ORDOVICIAN NEWS

SUBCOMMISSION ON ORDOVICIAN STRATIGRAPHY
INTERNATIONAL COMMISSION ON STRATIGRAPHY

Number 30 (for 2012)

Edited by Ian G. Percival

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Ordovician Subcommission website: http://ordovician.stratigraphy.org

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Cover photo

Major exposure of reddish ‘orthoceratite limestone’ of Darriwilian (late Middle Ordovician) age in a large abandoned quarry in one of the classical ‘plateau mountains’ in Västergötland, south-western Sweden. It forms a condensed succession of cool-water limestone with abundant corrosional hardgrounds. A light grey band in the upper half of the section represents the intriguing ‘täljsten horizon’. The ‘orthoceratite limestone’ is overlain by richly fossiliferous calcareous mudstone and limestone of the Gullhögen and Ryd formations. The locality will be visited during the post-conference excursion of the IGCP 591 Annual Meeting in Lund in June 2013. Caption and photograph courtesy of Mikael Calner.

ORDOVICIAN NEWS Number 30 (for 2012)

Chairman's Message

This has been another momentous year for Ordovician research. A cursory glance at Google Scholar reveals nearly 5000 publications involving our system in the last year. A huge diversity of publications are reported, ranging from the essential work of systematic palaeontologists describing new and existing taxa, through the innovative research of evolutionary palaeoecologists to cutting-edge studies on chemostratigraphy, particularly stable isotopes, of the system. The Great Ordovician Biodiversification Event and the end-Ordovician extinctions continue to be rich veins of investigation providing our communities with no shortage of high-profile and highly-cited papers.

Late in 2012, through the tireless efforts of Olle Hints, the Ordovician Subcommission launched a new, attractive and informative website (http://ordovician.stratigraphy.org). These are your webpages and I hope many of you will contribute to them, to add a new dynamism and vibrancy to our system and help promote Ordovician research to the wider community. Two key meetings are advertised for next year: **IGCP 591: Early to Middle Paleozoic Revolution, 4th Annual Meeting**, June 10–19, 2014, Estonia and **IGCP 591, Field Workshop** August 18-28, 2014, China. Both meetings will be supported by the subcommission.

The Ordovician too has been a focus of high personal achievement. One of the stalwarts of the Ordovician System, **Stig Bergström** of Ohio State University was selected as the recipient of the 2012 ICS Digby McLaren Award for his contributions over more than 40 years. The ICS Digby McLaren Award was established to recognize a career of outstanding achievements in, and contributions to, stratigraphy; Prof. Bergström's contributions have been immense and have developed through his long career. In addition Stig was awarded one of the IUGS Awards of Excellence at a formal ceremony during IGC in Brisbane last August. **Peter Sadler** of the University of California-Riverside, himself no stranger to the Ordovician, was selected as the recipient of the 2012 ICS Stratigraphy Prize for his ground-breaking contribution to stratigraphy, naming developing and applying the CONOP software program. The ICS Stratigraphy Prize was established to recognize singular achievements in and contributions to stratigraphy; the development and application of CONOP is one such major contribution.

As I write, the final volume from IGCP 503 is complete and with the Geological Society (*Early Palaeozoic biogeography and geography*, edited by Harper and Servais). Twenty-nine chapters cover virtually all the fossil groups through this interval and the volume will be a lasting source of reference for all Ordovician workers. This has been a long haul but hopefully we will see the fruits of this major endeavour published later this year.

And just around the corner, our partner project IGCP 591 'The Early to Middle Paleozoic Revolution: Bridging the gap between the Great Ordovician Biodiversification Event and the Devonian terrestrial revolution' has its annual meeting. All three Lower Palaeozoic subcommissions will meet together with IGCP 591 in the historic centre for Early Palaeozoic research in Lund this June. This will be an extraordinary occasion, bringing together the many multidisciplinary strands of our science. A particular theme of the Ordovician symposia will be both the global and regional development of the system, encouraging our colleagues working at the coal face to report new discoveries and the

alignments of regional stratigraphies with our widely-used global series and stages. We hope to publish a special volume devoted to regional chronostratigraphies.

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 aid, inform and stimulate your research.

David A.T. Harper
Chair, International Subcommission on the Ordovician System

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International Commission on Stratigraphy
Subcommission on Ordovician Stratigraphy

ANNUAL REPORT 2012

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

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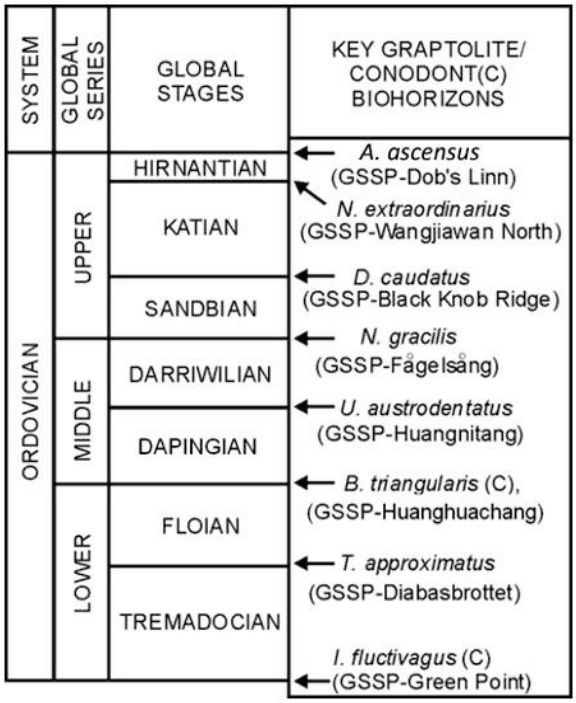
2. Overall objectives, and Fit within IUGS science policy:

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

Specific objectives are:
a. To delimit and subdivide the Ordovician System (and Period) as a part of the overall ICS mission to elaborate the standard global stratigraphic scale. This work aims to establish the boundaries (GSSPs), 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



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).

I would like to personally thank outgoing Vice Chairman, Juan Carlos Gutiérrez-Marco, Alan Owen, Leonid Popov, Chuck Mitchell and Godfrey Nowlan for the time and effort they have devoted to subcommission work over many years. Thank you indeed. I also have the pleasant task of welcoming our new members, Andrei Dronov (Vice President), Dan Goldman, Mansoureh Ghobadi Pour, Artur Sa, Tatiana Tolmacheva and Mark Williams and look forward to some great collaboration on the future challenges we face.

I am also delighted to report the presentations of the Digby McLaren Medal and IUGS Award for Excellence to Dr Stig Bergström, during the Brisbane IGC, in recognition of his many outstanding academic achievements in the fields of palaeontology and stratigraphy, not least the huge impact he has made on Ordovician Research.

5. Interfaces with other international projects

IGCP Project 503: 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. The results of the very successful IGCP project n° 410 "The Great Ordovician Biodiversification Event" not only included the development of an improved globally-integrated biozonation for graptolites, conodonts and chitinozoans, but also generated biodiversity curves that have been constructed for all Ordovician fossil groups.

Following the work of the numerous regional teams and of the clade teams, that were established for each fossil group in IGCP project n° 410, a new successor project (IGCP project n° 503) was approved in order to develop a better understanding of the environmental changes that influenced the biodiversity trends in the Ordovician and Early Silurian. In this project, the major objectives are 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 'Early Palaeozoic biogeography and palaeogeography' will be published next year (2013).

IGCP Project 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. The project has already featured at international congresses in Spain, the UK and the USA.

6. Chief accomplishments and products in 2012 cycle

a. The 11th International Symposium on the Ordovician System took place in Spain during May, 2011. The conference itself and associated business meetings and workshops were held in the environs of Madrid at Alcalá de Henares with field excursions to various parts of the Iberian Peninsula including the Iberian Chains and northern Portugal. A substantial volume, **'Ordovician of the World'** was published together with a number of field guides (see also below)

b. Although IGCP 503 formally concluded its 5-year program with an International Congress on Palaeozoic Climates in Lille, France during August, 2008, an extension of this successful project was agreed and a further meeting on 'Early Palaeozoic Palaeogeography' was held in Copenhagen during late August and early September 2009. The proceedings of this conference (Early Palaeozoic biogeography and geography) of some 25 manuscripts to be published as a Memoir of the Geological Society are currently being edited by Harper and Servais. **Publication will be in 2013 supported by ICS.**

c. The Subcommission completed its GSSP research programme in 2008 and all 7 Stage GSSPs were established and approved by the IUGS before the Ordovician Yangtze Conference (June 2007). Bergström, Chen Xu, Gutiérrez-Marco, and Dronov have compiled a new chronostratigraphic classification of the Ordovician System and its relations to the main regional series and stages. The English version has been published in *Lethaia* and the Chinese version was published in the *Journal of*

Stratigraphy in China prior to the 33rd IGC in Oslo during August 2008. Discussion, however, at the business meetings in Copenhagen, Madrid and Brisbane included the wish to routinely evaluate the efficacy of the current stages. No candidates for re evaluation have yet been formally requested. **A colour reprint of the Global Ordovician Chronostratigraphy (The Ordovician Time Table) chart was integrated with the ICS GTS and was distributed to colleagues at the IGC in Brisbane 2012 and beyond.**

d. ***Ordovician News No. 29*** was produced and posted on the Subcommission website and is available for download.

e. A thematic session on **Ordovician geology (International Subcommission on Ordovician stratigraphy: Ordovician intercontinental correlations: developing global and regional chronostratigraphy)** at the Brisbane IGC (convened by Harper and Percival) was well attended with over 60 participants during the session.

7. Chief problems encountered in 2012

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.

8. Summary of expenditure for 2011-2012

TOTAL INCOME (from ICS): USD 3250
Support for attendance of officers and presenters at the IGC, Brisbane USD 2500
Grant towards production of Geol. Soc. Memoir on Early Palaeozoic biogeography and geography USD 750

TOTAL EXPENDITURE **USD 3250**

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

The new Subcommission came into force during the 34th IGC in Brisbane. Plans for the Subcommission's future work were initially stated as follows, during a series of meetings in Copenhagen, Madrid and Brisbane.
a. Will open debate on the formal definition of chronozones within the Ordovician System. This possibility arises from the time-slice concept of Webby (2004) and the finer subdivision of the system presented by Bergström et al. (2008). **This was previously addressed in a session at the Madrid Meeting without strong support.**
b. Will establish a forum to assess the efficacy and utility of the newly-established international stages. **This too was previously addressed at the Madrid meeting. With exception of the base of the system no clear candidates in need of reassessment have emerged.**
c. 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. **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 these will be progressed to publication.**

d. Will open debate on the applicability of non-biologic methods of correlation of Ordovician strata.

e. Management of Subcommission website will remain based in Nanjing. Following discussions with the webmaster, Fan Junxuan, the site will be remodelled following the general format of the attractive and effective main ICS site. A number of redundant features will be removed and a number of more relevant additions will appear during the next few months. **Agreement has been made to move the website to Tallinn with a new webmaster, Dr Olle Hints.**

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.**
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.**
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 are 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, Calner 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, Calner 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 that is forming the basis for many chapters in the forthcoming GSL Memoir on Early Palaeozoic biogeography and geography edited by Harper and Servais and to be published in 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 Jim Connelly. These discussions are ongoing.**
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

a. Support for publication of Geological Society Special Paper on Ordovician regional stratigraphy (with fold out charts), arising out of the Brisbane IGC, edited by Harper and Percival. Publication has been agreed in principle by the Geological Society. The ICS will be credited as a main sponsor. **5000 USD**
b. Attendance at first ever Lower Palaeozoic symposium involving all three subcommissions in Lund, June 2013. **5000 USD**
c. Startup funding for potential review of GSSPs, in particular that at the base of the system: **2500 USD**

TOTAL 2012-2013 BUDGET: 12,500 USD
REQUESTED FROM ICS: **12, 500 USD**

Potential funding sources outside IUGS

The IGCP Project 503, "Ordovician Palaeogeography and Palaeoclimate", co-funded four meetings (with related field trips) in 2007, including the 10th Ordovician conference China and further relevant meetings in 2008: The project has continued for a final year in 2009 but without funding and was marked by two volumes of *Palaeogeography, Palaeoclimatology, Palaeoecology* in 2010. This project has in the past provided travel support to a significant number of Ordovician specialists, including voting members of the Subcommission, allowing for regular meetings at the annual workshops scheduled for the project. A new successor project has been initiated by Brad Cramer and colleagues and will continue to support Ordovician together with Silurian geology.

The State Key Laboratory of Stratigraphy and Palaeobiology, Nanjing Institute of Geology and Palaeontology, Chinese of Academy of Sciences, provides a server for the Subcommission website.

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."

k. Sponsorship at the 32nd International Geological Congress, Florence, Italy, 2004, of the symposium "The global Ordovician Earth system".

l. Launched GOES (Global Ordovician Earth System) Program to stimulate integrated multi-disciplinary studies of global events (mass extinction, sea-level changes, greenhouse conditions, tectonics) during the Ordovician Period.

m. Sponsorship of a special symposium on the Ordovician System at the Geological Society of America Annual Meeting in 2000, of WOGOGOB 2001 in Copenhagen, and the meeting and field excursion "The Gondwanan Platform in Ordovician times: Climatic, eustatic and geodynamic evolution", in Morocco in February 2001.

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.

v. Support, participation and sponsorship of Ordovician session at IPC3 in London, June 2010.

w. Publication of a *Special Paper, Geological Society of America* (2010) on Ordovician research (edited by Finney and Berry).

x. Publication of two volumes of *Palaeogeography, Palaeoclimatology, Palaeoecology* (2010) on Ordovician research (edited by Servais and Owen together with Munnecke, Calnar and Harper).

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.

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CONFERENCE ANNOUNCEMENTS

IGCP 591 "The Early to Middle Paleozoic Revolution"

IGCP 591 Annual meeting 2013 in Lund, Sweden 9-19 June

The link to IGCP 591 is http://igcp591.org/ and the link to the second circular is http://igcp591.org/downloads/lund2013_2circular.pdf The meeting is joint with the annual meetings of the Cambrian, Ordovician and Silurian subcommissions and has already attracted 160 participants from more than 20 countries.

Abstract submission and registration deadline March 29 2013.

