurian Period;
- (3) Working towards an international policy concerning conservation of geologically important sites (such as GSSPs, global and regional stratotype sections, etc.).

**Goals**

- Rationalization of global chronostratigraphical classification.
- Intercalibration of fossil biostratigraphies, integrated zonations, and recognition of global datums.
- Establishment of magneto- and chemo-stratigraphic scales.
- Redefinition of stage boundaries and restudy of global stratotype sections.
- Correlation of Silurian rock successions and events, including marine and non-marine.

**3a. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2013**

Silurian Times No 20 was edited by the outgoing secretary, Jacques Verniers, in March, 2013, posted on the web site for the ISSS, and circulated as an email attachment to all titular, corresponding and interested members of the Subcommission. It contained the

reports on previous meetings, announcement of upcoming meetings and publications, and the latest news and recent publications on Silurian research.

The ISSS Website was moved to a more secure server and also extensively redesigned by our webmaster, Junxuan Fan. The new web site can be found at:

<http://silurian.stratigraphy.org/>. This page is still in the process of being populated and updated in terms of content.

A major Silurian meeting was held in Lund, Sweden, in June 2013, in association with IGCP 591, as well as the Ordovician and Cambrian subcommissions. The principal conference organizers were Mikael Calner and Oliver Lehnert. An excellent field trip visited localities in SE Sweden and the Oslo region of Norway.

Work proceeds on the restudy of potential GSSP candidate sections for the Base of Wenlock and the Base of Aeronian. Four papers were presented at the Silurian meeting in Lund pertaining to recent progress related to these boundaries.

The ISSS is a key partner in IGCP 591 – The Early to Middle Paleozoic Revolution. The following additional IGCP 591 meetings occurred in 2013, involving the ISSS members of IGCP 591:

- 3rd International Conodont Symposium and IGCP 591 regional field meeting, Mendoza, Argentina, July 15-19, 2013, Organized by Guillermo L. Albanesi and colleagues.
- STRATI 2013, 1st International Congress on Stratigraphy, Lisbon, Portugal, July 3-5, 2013
- IGCP 591 project workshop at STRATI 2013: Chemostratigraphy versus biostratigraphy: reuniting micropalaeontology and geochemistry.
- IGCP 591 session at GSA Meeting, Denver, United States, 27–30 October 2013, Biological and environmental feedbacks in the colonization of the water column (T236)

### **3b. ISSS MAJOR PUBLICATIONS IN 2013**

Lindskog, A. & Mehlqvist, K., 2013: Proceedings of the 3rd IGCP 591 Annual Meeting– Lund, Sweden, 9–19 June 2013. Lund University. 368 pp.

Holloway, D.J. & Laurie, J.R., 2013. Siluro-Devonian Studies 2. Memoirs of the Australasian Association of Palaeontologists 44, 207 pp.

A volume of short papers from the Lund meeting is in preparation.

### **3c. CHIEF PROBLEMS ENCOUNTERED IN 2013**

There remains the old problem related to difficulties in obtaining grants for research on stratigraphical topics and travel to meetings of Subcommittee. Applications are often given low priority by national grant-awarding agencies.

Last year it was reported that a potential GSSP candidate section for the Base of Wenlock, Trannon River, Wales, was under study by David Loydell and a student of his.

Unfortunately, the boundary interval at that section has been proven to be inaccessible for the past three years as a result of high water levels. As a result, Dr. Loydell has shifted some of his research interest to study of a potential mid-Llandovery GSSP section in Spain. We continue to search for potentially suitable GSSP candidate sections for the base of the Wenlock.

#### **4. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR (2014)**

Regular updating the website for Silurian Subcommittee. We gratefully acknowledge the support of the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences for this work.

Publication of Silurian Times Newsletter 21 (scheduled to be out by the end of March 2014)

The ISSS will be co-sponsoring the IGCP 591 regional meeting in Kunming, China, in August, 2014. There will be several very important ISSS activities at this conference:

- A workshop on the Rhuddanian-Aeronian Boundary Working Group. At this workshop, it is planned that presentations will be made on the results of current research on R-A boundary candidate sections in Wales, Bohemia, China, and possibly Spain. Based on these results, the working group will consider criteria for definition of the boundary and further work that is required. This group also plans a meeting in Europe in 2015 to visit the European sections and then proceed to decision-making process.
- The Rhuddanian-Aeronian Boundary Working Group is discussing a proposal to implement a new, innovative approach to consideration of GSSP candidate sections and improving correlation among sections. It is proposed that as the data from each candidate section are assembled, all of the biostratigraphic, chemostratigraphic, and other data useful for correlation, will be assembled into a database (the Geobiodiversity Database), along with data from other sections, globally. These data will then be studied using quantitative correlation methods, such as CONOP9 and Horizon Annealing. These methods allow for simultaneous correlation of many sections using a range of different types of stratigraphic data, producing a high-resolution correlation between all sections. This approach permits integration of data from different fossil groups that only rarely co-occur, as well as chemo- and lithostratigraphic and radiometric data, thus permitting correlation between different facies and paleogeographic regions. They also permit quantitative assessment of the precision with which particular levels at any given section can be placed within the composite succession. We feel that this may be a good approach to find a GSSP level that can be correlated globally with the highest level of precision and confidence.
- We are planning a field trip to a locality in the western Hubei Province that is being proposed as a potential GSSP candidate section for both the base of the Aeronian and the base of the Telychian. It will probably be arranged just before the Kunming meeting next August, and will take about 4 days. We hope to secure funding from ICS through a separate grant proposal that will help make it possible for all of the members of the R-A boundary working group to participate in this field trip.



- The ISSS proposes to establish a working group for restudy of the Aeronian-Telychian Boundary.

The ISSS is a key partner in IGCP 591 – The Early to Middle Paleozoic Revolution. The planned milestone for IGCP 591 for 2014 is “Biological and chemical indicators of climate events”. Besides the Kunming meeting, noted above, the main annual meeting of IGCP 591 for 2014 will take place in June, in Tartu, Estonia.

ISSS members continue to collaborate on the process of full integration of the various regional and global biostratigraphic, lithostratigraphic, sequence stratigraphic, and chemostratigraphic scales for the entire Silurian. This integration is essential for refinement of the Silurian time scale and high-resolution correlation of Silurian events. In addition, some ISSS members are focusing on generation of new, high-resolution radiometric dates that are well constrained within the Silurian time scale. This is essential to achieve better calibration of time scale, which has been a serious weakness for the Silurian System.

## 5. SUMMARY OF EXPENDITURES IN 2013

### Income

Carried forward from 2012	US\$4,000
ICS Allocation	US\$3,333
<u>Total</u>	<u>US\$7,333</u>

### Expenditures

Expenses for ISSS Chair to attend ISSS Meeting, Lund	US\$2,500
Expenses, ISSS Chair to travel to China to study GSSP candidate section for base of Aeronian and Base of Telychian	US\$1,500
Bank fees for ISSS account	US\$14
<u>Total</u>	<u>US\$4,014</u>

<b>Balance</b>	US\$3319
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## 6. BUDGET AND ICS COMPONENT FOR 2014

Contribution toward transportation, accommodation and registration of the Chair and Vice-Chair, to participate in the field meeting of the the ISSS in China US\$4000

Financial support for other members studying potential GSSP candidate sections for the base of Aeronian and base of Telychian (includes six other researchers). US\$12,000

The ISSS has done pioneering work in the area of restudy of previously ratified GSSPs. Recent work has shown that many of the Silurian GSSPs, all of which were ratified in the mid-1980s, have serious deficiencies in terms of their potential use as benchmarks for high-resolution global correlation. Two working groups are currently focusing on restudy of the base of the Aeronian Stage (R-A boundary) and the base of the Wenlock Series. Future working groups will study the other GSSPs of Silurian System. The money carried over from 2013 combined with our request will be used to help fund the ISSS Chair and

Vice-chair and other members of the R-A boundary working group travel to China for the 2014 meeting in Kunming. The funds will be particularly directed at young members of the working group, and members who have no access to other funds for international travel. The ISSS will be submitting a separate proposal for funds to support the costs of the R-A Boundary Working Group field trip within China, to the western Hubei Province, to study the potential GSSP candidate sections there.

<u>Total proposed budget for 2014</u>	<u>US\$16,000</u>
<u>Balance forward from 2013</u>	<u>US\$3319</u>
<b>Total requested from ICS for 2014</b>	<b>US\$12,681</b>

### **Potential funding sources outside IUGS**

Most of the remaining costs of Working Group newsletter, meetings and other activities will be met by local support from host institutions and participation by individuals through national research grants and travel grants from their own authorities. However, such sources of funding are getting increasingly difficult to secure, particularly in North America and Europe.

## **7. CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (2009-2013)**

Over the period of 2009-2013 the Subcommittee on Silurian Stratigraphy was active in several respects. The most recent of these activities are summarized above under the heading of “CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2013”. In addition to those, the following are the most significant accomplishments of the past five years.

ISSS members organized or participated in 15 conferences related to IGCP 503 and 591. ISSS members were also leaders in the planning and are actually leading the conduction of IGCP 591.

The Silurian Field Meeting , called “*Time and life in the Silurian: a multidisciplinary approach*” was held between 4-11 June 2009 in Sardinia, Italy. The meeting (organized by Petr Storch, Enrico Serpagli and Annalisa Ferretti) consisted of three days of scientific communications followed by a four days field trip in southern Sardinia. More than fifty scientists from fifteen countries attended the meeting. The scientific sessions were filled with talks dealing on any aspect of Silurian stratigraphy and palaeontology; the poster session included 18 posters.

In connection with the meeting, three special volumes were published in the series of the *Rendiconti della Società Paleontologica Italiana*: **A.** The Silurian of Sardinia - Corradini, C., Ferretti, A. and Storch, P. (eds), 170 pp., which was dedicated to Prof. Enrico Serpagli. **B.** Time and Life in the Silurian: a multidisciplinary approach - Field Trip Guidebook - Corradini, C., Ferretti, A. and Storch, P. (eds), 96 pp. **C.** Time and Life in the Silurian: a multidisciplinary approach - Abstracts - Corriga, M.G. and Piras, S. The volume includes the forty-seven abstract of the talk or posters presented at the meeting. The pdf of the volume is available in the meeting web page ([www.unica.it/silurian2009](http://www.unica.it/silurian2009)).

A proceedings volume from this conference was published in a special issue of *Bollettino of the Società Paleontologica Italiana in 2010*.

All three of the ISSS executive participated in the ICS Workshop “The GSSP Concept”, in

Prague, May 30-June 3, 2010. The ISSS chair made a brief presentation on the current state of understanding and some of the revisions and remaining problems associated with several of the Silurian GSSPs.

The International Symposium on the Silurian System “Siluria Revisited” took place July 9-15, 2011, in Ludlow, England. There were two days of oral presentations focusing on a wide range of Silurian topics and many of the presentations were also contributions to IGCP 591. Of particular significance were the pre- and post meeting field trips that toured the type areas for the Llandovery Series in Wales and the Wenlock and Ludlow series in England. These trips gave the opportunity to a new generation of Silurian researchers to view the GSSPs for all of the Llandovery, Wenlock and Ludlow series and stages (except the base of the Llandovery, which is in Scotland). This meeting resulted in the publication of a program and abstracts volume, a field guide, which includes many new observations and interpretations of the localities, including the GSSPs visited. This field guide is available for download at: <http://www.igcp591.org/books.php>. In addition, a conference volume of submitted papers, to be published as a special issue of Bulletin of Geosciences, is in progress.

The ISSS Chair continued his interaction with scientists at the British Geological Survey in the development of collaborative research between BGS scientists and members of the Silurian Subcommission, particularly focusing on the restudy of the type areas for the GSSPs for the Silurian, all of which occur in the UK except for the base of the Pridoli. Such work is forming the basis of future refinement of the definition and correlation of the GSSP, particularly those in Wales and the Welsh borders, including the bases of Aeronian, Telychian, Wenlock (Sheinwoodian), Homerian, Ludlow (Gorstian), and Ludfordian. Each of these GSSPs can be shown to be in need of refinement or redefinition and these features were highlighted during the Siluria Revisited field trips. New research by the BGS has resulted in considerable refinement of the stratigraphic and structural framework for this region and this will form an important basis for future deliberations regarding the merits of these GSSPs and their possible need for reconsideration. As a result, a number of the BGS researchers were key participants and co-leaders of the Siluria Revisited field trips and made substantial contributions to the field guide for that trip. The results of some of the research in the type Llandovery area were recently published in: Jeremy R. Davies, Richard A. Waters, Stewart G. Molyneux, Mark Williams, Jan A. Zalasiewicz, Thijs R.A. Vandenbroucke and Jacques Verniers, 2012. A revised sedimentary and biostratigraphical architecture for the Type Llandovery area, Central Wales. Geological Magazine, available on CJO doi:10.1017/S0016756812000337

As part of the ongoing efforts to resolve this problem of the GSSP for the Base of the Wenlock the ISSS voting member Dr. P. Štorch has been working with Chinese researchers on a Llandovery-Wenlock boundary section in Ziyang, China. The results of this and other recent investigations have shown that we are still lacking a strong candidate for a new GSSP for the Base of Wenlock. As noted above, new research on this problem is under way.

It was decided at the business meeting of the ISSS in Ludlow to strike a new stage boundary working group to restudy the base of the Aeronian Stage. This was decided after the field trip visit to the current GSSP and extensive discussion at the business meeting. Dr. Petr Štorch has agreed to lead this working group.

Five of the ISSS Titular Members, including the Chair and Vice-Chair, were co-authors on a paper published in *Lethaia* in 2011, outlining a proposed, informal subdivision of the Silurian time scale into stage slices. The paper also presented a generalized carbon isotope curve for the Silurian as well as an updated proposed correlation of the North American regional stages with the global standard scale.

The ISSS Chair, with several colleagues, prepared the chapter on the Silurian System for the 2012 edition of *The Geologic Time Scale*. This chapter is now published.

Publication of a special volume of *Proceedings of the Yorkshire Geological Society* honouring the lifetime contributions of Dr. Barrie Rickards, a well-known and respected Ordovician-Silurian graptolite paleontologist and stratigrapher was published in November, 2011. Invited papers focus on current research in graptolites, including contributions from Silurian graptolite researchers.

A thematic volume of twelve papers emerging from the ISSS field meeting of 2011 was published in 2012 in the *Bulletin of Geosciences*, edited by David Loydell.

IGCP 591 held a special session at the International Geological Congress in Brisbane, Australia in August, 2012, co-organized by ISSS member Kathleen Histon and ISSS chair, Mike Melchin. IGCP 591 also held its annual meeting in July in Cincinnati, co-organized by ISSS members Carl Brett and Brad Cramer. Special symposium volumes are in preparation for both conferences.

## **8. OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2014-2017)**

In addition to the points listed above as “WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR”, many of which will extend into future years, the priorities (not in order of merit) proposed for the Silurian Subcommittee for the next four years include:

Research is currently under way or planned to begin in 2014 by ISSS members, colleagues and students on base of Aeronian, Telychian and Sheinwoodian sections in UK, Czech Republic, Spain and China, as part of the process of selection of possible new GSSP sections.

A field meeting is being planned for the summer of 2015 in Europe, possibly in association with the International Congress on Stratigraphic in Graz, Austria. This field meeting will be a workshop to visit and discuss GSSP candidate section in Europe. We hope to be in a position to vote on proposals for the Base of the Aeronian shortly after that meeting.

Silurian Symposium for 2015: Ottawa, Canada, July, 2015, final dates TBA. This meeting will be held in association with the annual meeting of IGCP 591 and the International Subcommittee on Cambrian Stratigraphy. Planning is under way for the conference sessions, a Silurian field trip to Anticosti Island and a published volume of papers. Discussions with *Canadian Journal of Earth Sciences* are under way for the conference volume.

The research objectives for IGCP Project 591 are to investigate the biological, chemical and physical evolution of the ocean-atmosphere-biosphere system during this dynamic

interval of Earth history by addressing in detail the relationships between climate, sea level, tectonics, biology, oceanography, volcanism, and the stratigraphic record of Early to Middle Paleozoic global planetary change. This project is being conducted in collaboration with the International Subcommissions on Ordovician, Silurian, and Devonian Stratigraphy (SOS, SSS, SDS), and will be accomplished in successive steps over the five-year duration of the project (2011-2015).

- 2011 – Improving global biostratigraphic and chronostratigraphic correlation
- 2012 – Reconstructing global sea levels, sequence stratigraphy and paleogeography
- 2013 – Identifying biological, chemical and physical indicators of global planetary change
- 2014 – Addressing evolutionary paleoecology, paleobiodiversity and paleobiogeography
- 2015 – Oceanographic and climate modeling of Early to Middle Paleozoic events

#### **Upcoming IGCP 591 meetings include:**

Evolutionary paleoecology and paleobiogeography, IGCP 591 Annual Meeting, Estonia, June 10-19, 2014

IGCP 591 Field Workshop, Kunming, China, August 12-22, 2014. This will also be a Field Meeting of ISSS.

IGCP 591 Annual Meeting, Ottawa, Canada, July, 2015

IGCP 591 Annual Meeting, Lille, France, 2016.

We are working on the development of databases which would bring together and make available information from all sources associated with the Silurian researchers. One such database has been created at the Nanjing Institute of Geology and Palaeontology by Dr. Fan Junxuan, who is also Webmaster for ISSS. This database, called Geobiodiversity Database (GBDB) is currently in the advanced development stage.

## **9. ORGANIZATION**

The ISSS is a Subcommission of the Commission on Stratigraphy. The Subcommission is organized by an Executive consisting of Chairman, Vice-Chairman and Secretary, who are all Voting Members of the Subcommission. In the Subcommission elected for 2012-2016 there are twelve other Voting Members. The network of Corresponding Members has first of all a responsibility for communication in both directions between the Subcommission and researchers on Silurian topics in their region. Secondly they represent a broad spectrum of specialized stratigraphical disciplines from those countries or regions where Silurian rocks are extensively studied in relation to fundamental and/or applied geological research.

Current research activities and future plans are communicated through publication of an annual ISSS newsletter, *Silurian Times*, distributed by both email attachment and as a web release.

