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Ordovician Subcommission website: http://ordovician.stratigraphy.org
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### Cover photo

The Yerba Loca Formation (Middle-Upper Ordovician flysch) at Jáchal River gorge, in the Western Precordillera, San Juan Province of Argentina (photo by G.L. Albanesi, 2013). This locality was visited during the pre-symposium field trip of the 3rd International Conodont Symposium / 2013 Annual Field Meeting of IGCP 591, and will be viewed again during the post-conference field trip of the 4th International Paleontological Congress in October 2014.

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ORDOVICIAN NEWS Number 31 (for 2013)

Chairman’s Message

A cursory glance at Google Scholar reveals over 6000 publications involving our system in 2013, indicating another phenomenal year of research on the Ordovician System, its rocks and its fossils. A huge diversity of publications is again reported, ranging from hard-core taxonomy, through many key studies on evolutionary palaeoecology to leading-edge studies on stable isotopes of the system, its magmatism and tectonics. The Great Ordovician Biodiversification Event and the end-Ordovician extinctions continue to be foci for innovative research and high-profile and highly-cited papers. This number is likely to rise in 2014 as the results of the 3rd Annual IGCP 591 meeting in Lund are published later this year (see Early Palaeozoic Global Change, Calner et al. in press, online publications, GFF). The Lund meeting was an outstanding success and quite unique in formally engaging all three Lower Palaeozoic subcommissions for the first time. The meeting attracted almost 200 participants, including spouses and the organization committee, hailing from 23 countries, and including more than 30 PhD students who presented at the conference! The programme comprised more than 100 oral presentations and about 70 poster presentations, during three days of scientific sessions in Lund and followed by a well-attended post-conference excursion to key Lower Palaeozoic localities in southern Sweden and the Oslo Region of Norway. Both the abstracts (Lindskog and Mehlqvist 2013) and post-conference excursion guide (Calner et al. 2013) are available for download from the IGCP 591 website (links below). Virtually all the manuscripts to be included in the GFF thematic publication Early Palaeozoic Global Change are already published online on the GFF website (see link below) and the hard copy, including more than 70 manuscripts, will be printed in late March. Lead editor Mikael Calner wishes to thank all his guest editors (Guillermo Albanesi, Loren Babcock, Dave Harper, Oliver Lehnert and Mike Melchin) who have helped to assemble this extensive, multidisciplinary volume in only nine months. Useful links:

- Abstract proceedings (Lindskog and Mehlqvist 2013, 5.68 MB):
- Field Guide to southern Sweden and Norway (Calner et al. 2013, 35.49 MB):
- Early Palaeozoic Global Change (Calner et al. in press, online publications):
  http://www.tandfonline.com/action/showAxaArticles?journalCode=sgff20#.Uv4wZmwV-70

Meanwhile, in the Southern Hemisphere in 2013, Guillermo Albanesi and his team from Argentina successfully organised the Annual Field Meeting of IGCP 591, combined with the 3rd International Conodont Symposium. The Ordovician System features prominently in the papers presented to this conference (compiled as Conodonts from the Andes Publicación Especial Nº 13 Asociación Paleontológica Argentina, available for download from http://www.apaleontologica.org.ar/?p=6829&lang=es), and also in the associated field trips. If you missed this meeting last year, then you will have a second chance to visit some of the outstanding Ordovician outcrops exposed in the Western Cordillera of Argentina by attending the 4th International Palaeontological Congress being held in Mendoza in late September and early October this year and participating in the post-IPC field trip being run by Marcelo Carrera and colleagues.
Two key meetings are rapidly approaching for IGCP 591: Early to Middle Paleozoic Revolution. The **4th Annual Meeting will be hosted in Estonia, between June 10-19, 2014**, with scientific sessions in Tartu to be preceded and followed by two geological excursions to study the Lower Paleozoic carbonate succession of Estonia. The annual theme for 2014 of IGCP 591 targets *Evolutionary paleoecology and paleobiogeography*, however, the annual meeting will not be limited to these topics. A broad range of contributions on Early to Mid Paleozoic geology are expected, from paleontology and stratigraphy to geochemistry, paleogeography and climate modeling. **The IGCP 591 Field Workshop for 2014 will be held from August 12-21 in China.** This meeting will be organised jointly with ISSS, ISOS and ISCS, and will be hosted by the Yunnan University in Kunming (SW China). 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.

We already have an important date for your diary in 2015. The 12th International Symposium on the Ordovician System will be held on the campus of James Madison University ([www.jmu.edu](http://www.jmu.edu)) in the City of Harrisonburg, Virginia, USA ([http://www.harrisonburgtourism.com](http://www.harrisonburgtourism.com)). The entire symposium including pre and post conference fieldtrips will run through 3rd-17th June 2015. For full details please see the First Circular later in this edition of *Ordovician News*.

All these forthcoming meetings will be supported by the Subcommission and further information is located on the subcommission’s webpages ([http://ordovician.stratigraphy.org](http://ordovician.stratigraphy.org)), launched by Olle Hints in late 2012. These are your webpages and I hope many of you will contribute to them, to add a continued dynamism and vibrancy to our system and help promote our exciting Ordovician research to the wider community.

I would like to highlight one last publication! As mentioned elsewhere, the final volume from IGCP 503 was published late in 2013 as Geological Society Memoir 38 (*Early Palaeozoic biogeography and palaeogeography*, edited by Harper and Servais). Twenty-nine chapters cover virtually all the fossil groups through this interval and the volume will be an important source of reference for all Ordovician workers. This has been a very long haul but we are convinced this will be a lasting contribution to Lower Palaeozoic research.

Finally once again I thank all of you, particularly Ian Percival (Secretary) and Andrei Dronov (Vice Chair), for your continued important input and support. It is your system, we merely provide an infrastructure that we hope will stimulate and support your research. And on that note I hope as many of us as possible can meet up in Mendoza between 29th September – 3rd October this year for our session *Ordovician biotas of Gondwana: responses to global climatic and eustatic events, and their biogeographic relationships within the Ordovician world* (Organizers: David Harper and Andrei Dronov) during the 4th International Palaeontological Congress in Argentina.

**David A.T. Harper**  
Chair, Subcommission on Ordovician Stratigraphy
International Commission on Stratigraphy
Subcommission on Ordovician Stratigraphy

ANNUAL REPORT 2013

1. Name of constituent body:
Subcommission on Ordovician Stratigraphy (SOS)

Submitted by:
David A.T. Harper
Chairman, SOS
Department of Earth Sciences
Durham University
Durham DH1 3LE
UK
Tel. 0044 1913347143
Fax 0044 1913345991
E mail: david.harper@durham.ac.uk

Andrei Dronov
Vice Chairman, SOS
Geological Institute
Russian Academy of Sciences
Pyzhevsky per.7
119017 Moscow
Russia
Tel.: +7 (495) 959-30-17
Fax: +7 (495) 959-07-60
E-mail: Dronov@ginras.ru

I.G. Percival
Secretary, SOS
Geological Survey of NSW
NSW Department of Primary Industries
W.B. Clarke Geoscience Centre
47-953 Londonderry Road
Londonderry
New South Wales 2753
Australia
E-mail: ian percival@industry.nsw.gov.au
2. Overall objectives, and Fit within IUGS science policy:

The Subcommission promotes international cooperation on all aspects of Ordovician geology, specifically stratigraphy. It has a global network involving both academia and industry.

Specific objectives are:

a. To delimit and subdivide the Ordovician System (and Period) as a part of the overall ICS mission to elaborate the standard global stratigraphic scale. This work aims to establish the boundaries (GSSPs), the correlation of the subdivisions (Stages and Series), the nomenclature of the subdivisions and periodically review the effectiveness and utility of these decisions.

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

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

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

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

3. Summary table of Ordovician subdivisions

<table>
<thead>
<tr>
<th>SYSTEM GLOBAL SERIES</th>
<th>GLOBAL STAGES</th>
<th>KEY GRAPTOLOITE/ CONODONT(C) BIOHORIZONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordovician</td>
<td>HIRNANTIAN</td>
<td>A. ascensus (GSSP-Dob's Linn)</td>
</tr>
<tr>
<td></td>
<td>KATIAN</td>
<td>N. extraordinarius (GSSP-Wangjawan North)</td>
</tr>
<tr>
<td></td>
<td>SANDBIAN</td>
<td>D. caudatus (GSSP-Black Knob Ridge)</td>
</tr>
<tr>
<td></td>
<td>DARRIMILIAN</td>
<td>N. gracilis (GSSP-Fågelåsen)</td>
</tr>
<tr>
<td></td>
<td>DAPINGIAN</td>
<td>U. austrodentatus (GSSP-Huangnitang)</td>
</tr>
<tr>
<td></td>
<td>FLOIAN</td>
<td>B. triangulans (C), (GSSP-Huanghuachang)</td>
</tr>
<tr>
<td></td>
<td>TREMADOCIAN</td>
<td>T. approximatus (GSSP-Diabasbrottet)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I. fluctivagus (C) (GSSP-Green Point)</td>
</tr>
</tbody>
</table>
4. Organization

a. Subcommission Executive (from August 2012)
   Chairman, David A.T. Harper (UK)
   Vice Chairman, Andrei Dronov (Russia)
   Secretary, Ian G. Percival (Australia)
   16 other Voting Members
   Over 100 Corresponding Members

The Subcommission officers and voting members have been agreed for the next term from 2012-2016. Prior to the Subcommission’s business meeting during the Brisbane IGC (2012) a postal ballot confirmed the election of the new Subcommission officers, and elected a new group of voting members. The new Subcommission not only includes a broad national representation and coverage of key fossil groups but also specialists in interdisciplinary fields such as geochemistry and sedimentology.

F.G. Aceñolaza (Argentina)
G.L. Albanesi (Argentina)
A.V. Dronov (Russia)
O. Fatka (Czech Republic)
D. Goldman (USA)
M. Ghobadi Pour (Iran)
D.A.T. Harper (Denmark)
O. Hints (Estonia)
Li Jun (China)
S. Leslie (USA)
A.T. Nielsen (Denmark)
I.G. Percival (Australia)
M.R. Saltzman (USA)
A. Sa (Portugal)
T. Servais (France)
T. Tolmacheva (Russia)
T. Vandenbroucke (Belgium)
M. Williams (UK)
Zhang Yuandong (China).

5. Interfaces with other international projects

IGCP Project 503 (now completed): Arguably the most sustained rise in marine biodiversity took place during the Ordovician, and the second largest mass extinction event took place close to the end of that Period, coincident with an episode of major climate fluctuation. IGCP project n° 503, a new successor project (IGCP project n° 410) developed a better understanding of the environmental changes that influenced the biodiversity trends in the Ordovician and Early Silurian. In this project, the major objectives were thus to attempt to find the possible physical and/or chemical causes (e.g., related to changes in climate, sea level, volcanism, plate movements, extraterrestrial influences, etc.) for the Ordovician biodiversification, the end-Ordovician extinction, and the subsequent Silurian radiation. The
final volume of the project ‘Early Palaeozoic biogeography and palaeogeography’ published by the Geological Society (Harper and Servais [eds], Memoir 38) has now been printed (see below).

**IGCP Project 591:** The early to middle Palaeozoic revolution. This new project involving some 400 participants from nearly 40 countries has a strong Ordovician component and is supported by the subcommission. The project has already featured at international congresses in Spain, the UK and the USA. Last June over 200 colleagues gathered in Lund, Sweden for the first ever meeting of all three Lower Palaeozoic subcommisions under the organizational umbrella of IGCP 591. The thematic issue of *GFF* arising from the meeting is in preparation (see below).

### 6. Chief accomplishments and products in 2013 cycle

a. *Ordovician News No. 30* was produced and posted on the Subcommission website and is available for download.

b. The new website for the Ordovician Subcommission designed and edited by Olle Hints is now very much up and running at [http://ordovician.stratigraphy.org/](http://ordovician.stratigraphy.org/).

c. Publication of the Geological Society, London Memoir 38, ‘*Early Palaeozoic biogeography and palaeogeography*’. This Memoir, edited by Harper and Servais, first introduces the content, some of the concepts involved in describing and interpreting palaeobiogeography, and the changing Early Palaeozoic geography is illustrated through a series of time slices. The subsequent 26 chapters, compiled by some 130 authors from over 20 countries, describe and analyse distributional and in many cases diversity data for all the major biotic groups plotted on current palaeogeographic maps. Nearly a quarter of a century after the publication of the ‘Green Book’ (Geological Society, London, Memoir 12, edited by Mc kerrow and Scotese), improved chronostratigraphic and taxonomic data together with more accurate, digitized palaeogeographic maps, have confirmed the central role of palaeobiogeography in understanding the evolution of Early Palaeozoic ecosystems and their biotas. All the articles are now available online through the Geological Society’s ‘Lyell Collection’.

d. A substantial *GFF* special issue, arising from the IGCP 591 meeting in Lund, edited by Calner, Lehnert, Albanesi, Babcock, Harper & Melchin: *Early Palaeozoic Global Change*, is near completion and many articles are already available online through the Taylor and Francis website.

### 7. Chief problems encountered in 2013

Critical to the development of the research on the system is the improvement of regional chronostratigraphies, isotope curves, palaeogeographies and zonal schemes. The coming years will see an emphasis on renewed data collection and its integration with the global standard. But this will require global participation of all our regional groups. It is also clear that the system has few reliable, absolute dates. This forms part of a new ISOS sponsored project with StarPlan in the University of Copenhagen.
8. Summary of expenditure for 2012-2013

TOTAL INCOME (from ICS): USD 2666
   a. Support for attendance of officers and presenters at the Lund, IGCP 591: 1630 USD.
   b. Grant towards production of Geol. Soc. Memoir on Early Palaeozoic biogeography and
geography (colour figures): USD 980.
   c. Miscellaneous costs: USD 56

TOTAL EXPENDITURE   USD 2666

9. Work plan, critical milestones, anticipated results and communications to be achieved
next year

a. To design and execute a programme of radiogenic dating of key Ordovician horizons (using
Pb-Pb isotopes) in collaboration with Dr James Connolly and the state-of-the-art StarPlan
laboratory in the University of Copenhagen. Work has already commenced on some key sections
in Baltoscandia.
b. Will stimulate where relevant the production of revised regional correlation charts on the basis
of new regional stratigraphic data and their relationship to the newly-established international
stages. In additional regional isotope and sea-level data will be added. During the Prague
meeting in May those present agreed to begin discussions in their own regions regarding
the possibilities of providing simple correlation charts, linking regional chronostratigraphies to the global stages. Results were discussed in Brisbane, 2012 and
Lund, 2013; these will be progressed to publication as a Special Paper, Geological Society.
c. Management of Subcommission will move to Tallinn with a new webmaster, Dr Olle Hints.
This has been achieved.
d. The subcommissions will participate in various meetings (and publications arising from these
meetings) during 2014, notably in Kunming (August) and Tartu (June).

During the business meeting at the final meeting of IGCP 503 and at the ICS meeting in Prague
together with the ISOS meeting in Alcalá de Henares, plans were formalized with the agreement
of the subcommission to form a number of working groups in the following areas:

1. There may be a requirement to evaluate the efficacy and utility of our stages and stage
boundaries. Where appropriate and/or necessary we will have to move to establish some
small advisory groups. One major boundary problem may need urgent attention and
was raised at the congress in Madrid. A position paper is in preparation. This
remains the case.