The Organising Committee [Mikael Calner (chair) and Oliver Lehnert (vice-chair)] invites and encourages participants to submit a short paper to a Special Issue in the peer-reviewed Scandinavian geoscientific journal *GFF* dedicated to 'Early Palaeozoic Global Change'

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"Conodonts from the Andes"

3rd International Conodont Symposium

and

"The Early to Middle Paleozoic Revolution"

IGCP 591 Regional Field Meeting

Mendoza, Argentina, July 15-19, 2013

GENERAL INFORMATION

Mendoza, the capital city of Mendoza Province, is located in a region of foothills and high plains, on the eastern side of the Andes. Mendoza is a land of fine vineyards, olive oil production and gentle people willing to give our visitors a nice Argentine experience. The region around Greater Mendoza is the largest wine producing area in Latin America. As such, Mendoza is one of nine cities worldwide in the network of Great Capitals of Wine.

Mendoza is easily accessible by plane, or by road through National Route 7 (Bioceanic Corridor), which crosses Argentina from East to West connecting Buenos Aires with Santiago de Chile.

Mendoza exhibits a mild continental half-dry climate condition, with daytime temperatures ranging from -2 to 20ºC in July (winter), but hotter conditions are possible in the areas of the excursions.

Technical sessions will take place in the Mendoza Convention Center, located in the Civic Center, a wooded park where you may visit administrative buildings and the Wine Museum.

Posters will be displayed in the large foyer areas outside the lecture theatres. Tea, coffee and lunch will also be served here.

Schedule

July 8, 2013 – Reception of participants of the pre-symposium field trip to Precordillera at San Juan city (capital city of the San Juan Province, located 150 km to the north of Mendoza).
July 9-13, 2013 – Pre-symposium field trip to Precordillera (San Juan and Mendoza provinces).
July 14, 2013 – Registration - Icebreaker party at Mendoza City.
July 15, 2013 – Scientific sessions
July 16, 2013 – Scientific sessions - Pander Society dinner.
July 17, 2013 – Intra-symposium field trip (San Isidro section, Mendoza).
July 18, 2013 – Scientific sessions - Closure dinner.
July 19, 2013 – Scientific sessions.
July 20, 2013 – Travel from Mendoza City to Salta City.
July 21-25, 2013 – Post-symposium field trip to the Cordillera Oriental (Salta and Jujuy provinces), northwestern Argentina.

Organizing Committee

Honorary Chair: Mario A. Hünicken
Chair: Guillermo L. Albanesi
Secretary: Gustavo G. Voldman
Treasurer: Fernando J. Zeballo
Scientific programme coordinator: Gladys Ortega
Workshop coordinator: Susana E. Heredia
Social events coordinator: Matilde S. Beresi

Co-sponsored by the Academia Nacional de Ciencias, Asociación Paleontológica Argentina, Asociación Geológica Argentina, CONICET, Agencia Nacional de Promoción Científica y Tecnológica, International Palaeontological Association, International Union of Geological Sciences, IGCP 591, FCEFyN - Universidad Nacional de Córdoba, Universidad Nacional de Salta, Universidad Nacional de San Juan

Scientific Committee
Aldridge, Richard
Barnes, Christopher
Bergström, Stig
Corradini , Carlo
Ferretti, Annalisa
García-López, Susana
Henderson, Charles
Leslie, Stephen
Nicoll, Robert
Nowlan, Godfrey
Orchard, Michael
Over, Jeffrey
Perri, Maria Cristina
Purnell, Mark
Sarmiento, Graciela

Attendees and Costs
The registration fee will cover the formal registration, the proceedings, handouts, icebreaker party (food and drinks), all coffee breaks, the Pander Society and Closure dinners, and an intra-symposium field trip.
Prices
Professional: US$ 370 (after deadline US$ 430).
Undergraduate student: US$ 50 (after deadline US$ 70, without proceedings volumes).
Accompanying person: US$ 70 (after deadline US$ 100, without proceedings volumes).
Support for attendance
A limited amount of financial support is available to assist students and other participants who would otherwise have difficulty in attending the meeting. If you think you might qualify for support, please contact the organizers (3ICOS@efn.uncor.edu) before registering.

3rd ICOS 2013 Cancellation Policy
A US$ 50 administration fee will be charged for cancellations received prior to March 1st, 2013. **No refunds** will be issued after this date. Fees for registration and fieldtrips cancelled after May 30th, 2013 cannot be refunded. In the unlikely event that too few people register for an excursion for it to be viable, participants will be notified of its cancellation on or before July 1st, and refunded in full.

Field Trips
1) Pre-symposium Field Trip – Precordillera, San Juan Province
July 9-13, 2013
Price: US$ 500 - includes transportation, guidebook, and lunch and snacks from the morning of the 9th to the night of the 13th (without hotel, to be booked personally in San Juan City*).
Leaders: A.L. Banchig (Universidad Nacional de San Juan) - G.G. Voldman (CONICET, Universidad Nacional de Córdoba)
Description: The Precordillera of Western Argentina extends between 68º27'-69º18'W and 29º 00'-33º 00' S coordinates and is made up mainly of carbonate and siliciclastic rocks ranging in age from the early Paleozoic to the Cenozoic. It constitutes a typical

“thin-skinned” high level thrust-and-fold belt. The Precordillera has classically been divided into the Eastern, Central, and Western domains on the basis of structural and stratigraphical criteria. The Eastern and Central Precordillera represent an important Cambrian to Middle Ordovician carbonate platform, changing westwards from proximal to distal facies.
The Ordovician System is superbly exposed in the Precordillera, characterized by platform deposits, Tremadocian to Darriwilian in age, which bear an almost complete conodont, brachiopod and trilobite biozonal record, and reef structures. The carbonate sequence is overlain by a mixed calcareous/shaly package, with a fine graptolite biostratigraphy. Platform faunal records have strong affinities with those from the southeastern margin of Laurentia. The carbonate bank is covered by a mixed marine siliciclastic sequence, including graptolites, conodonts and a rich shelly fauna. The Western Precordillera displays deeper environments, with Cambrian to Lower Ordovician strata re-deposited during the Sandbian-Katian, as well as autochthonous Sandbian-Katian black shales with graptolites, and turbidite deposits, mafic intrusive rocks and tholeitic pillow basalts. The Precordillera is a unique site to examine a very complex geology throughout the Early Paleozoic that resulted in a controversial hypothesis regarding the origin of the Precordillera such as an allochthonous terrane originally located in Laurentia and accreted to Gondwana during the lower Paleozoic.
Localities to be visited:
July 9: Don Braulio Creek at Villicum Range (Ordovician, Silurian), return to San Juan.
July 10: Niquivil, La Silla, and Cerro Viejo de Huaco sections (Cambrian, Ordovician, Carboniferous, Permian -continental-), return to San Juan.
July 11: Jáchal River section and Las Aguaditas (Ordovician, Silurian, Devonian). Lodge in Rodeo.
July 12: Talacasto, La Invernada Range, El Tigre Range, Poblete Creek (Cambrian, Ordovician, Silurian, Devonian). Sections that include different carbonate and siliciclastic sequences of the lower Paleozoic bearing conodonts, graptolites and diverse invertebrate fossil groups, as well as ichnoassemblages, will be shown every day. Return to San Juan.
July 13: San Juan River (Las Burras Creek to Calingasta-Pachaco section; or Chica de Zonda Range to Ullum dam -lower Paleozoic-). Return to San Juan.

***Accommodation in San Juan City**
Hotels
Location map and contacts of hotels in San Juan:
http://goo.gl/maps/OUDke
Apart Hotels
Location map and contacts of apart hotels in San Juan:
http://goo.gl/maps/zO1SE
Hostels
Location map and contacts of hostels in San Juan:
http://goo.gl/maps/JCaoq

2) Intra-symposium Field Trip – San Isidro section, Mendoza Province
July 17, 2013
Price: included in the registration fee.
Leaders: S.E. Heredia (CONICET, Universidad Nacional de San Juan) - M.S. Beresi (CCTCONICET, Mendoza)

Description: The classical locality of San Isidro is one of the easternmost outcrops of the Precordillera in Mendoza province, located at 17 km away from Mendoza City. There, the Paleozoic units show different types of allochthonous deposits: rockfall deposits, canyon-fill deposits and diamictites. We will start with the Darriwilian (*Pterograptus elegans* Zone/ *Pygodus serra* Zone) talus olisthostromic deposits of the Estancia San Isidro Formation (192 m thick in San Isidro creek). We will follow with submarine canyon-fill conglomerate and sandstone (*Climacograptus bicornis* Zone), black shale (*Dicellograptus complanatus* and *Dicellograptus ornatus* zones/ *Amorphognathus ordovicicus* Zone) and stormy platform sandstone (Hirnantian stage) of the Empozada Formation (232 m thick). The latter facies includes a paraconglomerate with allochthonous conodonts from the *O. evae* and *A. superbus/A. ordovicicus* zones. Finally, we will visit the olisthostromic deposits of the Villavicencio Formation (ca. 1900 m thick) which includes giant olistoliths of Lower-Middle Devonian green shale, Cambrian limestone and sandstone of the Upper Ordovician Empozada Formation.

3) Post-symposium Field Trip – Cordillera Oriental, Salta and Jujuy provinces
July 20-25, 2013
Price: US$ 1,000 - includes bus from Mendoza to Salta, and all costs from July 21-25 (transportation, guidebook, hotels and meals (except dinner) - including the nights from the 20st to 25th). This field trip is planned for a minimum of 10 participants.
Leaders: C.R. Monaldi (CONICET – Universidad Nacional de Salta) - F.J. Zeballo (Universidad Nacional de Córdoba).
Description: The Eastern Cordillera is located in north-western Argentina, between the Puna – Altiplano Plateau to the west and the Santa Barbara - Subandean fold and thrust belt to the east. These morphotectonic regions formed as a consequence of intracontinental shortening of the western South American Plate margin, imparted by convergence between the Nazca Plate and the South American Plate. This field trip will be dedicated to look at some reference sections of the West Gondwanan margin of South America. Thick siliciclastic sequences reach up to 7000 m through the Cambrian-Ordovician systems. Selected localities with diverse landscapes such as dense tropical forests or dry areas as the Humahuaca Creek (where some Inca architectural remains are preserved) will be visited. Highly fossiliferous sections will be shown (graptolites, trilobites, brachiopods, conodonts, ichnofossils) with discussion of paleoenvironmental settings and biostratigraphical markers for the subdivisions of the Ordovician System in the basin. In addition, spectacular Precambrian-Cambrian, Silurian-Carboniferous and Cretaceous-Tertiary successions will be visited.
Localities to be visited:
July 20: Travel by bus from Mendoza to Salta, with magnificent views of the Andean foothills.
July 21: Mojotoro range: Cornisa Road and Gallinato Creek (Lower – Middle Ordovician).
July 22: Tilcara - Alfarcito area: Casa Colorada Creek (Cambrian – Lower Ordovician).
July 23: Humahuaca - Santa Ana Road (Lower – Middle? Ordovician).
July 24: Purmamarca – Salinas Grandes Road (Lower Ordovician).
July 25: Return from Purmamarca Village to Salta City. The excursion will end at noon in Salta down town.

Important: Please note that we will be going up to 4200 m above sea level. Health insurance is highly recommended for all participants.

Scientific Program
The sessions will be programmed after May, 2013, with the 3rd circular; including oral and poster presentations.
There will be four days of scientific sessions and workshops, and a day-long intra-symposium excursion. Additionally, bench space and microscopes for informal specimen based discussions would be provided should there be demand for this (contact the organizers: 3ICOS@efn.uncor.edu).
We are interested in any paper that discusses conodonts or uses conodonts within a broader context to solve geologic problems. In addition to the open sessions, thematic sessions would be arranged depending on the composition of the papers submitted.

Publication
Short-papers submitted to the 3rd ICOS will be published in a special volume of the *Asociación Paleontologia Argentina.* The contributions should not exceed 3000 words, including references, 2 line drawings and 1 photographic plate (5 pp. in total – 1 more line drawing or table can be accepted as addendum). For full editorial guidelines visit this link (see: "Paleontological Note" – same style for *Ameghiniana* is for *Special Publication*). Abstracts of 250 words can be submitted as well. Examples of Paleontological Notes and Abstracts can be seen in the symposium web page. Manuscripts for the Special Publication of the 3rd ICOS should be submitted by e-mail to: 3ICOS@efn.uncor.edu

Communications
Oral and poster presentations will be accepted. 15 minutes will be given for oral presentation + 5 minutes of discussions.

Conference Language
English.

Accommodation in Mendoza City
Accommodation must be booked by May 15, 2013, to ensure a room. Reservation and payment is your own responsibility. Hotels in Mendoza can be consulted online following this link: http://goo.gl/maps/qqpM1.
Or contact the Secretariat at e-mail: 3ICOS@efn.uncor.edu for a full listing.

Social events
The Pander Society Dinner is scheduled in Mendoza for the evening of July 16th. A tango show and fine wines will liven up the meeting. The Closure Dinner with a music spectacle will be organized for July 18th. If you have any special dietary requirements (vegetarian or others) please let us know.

Letter of Invitation
If an official document is needed to confirm participation or help arrange funds for traveland attendance, please write or contact the secretariat.

Important Dates
- Deadline for providing title of your presentation: February 1st, 2013.

- Early-bird registration ends: April 1st, 2013 (registration will continue to conference).
- Short-paper deadline: April 1st, 2013.
- Last circular distribution with program and final arrangements: July 1st, 2013.

Registration

Symposium

Registration fees (until April 1st, 2013)
Professionals US$370. *Accompanying person* US$70. *Undergraduate student* US$50
From April 1st 2013 to July 15th, 2013
Professionals US$430. *Accompanying person* US$100. *Undergraduate student* US$70

Field trips

Pre-symposium - Precordillera: US$500
Post-symposium - Cordillera Oriental: US$1000

Payment

Moneygram (https://www.moneygram.com/)
Transfer to Guillermo Luis Albanesi (transfer fees are responsibility of the depositor).
Contact us once you have the reference number.
Wire transfer
Beneficiary: U.N.C. - FAC. CS. EXACTAS FISICAS Y NATURALES
Name of the Bank: Banco Nación Argentina
Branch: Córdoba, #1570
Checking account: 213-19046/02
CBU: 01102132- 20021319046022
CUIT: 30-54667062-3
International wire transfers in DOLLARS
ABA: 026008552
Banco de la Nación Argentina
New York Branch
Swift: NACNUS33
Beneficiary Bank (BBK): Banco de la Nación Argentina
Córdoba Branch
Swift: NACNARBACOR
International wire transfers in EURO
Banco de la Nación Argentina
Madrid Branch
Swift: NACNESMM
IBAN: 0169-0001-91-0000110024
Beneficiary Bank (BBK): Banco de la Nación Argentina
Córdoba Branch
Swift: NACNARBACOR
Cash
to secretariat of the 3rd ICOS at the venue

Contacts

Secretariat e-mail: 3ICOS@efn.uncor.edu or Guillermo Albanesi
e-mail: galbanesi@arnet.com.ar, Tel.: 00 54-351-4694703, Fax: 00 54-351-4216350.