**Websites:** <http://www.silurian.cn/home.asp> contains newsletters, meeting announcements, discussion posting-boards, bibliography of Silurian articles, links to related sites, and other information.

### ***Subcommission officers***

**Chairman:** Michael J. Melchin, Department of Earth Sciences, St. Francis Xavier University, Antigonish, NS, Canada, B2G 2W5; [mmelchin@stfx.ca](mailto:mmelchin@stfx.ca).

**Vice Chairman:** Peep Männik, Institute of Geology at Tallinn University of Technology Ehitajate tee 5, 19086 Tallinn, Estonia; [peep.mannik@ttu.ee](mailto:peep.mannik@ttu.ee).

**Secretary:** Renbin Zhan, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, China, [rbzhan@nigpas.ac.cn](mailto:rbzhan@nigpas.ac.cn)

### ***List of Voting Members in 2013***

- A. I. Antoshkina, Syktyvkar, Russia, [antoshkina@geo.komisc.ru](mailto:antoshkina@geo.komisc.ru)
- C.E. Brett, Cincinnati, USA, [brettce@email.uc.edu](mailto:brettce@email.uc.edu)
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- J. Verniers, Ghent, Belgium, [Jacques.Verniers@ugent.be](mailto:Jacques.Verniers@ugent.be)
- Wang Yi, Nanjing, China, [yiwang@nigpas.ac.cn](mailto:yiwang@nigpas.ac.cn)
- Zhan Renbin, Nanjing, China, [rbzhan@nigpas.ac.cn](mailto:rbzhan@nigpas.ac.cn)

### **Working Task Groups**

Base of Wenlock GSSP Restudy – Chair - David Loydell

Base of Aeronian GSSP Restudy – Chair - Petr Štorch

### **Interfaces with Other International Projects**

Collaboration on IGCP Project 591, “The Early to Middle Paleozoic Revolution”, which was approved and began its work in 2011.

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# REPORTS OF ACTIVITIES IN 2013

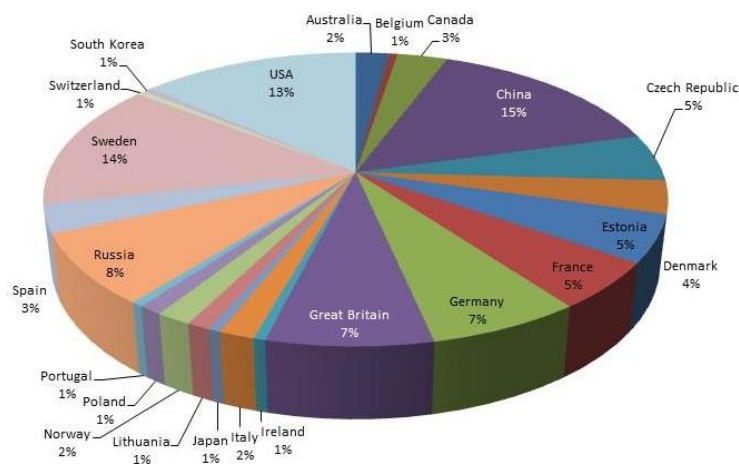
## 1. IGCP 591 Annual Meeting in Lund 2013 jointly with ISSS, ISOS and ISCS

by Mikael CALNER

The 3<sup>rd</sup> Annual Meeting of IGCP 591 was hosted by Department of Geology, Lund University in June 2013 and chaired by Mikael Calner, Oliver Lehnert and Per Ahlberg. We had great help from a very professional and responsive organization committee that included interested geologists from Lund as well as of several students from the department. The meeting was sponsored by the Swedish Research Council, the Swedish Geological Survey and the city of Lund.

The Lund meeting was unique in assembling all three Lower Palaeozoic subcommissions for the first time in many years. We hope that many took the chance to initiate ‘cross-disciplinary’ projects or just get inspired by the multi-topic research environment that flourished for a few days in June. The meeting attracted almost 200 participants, including spouses and the organization committee, from 23 countries ([http://igcp591.org/media/lund2013\\_group.jpg](http://igcp591.org/media/lund2013_group.jpg)). Very positive was the large number of PhD students – more than 30 young and talented researchers attended the conference! The program included more than 100 oral presentations and about 70 poster presentations. The meeting included three days of scientific sessions in Lund followed by a post-conference excursion to Lower Palaeozoic key localities in southern Sweden and the Oslo Region of Norway.

Both the abstract (Lindskog and Mehlqvist, 2013) and post-conference excursion proceedings (Calner *et al.*, 2013) are available on the IGCP 591 website (links below). The conference also publish a Special Issue named ‘*Early Palaeozoic Global Change*’ in the Swedish geoscientific journal *GFF* (impact 1.3 in 2013). More or less all included manuscripts are already published online on the GFF website (see link below) and the real, physical volume, including more than 70 manuscripts, will be printed in late March. I wish to direct a huge Thank You to my guest editors (Guillermo Albanesi, Loren Babcock, David Harper, Oliver Lehnert and Mike Melchin) that helped to create this extensive volume in only nine months.



National constituents of the delegates at the Lund meeting in June 2013

## Useful links:

Abstract proceedings (Lindskog and Mehlqvist 2013, 5.68 MB):

[http://igcp591.org/downloads/lund2013\\_abstracts.pdf](http://igcp591.org/downloads/lund2013_abstracts.pdf)

Field Guide to southern Sweden and Norway (Calner et al. 2013, 35.49 MB):

[http://igcp591.org/downloads/lund2013\\_guidebook.pdf](http://igcp591.org/downloads/lund2013_guidebook.pdf)

Early Palaeozoic Global Change (Calner *et al.* in press, online publications):

<http://www.tandfonline.com/action/showAxaArticles?journalCode=sgff20#.Uv4wZmwV-70>



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## 2. Notes of the Business Meeting of ISSS in 2013 (by ZHAN Renbin)

**Time:** 5:45pm onward, June 11, 2013

**Place:** Gondwana Lecture Room at Lund University, Lund, Sweden

**Chair:** Prof. Mike Melchin (Canada)

**Attendees:** 43 Silurian workers and experts including 14 Titular Members of ISSS (Carlton Brett, Carlo Corradini, David Holloway, Jisuo Jin, Markes Johnson, Anna Kozłowska, David Loydell, Peep Männik, Mike Melchin, Axel Munnecke, Petr Štorch, Jacques Verniers, Yi Wang, and Renbin Zhan)

The roughly 2-hour business meeting was chaired by Prof. Mike Melchin (chair of ISSS) and includes 9 major topics in the agenda.

Firstly, on behalf of the ISSS, Prof. Mike Melchin expressed his sincere thanks to the organizer of the Lund meeting, Prof. Mikael Calner and his team, for their wonderful work in organizing such a successful joint meeting for IGCP 591, ISSS, ISOS and ISCS.

Secondly, Prof. David Loydell (UK) made a brief report on the Field Meeting he organized for ISSS at Ludlow, England in July 2011. Nearly 50 Silurian workers showed up at the meeting exchanging their research achievements and visiting 6 GSSPs within Silurian during the pre- and post-conference field excursions, such as the base of Aeronian, the base of Telychian, the base of Wenlock, the base of Homerian, the base of Ludlow and the base of Ludfordian. Some constructive discussions were proceeded during the indoor meeting and the excursions.

Thirdly, Prof. Mike Melchin proposed a field meeting jointly with IGCP 591 that is being organized by Dr. Renbin Zhan (secretary and titular member of ISSS) and is going to be in Kunming, China in August 2014. All participants voted “Yes” for this proposal.



Fourthly, Prof. Mike Melchin made another proposal that ISSS has the Fourth Symposium in 2015 jointly with the IGCP 591 Annual Meeting to be held in Ottawa, Canada. A field excursion to Anticosti Island will be organized immediately after this meeting. Prof. Jisuo Jin and Prof. Mike Melchin will lead this trip. All participants voted “Yes” for this proposal and many of them promised to attend the symposium and the field excursion afterwards. But, according to the organizers, the attendees to the Anticosti field excursion will be limited within 30 persons.

Fifthly, Prof. Mike Melchin reported some latest progresses in the restudy of the base of Wenlock, particularly the discovery of a new riverside section in UK and the work being conducted in Shaanxi Province, China. No decisions had been made at the meeting.

Sixthly, some attendees reported their ongoing work on the restudy of the base of Aeronian. Prof. Petr Štorch is actually leading a group particularly working on this boundary. Currently they are working on three relevant sections in Czech Republic and hope to have some collaborations with experts specialized on chitinozoans and acritarchs. Dr. Thijs Vandenbroke introduced some achievements they had got from the work they conducted in central Wales particularly on graptolites, chitinozoans and isotope geochemistry. Dr. Junxuan Fan told the attendees that there are some well-developed and well-exposed boundary sections in South China. With the strong support from the Chinese government, some work is being conducted particularly on graptolites, geochemistry and some relevant microfossils such as chitinozoans and acritarchs. Interested experts are invited to visit those sections just before the Kunming meeting next August. Dr. Lawrence Sherwin mentioned that there is some relevant work being conducted in Australia because there are also some good sections across the Rhuddanian-Aeronian boundary.

Seventhly, Prof. Mike Melchin proposed all attendees to express our sincere thanks to Prof. Jacques Verniers for his great contribution to the ISSS during the past 8 years as the Secretary of the subcommission. He had compiled 8 issues of Silurian Times and communicated with thousands of relevant colleagues.

Eighthly, Prof. Mike Melchin asked all members of ISSS, particularly the titular members to nominate new corresponding members for ISSS. Prof. Petr Štorch nominated two young nautiloid workers, Dr. Sigitas Rodzeviciqs and Dr. Stepan Manda, Prof. Mike Melchin suggested a graptolite expert, Dr. Jian Wang, to be corresponding members of ISSS. Three of them were voted “Yes” by all attendees and became new corresponding members of ISSS.

Finally, Prof. Mike Melchin mentioned some relevant things to the attendees, such as asking for support to the website of ISSS that is currently managed by Dr. Junxuan Fan based in the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences. He also suggested that ISSS should strengthen the relationships with other Lower Paleozoic subcommissions and other IGCP projects, such as IGCP 596. Prof. Melchin also proposed a “Silurian Award” particularly for those young researchers as a token of recognizing their excellent performances in the study of Silurian. The Proposal was supported by most of the attendees, but some details related to this award need to be sorted out as soon as possible, and to be discussed and approved by all titular members of ISSS. Hopefully, the first “Silurian Award” will be given out at the Fourth Silurian Symposium in Ottawa in July 2015.

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### **3. 3rd International Conodont Symposium (3<sup>rd</sup> ICOS)**

**Mendoza, Argentina, July, 2013**

**by Guillermo L. ALBANESI**

*On behalf of the Organizing Committee of the 3<sup>rd</sup> ICOS*

The 3rd International Conodont Symposium was held in Mendoza, Argentina, between 14 to 19 July, 2013, as well as the associated field meetings (Regional Field Meeting IGCP Project 591), i.e., the pre-symposium field trip held in the Precordillera of San Juan Province (8-13/07/2013) and the post-symposium field trip held in the Cordillera Oriental of Salta and Jujuy provinces (20-26/07/2013). The aforementioned international symposium was attended by 50 participants (35 foreign and 15 Argentine), who contributed 62 scientific research papers (co-authored by more than 100 researchers from over 20 countries) that were presented in oral and poster modalities, and were published in the Proceedings of the Symposium entitled “Conodonts from the Andes” (Special Publication N°13 of the Paleontological Association of Argentina: <http://www.apaleontologica.org.ar/?p=6829&lang=es>).

The program began with the session of registration on Sunday, July 14, at Hotel Aconcagua, with a welcome drink with classical music, and continued with a series of scientific sessions (oral and poster presentations) and workshops held in the main auditorium and rooms linked of the CCT- CONICET Mendoza on 15, 16, 18 and July 19. On Tuesday 16, the dinner of the Pander Society (International Society of Conodont Specialists) was accomplished at the Aconcagua Hotel presenting a Tango show with the typical Argentine music and dance. On Thursday 18, the closing lunch of the event at the restaurant of Bodegas Nieto Senetiner, with a special visit to the old vineyard and wine factory. On Wednesday 17, the field trip intra-symposium to the high Andes was developed, including a special approach to the Aconcagua mountain (the highest peak of the Americas, ca. 7000 m altitude), by looking the interesting geology of the Cordillera. Finally, at the closing ceremony, the voting members decided between the two proposals presented for the 4th ICOS; one of them presented by the Chinese group, and the other one by as a joint venture between colleagues from Spain, Italy, Austria and the Czech Republic. A small difference of votes gave the opportunity to the latter team to organize the next meeting, which will be held in the summer of 2017. The venue will be Valencia, with field trips to the Spanish Pyrenees, the Prague basin and the Carnic Alps, among other localities.

The 3rd ICOS & Regional Field Meeting IGCP 591, was a successful event, held for the first time in Latin America, with valuable contributions to the development of the speciality. In particular, young researchers and graduate students from different universities of the country had the opportunity to actively participate in an international gathering of unique features such as the conodont symposium, which represents a continuous line of meetings for the speciality since the late 1960s, strengthening links with other researchers from home and abroad, in order to address the cutting-edge scientific knowledge, and strengthen ties to the undertaking of new research projects between different working groups worldwide.

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## IGCP 591: *Early to Middle Paleozoic Revolution*

# 4<sup>th</sup> Annual Meeting

June 10–19, 2014, Estonia

### Second Circular

The 4th Annual Meeting of IGCP 591 will be hosted in Estonia, June 10-19, 2014. The scientific sessions in Tartu will be preceded and followed by geological excursions to study the lower Palaeozoic carbonate succession of Estonia.

The 2014 annual theme of IGCP 591 targets **Evolutionary palaeoecology and palaeobiogeography**, however, the annual meeting will not be limited to these topics. A broad range of contributions on Early to Mid Palaeozoic geology are expected, from palaeontology and stratigraphy to geochemistry, palaeogeography and climate modelling.

The meeting will be organized jointly by the Department of Geology, University of Tartu and Institute of Geology, Tallinn University of Technology, with the support from the Geological Society of Estonia and IGCP 591.

Welcome to Estonia in 2014!

Tõnu Meidla and Olle Hints  
on behalf of the organizers

### Schedule and deadlines

<b>March 15, 2014</b>	Deadline for registration, abstracts, and payments
<b>April 1, 2014</b>	Deadline for booking accommodation in selected hotels
<b>May, 2014</b>	Distribution of Third Circular
<b>June 9, 2014</b>	Arrival to Tallinn (for pre-conference excursion)
<b>June 10-12, 2014</b>	Pre-conference excursion (Ordovician of northern and central Estonia, ending in Tartu)
<b>June 12, 2014</b>	Registration and Ice Breaker in Tartu
<b>June 13-15, 2014</b>	Scientific sessions in Tartu
<b>June 14, 2014</b>	Conference Dinner
<b>June 16-19, 2014</b>	Post-conference excursion (Silurian of central and western Estonia and Saaremaa Island, ending in Tallinn)
<b>July 1, 2014</b>	Deadline for short papers for the special issue in <i>Estonian Journal of Earth Sciences</i>

## About Estonia

Estonia is located in northern Europe, between Russia, Latvia, Finland and Sweden. With an area of 45,000 km<sup>2</sup> and a population of ca 1.3 million, it is one of the smallest countries in Europe. The capital of Estonia is Tallinn, famous for its medieval old town. Tartu, the second largest city in the country, is best known for its university, established in 1632.

Since 2004, Estonia is a member of the European Union and Schengen visa area. **Should you need a visa to enter the EU, please contact the organizers for official invitation in due time.** The local currency in Estonia is the Euro (EUR). See <http://www.visitestonia.com> for more information about Estonia.

## Travel

### Reaching Tallinn

Tallinn can be reached from many European cities by direct flights or via large international airports nearby (Helsinki, Copenhagen, Stockholm).

### Reaching Tartu

Tartu can be reached from Tallinn by bus or train (180 km); flight connections are limited at present. The easiest option to get to Tartu would be by bus which leaves Tallinn airport every hour (the tickets should be purchased in advance; see <http://www.sebe.ee/en>). The pre-conference excursion will end up in Tartu as well.

## Conference venue

The conference will be held in Tartu, the historical university town of Estonia, located 180 km south of the capital Tallinn. For more information about Tartu and the university see <http://www.tartu.ee> and <http://www.ut.ee>.

The scientific sessions will be in the main lecture hall of the Estonian Biocentre, University of Tartu (<http://vvv.ebc.ee>), located next to the Natural History Museum (see map on conference website). The organizers try to avoid parallel sessions. Poster sessions will be in nearby rooms of the same building. There will be modern presentation equipment, WiFi access etc.

## Accommodation

### In Tallinn

For the pre-conference excursion participants need accommodation in Tallinn for June 9-11 (two nights). Rooms are pre-booked in two hotels listed below. For locations see the map on conference website. The excursion coach will stop near both places.

If you plan to stay in any other hotel in Tallinn, please make sure you will be either in front of the Tallink City Hotel or Tallinn University of Technology main building in right time. Should you stay in Tallinn after the conference, or after the post-conference field trip, please book hotels of your choice well in advance.

<b>Hotel</b>	<b>Rooms and prices</b>
<p><b>Tallink City Hotel ****</b>  <a href="http://www.tallinkhotels.com">http://www.tallinkhotels.com</a>  The Tallink City Hotel is a modern and exclusive business class hotel in the centre of Tallinn.</p> <p>To book a room with special price please send an e-mail to <a href="mailto:hotelbooking@tallink.ee">hotelbooking@tallink.ee</a> with your name and accommodation dates, and mention the keyword <b>IGCP2014</b>. NB! Pre-booked rooms and special prices are valid only <b>until April 1st, 2014</b>.</p>	<p>Standard single: <b>EUR 54</b>  Standard twin/double: <b>EUR 54</b>  Double de Luxe: <b>EUR 79</b>  Junior Suite: <b>EUR 124</b>  Suite: <b>EUR 224</b>  Royal Suite: <b>EUR 244</b>  The rate includes buffet breakfast, internet, morning saunas and VAT. All rooms are equipped with shower or bath, hairdryer, air conditioning, free Wi-Fi, telephone, TV, safe and a mini bar. The hotel has also rooms for guests with special needs.</p>
<p><b>Academic Hostel</b>  <a href="http://academichostel.com">http://academichostel.com</a>  Located in the Tallinn University of Technology campus, 7 km from the city centre, this place provides a low-budget accommodation.</p> <p>10 double rooms are pre-booked. Make personal reservation <b>before April 1, 2014</b>, with keyword <b>IGCP2014</b>.</p>	<p>Double room: <b>EUR 25</b>  NB! No breakfast is included.</p>

### **In Tartu**

Rooms are pre-booked in five hotels of different price range. All are located in city centre, within walking distance from the conference location. Please contact conference secretary for further questions or in case of problems.