2. Clearly the Subcommission can now move with some confidence towards confirming
and establishing finer divisions of Ordovician time. In this respect Bergström et al.
(2009: *Lethaia*) have divided our international stages into stage slices based mainly on
existing biozones. Finer time slices were also proposed by Webby (2004: *The Great
Ordovician Biodiversification Event*, Columbia University Press) and used effectively in
developing data for the GOBE. As these time divisions are more widely adopted, it would
be useful to confirm their definition and status. These time slices have been used in the
recent *Palaeogeography, Palaeoclimatology, Palaeoecology* special issue on the
palaeoecology of the GOBE edited by Servais and Owen (2010). This was addressed at
the Madrid and Brisbane meetings. There is been no strong commitment to take this
forward to date.
3. Over the last few years we have neglected somewhat the role of the regional groups and the many important regional and diverse stratigraphies that make our system so exciting. A number of the key regional successions were included in the correlation charts provided by Bergström et al. (2009), but there more that require calibration with our new stages. Moreover a few regions such as Baltoscandia and SE Asia were never formally published. This is a priority for our system and work that can involve all our colleagues. **This was fully addressed at the IGC in Brisbane.**

4. Work is now far advanced on a Carbon stable isotope curve for the Ordovician. Consistent results have been already achieved for parts of the column. There are of course other stable isotopes and it will be appropriate and useful to evaluate if we can help develop these curves not least as one of our nonbiologic means of correlation. There are other nonbiologic techniques that we could also consider. **These issues were addressed in a recent issue of Palaeogeography, Palaeoclimatology, Palaeoecology edited by Munnecke, Calnar and Harper (2010).**

5. A more difficult area is sea-level or water-depth curves for the period. There have been a number of curves for the Ordovician and many more for particular parts of the period. It would be useful to examine these curves more carefully and the criteria upon which they are based with a move towards developing more standardised curves for the Ordovician. **Some of these issues were addressed in the recent issue of Palaeogeography, Palaeoclimatology, Palaeoecology edited by Munnecke, Calnar and Harper (2010) and were addressed further at the Brisbane IGC.**

6. We now have a number of accurate palaeogeographic maps for our period. Not everyone agrees with all the reconstructions and perhaps they never will. But it is possible to engage in cooperation with some of the groups to develop a more standard set of base maps for the period. **This is now an active area research with the wide availability of Trond Torsvik’s BugPlates program has formed the basis for many chapters in the recently published GSL Memoir on Early Palaeozoic biogeography and geography edited by Harper and Servais (2013).**

7. We already have a number of robust absolute dates for parts of the system but it would useful to develop more, not least to be able to calibrate the true rates of biological and geological process occurring during the period. **Discussions are now ongoing with a number of geochronology laboratories, for example the StarPlan group in Copenhagen, whose terrestrial dating facility is headed up by Dr Jim Connelly. These discussions are ongoing (see workplan for 2014).**

8. We have tended as a group to ignore the economic potential of our system. But, for example in New South Wales, nearly all the gold and copper mines are hosted in Ordovician volcanics of the Macquarie Arc and in China considerable funding is being made available through SINOPEC (the Chinese petroleum company) to support research into Ordovician biostratigraphy. **A strategy is under discussion.**

10. **Budget and ICS component requested for 2012-2013**

   1. Seedcorn funding for Radiogenic dating programme, mainly fieldwork costs: 2500 USD
   2. Support for attendance at IGCP Annual Meeting, Tartu (June 2014): 1000 USD
   3. Support for attendance at IGCP Field Meeting, Kunming (August 2014): 2500 USD.

**TOTAL 2013-2014 BUDGET: 6000 USD**  
**REQUESTED FROM ICS: 6000 USD**
Potential funding sources outside IUGS

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

11. Review chief accomplishments over last ten years (2001-2011)
   a. Approval, ratification, and dedication of the Green Point GSSP for the base of the Ordovician System.
   b. Approval, ratification, and dedication of the Diabasbrottet and Fågelsång GSSPs for the bases of the upper stage of the Lower Ordovician Series and the Upper Ordovician Series, respectively.
   c. Approval, ratification, and dedication of the Black Knob Ridge section, Oklahoma, USA and the Wangjiawan North, Yichang, China GSSPs for the bases of the Katian and Hirnantian stages, respectively.
   d. Approval, ratification, and dedication of the Huanghuachang section, Yichang, China for the base of the Dapingian Stage, which coincides with the base of the Middle Ordovician.
   e. With publication in 2000 of A Revised Correlation of Ordovician Rocks in the British Isles, correlation charts have been completed for Ordovician rocks on virtually all continents.
   f. The 9th International Symposium on the Ordovician System held in San Juan, Argentina, in August 2003, in conjunction with the 7th International Graptolite Conference and a Field Meeting of the Subcommission on Silurian Stratigraphy and publication of 556 page proceedings, 130 participants represented 18 countries, 124 papers were presented in technical sessions.
   g. Publication of Ordovician News nos. 17-27 and their posting on the Subcommission’s web site.
   h. Development of the web site “Ordovician Stratigraphy Discussion Group” to facilitate discussions on selection of the GSSPs. This site has evolved into the Subcommission’s web site and also includes postings of Ordovician News.
   i. Sponsorship of a technical session and field excursion on the GSSP for the base of the Middle Ordovician Series at the Annual Meeting of the Geological Society of America in November 2000.
   j. Sponsorship at the 31st International Geological Congress, Rio de Janeiro, Brazil, 2000, of the symposium “Paleontological, stratigraphical, and paleogeographical relations among South America, Laurentia, Avalonia, and Baltica during the Ordovician.”
   l. Launched GOES (Global Ordovician Earth System) Program to stimulate integrated multidisciplinary studies of global events (mass extinction, sea-level changes, greenhouse conditions, tectonics) during the Ordovician Period.
   o. Selection of names for 2nd, 3rd, 5th, 6th and 7th stages of the Ordovician System.
   p. Sponsorship of the 2006 IGCP 503 Glasgow meeting on “Changing palaeogeographical and palaeobiogeographical patterns in the Ordovician and Silurian”.
   q. Sponsorship of the 2007 Yangtze Conference (the 10th Ordovician Conference) that was combined with the 3rd Silurian Conference and the IGCP 503 annual meeting in Nanjing. The combined conference was attended by 140 scientists from 24 countries; 66 papers and 22 posters
were presented, with publication of these in a Proceedings volume of 566 pages. Two field guides were also printed.
r. Publication of ‘The new chronostratigraphic classification of the Ordovician System and its relations to major series and stages and to $\delta^{13}$C chemostratigraphy’ *Lethaia* 2008.

s. Support and participation in the following major conferences during 2008: 7th Baltic Stratigraphic Conference, Tallinn, and associated field excursions, May 2008 and ‘Development of Early Paleozoic Biodiversity: The role of biotic and abiotic factors, and event correlation’ Moscow, June 2008 and the subsequent field excursion to the Altai Mountains; 33rd IGC in Oslo during August 2008 and the IGCP 503 ‘International Congress on Palaeozoic Climates’ in Lille, France during August, 2008.

t. Support, participation and sponsorship of the following major conferences during 2009. NAPC Cincinnati 21-26 June and IGCP 503 Copenhagen 31 August – 4 September.

u. Agreement in principle to establish a new range of working groups tackling a wide spectrum of areas of Ordovician with a view to developing new products for the community.


z. Sponsorship of the 2011 Madrid Conference (the 11th Ordovician Congress), held in the spectacular surroundings of Alcalá de Henares, with field excursions to Portugal and central and northern Spain. The proceedings ‘Ordovician of the World’ was sponsored by the Subcommission on Ordovician Stratigraphy. It contains 100 contributions, most of which in the form of short papers, which were delivered as oral presentations or posters at the symposium. This volume represents a wealth of cutting-edge research on Ordovician rocks from around the world, and includes contributions from 228 authors and coauthors from 23 countries on four continents. Three field guides were also printed.

aa. Launch of IGCP 591: The early to middle Palaeozoic revolution. This new project involving some 400 participants from nearly 40 countries will have a strong Ordovician component and is supported by the subcommission.

bb. Support and attendance at a thematic symposium on Ordovician research during IGC 34 in Brisbane: 35.4 International Subcommission on Ordovician stratigraphy: Ordovician intercontinental correlations: developing global and regional chronostratigraphy. This was well attended and will act as a catalyst for a publication in 2014 on Ordovician chronostratigraphies in the regions.

cc. Publication of the Geological Society, London Memoir 38, ‘Early Palaeozoic biogeography and palaeogeography’. This Memoir, edited by Harper and Servais, first introduces the content, some of the concepts involved in describing and interpreting palaeobiogeography, and the changing Early Palaeozoic geography is illustrated through a series of time slices. The subsequent 26 chapters, compiled by some 130 authors from over 20 countries, describe and analyse distributional and in many cases diversity data for all the major biotic groups plotted on current palaeogeographic maps. Nearly a quarter of a century after the publication of the ‘Green Book’ (Geological Society, London, Memoir 12, edited by McKerrow and Scotese), improved chronostratigraphic and taxonomic data together with more accurate, digitized palaeogeographic maps, have confirmed the central role of palaeobiogeography in understanding the evolution of Early Palaeozoic ecosystems and their biotas. All the articles are now available online through the Geological Society’s ‘Lyell Collection’.
dd. Support and attendance at the 2nd Annual Meeting of ICGP 591, supported for the first time by all three Lower Palaeozoic subcommissions. A substantial GFF special issue, edited by Calner, Lehnert, Albanesi, Babcock, Harper & Melchin: Early Palaeozoic Global Change, is near completion and many articles are already available online through the Taylor and Francis website.

ee. A thematic symposium at the 4th International Palaeontological Congress, Mendoza, Argentina will be sponsored by the Ordovician Subcommission ‘Ordovician biotas of Gondwana: responses to global climatic and eustatic events, and their biogeographic relationships within the Ordovician world’.

ff. The new website for the Ordovician Subcommission designed and edited by Olle Hints is now very much up and running at [http://ordovician.stratigraphy.org/](http://ordovician.stratigraphy.org/).


*******************************************************************************

Attendees at the 2013 Annual Meeting of IGCP 591 at Lund, Sweden
([http://igcp591.org/media/lund2013_group.jpg](http://igcp591.org/media/lund2013_group.jpg))
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 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

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About Estonia
Estonia is located in northern Europe, between Russia, Latvia, Finland and Sweden. With an area of 45,000 km² 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.
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 and 10 (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.

<table>
<thead>
<tr>
<th>Hotel</th>
<th>Rooms and prices</th>
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| Tallink City Hotel ****
http://www.tallinkhotels.com|
The Tallink City Hotel is a modern and exclusive business class hotel in the centre of Tallinn.
To book a room with special price please send an e-mail to hotelbooking@tallink.ee with your name and accommodation dates, and mention the keyword IGCP2014. NB! Pre-booked rooms and special prices are valid only until April 1st, 2014. |
| Academic Hostel http://academichostel.com|
Located in the Tallinn University of Technology campus, 7 km from the city centre, this place provides a low-budget accommodation. 10 double rooms are pre-booked. Make personal reservation before April 1, 2014, with keyword IGCP2014. | Standard single: EUR 54
Standard twin/double: EUR 54
Double de Luxe: EUR 79
Junior Suite: EUR 124
Suite: EUR 224
Royal Suite: EUR 244
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.
Double room: EUR 25
NB! No breakfast is included. |
Accommodation 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.

**Hotel Antonius *******
http://hotelantonius.ee
8 rooms pre-booked until **April 30, 2014**. To make personal reservation send e-mail to sales@hotelantonius.ee with keyword **IGCP2014**.

**Room price per night**

- Single: **EUR 100**
- Twin/Double: **EUR 128**
- Breakfast included

**Hotel London ******
http://www.londonhotel.ee
12 rooms pre-booked until **April 12, 2014**. For personal booking send an e-mail to london@londonhotel.ee with keyword **IGCP2014**.

**Student accommodation**

- Single: **EUR 72**
- Twin/Double: **EUR 83**
- Breakfast included

**Hotel Pallas *****
http://www.pallas.ee
50 rooms pre-booked until **April 12, 2014**. For personal booking send an e-mail to pallas@pallas.ee with keyword **IGCP2014**.

**Hotel Dorpat *****
http://www.dorpat.ee
30 rooms pre-booked until **June 1, 2014**. For personal booking send an e-mail to info@dorpat.ee with keyword **IGCP2014**.

**Hotel Tartu *****
http://www.tartuhotell.ee
30 rooms pre-booked until **May 5, 2014**. Personal booking at hotel website with keyword **IGCP2014**.

**Student accommodation**

- Single: **EUR 40**
- Twin/Double: **EUR 55**
- Breakfast included

Check options and availability at http://kyla.ee

Registration fees and payment
Conference fee: **EUR 150**
Conference fee for students: **EUR 100**
Accompanying persons fee: **EUR 75**
Late conference fee: **EUR 250**
If paid after March 31st, 2014
Lunch tickets (optional): **EUR 30**
Buffet lunches during the conference, June 13-15, 2014
Pre-conference excursion: **EUR 200**
Ordovician, includes transportation, guidebook, one night accommodation and field lunches. The number of places is limited.
Post-conference excursion: **EUR 400**
Silurian, includes transport, guidebook, accommodation on Saaremaa Island (three nights), and field lunches. The number of places is limited.

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.

**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.

**Registration and ice-breaker**  
Registration of participants in Tartu will be open 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 look at [http://vvv.ebc.ee/](http://vvv.ebc.ee/); see also the map on conference website). Ice breaker will start at 18:00 on June 12th, 2014.

**Conference dinner and spouse activities**  
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 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. 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. Please note that the number of places is limited on both excursions. The places are booked in the order of registration date and kept only for those who pay the fee before March 31.

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); the maximum number of participants is limited to 60.
Please note that participants will return to Tallinn after the first excursion day (June 10) and need to book accommodation on their own (check the options above). The second day (June 11) will end in NW Estonia where accommodation is arranged and included in the fee. On June 12 the excursion will end in Tartu. 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).
- Ristna coastal 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, kerogene-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 for three nights and field lunches); the maximum number of participants is limited to **30**. The stops to be visited include:
- **Kalana quarry** (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)
- **Soegëëina cliff** (Ludlow)
- **Kaarma quarry** (Ludlow)
- **Kaugatuma and 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 Toom (Tallinn) ursula.toom@ttu.ee; Mare Isakar (Tartu) mare.isakar@ut.ee.

**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)
- **Živilė Žigaitė** (Evolutionary Biology Centre, Uppsala University)

**Contact and further information**
**Website**: http://igcp591.org/2014  
**E-mail**: 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

Labels: 
- **Geological Museum**: Tartu, Estonia
- **Fossil Collection**: Tallinn, Estonia
- **Silurian Sediment**: Saaremaa, Estonia
- **Llandovery Limestones**: Estonia
- **Přidoli Formation**: Estonia
- **Tallinn University of Technology**: Estonia
- **Institute of Geology**: Estonia
- **Geological Survey of Estonia**: Estonia
- **Geological Society of Estonia**: Estonia
- **Department of Geology**: University of Tartu, Estonia
- **Department of Geology**: University of Tallinn, Estonia
- **Department of Earth and Environmental Sciences**: University of Iowa, USA
- **Institute of Geology at Tallinn University of Technology**: Estonia
- **GeoZentrum Nordbayern**: Erlangen, Germany
IGCP 591: *Early to Middle Paleozoic Revolution*

Field Workshop 2014

jointly with

International Subcommission on Silurian Stratigraphy (ISSS),
International Subcommission on Ordovician Stratigraphy (ISOS) &
International Subcommission 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

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

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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 information on other nearby hotels in the full version of the Second Circular for this meeting, available from the IGCP 591 website http://igcp591.org/.