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IGCP 591 4th Annual Meeting, June 10–19, 2014, Estonia

The 4th Annual Meeting of IGCP 591 will be hosted in Estonia, from June 10-19, 2014. The scientific sessions in Tartu will be preceded and followed by geological excursions to study the lower Paleozoic carbonate succession of Estonia. The 2014 annual theme of IGCP 591 targets **Evolutionary paleoecology and paleobiogeography**, however, the meeting will not be limited to these topics. A broad range of contributions on Early to Middle Paleozoic geology are expected, from palaeontology and stratigraphy to geochemistry, palaeogeography and climate modeling.
The meeting will be organized jointly by the University of Tartu and Tallinn University of Technology, with the support from the Geological Society of Estonia and IGCP 591.

Schedule
November 1, 2013: Distribution of Second Circular
March 1, 2014: Deadline for registration, abstracts, and payments
June 9, 2014: Arrival to Tallinn (for pre-conference excursion)
June 10-12, 2014: Pre-conference excursion (Ordovician and Silurian of northern and central Estonia)
June 12, 2014: Arrival to Tartu, registration and Ice Breaker
June 13-15, 2014: Scientific sessions in Tartu
June 14, 2014: Conference Dinner
June 16-19, 2014: Post-conference excursion (Silurian of central and western Estonia and Saaremaa).

Excursions
Two excursions are planned to show the Ordovician and Silurian sections in mainland Estonia and Saaremaa Island. Optionally a short drill-core workshop will be organized. The **pre-conference excursion** (June 10-12, 2014) 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 estimated cost is EUR 250 (includes field lunches and one night accommodation in NE Estonia) and maximum number of participants is limited to 60.
The **post-conference excursion** (June 16-19, 2014) 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 estimated cost is EUR 500 (includes accommodation and field lunches); the maximum number of participants is limited to 30.
Estimated costs

- **Conference fee**: EUR 150 (EUR 100 for students)
- **Pre-conference excursion**: EUR 250 (includes one night accommodation)
- **Post-conference excursion**: EUR 500 (includes accommodation)

Please note that as of now the fees are approximate. The fees will be fixed and payments using credit card or bank transfer will be accepted starting from late 2013. The details will be provided in the Second Circular and on the conference website: http://igcp591.org/2014. Limited support from the IGCP 591 will be possible, details to be announced.

Publications
The abstract volume will be distributed at the conference. The length of abstracts is limited to one A4 page (single-spaced, 12 pt serif font, 2.5 cm margins), illustrations cannot be accepted. The abstracts should be submitted by e-mail to igcp591.2014@gmail.com. The deadline is **March 1, 2014**.

A thematic conference volume will be published in early 2015 as an issue of *Estonian Journal of Earth Sciences*, guest edited by IGCP 591 project leaders. All manuscripts for the thematic volume will be subject to regular peer-review and need to follow the journal's style. Further instructions will be provided in the Second Circular. *EJES* (http://eap.ee/earthsciences) is an international geosciences journal with current Impact Factor of 1.3 and indexing in ISI WoS and Scopus. Being an OpenAccess journal, all papers become freely accessible on-line and can be distributed by the authors with no restrictions. The deadline for manuscripts is **June 1, 2014**.

Contact and further information
Conference website: **http://igcp591.org/2014**
E-mail: igcp591.2014@gmail.com
Tõnu Meidla (University of Tartu): office +372 737 5895
Olle Hints (Tallinn University of Technology): office +372 620 3027, skype: olle.hints
http://igcp591.org/2014

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IGCP Project 591: Field Workshop 2014

jointly with

International Subcommission on Ordovician Stratigraphy (ISOS)

and

International Subcommission on Cambrian Stratigraphy (ISCS)

First Circular

18–28 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, Kunming

General information

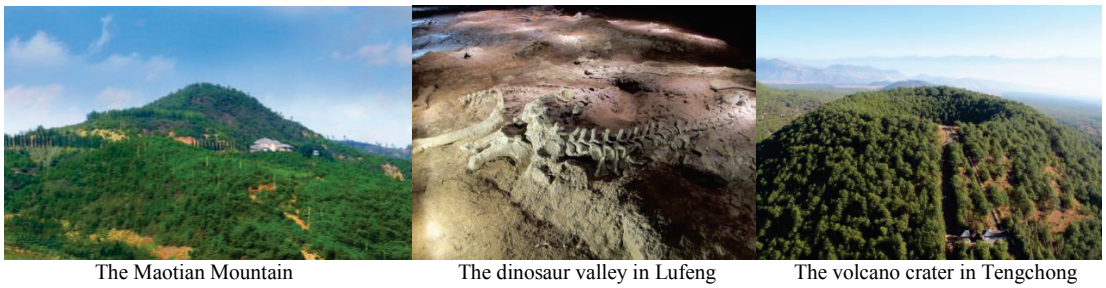
The 2014 Field Workshop of IGCP 591, to be held jointly with ISOS and ISCS, will be hosted by the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences and the Yunnan Key Laboratory of Palaeontology, Yunnan University. Its formal theme will be **'Global Events and their relationships in the Early to Middle Paleozoic'**. The meeting is scheduled tentatively for August 18-28, 2014. Scientific sessions in Kunming will be followed by a field excursion from northeastern Yunnan (western South China paleoplate) to western Yunnan (Indochina and Sibumasu paleoplates).

The meeting in Kunming will include two days of indoor scientific sessions for delegates to present their most recent research, and a day trip to the world-renowned Chengjiang Biota site, about 60 km east of Kunming.

Yunnan is well known for its "four seasons of spring weather" and spectacularly beautiful natural scenery, including several national and international geoparks. The meeting venue will be Yunnan University, which is one of the state key universities in China and located in the centre of Kunming city proper beside the Cuihu Lake.

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

During the post-conference field excursion, we will visit several Ordovician, Silurian and Devonian sections. Most of the stratigraphic sequences are continuous, containing rich and diverse fossils. Within one week, delegates will have the opportunity to investigate Lower Paleozoic sections and faunas of three different paleoplates (South China, Indochina, and Sibumasu), and to enjoy some stunningly beautiful scenery spots, such as the Cangshan International Geopark, Erhai Lake (one of the largest plateau lakes in China), as well as modern vocanic craters and hot springs in Tengchong.



The Maotian Mountain | The dinosaur valley in Lufeng | The volcano crater in Tengchong

The Ordovician section at Haidong, Dali, western Yunnan

Organizing committee
ZHAN Renbin (chair), Nanjing Institute of Geology & Palaeontology, CAS
HOU Xianguang (vice-chair), Yunnan University, Kunming China
ZHANG Yuandong (vice-chair), Nanjing Institute of Geology & Palaeontology, CAS
HUANG Bing (secretary), Nanjing Institute of Geology & Palaeontology, CAS
David HARPER (ISOS), Department of Earth Sciences, Durham University, UK
ZHANG Xingliang (ISCS), Northwest University, Xi'an China
WANG Yi, Nanjing Institute of Geology & Palaeontology, CAS
FENG Zhuo, Yunnan University, Kunming China
CONG Peiyun, Yunnan University, Kunming China
WU Rongchang, Nanjing Institute of Geology & Palaeontology, CAS
YANG Qun, Nanjing Institute of Geology & Palaeontology, CAS
LIU Yu, National Natural Science Foundation of China
Brad CRAMER, University of Iowa, USA
Jisuo JIN, Western University, Canada

Estimated registration fees
(Note: All registration fees are estimates at this stage. The final registration fees will be set and announced in the 2nd circular, to be distributed in the beginning of 2014).

The registration fee for the scientific sessions (see details in the early registration form) covers the formal registration, the summary and proceeding volumes, handouts, accommodations (optional), icebreaker, conference dinner, coffee breaks, day trip to the Chengjiang Biota site and the conference backpack.
The registration fee for the post-conference field excursion in northeastern and western Yunnan Province is estimated at $1100 US, which covers the field guidebook, hotels (mostly three stars or higher), meals, transportation, the flight ticket from Tengchong to Kunming, and the tickets to geoparks, historical sites and museums, etc.
It is possible for PhD students and young researchers to apply for a limited amount of financial support.

Tentative meeting itinerary
Monday, 18 August 2014. Registration throughout the day. Icebreaker at the convention centre of Yunnan University, 18:00–22:00. You can also upload presentations and mount posters during the icebreaker.
19 August. Scientific session. Presentations beginning at 9:00AM and ending at 5:30PM; poster display throughout the meeting.
20 August. Day trip to Chengjiang Biota site. We will visit the original site of the Chengjiang Biota—the Maotianshan Mountain, and the Fuxian Lake just beside it**.**
21 August. Scientific session.
21 August (evening). Conference banquet at Yunnan University.
22–27 August. Post-conference excursion to northeastern and western Yunnan Province (back to Kunming on the evening of 27 August).
28 August. Delegates depart or continue their own tourist activities. Maps and other tourist information about the Kunming International Airport, shopping, sightseeing, and transportation in Kunming, will be provided both in the 2nd circular and during the meeting.

Publications
1. Extended summary (up to 4 printed pages, including references, and figures) will be published by the Nanjing University Press (Eds. Huang Bing and Zhan Renbin). Deadline for submission: **31 May, 2014**.
2. A proceedings volume of full papers will be published in *Palaeoworld*, a peer-reviewed international journal (Eds. Zhan Renbin, Jin Jisuo and David Harper). Deadline for submission: **31 March, 2014**.
3. Field Guide will be published by Science Press (Beijing) (Zhang Yuandong et al.).
All three publications will be available and distributed to all delegates at the meeting.

Travel and accommodations
From the Kunming International Airport to the meeting site: We will provide detailed information on travel from the new Kunming International Airport to our convention centre. We will provide some free pick-up services for delegates who really need help.
All delegates are advised to stay at the Reception Centre (corresponding to a three-star hotel) of Yunnan University. We can reserve the room for you according to your selection in the registration form. You may also book your own room(s) outside Yunnan University, and some detailed information about the hotels around the University will be provided in the 2nd circular.
For the post-conference field excursion, all expenses are covered by the registration fee including transportation, accommodation (22–27 August, 2014, six nights), meals, guidebook, flight ticket from Tengchong to Kunming, tickets to Geoparks, Museums and historical sites etc.

Early Registration Form
For full details of indicative costings for a variety of accommodation and field trip options, please refer to the Ordovician Subcommision website
http://ordovician.stratigraphy.org
where you will find a Registration of Interest Form to be filled in and returned.

Contact information
All questions related to the Field Workshop should be directed to:
Huang Bing, bhuang@nigpas.ac.cn; or Zhan Renbin, rbzhan@nigpas.ac.cn

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4th International Palaeontological Congress (IPC 4)
"The history of Life: A view from the Southern Hemisphere"
September 28th to October 3rd, 2014
Mendoza, Argentina

The International Palaeontological Congress (IPC) is a global meeting devoted to Palaeontology throughout the world. It takes place every four years under the auspices of the International Palaeontological Association. After three previous editions in Sydney (2002), Beijing (2006) and London (2010), it will now come to the American continent.

The meeting will be held in Mendoza, Argentina, an attractive and easily accessible city in the mid-west of the country. Mendoza is renowned for its location at the foot

of the Andes, near the highest peak of the Western Hemisphere, the Aconcagua. The whole province of Mendoza provides many tourist attractions to explore and it is well known for being one of the foremost wine-producing regions in the world.

Local organizers are planning a comprehensive congress with an intellectually stimulating scientific program with combination of plenary lectures, symposia on leading issues, interactive workshops, technical sessions and short courses. Delegates will have also the opportunity to enjoy diverse conference excursions to rich and well-known Argentine palaeontological sites. These field trips will not only include visits to important scientific localities but also to regional tourist attractions. The schedule of field trips covers superbly exposed sedimentary successions representing a great diversity of marine and continental palaeoenvironments and encompasses nearly the whole Phanerozoic stratigraphic record.

Please, visit the website http://www.ipc4mendoza2014.org.ar/ and the first circular http://www.ipc4mendoza2014.org.ar/wp-content/uploads/2012/12/1st-Circular-4th-IPC1.pdf where you will find detailed information about all aspects of the meeting. We look forward to welcoming the Ordovician community at Mendoza in 2014!

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ISOS 2015
James Madison University
Harrisonburg, Virginia USA
Central Appalachian Mountains

Watch for the First Circular later this year

Organizing Committee (Preliminary)

Stephen A. Leslie, James Madison University
John Haynes, James Madison University
Achim Herrmann, Louisiana State University
Dan Goldman, University of Dayton
Matt Saltzman, Ohio State University
John Taylor, Indiana University Pennsylvania
John Repetski, United States Geological Survey

If you would like to help with the meeting, email Steve Leslie: lesliesa@jmu.edu

Proposed Dates (may change by a week or so in either direction)
Pre-meeting field trips June 3-7
Technical Sessions June 8, 9, 10
Conference Field Trip June 11
Post-Meeting Field Trip(s) June 12-17.

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. We plan to make arrangements for coaches to be available for transportation from Dulles International Airport 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 lows 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, 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) 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 is planned to be published as a Special Publication of the Virginia Museum of Natural History. See http://www.vmnh.net/store.cfm?deptID=4 for examples of this publication series.

Lodging & Meals

Both lodging and meals are available on-campus of JMU at reasonable cost (note that the food is quite good as it was ranked #3 Best Campus food in the USA for 2010 by the Princeton Review.) In addition to the university housing and meal plan there are many hotels and restaurants within easy walking distance.

Field Trips

The 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. The details below are examples of what we plan. **Watch for the First Circular where we will ask for field trip preferences and include information on costs.**

Pre-meeting field trip:
Southern Appalachians (Dates approximate)
This trip will begin in Birmingham, AL on June 3rd where we will examine the Middle to Late Ordovician carbonate to clastic transition from the Pratts Ferry Formation to the Athens Shale. June 4-7th visiting field sites. Next we will travel to the Nashville area to visit the Middle and Late Ordovician platform carbonates exposed in the Nashville Dome. We will then travel east into back into the Appalachian fold and thrust belts where we will examine the development of the Taconic foreland in Eastern Tennessee and southwestern Virginia. This trip will end at the conference venue in Harrisonburg, VA. Lodging, food and transportation in the field are covered in the field trip registration. A minimum of 8 and a maximum of 20 participants.