<b>Hotel</b>	<b>Room price per night</b>
<p><b>Antonius *****</b>  <a href="http://hotelantonius.ee">http://hotelantonius.ee</a>  8 rooms pre-booked until April 30, 2014.  To make personal reservations send e-mail to <a href="mailto:sales@hotelantonius.ee">sales@hotelantonius.ee</a> with keyword <b>IGCP2014</b>.</p>	<p>Single: <b>EUR 100</b>  Twin/Double: <b>EUR 128</b>  Breakfast included</p>
<p><b>London ****</b>  <a href="http://www.londonhotel.ee">http://www.londonhotel.ee</a>  12 rooms pre-booked until April 12, 2014.  Personal booking at hotel website with keyword <b>IGCP2014</b>.</p>	<p>Single: <b>EUR 72</b>  Twin/Double: <b>EUR 83</b>  Breakfast included</p>
<p><b>Pallas ***</b>  <a href="http://www.pallas.ee">http://www.pallas.ee</a>  50 rooms pre-booked until April 12, 2014.  Personal booking at hotel website with keyword <b>IGCP2014</b>.</p>	<p>Single: <b>EUR 54</b>  Twin/Double: <b>EUR 62</b>  Breakfast included</p>

<b>Dorpat ***</b> <a href="http://www.dorpat.ee">http://www.dorpat.ee</a> 30 rooms pre-booked until June 1, 2014. For personal booking send an e-mail to info@dorpat.ee with keyword <b>IGCP2014</b> .	Single: <b>EUR 56</b> Breakfast included
<b>Tartu ***</b> <a href="http://www.tartuhotell.ee">http://www.tartuhotell.ee</a> 30 rooms pre-booked until May 5, 2014. Personal booking at hotel website with keyword <b>IGCP2014</b> .	Single: <b>EUR 40</b> Twin/Double: <b>EUR 55</b> Breakfast included
<b>Student accommodation</b>	Check options and availability at <a href="http://kyla.ee">http://kyla.ee</a>

## Registration fees and payment

	Senior researchers	Students
<b>Conference fee</b> Covers abstract volume, ice breaker, coffee-breaks and conference dinner	EUR 150	EUR 100
<b>Accompanying persons fee</b>	EUR 75	EUR 75
<b>Late conference fee</b> If paid after March 31st, 2014	EUR 250	EUR 250
<b>Lunch tickets (optional)</b> Buffet lunches during the conference, June 13-15, 2014	EUR 30	EUR 30
<b>Pre-conference excursion</b> Ordovician, includes transportation, guidebook, one night accommodation and field lunches. The number of places is limited.	EUR 200	EUR 200
<b>Post-conference excursion</b> Silurian, includes transport, guidebook, accommodation on Saaremaa Island (three nights), and field lunches. The number of places is limited.	EUR 400	EUR 400

Please note that the excursion fees have been reduced compared to the First Circular and optional lunch tickets for the conference days are added.

## Payment by bank transfer

Bank transfer is currently the preferred option for payments. Please use the following:

Beneficiary: **University of Tartu**

Beneficiary bank: **AS SEB Bank**

SWIFT/BIC code: **EEUHEE2X**

International bank account number (IBAN): **EE281010102000234007**

Please indicate the **keyword “IGCP2014” (IMPORTANT!)** and names of the participant(s) in the payment description and ensure that the payment will be without

charges to beneficiary.

### **Payment using credit card**

The system for on-line credit card payments is currently being redesigned at the University of Tartu. Before the new system is in place the only option for card payment is to fill a separate form found on conference website and send it to the organizers **by fax**: +372 737 5895. We are sorry for the inconvenience. **NB! Do not send your credit card data by regular unencrypted e-mail.**

### **Cancellation**

Refunds of 50% of the conference and excursion fees will be paid if the cancellation is received before May 1st, 2014. No refunds are possible after this date.

### **Registration and ice-breaker**

Registration of participants in Tartu will be opened starting at 15:00 on June 12th, 2014, next to the main lecture hall of the Estonian Biocentre, University of Tartu (the main conference room of the IGCP meeting; look at <http://vvv.ebc.ee/>; see also the map on conference website). Ice breaker will start at 18:00 on June 12th, 2014.

### **Conference Dinner**

The conference dinner will take place on June 14th, 2014. The place will be announced in the Third Circular. Conference Dinner is included in the registration fee.

### **Spouse activities**

Spouse activities will be organized in Tartu for the period of scientific sessions. Please indicate your interest in the registration form. Details to be announced.

### **Presentations**

**Oral presentations** are limited to 15 minutes. Slides should be prepared in MS PowerPoint (.ppt, .pptx), Portable Document Format (.pdf) or OpenDocument Presentation (.odp) formats and delivered to the organisers during registration on June 12th.

**Posters** should be prepared in A0 format, preferably in portrait orientation and will be displayed throughout the meeting.

### **Publications**

#### **Abstracts**

The abstract volume will be distributed at the conference. The length of abstracts is limited to one A4 page. Please use 12 pt serif font (such as Times New Roman), single-spacing and 2.5 cm margins; no illustrations. Provide authors' names, affiliations and e-mail addresses after the title. The text should be written in correct English and

submitted by e-mail to [igcp591.2014@gmail.com](mailto:igcp591.2014@gmail.com). The Scientific Committee will review the abstracts reserving the right to accept or refuse any submission. Please note that your paper can be included in the programme only if your conference fee is paid in due time. The deadline is **March 31, 2014**.

### **Thematic issue of *Estonian Journal of Earth Sciences***

A thematic conference volume of short papers will be published in late 2014 as an issue of *Estonian Journal of Earth Sciences*, guest edited by IGCP 591 project leaders. *EJES* is an international geosciences journal indexed in ISI and Scopus. Being an OpenAccess journal, all papers become freely accessible on-line and can be distributed by the authors with no restrictions. See <http://eap.ee/earthsciences> for more information about the journal. All manuscripts for the thematic volume will be subject to regular peer-review and need to follow the journal's style. The length of each paper is limited to four printed pages (text page is about 5000 characters incl. spaces). The deadline for manuscripts is **July 1, 2014**. If you intend to submit a paper to this volume, please indicate that in the registration form.

### **Excursions**

Two excursions are planned to show the Ordovician and Silurian sections in mainland Estonia and Saaremaa Island. The excursions will visit a number of well-known outcrops, in addition to several new quarries that have never been visited by previous geological excursions.

#### **Excursion A: Ordovician (June 10-12, 2014)**

The 3-days excursion will start from Tallinn and focus on the Ordovician succession of northern and central Estonia. The excursion will end in Tartu, where the scientific sessions will be held. The cost is EUR 200 (includes bus travel, field lunches and one night accommodation in NE Estonia) and **maximum number of participants is limited to 60**. The stops to be visited include:

- **Pakri cliff** (Lower Cambrian to Middle Ordovician, condensed siliciclastic to carbonate succession).
- **Vasalemma quarry** (basal Katian; Keila and Oandu regional stages; carbonate mounds and associated facies, corresponding to GICE).
- **Ristnacoastal outcrop** (Sandbian; Keila Regional Stage, fossiliferous limestones and a bentonite)
- **Sutlema quarry** (Katian; Nabala and Vormsi regional stages, micritic limestones with various fossils)
- **Väo quarry** (Darriwilian; Lasnamägi and Uhaku regional stages; "building limestone")
- **Drill cores in Arbavere field station** (full Lower Ordovician to basal Silurian succession will be shown)
- **Aluvere quarry** (Sandbian; Haljala Regional Stage, argillaceous limestones with bentonites and various fossils)
- **Saka cliff** (Cambrian to Darriwilian succession)
- **Põhja-Kiviõli open cast mine** (Darriwilian-Sandbian; Kukruse Regional Stage, kerogen-rich limestones alternating with Baltic kukersite oil shale, rich in fossils)



- **Porkuni Quarry** (Hirnantian; Porkuni Regional Stage; tropical shallow-water limestones corresponding to HICE)

### **Excursion B: Silurian (June 16-19, 2014)**

The excursion will show Silurian shallow shelf carbonate succession of central and western Estonia, including the island of Saaremaa, starting from basal Llandovery to topmost Přidoli. The excursion starts in Tartu and ends in Tallinn. The cost is EUR 400 (includes bus travel, accommodation on Saaremaa and field lunches); **the maximum number of participants is limited to 30**. The stops to be visited include:

- **Kalanaquarry** (Llandovery limestones with exceptionally preserved biota)
- **Eivere quarry** (Llandovery)
- **Päri outcrop** (Llandovery)
- **Pulli cliff** (Wenlock)
- **Panga cliff** (Wenlock)
- **Abula cliff** (Wenlock)
- **Suuriku and Undva cliffs** (Wenlock)
- **Soegininacliff** (Ludlow)
- **Kaarma quarry** (Ludlow)
- **Kaugatumaand Lõo coastal outcrops** (Přidoli)
- **Ohesaare cliff** (Přidoli)

### **Studying geological collections in Estonia**

Large collections of Baltic Palaeozoic fossils and rocks are kept at the Institute of Geology at Tallinn University of Technology and at the Museum of Geology, University of Tartu. Participants of the conference are most welcome to arrive earlier or leave later, in order to study these collections. However, please contact the corresponding curators at your earliest convenience, but no later than April 1st, 2014, to ensure availability of the material. Data on nearly half of the collection specimens have been digitised and made accessible on-line at <http://geokogud.info/git> and <http://fossiilid.info>.

**Contact:** Ursula Toomin Tallinn ([ursula.toom@ttu.ee](mailto:ursula.toom@ttu.ee)), Mare Isakar in Tartu ([mare.isakar@ut.ee](mailto:mare.isakar@ut.ee)).

### **Support**

Limited support to young researchers from the IGCP 591 will be possible, please send a free form application alongside with registration form. Note that only participants with presentations will be considered for support.

### **Organizers and Scientific Committee**

The conference will be organized jointly by the Department of Geology of the University of Tartu, Institute of Geology at Tallinn University of Technology, the Geological Survey of Estonia and the Geological Society of Estonia.

- Leho Ainsaar (Department of Geology, University of Tartu)
- Heikki Bauert (Institute of Geology at Tallinn University of Technology)

- Olle Hints (Institute of Geology at Tallinn University of Technology)
- Peep Männik (Institute of Geology at Tallinn University of Technology)
- Tõnu Meidla (Department of Geology, University of Tartu)
- Anne Põldvere (Geological Survey of Estonia and Geological Society of Estonia)
- Oive Tinn (Department of Geology, University of Tartu)
- Mikael Calner (Department of Geology, Lund University)
- Brad Cramer (Department of Earth and Environmental Sciences, University of Iowa)
- Dimitri Kaljo (Institute of Geology at Tallinn University of Technology)
- Oliver Lehnert (GeoZentrum Nordbayern, Friedrich-Alexander Universität Erlangen)
- Zivile Zigaite (Evolutionary Biology Centre, Uppsala University)

## Contact and further information

### Website

<http://igcp591.org/2014>

### E-mail

[igcp591.2014@gmail.com](mailto:igcp591.2014@gmail.com)

**Oive Tinn** (conference secretary): phone +372 737 6693, oive.tinn@ut.ee

**Tõnu Meidla** (chairman of organizing committee): phone +372 514 4504

**Olle Hints**: phone +372 51 30 157, olle.hints@ttu.ee, skype: olle.hints



TALLINNA TEHNIKAÜLIKOOI  
TALLINN UNIVERSITY OF TECHNOLOGY



Eesti Geoloogiakeskus  
Geological Survey of Estonia



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**International Geoscience Programme  
IGCP Project 591  
Field Workshop 2014**

*jointly with*

**International Subcommittee on Silurian Stratigraphy (ISSS),  
International Subcommittee on Ordovician Stratigraphy  
(ISOS)  
and  
International Subcommittee on Cambrian Stratigraphy  
(ISCS)**

**Second (Final) Circular**

**12–21 August, 2014  
Kunming, China**

**Sponsored by:**

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

Yunnan University





Yunnan University (conference venue) and its main buildings on campus.

## General Information

The 2014 Field Workshop of IGCP 591, to be held jointly with ISSS, ISOS and ISCS, will be hosted at the Yunnan University in Kunming (SW China), August 12-21, 2014. Its formal theme is “Geologic and biotic events and their relationships during the Early to Middle Paleozoic”, however, the workshop will not be limited to these topics.

The Workshop will include two days of scientific sessions, an one-day trip to the Chengjiang Biota site (mid-conference field excursion), and a 6-day post-conference field excursion to investigate the Lower Paleozoic successions and fossils in northeastern Yunnan Province (western South China paleoplate) and western Yunnan Province (Indo-China and Sibumasu paleoplates).

The meeting is being organized jointly by the Nanjing Institute of Geology and Palaeontology (Chinese Academy of Sciences) and the Yunnan Key Laboratory for Palaeobiology (Yunnan University), with financial support from the State Key Laboratory of Palaeobiology and Stratigraphy (LPS), the National Natural Science Foundation of China (NSFC) and IGCP 591.

Welcome to Kunming, China in 2014!

ZHAN Renbin, HOU Xianguang and ZHANG Yuandong  
on behalf of the Organization Committee

## Key dates

Dates	Activities
May 15, 2014	Deadline for registration Deadline for submission of the application for financial supports
June 25, 2014	Deadline for payments
June 30, 2014	Deadline for submission of extended summary
July 20, 2014	Distribution of detailed conference program
August 12, 2014	Registration and ice breaker at the Yunnan University
August 13, 2014	Scientific sessions and conference dinner
August 14, 2014	Mid-conference field excursion to Chengjiang —The original site of the Chengjiang Biota

August 15, 2014	Scientific Sessions
August 16-21, 2014	Field excursion to northeastern and western Yunnan
September 20, 2014	Deadline for the submission of short papers for <i>Palaeoworld</i> as Conference Proceedings
December, 2014	Publication of Conference Proceedings as the fourth issue of <i>Palaeoworld</i> in 2014, and possibly the first issue in 2015 (depends on how many manuscripts we receive)

## **Kunming and the Conference Venue**

Kunming, the capital city of Yunnan Province, is well known as a “Spring City” with temperatures not exceeding than 24 °C in August, and may cool to around 10 °C in rainy day. There are many scenery spots within and just beside the city proper, such as the Ethnic Village, Mount Xishan (Dragon Gate), Cuihu Lake, the Golden Temple, the Expo Garden, the Black Dragon Pool, the Kunming Safari, etc. Some tourist activities will be arranged for the spouses and companions to visit these sites during the Scientific Sessions of the meeting.

The Conference Venue will be on campus of the Yunnan University. This is the largest and the best university in Yunnan Province and one of the top-rank universities in China. It is located beside the Cuihu Lake in the centre of Kunming city proper. It was founded in 1922 and experienced its first flourishing period before 1937. There are more than 10 buildings that are nearly a century old. A small museum of the Chengjiang Biota has hundreds of specimens amongst which many are wonderfully preserved. All attendees will be invited to visit that museum during the Scientific Sessions because the conference will be in the same building.

## **Getting to and Leaving Kunming**

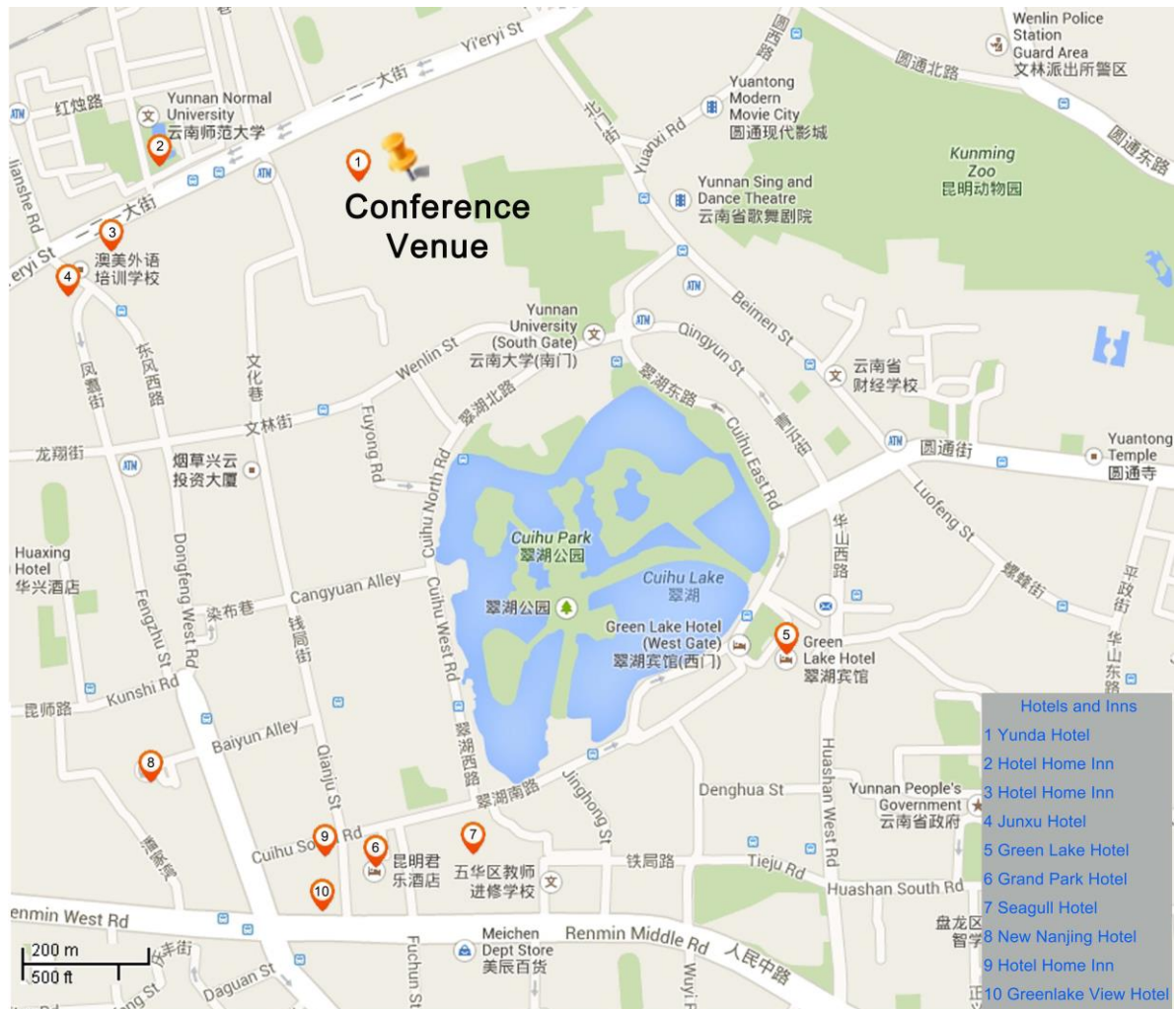
Kunming Changshui International Airport is one of the five largest international airports within mainland China. It is about 24 km northeast of Kunming city proper, and has many flights to south and southeast Asia, and some European countries and regions. The organizers will provide free pick-up service at the Airport according to the requests from the delegates.