Registration Fees and Payment The registration fee for the scientific sessions (see details in the Registration Form) 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.
8:00am: Departure from the Conference Venue, Kunming. 10:00–10:40: Maotianshan Mountain, the original fossil site of the Chengjiang Lagerstätte, 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.
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 Qüijing, 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 Qüijing City.

Day 2 (Aug. 17): Qüijing 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 prosauropod dinosaurs were buried and are being exhibited in situ. Overnight in the Dali Ancient City.

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

**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), 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, mobile: +86-13913927224, Office: +86-25-83282189.
ZHAN Renbin: rbzhan@nigpas.ac.cn, mobile: +86-13851647619, Office: +86-25-83282132.

**Registration Form**
A Registration Form is available in the full version of the Second Circular for this meeting, available from the IGCP 591 website [http://igcp591.org/](http://igcp591.org/)

Please fill in the form, scan it and send it to Huang Bing (bhuang@nigpas.ac.cn) or Zhan Renbin (rbzhan@nigpas.ac.cn) at your earliest convenience before May 15, 2014.
4th International Palaeontological Congress
The History of Life: a View from the Southern Hemisphere
Mendoza, Argentina  September 28 – October 3, 2014

Full details of the 4th IPC are available from the Congress website
http://www.ipc4mendoza2014.org.ar/

Please note the following important dates
Close of Early Bird Registration has been extended to March 31, 2014
Final day for booking of field trips  March 31, 2014
Deadline for submission of Abstracts  April 15, 2014

Post-congress field excursion A Palaeozoic Marine Journey through the Argentine Precordillera (October 4-7) will visit significant Ordovician outcrops (see photographs below)

Leaders: Marcelo G. Carrera (CICTERRA-CONICET, Universidad Nacional de Córdoba), Gabriela Cisterna (CONICET, Universidad Nacional de La Rioja), Juan J. Rustán & Andrea Sterren (CICTERRA-CONICET, Universidad Nacional de Córdoba)

The main purpose of the field trip is to provide an introduction to the Geology and Palaeontology of the Argentine Precordillera in San Juan Province. Understanding the geological framework and palaeontology of this basin is essential to many current and proposed ideas related to the origin and evolution of this region and its fossil biota.

The Precordillera basin in Western Argentina includes one of the most spectacular Palaeozoic outcrops worldwide. It comprises 3500 meters of Cambrian-Lower Ordovician carbonate units with plentiful fossil remains mainly represented by brachiopods, trilobites, sponges, echinoderms and molluscs. The route as chosen will show also the different Upper Ordovician, Silurian and Devonian outcrops composed of thousands of meters of siliciclastic units dominated by brachiopods, trilobites, echinoderms and corals. Finally, superb continental and marine Carboniferous and Permian richly fossiliferous outcrops cap the Palaeozoic succession with amazing landscapes.

Left: Guandacol Formation (Carboniferous continental strata) unconformably overlying the San Juan Formation (Lower-Middle Ordovician marine limestones – close to the road) at Buenaventura Luna locality, Precordillera of San Juan Province, Argentina (photo by Guillermo Albanesi, 2013). Right: Tremadocian reef-mounds from the Cerro La Silla section (base of the San Juan Formation) in the Argentine Precordillera (photo by M. Carrera).
12th ISOS First Circular
June 2015 at James Madison University, Harrisonburg
Central Appalachian Mountains
Eastern United States

NOTE: All costs listed are estimates.

Organizing Committee
Stephen A. Leslie, James Madison University (Chair)
Daniel Goldman, University of Dayton (Co-Chair)
John T. Haynes, James Madison University
Matthew R. Saltzman, The Ohio State University
John Taylor, Indiana University Pennsylvania
Achim Herrmann, Louisiana State University
Charles E. Mitchell, University of Buffalo
John E. Repetski, United States Geological Survey
Randi Ordnorff, United States Geological Survey
Stig M. Bergström, The Ohio State University
Jesse Carlucci, Midwestern State University
Stephen R. Westrop, University of Oklahoma

Important Dates
First Circular distributed March, 2014
Second Circular scheduled September/October 2014 [including Call for Abstracts]
Third Circular scheduled March 2015 [with provisional program]
Pre-Meeting Field Trips June 3-7, 2015
Technical Sessions June 8, 9, 10, 2015
Conference Field Trip June 11 (included in registration)
Post-Meeting Field Trips June 12-17, 2015.

Location
The meeting will be on the campus of James Madison University (www.jmu.edu) in the City of Harrisonburg (http://www.harrisonburgtourism.com). We are located in the beautiful Shenandoah Valley of Virginia (http://www.shenandoahvalleysbest.com) close to major highways (Interstate 81 and Interstate 64) and serviced by Shenandoah Regional Airport (airport code SHD, http://www.flyshd.com/). Both Richmond, Virginia (airport code RIC) and Washington, D.C. (airport code WAS) are approximately two hours away by car. Charlottesville (airport code CHO) is one hour away. Coaches will be available for transportation from Dulles International Airport (Airport Code IAD) to Harrisonburg at two times on June 7th. We will also provide coaches, if necessary, to Dulles on the morning of June 12th.

The town of Harrisonburg was officially chartered in the late 18th century, though its settlement began much earlier. Its population is just under 50,000 and growing. The weather in June is moderate, with average monthly temperatures ranging from an average low of about 15 °C (59°F) at night to an average high of 28°C (83°F) during the day.
Those who enjoy outdoor activities will find many opportunities nearby for getting out. JMU's location lies between the Blue Ridge Mountains to the east and the Valley and Ridge to the west. Shenandoah National Park is 15 miles to the east and offers some of the best scenery in the eastern US along the scenic Skyline Drive.

**Technical Sessions**
Technical sessions will be held at the university, and there will be ample spaces for small gatherings of all sizes. The Department of Geology and Environmental Science at JMU ([http://www.jmu.edu/geology/index.shtml](http://www.jmu.edu/geology/index.shtml)) is one of the largest undergraduate-focused programs in the eastern US, with over 15 faculty and roughly 130 geology and Earth science majors. The resources of the department, e.g. lab spaces equipped with microscopes, will be available during the meeting. If there is a specific type of space that your research group needs for a meeting, please let us know and we will do all we can to arrange it for you.

**Publication**
A conference volume will be published as part of a theme issue for the journal *Stratigraphy*. A Short Papers/Abstracts volume and a Field Guidebook volume will be available at the meeting as a pdf and given out to participants in printed form. The *Stratigraphy* theme issue will be published post meeting. Invitation for papers/call for papers for the Theme Issue of *Stratigraphy* is forthcoming. The Short Papers/Abstracts volume and Field Guidebook volume pdf will be available at the public access site for *Stratigraphy*, on the Ordovician Subcommission website, and on the meeting website with free access.

**Lodging & Meals**
Both lodging and meals are available on-campus. Below are current costs. Please note that these costs may increase at a maximum rate of 5% per year.

<table>
<thead>
<tr>
<th>University dorm housing* (Per person/per night)</th>
<th>NO A/C</th>
<th>WITH A/C</th>
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<tr>
<td>SINGLE OCCUPANCY</td>
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<td>$36.50</td>
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<table>
<thead>
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<th>University meal plan (Per person/per day)</th>
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</thead>
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<tr>
<td>MON - SUN</td>
<td></td>
</tr>
<tr>
<td>Breakfast</td>
<td>$6.50</td>
</tr>
<tr>
<td>Lunch</td>
<td>$8.25</td>
</tr>
<tr>
<td>Dinner</td>
<td>$8.50</td>
</tr>
<tr>
<td></td>
<td>$23.25 + 6.5% local meals tax</td>
</tr>
</tbody>
</table>

* Room rates do not include linen. For optional linen service, a per person charge of $7.50 per week will be assessed.

In addition to the university housing and meal plan there are many hotels and restaurants within easy walking distance. The hotels listed below and shown on the map are examples of what is in close proximity to the university and to the proposed meeting venue. Prices subject to change.
Hotel/Inn Conference Rates are subject to change based on hotel contract.

A Courtyard by Marriott
1890 Evelyn Byrd Ave.
ph 540.432.3031
fx 540.432.3032
reservations # same
Conf Rate: $79 + 11% tax
Contact: Franita Coleman
e-mail: franita.coleman@marriot.com

B Comfort Inn
1440 E. Market St.
ph 540.433.6066
fx 540.433.0793
reservations # same
Conf Rate: $69 - $89 + 11% tax
Contact: Jenifer Jackson

C Holiday Inn
1400 E. Market St.
ph 540.433.2521
fx 540.434.7693

(Holiday Inn continued)
reservations # 800.708.7037
Conf Rate: $83 + 11% tax
Contact: Brenda Zirkle

D Days Inn
1131 Forest Hill Rd.
ph 540.433.9353
fx 540.433.5809
reservations # 800.457.2792
Conf Rate: $55 + 11% tax
Contact: Andy

E Quality Inn
1881 Evelyn Byrd Ave.
ph 540.442.1515
fx 540.442.6655
reservations # 800.526.3766
Conf Rate: $77 + 11% tax
Contact: Christine Forehand
harrisonburgva@cphosp.com
F Candlewood Suites Extended Stay
~$65/night
1560 Country Club Road, Harrisonburg
(540) 437-1400

G Best Western
45 Burgess Rd.
ph 540.433.6089
fx 540.433.6485
Conf Rate: $64 + 11% tax
Contact: Gina Boyers/Janice Hartman

H Stonewall Jackson Inn B & B
~$149/night
547 East Market Street, Harrisonburg
(800) 445-5330

I Sleep Inn & Suites
1891 Evelyn Byrd Ave.
ph 540.433.7100
fx 540.437.2144
res # same
Conf Rate: $72 + 11% tax
Contact: Julie Spritzer
julie@beckcompanyhotels.com
dennis@beckcompanyhotels.com

J Hampton Inn Harrisonburg
85 University Blvd.
ph 540.432.1111, 437-1402
fx 540.432.0748
reservations # same
Conf Rate: $84 + 11% tax
Contact: karennesselrodt@hilton.com

(following not shown on map)
Fairfield Inn & Suites
1946 Medical Ave., 22801
ph 540.433.9333
fx 540.433.9332
reservations # 800.228.2800
Conf Rate: $83 + 11% tax
Contact: Richard Smith
email: rsmith@pgmhotels.com

Residence Inn
1945 Deyerle Ave., 22801
ph 540.437.7426
fx 540.437.7425
reservations # same
Conf Rate: $83 - $99 + 11% tax
Contact: Jordan Cassell
jordan.cassell@marriott.com
Field Trips: Details of the field trips will obviously change as they are more fully planned. There will be at least one pre-meeting field trip, a conference fieldtrip to Ordovician localities in the Shenandoah Valley area, and a post-meeting field trip.

To gauge the level of interest in the potential field trips, we request that those who are either (a) definitely planning, or who are (b) highly likely, to go on one or more field trips, please e-mail Steve Leslie lesliesa@jmu.edu with your intentions by June 30, 2014. This does not obligate you (or us) but will greatly assist our planning.

Pre-meeting field trips:

**Southern Appalachians – Leaders: Achim Herrmann and John Haynes**

This trip will begin in Birmingham, Alabama on June 3rd and will spend four days, June 4th-7th, visiting field sites. We will travel northeast in the Valley and Ridge province through northeastern Alabama, northwestern Georgia, eastern Tennessee, and western Virginia. We will examine exposures in both eastern and western facies of Ordovician strata. At eastern exposures we will see the carbonate to clastic transition, including the transition from shelf and shelf margin carbonates of the Lenoir and Pratts Ferry Formations upsection to the basinal graptolitic mudrocks of the Athens Shale, and the parallel transition of the Lenoir upsection into the redbeds and quartz arenites (Bays Formation, Greensport Formation, Colvin Mountain Sandstone) that are the molasse of the Blount foredeep section of the Taconic foreland basin. Near Gadsden we will see a spectacular exposure of the Attalla Chert Conglomerate above the regionally extensive Knox Unconformity. In western exposures we will see shallow shelf carbonates of the Chickamauga Group including a section where the first carbon isotope investigations of Ordovician strata in Alabama are being carried out. K-bentonites including the Deicke and Millbrig will be seen at several of these exposures as well, in both eastern and western facies belts. Traveling toward Chattanooga, Knoxville, Roanoke, and Harrisonburg we will again stop at many exposures of the Ordovician carbonates and clastics that comprise the Taconic shelf to basin and basin fill sequence of the southern Appalachians. There will be opportunities to examine shelf edge and downslope buildups in the Holston, Rockdell, and Effna Limestones, as well as additional exposures of the Knox Unconformity that will show the diversity of strata which were deposited on the karstic surface of the Knox. Sandbian and Katian K-bentonites and associated coarse sandstones including the Upper Ordovician clastics of the Sequatchie, Oswego, and Juniata Formations will provide a look at the transition from carbonate to clastic sedimentation that occurred regionally during the later Ordovician as a result of uplift in the Taconic orogen. Regional sealevel changes will be discussed as well. Exposures of the unconformable Ordovician-Silurian boundary will also be seen. A side trip to Nashville to see the Middle and Late Ordovician platform carbonates there is possible as well. Discussions at most stops will include summary findings from conodont and graptolite biostratigraphic investigations, as well as the local and regional paleoecological, tectonic, and structural settings and interpretations. This trip will end at the conference site in Harrisonburg, Virginia. Lodging, food and transportation in the field are covered in the field trip registration. Registration is expected to be approximately $600 for a minimum of 8 and a maximum of 20 participants.
**Possible trip to Oklahoma depending on interest**  
*Leaders: Dan Goldman and Jesse Carlucci*

This trip will visit the extensive Ordovician exposures in Oklahoma including the exposures of the upper Arbuckle Group (Early Ordovician), Simpson Group (Middle-Late Ordovician) and the Viola Springs Fm., Sylvan Shale, and Keel Limestone (Late Ordovician) along Interstate 35 through the Arbuckle Mountains. We will also visit the Womble Shale and Big Fork Chert at Black Knob Ridge, site of the Katian GSSP, and the Fittstown section that exposes the Bromide Formation and Viola Springs Fm., which is the auxiliary Katian GSSP section. This field excursion will meet on June 3rd at the airport in Dallas, TX. We will spend June 4th - 6th visiting field sites, and return to Dallas by 8:00 AM on June 7th where participants will fly to Harrisonburg. Participants need to make their own flight arrangements. Lodging, food and transportation in the field are covered in the field trip registration. Registration is expected to be approximately $550 for a minimum of 8 and a maximum of 20 participants.

**Conference Field Trip – Leaders: John Haynes and Randy Orndorff**

The Shenandoah Valley hosts classic Ordovician exposures of the Early, Middle and Late Ordovician. We will take advantage of these exposures during a trip on the third day of the four day conference to the classic Tumbling Run section at Strasburg, Virginia, where the carbonate shelf to ramp to basin transition that resulted from the Taconic orogeny in this region is exposed and which transitions upsection to the flysch of the Martinsburg Shale and then to the Silurian clastics. This will be followed in the afternoon by a trip to Germany Valley, West Virginia, where the shelf sequence is quite different from what is seen at Tumbling Run because of differences in depositional settings and perhaps sealevel change as well as accommodation space in the Taconic foredeep.