Possible trip to Oklahoma depending on interest (Dates approximate)
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. A minimum of 8 and a maximum of 20 participants.

Conference Field Trip
The Shenandoah Valley hosts classic Ordovician exposures of the Early, Middle and Late Ordovician. We will take advantage of these exposures during a trip to the Classic Tumbling Run section in the Strasburg, VA area. We plan travel to Washington DC where there will be the opportunity to visit the spectacular museums of the USA National Capital. We anticipate getting to the Washington DC National Mall (http://www.nps.gov/nacc/index.htm). Conference attendees that are traveling out of Washington DC may bring luggage and depart from the conference at this time.

Post-meeting field trips

Central and north-central Appalachians (Dates approximate)
This trip will leave from Harrisonburg, VA on June 12 and begin with the exposures of nearly the entire Ordovician sequence as developed along the C & O 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 (http://www.dcnr.state.pa.us/topogeo/tbr/tbr.aspx). The final leg of the field trip on June 14-15 will visit the classic Carbonate to clastic filling of the Taconic foreland as exposed in New York's Mohawk River Valley succession of limestones and black shales exposed in the Mohawk and Black River valleys of central New York State, which are the standard reference of the upper part of the Middle Ordovician in North America. For over 150 years these strata have posed complex and vexing problems whose solutions were of primary importance to Ordovician geology. The Late Ordovician outcrops that we will visit, including the

magnificent exposures at Trenton Falls, are abundantly fossiliferous, expose an interesting array of different facies, and reflect the history of the Taconic Orogeny. The western-most regions of the present study area were dominated by supratidal to deep subtidal carbonates of the Black River and Trenton groups. These rocks are eastwardly replaced, in the deeper parts of the Appalachian Basin, by the Utica Group. The Utica Group is here a thick succession of dominantly black shale with some intervals of interbedded calcisiltite and calcilutite turbidites. The Utica facies migrated westward over time and diachronously replaced the Trenton facies during the course of the early Katian. The disparate clastic eastern and carbonate western facies are precisely correlated with a series of geochemically fingerprinted K-bentonite beds. Hence, participants will get to examine facies transitions and collect fossils within a precise geologic time framework. We will return to Harrisonburg on June 16th. Lodging, food and transportation in the field are covered in the field trip registration. A minimum of 8 and a maximum of 20 participants.

Possible trip to Trail Creek, Idaho depending on interest (Dates approximate)
This field trip will examine an 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 natural 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. Minimum of 8 and a maximum of 15 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).**

Social Program for Accompanying People

The Shenandoah Valley boasts many vineyards, historic sites, and spectacular natural scenery including public caverns (http://www.shenandoahcaverns.com/, http://www.grandcaverns.com/v.php?pg=15, http://www.luraycaverns.com), and Shenandoah National Park (http://www.nps.gov/shen/index.htm). These may be visited easily by accompanying persons and are most accessible via rental car. If there is sufficient interest, we will have a one-day of trip to Colonial Williamsburg (http://www.history.org) or Historic Jamestown http://www.historicjamestowne.org. Alternatively, if there is sufficient interest trips may be scheduled for Monticello, the home of Thomas Jefferson, author of the Declaration of Independence, third president of the United States (http://www.monticello.org) and Mountpelier, the home of James Madison, father of the US Constitution, fourth President of the United States (http://www.montpelier.org/). In addition Harrisonburg is located 2 hours from the many attractions of Washington DC. More details will be in the first circular.

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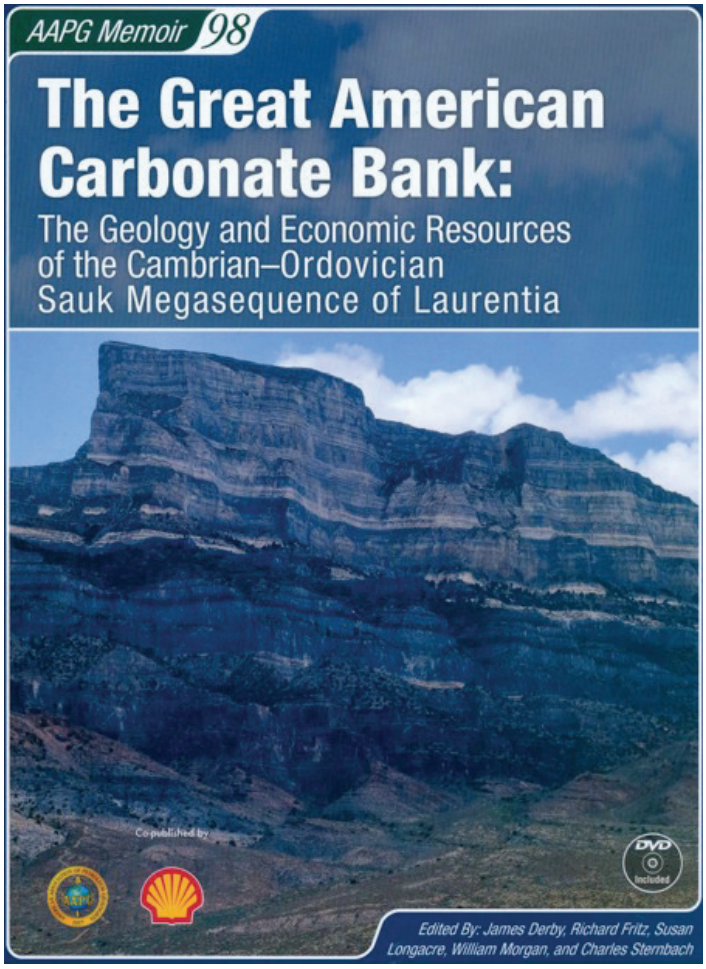
NEW PUBLICATIONS OF INTEREST TO ORDOVICIAN RESEARCHERS



The Great American Carbonate Bank (AAPG Memoir 98)

The Great American Carbonate Bank (GACB) comprises the carbonates (and related siliciclastics) of the Sauk megasequence, which were deposited on and around the Laurentian continent during Cambrian through earliest Middle Ordovician, forming one of the largest carbonate-dominated platforms of the Phanerozoic.

The Sauk megasequence, which ranges upwards of several thousand meters thick along the Bank's margin, consists of distinctive Lithofacies and fauna that are widely recognized throughout Laurentia. A refined biostratigraphic zonation forms the chronostratigraphic framework for correlating disparate outcrops and subsurface data, providing the basis for interpreting depositional patterns and the evolution of the Bank. GACB hydrocarbon fields have produced 4 BBO and 21 TCFG, mostly from reservoirs near the Sauk-Tippecanoe unconformity. The GACB is also a source of economic minerals and construction material and, locally, serves as either an aquifer or repository for injection of waste material.

This Memoir comprises works on biostratigraphy, ichnology, stratigraphy, depositional facies, diagenesis, and petroleum and mineral resources of the GACB. It is dedicated to James Lee Wilson who first conceived of this publication and who worked on many aspects of the GACB during his long and illustrious career.

[above information taken from AAPG Bookstore website]

ISBN: 0891813804
Edited by James Derby, Richard Fritz, Susan Longacre, William Morgan, and Charles Sternbach
Publisher: Co-published by AAPG and Shell
Format: Hardcover volume of 528 pp, plus DVD (c.1200 pp)
Pages: 528
Publishing Date: 01/13
Cost: AAPG Member price U$189; non-member price U$304
Obtainable from: AAPG Bookstore, Canadian Society of Petroleum Geologists Bookstore, Geological Society of London Bookstore and other distributors

CONTENTS of DVD

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SPECIAL ISSUE OF *GEOLOGICAL JOURNAL* 48(2-3)
on **Lower Palaeozoic fossils, biostratigraphy and events from western Gondwana**

This Special Issue of *Geological Journal*, edited by Guillermo Albanesi and Gladys Ortega and published in early 2013, is focused mainly (but not entirely) on South American geology. It incorporates selected papers that were originally presented at the '10th Congreso Argentino de Paleontología y Bioestratigrafía' held in La Plata, Argentina, on 20–24 September 2010. About half of them are on Ordovician topics; the remainder (arranged chronologically) range from early Cambrian to Devonian in coverage of a variety of fossil groups and associated palaeoenvironments.

Contents

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PALAEOGEOGRAPHY, PALAEOCLIMATOLOGY, PALAEOECOLOGY
SPECIAL ISSUE: vol. 367–368 (2012)
"Time-Specific Facies: the color and texture of biotic events"
Edited by
Annalisa Ferretti, Kathleen Histon, Patrick I. McLaughlin & Carlton E. Brett

Broadly defined, "Time-specific facies" represent relatively short-lived and widespread occurrences of distinctive facies (Brett et al., 2012, herein). The seventeen papers included in this Special Issue have been organized to emphasize two main aspects of TSFs: firstly, the time-specific response of organisms to a changing environmental scenario provides a significant pattern that may be recurrent in time and space. In this case, the identification of the "texture" of widespread events becomes crucial in recognizing TSFs. Secondly, such facies may reveal much more widespread physical and geochemical phenomena, such as variation in the coupled ocean–atmosphere system, through specific colouring of the sedimentary successions. Most papers in this Special Issue were presented at the symposium of the same name, held at the 3rd International Palaeontological Congress (IPC) in London in 2010. Six of these directly concern the Ordovician.

CONTENTS

Part B – Time-Specific Facies and colour of events

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RESEARCH REPORTS & Contact details
(in alphabetical order)

Jonathan M. ADRAIN (USA) continues to work on a comprehensive field-based reinvestigation of the Lower and lower Middle Ordovician faunas of the western Laurentian cordillera, with fieldwork in Nevada, Utah, and Idaho. A new trilobite zonation for the Stairsian Stage (upper Tremadocian) should appear in 2013, as should a review paper surveying the distribution, diversity, and phylogenetic status of all Ordovician trilobite families. Other fieldwork in 2012 saw extensive new collections of a rich silicified Darriwilian fauna from the Antelope Valley Formation of the Funeral Mountains in Death Valley National Park. Elements of this fauna were originally treated by Ross (1967), but the new collections permit much more detailed monographic treatment and there are many new species and several new genera. From the same section a silicified Skullrockian (lower Tremadocian) fauna was obtained from the Goodwin Formation. A deeper water Floian silicified fauna, mentioned in passing in a paper by Ross, was recovered from the basal Antelope Valley Formation at Striped Hills, southeastern Nevada. Finally, a low diversity, asaphid-dominated upper Floian silicified fauna was discovered and collected in the Skoki Formation at the Lower Ordovician cordilleran reference section at Wilcox Pass, Jasper National Park, Alberta (Canada).

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Jonathan AITCHISON (Australia) is working at present with other members of the Interrad Paleozoic Working Group on revision of systematics for Early Paleozoic radiolarians. This has involved workshops in Lille and Cadiz and hopefully will be completed sometime this year. One result is that I am looking for a good student to do some further work on Ordovician radiolarians - mainly using micro-CT and nano-CT (both available on campus at the University of Sydney) as we need to see inside them to understand their detailed microstructure and evolution.

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Guillermo ALBANESI (Argentina) is participating in collaborative projects with Gladys Ortega and colleagues from universities of Argentina and other countries. The projects are devoted to diverse topics of historical geology from the Lower Paleozoic of South America, including conodont biostratigraphy, chemostratigraphy, events, and paleothermometry. His project on early Paleozoic conodont faunas from the Eastern Cordillera and Puna of northwestern Argentina includes the associated PhD student M. E. Giuliano for the next years. Post-doctoral students G. Voldman and F. Zeballo are carrying out their projects on Cambrian-Ordovician conodont biostratigraphy, paleoenvironmnents and paleothermometry of Argentine basins under his supervision. F. Serra and N. Feltes are studing conodont biostratigraphy and paleoenvironmets of mixed carbonate-siliciclastic sequences from the Ordovician System of the Argentine Precordillera, under his direction for the CONICET. He is organizing the regional field meeting to be held in Mendoza, Argentina, July 2013, as regional co-leader for the IGCP 591, "The Early to Middle Paleozoic Revolution", together with the 3rd International Conodont Symposium, "Conodonts from the Andes" (website: www.efn.uncor.edu/3icos). He has published a special thematic issue of *Geological Journal* on Early Palaeozoic faunas of South America with G. Ortega as guest editors. He is also organizing the "XIX Congreso Geológico Argentino", which will be held in Córdoba, Argentina, June 2014 (website: www.congresogeologico.org.ar).

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Dick ALDRIDGE (UK) reports publication of a paper on a 17-element conodont apparatus based on natural assemblages from the Soom Shale Lagerstatte, South Africa. Work on other animals, including agnathans, from the Soom Shale continues with Sarah Gabbott and Hannes Theron.

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J. Javier ALVARO (Spain) is working on palaeontological and stratigraphic aspects of the Cambrian-Ordovician transition and the Upper Ordovician episodes of carbonate productivity and glaciation patterns along different margins of Gondwana, such as Morocco, Spain, France and Iran.

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Chloé AMBERG (France) is working as a PhD student with Thijs Vandenbroucke (Lille1 University) on Ordovician palaeoclimate reconstructions. For this study, I will be working mainly with chitinozoans from sections in the "Arenig" of South Wales. The fossil zooplankton will be used to build distribution maps of palaeoprovinces as a tool to track climate belt migration and identify climate variations. I am also investigating the nature of rhythmic deposits in the Oslo-Asker area (Norway) of the same age, using bed-by-bed palynology and geochemistry.

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Anna ANTOSHKINA (Russia) is actively working on study of the Paleozoic reefs and Lower Paleozoic sedimentation of the north-eastern European Platform. In this year I focused my study on the Hirnantian deposits in the Subpolar Urals where is very well recognized two phases of the Hirnantian sedimentation: early regression (carbonate breccias) and late transgression (reef-like massive carbonates).

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Chris BARNES (Canada) reports that the geochemistry of Lower Paleozoic conodonts, particularly oxygen isotopes for paleotemperatures, is being pursued further in collaboration with Julie Trotter (University of Western Australia) and other colleagues. Work with Shunxin Zhang (Geological Survey of Canada, Iqaluit) continues using my extensive conodont database to relate conodont biostratigraphy, biofacies and biogeography to the pattern of eustasy and tectonism that affected northern Laurentia in the early Paleozoic. After retiring as Director of NEPTUNE Canada in 2011, I am active in completing several Lower Paleozoic conodont studies as well as some ongoing ocean observatories activities as Professor Emeritus.