The post-conference field excursion will end on August 21, and all delegates will be back to Kunming before dinner time on August 21. Delegates are advised to arrange their own travel accordingly (the accommodation on August 21 is included in the registration fee).

## **Accommodations**

All delegates are advised to stay in the Reception Centre of the Yunnan University (Yunda Hotel) during the meeting, i.e. from August 12 to August 15 (four nights). It is on the university campus, and very close to the Cuihu Lake. The facilities in the Centre are corresponding to a three-star hotel with internet connection in guest rooms. Fees will be included in the registration fee if delegates choose to stay in the Reception Centre. For

delegates who wish to stay off-campus, we provide the following information.



### 1. The Reception Centre of the Yunnan University (Yunda Hotel)

The Conference Venue and the meeting hall.



**2. Hotel Home Inn (No. 121 Street)**

Distance to the Conference Venue: ~400 m  
Tel.: +86-871-6852 6888  
220~250 Yuan RMB (special offer)  
www.homeinns.com



**3. Hotel Home Inn (Jianshe Road)**

Distance to the Conference Venue: ~600 m  
Tel.: +86-871- 6538 7888-9  
189~288 Yuan RMB (special offer)  
www.homeinns.com



**4. Junxu Hotel**

Distance to the Conference Venue: ~600 m  
Tel.: +86-871-6616 3606, +86-871-6616 3705  
218~248 Yuan RMB (special offer)



**5. Cuihu Lake Hotel (five-star)**

Distance to the Conference Venue: ~900 m  
Tel.: +86-871-6515 8888  
980~9880 Yuan RMB  
www.greenlakehotel.com



**6. Grand Park Hotel (five-star)**

Distance to the Conference Venue: ~1000 m  
Tel: +86-871-6538 6688  
650~850 Yuan RMB  
<http://hotel.ouyang88.com/default.aspx?hotel=5290>



**7. Kunming Seagull Hotel**

Distance to the Conference Venue: ~1100m  
Tel.: +86-871-6531 5388  
240~600 Yuan RMB



**8. Kunming New Nanjing Hotel**

Distance to the Conference Venue: ~1200 m  
Tel.: +86-871-6538 1999  
578~860 Yuan RMB  
www.ynwestinn.com



**9. Hotel Home Inn (Cuihu Lake)**

Distance to the Conference Venue: ~1200 m  
Tel.: +86-871-6533 5588  
195~285 Yuan RMB  
www.homeinns.com



## **10. Green Lake View Hotel**

Distance to the Conference Venue: ~1200 m

Tel.: +86-871-6611 6666

500~670 Yuan RMB

[www.jmlhotel.com/skin\\_index\\_42501021\\_4](http://www.jmlhotel.com/skin_index_42501021_4)



## **Registration Fees and Payment**

The registration fee for the scientific sessions (see details in the Registration Form below) covers: (1) the formal registration, (2) the extended summary volume, (3) the proceedings volume, (4) handouts, (5) accommodations (see Registration Form for options), (6) icebreaker, (7) conference dinner, (8) other meals during the meeting, (9) performance of “Dynamic Yunnan”, (10) coffee breaks, (11) day trip to the Chengjiang Biota site, and (12) the conference backpack.

The registration fee for the post-conference field excursion to northeastern and western Yunnan Province covers: (1) the field guidebook, (2) hotels for 6 nights (mostly three stars or higher), (3) meals for 6 days, (4) transportation, (5) the airfare from Tengchong to Kunming, and (6) the tickets to geoparks, historical sites and museums.

It is possible for students and young researchers to apply for a limited amount of financial support.

## **IGCP 591 Kunming Meeting Account Information:**

**NAME: HUANG BING**

**ACCOUNT: 6217866100001557227**

**SWIFT CODE: BKCHCNBJ940**

**BANK NAME: BANK OF CHINA NANJING CHENGZHONG SUB-BRANCH**

**ADDRESS: NO. 29 HONGWU LU, NANJING, JIANGSU, CHINA**

## **Applying for Financial Support**

With the supports from the State Key Laboratory of Palaeobiology and Stratigraphy (LPS), the National Natural Science Foundation of China (NSFC) and the IGCP 591, the organizers will be able to provide some financial supports for those who have financial difficulties but are wishing to attend this meeting. Each award will be a reasonable amount up to \$500 US to cover all relevant expenses during the indoor meeting, the mid-conference field excursion and part of the post-conference field excursion fees. The applicant must give an oral presentation during the Scientific Sessions to qualify for the award.

All young attendees (particularly PhD students and postdoctoral fellows) are welcome to submit their applications for this special award by providing the following:

- 1) A formal registration form.
- 2) A detailed personal CV including Education, Research and working experiences (if applicable), List of publications, etc.



3) A personal statement (i.e. Application) (one page).

All applications will be assessed by a committee composed of the chairmen of the Organization Committee, ISSS, ISOS and ISCS, and Dr. Brad Cramer (senior leader of IGCP 591). The award winners will receive an email confirmation from the organizer before June 25, 2014.

## **Registration and Ice-breaker**

The registration desk will be open at 8:30 AM on August 12, 2014, and will remain open for the day. The registration will be in the lobby of the Reception Centre of the Yunnan University (Yunda Hotel).

The Ice-breaker will start at 18:00 in the dining hall just opposite of the hotel building. It will be a Chinese buffet with some wine and ample supply of beer.

## **Conference Dinner**

The conference dinner will be a typical Chinese dinner with 12 people per table and enjoying various dishes together with some wine and Chinese liquor. It will take place at Weicai Restaurant at 18:00 on August 13, 2014. All delegates will be invited to watch a 90-minute performance of “Dynamic Yunnan” after the dinner (the performance is within walking distance from the dinner place). The performance was created and directed by the very famous Chinese dancer Yang Liping, and includes various singing and dancing of several ethnic groups in Yunnan Province.

## **Presentations**

Each oral presentation will be limited to 20 minutes (15 min talk + 5 min discussions). Slides should be prepared in MS PowerPoint (.ppt, .pptx), or Portable document format (.pdf), and delivered to the Organizers during the registration on August 12.

Posters should be prepared in a size of 90 cm x 120 cm (width and height, respectively), and will be displayed throughout the Scientific Sessions.

## **Publications**

1. Extended summary (up to 4 printed pages, including references, and figures) will be formally published by the Nanjing University Press (Eds. HUANG Bing and ZHAN Renbin). Deadline for submission: 30 June, 2014.
2. A proceedings volume of full papers (within 10 printed pages) will be published in *Palaeoworld*, a peer-reviewed and SCI-cited international journal (Eds. ZHAN Renbin, JIN Jisuo and David HARPER). Deadline for submission: 20 September, 2014.
3. A field guide will be published by Science Press (Beijing) (ZHANG Yuandong et al.).

All three publications will be distributed to all delegates. The Summary Volume and the

Field Guide will be available at the meeting.

## Meeting Itinerary and Field Excursions

**Tuesday, 12 August 2014.** Registration throughout the day. Icebreaker at the dining hall opposite the Hotel building, 18:00–21:00. You can also upload presentations and mount posters during the icebreaker.

**13 August.** Opening ceremony and Scientific sessions. Presentations beginning at 9:00 and ending at 17:30; posters display throughout the meeting.

**13 August (evening).** Conference banquet at Weicai Restaurant, 18:00-19:30; Watch the performance “Dynamic Yunnan”, 20:00-21:30.

**14 August.** Day trip to the Chengjiang Biota sites. All delegates will visit the original site of the Chengjiang Biota—the Maotianshan Mountain, and the Fuxian Lake just beside it (the deepest fresh water lake on plateau). Lunch will be by the Fuxian Lake.

**15 August.** Scientific sessions.

**16~21 August.** Post-conference excursion to northeastern and western Yunnan Province studying the Lower Paleozoic sequences and fossils of South China, Indo-China and Sibumasu paleoplates (back to Kunming in the evening of 21 August).

**22 August.** Delegates depart, or continue their own tourist activities. Maps and other tourist information about the Kunming Changshui International Airport, shopping, sightseeing, and transportation in Kunming, will be available during the meeting.

## Mid-conference Field Excursion

Leaders: Hou Xianguang, Feng Zhuo, Cong Peiyun and Ma Xiaoya

Transportation: By coach through the entire trip.



The Maotian Mountain



*Yunnanozoon*



*Haikouichthys*

8:00am: Departure from the Conference Venue, Kunming.

10:00~10:40: Maotianshan Mountain, the original fossil site of the Chengjiang Lagerstätte, the Field Station of NIGP, National Geopark, and UNESCO Heritage.

11:20~14:30: Lunch, tour to the Fuxian Lake and the local museum in Chengjiang County town.

15:30~16:30: Haikou fossil site, a classical fossil site of the Chengjiang Lagerstätte and about 75 km away from the Maotianshan. All delegates will have opportunity to make their own collection of the Chengjiang biota here. Most of the best preserved fossils of the Chengjiang biota were collected at this site, particularly those exceptionally well-preserved bradoriids, worms, algae, arthropods, and possibly those primitive fishes.

16:30~18:00: Back to the Conference Venue, Kunming.

## Post-conference Field Excursion

Participants limit: Up to 40.

Leaders: Zhang Yuandong, Wang Yi, Zhan Renbin, Fan Junxuan, Liu Jianbo and Zhou Zhiqiang

Transportation: By coach through the entire trip, but will take a flight from Tengchong to Kunming in the evening of August 21.

**Day 1** (Aug. 16): Kunming to Qūjing, northeastern Yunnan in the morning, and investigating the upper Silurian sequence and fossils of South China paleoplate in the afternoon (three academic stops at Chongjiawan, Longwangmiao and Hongmiao, respectively). Overnight in Qūjing City.

**Day 2** (Aug. 17): Qūjing to Dali, western Yunnan (about 450 km, freeway). On the way, all delegates will be invited to visit the extensive Mesozoic red deposits of terrestrial facies, and the famous ‘Dinosaur Valley’ where over a hundred skeletons of the Middle Jurassic *Lufengosaurus* in association with some other prosauropoda dinosaurs were buried and are being exhibited *in situ*. Overnight in the Dali Ancient City.



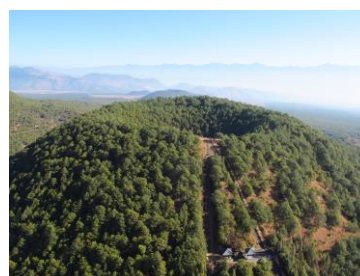
The Ordovician section at Haidong, Dali, western Yunnan



The dinosaur valley in Lufeng



The Chongsheng Temple in Dali



The volcanic crater in Tengchong

**Day 3** (Aug. 18): Morning: Investigate the Ordovician sequence at Haidong section (paleogeographically the northern extension of the Indo-China paleoplate), and collect fossils of late Dapingian to Darriwilian age within the Xiangyang Formation at three academic stops, including brachiopods, trilobites, bivalves, graptolites, bryozoans, etc.

Afternoon: Visit: (1) the Cangshan World Geopark, where evidence of the Quaternary Dali Glaciation was recorded, (2) the Dali Ancient City (1200 years old), and possibly (3) the famous Chongsheng Temple (time permitting).

Overnight in the Dali Ancient City.

**Day 4** (Aug. 19): Morning: Dali to Baoshan (about 3-hour drive on freeway).

Afternoon: Investigate the Ordovician sequence at the Laojianshan section (west of

but in the vicinity of the Baoshan City proper) (paleogeographically part of the Sibumasu paleoplate), and collect Darriwilian to Katian fossils in the Shihtien and Pupiao formations, including abundant brachiopods and trilobites together with some graptolites, bivalves, echinoderms, etc.

Overnight in Baoshan.

**Day 5** (Aug. 20): Morning: Investigate the Silurian sequence at the Laojianshan section, including several stops on the Ordovician-Silurian boundary, Aeronian, Telychian, Ludfordian and Pridoli outcrops, respectively.

Afternoon: Baoshan to Tengchong (about 2.5-hour drive on freeway).

Overnight in Tengchong County Town.

**Day 6** (Aug. 21): Touring in Tengchong, and coming to Kunming (by air)

Morning: Visit “Tengchong Hot-spring Park” (tens of hot springs).

Afternoon: Visit “Tengchong National Volcanic Geopark” (check at least two volcanic craters).

Evening: Tengchong to Kunming (about 50 minutes by air)

Overnight in Kunming.

**Day 7** (Aug 22): Delegates depart for their own destinations.



The Laojianshan Fm in Baoshan



Graptolites from the Shihtien Fm



Fossiliferous bed at Laojianshan

## Organizers and Scientific Committee

ZHAN Renbin (chair), Nanjing Institute of Geology & Palaeontology

HOU Xianguang (vice-chair), Yunnan University, Kunming

ZHANG Yuandong (vice-chair), Nanjing Institute of Geology & Palaeontology

FENG Zhuo (secretary), Yunnan University, Kunming

HUANG Bing (secretary), Nanjing Institute of Geology & Palaeontology

Mike MELCHIN (ISSS), St. Francis Xavier University, Canada

David HARPER (ISOS), Palaeoecosystems Group, Department of Earth Sciences,  
Durham University, UK

ZHANG Xingliang (ISCS), Northwest University, Xi'an

WANG Yi, Nanjing Institute of Geology & Palaeontology

CONG Peiyun, Yunnan University, Kunming China

WU Rongchang, Nanjing Institute of Geology & Palaeontology

YANG Qun, Nanjing Institute of Geology & Palaeontology

LIU Yu, National Natural Science Foundation of China

Brad CRAMER, University of Iowa, USA

Jisuo JIN, Western University, Canada

## Contact

Please contact us any time when you have questions about this meeting.

HUANG Bing: [bhuang@nigpas.ac.cn](mailto:bhuang@nigpas.ac.cn), mobile: +86-13913927224,  
Office: +86-25-83282189.

ZHAN Renbin: [rbzhan@nigpas.ac.cn](mailto:rbzhan@nigpas.ac.cn), mobile: +86-13851647619,  
Office: +86-25-83282132.

## Registration Form

Please print this page, fill in the following table using “√”, scan it using 200 dpi resolution or over, and send it to Huang Bing ([bhuang@nigpas.ac.cn](mailto:bhuang@nigpas.ac.cn)) or Zhan Renbin ([rbzhan@nigpas.ac.cn](mailto:rbzhan@nigpas.ac.cn)) at your earliest convenience before May 15, 2014.

**Name** (same as printed on passport):

**Title:** \_\_\_\_\_ **Gender:** \_\_\_\_\_

**Nationality and passport number:** \_\_\_\_\_

**E-mail address:** \_\_\_\_\_

**Postal address:** \_\_\_\_\_

Item	Selection
I am a full-time researcher	
I am a student	
Registration: (30% off for students) A1: I will attend 3-day activities, including single room for 4 nights at \$480 US per person A2: I will attend 3-day activities, including double room for 4 nights, sharing with another person at \$380 US per person A3: I will attend 3-day activities, including double room for 4 nights but not shared at \$480 US per person A4: I will attend 3-day activities with a spouse, including double room for 4 nights at \$550 US per couple A5: I will attend 3-day activities without accommodation at \$280 US per person (banquet included)	
Post-Conference Excursion (6 days, all included): B1: I will attend the Field Excursion (accommodation shared with another person, \$1100 US per person) B2: I will attend the Field Excursion (accommodation not shared, \$1350 US per person) B3: I will attend the Field Excursion (with spouse) (\$2100 US per couple)	
I will submit an abstract or an extended summary	
I will submit a paper for the proceedings	
I will need an invitation letter	
<b>Remarks</b>	

\*If you will be accompanied by your spouse, please provide us with his/her personal information (such as full name, title, nationality and passport number), so that we can issue the invitation letter accordingly.

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# 5<sup>th</sup> International Symposium on the Silurian System 5<sup>th</sup> Annual Meeting of the IGCP 591 - The Lower to Middle Paleozoic Revolution

Quebec City, July 8 – 10, 2015

## First Circular



### Aims of the scientific meeting

The aims of the joint IGCP 591 – ‘The Early to Middle Paleozoic Revolution’ / Silurian Subcommission meeting are to investigate this dynamic and important interval in the history and evolution of life and our planet and to improve our understanding of the definition, correlation and resolution of Silurian time. Contributions on relevant topics (ocean biogeochemistry, sea-level change, biodiversity changes, paleoecology...) are welcome.