**Post-meeting field trips**

**Central and north-central Appalachians**  
*Leaders: Chuck Mitchell, John Taylor, John Repetski*

This trip will leave from Harrisonburg on June 12 and begin with the exposures of nearly the entire Ordovician sequence as developed along the Chesapeake & Ohio Canal along the Potomac River in Maryland (http://pubs.usgs.gov/pp/1691/). We will then travel north on June 13 to examine the spectacular exposures of Ordovician carbonates in central Pennsylvania including Sandbian to early Katian rocks that contain exposures of the widely known Deicke and Millbrig super-ashfall deposits and also span the GICE interval and the associated shift from clear-water tropical carbonate faunas to the mixed carbonate-siliclastic and cool-water assemblages that inhabited Katian environments in this region. The final leg of the field trip on June 14-16 will visit the classic Taconic foreland basin succession exposed in the Mohawk and Hudson river valleys of central New York State. We will follow a shelf to allochthon transect that begins (at the western-most sites) in supratidal to deep subtidal carbonates of the Black River and Trenton groups. These rocks contain a diverse and abundant shelly fauna. To the east, at classic exposures in the central Mohawk Valley, the carbonates are replaced by the Utica Group black shales, which yield primarily graptolites and the olenid trilobite *Triarthrus*. These disparate facies were strongly influenced by extensional fault motions that created a complex facies mosaic linked together by a series of distinctive fingerprinted and dated K-bentonite beds. Finally, farther east in the Hudson Valley region we will enter a zone dominated by synorogenic flysch and mélange that is capped by the hard-rock thrust belt.
of the classic Taconic Allochthon. In this region we will examine the early Katian Snake Hill Formation greywackes with their spectacular sedimentary structures, soft bottom shelly and trace fossil faunas, as well as the late Sandbian C. bicorns Zone Mount Merino Formation radiolarian cherts and black shales. We will return to Harrisonburg on June 17th. Lodging, food and transportation in the field are covered in the field trip registration. Registration is expected to be approximately $750 for a minimum of 8 and a maximum of 20 participants.

**Possible trip to Trail Creek, Idaho depending on interest**  
**Leaders: Dan Goldman and Steve Leslie**

This field trip will examine this exceptional series of exposures in the Ordovician and Silurian Phi Kappa and Trail Creek Formations in the beautiful Pioneer Mountains of central Idaho. We will visit the Trail Creek Summit, Little Fall Creek, Trail Creek road, and Trail Creek (creek) sections that have yielded beautiful graptolite faunas for nearly a century. In addition to examining a graptolite succession that spans most of the Ordovician Period (Floian to Hirnantian), participants will also have an opportunity to collect abundant conodonts on bedding plane surfaces, including some bedding plane assemblages. In addition to examining outcrops that have served as biostratigraphic reference sections for western North America, participants can also enjoy the restaurants, art galleries, and pubs of Sun Valley, one of North America’s premier winter ski resorts. Participants need to make their own flight arrangements to and from Idaho.

Arrive Boise Idaho, June 12th. Field excursion June 13-16th. Depart Boise Idaho, June 17th. Lodging, food and transportation in the field are covered in the field trip registration. Registration is expected to be approximately $850 for a minimum of 8 and a maximum of 12 participants. **This will be an extremely strenuous field excursion in rugged mountainous terrain that will require substantial climbing on talus slopes at elevation over ~2400 m (~7880 ft).**

**Conference Registration:** ~$325, **Student Registration $100**

The registration fee covers the costs of publication, conference bag, coffee breaks, symposium excursion and social activities. (Ultimate costs will be determined once reservations and meeting space costs are confirmed)

**Conference Dinner ~$65** (Ultimate cost will be determined once reservations and location is confirmed)

**Social Program for Accompanying Partners**


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NEW PUBLICATIONS OF INTEREST TO ORDOVICIAN RESEARCHERS

**Early Palaeozoic Biogeography and Palaeogeography**

Geological Society London Memoir 38


ISBN: 978-18623-373-8 Published: December 2013
Hardback 496 pp
Prices: List: £125, GSL members: £62.50,
Members of other qualifying societies: £75

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Obituaries

Professor ZHANG Wentang (1925-2013)

Prof. Zhang Wentang, 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. He was born in Henan Province, China 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 had been a research scientist at NIGP since its establishment in 1951, and dedicated more than 60 years of his career to working on 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 of Invertebrate Paleontology, responsible for the revision of several trilobite superfamilies.

(Thanks to his colleagues at NIGPAS for this tribute)

Prof. Richard Aldridge (deceased 4th February 2014)

Richard (Dick) Aldridge was an eminent British palaeontologist and widely respected conodont specialist. His career began at Southampton University before moving to a temporary lectureship at University College London and then to Nottingham University where he remained until 1989 when, during the Oxburgh Review of Earth Sciences, he moved to the University of Leicester, where he was Bennett Professor of geology and served two terms as Head of Department. Dick Aldridge's research focused primarily on conodont biostratigraphy and palaeobiology and one of his seminal contributions was to uncover the vertebrate nature of the long-enigmatic conodont animal, principally in collaboration with Derek Briggs and Euan Clarkson. This was achieved through careful analysis of skeletal remains, but also through analysis of rare soft tissue remains of conodonts. His studies of conodonts in the Ordovician Soom Shale lagerstatten of South Africa were another notable research area. Prof. Aldridge was awarded the Pander Medal of the Pander society in 2006. He was President of the Palaeontological Association and received the Lapworth Medal of the PA in 2011. He also was awarded the 2012 Coke Medal of the Geological Society of London. Dick Aldridge was previously President of the Palaeontological Association and President of the International Palaeontological Association. He was a true gentleman, a great scientist and will be sadly missed.

(adapted from biographical entry in Wikipedia, compiled by his colleagues at Leicester)

W.T. (Bill) Dean, author of many Ordovician trilobite papers over the years, died in mid-February, 2014. Bill was a quiet and highly competent trilobite specialist with long-standing interests (with field projects) in Turkey, as well as continuing Whittard’s earlier work on Palaeozoic stratigraphy in the Shelve Inlier and elsewhere in the Welsh Borderlands. (Thanks to John Cope for conveying this sad news, and to Barry Webby for additional observations – no obituary was available at the time this issue of Ordovician News was being distributed).
Guillermo ALBANESI (Argentina) is participating in projects on diverse topics of historical geology from the Lower Paleozoic of South America, including conodont biostratigraphy, chemostratigraphy, events, and paleothermometry. These projects are carried out with Gladys Ortega and colleagues from universities of Argentina and other countries. He continues his project on early Paleozoic conodont faunas from the Eastern Cordillera and Puna of northwestern Argentina, in collaboration with colleagues from different universities, including M.E. Giuliano (a PhD student associated with the project for the next years). G. Voldman is undertaking research on Cambrian-Ordovician conodont biostratigraphy, paleoenvironments and paleothermometry of Argentine basins under Guillermo’s supervision. He is also supervising F. Serra and N. Feltes who continue their studies (funded by CONICET scholarships) on Ordovician conodont biostratigraphy and paleoenvironments of mixed carbonate-siliciclastic sequences from the Argentine Precordillera, and undergraduate students M. Mango, G. Torre and B. Thalmeier who are developing their theses on conodont issues. Fernando Zeballos finished his post-graduate fellowship and got a new job at an oil company in Argentina.

As regional co-leader for the IGCP 591 “The Early to Middle Paleozoic Revolution”, Guillermo (with other co-leaders) is guest editing a special issue of *GFF* including contributions to the annual meeting of the project held in Lund in 2013. During 2014, Guillermo is responsible for the organization of the “XIX Congreso Geológico Argentino” that will be accomplished in Córdoba, next June, and is convening a symposium on biostratigraphy, lower Paleozoic biotas and events, in cooperation with Gladys Ortega. Also this year he will participate in the 4th International Palaeontological Congress in Mendoza, Argentina.

He is the director of the “Centro de Investigaciones Geológicas Aplicadas” (CIGEA, established August 2011; [http://www.efn.uncor.edu/investigacion/CIGEA](http://www.efn.uncor.edu/investigacion/CIGEA)) at the Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba, which includes a laboratory of micropaleontology especially equipped for conodont studies, in the campus installations of the Comisión Nacional de Energía Atómica (CNEA) at Córdoba. His current place of work and new office is in the CICTERRA (CONICET-UNC) at the university campus, with a repository space for the conodont collections at the Museo de Paleontología, FCEFyN, UNC.

Javier ÁLVARO (Spain) is working in Upper Ordovician discontinuities and gaps from Morocco, Spain and France, mainly related to the onset of the Hirnantian glaciation. In collaboration with Mansoureh Ghobadi Pour and Leonid Popov, he has been supporting stratigraphic controls on shelly and microphytoplancton distribution across the Katian-Hirnantian of the Zagros Ranges.
Chris BARNES (Canada) is continuing Ordovician conodont paleontology, stratigraphy, and isotope geochemistry research. The main current projects being: a) Ordovician paleotemperature record for tracking Argentine Precordillera across Iapetus Ocean determined from SHRIMP oxygen isotope measurements from conodonts (with Julie Trotter (UWA), Ian Williams (ANU) and Guillermo Albanesi (CONICET, Cordoba)); b) completion of a study of Katian conodonts from Wales (with Annalisa Ferretti (Univ. Modena) and Stig Bergström (Ohio State Univ.), and c) Ordovician and Silurian conodont biostratigraphy and paleoecology, Canadian Arctic Islands (with Shunxin Zhang (GSC), Jowett and Carson (PetroCanada)).

Chris Barnes
School of Earth and Ocean Sciences
University of Victoria, P.O. Box 1700, STN CSC,
Victoria, BC V8W 2Y2, Canada
Telephone: +1-250-920-8382
Fax: +1-250-721-6200
E-mail: crbarnes@uvic.ca

Denis BATES (United Kingdom) is working on the graptolite genus Cryptograptus, and on contributions on graptolites to the Treatise on Invertebrate Paleontology.

Denis Bates
Department of Geography and Earth Sciences, Aberystwyth University,
Aberystwyth, Ceredigion SY23 3DB, United Kingdom.
Telephone: (+44)1970617667
E-mail: deb@aber.ac.uk

Juan L. BENEDETTO (Argentina) is working on the taxonomy and phylogeny of Lower Ordovician brachiopods from the Central Andean basin of NW Argentina. The study, which includes the linguliforms from the Santa Rosita and Acoite formations, is being carried out in collaboration with the doctoral student Diego Muñoz, who also is writing a paper jointly with me on the taxonomy and stratigraphic distribution of the punctate orthide Lipanorthis. Research is continuing on the Middle Ordovician brachiopod faunas from the San Juan and the Las Chacritas formations. A paper on the early colonization of deep water dysoxic marine environments in the Precordillera (Los
Azules Formation, Darriwilian) is in the final stages of preparation. In late 2013, a PhD project started focused on the taxonomy, paleoecology and biogeography of organophosphatic and craniiform brachiopods from the San Juan Formation (upper Tremadocian-Darriwilian) and other Ordovician carbonate units of the Argentine Precordillera.

Juan L. Benedetto  
CICTERRA (Centro de Investigaciones en Ciencias de la Tierra)  
CONICET-Universidad Nacional de Córdoba  
Av. Velez Sarsfield 1611, Ciudad Universitaria  
X5016GCA - Córdoba - ARGENTINA  
jbenedetto@efn.uncor.edu

Matilde Sylvia BERESI (Argentina) continues working on sponges from the Cambrian and Ordovician carbonate platforms of the Precordillera, western Argentina. A systematic paper, with Dr. J. Keith Rigby, on Middle Cambrian sponge fauna of the Precordillera of Mendoza Province has been published by Neues Jahrbuch für Geologie und Paläontologie. Another systematic paper on the first spicules from the Silurian of the Argentina has been published by the Geological Journal. A paper on the Cambrian, Ordovician and Silurian distributions of non-stromatoporoid sponges in collaboration with J. Botting, L. Muir and M. Carrera has been published by the Geological Society London Memoir on Early Palaeozoic Palaeobiogeography and Palaeogeoigraphy. In collaboration with colleagues of the Sonora University, we have published a systematic work on Cambrian sponges and chancellorids of Sonora, México.

I am also researching the stratigraphy, microfacies and palaeo-environmental reconstructions of Ordovician limestones of central and eastern Precordillera with S. Heredia, and A. Mestre (conodonts) from the San Juan University. We have published short papers on nautiloids and a larval gastropod assemblage associated with the Yangtzeplacognathus crassus Zone (Darriwilian) in several Precordillera carbonate sections. I was actively involved in the organization of the 3rd International Conodont Symposium, held in conjunction with the IGCP 591 Regional Field Meeting, in Mendoza, Argentina, July 15-19, 2013.

Matilde Sylvia Beresi  
Avda. Adrián Ruiz Leal s/n, Parque Gral. San Martín (5500)  
Mendoza. Argentina.  
Telephone number: 54-261-5244247  
Fax number: 54-261-5244201  
E-mail: mberesi@mendoza-conicet.gob.ar

STIG M. BERGSTRÖM (USA) continues his global work on Ordovician conodonts, graptolites, biostratigraphy, chemostratigraphy and related subjects. Current work involves material from China, Sweden, UK, Ireland, Argentina, and North America. The past year has been very good publication-wise with 11 articles and 9 abstracts. I have had the opportunity to have great cooperation with specialists from several parts of the world during the past year and since January, 2014 Prof. Annalisa Ferretti, of Modena, Italy,
has been here for joint work on a variety of Ordovician conodont faunas. I greatly enjoyed participating in the Ordovician conference in Lund last summer where I had the opportunity to see many old friends.

**Stig M. Bergström**  
Professor of Geological Sciences  
School of Earth Sciences  
Division of Geological Sciences  
The Ohio State University  
125 S. Oval Mall  
Columbus, Ohio 43210 USA  
Phone (614) 292-4473 (office); (614) 457-2588 (home)  
e-mail Stig @ geology.ohio-state.edu  
Fax 614-292-1496

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**Alain BLIECK (France)** reports that last year he co-authored a paper with Ž. Žigaite, concerned in part with Ordovician vertebrate palaeobiogeography, for the *Geological Society Memoir* 38 edited by D.A.T. Harper and T. Servais.

**Dr. Alain Blieck**  
UMR 8217 "Géosystèmes" du CNRS  
e/o Université Lille 1 - Sciences et technologies  
UFR Sciences de la Terre (SN5)  
F-59655 Villeneuve d’Ascq cedex (France)  
tel. +33 320434140 ; fax: +33 320434910  
alain.blieck@univ-lille1.fr

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**Carlton E. BRETT (USA)** continued to work with Steve Westrop (University of Oklahoma), Lisa Amati (SUNY at Potsdam), Patrick McLaughlin (University of Wisconsin), Ben Dattilo (Indiana-Purdue University, Ft. Wayne), Rebecca Freeman (University of Kentucky) and University of Cincinnati students on a number of Ordovician projects in eastern North America. Results of stratigraphic studies on the Upper Ordovician Sandbian to Katian strata include the following:

A) NSF-funded research with Steve Westrop and University of Oklahoma student, Rob Swisher, in 2013 focused on investigating sequence stratigraphic, geochemical, and biotic patterns through the Upper Ordovician of the mid-continent of North America. Upper Ordovician Plattin, Decorah, Kings Lake, Guttenburg, and Kimmswick in Missouri and their lateral equivalents in Oklahoma, Illinois, Iowa and Wisconsin have been subdivided into third- and fourth-order depositional sequences with the recognition of through-going sequence boundaries, maximum flooding surfaces, and systems tracts. With translation of that framework into chronostratigraphy, this study is breaking new ground in tracking lithostratigraphic properties within sub-million year time slices from the ancient continental margin to the cratonic interior. Analysis of chemical gradients at this scale through a series of time slices provides insights to the redox evolution of the epicontinental sea through a series of carbon cycle perturbations (e.g., GICE and Mifflin) that are coordinated with overturn events in fossil taxa.

