

ORDOVICIAN NEWS

SUBCOMMISSION ON ORDOVICIAN STRATIGRAPHY
INTERNATIONAL COMMISSION ON STRATIGRAPHY

Number 29 (for 2011)

Edited by Ian G. Percival



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CONTENTS

	<i>Page</i>
CHAIRMAN'S MESSAGE	4
ANNUAL REPORT OF ORDOVICIAN SUBCOMMISSION FOR 2011	5
ORDOVICIAN SUBCOMMISSION NEWS	13
REPORT ON THE 11 TH ISOS, Alcalá de Henares, Spain, May 2011	15
PRELIMINARY NOTICE: 12 th ISOS, Eastern (Appalachian) USA, 2015	17
ANNOUNCEMENTS – IGCP 591 Annual Meeting 2012, Cincinnati, USA	20
ICOS 2013, Mendoza, Argentina	20
IGCP 591 Annual Meeting 2013, Lund, Sweden	21
NEW CAMBRO-ORDOVICIAN STUDIES VOLUME (Contents list)	22
MEMORIAL NOTICES – June Phillips Ross (1931-2012)	23
– A.D. (Tony) Wright (1934-2011)	24
– W.I. (Ian) Mitchell (1947-2011)	26
ORDOVICIAN RESEARCH REPORTS & CONTACTS	28
RECENT ORDOVICIAN RESEARCH PUBLICATIONS	67

Cover photo

Juan Carlos Gutiérrez-Marco (Chairman of the 11th ISOS Organising Committee) discussing the interpretation of the giant trace fossil in the Armorican Quartzite (adopted as the logo of the 11th ISOS) on the intra-symposium field trip, May 2011.

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ORDOVICIAN NEWS Number 29 (for 2011)

CHAIRMAN'S MESSAGE

It has been a momentous year for our system. The 11th International Symposium on the Ordovician System, hosted in the beautiful and historic surroundings of Alcalá de Henares a stone's throw from Madrid, has been and gone leaving in its wake a huge amount of new data and ideas on the Ordovician. Juan Carlos Gutiérrez-Marco, Isabel Rabano and their team have to be thoroughly congratulated for a quite exceptional meeting; David Bruton, Stan Finney and Ian Percival have provided an admirable review of the congress and its excursions [see Bruton et al. (2011) in *Episodes* 34] capturing the excitement of the meeting and its many presentations. The published volume, aptly named *Ordovician of the World* of some 679 pp will be lasting source of reference for generations of Ordovician researchers.

As the final volume from IGCP 503 (*Early Palaeozoic biogeography and geography*, eds D.A.T. Harper and T. Servais) is nearing the copy editing stage, we welcome our new partners in IGCP 591 'The Early to Middle Paleozoic Revolution: Bridging the gap between the Great Ordovician Biodiversification Event and the Devonian terrestrial revolution'. We look forward to building on the great cooperation initiated with IGCP 410 and continued with IGCP 503. As a first step, all three Lower Palaeozoic subcommissions plan to meet together with IGCP 591 in the historic centre for Early Palaeozoic research in Lund, Sweden next June. This will be a unique occasion and will bring together the many multidisciplinary strands of our science.

But we need not wait until next year. Symposium 35.5 (Ordovician Subcommission symposium in the Geostandards Theme) convened by Ian Percival and myself, to be held at the 34th International Geological Congress in Brisbane, Australia this August, will host 17 oral and 5 poster presentations on a diversity of Ordovician topics.

This year the subcommission must say farewell to number of its titular members, who have served the system well through a challenging period in its development. 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.

Finally once again I thank all of you, particularly Ian Percival and Juan Carlos, for your continued important input and support. It is your system, we merely provide an infrastructure that we hope will aid and stimulate your research. Ian once again deserves special mention for assembling and editing *Ordovician News*, and to Juan Carlos and his Iberian colleagues, nuestro más sincero agradecimiento.

David A.T. Harper
Chair, Subcommission on Ordovician Stratigraphy



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

ANNUAL REPORT 2011

1. Name of constituent body:

Subcommission on Ordovician Stratigraphy (SOS)

Submitted by:

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

J. C. Gutiérrez-Marco
Vice-Chairman, SOS
Instituto de Geología Económica (CSIC-UCM)
Facultad de Ciencias Geológicas
28040 Madrid
Spain
Tel.: +34 915 44 54 59
Fax: +34 913 94 48 74
E-mail: jcgrapto@geo.ucm.es
URL: <http://www.ucm.es/info/paleo/personal/gutierrez.htm>

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

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

The Subcommittee 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 Subcommittee 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 Subcommittee thus involves much of the global geological community.