### Important Dates

June 2014: Distribution of Second Circular  
December 2014: Distribution of Third (final) Circular  
March 15, 2015: Deadline for registration, abstracts, and payments  
July 4-7, 2015: Pre-conference excursion in the Gaspé Peninsula  
July 8-10, 2015: Scientific sessions at the INRS-ETE Complex, Quebec City  
July 11-17, 2015: Post-conference excursions on Anticosti Island and St. Lawrence Lowlands

### Conference Organizers

Aicha Achab (INRS-ETE, Québec); André Desrochers (University of Ottawa, Ottawa); Jisuo Jin (Western University, London); Denis Lavoie (GSC, Québec); Michel Malo (INRS-ETE, Québec); Mike Melchin (St. Francis University, Antigonish)

### Conference Highlights

- Pre-conference excursion to the classical Silurian localities of the Gaspé Peninsula
- Scientific sessions with keynote speakers, oral & poster presentations
- Mid-conference excursion to the classical Ordovician localities in the Québec City/Lévis area
- Mid-conference short course on sequence stratigraphic analysis of Paleozoic black shales and post-conference excursion to Upper Ordovician Utica shales in the St. Lawrence Lowlands
- Post-conference excursion on Anticosti Island to examine classical sections at the O/S boundary
- Social events including an icebreaker reception and a conference dinner
- Abstract volume, field guidebooks, and thematic conference volume of papers published in the Canadian Journal of Earth Sciences

**More information on registration/travel/accommodations/meeting/excursions in the 2<sup>nd</sup> circular**  
(if you have any questions, please, contact André Desrochers; [andre.desrochers@uottawa.ca](mailto:andre.desrochers@uottawa.ca))

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# Silurian Sequence Stratigraphy and Paleontology of the Great Lakes area

**Organizers: Don Mikulic and Joanne Kluessendorf**

A Silurian-based theme session and field trip will be held at the Geological Society of America North-Central meeting at the University of Illinois Urbana-Champaign, 18-19 April 2016; this meeting will be open to all papers on Silurian, late Ordovician, and early Devonian topics. The session and field trip will highlight new information on the sequence-, chemo-, and biostratigraphy of the classic Silurian strata in the Chicago-Milwaukee area, a region that has played a prominent role in North American Silurian studies since the mid-nineteenth century. This was one of the first areas in the central United States where James Hall was able to correlate his newly-erected New York System. Based on his work in Wisconsin, he was also the first person to correctly identify a fossil reef in the geologic record, and this region became famous for its Silurian reefs. The region's reef biotas and *Konservat Lagerstätten*, such as the Waukesha Biota, have figured notably in determining the true biotic diversity and paleoecology of the Silurian. In recent decades, the development of deep quarry exposures and extensive subsurface information has offered an outstanding opportunity to study the vast epicontinental Silurian seas across the North American craton.

**Contact:**

Dr. Donald G. Mikulic  
Senior Paleontologist  
Illinois State Geological Survey  
University of Illinois at Urbana-Champaign  
615 E. Peabody Drive  
Champaign, IL 61820  
Tel.: +1-217-244 2518  
E-mail: [mikulic@illinois.edu](mailto:mikulic@illinois.edu)

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## Obituary

### —Professor ZHANG Wentang (1925-2013)

We are saddened to announce that Prof. Zhang Wentang, a well-known palaeontologist and geologist, and a research professor at the Nanjing Institute of Geology and Palaeontology (NIGP), died in Nanjing on October 20, 2013 at 5:30PM. Prof. Zhang enjoyed a healthy old age until he passed away peacefully during a nap after lunch.

Prof. Zhang was born in Henan Province on January 10, 1925. He graduated from the Geology Department of Peking University in July 1948, and started his career as a stratigrapher and palaeontologist in the Institute of Geology of the Central Institution of Kuomintang (KMT) government. He has been a research scientist at NIGP since the establishment of NIGP in 1951, and he dedicated more than 60 years of his career to working on the Cambrian stratigraphy, trilobites and other related fields. He was a titular member of the International Subcommission on Cambrian System (ISCS) for many years, and was a member of the International Commission on Zoological Nomenclature based in London. He was also one of the editors of the revised trilobite volumes of the Treatise, responsible for the revision of several trilobite superfamilies.

Prof. Zhang's death is a tremendous loss of the palaeontological, stratigraphical, and geological communities in China and worldwide.

Prof. Zhang will be alive in our heart for ever.

Nanjing Institute of Geology and Palaeontology,  
Chinese Academy of Sciences  
October 21, 2013

### **Invitation for contribution to the festschrift for late Prof. Zhang Wentang**

#### **Dear Friends and Colleagues,**

To commemorate the late Prof. ZHANG Wentang, who passed away on Oct. 20, 2013, and to celebrate his life-long accomplishment in paleontology and stratigraphy, particularly in Cambrian and Ordovician trilobites and biostratigraphy, a special volume of *Acta Palaeontologica Sinica* is scheduled for publication in December, 2014. We now cordially invite you to contribute a research paper, a commemorative article, or even an eulogy to this volume. All research papers will be peer-reviewed.

This commemorative volume will be published as Volume 53, Part 4 in 2014. Prof. SHEN Yanbin (ybshen888@hotmail.com), Prof. CHEN Peiji (pjchen@nigpas.ac.cn) and Dr. SUN Xiaowen (xiaowen\_s@yahoo.com.au) will be the guest editors of this special issue. Please send us your contribution(s) by June 30, 2014 to:

SHEN Yanbin (Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, 39 East Beijing Road, Nanjing 210008, China)

Thank you very much for your kindest support in advance!

Sincerely Yours,

Nanjing Institute of Geology and Palaeontology, CAS

Dec. 12, 2013

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**SILURIAN RESEARCH 2013:  
NEWS FROM THE MEMBERS**  
**(in alphabetical order)**

**Guillermo ALBANESI (Argentina):** I continue working mainly on Ordovician and Cambrian conodont faunas and stratigraphy, and will do some work on Silurian conodonts.

**Guillermo L. Albanesi**

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**Fernando ALVAREZ (Spain):** In recent years, I dedicate most of my time to work as Editor of The Palaeontological Association and to my work on Recent brachiopods.

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**Anna ANTOSHKINA (Russia):** I continue to work on the Upper Ordovician and Silurian deposits in the Timan-northern Ural region, especially on the Lau Event and Wenlockian ooids, and particularly on the Paleozoic reefs of the Urals. During 2013, together with a PhD student Natalia Kaneva and a research staff E. Ponomarenko, I intended to finish several manuscripts about the depositional environments, fabrics, etc of the Upper Devonian reef-like formations. These studies include documentation of microbial communities and bacterial activity in their origin. Together with C. Soja, I am now continuing the work on an updated paleogeographic analysis of Upper Silurian reefs, and together with Tatiana Tolmacheva and Tiiu Marss, I am compiling the data on Baltic Late Ordovician thelodont and conodonts.

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**Chris BARNES (Canada):** I am continuing Silurian conodont paleontology, stratigraphy, isotope geochemistry research. The main current projects are: a) Silurian paleotemperature record determined from SHRIMP oxygen isotope measurements from conodonts (with Trotter (UWA), Williams (ANU) and Mannik (TUT)); and b) Ordovician and Silurian

conodont biostratigraphy and paleoecology, Canadian Arctic Islands (with Zhang (GSC), Jowett and Carson (PetroCanada)).

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**Denis BATES (UK):** I am working, with Anna Kozłowska, on retiolitine graptolites, in particular the genus *Paraplectograptus*, and on contributions on graptolites to the Treatise on Invertebrate Paleontology.

**Denis Bates**

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**Stig BERGSTRÖM (USA):** My main activities during 2013 have been on Ordovician rocks and faunas (6 published papers), but I maintain a strong interest also in the geology of the lower Silurian and especially in the interval round the Ordovician/Silurian boundary, particularly in North America, Baltoscandia, and China. Two relatively comprehensive papers on various aspects of that subject became available during the past year (see publication list) and I continue cooperation with researchers in several countries. Much of my present work involves chemostratigraphy and its relations to biostratigraphy and faunal evolution. After my retirement several years ago I have much more time for geological research, which I greatly enjoy.

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**Alain BLIECK (France):** Last year, Silurian vertebrates have been concerned with part of a paper on Early Paleozoic vertebrate paleobiogeography, co-authored by Z. Zigaite for the Geological Society Memoir 38 edited by David A.T. Harper and Thomas Servais.

**Alain Blicck**

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**Olga BOGOLEPOVA (UK):** I am currently working on Silurian organic-rich black shales of Russia with regard to their bio- and lithostratigraphy and geochemistry. For information

see

<http://www.casp.cam.ac.uk/projects/silurian-organic-rich-source-rocks-part-1-russia-east-siberia-taimyr-and-new-siberian-island>

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**Art BOUCOT (USA):** In 2013, the only thing of any consequence for me is the October publication of the SEPM Atlas, which includes information about Silurian climate and paleogeography.

**Art J. Boucot**

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**Carlton BRETT (USA):** In 2013, I continued working with Patrick McLaughlin (Wisconsin Geological Survey) and graduate students James Thomka and Nicholas Sullivan, on Silurian sequence, chemo- and event stratigraphy and paleoecology of southern Laurentia. **1)**

James Thomka and I have been working on the detailed sequence and cycle stratigraphy, paleoecology (especially of echinoderms) and paleoenvironments of the early Wenlock interval in Indiana, Kentucky, and Tennessee as part of his PhD dissertation. We are currently in the process of writing up these case studies in several papers. Thomka submitted five papers for publication in 2013. **2)** Masters student Nicholas Sullivan (MS, 2013) and I completed a series of papers dealing with revised stratigraphy of the mid Silurian Telychian interval in eastern North America. New biostratigraphic studies, in conjunction with Dr. Mark Kleffner (Ohio State University at Lima, Ohio) and carbon isotope work with Pat McLaughlin, coupled with our physical stratigraphic studies, have resulted in substantially modified correlations of the Waco-Dayton interval (early to mid Telychian) in Ohio and Kentucky as well as in coeval rocks in New York State, resulting in substantial revision of sequence stratigraphy. Sullivan also has sampled a number of sections of ferruginous strata for magnetic susceptibility (MS) and has developed a model relating variations in MS to phases of sea level variation as well as redox conditions of the seafloor. **3)** Both Thomka and Sullivan aided in measuring and sampling (for C-isotopes) correlative sections of ferruginous mid to upper Silurian strata in central Pennsylvania. These studies are refining our views associated with the Valgu, Ireviken, Mulde, and Lau events in eastern North America. **4)** Nick Sullivan worked closely with Pat McLaughlin and myself during the past year, preparing a revised litho- and chronostratigraphy for the Silurian Period throughout the entire United States; this is part of a long-term project, sponsored by the US Geological Survey, to revise and upgrade, in digital form, the well known COSUNA (Correlation of Stratigraphic Units in North America) charts. To date, this research has resulted in the production of about 20 large correlated cross sections of

the Silurian System for all of the United States, with completely updated (and in some cases substantially synonymized) terminology. These will be published as an Open File Report with the US Geological Survey. We hope to continue this project with revised charts for the Ordovician and Devonian systems. 5) Pat McLaughlin and I are finalizing our major multi-year effort on sampling outcrops and cores the Silurian of Wisconsin, Indiana, Pennsylvania, and New York to develop a comprehensive understanding of the regional relationship between C-isotope variation and sequence stratigraphic patterns. This work, collaborative with the geochemistry studies of Poul Emsbo (US Geological Survey, Denver) has resulted in a preliminary model relating Silurian bioevents and time-specific facies (red-green vs. gray-black shale) phases and C-isotopic excursions. We are planning a series of publications relaying the additional finding of this work to begin in 2014. 6) Pat McLaughlin and I have now completed our multi-year study of the sequence stratigraphy and geochemistry of the Ireviken Event on Gotland (Sweden). This work demonstrates coordinated development of certain facies components (including reef buildup) on separate paleocontinents during each of three (newly recognized) phases of the Ireviken Event. These parallel patterns indicating global climatic, eustatic, and redox signatures. 7) Over the past two years I have been working with graduate student Matt Vrazo, on the sequence stratigraphy and depositional environments of Late Silurian Salina and Bertie Groups in the Appalachian Basin and the eastern Mid-continent. These peculiar facies, including widespread evaporites and peritidal carbonate facies, are locally rich in eurypterids. We are collaborating with geologist Jeffrey Trop of Bucknell University on the stratigraphic context and paleoenvironments of eurypterid rich strata of the Tonoloway Formation (Pridoli) in central Pennsylvania. We have just submitted a manuscript dealing with a spectacular new eurypterid Lagerstätten recently discovered near Winfield, Pennsylvania. This occurrence provides new data and insights into the paleoenvironments of the enigmatic eurypterids, the topic of Vrazo's PhD dissertation.

Edited and updated versions of the following field guides on Ordovician and Silurian strata from the 2012 IGCP 591 Foerste Meeting are available on-line at the IGCP 591 website (<http://www.igcp591.org/meetings.php>).

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**Carole BURROW (Australia):** My work on late Silurian vertebrates from several localities in the maritime regions of North America, in particular from Nova Scotia and Maine continues, with a recent publication on the long-known microvertebrate assemblages from coastal exposures near Arisaig, Nova Scotia (Burrow *et al.*, 2013). Sue Turner (QM) and I continue to work on material from Maine. I published a revised description of *Ischnacanthus? scheii* (now *Radioporacanthodes scheii*) from the ?Silurian/Devonian boundary in Ellesmere Island, arctic Canada (Burrow, 2013), based on a closer look at the scales of this taxon and associated comparison with scales in contemporary assemblages of vertebrate microremains in other areas. Study on an articulated ischnacanthiform from the late Silurian of Canada is still under investigation,

in collaboration with David Rudkin (Royal Ontario Museum, Toronto). Silurian Australian vertebrates remain elusive.

**Carole J. Burrow**

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**Mikael CALNER (Sweden):** Since last year, I am the Head of the Department of Geology in Lund University and this strongly limit my time for research. But I do a few things. I chaired the IGCP 591 meeting in Lund in 2013 together with Oliver Lehnert and Per Ahlberg and several helpful colleagues and students. Special papers related to the conference have been published successively on the *GFF* website during the autumn and me and guest editors are now preparing for the final print of the volume, which includes no less than about 70 highly interesting articles on the Cambrian, Ordovician and Silurian systems. For the last few years I have been working mainly with Ordovician strata, generally with basic stratigraphic work, sedimentology and stable isotope geochemistry. Right now I am particularly interested in the Lower-Middle Ordovician, which is very condensed in Baltoscandia. I have recovered a new drillcore through the classical ‘orthoceratite limestone’ of the small island of Öland (Sweden) and study equivalent strata in several other drillcores from the region, mainly together with Rongchang Wu, who is now doing post-doc at the department in Lund, and with Oliver Lehnert. Together with my wife Hanna Calner, I am also studying the Hirnantian oolites in Baltoscandia and North America. My interest in the Silurian is of course still strong and right now I study lower Silurian sections from the Siljan district in central Sweden together with Oliver Lehnert.

**Mikael Calner**

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**CHEN Xiaohong (China):** Together with my colleagues, I am working on the Silurian chitinozoan biostratigraphy, biodiversification and environment in Yichang area. Based on the high resolution systematic collection, analysis and study of the chitinozoan samples at the classical Silurian sections in Yichang area, the Silurian chitinozoan sequence of the Yichang area will be revised. The Silurian chitinozoan diversity curve will be compiled. And the problem of the ages of the sand beds at the upper part of Shamao Formation will be further investigated. Furthermore, based on the integrated study of sedimentary facies, the characteristics of the trace elements of clastic rocks, the stable Carbon and Oxygen isotopes of carbonate rocks at the key beds or layers and their significance for the environments, the relationships between the Silurian chitinozoan recovery, diversity and the environment changes will be analyzed.

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**Robin COCKS (UK):** In 2013, I had another busy year, working partly on Ordovician and Silurian brachiopods and partly on paleogeography with Trond Torsvik. The *Special Paper in Palaeontology* on Katian and Hirnantian brachiopods from south-western Wales was revised and will be published in April 2014. Another substantial paper, on Katian and Hirnantian brachiopods from the Chingiz Terrane, Kazakhstan, with Leonid Popov, is also in proof. During the year papers on Aeronian spiriferids from Iran (also with Leonid Popov) and on global Aeronian brachiopod distributions (with Rong Jiayu) were completed. A paleogeographical survey of Gondwana from the Cambrian onwards with Trond was started, completed, accepted and published in *Gondwana Research* during the year. Current work includes the start of a monograph on Aeronian and Telychian brachiopods of the Welsh Borderland (my original doctoral topic, but in 1965 I completed only the strophomenide taxonomy), but that will not be finished soon. There were two visits to Oslo to work with Trond and also attendance at the Lund meeting, where I gave a joint paper on Gondwana.

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**Paul COPPER (Canada):** Have two papers in press, one on the early Silurian Becscie Formation, and the other on the Ordovician-Silurian boundary of Anticosti. Continuing work on the revisions of the Jupiter Formation, revision of the type species and related species of the Hirnantian genus *Hindella* and Aeronian genus *Cryptothyrella*. Monographs on the Late Ordovician-early Silurian Llandovery atrypides, athyridides, spiriferides of Anticosti.

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**Carlo CORRADINI (Italy):** I am working on Silurian and Devonian conodonts of North Gondwana. In the Carnic Alps, I am investigating the Silurian and Lower Devonian *Orthoceras* Limestone, and several other sections. A revision of the biostratigraphy of the Silurian part of the Cellon section is in press. The taxonomic and biostratigraphic study of the conodont fauna from several sections from Ludlow to Lochkovian is in progress (with M.G. Corrigan). A project with the goal to achieve a formal lithostratigraphy of the pre-Variscan sequence of the Carnic Alps is in progress: it involves several colleagues from Italy, Austria and other countries. In Sardinia I am studying calcareous sections (with M.G. Corrigan) and black shales outcrops (with S. Piras). Furthermore, the conodont and crinoid biostratigraphy of three sections spanning the S/D boundary in Morocco, sampled by O.H. Walliser and R. Haude, have been published.

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**Maria CORRIGA (Italy):** I am working on conodont taxonomy and biostratigraphy across the Silurian-Devonian boundary in Sardinia, the Carnic Alps and other North Gondwana regions. In the Carnic Alps, I am investigating the Silurian and Lower Devonian *Orthoceras* Limestone, and several sections are in study, including Cellon, Rauchkofel Boden and other classical and new sections. In Morocco the conodont and crinoid biostratigraphy of three sections spanning the S/D boundary in Tafilalt have been published.