B) Research with UC undergraduate students, Allison Young and Alex Reis, has resulted in a detailed characterization of a portion of the lower Katian middle Lexington Limestone
near Winchester, Kentucky. Building on the previous research of Susannah Taha McLaughlin and Patrick McLaughlin, this work documents the outcrop sections with graphic logs, as well as photo mosaics, which permitted discerning subtle bedding features channels and markers and utilized this information to make a preliminary, high-resolution sequence stratigraphic analysis of the section. In addition, we measured and documented sizes and orientations of stromatoporoids and biostromes of red algae (solenoporids). This intriguing occurrence closely parallels the much later Richmondian Invasion documented by Steve Holland and Mark Patzkowsky and suggests an earlier episode of comparable warming and immigration of stromatoporoids, corals, trilobites, and other faunal elements from near equatorial regions into the subtropics.

C) Thomas J. Malgieri is completing a thesis on sequence stratigraphic and paleoenvironmental study of the lower Richmondian Stage (upper Katian) of the eastern Cincinnati Arch. In particular, this research has shown that the Bull Fork Formation is a stratigraphically complex lithostratigraphic unit that actually encompasses at least three regional disconformities. Major discoveries of this research include: a) a sequence boundary and regional truncation surface at the base of Mt. Auburn Member limestones (formerly assigned to late highstand of sequence C3 by Holland and Patzkowsky, 1996); it is reinterpreted as the transgressive systems tract (TST) of sequence C4. b) The Sunset Member (of Arnheim Formation) is a shallow marine carbonate interval, genetically related to Mount Auburn and not the beginning of a new sequence; it reflects later TST deposition and is capped by a maximum flooding surface at base of the Bull Fork Formation (= Oregonia Member of the Arnheim Formation, sensu stricto). The Mount Auburn passes laterally into greenish gray shales and argillaceous limestones. c) The Arnheim (C4 sequence) is terminated by a locally channeled phosphatic grainstone that marks the base of the Fort Ancient Member (of Waynesville Formation), a minor erosion surface corresponding to Holland and Patzkowsky's C4-C5 sequence boundary. d) Two widespread distinctive shale-rich intervals separated by a thin, widespread coral-bryozoan biostrome (Fisherville bed) appear to represent the Fort Ancient Member through much of northern Kentucky on both east and west sides of the Cincinnati Arch. e) A more significant unconformity occurs below greenish, silty, calcareous rarely desiccation cracked shales and argillaceous carbonates of the Rowland member (Drakes Formation). f) The basal Rowland sequence boundary is a regionally angular unconformity which truncates much of the Bull Fork (lower Waynesville and Arnheim equivalents) along the south sides of the Cincinnati Arch.

D) Research with MS student Christopher Aucoin is refining the sequence stratigraphy of the Richmondian strata along the northwest side of the Cincinnati Arch and links well with results from the east. Important results include: a) the Mount Auburn-Sunset interval is recognizable along the west side of the arch in Indiana and northern Kentucky; b) the sharp contact between a previously unnamed bundle of brachiopod-rich limestones (Southgate Bed) defines the C4-C5 sequence boundary; c) the overlying Fort Ancient Member is divisible into two major shale packages separated by a 2 meter thick bundle of brachiopod-bryozoan rich pack and grainstones (Bon Well Bed) that apparently correlates with the Fisherville Bed in the Bull Fork Formation to the south and east; d) A regionally angular discontinuity occurs between the Clarksville and Blanchester Members of the Waynesville Formation. This surface appears to be confluent with the sharp basal surface of the lower Marble Hill Bed grainstones and, in turn, with the regionally angular unconformity at the base of the Rowland Member. In addition, Aucoin is developing a depositional model for the occurrence of widespread trilobite-rich "butter shales"; these appear to be associated with pulses of mud deposition during late highstands of small- scale depositional sequences.

E) Continued research with former MS student Thomas Schramm (presently a doctoral candidate at Louisiana State University) is focused on detailed microstratigraphic and
magnetic susceptibility study of a single very well correlated interval (Z-bed and "Two-foot" shale) at the base of the Maysvillian Stage in Ohio, Kentucky, and Indiana. Fieldwork was largely completed during 2013. The premise of this study is to test the notion that there are systematic changes in magnetic susceptibility along a proximal-distal gradient with overall higher values in upramp sections near to areas of influx of detrital sediment. In addition, sampling for magnetic susceptibility profiles in the Sandbian-basal Katian interval was completed in summer 2013 by Schramm; results will aid in testing alternative sequence correlations of Cincinnati Arch and Nashville Dome successions with those in the classic New York section.

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.)


Carlton E. Brett
Department of Geology, University of Cincinnati,
Cincinnati, OH 45221-0013 USA
Telephone: 001 513 556-4556
Fax: 001 513 556-6931
E-mail: carlton.brett@uc.edu

Yves CANDELA (Scotland) is still working on brachiopods, but a couple of papers are due out this year dealing with other phyla: (1) an occurrence of a polyplacophoran from the Kirkcolm Formation, Kilbucho, Scotland (with Lesley Cherns [Cardiff University] and Lore Troalen [NMS]) and (2) machaeridians from the Pentland Hills, Scotland (Silurian) (this includes a redescription of Archie Lamont’s specimens) with Bill Crighton [NMS]. The work I undertook with David Harper (Durham University) on brachiopod biofacies from the Barr and Lower Ardmillan groups of the Girvan district (SW Scotland) (see last year’s edition of the Ordovician News), is also due out this year (hopefully around Spring). I am still working, with David Harper, on a project destined to review relationships within the Plectambonitoidea superfamily, using the cladistic method. I continue working on brachiopod faunas from Laurentia, and a paper entitled “Evolution of brachiopod faunas around Laurentia during the Ordovician” was submitted earlier this year (2014).
I am currently working on the description of a brachiopod fauna (linguliform) from the Glenkiln Shales (Sandbian), along the Wandel Burn and its attributes, SE Scotland.

**Yves Candela**
Department of Natural Sciences
National Museums Scotland
Chambers Street
EDINBURGH EH1 1JF, U.K.
Tel +44 (0)131 247 4280
e-mail: y.candela@nms.ac.uk

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**Marcelo G. CARRERA (Argentina)** is actively working on the evolutionary history of lower Paleozoic sponges and the taxonomy, paleoecology and paleobiogeographic significance of the bryozoan fauna of the Argentine Precordillera.

**Marcelo G. Carrera**
CICTERRA-CONICET Facultad Ciencias Exactas Físicas y Naturales,
Universidad Nacional de Córdoba
Av. Velez Sarsfield 299 (5000) Córdoba, Argentina
Telephone (IP phone): 5353800 (office code 30222)
Fax: =54-351-4332097
E-mail: mcarrera@efn.uncor.edu

*******************************************************************

**Chen Xu**
Key Laboratory of Economic Stratigraphy & Palaeogeography (CAS)
State Key Laboratory of Palaeobiology & Stratigraphy
Nanjing Institute of Geology & Palaeontology,
Chinese Academy of Sciences
39 East Beijing Road, Nanjing, P.R. China
Tel. & Fax. 0086-25-83375157 (Office)
Mobile 13512511007
Email xuchen@nigpas.ac.cn

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**Carlos CINGOLANI (Argentina)** continues working on sedimentary provenance and tectono-stratigraphic evolution of Lower to Middle Palaeozoic sequences from the Argentine Precordillera-Cuyania terrane and Paraná basin (Eastern Paraguay). Isotope geology and geochronology on detrital minerals (mainly zircons) are the main tools used for provenance analysis in documented stratigraphic sequences. A PhD thesis (P. Frigerio) based on sedimentary provenance of the Lower Palaeozoic of the Jagué region (Northern Precordillera) was examined and approved during 2013 at the University of La Plata. Isotopic studies on the Ordovician K-bentonites of the Precordillera and equivalent famatinian magmatism are in progress (A. Bidone) as a PhD thesis.
Robin COCKS (England) has had another busy year, working partly on Ordovician and Silurian brachiopods and partly on palaeogeography 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. The other substantial paper, on Katian and Hirnantian brachiopods from the Chinghiz Terrane, Kazakhstan, with Leonid Popov, is now in proof. During the year papers on Aeronian spiriferids from Iran (also with Leonid Popov) and on global Aeronian brachiopod distributions (with Rong Jiayu) have been completed. A palaeogeographical 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 then I completed only the strophomenides), 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 paper on Gondwana.

L. Robin M. Cocks
Department of Earth Sciences, The Natural History Museum
Cromwell Road, London SW7 5B U.K.
Tel. 0047 (0)20 7942 5140
e-mail r.cocks@nhm.ac.uk

Roger COOPER (New Zealand), in collaboration with James Crampton and Peter Sadler, is using taxon survivorship analysis of graptoloids to test for age-selectivity of extinction through the Ordovician and Silurian. A link between global climatic events and graptoloid extinction episodes is proposed in a paper with Sadler, Munnecke and Crampton (Geol. Mag.), available in pre-publication form. Two collaborative works - with Ian Percival, Yong-Yi Zhen and John Simes, and with John Pojeta and John Simes - on NZ Cambrian and Ordovician microfossils are in press with Memoirs of the AAP.

Roger Cooper
GNS Science, PO Box 30368,
Lower Hutt, NZ
Ph +4 5704853
r.cooper@gns.cri.nz
John COPE (UK): Nothing in the way of Ordovician news to report since I’ve been too preoccupied with Jurassic projects of late.

John C.W. Cope  
Department of Geology,  
National Museum of Wales,  
Cathays Park,  
Cardiff CF10 3NP UK  
Tel. 44 (0) 29 2057 3164  
email: john.cope@museumwales.ac.uk

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Helena COUTO (Portugal) is working on the study of Palaeozoic stratigraphy, palaeontology and gold-antimony mineralization in the area of Valongo Anticline (North Portugal). These studies aim contributing for a better knowledge of the Palaeozoic stratigraphy and to define prospecting guides for gold. Geological mapping, petrographic, geochemical and stratigraphic studies go on being developed on the Cambrian-Ordovician transition, Lower and Middle Ordovician, on the Upper Ordovician deposits related to the Late Ordovician glaciation and on Silurian-Devonian transition.

Helena Couto  
Department of Geosciences Environment and Management,  
Faculty of Sciences, University of Porto  
Geology Centre, University of Porto  
Rua do Campo Alegre 687  
4169-007 Porto  
Portugal  
tel +351 22 0402489/69  
hcouto@fc.up.pt

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G. Susana DE LA PUENTE (Argentina) continued in 2013 to focus on chitinozoans of the Ordovician and Silurian successions from Argentina. I have recently moved to Neuquén (Argentina) where I still work 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). I am actively involved in the organization of the 4th International Palaeontological Congress, to be held this year, from September 28th to October 3rd, 2014 in Mendoza, Argentina <http://www.ipc4mendoza2014.org.ar/>

Graciela Susana de la Puente  
CONICET – Departamento de Geología y Petróleo, Facultad de Ingeniería  
Universidad Nacional del Comahue (UNCo)  
Buenos Aires 1400  
Q8300IBX Neuquén  
ARGENTINA  
Phone: 54-299-4490368 / 4490350
Andrei DRONOV (Russia) continued his work on facies, sea-level changes and biotic events on the Russian and Siberian platforms during the Ordovician. In the year 2013 we started a new 3-year project “Influence of eustatic sea-level changes on dynamics of biodiversification in the Ordovician paleobasins (comparative analysis of data from the Siberian and Russian platforms). The project’s team includes Alexaner Kanygin, Taras Gonta, Alexandr Timokhin, Anastasia Yadrenkina, Olga Maslova, Veronica Kushlina, Elena Raevskaya and Tatiana Tolmacheva.

I am also involved into investigation of the Ordovician trace fossils in cooperation with Radek Mikuláš. Together with Birger Schmitz we study distribution of extraterrestrial chromites in the Darriwilian sections of St. Petersburg region and Siberia. The studies of K-bentonite beds from the Upper Ordovician of Siberian platform are conducted in collaboration with Warren Huff and Bryan Sell as well as Christian Rasmussen and David Harper.

Andrei V. Dronov  
Geological Institute  
Russian Academy of Sciences  
Pyzhevsky per.7  
119017 Moscow  
RUSSIA  
Tel.: +7 (495) 959-30-17  
Fax: +7 (495) 959-07-60  
E-mail: dronov@ginras.ru

Jan Ove EBBESTAD (Sweden) is continuing with studies on the Ordovician of the Siljan impact craters in collaboration with the research group of Oliver Lehnert (Erlangen), Björn Kröger (Helsinki) and Anette Högström (Tromsö). Also this summer I will look at the Tremadocian Ceratopyge Limestone in northern Sweden in collaboration with Åsa Frisk (Uppsala). The chapter on biogeography of Ordovician and Silurian gastropods, monoplacophorans and mimospirids came out in the Geological Society of London Memoir, and will hopefully serve as a guideline for further research. To follow up this, a number of taxonomic studies on Ordovician gastropods and tergomyans that have been on hold should be finished this year.

Jan Ove R. Ebbestad  
Museum of Evolution, Uppsala University,  
Norbyvägen 16, SE 752 36 Uppsala, Sweden  
Telephone: +46184712709  
E-mail: jan-ove.ebbestad@em.uu.se
Bob ELIAS (Canada), together with Graham Young, Godfrey Nowlan and students, is continuing to study the Upper Ordovician and 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.

A paper by Ning Sun, Bob and Dong-Jin Lee, on the biological affinity of *Amsassia* with new evidence from the Ordovician of North China, has been accepted for publication in *Palaeontology*. Papers on various tabulate corals from Estonia and China are in preparation with Kun Liang, Dong-Jin, Mari-Ann Mötus and Boo-Young Bae.

**Bob Elias**
Department of Geological Sciences, University of Manitoba, Winnipeg, Manitoba, Canada R3T 2N2
Telephone: (204) 474-8862
Fax: (204) 474-7623
E-mail: eliasrj@cc.umanitoba.ca

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Annalisa FERRETTI (Italy): My Ordovician research continues to be focused on conodont faunas from Europe and elsewhere, conducting cooperative research with Stig Bergström on conodonts from different localities in UK, the Carnic Alps (with Hans Peter Schönlaub) and the United Arabian Emirates (with Giles Miller). A rich Katian conodont fauna from the Sholeshook Limestone Formation (Wales) has been recently described (Ferretti, Bergström & Barnes) and a study on well preserved conodont material from the Keisley Limestone (England) has been completed (Bergström & Ferretti). Enigmatic fossilized ring-like structures with unknown function and taxonomic affiliation are described from conodont residues in the Upper Ordovician of the Carnic Alps and the Silurian of Bohemia (Ferretti, Cardini, Crampton, Serpagli, Sheets & Storch).

**Annalisa Ferretti**
Dipartimento di Scienze Chimiche e Geologiche
Università degli Studi di Modena e Reggio Emilia
l.go S. Eufemia 19
41121 MODENA (Italy)
Telephone: ++39-059-2055868
Fax number: ++39-059-2055887
E-mail: ferretti@unimore.it

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Stanley C. FINNEY (USA) reports that serving as Chair of ICS consumes most of the time that I would otherwise devote to research, yet my experience with Ordovician stratigraphy and the Ordovician Subcommission serves me well in that role. 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. Other my
recent papers have dealt with matters other than the Ordovician (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".