3. Summary table of Ordovician subdivisions

SYSTEM	GLOBAL SERIES	GLOBAL STAGES	KEY GRAPTOLITE/ CONODONT(C) BIOHORIZONS
ORDOVICIAN	UPPER	HIRNANTIAN	← <i>A. ascensus</i> (GSSP-Dob's Linn)
		KATIAN	← <i>N. extraordinarius</i> (GSSP-Wangjiawan North)
		SANDBIAN	← <i>D. caudatus</i> (GSSP-Black Knob Ridge)
	MIDDLE	DARRIWILIAN	← <i>N. gracilis</i> (GSSP-Fågelång)
		DAPINGIAN	← <i>U. austrodentatus</i> (GSSP-Huangnitang)
	LOWER	FLOIAN	← <i>B. triangularis</i> (C), (GSSP-Huanghuachang)
		TREMADOCIAN	← <i>T. approximatus</i> (GSSP-Diabasbrottet)
			← <i>I. fluctivagus</i> (C) (GSSP-Green Point)

4. Organization

- a. Subcommittee Executive (from August 2008)
 - Chairman, David A.T. Harper (UK)
 - Vice Chairman Juan Carlos Gutiérrez-Marco (Spain)
 - Secretary, Ian G. Percival (Australia)
 - 16 other Voting Members
 - Over 100 Corresponding Members

Subcommittee website: www.ordovician.cn. Alternative website: <http://seis.natsci.csulb.edu/ISOS> (remains active for facilitating discussion of GSSP proposals, if and when relevant).

The Subcommittee officers and voting members have been agreed for the next term from 2008-2012. Following the Subcommittee's business meeting during the Nanjing conference (2007) a postal ballot confirmed the election of the new Subcommittee officers, and elected a new group of voting members. Details of the procedure and results were included in the report for 2007. The new Subcommittee 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)
J.C. Gutiérrez-Marco (Spain)
D.A.T. Harper (Denmark)
O. Hints (Estonia)
Li Jun (China)
S. Leslie (USA)
C.E. Mitchell (USA)
A.T. Nielsen (Denmark)
G. Nowlan (Canada)
A.W. Owen (UK)
I.G. Percival (Australia)
L.E. Popov (UK)
M.R. Saltzman (USA)
T. Servais (France)
T. Vandenbroucke (Belgium)
Zhang Yuandong (China).

Three members are due to retire next year and one has resigned due to heavy administrative commitments. Replacements are being sought.

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 (2012).

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 Ordovician and Silurian international congresses in Spain and the UK, respectively.

6. Chief accomplishments and products in 2011 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 2012 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 meeting in Copenhagen included the wish to routinely evaluate the efficacy of the current stages. **A colour reprint of the Global Ordovician Chronostratigraphy (The Ordovician Time Table) chart is planned for 2012 dependent on funding and will be distributed to colleagues at the IGC in Brisbane 2012 and in different countries if finance permits.**

d. *Ordovician News No. 28* was produced and posted on the Subcommittee website and is available for download.

7. Chief problems encountered in 2011

The Subcommittee is planning to publish an Ordovician ‘Time Table’ following the approval and ratification of all the GSSPs. This was discussed and agreed at the Yangtze conference during June 2007 in Nanjing. The Subcommittee, however, lacks financial support to publish this table. A lack of travel support limited the participation of Voting Members in the 33rd IGC in Oslo during August 2008. In fact only two members were present (Harper and Gutiérrez-Marco) at the ISOS business meeting. This problem was partly rectified during 2009, when the ISOS business meeting associated with IGCP 503 in Copenhagen was well attended by titular and corresponding members together with other interested parties. An excellent turnout, not surprisingly, at Alcalá de Henares this year (2011), allowed a proper discussion of issues facing the subcommittee in the coming years. However numbers are likely to be low at the Brisbane IGC in 2012.