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**Erika DANIELSEN (USA):** I am working on the documentation of lower Silurian conodonts from southwestern Mongolia.

**Erika Danielsen**

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**Susana DE LA PUENTE (Argentina):** In 2013, I continued to focus on chitinozoans of the Ordovician and Silurian successions from Argentina. I have recently moved to Neuquén (Argentina) where I am still working as a scientific researcher for CONICET of Argentina, concentrating on the same topics while under the direction of Dr. Claudia Rubinstein as well. Additionally I have started to collaborate as an Assistant Professor in the Geology Department at the Universidad Nacional del Comahue (Neuquén, Argentina). Besides, I am actively involved in the organization of the 4th International Paleontological Congress, to be held this year, from September 28th to October 3rd, 2014 in Mendoza, Argentina (I hope to see you there!). Details at <http://www.ipc4mendoza2014.org.ar/>

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**Andr éDESROCHERS (Canada):** I am actively working on Upper Ordovician to Lower Silurian strata exposed on Anticosti Island. Our recent studies (Achab et al, 2013) suggest that the entire Ellis Bay Formation is of Hirnantian age based on the presence of a Hirnantian shelly fauna, the comparison of the Anticosti chitinozoan assemblages with those from other sections dated by graptolites and the available stable isotope geochemistry information. Current research projects at the University of Ottawa by graduate students include: 1) depositional setting and geochemistry of Upper Ordovician black shales in the subsurface of the Anticosti Basin, 2) utility of conodonts for (U-Th)/He analysis, testing the hypothesis that conodonts can represent a reliable low-temperature thermochronometer in carbonate sedimentary successions, and 3) architecture and composition of end-Ordovician reefs. A number of collaborative projects are in progress including: 1) a sequence stratigraphic perspective on the Late Ordovician Glaciation (with J.F. Ghienne et al.), 2) the use of  $\delta^{18}\text{O}$  values of conodont apatite for testing whether significant orbital-scale climatic fluctuations controlled the development of widespread marine sedimentary cycles during the late Ordovician (with Maya Elrick and James Wheeley); 3) the use of Li and Ca isotopes to decipher drivers of end-Ordovician glaciation (with Philip Pogge von Strandmann); and 4) revisiting clumped isotope temperature data from organic material across the O/S boundary (with Ruth Kirk and Paul Dennis).

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**Rein EINASTO (Estonia):** I am currently working on the facies, cyclicity and gaps of Estonian Ordovician and Silurian carbonate sections, and stratotypes of O-S boundary-beds in Estonia.

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**Bob ELIAS (Canada):** Together with Graham Young, Godfrey Nowlan and students, I am continuing to study the Ordovician-Silurian boundary interval in the Williston and Hudson Bay basins of central North America. Ongoing M.Sc. thesis research by Matt Demski is focussed on the boundary interval in the Williston Basin area of southern Manitoba and Saskatchewan, Canada. A paper is in preparation by Kun Liang, Bob Elias, Mari-Ann Mõtus and Dong-Jin Lee, on species of the tabulate coral *Catenipora* from the Ordovician and Silurian of Baltoscandia.



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**Frank ETTENSOHN (USA):** I continue to work on the Silurian rocks of Kentucky, trying to relate them to rocks of similar ages in the Appalachian Basin, especially in a tectonic framework.

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**Annalisa FERRETTI (Italy):** My Silurian research continues to be concentrated on the biosedimentology and paleoecology of the Austrian Carnic Alps. Fossilized ring-like structures with enigmatic function and taxonomic affiliation are described from the Upper Ordovician of the Carnic Alps and the Silurian of Bohemia (Ferretti, Cardini, Crampton, Serpagli, Sheets and Storch, 2013).

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**Stan FINNEY (USA):** Serving as Chair of ICS consumes most of my time that I would otherwise devote to research. The highlight of 2013 for me was STRATI 2013 - 1st International Congress on Stratigraphy. To participate in a large meeting that was all stratigraphy and the full range of stratigraphy was most enjoyable. The 2nd International Congress on Stratigraphy, STRATI 2015, will be held in Graz, Austria in July 2015, and I expect it to be a much larger event. I was pleased to learn of the successful combined Cambrian-Ordovician-Silurian meeting in Lund, Sweden in 2013 and wish I could have attended. My recent papers have dealt with matters other than the Silurian (ICS International Chronostratigraphic Chart, the Anthropocene, and the nature of GSSPs), I am revising and soon hope to submit a paper on a structural geology interpretation that could only have been developed by using graptolite and conodont biostratigraphy to unravel the structures within the Roberts Mountains allochthon. Its title is "Tectonic Erratics - remarkable exotic blocks emplaced by the Henderson thrust, Eureka County, Nevada".

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**Mansoureh GHOBADI POUR (Iran):** I am focusing on various aspects of taxonomy, biogeography and paleoecology of the Llandovery benthic faunas from central Iran and the Kopet-Dagh Region with a special attention to trilobites. I also continue my work on the Ordovician-Silurian boundary beds in the Zagros Basin.

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**Cemal GONCUOGLU (Turkey):** I am working on the drop/driftstones within the Hirnantian sediments both in Gondwana and Peri-Gondwana terranes.

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**David HARPER (UK):** Research is continuing on some Silurian projects in Scotland (a monograph on the Silurian brachiopods of the Pentland Hills with Emma Gallagher; Silurian shell beds with Euan Clarkson and Yves Candela), Ireland (the Llandovery brachiopods of the Kilbride Peninsula with Yves Candela), and Greenland (with Jan Audun Rasmussen, Christian Mac Ørum Rasmussen, Jin Jisuo and Peter Sheehan). A large monograph on the late Ordovician and early Silurian brachiopods faunas from South China with Rong Jiayu, Zhan Renbin and Huang Bing was published in *Special Papers in Palaeontology*. Research is ongoing into the causes of the end Ordovician extinction event and early Silurian recovery with Howard Armstrong, Seth Finnegan, Jin Jisuo, Christian Rasmussen and Peter Sheehan (a paper with Howard is in press in GSA Special Papers). In early 2013, Dave Harper and Thomas Servais completed editing the c. 30 manuscripts that address the relationships between biogeography and palaeogeography in the Early Palaeozoic. This seminal volume, *Early Palaeozoic biogeography and palaeobiogeography*, was published at last in late 2013 as Geological Society, London Memoir 38. The project turned out to be much more extensive and time-consuming than initially expected, but we hope the book will be a landmark publication in Lower Palaeozoic research.

**David A.T. Harper** (Principal of Van Mildert College, Professor of Palaeontology)

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**Luke HAUSER (UK):** I have been working on the Downton Bone Bed in the Welsh borders and I am in the 3<sup>rd</sup> year of my part time PhD. I have completed the initial sedimentological analysis and lithostratigraphy and I am currently writing this up. The processing of the bone bed is ongoing as it has proven very challenging but I have now found the solution. I have looked at the trace fossils and this too is being written up. The palynomorphs have as suggested last year turned up some interesting results. This year I am hoping to present some findings at the PALASS Progressive Palaeontology meeting in

Southampton.

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**Olle HINTS (Estonia):** I continue to work on Ordovician and Silurian microfossils (particularly scolecodonts, chitinozoans and conodonts), geochemistry and Baltic regional geology and stratigraphy. Together with Petra Tonarova (in Tallinn for postdoc since 2013) and Mats E. Eriksson (Lund), I aim at getting a better picture of the diversification of Silurian jaw-bearing polychaetes. Together with Viuu Nestor (Tallinn) and Liina Paluveer (PhD student in Tallinn), I am compiling data on Baltic Ordovician and Silurian chitinozoans and conodonts in order to analyse them by means of quantitative stratigraphy.

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**Kathleen HISTON (Italy):** My current research forms part of a study of sea-level changes, oceanic cycles and biotic response in the Ordovician-Silurian of the Carnic Alps and other localities. It is focused on a systematic, taphonomic, paleoecologic and paleobiogeographic study of Silurian cephalopods with a view to greater precision in nautiloid biostratigraphy, establishment of nautiloid biozones and defining the migrational pathways of pelagic faunas as a tool for timing of open seaways and microterran position along the North Gondwana margin.

As part of my research activities I spent two weeks studying collections of British Silurian nautiloids at the Natural History Museum London (July 2013) with a grant from the SYNTHESYS Program. As part of my activities as co-leader of IGCP Project 591, I co-edited with M. Melchin and V. Tewari a Special Issue: Pre-Mesozoic climates and global change in *Palaeogeography, Palaeoclimatology, Palaeoecology*, vol 389 (2013). This thematic set of papers resulted from presentations given at the 34<sup>th</sup> IGC (2012) under the IGCP 591 sponsored symposium: Theme 3: Climate Change: Lessons from the past; implications for the future; Symposium 3.7: Pre-Mesozoic climates and global change [IGCP 591] organized by K. Histon (Italy), V. Tewari (India) and M. Melchin (Canada).

#### **Kathleen Histon (Independent Researcher)**

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**David HOLLOWAY (Australia):** I continue to work on late Llandovery scutelluids and illaenids from north Queensland (jointly with Phil Lane, Keele University, UK). The fauna includes the oldest known representatives of *Australoscutellum* and *Illaenoscutellum* as well as *Japonoscutellum*, *Kosovopeltis*, *Cybantyx?*, *Opsypharus?*, *Stenopareia* and four new scutelluid genera. Work also proceeds on the scutelluids *Poroscutellum* and

*Spiniscutellum* from the Lower Devonian of Victoria.

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**HUANG Bing (China):** I have been working on Silurian brachiopods from South China during the survival and recovery interval after the end Ordovician mass extinction since 2005. Recently, besides working on a monograph about the latest Ordovician and the earliest Silurian brachiopods across O/S boundary in SE China as the second author with my colleagues (it has been published), I was mainly concentrating on two aspects: 1) Recovery of brachiopods in South China in earliest Silurian. Together with my Chinese colleagues, I have found and collected a well-preserved and diverse brachiopod fauna during this particular interval in SW China. Preliminary study about the fauna has been published, and detailed systematic study is now going on. 2) Brachiopod numerical paleontology. During the study, some related statistical question drew my interest. Some of them, such as rarefaction, sampling efficiency and morphometric method have been studied and published.

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**Helen HUGHES (UK):** Work continues in collaboration with David Ray on resolving the  $\delta^{13}\text{C}_{\text{carb}}$  record, sequence stratigraphy and faunal responses over the Ireviken Event interval, Sheinwoodian, of the Midland Platform, UK. Data from the Tortworth and Woolhope inliers is now published online in *GFF*.

**Helen Hughes**

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**Jisuo JIN (Canada):** I am currently working as a collaborator with Paul Copper and Andr e Desrochers on the revision of the Ordovician-Silurian boundary sections of Anticosti Island. The stratigraphic divisions (at the level of members) of the Hirnantian Ellis Bay Formation and the Rhuddanian Becscie Formation are being revised or formally proposed. I have one graduate student (Kathryn Lapenskie, MSc) working on the species cline and paleogeographic variations of the Rhuddanian *Virgiana* brachiopod fauna in

North America (early recovery fauna after the Hirnantian Mass Extinction). Another project is to begin in 2014 on the full-fledged diversification of brachiopod faunas and their major invasion of the reef environment in North America.

**Jisuo Jin**

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**Dimitri KALJO (Estonia):** I am continuing studies on the Ordovician and Silurian bio- and chemostratigraphy of Baltica as a part time emeritus member at the institute of Geology (Tallinn University of Technology). At the Lund Meeting in June 2013, I suggested to begin a revision of the Pridoli stratigraphy, at the place response was promising, but no new information has appeared yet.

**Dimitri Kaljo**

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**Raliya Khabibulina (Russia):** I am a PhD student working on Silurian tabulate corals from south of West Siberia. I am also involved in the project of improving the new regional stratigraphic charts for the Silurian of Altai-Salair, Tyva and West Sayan regions (south of West Siberia).

**Raliya A. Khabibulina**

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**Tarmo KIIPLI (Estonia):** I am working on the geochemistry of bentonites (altered volcanic ashes). At well preserved sections of the East Baltic and Gotland (Sweden), we apply successfully sanidine phenocryst composition analysed by the X-ray diffractometry as identification criterion for the eruption layers. Method is extremely precise ( $\pm 0.5$ -1 mol %) enabling discrimination of ash beds of very similar compositions. Although our first publication on this topic appeared already in 2002 it seems, that nobody else apply this method still now. Obvious reason is, that method is not working in areas underwent elevated temperatures (possibly even over 500C) and in areas where ashes did not contain sanidine initially. Anyway I do not believe, that the Baltic Palaeozoic Basin is the only one in the World, where sanidine composition of bentonites can be used for accurate correlation of sections. So we are still waiting of application of this method by other

researchers and in other regions of the world. For extending correlations to the areas, with significant late diagenetic changes immobile trace elements can be used. In the article by Kiipli *et al.* (2013), we try to present visually easily readable method for using immobile and low mobility elements for correlation of bentonites. Attached to the article is a database of stratigraphically arranged X-ray fluorescence analyses of the East Baltic Silurian bentonites which can be used as a reference in searching correlations in the Baltoscandian area.

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**Anna KOZŁOWSKA (Poland):** I am working mostly on Silurian graptolites. The main focus in the study is evolution of retiolitids (Retiolithina). The graptolites are isolated and come from boreholes and erratic boulders of Poland. I am cooperating with Alf Lenz, Denis Bates, Mike Melchin and Sigitas Radzevičius on graptolites from Arctic Canada and Lithuania. I am also working with Adam Urbanekand, and my PhD students Kinga Dobrowolska and Dagmara Chmielarz investigating the monograptids from Polish boreholes. And finally, together with Jörg Maletz, I have described graptolites from Lower Ordovician of China.

**Anna Kozłowska**

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**Alfred LENZ (Canada):** I have been working on isolated Llandovery retiolitids (graptolites) from Arctic Canada, in collaboration with Mike Melchin and Ania Kozłowska. The manuscript is reaching completion and illustrates beautiful three-dimensionally preserved material. Project two, working with Ania Kozłowska and Denis Bates, is the preparation of the retiolitid chapter of the graptolite Treatise revision. This work is nearing completion. Project three, in collaboration with Fred Longstaffe (geochemist, Western University Canada), will be the assembling of the geochemical data derived from analyses of upper Wenlock, Ludlow and Pridoli graptolitic facies of Arctic Canada.

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**LI Lixia (China):** I finished my PhD in Nanjing University in July 2013, and I am doing my post-doc at the Nanjing Institute of Geology and Palaeontology (NIGP), Chinese

Academy of Sciences. I am particularly working on the Ordovician and Silurian graptolites from South China. My research is mainly focusing on graptolite taxonomy, biostratigraphy, paleoecology and macroevolution.

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**Steve LODUCA (USA):** I continue to work on the taphonomy, systematics, functional morphology, paleobiogeochemistry, and evolution of Early Paleozoic macroalgae, especially dasyclads. Work also continues on the stratigraphy of Silurian units within and adjacent to the Michigan Basin. Currently, I have been working mainly in the Cambrian, but I will be getting back to the Silurian very soon.

**Steve LoDuca**

Dept. of Geography and Geology, Eastern Michigan University, USA

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**David LOYDELL (UK):** 2013 saw continuation of work on the graptolites from Aeronian-Telychian sections around the El Pintado reservoir, Spain. This work is nearly finished now. It has taken longer than expected in large part due to the high number of both specimens and species.

**David K. Loydell**

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**Gil MACHADO (Sultanate of Oman):** I moved about one year ago to Oman to work as a stratigrapher and palynologist in the Petroleum Development Oman. Most of my activities are focused on the Cambrian and Ordovician units of the Haima Supergroup, as well as other units above and below (the Ediacaran has been quite a challenge!). I do some work in the early Silurian Sahmah Formation, mostly in operational situations (notably subsurface recognition from wireline data) and its biostratigraphy - acritarchs, chitinozoans and cryptospores. There are two on-going University-based projects involving this unit, focusing on its thermal maturation and the biogeochemistry of its chitinozoans.

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**Peep MÄNNIK (Estonia):** I am actively working on evolution, taxonomy and paleoecology of conodonts, conodont-based high-resolution stratigraphy, bioevents and paleogeography. I am also interested in sequence stratigraphy, paleoclimatology and evolution of sedimentary basins. My studies will continue under projects “Changes in the Telychian–lower Sheinwoodian conodont faunas as a proxy for basin evolution in northern Baltic” and “Quantitative stratigraphical approach to early Paleozoic chitinozoans and conodonts of the Baltic area: high-resolution time scales and paleobiodiversity”. A new four-year project “Environmental and faunal changes in the pre-Hirnantian Late Ordovician: a prelude to the end-Ordovician mass extinction? A Baltoscandian perspective” has been started (in co-operation with Oliver Lehnert from Erlangen). Also, joint studies together with colleagues from Estonia, Germany, Iran, Russia, Sweden, UK and USA on evolution and high-resolution stratigraphy of the Early Paleozoic faunas and sedimentary basins on different paleocontinents are going on.

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**Tiiu MÄRSS (Estonia):** With Peep Männik, we revised Silurian vertebrate biozones and their correlations with conodont succession. The paper was published by the *Estonian Journal of Earth Sciences* (see References). Another, a more extensive work was finished as well. With my co-authors Henning Blom, Uppsala, and Olga Afanassieva, Moscow, we completed a monograph manuscript on the biodiversity of the Silurian osteostracans of the East Baltic planned for the publication in *EESTRSE* [submitted 30 October 2013]. A few smaller collaborative projects are in progress including: 1) thelodont scales in the Upper Ordovician of Moscow Basin, and its implication for stratigraphy and palaeogeography (with Tania Tolmachova, St. Petersburg, as the senior author, and Anna Antoshkina, Syktyvkar; abstract was published in the Lund Meeting Proceedings); and 2) new data on a chondrichthyan *Karksiodus* from the Main Devonian Field (with A. Ivanov as the senior author).

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**Alexander (Sandy) MCCRACKEN (Canada):** I continue to work on Middle to Upper Ordovician, Silurian and Devonian and conodonts from various locations in Canada. I am now concentrating on good collections from Hudson Bay and Moose River basins, Ontario and Manitoba.