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****

Jeff BAUER (USA) is working on Ordovician conodonts from the Pruitt Ranch Member, Oil Creek Formation, Criner Hills, Oklahoma.

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Juan L. BENEDETTO (Argentina) is working on the taxonomy and phylogeny of Lower Ordovician brachiopods from the Central Andean basin of NW Argentina, including the punctate orthide *Lipanorthis* of Tremadocian age. Particular interest is being devoted to the early diversification and phylogeny of orthoids and plectorthoids and their bearing on the taxonomy of rhynchonelliformean brachiopods. Research is continuing on the Middle Ordovician brachiopod faunas from the upper San Juan Formation and Las Chacritas formations and the early colonization of deep water marine environments. A study of a Hirnantian brachiopod fauna from Paraguay (Parana basin) was concluded and sent for puiblication. A morphologic and phylogenetic revision of the genus *Castellaroina* and related Silurian strophomenoid brachiopods from the Afro-South American Realm is in the final stages of preparation.

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Carlton E. BRETT (USA). Much of my effort in the summer of 2012 was directed toward organizing, together with Brad Cramer, and running the Foerste Symposium and associated field trips for IGCP 591: *The Early to Middle Paleozoic Revolution*. The meeting focused on Ordovician and Silurian sequence and event stratigraphy, using the classic venue of the Cincinnati Arch region as an exemplar. This meeting was attended by about 50 people, representing 12 different countries. Formal talk sessions were preceded by a two-day field trip, July 22-23 with about 20 stops in the

Upper Ordovician (Sandbian-Katian) to Silurian (Llandovery-Ludlow) along the southeastern side of the Cincinnati Arch of Kentucky and southern Ohio. The technical session, held at the University of Cincinnati, on July 24 and 25, featured some 30 talks and posters from more than 50 authors. A mid-meeting dinner cruise was held on a riverboat on the Ohio River. The post-meeting field trip featured two days of study of about ten Upper Ordovician to Devonian outcrop sections on the northwest side of the Arch in southwestern Ohio, Kentucky and southern Indiana. This was followed by a one-day tour piloted by Donald Mikulic (Illinois Geological Survey) of sections, including the famed Thornton reef (Wenlock), in the vicinity of northern Illinois. Another highlight of the meeting was the three-dimensional digital imaging of classic Silurian outcrop section near Peebles, Ohio, by Carlos Aiken (University of Texas, Dallas) and his students prior to the field trip. During the trip, at the outcrop participants did an interactive overview of the outcrop using digital pads to illustrate features of sequence and event stratigraphy, as Brad and I pointed them out on the outcrop. The meeting was also supported by the Dry Dredgers, a very active group of amateur paleontologists affiliated with the University of Cincinnati.

All told, we highlighted about 40 outcrop sections in four states. Descriptions of these outcrop sections, together with overview chapters on the sequence stratigraphy, biostratigraphy, sedimentary processes and paleontology, are presented in a series of three field guides distributed at the meeting (see references below). In addition, road logs in these guides provide notations on well over 200 outcrop sections, seen in passing, during the various trips. Edited and updated versions of these field guides will be available on-line at the IGCP 591 website early in 2013 (For more details, visit the IGCP 591 website: http://www.igcp591.org/meetings.php.)

Former student Thomas Schramm and I continued to work on details of Maysvillian sequence stratigraphy in the Cincinnati Arch; sections have been sampled for magnetic susceptibility and carbon isotopes. Schramm is doing a dissertation dealing with magnetosusceptibility of the Upper Ordovician in eastern North America with Brooks Ellwood (LSU). With new University of Cincinnati graduate students, Thomas J. Malgieri and Christopher Aucoin, I am studying the detailed sequence stratigraphy, taphonomy, and paleoecology of the uppermost Maysvillian and lower Richmondian (upper Katian) strata in Indiana, Kentucky, and Ohio. In the process, we have defined three new depositional sequences and found a major regional unconformity, which apparently truncates much of the lower Richmond Group southward in the Cincinnati Arch region. Moreover, thin transgressive deposits to the north appear to pass laterally, southward into a thicker succession of peritidal argillaceous carbonates, indicating complementarity of preservation of TST and HST deposits, with preferential preservation of shallow lowstand and early transgressive facies in the proximal areas and of highstand sediments in downramp positions.

During the past year Pat McLaughlin and I have obtained more new data and have continued to generate several new carbon isotopic profiles that will provide significant insight into Ordovician correlations in eastern North America.

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Elena BUKOLOVA (Russia) is working on Ordovician graptolites from Gorny Altay (south of West Siberia). She is preparing to defend her PhD thesis "Graptolites and zonal stratigraphy for Lower and Middle Ordovician of Gorny Altai" (supervisor - Dr. Nikolay Sennikov).

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Mikael CALNER (Sweden) is currently working with the sedimentology and carbon isotope geochemistry of Ordovician core sections from southern Sweden in order to increase the stratigraphic resolution of the Swedish Ordovician. I am also working in the Ordovician of the Siljan impact crater of central Sweden (both projects together with Oliver Lehnert). Main focus in 2013 is to arrange the IGCP 591 Annual Meeting that will take place in Lund between 9-19 June 2013 (jointly with the annual meetings of the Cambrian, Ordovician and Silurian subcommissions), and to prepare a session on the Lower Palaeozoic of Baltoscandia in the Nordic Geological Winter Meeting (January 2014). I am now Head of the geology department in Lund, so time for research is far more limited than before.

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Yves CANDELA (Scotland) is still working on brachiopods. I am currently working with David Harper (Durham University, England), on brachiopod biofacies from the Barr and Lower Ardmillan groups of the Girvan district (SW Scotland) and on a project destined to review relationships within the Plectambonitoidea superfamily, using the cladistic method. I am also working, in collaboration with Joseph Botting (England), on the description of a new sponge taxon and I am redescribing Lamont's Machaeridians, both collected from the Silurian rocks of the Pentland Hills, Scotland.

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Josefina M.T. CARLOROSI (Argentina) is working on biostratigraphy and taxonomy of Lower and Middle Ordovician conodonts from Eastern Cordillera (NW Argentina) and Famatina Ranges. I am part of a working group focused on Ordovician conodonts of Argentina composed by Dr. Susana Heredia, Dr. Ana Mestre and Lic. Tatiana Soria. At the same time I am part of the INSUGEO staff. Currently I have a CONICET postdoctoral fellowship to develop the Famatina Ordovician conodonts. Recently two papers on Lower-Middle Ordovician conodonts were accepted for publication, one on the lowermost Middle Ordovician from NW Argentina (*Alcheringa*) and the other on the record of the genus *Trapezognathus* in the Eastern Cordillera (*Neues Jahrbuch für Geologie und Paläontologie*).

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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.

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Xiao CHUANTAO (China). Our paper detailing the paleoecology of Early Ordovician reefs around Yichang, central China (Xiao Chuantao et al., 2011), including the earliest-known bryozoan reefs (Cuffey et al., 2013), recently appeared. Additional Ordovician projects in the area are also underway with colleagues and students.

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Carlos CINGOLANI (Argentina) continues working on sedimentary provenance and tectono-stratigraphic evolution in 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. Papers were published in the *JSAES* and *Geological Journal*. A PhD thesis (P. Frigerio) based on sedimentary provenance of the Lower Paleozoic of the Jagué region (Northern Precordillera) was submitted to the authorities of the University of La Plata. A low diversity Hirnantian graptolite fauna was described by Alfaro et al. in the Eusebio Ayala Fm (Paraguay). A Catalog of Graptolite specimens, mainly studied by Alfredo Cuerda and co-workers in the Department of Geology, Museo de La Plata, during the last 15 years is in press (INSUGEO, Tucumán, Argentina).

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Robin COCKS (U.K.) has had another full year, completing and submitting a largely systematic paper on Late Ordovician (Katian and Hirnantian) brachiopods from Pembrokeshire, Wales, as a *Special Paper in Palaeontology.* Another systematic paper, on Late Ordovician brachiopods of the Chingiz-Tarbagatai Terrane in Kazakhstan, with Leonid Popov, was submitted to the *Journal of Systematic Palaeontology.* A paper with Cazibe Sayar on the Ordovician and Silurian faunas of the Pontides of Turkey was submitted and accepted by *Geological Magazine.* A paper on the whole Palaeozoic geography of Eastern Asia with Trond Torsvik was submitted to *Earth-Science Reviews*, and is now in proof, and another on Wegener and plate tectonics by Trond and I was submitted to and published by *Geologica Belgica*. Robin was a junior author on submitted and published papers by Torsvik et al. on True Polar Wander in *Earth-Science Reviews*, and Jin et al. on the Late Ordovician equator in *Geology.* A new edition of the popular *British Palaeozoic Fossils* was edited and published. Robin spent some time in Nanjing, China, working with Rong Jiayu on the global distribution of Aeronian brachiopods, and also enjoyed the IGCP 591 meeting in Ohio in July.

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Roger COOPER (New Zealand) with James Crampton and Peter Sadler is using the CONOP composite sequence of graptolite ranges to measure evolutionary rates and environmental drivers of diversity change; a paper has been submitted (to *Geological Magazine*). Future work will focus on testing some paleobiological theory such as whether diversity change is driven mainly by change in extinction rate or origination rate, and whether extinction episodes were selective for taxon age. A revised geological time scale for the Ordovician (with Peter Sadler) and Silurian (with Mike Melchin, Peter Sadler and Brad Cramer) was published by Elsevier in August, using the same CONOP composite as above. The new scale incorporates the geochronological and stratigraphic age revisions to all radiometric ages used for calibration, and results in age changes for all stage boundaries. A review of the ecology of the graptoloids, with David Loydell, Sue Rigby and Denis Bates, was published (in *Earth science Reviews*).

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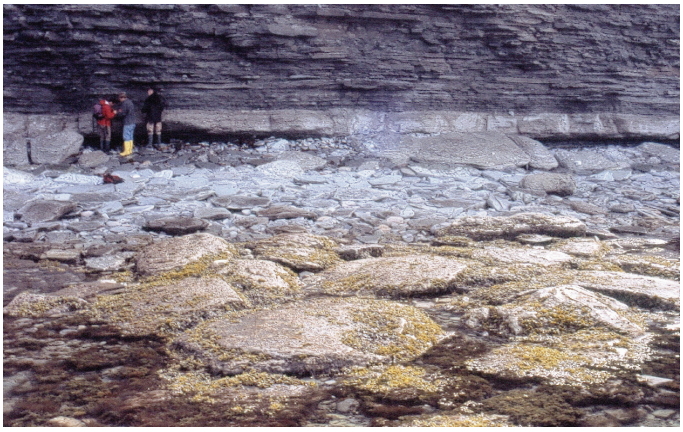
Paul COPPER (Canada/France) sent a photo of the Ordovician/Silurian boundary on Anticosti Island, emanating from ongoing research, including a paper to be published later this year in *Stratigraphy*. Several papers have appeared in 2012 and 2011 focussing on Late Ordovician extinctions and the Early Silurian biotic recovery.



NE coast of Anticosti Island, Canada: coastal bluff and tidal flat outcrop showing the O/S boundary ca. 300m NW of 'Ruisseau aux Algues', a small creek that drains into the Gulf of St Lawrence. Shown are the light grey Laframboise Member of the Ellis Bay Formation (top of the Hirnantian), in which *Hirnantia sagittifera* and *Hindella* occur as whole calcite shells. Most of this ca. 1- 2 m thick unit here consists of oncolite conglomerate formed by *Girvanella* coatings of bioclasts. These oncolite beds are capped locally by small latest Hirnantian patch reefs up to 3-4 m in diameter and 1 m in height, formed by Hirnantian rugose and tabulate corals, and stromatoporoids such as *Labyrinthodictyon* and *Aulacera*. The Ellis Bay Fm is directly overlain by lowest Rhuddanian (Llandovery) limestones with a *Koigia-Becsci*a brachiopod fauna, marking biotic recovery. Scale is provided by Michael Joachimski, Marco Vecoli in background; photo - Paul Copper.

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

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Roger J. CUFFEY (USA). Our comprehensive paper documenting the world's oldest bryozoan-built reef-mounds (Cuffey et al. 2013) has now been published, elaborating on an interim summary (Cuffey & Zhu Zhongde, 2010) as well as preliminary notes in 1993, 1995, 1997, and 2006. The paleoecologic context of these and related reefs has also recently appeared (Xiao Chuantao et al. 2011). Comparisons and contrasts with later Ordovician reefs are continuing.

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Jerzy DZIK (Poland) has returned to the Ordovician in my research. A paper describing Ordovician corals from China was published, and I have in press two papers dealing on fossils from the Chinese Fenxiang Formation. Work on Ordovician conodonts from central Siberia is in progress.

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Andrei DRONOV (Russia) continued his work on facies, sea-level changes and biotic events on the Russian and Siberian platforms during the Ordovician. For the years 2013-2015 we have applied for a new 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 in the new project on the Baltic Ordovician together with Mark Harris, Peter Sheehan, Seth Finnegan, Leho Ainsaar, Tõnu Meidla, Olle Hints, Linda Hints, Jaak Nõlvak and Peep Männik. Trace fossils are investigated in cooperation with Radek Mikuláš and Dirk Knaust. I am also collaborating with Warren Huff and Bryan Sell in the studies of K-bentonite beds from the Upper Ordovician of the Siberian platform.

Fieldwork in Siberia: looking towards the Ordovician outcrops along the Stolbovaya River (photo Andrei Dronov).

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Jan Ove EBBESTAD (Sweden) is continuing with the CISP project (Concentric Impact Structures of the Palaeozoic) investigating the Ordovician of the Siljan and Lockne impact craters. Several papers are out already, through a broad collaboration of palaeontologists, geochemists, sedimentologist, hard rock geologists and geophyisicists. Updates and information is available on the project home page (http://www.sddp.se/CISP). A larger work on Ordovician deep water gastropods and tergomyans in southern Sweden was finished during 2012. Field work aimed at the Tremadocian Ceratopyge Limestone in Sweden was conducted in collaboration with Åsa Frisk (Zurich) and more work on the Ordovician Boda Limestone of the Siljan area has been done in collaboration with Oliver Lehnert (Erlangen), Björn Kröger (Berlin) and Anette Högström (Tromsö).