Stanley C. Finney  
Chair - International Commission on Stratigraphy  
Professor, Department of Geological Sciences  
California State University - Long Beach  
Long Beach, CA 90740 USA  
Stan.Finney@csulb.edu

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Richard FORTEY (U.K.) continues to work at the Natural History Museum two days a week emeritus. The big news for me in 2013 was the publication of a substantial monograph on the early Ordovician trilobites of Spitsbergen from the Kirtonryggen Formation (Tremadocian-early Floian). This work completes a series of papers I began more than forty years ago! Spitsbergen has probably the most complete, and richest succession of trilobite faunas on the eastern (present day) side of the Laurentian platform, with different species from those in the Great Basin, which are under study by J. Adrain and colleagues. The succession of Kirtonryggen species helps to clarify some of the older trilobite literature based on small collections from Greenland, mostly described by C. Poulsen. Although there is no silicification, preservation is generally good. I also continue to study Ordovician trilobites from Morocco when they become available to me.

Richard Fortey  
Department of Earth Sciences, The Natural History Museum  
Cromwell Road, London SW7 5B U.K.

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Mansoureh GHOBADI POUR (Iran) is currently working on the Ordovician of Iran and Central Asia, as well as general trilobite taxonomy, biostratigraphy, paleobiogeography, paleoclimate and biofacies. My ongoing research projects include studies of the Tremadocian-Darriwilian trilobites of the eastern Alborz Mountains in northern Iran, Mid to Late Ordovician brachiopods and trilobites of the Anarak Region in Central Iran and the Katian trilobites and brachiopods from High Zagros in south-eastern Iran. I also continue my cooperation with Irina Kim (Geological Survey of Uzbekistan) in studies of the trilobites and brachiopods from the Obikalon, Obikanda, Chashmankolon and Archalyk beds of the Zerafsan Range.

Mansoureh Ghobadi Pour  
Department of Geology, Faculty of Sciences,  
University of Zanjan, University Boulevard,  
45371-38791, Zanjan, Iran  
Mobile: +98 913 2654300  
E-mail: mghobadipour@yahoo.co.uk
Karen HALPERN (Argentina) is writing a Ph.D thesis on the Late Ordovician Extinction in the Argentine Precordillera, supervised by Marcelo Carrera. My research is mostly focused on brachiopods communities from the upper Ordovician and early Silurian, and I am interested particularly in paleo ecological issues that are in response to environmental changes during this biotic event.

Karen Halpern  
Lic. Biología Or. Paleontología  
CICTERRA (CONICET y Universidad Nacional de Córdoba)  
Velez Sarfield 1611 - Córdoba Capital (5000) - Argentina  
+54-351-5353800 INT #30212  
http://www.cicterra-conicet.gov.ar/  

David A.T. HARPER (UK). Research is continuing on Ordovician stratigraphy and faunas in Scotland (with Yves Candela, Euan Clarkson and Alan Owen; a paper revising the brachiopod identifications of the Barr and Lower Ardmillan faunas, led by Yves, is now in press in the Transactions of the Royal Society of Edinburgh: Earth Sciences), Ireland (George Sevastopulo, Svend Stouge and John Murray; a manuscript will be submitted shortly on the enigmatic conodont fauna from the allochthonous limestone blocks in the Rosroe Formation, western Ireland), and Greenland (with Jan Audun Rasmussen, Christian Mc Ørum Rasmussen, Jin Jisuo and Svend Stouge). 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. Work continues on the Ordovician of southern Tibet and Xinjiang with Zhan Renbin (Nanjing), Liu Jianbo (Beijing), Lars Stemmerik and Svend Stouge (Copenhagen), with a recent paper on the Tibet brachiopods published in Palaeontology. And together with Jorge Colmenar and Enrique Villas, a new look at the distribution of the brachiopod Svobodaina, using digitized images of the species, was published in Palaeontology. Research is ongoing into the causes of the end Ordovician extinction event 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  
Department of Earth Sciences  
Durham University  
Durham DH1 3LE, U.K.
Susana HEREDIA (Argentina) is working on taxonomy and biofacies of Middle Ordovician conodonts (Lenodus variabilis to Eoplacognathus suecicus zones) in the Central Precordillera, especially the taxonomy of the genus Eoplacognathus. Lower and Upper Ordovician conodonts from Precordillera are still under study. Research continues with Josefina Carlorosi on Lower-Middle Ordovician key conodonts from North Western Argentina.

Susana shares interests on Ordovician matters with Ana Mestre, Graciela Sarmiento, Matilde Beresi, Guillermo Aceñolaza, Josefina Carlorosi, Andrea Bidone, Gilberto Aceñolaza, Tatiana Soria, Cintia Kauffman and Galina Nestell.

Susana Heredia
Laboratorio de Micropaleontología
CONICET- IIM - Facultad de Ingeniería
Universidad Nacional de San Juan
Urquiza y Libertador
5400-San Juan
Argentina
E-mail address: sheredia@unsj.edu.ar

Linda HINTS (Estonia) is working on Ordovician brachiopods and stratigraphy from the East Baltic. Special attention is paid to the development and stratigraphy of the Katian reefs in Northern Estonia in collaboration with Björn Kröger.

Linda Hints
Institute of geology at Tallinn University of Technology
Ehitajate tee 5, 19089, Tallinn
Estonia
linda.hints@ttu.ee

Olle HINTS (Estonia) is continuing studies on Ordovician-Silurian microfossils (scolecodonts, chitinozoans, conodonts), geochemistry and Baltic regional geology and stratigraphy. In collaboration with Mats E. Eriksson (Lund) and Petra Tonarova (in Tallinn for postdoc) several projects on Paleozoic scolecodonts are in progress. A chapter on polychaete paleobiogeography was published in the Geological Society Memoir "Early Palaeozoic Biogeography and Palaeogeography". Together with Liina Paluveer, Jaak Nõlvak and Viivu Nestor he is involved in compiling distributional database of Baltoscandian microfossils and analysing it with quantitative stratigraphic tools, especially CONOP9. In collaboration with Yanan Shen (Hefei, China) Late Ordovician sulfur isotope record from was obtained from the Viki reference drill core, western Estonia. These data alongside with carbon isotope curve and biostratigraphy were
presented at the IGCP 591 Annual Meeting in Lund, and a paper was submitted to the GFF special volume (http://dx.doi.org/10.1080/11035897.2013.873989).

**Warren HUFF (USA)** is involved in several collaborative projects with European colleagues. With Oliver Lehnert and Guido Meinhold we are studying Paleozoic K-bentonites in drill cores from the Siljan impact structure. This is the largest known impact structure in Europe and the relict of the late Devonian Siljan meteorite crater in central Sweden. Three cores, provided by the private Swedish company Igrene AB, include more than 1500 m of Proterozoic basement and strata ranging from the late Tremadocian to Wenlock in age. Our work is focused on the mineralogy and geochemistry of a number of Ordovician and Silurian K-bentonites with the intent to explore possible correlations with previously described K-bentonites throughout Baltoscandia. By comparison, the Middle Ordovician section at Röstånga in Scania contains eighteen K-bentonite beds ranging from 1-67 cm in thickness, and all occur within the *D. multidens* graptolite biozone. Several beds at Röstånga correlate equally well with the Kinnekulle bed and thus argue strongly for the composite nature of what is called the Kinnekulle K-bentonite. We suggest the same for the equivalent sequence in the Siljan cores. With Andrei Dronov we are studying samples from the Dolborian Regional Stage (middle to upper Katian) from the outcrop on Bolshaya Nirunda River, the tributary of Podkamennaya Tunguska. It is about 300 km to the east from Yenisei River. The continental margin during the Ordovician was about 200 km to the west from the position of the Yenisei River and the volcanic arc was probably even further to the west. So we estimate the minimal distance from the source of volcanic ash was no less then 500-600 km. We are currently generating zircon ages plus acquiring trace element data from biotites and apatites to refine the chemostratigraphic correlation of these beds over the 25 km known outcrop area.

**Warren D. Huff**  
Department of Geology  
University of Cincinnati  
PO Box 210013  
Cincinnati, OH 45221-0013  
Voice: 513-556-3731  
Fax: 513-556-6931  
Email: warren.huff@uc.edu

**Anna KOZŁOWSKA (Poland)** is working mostly on Silurian graptolites, but has recently described graptolites from the lower Ordovician of China (together with Jörg Maletz). The main focus of my research is evolution of retiolitids (Retiolithina). The
graptolites are isolated and come from Poland, in boreholes and erratic boulders. I cooperate with Alf Lenz, Denis Bates, Mike Melchin and Sigitas Radzevičius studying graptolites from Arctic Canada and Lithuania. I am working with Adam Urbanek and my PhD students Kinga Dobrowolska and Dagmara Chmielarz studying monograptids from Polish boreholes.

Anna Kozłowska
Institute of Paleobiology
Polish Academy of Sciences
ul. Twarda 51/55
00-818 Warszawa
Telephone number (4822) 6978872
Fax number (4822) 6206225
akd@twarda.pan.pl

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Petr KRAFT (Czech Republic) continued his studies on graptolites from the Prague Basin, Czech Republic, and New South Wales, Australia (together with Ian Percival). I also continued field work on a small project in the West Bohemian Museum focused on temporary and protected paleontological localities in the Ordovician of the Prague Basin. Together with my student Karolína Lajžlová we finished two studies on the Middle Ordovician ostracods from the Prague Basin, one of them in co-operation with Tonu Meidla (Estonia).

Petr Kraft
Charles University in Prague
Faculty of Science, Institute of Geology and Palaeontology
Albertov 6
128 43 Praha 2
Czech Republic
tel.: +420 22195 1459
e-mail: kraft@natur.cuni.cz

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Stephen LESLIE (USA) is primarily working on Middle and Late Ordovician conodont biostratigraphy and integrating the biostratigraphy with studies of Ordovician paleoclimate change. He is collaborating with Achim Herrmann (Louisiana State University) and Ken MacLeod (University of Missouri) in testing the early Late Ordovician cool water carbonate hypothesis in the North American Midcontinent using oxygen isotopes from conodont apatite. Steve and Matt Saltzman (The Ohio State University) are working on a project related to Sr and Nd isotope stratigraphy of the Ordovician, particularly focused on the continuity of deposition through the Darriwilian and Early Sandbian in the Central Appalachians. This research is collaborative with Stig Bergstrom, Ken Poland, Alyssa Bancroft, and Amanda Howard (The Ohio State University), as well as John Repetski (USGS) and Seth Young (Indiana University). Steve is also working with Bryan Sell (University of Michigan), Chuck Mitchell (University of Buffalo), and Scott Samson (Syracuse University) to integrate K-bentonite fingerprinting with biostratigraphy in the upper Sandbian and lower Katian. Another
current project involves the integration of graptolite and conodont biostratigraphy in dark shale successions, with Dan Goldman (University of Dayton) providing the graptolite input. A study with Mike Pope (Texas A & M) and GSC Calgary is investigating Late Ordovician – Early Silurian sequence stratigraphy and conodont biostratigraphy in the Northwest Territories of Canada.

Stephen A. Leslie  
Department of Geology and Environmental Science  
James Madison University  
395 South High St., MSC 6903  
Harrisonburg, VA 22807 USA  
Phone: 540-568-6144  
Fax: 540-568-8058  
e-mail: lesliesa@jmu.edu

Lixia LI (China) continues to work on the Ordovician graptolites from South China. My research is mainly focusing on graptolite taxonomy, palaeoecology, biostratigraphy, and its macroevolutionary trends. Currently, I am doing postdoctoral studies at NIGPAS, Nanjing, China.

Lixia Li  
Nanjing Institute of Geology and Palaeontology,  
Chinese Academy of Sciences  
39 East Beijing Road, Nanjing 210008, China  
Telephone: +86-25-83282147  
E-mail: lilixia1015@gmail.com

Anita LÖFGREN (Sweden) continues working on Early and Middle Ordovician conodonts from Baltoscandia.

Anita Löfgren  
Lund University, Geological Institution,  
Department of Geology, Sölvegatan 12, SE-223 62 Lund,  
Sweden  
Telephone: +46-46-152406  
E-mail: anita.lofgren@geol.lu.se

Elena LYKOVÁ (Bukolova) (Russia) is working on Ordovician graptolites from Gorny Altay (South of West Siberia).

Elena Bukolova  
Trofimuk Institute of Petroleum Geology and Geophysics  
Siberian Branch of RAS  
Acad. Koptyug av., 3
Jörg MALETZ (Germany) is working on a number of projects, the most important of which are the Graptolite Treatise and a book on Graptolites (Topics on Palaeobiology Series). Research on Cambrian and Ordovician pterobranchs is in progress with Michael Steiner (FU Berlin, Germany) as part of the DFG Forschergruppe 736 ‘The Precambrian-Cambrian ecosphere (R)evolution: Insights from Chinese microcontinents’. Some results will be published in PPP398 (15. March 2014) as a special issue with the title ‘The Cambrian Bioradiation Event: A Chinese Perspective’. Work on the sedimentology of the Middle Ordovician successions of western Newfoundland is in progress with Sven Egenhoff and students at Colorado State University, Fort Collins, CO.

Jörg Maletz
Freie Universität Berlin
Institut für Geologische Wissenschaften
Malteserstr. 74-100 Haus B, Raum 322
D-12249 Berlin
Germany
Phone: +49 30 838 70678
e-mail: yorge@zedat.fu-berlin.de

Peep MÄNNIK (Estonia) is working on evolution, taxonomy and palaeoecology of conodonts, conodont-based high-resolution stratigraphy, bioevents and palaeogeography. He is also interested in sequence stratigraphy and evolution of sedimentary basins. His studies continue under project "Quantitative stratigraphical approach to early Palaeozoic chitinozoans and conodonts of the Baltic area: high-resolution time scales and palaeobiodiversity". 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”, starts in this year. Also, joint studies together with colleagues from Estonia, Germany, Iran, Russia, Sweden, U.K. and USA on evolution and high-resolution stratigraphy of the Early Palaeozoic faunas and sedimentary basins on different palaeocontinents are ongoing.

Peep Männik
Institute of Geology at Tallinn University of Technology
Ehitajate tee 5
19086 Tallinn
Estonia
tel.: + 372 58845082
fax: + 372 6203011
e-mail: peep.mannik@ttu.ee
Alexander (Sandy) D. McCracken (Canada) continues to work on Middle to Upper Ordovician, Silurian and Devonian and conodonts from various locations in Canada. He is concentrating on good collections from Hudson Bay and Moose River basins, Ontario and Manitoba.

Alexander (Sandy) D. McCracken  
Geological Survey of Canada  
3303-33rd St. NW, Calgary, Alberta T2L 2A7  
Canada  
Telephone 1-403-292-7130  
E-mail samccrac@NRCan.gc.ca

Tõnu Meidla (Estonia) is actively working on several aspects of Ordovician and Silurian ostracods from the Baltic area and Canada, in cooperation with M. Williams, O. Tinn, V. Perrier and K. Truuver.

Tõnu Meidla  
Institute of Ecology and Earth Sciences, University of Tartu,  
14A Ravila Street, Tartu 50411, Estonia  
phone: +372 737 5895  
Tonu.Meidla@ut.ee

Michael J. Melchin (Canada) is 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 a project with Dan Goldman, Chuck Mitchell, Fan Junxuan and others on quantitative graptolite biogeography. My masters 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 Anna Kozlowska 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.