**Alexander (Sandy) D. McCracken**

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**Tõnu MEIDLA (Estonia):** I am now working on the Llandoveryan of the Baltic area and Canada (ostracods and other groups, stable isotopes, quantitative stratigraphy).



**Tõnu Meidla**

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**Michael MELCHIN (Canada):** I am currently working on several projects related to graptolite biostratigraphy and biodiversity as well as chemostratigraphy through the Late Ordovician and Early Silurian, particularly in North America, Europe, and China. I am collaborating with Charles Mitchell, David Sheets and Petr Storch, on the study of Late Ordovician–Early Silurian faunas in Bohemia, Scotland, and Fan Junxuan and Chen Xu on the study of Rhuddanian–early Telychian graptolites from South China, including two potential GSSP candidate sections. I am working on project with Dan Goldman, Chuck Mitchell, Fan Junxuan and others on quantitative graptolite biogeography. My master student, Peter Bullock has recently completed his study of the C and N isotope geochemistry of some mid-Llandovery graptolites from Arctic Canada and a paper on that work is in preparation. I have been working with Alf Lenz and Ania Kozłowska on some isolated Llandovery graptolites. I am also expanding my research interest in the distribution, geochemistry, and origin of black shales in Ordovician-Silurian time.

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**Tatiana MODZALEVSKAYA (Russia):** I am working on Silurian-Devonian brachiopods of Iran from Kopet-Dag and Derenjaj Mountains in collaboration with Leonid Popov (UK) and coauthors, Hairapetian, V. and Ghobadi Pour, M. Paper “A new, aberrant rhynchonellide with a strophic shell from the Silurian of Iran” will be published in *Acta Palaeontologica Polonica*. Together with Prof. Fernando Alvarez (Spain), I am continuing our investigations on athyridids from Kuznetsk Basin, Russia. Work on new material of Upper Ordovician-Silurian brachiopods from Kotel’ny Island (Arctic Russia), which were collected by colleagues from VNIIOkeangeologiya and Pamir.

**Tatiana L. Modzalevskaya**

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**Axel MUNNECKE (Germany):** I am currently working on Ordovician and Silurian chemostratigraphy in different areas (China, Gotland, Poland, Podolia, etc.). In addition, I

am also very interested in the biological response to the pronounced climatic changes that took place during this time interval.

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**Viuu NESTOR (Estonia):** In 2013, I composed the East Baltic Silurian chitinozoan database for the project "Quantitative stratigraphical approach to early Paleozoic chitinozoans and conodonts of the Baltic area: high resolution time scales and paleobiodiversity". More than 4500 samples from 53 core sections have been restudied up to now, in order to make uniform identifications of all species, determined during 40 years of the chitinozoan study.

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**Godfrey NOWLAN (Canada):** I retired from the Geological Survey of Canada in July 2013 and have cut back scientific activity considerably. I remain a volunteer at GSC but most of my time is related to Global Geoparks in Canada and finishing a popular book (with others) on the Geology of Canada entitled *Four Billion Years and Counting: Canada's Geological Heritage* that should come out in 2014. Research continues at a moderate level mainly with Bob Elias (University of Manitoba) and Graham Young (Manitoba Museum) on Ordovician and Silurian conodonts from the Williston and Hudson Bay basins. I am also working with Bill Arnott and David Lowe (University of Ottawa) on dating Lower Paleozoic sediments in near contact with basement in the Ottawa area. I completed a short paper on basal Ordovician *Iapetognathus* with Jim Miller and others.

**Godfrey S. Nowlan**

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**Olga OBUT (Russia):** I just start the study of Silurian conodonts from south of West Siberia. Together with Siberian colleagues, I am also working on the improvement of new regional stratigraphic charts for the Silurian of Altai-Salair, Tyva and West Sayan regions (south of West Siberia).

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**Vincent PERRIER (UK):** My research as a Leverhulme Post-Doc at the university of Leicester (in collaborations with Mark Williams and David Siveter) focuses on the different colonization events of the water column and mainly that of Myodocope Ostracodes. Ostracods were early zooplankton colonists, making the ecological shift from the benthos during the Silurian, and leaving behind an unparalleled fossil record of their environmental distribution, and crucially of their soft anatomy. Coupled with detailed work on the physiology of Recent ostracods, there is an extensive dataset from which to assess the ‘when’ (temporally), ‘how’ (carapace design, physiology and functional anatomy), and ‘why’ (environmental and biological feedback mechanisms) ostracods colonized the water column, a major event in the ecological radiation of the group and a model for the study of benthic to zooplanktonic ecological shifts.

I also continue my collaboration with the University of Tartu (Tõnu Meidla, Oive Tinn, Leho Ainsar and Karin Truver) on how Baltic ostracods reacted to rapid environmental changes in the Lower Paleozoic. We now concentrate mainly on the Silurian recovery after the end-Ordovician extinction. Since January 2014, I am the Ostracod group secretary of the Micropalaeontological Society. I will keep the world ostracod community informed of the different events (field trips, conferences....) of the society at <http://www.tmsoc.org/ostracod.htm>. I am the treasurer of the Group of FrenchPalaeozoists, see website below (in French): <http://sites.google.com/site/groupefrancaispaleozoique/home>

#### **Vincent Perrier**

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**Jos é Manuel PIÇARRA (Portugal):** I' m working on the Lower Paleozoic stratigraphy of South Portugal (Ossa Morena Zone) and also on the Ordovician and Silurian graptolites from Portugal.

#### **Jos é Manuel Pi çarra d ´Almeida**

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**Teresa PODHALAŃSKA (Poland):** I am actively working on graptolite taxonomy and stratigraphy. I am also interested in Ordovician and Silurian bioevents. Together with Dan Goldman and others, we compile data on Baltic Ordovician graptolites. Currently I am concentrated on Ordovician and Silurian stratigraphy based on graptolites in the context of shale-gas prospecting.

**Teresa Podhalańska**

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**Leonid POPOV (UK):** I am presently working on the brachiopods and associated faunas from the Llandovery of Kopet-Dagh and Central Iran in cooperation with Mansoureh Ghobadi Pour and Vachik Hairapetian, and on the late Silurian brachiopods of Nuratau and Turkestan Ranges in cooperation with Irina Kim.

**Leonid E. Popov**

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**Helga PRIEWALDER (Austria):** In 2013, I published two papers with references to the Silurian, and I am now still working on some similar projects in our traditional and classical areas.

**Helga Priewalder**

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**David RAY (UK):** My research activities over the past year have focused upon the Wenlock Series of the Midland Platform (England). In collaboration with Helen Hughes and Carl Brett, I have focused upon sequence and carbon isotope stratigraphy within the Sheinwoodian of the Welsh Borderlands and central England.

**David C. Ray**

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**John RICHARDSON (UK):** I am now working at Sheffield University in collaboration with Palaeobotanists from Cardiff and New York Museum Geologists on Upper Old Red Sandstone soils in New York State. Work has continued on the Přídolí–Lochkovian of the Anglo-Welsh Basin and the relationships and development of early land floras using a combination of plant morphological and cryptospore – trilete spore characteristics (see Edwards *et al.* 2014). Both dispersed and *in situ* cryptospores and trilete spores have

illuminated vexing questions on early evolutionary history and nature of early land plants, their inter-relationships, and early colonisation of the land. The work was collaborative between Prof. Dianne Edwards F.R.S. (Earth Sciences, Cardiff University) and myself financed by a joint grant which provides funds for a Research Associate (Dr. Jenny Morris) supervised respectively by Prof. Edwards on Paleobotany and myself on the morphology of *in situ* and dispersed permanent and loose cryptospore, monads, dyads and polyads, trilete monads and tetrads, their sculptural variations and stratigraphical and facies dispersal in Lower Old Red Sandstone sediments. The work follows the publication of microscopic plant remains and their *in situ* spores e.g. Fanning *et al.* 1988.

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**RONG Jiayu (China):** I continue my work on Silurian biostratigraphy and brachiopods in South China and other regions. Compilation of correlation charts and their explanations for the Silurian stratigraphy in various blocks of China have been completed with Wang Yi and Huang Bing. Syntheses of Silurian shallow marine red beds have been completed with Wang Yi and Zhang Xiaole. Together with many Chinese colleagues (Shen Shuzhong, Zhan Renbin, Huang Bing and many others), I have been working on a comprehensive monograph “The Brachiopod Genera with the Type Species from China” (all in English), including all Chinese genera from Cambrian to Cretaceous. The manuscript of this book will be completed within 2014 and published by Science Press next year.

#### **RONG Jiayu**

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**Valeri SACHANSKI (Bulgaria):** I am actively working on Ordovician-Devonian stratigraphy of Bulgaria and Turkey and especially on Silurian-Lower Devonian graptolite biostratigraphy.

#### **Valeri Sachanski**

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**Paul SELDEN (USA):** I am not currently working on any Silurian projects, but I do have one recent paper on Silurian forms. My work at the moment ranges from Cambrian (arthropods of the Guanshan Formation, Yunnan), through Carboniferous (arachnids from European and North American coalfields), Triassic (crustaceans of the Italian Alps), to the Jurassic (spiders of the Jiulongshan Formation, Inner Mongolia).

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**Nikolay SENNIKOV (Russia):** I continue to work on lithostratigraphy, paleobiogeography and Silurian graptolites from the Altay-Sayan Folded Area and Siberian Platform. New regional stratigraphic charts for the Silurian of three large geological regions on the South of West Siberia– Altai-Salair, Tyva and West Sayan are under preparation.

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**Lawrence SHERWIN (Australia):** I continue to be employed part time by the Geological Survey following official retirement several years ago. Still in progress is taxonomic work on early Silurian graptolites from near Bungonia that began with the late Tatiana Koren'. Current work includes checking the identification, locality and stratigraphic details of Silurian graptolites in the Geological Survey paleontological collection and revising Siluro-Devonian correlations in central New South Wales.

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**Constance SOJA (USA):** I remain interested in Silurian rocks of the Northern Hemisphere that record changing oceanographic conditions along the Uralian Seaway during Caledonide tectonics. Field work in southeastern Alaska (Alexander terrane) on the Heceta and Karheen formations (Silurian-Devonian) reveals that these units record the transition from molasse to flysch and the deposition of 1500+m of Old Red Sandstone-like sequences. Ongoing research with Anna Antoshkina (Russia) shows strongest fossil affinities of Alexander terrane biotas with Baltica, Farewell terrane (southwestern Alaska), Laurentia, and Salair (western Siberia) in the mid-Paleozoic.

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**Petr ŠTORCH (Czech Republic):** I am currently working on rich graptolite-dominated fauna from three sections (Vseradice, Bykos and Nesvacily) through upper Silurian offshore shaly facies of the western part of Prague Synform. *Leintwardinensis* graptolite extinction Event and Gorstian - Ludfordian boundary have been analyzed by Štorch *et al.* (Paleontology, in press). Rich plectograptine and monograptid fauna of the lower through middle Gorstian succession, including several taxa known from Arctic Canada and/or Baltica till now, is prepared for publication in Bulletin of Geosciences. Other study which deals with new graptolite fauna of Wenlock/Ludlow boundary is in progress. Principal results of the upper Silurian project have been summarized by Slavík *et al.* (GFF, in press). Reevaluation of some Silurian GSSPs decided by the ISSS inspired current grant project focussed on multidisciplinary study of two potential candidate sections in the Barrandian area (Prague Synform): Rhuddanian-Aeronian boundary section in Hlasna Treban and Sheinwoodian-Homerian boundary section in Kosov Quarry. Joint work continues with Jan Mortier on integrated chitinozoan-graptolite stratigraphy of Condroz Inlier, Belgium, and with Juan Carlos Gutiérrez-Marco and Josep Bernal on O/S boundary graptolites of Catalonian Pyrenées, Spain.

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**Desmond STRUSZ (Australia):** In 2013, I had published a paper on a collection of heavily tectonically distorted brachiopods from a temporary exposure east of Cooma in New South Wales. Work continues on a collaborative project with Dr Ian Percival of the New South Wales Geological Survey, to describe (for the first time) the Silurian brachiopod fauna from the Quidong Basin near Delegate, southern New South Wales. This is based on collections held by the Survey and the Australian Museum from earlier unpublished PhD studies, plus material collected by him and now held by Geoscience Australia, and material held by ANU from previous student field studies. Most of the material is now at the Survey's Londonderry facility west of Sydney, where necessary preparation and photography is progressing as Dr Percival's other commitments allow time. Many of the taxa have already been identified, and some descriptions drafted.

Input on age relationships in the Canberra region was made to a study by Vincent Perrier, at the University of Leicester, on a small ostracod fauna from a Canberra locality. The trilobites and brachiopods from that locality have already been published. The resulting paper was submitted at the end of 2013.

In June 2013, Des participated in the annual meeting of IGCP 591 'The Early to Middle

Palaeozoic Revolution', with financial assistance from the Australian IGCP committee. The meeting, held jointly with the International Subcommissions on Cambrian, Ordovician and Silurian Stratigraphy, was followed by a very useful field trip through southern Sweden to the Oslo region in Norway.

Looking ahead, there remain a number of taxa to be described from the Canberra Silurian, and from localities farther south, near Bredbo.

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**Petra TONAROVÁ (Czech Republic/Estonia):** I continue to work on the evaluation of the distribution of Silurian scolecodont taxa in Estonia (together with Olle Hints and Mats Eriksson). One of the tasks is also to study changes in jawed polychaete fauna caused by major environmental events. Some early results were published in Tonarov *á et al.* (2013).

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**Olev VINN (Estonia):** I am actively working on the paleontology of problematic calcareous tubeworms from the Paleozoic (e.g. cornulitids, tentaculitids, microconchids etc.) and evolution of tubeworm biomineralization. I am also working on the evolution of bioerosion and biofouling of hard substrates in the Silurian of Baltica. In addition I am studying symbiotic interactions among the various invertebrates in the Silurian of Baltica.

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**WANG Jian (China):** I am working on Silurian paleontology and stratigraphy at the Xi'an Centre of Geological Survey, China Geological Survey. My major research interest lies in the Llandovery and Wenlock graptolites and biostratigraphy in southern Shaanxi Province, central China. Currently I am working on a project "Study of typical Silurian sections of Shaanxi Province, China" which is from China Geological Survey.

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**WANG Wenhui (China):** I am working at the School of Earth Sciences and Engineering in Nanjing University, China, as an assistant researcher since 2013. I finished my PhD at Nanjing University in 2013 specialized in Paleontology and Stratigraphy, and my PhD thesis was on the Ordovician fossil groups from the graptolitic shales. I was conducting an integrative study on the Early Ordovician chitinozoans, acritarchs and graptolites from South China when I was at the Research Unit of Paleontology of Ghent University (Belgium) and the Geosystem Department of University of Lille (France) in 2010. Recently, I am working on an Early Ordovician paleoscolecidan worm from the graptolitic shales in Hunan Province, South China, and the Ordovician-Silurian boundary graptolites from South China and Tarim. Together with my colleagues at the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, I am also involved in a research project focusing on the geographic and biostratigraphic distribution of the graptolitic shales in South China across the Ordovician-Silurian boundary.

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**WANG Yi (China):** In 2013, I had finished two important projects. First, confirmation of the occurrence of Permian plant roots in the early Silurian rocks (Llandovery) in many places of South China. This is a joint project between my group and Profs. Diane Edwards and Mike Bassett from Cardiff UK lasting for more than 10 years, and several collaborative papers have been published. Second, collaborating with Prof. Jisuo Jin (Canada) and one of my colleagues, Prof. Zhan Renbin, I was working on some wonderfully preserved Lower Silurian noncalcified thallophytic alga from Anticosti Island, east Canada, and a couple of papers are now in press. Together with many colleagues, I will continue to work on the Silurian of China, the origin and early evolution of land plant based on micro- and macro- fossil plant materials in 2014.

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**Anthony WRIGHT (Australia):** Although most of my work is now focused on the Devonian, I maintain an interest in Silurian matters. In 2013, I published a small paper on

some Canadian Arctic material. The long-standing graptolite research cooperation with the late Barrie Rickards has come to a standstill, although there is some hope that Lawrence Sherwin will be able to help by finishing the incomplete graptolite taxonomy for the Quarry Creek area, NSW. Much other work on calceoloid corals is under way, focusing on German, French, Polish, African and Australian material.

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**WU Rongchang (China):** I am working on the Ordovician and Silurian conodonts and (bio-, litho-, and chemo-) stratigraphy. My research mainly focuses on conodont taxonomy, paleoecology, biostratigraphy, chemostratigraphy and carbonate sedimentology. Currently, I am collaborating with Prof. Mikael Calner in Lund investigating Ordovician stratigraphy in Sweden. My previous projects on Ordovician and Silurian conodonts from China are still going on.

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**ZHAN Renbin (China):** In 2013, together with my domestic and overseas colleagues, I had finished two things in Silurian fossils and stratigraphy. First, we worked on a decent collection of Telychian algae collected from the Silurian rocks on Anticosti Island in 1990s, and finished two papers, both of which are published now, one in International Review of Paleobotany, another in Geology Today. Second, we went to investigate the Llandovery rocks in southern Sichuan (paleogeographically Upper Yangtze Platform), and figured out the development and distribution of the Silurian marine red beds (the Lower Red Beds) in South China. One paper is now in press in Journal of Stratigraphy. Besides, we had a big monograph on the earliest Silurian brachiopods of east China (South China paleoplate) published in Special Papers in Palaeontology 90 in 2013. This project had lasted for more than 10 years.

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**ZHANG Yuandong (China):** I am continuously working on (1) paleogeographic reconstruction and facies patterns of Late Ordovician to early Silurian in South China and Tarim, as the black shale of this interval has been highly potential hydrocarbon source rocks. (2) Gas shale in China: extensions and primary geological features. This has been the main work of a launching project on gas shale in China by the Chinese Academy of Sciences (2014-2018). This project includes several drills for cores of the major gas shale intervals in China, i.e. Early Cambrian, Darriwilian-Sandbian, late Katian to Llandovery, Late Permian and Late Triassic (non-marine facies). These cores will be stored in Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences and opened to global scientists for study and appropriate sampling. Those have interests to involve in this work, please contact the project leader (Zhang Yuandong).