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Bob ELIAS (Canada) and Graham Young will be leading a field trip on the "Ordovician-Silurian boundary interval in the Williston Basin outcrop belt of Manitoba: a record of global and regional environmental and biotic change", May 25-27, 2013, in conjunction with the GAC-MAC Annual Meeting being held in Winnipeg, May 22-24. See http://gacmacwinnipeg2013.ca/files/fieldtrips/c5.pdf or contact Bob for further information. **Registration ends April 15, 2013**.

Papers have been completed on growth characteristics of the tabulate corals *Catenipora* (Bae, Elias, and Lee; Lethaia, 46:98-113) and *Protoheliolites* (Liang, Lee, Elias, Pärnaste, and Mõtus; *Palaeontology*, in press). A major paper by Elias, Young, Lee, and Bae on "Coral biogeography in the Late Ordovician (Cincinnatian) of Laurentia" will be published in a Geological Society London Memoir on Early Palaeozoic Palaeobiogeography and Palaeogeography.

In 2012, Lori Stewart completed a M.Sc. thesis on "Paleoenvironment, paleoecology, and stratigraphy of the uppermost Ordovician section, north of Grand Rapids, Manitoba". Matt Demski is continuing M.Sc. thesis research on the Ordovician-Silurian boundary interval in the Williston Basin area of Manitoba and Saskatchewan. Kathryn Lapenskie presented some results from her B.Sc. thesis (Lapenskie, Elias, Young, and Nowlan, 2012, "Late Ordovician to earliest Silurian environmental and biotic changes, recorded in a core from Churchill Rocket Research Range, Manitoba"; Canadian Paleontology Conference, Proceedings No. 10: 45-46).

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Ray ETHINGTON (USA) is continuing to work on collections of Lower and Middle Ordovician conodonts from central and western United States that were assembled prior to his retirement. Retirement isn't a bad life, but he regrets that wisdom precludes more visits to the deserts of Utah and Nevada. A paper (with John Repetski and Jim Derby) summarizing Lower Ordovician stratigraphy of southern Missouri and northern Arkansas was published late in 2012 by the American Association of Petroleum Geologists. It reviews the physical stratigraphy of the southern Ozarks region and the problems of identification of rock units. Brief references are made to application of previously unpublished conodont data to the stratigraphic units recognized in the region and to correlation of them with sections elsewhere in Laurentia.

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David EVANS (United Kingdom) has almost completed a study of the cephalopod faunas of the late Darriwilian and early Sandbian Llanfawr Mudstone Formation of Central Wales. The composition of the assemblage, despite relatively poor preservation, indicates a strong Baltic affinity and also records the appearance in abundance of the tarphycerid *Trocholites* as also observed in coeval successions in Perunica and Armorica. Work on Ordovician cephalopods from Iran (with Mansoureh Ghobadi Pour and Leonid Popov) continues on several new Darriwilian assemblages that indicate a considerable diversity and further support strong affinities with Southern China and Baltica. David is also studying cephalopods from new collections made from the Katian Sholeshook Limestone Formation of South Wales. This material forms a significant supplement to current museum collections and adds to the diversity of the assemblage whilst providing evidence that will facilitate better resolved taxonomic determinations.

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Oldrich FATKA (Czech Republic) is active on the revision of Ordovician associations of the Prague Basin; in cooperation with Petr Budil he is working on papers describing the recently collected trilobites with rests of digestive structures and functional morphology of selected trilobite taxa.

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Annalisa FERRETTI (Italy). My Ordovician research continues to be concentrated on conodont faunas from Europe and elsewhere, conducting cooperative research with Stig Bergström on conodonts from Wales (together with Chris Barnes), the Carnic Alps (together with Hans Peter Schönlaub) and the United Arabian Emirates (together with Giles Miller).

Together with Kathleen Histon, Pat McLaughlin and Carlton Brett, I recently edited a Special Issue of *Palaeogeography, Palaeoclimatology, Palaeoecology* entitled “Time-specific facies: the colour and texture of biotic events”, a thematic set of papers arising from a Symposium held during the 3rd International Palaeontological Congress in 2010. In another project, fossilized ring-like structures with enigmatic function and taxonomic affiliation are described from the Upper Ordovician of the Carnic Alps and the Silurian of Bohemia (Ferretti, Cardini, Crampton, Serpagli, Sheets & Storch, in press). Finally, a provocative short discussion focusing on the term "black-shales" has been produced (Ferretti, Melchin & Negri, 2012).

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Åsa FRISK (Sweden) has been doing a two year post doc at the University of Zürich and is now going back to Uppsala University for a third year, all on a Swedish Research Council Postdoctoral Fellowship. In Switzerland the work was mostly concentrated on Early Triassic molluscs from China and Oman following the end-Permian mass extinction. This work will be continued but as well earlier Ordovician projects summarised as; global and regional changes in diversity patterns following catastrophic events on Earth: the Permian-Triassic mass extinction and Late Ordovician meteorite impact events. The Ordovician part of the project will concentrate on brachiopods (in collaboration with Dave Harper, Lars Holmer), trilobites (Jan Ove R. Ebbestad) and scolecodonts (Mats Eriksson) from the Kukruse and Idavere of Sweden and Estonia.

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Bob GANIS (USA) is working on completing quadrangle mapping in conjunction with the Pennsylvania Geologic Survey for Ordovician clastics in the Great Valley of Pennsylvania; this involves biostratigraphic control for allochthonous units of L.-M. Ordovician age and U. Ordovician autochthonous units of the Martinsburg foreland.

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Mansoureh GHOBADI POUR (Iran) is currently working on the Ordovician and Silurian faunas from 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 and of the Katian trilobites and brachiopods from High Zagros in south-eastern Iran.

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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 close to submission), Ireland (George Sevastopulo and Svend Stouge), 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 is in press 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 large paper on the Tibet brachiopods in process with *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, is in press in *Palaeontology*. Dave Harper and Thomas Servais have completed editing c. 30 manuscripts that address the relationships between biogeography and palaeogeography in the Early Palaeozoic. These results will be published at last in mid 2013 in a Geological Society of London Memoir. The project has turned out to be much more extensive than initially expected. The Geological Society has insisted, quite correctly, that our coverage is as comprehensive as possible. We're there now!

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Susana HEREDIA (Argentina) is working on taxonomy and biofacies of Middle Ordovician conodonts (*Lenodus variabilis* to *Eoplacognathus suecicus* zones) in the Central Precordillera of Argentina. Lower and Upper Ordovician conodonts from Precordillera are still under study. Research continues with Josefina Carlorosi on Middle Ordovician key conodonts from North Western Argentina. Susana shares interests on Ordovician matters with Ana Mestre, Graciela Sarmiento, Matilde Beresi, Guillermo Aceñolaza, Gilberto Aceñolaza, Juan Pablo Milana, Tatiana Soria and Galina Nestell. A project has commenced (2012) on conodonts from Upper Ordovician limestones of the Precordillera.

Several papers in collaboration were accepted for publication on diverse Ordovician topics such as the biostratigraphic significance of Darriwilian conodonts from Central Precordillera (focused on *Dzikodus tablepointensis*) (*Geosciences Journal*); the Darriwilian conodont *Lenodus variabilis* in the Central Precordillera

(*Serie Correlación Geológica*); the early Dapingian conodonts in the Andean Basin of Argentina (*Alcheringa*); the Ordovician conodont *Trapezognathus* Lindström in the Andean Basin (*Neues Jahrbuch für Geologie und Paläontologie*); Floian conodonts from Talacasto Creek (*Serie Correlación Geológica*) and the *Yangtzeplacognathus crassus* in the Darriwilian of the Precordillera (*Ameghiniana*).

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Olle HINTS (Estonia) is continuing studies on Ordovician-Silurian stratigraphy and microfossils, primarily scolecodonts, but also chitinozoans and conodonts. In collaboration with Mats E. Eriksson (Lund) and Petra Tonarova (in Tallinn for postdoc as of 2013) several projects on Paleozoic scolecodonts are in progress and two reports on Silurian material were published in 2012 (for fun, google "Kingnites diamondi"). Also, a chapter on polychaete paleobiogeography is in press in the Geological Society Memoirs issue edited by Dave Harper and colleagues. Together with Florentin Paris (Rennes) and Sa'id Al Hajri (Dhahran) a paper on diverse Late Ordovician scolecodonts from Saudi Arabia was submitted to *GeoArabia*, likely to be published in 2013. With Liina Paluveer (PhD student) and other colleagues in Tallinn, Olle is building an occurrence-level database for Baltic chitinozoans and conodonts to be used for quantitative stratigraphic analysis. Based on the compiled data, a paper on Silurian chitinozoans will be presented at the IGCP 591 Annual Meeting in Lund, Sweden, June 2013. A paper on Darriwilian conodont biostratigraphy in NW Estonia was published together with Viive Viira and Jaak Nõlvak (Tallinn). Olle is also taking part in a sedimentoogical-paleontological project devoted to Middle Ordovician to early Silurian Baltic Basin, lead by Mark Harris (Milwaukee), Peter Sheehan (Milwaukee) and Seth Finnegan (Berkeley). He continues development of Estonian geocollections database, which contains growing information on Ordovician fossils, localities, drill cores etc and is freely accessible at http://sarv.gi.ee. As of late 2012 he is also responsible for the website of the Subcommission on Ordovician Stratigraphy (http://ordovician.stratigraphy.org).

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Jisuo JIN (Canada) is working on biodiversity change and latitudinal gradient of tropical biodiversity of brachiopods and related biofacies in Laurentia during the Late Ordovician and Early Silurian. One of the highlights of research activity in 2012 was using brachiopod shell beds and Massive Bedded Thalassinoides Facies to locate the Late Ordovician Equator of Laurentia.

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Dimitri KALJO (Estonia) is continuing studies on the Ordovician and Silurian bio- and chemostratigraphy of Baltica and elsewhere for comparison. Some projects in cooperation with colleagues in Sweden and Ukraine (Podolia) are in progress. Some others lie dormant. Last year I spent much time writing together with colleagues a history book in Estonian about our institute (for a summary see Heinsalu, A., Hints, O. & Kaljo, D. 2012. Anniversaries provoke interest in lessons gained from history. *Est. J. Earth Sci*., 61, 193–194. Our publications in this journal are available online (www.eap.ee/earthsciences).

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Petr KRAFT (Czech Republic) together with Petr Štorch and Chuck Mitchell finished a study of the upper Katian graptolites in the Prague Basin. It was a part of my current studies at this stratigraphic level. Final steps were also done on the related and contemporaneous project on the Bolindian graptolites from New South Wales, Australia, together with Ian Percival. I also worked on a small project in West Bohemian Museum (where I have a small partial job, especially related to graptolite collections of B.-D. Erdtmann) focused on field studies, especially at temporary and protected paleontological localities in the Ordovician of the Prague Basin, Czech

Republic. Together with two colleagues from my home institute we finished the study proving an extension event in the early stages of the Prague Basin.

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Philippe LEGRAND (France) had a short trip in the Algerian Sahara. Now, I am studying stratigraphy and the uppermost Ordovician fauna of this country.

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Steve LESLIE (USA) is primarily working on Middle and Late Ordovician conodont biostratigraphy and integrating the biostratigraphy with studies of Ordovician paleoclimate change. Steve is working with Matt Saltzman (Ohio State University) 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 work is collaborative with Stig Bergstrom (Ohio State University), 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) integrating K-bentonite fingerprinting with biostratigraphy in the upper Sandbian and lower Katian. Steve is working with Dan Goldman (University of Dayton) integrating graptolite and conodont biostratigraphy in dark shale successions. Steve is working with Achim Herrmann (Louisiana State University) and Ken MacLeod (University of Missouri) testing the early Late Ordovician cool water carbonate hypothesis in the North American Midcontinent using oxygen isotopes from conodont apatite. Steve is also working with Mike Pope (Texas A & M) and GSC Calgary on Late Ordovician – Early Silurian sequence stratigraphy and conodont biostratigraphy in the Northwest Territories.

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LI Jun (China) continues working on Ordovician acritarchs from China. In August I went to Japan and participated (with abstracts and a talk) in the 13th International Palynological Congress and the field trip.

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Jianbo LIU (China) continues research on the changes in the Early Ordovician sedimentary systems and fabrics (reefs, ooids, bioturbation, etc.) and their relationship with the GOBE in South China, with Renbin Zhan (Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences), Yoichi Ezaki, and Natsuko Adachi (Osaka City University). Studies continue with my students and other cooperative researchers on geochemistry of the Ordovician carbonate and terrigenous clastics, and on Ordovician biostratigraphy and cyclostratigraphy in South China. Studies on the Phanerozoic microbialites are still in progress with Yoichi Ezaki and Natsuko Adachi.

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James D. LOCH (USA) is working on Lower Ordovician (Ibexian) trilobites from the southwest of the United States. Recent activities include collecting through the C-O boundary in Texas and across the base of the Tulean Stage in New Mexico. A manuscript on the base of the Whiterockian Series at the Whiterock Canyon Narrows is approaching completion and will document the presence of a disconformity within the upper Ninemile Formation. Academically, the University of Central Missouri has eliminated its Geology and Earth Science programs which has led to a re-orientation of teaching assignments.

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Anita LÖFGREN (Sweden) is retired, but maintains a great interest in Ordovician conodonts, particularly from Baltoscandia

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Jörg MALETZ (Germany) is working hard on the Graptolite Treatise and at the same time on a graptolite book with a number of authors, organized by Jörg and Jan Zalasiewicz for the Series 'Topics in Paleobiology' edited by Michael J. Benton. Further research on Ordovician and Silurian stratigraphy and graptolite faunas from Sweden and Norway is done in association with a number of colleagues (Per Ahlberg, Lund; Sven Egenhoff, Fort Collins; Oliver Lehnert, Erlangen). Important biogeographic and taxonomic studies on radiolarians (with Taniel Danelian & Lauren Pouille, Lille) and graptolites (Dan Goldman, Dayton, Ohio; Blanca Toro, Mendoza; Zhang Yuandong; Nanjing) are in preparation. Jörg is working with Michael Steiner (FU Berlin, Germany) in a project on early (Middle Cambrian) pterobranchs from Scandinavia, North America and Australasia.