Michael Melchin, Professor and Chair  
Department of Earth Sciences  
St. Francis Xavier University  
Antigonish, Nova Scotia, Canada B2G 2W5  
Phone: 902-867-5177  Fax: 902-867-2414  
E-mail: mmelchin@stfx.ca
Michal MERGL (Czech Republic) is now actively working on several aspects of middle Devonian brachiopods, especially of Eifelian age. My Ordovician interests concern effaced trilobites of the early Ordovician (manuscript now submitted), and odontopleurid trilobites of Katian age (manuscript accepted), all of Bohemian provenance. My continuing hobby is focused on organophosphatic brachiopods from the Ordovician to Devonian, concentrating now on evolution of the discinid *Schizocrania*. I will be happy for any (especially unpublished) reports concerning this genus. For my pdf reprints please visit http://www.kbi.zcu.cz/OB/zam/mer_data/w_PUB_14.htm

Michal Mergl
Centre of Biology, Earth and Environmental Sciences
Faculty of Education, University of West Bohemia
Plzeň, 30619, Czech Republic
Telephone: +420 377 363 240
Mobil: +420 606 665 122
E-mail: mmergl@cbg.zcu.cz  Note change of my e-mail address from mid-2013

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Ana MESTRE (Argentina) is working on stratigraphy, biostratigraphy, taxonomy and biofacies of Middle Ordovician conodonts (*Lenodus variabilis* to *Eoplacognathus pseudoplanus* zones) in the Argentina Precordillera. Lower Ordovician conodonts from Precordillera are still under study. Ana shares interests on Ordovician matters with Susana Heredia, Graciela Sarmiento, Matilde Beresi, Josefina Carlorosi, Tatiana Soria, Cintia Kauffman, Andrea Bidone, Galina Nestell and Michael Stamatakis.

Ana Isabel Mestre García
Laboratorio de Micropaleontología
CONICET- IIM - Facultad de Ingeniería
Universidad Nacional de San Juan
Urquiza y Libertador
5400-San Juan
Argentina
E-mail address: amestre@unsj.edu.ar

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Tatiana L. MODZALEVSKAYA (Russia) continues working on Silurian-Devonian brachiopods of Iran from Kopet-Dag and Derenjal Mountains in collaboration with Leonid Popov (UK) and coauthor, Hairapetian, V., Ghabadi Pour. 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) we are 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 VNIOkeangeologiya and Pamir.

Tatiana L. Modzalevskaya
All-Russian Geological Research Institute (VSEGEI)
Department of Stratigraphy and Palaeontology
Sredny pr. 74
Axel MUNNECKE (Germany) is currently working on Ordovician and Silurian (chemo-) stratigraphy in different areas (China, Gotland, Poland, Podolia). In addition, he is very interested in the biological response to the pronounced climatic changes that took place during this time.

Axel Munnecke
GeoZentrum Nordbayern, Loewenichstr. 28, D-91054 Erlangen, Germany
Telephone: 0049 9131 85 26957
Fax number: 0049 9131 85 22690
E-mail: axel.munnecke@fau.de

Diego Fernando MUÑOZ (Argentina) is doing a PhD at Universidad Nacional de Córdoba on Lower Ordovician deposits of NW Argentina with emphasis on systematics, taphonomy and diversity of rhyonchelliformean brachiopods. This research is directed by Dr. Juan Luis Benedetto and Dr. Beatriz G. Waisfeld. Muñoz and Benedetto are undertaking publication of lingulid brachiopods from the Santa Rosita Formation (Furongian-Tremadocian) of NW Argentina. A revision of the Lipanorthis genus, which is present in Tremadocian and Floian deposits of the Santa Victoria Group, is in the final stages of preparation.

Diego F. Muñoz
Centro de Investigaciones en Ciencias de la Tierra (CICTERRA): CONICET-UNC
Centro de Investigaciones Paleobiológicas (CIPAL): FCEFyN, UNC
Edificio CICTERRA, Av. Vélez Sársfield 1611, 1° Piso of. 7, X5016CGA
Ciudad Universitaria, Córdoba, ARGENTINA
Of.: +54 351 535-3800 int. 30212
Cel.: +54 (9) 351 15-6669998
e-mail: dmunoz2708@gmail.com

Elise NARDIN (France) is working on the investigation of faunal dynamism and ecological adaptations as major factors of the Early-Middle Palaeozoic biodiversifications. The first approach is the investigation of the functional morphology of echinoderms (blastozoans and crinoids) during the Paleozoic and the ecological interactions of these echinoderms with the other benthic fauna. The second approach is the question of the impact of the paleogeography and the environmental factors on the diversity dynamics of Paleozoic fauna (collaboration B. Lefebvre (Univ.-Lyon, France), M. Aretz (Univ.-Toulouse, France) Y. Donnadieu (LSCE, France). The biodiversification constraints are also investigated by global earth modeling to reconstruct marine environment, paleoclimate variations,
paleobioproductivity and boundary conditions of anoxic events (collaboration with G. Dera and Y. Goddéris (Univ.-Toulouse, France), Y. Donnadieu (LSCE, France), E. Pucéat (Univ. Dijon, France), and G. Le Hir (IGCP, France)), and their impact on the marine life.

Elise Nardin
Geosciences Environment Toulouse
Observatoire Midi-Pyrénées, CNRS
14 avenue Edouard Belin
F-31400 Toulouse, France
Tel. +33 561332577
E-mail. elise.nardin@get.obs-mip.fr

Hendrik NOWAK (France) continues his PhD, which is part of the RALI (Rise of Animal Life) project, researching palynomorphs from the Ordovician Lagerstätten of the Fezouata Formations (Morocco, Tremadocian-Floian) and the Winneshiek Shale (Iowa, USA, Darriwilian).

Hendrik Nowak
Université Lille 1
UMR 8217 Géosystèmes, U.F.R. des Sciences de la Terre
Bâtiment SN5, Avenue Paul Langevin
59655 Villeneuve d’Ascq, France
Telephone: +33 (0)320336023
E-mail address: hendrik.nowak@ed.univ-lille1.fr

Godfrey S. NOWLAN (Canada) retired from the Geological Survey of Canada in July 2013 and has 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 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 Iapetognathus with Jim Miller and others.

Godfrey S. Nowlan
Geological Survey of Canada
3303 – 33rd Street NW
Calgary, Alberta T2L 2A7 Canada
Phone: 403-292-7079
Fax: 403-292-4961
E-mail: gnowlan@NRCan.gc.ca
Olga OBUT (Russia) is investigating Ordovician radiolarians and conodonts from Gorny Altai (South of West Siberia).

Dr. Olga T. Obut  
Trofimuk Institute of Petroleum Geology and Geophysics  
Siberian Branch of RAS  
Acad. Koptyug av., 3  
630090, Novosibirsk, Russia  
Tel: +7 (383) 333-24-31  
Fax: +7 (383) 333-23-01  
E-mail address: ObutOT@ipgg.sbras.ru

Alan OWEN (UK) is continuing his investigations of the Ordovician biodiversification in general and of deep water faunas in particular. Ordovician trilobites are included in a paper in press on the fine scale crystallography of schizochroal trilobite eyes with Martin Lee (Glasgow) and former research student Clare Torney. Work on new material of the trilobite Staurocephalus and on abnormal encrinurid specimens from the Upper Ordovician of South Wales with Patrick McDermott (St Clears, South Wales) is progressing, but slowly.

Florentin PARIS (France) continues various collaborations on Ordovician chitinozoans assemblages from Northern Gondwana and is implementing several regional chitinozoan atlases. My updated CHINOVOSP database presently records 1266 chitinozoan species with stratigraphical ranges documented according to the latest definitions of the Ordovician, Silurian and Devonian stages.

Ian PERCIVAL (Australia) continued studies on various Ordovician projects during 2013, but also admits to dabbling in Cambrian and Silurian faunas. A paper describing Late Cambrian lingulate brachiopods from the Maruia district of New Zealand’s South Island (co-authored with Yong Yi Zhen who documented associated Early Ordovician
conodonts, together with John Simes and Roger Cooper from GNS) is currently in press (AAP Memoir Cambro-Ordovician Studies V). Yong Yi has recently (November 2013) taken up a secondment with the Geological Survey of NSW and is now working with Ian at his Londonderry office. Two manuscripts with Wu Rongchang as senior author, on Ordovician conodont biodiversification and biofacies in China, were progressed towards publication. Other Ordovician projects are underway with Petr Kraft and Zhang Yuandong (graptolites), and Vic Semeniuk and Barry Webby (petrography and depositional environments of the Cliefden Caves Limestone Group). Finally, by the time this edition of Ordovician News is distributed, a manuscript on geochemistry of Ordovician cherts from southeastern Australia will have been submitted.

In June and July 2013, Ian hosted Page Quinton, a Ph.D student at the University of Missouri, during her short-term Australian Academy of Sciences – National Science Foundation fellowship. Her research involves study of Ordovician seawater temperatures, especially with respect to the Late Ordovician glaciation episodes, using conodonts for isotopic analysis. Page collected limestone samples and conodonts through the Ordovician succession in central New South Wales, and is currently analysing these back in Missouri.

Ian also edits two annual newsletters: Ordovician News in his capacity as Secretary of the Subcommission on Ordovician Stratigraphy, and Nomen Nudum (for the Association of Australasian Palaeontologists).

**Ian Percival**  
Geological Survey of New South Wales  
WB Clarke Geoscience Centre  
947-953 Londonderry Rd, Londonderry NSW 2753  
Tel. (02) 4777 0315  
Fax (02) 4777 4397  
e-mail: ian.percival@industry.nsw.gov.au

José Manuel PIÇARRA (Portugal) is working on the Lower Paleozoic stratigraphy of South Portugal (Ossa Morena Zone), and also on the Ordovician and Silurian graptolites from Portugal.

**José Manuel Piçarra d’Almeida**  
LNEG - LGM (Laboratório Nacional de Energia e Geologia – Laboratório de Geologia e Minas). Unidade de Geologia, Hidrogeologia e Geologia Costeira  
Ap. 104, 7801-902 Beja Codex, Portugal  
tel.: 351 210924672 (note new phone number)  
e.mail: jose.picarra@lneg.pt

Leonid E. POPOV (United Kingdom) is presently working on the brachiopods and associated faunas from the Upper Ordovician of Kazakhstan, Ordovician of Iran and Upper Ordovician of the Zerafshan Range in Uzbekistan.

**Leonid E. Popov**  
Department of Geology, National Museum of Wales,
John REPETSKI (USA) continues to work chiefly on Cambrian, Ordovician and Middle Devonian conodonts and biostratigraphy of various regions, mostly in Laurentia, including the Appalachians, Midcontinent North America, Great Basin, and Alaska.

Support for geologic mapping and CAI-based thermal maturation maps dominates, but I am also working on several regional biostratigraphic, faunal, and taxonomic studies; most of these are in cooperation with numerous good colleagues. Collaborative work also continues on phosphatized larval arthropods, embryos, and paleobiology of the paracondont-eucondont transition interval.

Activity is beginning to ramp up for the planning committee related to planning for next year's ISOS-2015, under the very competent leadership of Steve Leslie. We are looking forward to seeing many of our fellow Ordoviciphiles here in Virginia next year.

John E. Repetski
U.S. Geological Survey,
MS 926A National Center,
12201 Sunrise Valley Drive,
Reston, Virginia 20192, U.S.A.
Telephone number: 1-703-648-5486
Fax number: 1-703-648-6953
E-mail address: jrepetski@usgs.gov (work), or jrepetski@cox.net (home)

Matthew SALTZMAN (USA) continues working on Ordovician stable and radiogenic isotope stratigraphy. PhD student Cole Edwards has just published his first paper in Palaeo3 on the Early-Middle Ordovician C isotope in the Shingle Pass and Ibex areas of Utah and Nevada (USA). Cole has also generated Sr isotope data from conodont apatite and carbonate rock in North America and we have one paper submitted to GSA Bulletin and another in preparation documenting these results with many co-authors, including Steve Leslie, John Repetski, Stig Bergstrom, Jeff Bauer, Gary Dwyer, and Walt Sweet. Work continues on a collaborative project with Steve Westrop in the Middle-Late Ordovician. In addition, collaborative efforts with Ben Gill and Lee Kump are planned on coupled carbon-sulfur studies in the Early Ordovician, and a new project is also planned with Alycia Stigall on Middle Ordovician brachiopod evolution in North America and comparisons to Baltoscandia.

Matthew R. Saltzman
School of Earth Sciences
125 South Oval Mall
Ohio State University
Columbus OH 43210-1398 U.S.A.
phone: 614-292-0481
email: saltzman.11@osu.edu
Vic SEMENIUK (Australia), with Ian Percival and Barry Webby, continues to work on the petrography, stratigraphy, palaeo-environmental reconstructions, and palaeoecology of Ordovician limestones of central western New South Wales. With Barry Webby Vic is researching the diagenesis and other alteration products of Ordovician labechiid stromatoporoids, and the inter-relations between the stromatoporoids and the enclosing sediment.

Vic Semeniuk  
21 Glenmere Rd., Warwick, WA, 6024 Australia  
vcsrg@iinet.net.au

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Nikolay SENNIKOV (Russia): Current activities include 1) Study and description of Ordovician graptolites from Novosibirsk Islands (Arctic Russia); 2) Paleogeographic reconstructions of the Ordovician basins on the South of west Siberia; 3) Specification and synthesis of the graptolite, conodont and chitinozoan zonation for the Ordovician of Siberia.

Dr. Nikolay V. Sennikov  
Trofimuk Institute of Petroleum Geology and Geophysics  
Siberian Branch of RAS  
Acad. Koptyug av., 3  
630090, Novosibirsk, Russia  
Tel: +7 (383) 330-88-47  
Fax: +7 (383) 333-23-01  
E-mail address: SennikovNV@ipgg.sbras.ru

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Thomas SERVAIS (France) is research director of the CNRS at Lille1 University, where he is the head of the CNRS department (UMR 8217 Géosytèmes) for one more year in 2014. He is currently a Vice-President of the International Paleontological Association (IPA: 2010-2014) and Past-President of the International Federation of Palynological Societies (IFPS), the French Palaeontological Association (APF) and the French Palynological Association (APLF).

The "book" on palaeobiogeography (the last product of IGCP 503) has finally been published in December 2013, co-edited with Dave Harper (Durham University, UK). All Ordovician workers should now buy this Geol Soc Memoir 38!

Ordovician research is focused on acritarchs, including collaboration with Li Jun and Yan Kui (NIGPAS, Nanjing) and Wang Wenhui (Nanjing University) on the Ordovician of the Yangtze Platform. A revision of several Ordovician taxa is in progress, such as *Rhopaliophora* and *Dactylofusa velifera*.

A paper on the first appearance data of many important peri-Gondwanan taxa will maybe get ready this year in order to be submitted, in collaboration with Stewart Molyneux (British Geological Survey) and several other colleagues.

Projects on the regional geology of western Europe includes a revision of the Belgian sequences in collaboration with Alain Herbosch (University of Brussels, Belgium).
The PhD project of H. Nowak started at Lille in late 2012 focuses on the palynology of some Ordovician Lagerstätten including the Fezouata Biota of Morocco.

**Thomas Servais**  
UMR 8217 Géosystèmes  
Bâtiment SN5  
Université Lille1  
F-59655 Villeneuve d'Ascq (France)  
Phone: 0033(0)320337220  
Fax: 0033(0)320434910  
thomas.servais@univ-lille1.fr

Lawrence SHERWIN (Australia) continues with post retirement part time employment by the Geological Survey of NSW. His main item of work for 2014 is reviewing identifications and locality details of graptolites in the Geological Survey collection, the catalogue entries going back to 1898. For the past half century most entries are his own. Other outstanding projects are part completed studies on Late Ordovician graptolite faunas from Forbes and with the late Tatiana Koren' from a locality near Orange. He presented a talk at the 3rd IGCP 591 meeting at Lund in June 2013.