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**ZHAO Wenjin (China):** I am actively working on the Silurian-Devonian vertebrate paleontology, stratigraphy, paleogeography, and relative paleoenvironmental and paleoclimatic changes. I continued to focus on the study of Silurian fishes and Silurian-Devonian boundary in China in 2013. I went to Lund Sweden to attend the IGCP591 3<sup>rd</sup> Annual Meeting jointly with the ISCS, ISOS, and ISSS in June 2013, where I gave a talk on the research of Silurian-Devonian boundary in China.

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## RECENT PUBLICATIONS ON THE SILURIAN RESEARCH

[note that a few publications are of 2012 which were not included in Silurian Times 20, and some papers are dealing with Ordovician topics by members of ISSS]

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- Adomat, F., Munnecke, A. and Kido, E. 2014. Mass occurrence of the large solitary rugose coral *Phaulactis angusta* at the boundary Lower/Upper Visby Formation, Silurian, Gotland: Palaeoecology and depositional implications. *GFF*, (in press).
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- Alvarez, F., Modzalevskaya, T.L. and Brime, C. 2011. Early Devonian diversification of athyridide brachiopods in the Cantabrian Zone (NW Spain) and their affinities, revisited. *Memoirs of the Association of Australasian Palaeontologists*, 41, 179–194.
- Antoshkina, A.I. 2013. Late Devonian reef ecosystems: peculiarity of communities and biogenic fabrics (by example of the Timan-Northern Ural region). In: Rozhno, S.V. (ed.), *Problems of Biosphere Evolution*. Moscow: PIN RAS. 190–205 (in Russian).
- Araújo, A., Piçarra, J.M., Borrego, J., Pedro, J. and Oliveira, T. 2013. As regiões Central e Sul da Zona de Ossa Morena. Em: *Geologia de Portugal*, vol. I - Geologia Pré-mesozóica de Portugal (Dias, R., Araújo, A., Terrinha, P. e Kullberg, Editores), 509–549. Escolar Editora, ISBN 978-972-592-364-1.
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- Bergström, S.M., Eriksson, M.E., Young, S.A. and Widmark, E.-M. 2013. Conodont biostratigraphy, and  $\delta^{13}\text{C}$  and  $\delta^{34}\text{S}$  isotope chemostratigraphy, of the uppermost Ordovician and Lower Silurian of Osmundsberget, Dalarna, Sweden. *GFF*, dx.doi.org/10.1080/1135897.2012.758169. 22 pp.
- Bergström, S.M., Eriksson, M.E., Young, S.A., Ahlberg, P. and Schmitz, B. 2013.

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## 2. Brief introduction of new Siliurian workers

### Štěpán MANDA

**Date of Birth:** 9 August 1976

**Affiliation:**

Czech Geological Survey, Klárov 3, P. O. B. 85, Praha 011, 118 21, Czech Republic

**Education:**

- 1998 – 2003 Charles University, Prague, Palaeontology – Geology,
- 2003 Mgr., Charles University, Prague, Palaeontology - Geology (Environment and Communities of the Silurian and early Devonian Cephalopod limestones - Prague Basin, Bohemia),
- 2003 RNDr., Charles University, Prague (based on Diploma Thesis and published papers),
- 2003–2010 Ph.D. study, Charles University, Prague (Environment and Communities of the late Silurian and early Devonian, Prague Basin; supervised by Jiří Kříž and Jiří Frýda).

**Present position:**

Specialist on Silurian and Devonian litostratigraphy, biostratigraphy and chronostratigraphy and lower Palaeozoic cephalopods, Division of the Regional geology of Sedimentary Formations, Czech Geological Survey, Prague; Editor of Bulletin of Geosciences

**Research interests:**

- Silurian litostratigraphy, biostratigraphy and chronostratigraphy,
- Phylogeny, systematics and palaeoecology of the Palaeozoic cephalopods,
- Carbonate sedimentology



**WANG Wenhui**

**Date of Birth:** 15 February 1986

**Affiliation:**

School of Earth Sciences, Nanjing University, 163 Xianling Road, Nanjing 210023, China

**Education:**

2003–2007: China University of Geosciences, Wuhan China; Bachelor: Palaeontology – Geology,

2007–2013: Nanjing University, Nanjing China; Ph D thesis: Phylogeny, systematics and diversity of the Early Ordovician graptolites, supervised by Prof. FENG Hongzhen.

2010–2011: Ghent University, Ghent, Belgium; doctoral study: systematics and biostratigraphy of Early Ordovician chitinozoans and acritarchs, supervised by Jacques Verniers, Thijs Vandenbroucke and Marco Vecoli.

2013: University of Lille 1, Lille, France; postdoctoral study: systematics and biostratigraphy of Ordovician graptolites and acritarchs, in cooperation with Thomas Servais).

2013–: Nanjing Institute of Geology and Palaeontology, China, postdoctoral study: Systematics and biostratigraphy of Silurian graptolites, in cooperation with Prof. CHEN Xu.

**Present position:**

Assistant researcher at School of Earth Sciences, Nanjing University

**Research interests:**

- Phylogeny, systematics and geography of the Palaeozoic graptolites
- Biostratigraphy and geography of Silurian and Ordovician chitinozoans and acritarchs.

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# NEW PUBLICATIONS OF INTEREST TO SILURIAN RESEARCHERS

## 1. Pre-Mesozoic Climates and Global Change

*Palaeogeography, Palaeoclimatology, Palaeoecology*, vol. 389 (2013)  
eds. K. Histon, V. Tewari and M. Melchin

This thematic set of papers (see list below) resulted from presentations given at the 34<sup>th</sup> IGC (2012) under the IGCP 591 sponsored symposium: Theme 3: Climate Change: Lessons from the past; implications for the future; Symposium 3.7: Pre-Mesozoic climates and global change [IGCP 591], which was organized by K. Histon (Italy), V. Tewari (India) and M. Melchin (Canada).

The research presented in this Special Issue ranges from the Meso-Proterozoic to Permian with 6 papers on the Ordovician-Silurian interval. These integrated approaches to the study of climate change highlight the importance of comparing and contrasting results from deep time in order to unravel biological, chemical and depositional cycles that may shed light on present-day climatic fluctuations. Some of the papers also represent works by PhD students, women geoscientists and scientists from developing countries. The research has focused on all the continents especially Africa, South America and Asia.

### Thematic papers

- Histon, K., Tewari, V.C. and Melchin, M.J. Preface: Pre-Mesozoic climates and global change. pp. 1–4.
- Delpomdor, F., Linneman, U., Boven, A., Gärtner, A., Travin, A., Blanpied, C., Virgone, A., Jelsma, H. and Pr éat, A. Depositional age, provenance, tectonic and palaeoclimatic settings of the late Mesoproterozoic - middle Neoproterozoic Mbuji-Mayi Supergroup, Democratic Republic of Congo. pp. 4–34.
- Delpomdor, F. and Pr éat, A. Early and late Neoproterozoic C, O and Sr isotope chemostratigraphy in the carbonates of West Congo and Mbuji-Mayi supergroups: A preserved marine signature? pp. 35–47.
- Albanesi, G.L., Bergström, S.M., Schmitz, B., Serra, F., Feltas, N.A., Voldman, G.G. and Ortega, G. Darriwilian (Middle Ordovician)  $\delta^{13}\text{C}_{\text{carb}}$  chemostratigraphy in the PreCordillera of Argentina: Documentation of the middle Darriwilian Isotope carbon excursion (MDICE) and its use for intercontinental correlation. pp. 48–63.
- P ärnaste, H. and Bergström, J. The Asaphid trilobite fauna: from rise to fall in Baltica. pp. 64–77.
- Sohrabi, A. and Jin, J. Global palaeobiogeography of brachiopod faunas during the early Katian (Late Ordovician) greenhouse episode. pp. 78–86.
- Dronov, A. Late Ordovician cooling event: evidence from the Siberian craton. pp. 87–95.
- Fan Junxuan, Chen Qing, Melchin, M.J., Sheets, H.D., Chen Zhongyang, Zhang Linna and Hou Xudong. Quantitative stratigraphy of the Wufeng and Lungmachi black shales and graptolite evolution during and after the Late Ordovician mass extinction. pp. 96–114.
- Ray, D.C., Richards, T., Brett, C.E., Morton, A. and Brown, A.M. Late Wenlock

sequence and bentonite stratigraphy in the Malvern, Suckley and Abberley Hills, England. pp. 115–127.

Cui, Y., Kump, L.R. and Ridgwell, A.J. Initial assessment on the carbon emission rate and climatic consequences during the end Permian mass extinction. pp 128–136.

(information provided by Mike Melchin)

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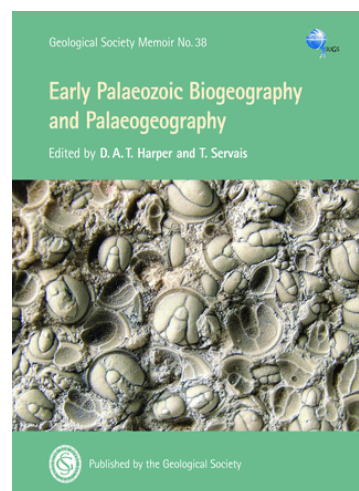
## 2. Early Palaeozoic Biogeography and Palaeogeography

*Geological Society London Memoir, 38*

eds. David A.T. Harper and Thomas Servais

### Contents

- Chapter 1.** Harper, D.A.T. and Servais, T. Early Palaeozoic biogeography and palaeogeography: towards a modern synthesis. pp. 1–4.
- Chapter 2.** Torsvik, T.H. and Cocks, L.R.M. New global palaeogeographical reconstructions for the Early Palaeozoic and their generation. pp. 5–24.
- Chapter 3.** Servais, T., Cecca, F., Harper, D.A.T., Isozaki, Y. and Niocail, C.M. Palaeozoic palaeogeographical and palaeobiogeographical nomenclature. pp. 25–34.
- Chapter 4.** Hendricks, J.R. Global distributional dynamics of Cambrian clades as revealed by Burgess Shale-type deposits. pp. 35–44.
- Chapter 5.** Jensen, S., Buatois, L.A. and Mángano, M.G. Testing for palaeogeographical patterns in the distribution of Cambrian trace fossils. pp. 45–58.
- Chapter 6.** Kerner, A. and Debrenne, F. The role of Archaeocyatha in Cambrian biostratigraphy and biogeography. pp. 59–66.
- Chapter 7.** Nestor, H. and Webby, B.D. Biogeography of the Ordovician and Silurian Stromatoporoidea. pp. 67–80.
- Chapter 8.** Muir, L.A., Botting, J.P., Carrera, M.G. and Beresi, M. Cambrian, Ordovician and Silurian non-stromatoporoid Porifera. pp. 81–96.
- Chapter 9.** Elias, R.J., Young, G.A., Lee, D.-J. and Bae, B.-Y. Coral biogeography in the Late Ordovician (Cincinnatian) of Laurentia. pp. 97–116.
- Chapter 10.** Popov, L.E., Holmer, L.E., Bassett, M.G., Ghobadi Pour, M. and Percival, I.G. Biogeography of Ordovician linguliform and craniiform brachiopods. pp. 117–126.
- Chapter 11.** Harper, D.A.T., Rasmussen, C.M.Ø., Liljeroth, M., Blodgett, R.B., Candela, Y., Jin, J., Percival, I.G., Rong, J.-Y., Villas, E. and Zhan, R.-B. Biodiversity, biogeography and phylogeography of Ordovician rhynchonelliform brachiopods. pp. 127–144.
- Chapter 12.** Buttler, C.J., Jackson, P.N.W., Ernst, A. and Mckinney, F.K.A. Review of the Early Palaeozoic biogeography of bryozoans. pp. 145–156.
- Chapter 13.** Zamora, S., Lefebvre, B., A Lvaro, J.J., Clausen, S., Elicki, O., Fatka, O., Jell, P., Kouchinsky, A., Lin, J.-P., Nardin, E., Parsley, R., Rozhnov, S., Sprinkle, J., Sumrall, C.D., Vizca ño, D. and Smith, A.B. Cambrian echinoderm diversity and



- palaeobiogeography. pp. 157–172.
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- Chapter 15.** Ebbestad, J.O.R., Frýda, J., Wagner, P.J., Horný, R.J., Isakar, M., Stewart, S., Percival, I.G., Bertero, V., Rohr, D.M., Peel, J.S., Blodgett, R.B. & Högström, A.E.S. Biogeography of Ordovician and Silurian gastropods, monoplacophorans and mimospirids. pp. 199–220.
- Chapter 16.** Cope, J.C.W. and Kříž, J. The Lower Palaeozoic palaeobiogeography of Bivalvia. pp. 221–242.
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- Chapter 18.** Eriksson, M.E., Hints, O., Paxton, H. and Tonarova P. Ordovician and Silurian polychaete diversity and biogeography. pp. 265–272.
- Chapter 19.** Álvaro, J.J., Ahlberg, P., Babcock, L.E., Bordonaro, O.L., Choi, D.K., Cooper, R.A., Ergaliev, G.Kh., Gapp, I.W., Ghobadi Pour, M., Hughes, N.C., Jago, J.B., Korovnikov, I., Laurie, J.R., Lieberman, B.S., Paterson, J.R., Pegel, T.V., Popov, L.E., Rushton, A.W.A., Sukhov, S.S., Tortello, M.F., Zhou, Z. and Žylińska, A. Global Cambrian trilobite palaeobiogeography assessed using parsimony analysis of endemism. pp. 273–296.
- Chapter 20.** Adrain, J.M. A synopsis of Ordovician trilobite distribution and diversity. pp. 297–336.
- Chapter 21.** Meidla, T., Tinn, O., Salas, M.J., Williams, M., Siveter, D., Vandenbroucke, T.R.A. and Sabbe, K. Biogeographical patterns of Ordovician ostracods. pp. 337–354.
- Chapter 22.** Perrier, V. and Siveter, D.J. Testing Silurian palaeogeography using ‘European’ ostracod faunas. pp. 355–364.
- Chapter 23.** Molyneux, S.G., Delabroye, A., Wicander, R. and Servais, T. Biogeography of early to mid Palaeozoic (Cambrian–Devonian) marine phytoplankton. pp. 365–398.
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- Chapter 25.** Danelian, T., Noble, P., Pouille, L. and Maletz, J. Palaeogeographical distribution of Ordovician Radiolarian occurrences: patterns, significance and limitations. pp. 407–414.
- Chapter 26.** Goldman, D., Maletz, J., Melchin, M.J. and Fan J.-X. Graptolite palaeobiogeography. pp. 415–428.
- Chapter 27.** Kröger, B. Cambrian–Ordovician cephalopod palaeogeography and diversity. pp. 429–448.
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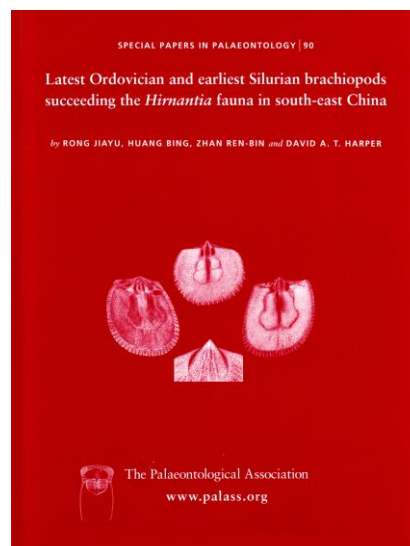
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### 3. Latest Ordovician and earliest Silurian brachiopods succeeding the *Hirnantia* fauna in south-east China

*Special Papers in Palaeontology*, 90, 142 pp, 100 figs, 1 table (2013)

by RONG Jiayu, HUANG Bing, ZHAN Renbin and David A.T. HARPER

**Abstract:** Late Hirnantian and early Rhuddanian shelly faunas dominated by brachiopods are well developed in the clastic facies succeeding the cool and deep-water, very low diversity *Hirnantia* fauna in Zhejiang and Jiangxi provinces, southeast China; elsewhere in the world, during this interval, brachiopod assemblages are generally rare. The *Cathaysiorthis* brachiopod fauna, occurring within the *Normalograptus persculptus* to *Akidograptus ascensus* biozones, straddling the Ordovician-Silurian boundary, is systematically described herein. Comparison of the fauna with the preceding *Hirnantia* fauna in South China shows some major contrasts, but similarities in the dominance of orthides and strophomenides, the rarity of pentamerides and atrypides, and the lack of trimerellides. Virtually all the genera recorded are 'hold-over' genera from the diverse latest Katian fauna and have long ranges and wide geographic distributions except for some endemics. A major faunal change in the brachiopod fauna occurred within the *N. persculptus* Biozone, beneath the Ordovician-Silurian boundary. The end of the second episode of the Ordovician extinction event of brachiopods may have extended from the middle *N. persculptus* Biozone, prior to the start of Silurian, coincident with *N. persculptus* Biozone-bearing beds generally overlying the *Hirnantia* fauna and a striking positive carbonate isotope excursion, present in many places in the world. The end Ordovician mass extinction is substantially different from the end Permian mass extinction characterized by a sharp decline at all taxonomic levels with high extinction rates, the absence of 'hold-overs', Lazarus and progenitor taxa, prevalent miniaturization of shell size, and a much slower recovery rate during the Triassic. This sharp contrast was enhanced by the relative intensity of both extinctions with widely different causes, patterns and consequences and by the relatively weak ecosystem disturbances through the Ordovician-Silurian transition rather than the ecosystem collapse during the early Triassic. A new family, Cathaysiorthidae, and five new genera or subgenera: *Aegiromena* (*Aegiromenella*), *Eopholidostrophia* (*Megapholidostrophia*), *Chunanella*, *Yuhangella* and *Eospirifer* (*Protospirifer*), are established, as well as fourteen new species: *Anisopleurella asiatica*, *Chunanella chunanensis*, *Deliella delicatula*, *Dolerorthis* (*D.*) *multicostellata*, *Epitomyonia subquadrata*, *Eopholidostrophia* (*Megapholidostrophia*) *magnifica*, *Eoplectodonta* (*E.*) *boucoti*, *Eospirifer* (*E.*) *eosinensis*, *Fardenia* (*F.*) *flexa*, *Hesperorthis orientalis*, *Katastrophomena zheganensis*, *Mendacella mutabilis*, *Sulcatospira simplex*, and *Yuhangella yui*.



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