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Peep MÄNNIK (Estonia) is working on evolution, taxonomy and palaeoecology of conodonts, conodont-based high-resolution stratigraphy, bioevents and palaeogeography. He is also interested in sequence stratigraphy and evolution of sedimentary basins. His studies continue under projects "Ordovician and Silurian biodiversity in Baltica: evolution and impact of the changing environment" and "Quantitative stratigraphical approach to early Palaeozoic chitinozoans and conodonts of the Baltic area: high-resolution time scales and palaeobiodiversity". 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.

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Neo E.B. McADAMS (USA) is working on doctoral research exploring the interactions of sampling, specimen imaging, morphological completeness, and phylogeny reconstruction. Neo also works on descriptive taxonomy and phylogenetic systematics of Lower and Middle Ordovician Laurentian trilobites.

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Alexander (Sandy) D. McCRACKEN (Canada) continues to work on Middle to Upper Ordovician, Silurian and Devonian and conodonts from various locations in Canada.

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Tõnu MEIDLA (Estonia) is actively working on several aspects of Ordovician and Silurian ostracods from the Baltic area and Canada, in cooperation with O. Tinn, V. Perrier and K. Truuver. A research project dealing with various apects of Ordovician palaeoenvironments (palaeoclimates, stable isotopes) is in progress (in cooperation with L. Ainsaar, O. Tinn, V. Perrier, K. Truuver). Sea level studies are continued in cooperation with L. Ainsaar and A. Dronov.

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Facundo René MEROI ARCERITO (Argentina). My research is mainly focussed on the evolution and systematics of Asaphid Trilobites. To assess this in the north of Argentina is paramount due to lack of information despite their abundance.

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Jim MILLER (USA) is retired but continues working on Cambrian and Ordovician faunas and strata. Current Ordovician projects include 1) Problems with the GSSP for the base of the Ordovician at Green Point, Newfoundland, Canada (with several colleagues); 2) Conodonts from Lower Ordovician strata in central Texas, USA (with Ray Ethington); 3) Ordovician and Silurian faunas redeposited in an asteroid impact structure in central Missouri, USA (with several colleagues); 4) Revisions of lithostratigraphic classification of Upper Cambrian and Lower Ordovician strata in eastern Nevada, USA.

Jim, along with many other colleagues from North America (and some from Europe) was involved in AAPG Memoir 98 "The Great American Carbonate Bank" which was published in January 2013. The title refers to Laurentia during the Sauk Megasequence (Cambrian through Middle Ordovician), and the 48 chapters cover virtually all parts of Laurentia, including chapters on economic resources (petroleum, minerals) found in these strata. This volume is quite comprehensive, and probably will be a major reference for the Cambrian and much of the Ordovician in North America for many decades. The printed book includes 4-page extended abstracts of most chapters; the latter are expanded and in full colour on the accompanying DVD (see details elsewhere in this issue of *Ordovician News*). Each author was given PDF files of their individual chapters for distribution. I will be happy to provide details of how to obtain copies (some of which are extremely large digital files) to anyone who sends me an e-mail requesting it.

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Tatiana L. MODZALEVSKAYA (Russia) continues working on Cambrian-Silurian-Devonian brachiopods of Iran from Kopet-Dag and Derenjal Mountains in collaboration with Leonid Popov (UK). The paper '*Cambrian (Furongian) rhynchonelliform brachiopods from the Eastern Alborz Mountains, Iran*.' by Leonid E. Popov, Mohammad-Reza Kebria-ee Zadeh, Mansoureh Ghobadi Pour, Lars E.

Holmer & Tatiana L. Modzalevskaya will be considered for publication in *Bulletin of Geosciences*. Together with Prof. Fernando Alvarez (Spain) a paper 'Evolution, migration and biogeography of the plicathyridine brachiopods with a revision of Devonian faunas from the Kuznetsk Basin' was prepared for the Memoirs series of the Association of Australasian Palaeontologists (AAP).

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Axel MUNNECKE (Germany) is currently working on Ordovician and Silurian (chemo-)stratigraphy in different areas (China, Gotland, Poland, Podolia). In addition, I am very interested in the biological response to the pronounced climatic changes that took place during this time. In December 2012 we published a manuscript documenting high abundances of malformed acritarchs during the onsets of pronounced carbon isotope excursions.

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Diego Fernando MUÑOZ (Argentina) is doing a PhD at Universidad Nacional de Córdoba on Lower Ordovician deposits of NW Argentina. This research is particularly based on systematics, taphonomy and diversity of rhynchonelliformean brachiopods and is under the supervision of Dr. Juan Luis Benedetto and Dr. Beatriz G. Waisfeld.

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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 interaction 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 Palaeozoic fauna (collaboration B. Lefebvre (Univ.-Lyon, France), M. Aretz (Univ.-Toulouse, France) Y. Donnadieu (LSCE, France). The investigation of the biodiversification constraints is 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.

I would like to **announce an international workshop about pre-Cenozoic paleoclimate**, that we organize in June (17th-19th) 2013 in Toulouse (South of France). The purpose of the workshop is to extend our understanding of the natural variations that take place within the earth's climate system in deep times by bringing together specialists from diverse fields including sedimentology, paleontology, geochemistry (data-community) and numerical modeling (model-community). This workshop aims at exploring climate reconstructions and processes throughout the pre-Cenozoic time. In recent years, the number of available data has grown exponentially, including paleontological, sedimentological, isotopic, and geochemical data. Two questions arise: (1) is there a unified picture of the pre-Cenozoic climates and environmental evolution emerging from this large amount of data? (2) how can we promote dialogue between numerical models, which deliver large amounts of climatic and environmental parameters, and geological observations?

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Brian NORFORD (Canada) writes that he is one of the many authors contributing to *The Great Ordovician Carbonate Bank* (Memoir 98 of the American Association of Petroleum Geologists), ably compiled and edited by Jim Derby and colleagues. His contribution covers the southern and central Canadian Rocky Mountains.

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Hendrik NOWAK (France) has started his PhD on palynomorphs of Cambro-Ordovician Lagerstätten, beginning with the Lower Ordovician Fezouata Formations from southeastern Morocco. This work is part of the RALI (Rise of Animal Life) project and funded by the ANR (Agence Nationale de la Recherche, France).

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Godfrey S. NOWLAN (Canada) reports that research continues at a moderate level. Our conodont lab receives substantial numbers of samples from all over Canada and reports are prepared in support of various projects. In 2012, I completed reports on Cambrian, Ordovician and Silurian conodonts from Victoria Island and the Mackenzie Mountains, Northwest Territories. I am currently working on samples from British Columbia, Manitoba and Newfoundland. I continue to work with Bob Elias (University of Manitoba) and Graham Young (Manitoba Museum) on conodonts from the Williston and Hudson Bay Basins. I am also completing a manuscript on fossil fish from Arisaig, Nova Scotia with Carole Burrow and Sue Turner (Queensland Museum).

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Olga OBUT (Russia) continued study of Ordovician radiolarians and conodonts from South of West Siberia. Work on improvement of new regional stratigraphic charts for the Ordovician Altai-Salair, Tyva and West Sayan regions, together with Siberian colleagues, is ongoing.

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Gladys ORTEGA (Argentina) continues with her projects on taxonomy and biostratigraphy of Tremadocian graptolites from the Zenta Range of the Eastern

Cordillera, and Darriwilian faunas from Lina Range, western Puna region, in northwestern Argentina. Ordovician (Floian to Katian) graptolites from the Precordillera of San Juan, western Argentina, are incorporated in other of her projects as well. She is co-supervising the scholarship programs of M.E. Giuliano, F. Serra, and N. Feltes supported by the FONCyT and CONICET. She participated with G. Albanesi as guest editor of a special volume of *Geological Journal* entitled 'Lower Palaeozoic fossils, biostratigraphy and events from western Gondwana'. She is involved in the organization of the IGCP 591 regional field meeting and the 3rd International Conodont Symposium to be held in Mendoza, Argentina, July, 2013, and continues with her activities at the Museum of Paleontology.

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Alan OWEN (UK) is continuing his investigations of the Great Ordovician Biodiversification Event in general and of deep water faunas in particular. Ordovician trilobites figure in a well advanced manuscript on the fine scale crystallography of schizochroal trilobite eyes with Martin Lee (Glasgow) and former research student Clare Torney and collaboration continues with Thijs Vandenbroucke (Lille) and Carys Bennett (Leicester) and their co-workers on the use of stable isotopes in the eyes of pelagic trilobites as palaeoclimate indicators. 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) has stalled a little but will re-start later in the year. A paper on the Rare Earth Element geochemistry of Ordovician cherts from the Scottish Highland Border Complex with Howard Armstrong (Durham) and Geoff Tanner (Glasgow) has been submitted for publication after many years "on the back burner".

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Florentin PARIS (France). Since my retirement two years ago, I am still investigating chitinozoans, and especially the Late Ordovician/early Silurian assemblages from Northern Gondwana. I am also updating my database CHINOVOSP which records and illustrates all the chitinozoans species described fsince the first report by Eisenack in 1930.

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Helje PÄRNASTE (Estonia) continues studies on trilobite faunas of Baltica, which in last years were concentrated on the lower part of the Ordovician due to co-operation together with late Jan Bergström. Jan's idea about similarities of the faunal development in Baltoscandia and South China forced us to revise first, the trilobites on western and eastern sides of Baltoscandia, then on the western and eastern sides of Baltica to face the trilobite faunas in South China. Sadly, Jan Bergström passed away last November, but there is a series of papers together with Zhou Zhi-Yi on their way of being published, some already are. Two subjects of this series were presented last summer on 34th IGC in Brisbane (The asaphid (trilobite) fauna: from rise to fall) and on the 5th Conference on trilobites and their relatives in Prague (Ölandian trilobite faunas along the Ural border of Baltica). Hereby I am glad to mention that Estonia was elected to hold the 6th Conference on trilobites and their relatives in 2017.

In 2011 my student Adrian Popp successfully completed his PhD studies on Baltoscandian proetids, and together with Robert Owens (Cardiff) we continue our investigation on taxonomy and distribution of the Ordovician proetids. Revision of several other groups of trilobites like cheirurids and illaenids in co-operation with David Holloway (Melbourne), David Bruton (Oslo), and Elise Nardin (Toulouse) are planned to proceed with research on different aspects on their distribution in various environments.

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Ian PERCIVAL (Australia) continues to be fully occupied, with papers published during the past year including description of Middle Ordovician brachiopods and conodonts from the southern Takaka Terrane of New Zealand, and documentation of biota found in Ordovician cherts in the Lachlan Orogen. Current projects with an Ordovician focus involve descriptions of Ordovician graptolites from NSW (with Petr Kraft of Charles University, Prague and Zhang Yuandong of the Nanjing Institute of Geology & Palaeontology), analysis of the geochemistry of Ordovician cherts with implications for better understanding the tectonic history of southeastern Australia

(with Michael Bruce from the Geological Survey of NSW), and detailed investigation of the sedimentary petrography and depositional environments of Ordovician limestones in central western NSW (with Vic Semeniuk and Barry Webby).

I attended the 34th International Geological Congress held in Brisbane during August, there presenting two papers (one an overview of Ordovician stratigraphy of Australia), and also participated as co-leader on a post-IGC field trip to the Ordovician–earliest Silurian Macquarie Volcanic Belt in central NSW.

I edit two annual newsletters: *Nomen Nudum* (the Association of Australasian Palaeontologists newsletter), and *Ordovician News* which you are currently reading (and hopefully finding useful).

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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. He is a Member of the IGCP Portuguese Committee.

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Leonid E. POPOV (United Kingdom) is continuing his studies on the Ordovician brachiopods and associated faunas from Kazakhstan and Iran. Other aspects of the ongoing research include Ordovician brachiopod biogeography, biofacies, systematic and ontogeny.

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G. Susana DE LA PUENTE (Argentina). In 2011 and 2012, I continued with my job as a scientific researcher with CONICET of Argentina on chitinozoans of the Ordovician and Silurian successions from Argentina, under the direction of Dr.

Claudia Rubinstein in the Palaeopalynology Unit at IANIGLA-CCT, CONICET Mendoza.

I am actively involved in the organization of the 4th International Palaeontological Congress, to be held from September 28th to October 3rd, 2014 in Mendoza, Argentina. http://www.ipc4mendoza2014.org.ar/

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John REPETSKI (USA) continues to work chiefly on Ordovician and Late Cambrian conodonts and biostratigraphy of various regions, mostly in Laurentia, including the Appalachians, Midcontinent North America, Great Basin, and Alaska. Support for mapping and other projects dominates, but I am also working on several regional biostratigraphic, faunal, and taxonomic studies; most of these are in cooperation with numerous good colleagues.

Kudos to Jim Derby and the other editors (and the many authors) who saw the AAPG Memoir 98 on the 'Great American Carbonate Bank' to completion. The final product contains 48 papers concerning Ordovician topics.

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Claudia V. RUBINSTEIN (Argentina) is currently working on several projects related to organic-walled phytoplankton and miospore biostratigraphy and biodiversity from the Cambrian/Ordovician boundary to the Early Silurian in different basins of Argentina, particularly in the Central Andean Basin and the Precordillera. I am actively collaborating with Susana de la Puente who studies Ordovician – Early Silurian chitinozoans. Our work also includes carbon isotope analysis of Late Ordovician- Early Silurian successions of northwestern Argentina. Concerning terrestrialization, recent works in collaboration with Philippe Steemans allow us to push back to the Dapingian the oldest evidence of land plants. New findings of cryptospores in the Katian and Hirnantian have contributed to complete the Ordovician record of land plants in Argentina. Among other projects, as General Chair of the next 4th International Palaeontological Congress (IPC 4), to be held in Mendoza in 2014 (28 September-3 October), I am deeply involved with its organization.

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Artur Abreu SÁ (Portugal) is working on Ordovician stratigraphy and paleontology of the Central-Iberian Zone in Portugal and Spain, in collaboration with Juan Carlos Gutiérrez-Marco, Isabel Rábano, Carlos Meireles, Jorge Pamplona, José Piçara and Nuno Vaz. My work is also focused in the Ordovician Geological Heritage of Portugal (Arouca Global Geopark, Aspiring Geopark "Terras de Cavaleiros" and Ordovician of Central-Iberian Zone Framework) and Spain (Geodiversity and Geosites of the Cabañeros National Park). I'm directing one Ph.D. student in Upper Ordovician trilobites of Portugal and a M.Sc. student in chitinozoans biozonation of the Valongo and Moncorvo formations (N Portugal). I'm still working as Scientific Coordinator of the Arouca Global Geopark (GGN) and as President of the Portuguese National Committee for the International Geoscience Programme (IGCP).