**Lawrence Sherwin**  
Geological Survey of New South Wales  
Locked Bag 21, Orange  
New South Wales 2800 Australia  
email: lawrence.sherwin@trade.nsw.gov.au  
Phone: 61 (0)2 6360 5349  Fax: 61 (0)2 6360 5366  
Mobile: 0458 757 515

Tatiana TOLMACHEVA (Russia) continues to work on Ordovician conodonts from Kazakhstan and Russian part of East European platform and Ural Mountains. Last autumn I received a Doctor of Science Degree for the Thesis “Ordovician conodonts of East-European platform and Western part of the Central Asian Folded Belt: biostratigraphy, biogeography and paleoecology”. The Kazakhstanian part of the thesis will be published as a monograph hopefully at the end of this year. I collaborate with colleagues from the Geological institute and Moscow State University (Andrei Dronov, Alexander Alekseev, Kirill Degryarev) on several research projects concerning sequence stratigraphy, tectonic and paleodynamic reconstructions of Central Asia and Siberia in the Ordovician. My ongoing research project is on Cambrian conodont clusters from siliceous rocks of Central Kazakhstan. An updated regional stratigraphic scheme of Kazakhstan (with Kirill Degryarev and Olga Nikitina) is in preparation.

**Tatiana Tolmacheva**  
Leading scientist of  
Stratigraphy and Paleontology Department  
A.P. Kartpinsky Russian Geological Research Institute,  
Sredny pr. 74, 199106 Saint Petersburg, Russia
Blanca A. TORO (Argentina). After my incorporation to CICTERRA-CONICET at Cordoba University I continue working on Ordovician and Silurian graptolites from the Central Andean Basin, northwestern Argentina. I am specially focused on biostratigraphy and palaeobiogeography, but in addition quantification analyses of taxonomic and paleoecological relationships of graptolites were conducted recently for the first time in Argentina. A PhD thesis under my supervision was finished last year, and a number of papers regarding these topics have just been published. Other multidisciplinary projects dealing with Ordovician and Silurian graptolites from Bolivia and Brazil, as well as international cooperation with colleagues from Germany and China are still in progress.

Blanca A. Toro
CICTERRA (Centro de Investigaciones en Ciencias de la Tierra)
CONICET-Universidad Nacional de Córdoba
Av. Vélez Sarsfield 1611, Ciudad Universitaria
X5016GCA - Córdoba - ARGENTINA
btorogr@mendoza-conicet.gov.ar

Thijs VANDENBROUCKE (France) continues to be interested in reconstructing the Ordovician palaeoclimate and palaeo-environment. Two research students currently work with Thijs on these topics: Chloé Amberg’s project concentrates on identifying and documenting Pre-Hirnantian glaciations (see last year’s report). Lorena Tessitore joined the team as a PhD student in 2013, with a research project that is part of the ANR research grant “SeqStrat-Ice: Lessons from our Ancient Frozen Planet” (Project coordinator: J.F. Ghienne, University of Strasbourg/CNRS, 2013-2017). This ANR grant focuses on the glacial deposits of the Upper Ordovician, and Lorena contributes to the development of a bio-chemostratigraphic framework for the Moroccan successions studied within this programme.

Thijs also remains active as one of the coordinators of the IGCP 591 project. All information can be found on our website www.igcp591.org. The group is looking forward to seeing you at one of their next meetings (see circulars of the 2014 Tartu meeting and this year’s regional field meeting in Kunming, elsewhere in this newsletter).

Thijs Vandenbroucke
Université Lille 1 - Sciences et Technologies
UMR 8217 du CNRS: Géosystèmes
Avenue Paul Langevin- bâtiment SN5
59655 Villeneuve d'Ascq cedex
France
(T) + 33 (0)3 20 43 69 00
(E) Thijs.Vandenbroucke@univ-lille1.fr
Marco VECOLI (Saudi Arabia) is working on acritarchs, chitinozoans and cryptospores from Ordovician and Silurian deposits in Saudi Arabia in support of basin analyses and sequence stratigraphy interpretation for hydrocarbon exploration. In particular, I am responsible for a project, among others, on the stratigraphy and correlation of Upper Ordovician subsurface sequences in the NW of Saudi Arabia, targeting hydrocarbon systems which are related to the Late Ordovician glacial episode. My work requires continued hands-on analytical work which includes taxonomic revisions, as well as refining biozonal concepts to suit exploration and operational needs. I am also having a lot of fun during well-site palynological analyses supporting drilling operations across Saudi Arabia.

I am slowly completing a number of research projects started before I joined Saudi Aramco, with my former students and international colleagues, on Ordovician acritarchs and cryptospores, mainly from North Africa and North America.

This year, moreover, will be my final one of the 4-year term (2010-2014) as President of the CIMP (International Commission on Paleozoic Microflora).

Marco Vecoli
Biostratigraphy Group
Geological Technical Services Division
Saudi Aramco
Dhahran, Saudi Arabia

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Olev Vinn (Estonia) is working on the palaeontology of problematic calcareous tubeworms from the Palaeozoic (e.g. cornulitids, tentaculitids, microconchids etc.) and evolution of tubeworm biomineralization. I am currently also working on the evolution of bioerosion and biofouling of hard substrates in the Ordovician of Baltica.

Olev Vinn
Department of Geology, University of Tartu
Ravila 14A
50411 Tartu, Estonia
Tel./Fax +372-7375836
E-mail: olev.vinn@ut.ee

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Viive VIIRA (Estonia) continues to work on the Lower and Middle Ordovician from Estonia.

Viive Viira
Institute of Geology at Tallinn Technical University
Ehitajate tee 5
19086 Tallinn, Estonia
tel. 372 58846899
Viive.viira@ttu.ee

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Gustavo G. VOLDMAN (Argentina) is actively working on taxonomy, biostratigraphy, and thermal alteration studies of conodonts from the Ordovician basins of Northwestern Argentina.

Gustavo G. Voldman  
CONICET, CICTERRA  
Av. Vélez Sarsfield 1611  
Córdoba X5016GCA, Argentina  
Tel. +54-351-433-3199 #30208  
voldman@efn.uncor.edu

Barry WEBBY (Australia). All the Treatise Online chapters dealing with sections of the Treatise on Invertebrate Paleontology, Part E, Revised volume 4 (Hypercalcified Porifera) were published prior to early 2013, and now currently (Feb 2014) the fully integrated “Blue Book” Treatise on all known nonspiculate fossil sponges with hypercalcified skeletons is being assembled in two volumes (exceeding 1200 printed pages of text and illustrations) for printing by the University of Kansas Press - hopefully the volumes will be available to all later this year (2014).

In addition, a joint paper on the Ordovician and Silurian biogeography of stromatoporoids with Heldur Nestor was published recently (in online version appeared in late 2013; and within the hard copy version (22 Jan 2014) of the final IGCP 503 report in the Memoir Series of the Geological Society of London on Lower Palaeozoic palaeobiogeography. My other current work remains partly curatorial, involving cataloguing and transferring an extensive Ordovician collection to the two main long-term fossil repositories in the Sydney region (the Australian Museum, and Londonderry laboratory and storage facility of the Geological Survey of New South Wales). Also preliminary work on a small collection of Ordovician sphinctozoans and other sponges collected originally by Leonid Popov and others from Kazakhstan is continuing with the help of Leonid, Ian Percival, Zhen Yong Yi and others; and work is continuing on some Mid-Palaeozoic stromatoporoid faunas from New South Wales and North Queensland, also with Zhen Yong Yi.

Barry D. Webby  
Department of Earth & Planetary Sciences,  
Macquarie University,  
North Ryde, NSW 2109  
AUSTRALIA  
Tel. +61-2-9816-4020  
E-mail: bwebby25@gmail.com  
Home address: 77 Woolwich Road, Hunters Hill, N.S.W., 2110, Australia

Charles WELLMAN (UK) continues his work on early land plant spores and other remains, including those from the Ordovician. In 2013 he undertook fieldwork in Kazakhstan for the first time and sampled a number of Ordovician sections for palynological analysis. He continues with his work on Ordovician spore assemblages from Saudi Arabia (in conjunction with Philippe Steemans) and Oman. Charles is still
on the look-out for Ordovician terrestrial deposits and would love to hear from any of you with news on that front.

**Charles Wellman**  
Dept. of Animal & Plant Sciences  
University of Sheffield  
Alfred Denny Building  
Western Bank  
Sheffield S10 2TN U.K.  
Tel: 0114 222 3689  
E-mail: c.wellman@sheffield.ac.uk

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**Rongchang WU (China)** is working on Ordovician and Silurian conodonts and chemostratigraphy. My research mainly focuses on conodont taxonomy, palaeoecology, biostratigraphy, chemostratigraphy and carbonate sedimentology. Currently, I am collaborating with Prof. Mikael Calner in Lund, investigating Ordovician stratigraphy in Sweden.

**Rongchang Wu**  
Dept. of Geology, Lund University  
E-mail: Rongchang.Wu@geol.lu.se

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**YAN Kui (China)** continued work on Ordovician acritarchs this past year. In June, I attended the IGCP 591 annual meeting in Lund, Sweden, and visited the Lower Paleozoic sections in Sweden and Norway. Li Jun and I also visited Prof. Thomas Servais in France. In August, I went to North China to collect microfossil samples from the Middle-Upper Ordovician with my colleague. I also work on the acritarch biostratigraphy and palaeoenvironment in South China, especially the Ordovician acritarch assemblages and will begin to study the North China acritarch assemblage.

**Yan Kui**  
Nanjing Institute of Geology and Paleontology Academia Sinica  
39 East Beijing Road, Nanjing  
China  
Tel: 86-25-83282214  
E-mail: kuiyan@nigpas.ac.cn

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**Graham YOUNG (Canada)** is continuing to work on Palaeozoic palaeoecology and on the diversity of Ordovician cnidarians and arthropods. I am also collaborating with Bob Elias and others to study palaeoenvironments and stratigraphy in the Ordovician rocks of central and northern Manitoba; a recently published field trip guidebook captures the current state of knowledge. Detailed studies of the varied fossils at the William Lake site in central Manitoba are under way, in collaboration with Dave Rudkin, Michael Cuggy,
and others. Our current focus is on preparation and description of a large number of well-preserved eurypterid specimens.

**Graham Young**
The Manitoba Museum
190 Rupert Avenue
Winnipeg, MB, R3B 0N2
Canada
Phone: 1-204-988-0648
Fax: 1-204-942-3679
gyoung@manitobamuseum.ca

ZHAN Renbin (China) reports that in 2013, together with my colleagues within our institute and China and in the world, I have kept working on the Great Ordovician Biodiversification Event (GOBE). More case studies conducted in South China real that the first acme of the Ordovician brachiopod radiation was apparently episodic: first on the upper part of the Jiangnan Slope, then on the vast area of the Yangtze Platform and finally at those near shore, shallow water localities. The discovery of some primitive strophomenids from the lower to middle Dapingian on the Yangtze Platform indicates that South China might be a cradle of the GOBE. New case studies on this particular topic and the end-Ordovician mass extinction are going on.

**Dr. Zhan Renbin**
State Key Laboratory of Palaeobiology and Stratigraphy
Nanjing Institute of Geology and Palaeontology (NIGP)
Chinese Academy of Sciences
39 East Beijing Road
Nanjing 210008, China
Tel./fax:+86-25-83282132;mobile:+86-13851647619
E-mail:rbzhan@nigpas.ac.cn

Shunxin ZHANG (Canada) has focused her research on biostratigraphy and petroleum potential in Hudson Bay and Foxe Basin. She has worked on the Late Ordovician conodont biostratigraphy on Melville Peninsula in the Arctic area; she has also worked on the Late Ordovician and Early Silurian conodonts (taxonomy and CAI) from limestone xenoliths on Hall Peninsula, Baffin Island where is no Phanerozoic cover nowadays. She used the conodont data to estimate the thickness of eroded Paleozoic strata and erosion rate, as well as the kimberlite temperatures.

**Shunxin Zhang**
Canada-Nunavut Geoscience Office
PO Box 2319, 1106 Inuksugait IV, 1st floor
Iqaluit, Nunavut X0A 0H0
Canada
Yuandong ZHANG (China) continues working on:

(1) Ordovician integrated stratigraphy. This work aims at a refined stratigraphic correlation of late Darriwilian to early Sandbian black shale in South China and Tarim, based on an integrated biostratigraphy of the graptolite, conodont, chitinozoan, acritarch and radiolarians (with Zhen Yongyi of Australia, and colleagues in NIGPAS), and chemostratigraphy on stable carbon isotope records in South China, Tarim and their implications for a refined stratigraphic correlation (with Axel Munnecke from Erlangen-Nurnberg University of Germany). This work has been supported by a grant from the Natural Science Foundation of China (Jan. 2012 to Dec. 2015).

(2) Systematics of the graptolites from the Ningkuo and Hulo Formations (Floian to Sandbian, Ordovician) in SE China, which is envisaged as a monograph with tens of plates of SEM and BSEM pictures showing the fine microstructures preserved in pyritic modes. This work has been slow due to frequent interruptions and will take a couple of more years to be ready for publication.

(3) Palaeogeographic 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 rated as potential hydrocarbon source rocks. This work has been financially supported by the Ministry of Science and Technology of China (project entitled “Palaeogeographic reconstruction of some critical intervals of Palaeozoic in South China and Tarim”, 2011-2015).

(4) 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 work will include 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 and made available to global scientists for study and appropriate sampling. Those who have interests in being involved in this work, please contact the project leader (Zhang Yuandong).

Yuandong ZHANG
Nanjing Institute of Geology and Palaeontology
39 East Beijing Road, Nanjing 210008
China
Tel.: 0086-25-83282145
Fax: 0086-25-83357026, 83282140
E-mail: ydzhang@nigpas.ac.cn

Yong Yi ZHEN (Australia) recently joined the Geological Survey of New South Wales (GSNSW), after having worked in palaeontology collections management and curation at the Australian Museum, Sydney for nearly 18 years. I am now heavily involved in the digitization and management of the fossil collections of GSNSW, in support of the regional geological mapping projects being carried out in New South Wales. I am also researching late Cambrian and Ordovician conodonts from New South Wales and other parts of Australia, New Zealand, and China.

Yong Yi Zhen
Geological Survey of New South Wales
W.B. Clarke Geoscience Centre,
947-953 Londonderry Rd, Londonderry,
NSW 2753. Australia
Telephone: 61 2 47770318
Fax: 61 2 47774397
e-mail: yong-yi.zhen@industry.nsw.gov.au

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

A


B


Bergström, S.M., Eriksson, M.E., Young, S.A. & Widmark, E.-M., 2013. Conodont biostratigraphy, and $\delta^{13}$C and $\delta^{34}$S isotope chemostratigraphy, of the uppermost Ordovician and Lower Silurian at Osmundsberget, Dalarna, Sweden. *GFF* doi.org/10.1080/11035897.2012.758169


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Pouille, L., Danelian, T. & Maletz, J. 2013. Radiolarian diversity changes during the Late Cambrian–Early Ordovician transition as recorded in the Cow Head Group of Newfoundland (Canada). *Marine Micropaleontology*. doi.org/10.1016/j.marmicro.2013.05.002


Vinn, O. 2013. Cornulitid tubeworms from the Ordovician of eastern Baltic. Carnets de Géologie CG2013_L03


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