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Matthew SALTZMAN (USA) continues working with Steve Leslie at James Madison on the bio-, sequence, and carbon-strontium isotope stratigraphy of the Middle-Late Ordovician in the Appalachian Basin. Studies mainly involve sections in Maryland, Virginia and Pennsylvania. Fossiliferous sections in Oklahoma and Nevada are particularly useful in calibration of the Sr isotope curve to the standard conodont zonation. Sr isotope stratigraphy is also used to correlate within zones due to the rapid drop in the Middle-Late Ordovician boundary interval. Efforts continue with the carbon isotope curve to fully integrate this with the dual conodont biostratigraphy (North Atlantic - Midcontinent) and Walt Sweet's composite standard.

Current PhD student at Ohio State, Cole Edwards, is making excellent progress comparing Sr isotope data from rocks and conodonts, as well as looking at pairing sulfur and carbon isotopes. Cole is working with Seth Young at Indiana Univ to analyze the sulfur isotopes.

Matthew is also continuing to work on a collaborative project with Steve Westrop (Univ of Oklahoma), Lisa Amati (SUNY Potsdam), and Carlton Brett (Univ of Cincinnati) to understand carbon cycling and faunal changes in response to the

Taconic orogeny. A poster was presented at the recent GSA meeting in Charlotte by undergraduate Cody Trigg, who compared the sequence stratigraphy of the Bromide Formation (as analyzed by Jesee Carlucci and co-authors) with the carbon isotope stratigraphy.

A chapter on carbon isotopes was finally published in 2012 for the new version of the Geologic Time Scale, and a poster was presented on this topic at the GSA meeting in Charlotte. The Ordovician curve was based on compilation of existing studies as well as a segment of unpublished data from work in Maryland with Stig Bergstrom, John Repetski, and Steve Leslie, among others. Work to further develop the Ordovician $\delta^{13}C$ reference standard is ongoing.

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Vic SEMENIUK (Australia) is working with Ian Percival and Barry Webby 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.

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Nikolay SENNIKOV (Russia) is continuing investigation of the Ordovician strata of the Altai-Sayan Folded Area. His current activities involve (1) producing new regional stratigraphic charts for the Ordovician of three large geological regions – Altai-Salair, Tyva and West Sayan are under preparation; (2) working on improvement of the graptolite zonation for the Ordovician of South Siberia; (3) working on definition of Ordovician Stage boundaries (lower boundaries) of the ISS in the Ordovician sections of Siberia.

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Thomas SERVAIS (France) is research director of the CNRS at Lille1 University, where he is currently the head of the CNRS department (UMR 8217 Géosytèmes), that hosts other Ordovician palynologists such as Marco Vecoli and Thijs Vandenbroucke.

His 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. Other collaborative work is in progress with Stewart Molyneux (British Geological Survey) and Axel Munnecke (Universität Erlangen, Germany). The "book" on palaeobiogeography (the last product of IGCP 503) should finally be published in 2013, co-edited with Dave Harper (Durham University, UK). Projects on the regional geology of western Europe (Belgium, France, Germany) include collaboration with Alain Herbosch (University of Brussels, Belgium) and Lutz Koch (an outstanding German amateur palaeontologist).

In late 2012, a PhD project started, focused on the palynology of the Lagerstaïten covering the Cambrian- Ordovician radiation. The PhD student (Dipl. Geol. Hendrik Nowak, formerly University of Münster, Germany) will focus on the Ordovician of Morocco.

Thomas 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).

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Lawrence SHERWIN (Australia) continues to be employed part time by the Geological Survey of New South Wales following notional retirement several years ago. Most of my recent Ordovician output has been contributing to the Ordovician section of explanatory notes to accompany regional geological maps of the state. Still in progress is taxonomic work on Late Ordovician graptolite faunas that began with the late Tatiana Koren'.

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Petr ŠTORCH (Czech Republic) continues joint work with Petr Kraft and Charles Mitchell on comprehensive revision of the upper Katian graptolites of Barrandian area (Czech Republic). Environmental changes in the Late Ordovician – early Silurian were studied in collaboration with Michael Melchin, Charles Mitchell and Chris Holmden. Further research will focus on Ordovician-Silurian boundary graptolites from Barrandian area and Pyrenées (together with Juan Carlos Gutiérrez-Marco and Josep Roqué).

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Peng TANG (China) continues working on Ordovician and Silurian chitinozoans in South China and Tarim Basin, northwestern China. From 2009 to 2011, I have been working on an oil company project which aims to study Ordovician, Silurian chitinozoan stratigraphy in the Tarim Basin, and provided stratigraphical correlation among outcrops and subsurface areas for the oil company. I was totally involved in that project, with thousands of samples having been processed. Last year, I completed that project finally, and now have time to do stratigraphy work in South China. Part of results of that project on chitinozoan systematics and biostratigraphy are in preparation and will be published in the following 3 years.

Now, I am involved as a group member in a great project lead by Prof. Renbin Zhan of NIGPAS, which is financially supported by the National Natural Science Foundation of China (NSFC). This project will continue for 3 years and focuses on Lower Paleozoic bio-events. In the following 3 years, I will focus most of my energy on Ordovician and Silurian chitinozoans in South China.

In 2012, I published a paper on chitinozoans from the Ordovician-Silurian boundary interval in Zhejiang Province, East China. A chitinozoan assemblage of low abundance and low diversity was recovered near the base of the Anji Formation, dating the base of the Formation as Latest Ordovician to Earliest Silurian. It is the first time that a chitinozoan assemblage across the O/S boundary was recovered from South China, which may help improve our understanding of the chitinozoan distribution and evolution after the end-Ordovician mass extinction in South China and elsewhere. The co-occurred brachiopod fauna was assigned to upper-middle BA (Benthic Assemblage) 3, indicating normal shallow water regimes. Two species, i.e. *Belonechina* cf. *postrobusta* and *Spinachitina verniersi*, are described in that paper.

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John Taylor (USA) continues to plod forward, refining the species and genus level taxonomy and derivative biostratigraphic value of Lower Ordovician (Tremadocian) trilobites and conodonts in various areas of Laurentian North America, in collaboration with fellow trilobitologist James Loch and conodont specialist John Repetski. The three projects currently consuming most of his research time are 1) detailed description of species of the basal Stairsian signature genus *Paraplethopeltis* from Colorado and New Mexico, along with some comparative material from the zone named for that genus in the standard Ibexian succession in Utah, 2) complete description of the asaphid species *Bellefontia collieana* (Raymond) from type material collected from upper Skullrockian strata near Bellefonte, Pennsylvania, and 3) description of a number of uppermost Skullrockian to basal Stairsian trilobite taxa recovered from the Nanook Limestone in northeastern Alaska by new partner-in-crime Justin Strauss. Research projects by students John Kearney and Joy Kiefer are contributing to the progress on *Bellefontia* and *Paraplethopeltis*, respectively.

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Tatiana TOLMACHEVA (Russia) continues to work on conodont collections from very different parts of Russia and Kazakhstan in cooperation with Andrey Dronov, Alexey Zaitsev and Kirill Degtyarev.

The photograph (taken in September, 2011) shows the lower Darriwilian turbidities of one of the least visited places in the world – the eastern coast of Bennett Island (part of the De Long archipelago, nearby Novosibirsk islands, Arctic Russia). Shales within these deposits contain numerous graptolites.
Photographer: T.Yu. Tolmacheva

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Thijs VANDENBROUCKE (France) continues to test the potential of several proxies and methods for ground-truthing Ordovician climate models and hypotheses. The main focus remains on using the palaeobiogeography of planktonic chitinozoans and graptolites to ground-truth Early-Mid Ordovician climate model (GCM) predictions of ocean state. Chloé Amberg joined the team as a PhD student in 2012, with a research project that concentrates on Pre-Hirnantian glaciations. Together with Carys Bennett (postdoc in Lille 2011-2012) and many collaborators, we are finalising a project that uses stable oxygen isotopes of the calcitic eyes of epipelagic trilobites (such as *Carolinites*) to reconstruct Sea Surface Temperatures. Together with Arne Nielsen, Øyvind Hammer and Axel Munnecke, Thijs is investigating the nature of rhythmic deposits in the Oslo-Asker District, and whether those can tell us anything about Ordovician climate change. Three students are actively working on the palynology and geochemistry of the 800+ samples collected from these rocks: Chloé Amberg (PhD student, Lille1 University), Wout Salembien (MSc student, Ghent University) and Tim Collart (MSc student, Ghent University).

Success has been obtained in finding funding for ongoing research on the glacial deposits of the Upper Ordovician, within the framework 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 research grant includes a fully funded palynology PhD-project in Lille, which will focus on the Katian-Hirnantian of Morocco, and we are currently advertising for suitable candidates (see my website for full details)

Research on exceptionally preserved biotas from the Early Ordovician, with Jean Vannier and Bertrand Lefebvre of the University of Lyon, is developing as planned, revolving around another ANR-research grant entitled "The Rise of Animal Life (Cambrian-Ordovician)". Hendrik Nowak has been recruited as a PhD student in Lille, working on the palynological aspects of this research project. The website with a regularly updated progress report can be accessed via Thijs' research group's portal http://geosystemes.univ-lille1.fr/

Thijs also is one of the coordinators of the new IGCP 591 project, which started in 2011 and builds on the momentum gained by the highly successful 503 and 410 projects. All information can be found on our website www.igcp591.org. We are looking forward to seeing you at one of our next meetings (see announcement of the 2013 Lund meeting elsewhere in this newsletter). Thijs is actively involved in the IGCP 591 sessions at Strati 2013 in Lisbon, Portugal in July (Session 8a 'Palaeozoic Stratigraphy and Palaeogeography' convened by Elise Nardin & Thijs) and at the Geological Society of America Annual Meeting in October 2013 in Denver (session T236 'Biological and environmental feedbacks in the colonization of the water column' convened by Mark Williams, Thijs Vandenbroucke & Bradley Cramer).

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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.

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Beatriz WAISFELD (Argentina) continues working actively on Cambro-Ordovician trilobite dominated assemblages from western Argentina with special focus on trilobite taxonomy, biostratigraphy, and paleoecology. Research on these aspects, together with my colleague Emilio Vaccari, is now extended to the Cambro-Ordovician successions of Southern Bolivia.

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WANG Wenhui (China) continues working on the biostratigraphy of lower Ordovician fossil groups (graptolite, chitinozoan, acritarch and palaeoscolecidan worm) from South China. The results of these studies were recently published in the *Review of Palaeobotany and Palynology*. At the beginning of 2013, I am working closely with Chen Xu and Tang Peng from NIGPAS on the Ordovician-Silurian boundary interval from the Tarim Basin, northwest China. New findings on graptolite and chitinozoan fauna will help to fix the local O-S boundary in this area.

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Rongchang WU (China) continues to work on the Ordovician and Silurian conodonts from South China. My research interest focuses on conodont taxonomy, palaeoecology, biostratigraphy, and its macroevolutionary trends (e.g. Ordovician conodont biodiversity pattern). I am also very interested in using the conodont apatite $\delta^{18}O$ to interpret the paleoclimate. Currently I am working on conodonts from the Zitai and Kuniutan formations in South China, the age of which is from Floian to Darriwilian.

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YAN Kui (China) continued work on Ordovician acritarchs in 2012. In July and August, I attended the 34th IGC in Brisbane, and visited the coral reef at Heron Island, Queensland. In August, I attended IPC XIII/IOPC IX in Tokyo, and visited Hokkaido. In September, I went to Xinjiang to collect samples for upper Ordovician. In December, I went to Yunnan to collect samples for O/S boundary. I also work on the acritarch biostratigraphy in South China and I hope to do some work on some Silurian acritarch assemblages in China.

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Graham YOUNG (Canada) will be co-chairing a symposium at the Geological Association of Canada – Mineralogical Association of Canada (GAC-MAC) Winnipeg 2013 meeting, entitled *Life and Times of Phanerozoic Seas* (in honour of Rolf Ludvigsen). This is a collaboration with Brian Pratt, Nigel Hughes, Ed Landing, Godfrey Nowlan, Dave Rudkin, and Steve Westrop. I am continuing to work on Palaeozoic palaeoecology and on the diversity of Ordovician cnidarians and arthropods. I am collaborating with Bob Elias and others to study palaeoenvironments

and stratigraphy in the Ordovician rocks of central and northern Manitoba. Graduate student Matt Demski and recent graduate student Lori Stewart (co-supervised with Bob Elias at the University of Manitoba) have been improving the understanding of palaeoenvironmental change in the interval leading up to the Ordovician – Silurian boundary. I am continuing detailed studies of the varied fossils at the William Lake site in central Manitoba, collaborating with Dave Rudkin, Michael Cuggy, and others. A paper on an Ordovician fossil pycnogonid is in press, and we are actively studying eurypterids and cnidarian medusae (jellyfish) from the same site.

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ZHAN Renbin (China). Together with my Chinese colleagues, I was making case studies in South China on the Great Ordovician Biodiversification Event (GOBE) during 2012. We have found that the first radiation of the brachiopod GOBE in South China could be recognized as three episodes: the first phase was on the upper Jiangnan Slope at the very beginning of Floian (*Tetragraptus approximatus* Biozone), the main pulse on the centre of the Upper Yangtze Platform during the early Floian (*Didymograptellus eobifidus* and *Corymbograptus deflexus* biozones), and the concluding episode took place on nearer shore localities during the early Dapingian (*Expansograptus hirundo* Biozone). The case study on GOBE is now still going on in South China, and we are concentrating on the marginal platform facies (the purple red argillaceous limestone of the Zitai Formation, Floian to lower Darriwilian). We hope to have some experts of sedimentology and geochemistry to join us in order to further investigate the dynamics of GOBE in South China.

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Yuandong ZHANG (China) is continuously working on: (1) stable carbon isotope records of the Ordovician in South China, Tarim and their implications for a refined stratigraphic correlation (in cooperation with Axel Munnecke from Erlangen-Nurnberg University of Germany); (2) a systematic description of the graptolites from the Ningkuo and Hulo Formations (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; (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 regarded as having high potential as 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 Paleozoic in South China and Tarim", Jan. 2011 to Dec. 2015). (4) 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 (in cooperation with Zhen Yongyi of Australia, and colleagues in NIGPAS), and an incorporation of carbon isotope records. This work has been supported by a grant from the Natural Science Foundation of China (Jan. 2012 to Dec. 2015).

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ORDOVICIAN RESEARCH PUBLICATIONS

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