8. Summary of expenditure for 2011-2012

TOTAL INCOME (from ICS): USD 3000

Support for attendance of subcommittee officers at ISOS meeting in Madrid USD 1500

Grant towards production of Geol. Soc. Memoir on Early Palaeozoic biogeography and geography USD 1000

Contingency fund USD 300

Miscellaneous expenditure USD 200

TOTAL EXPENDITURE USD 3000

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

The new Subcommittee came into force during the 33rd IGC in Oslo. Plans for the Subcommittee’s future work were initially stated as follows.

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 addressed in a session at the Madrid Meeting.**

b. Will establish a forum to assess the efficacy and utility of the newly-established international stages. **This too was addressed at the Madrid meeting.**

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 will be presented in Brisbane, 2012.**

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

d. Production and internet distribution of *Ordovician News No. 27* in 2010.

e. Management of Subcommittee 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. **Little progress has been made on this front.**

f. Production and internet distribution of *Ordovician News No. 28* in 2011.

g. 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 subcommittee 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 Subcommittee 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 meeting.**
3. Over the last few years we have neglected somewhat the role of the regional groups and the many important regional and diverse stratigraphies that make our system so exciting. A number of the key regional successions were included in the correlation charts provided by Bergström et al. (2009), but there more that require calibration with our new stages. Moreover a few regions such as Baltoscandia and SE Asia were never formally published. This is a priority for our system and work that can involve all our colleagues. **This will be fully addressed at the IGC in Brisbane.**
4. Work is now far advanced on a Carbon stable isotope curve for the Ordovician. Consistent results have been already achieved for parts of the column. There are of course other stable isotopes and it will be appropriate and useful to evaluate if we can help develop these curves not least as one of our nonbiologic means of correlation. There are other nonbiologic techniques that we could also consider. **These issues were addressed in a recent issue of *Palaeogeography, Palaeoclimatology, Palaeoecology* edited by Munnecke, Calnar and Harper (2010).**
5. A more difficult area is sea-level or water-depth curves for the period. There have been a number of curves for the Ordovician and many more for particular parts of the period. It would be useful to examine these curves more carefully and the criteria upon which they are based with a move towards developing more standardised curves for the Ordovician. **Some of these issues were addressed in the recent issue of *Palaeogeography, Palaeoclimatology, Palaeoecology* edited by Munnecke, Calnar and Harper (2010) and will be 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 2012.**
7. We already have a number of robust absolute dates for parts of the system but it would be useful to develop more, not least to be able to calibrate the true rates of biological and geological processes 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 for 2012

- 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. The ICS will be credited as a main sponsor. **5000 USD**
- b. Preparation of an Ordovician Time Table, carried over from last year: **1000USD**
- c. Support for attendance at IGC in Brisbane, August 2012: **5000USD**
- d. Support for production of revised regional correlation charts: **2500 USD**
- e. Startup funding for potential review of GSSPs, in particular that at the base of the system: **2500 USD**

TOTAL 2012 BUDGET: 25, 000 USD

REQUESTED FROM ICS: **10, 000USD**

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 in 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 Subcommittee, 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 Academy of Sciences, provides a server for the Subcommittee website.

The Subcommittee 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 Subcommittee 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 Subcommittee'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 Subcommittee'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 $\delta^{13}\text{C}$ 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 Subcommittee 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.

ORDOVICIAN SUBCOMMISSION NEWS

New Titular (Voting) Members elected to fill vacancies on the Ordovician Subcommittee

The Subcommittee on Ordovician Stratigraphy is run by a group of specialists in Ordovician stratigraphy, biostratigraphy, palaeontology, geochronology, geochemistry/isotope geology and related fields of relevance to determining

internationally agreed subdivisions of the Ordovician System and interregional correlations. These specialists, known as Titular Members, represent all regions of the world with significant deposits and exposures of Ordovician strata (a full list of the Members is shown on page 2 of this *Ordovician News*). Their duties involve participation in informed discussion on matters of importance to Ordovician stratigraphy, exercising their vote to decide various issues, and providing leadership in key areas of Ordovician research in their home regions. Titular Members are elected for terms of four years (being the interval between International Geological Congresses) which may be extended for a total of five consecutive terms.

This year will see the retirement of three long-serving Titular Members who have each performed with distinction on the Ordovician Subcommittee over the past 20 years. They are the current Vice Chairman, **Juan Carlos Gutiérrez-Marco** (Spain) – who also was a driving force behind last year’s highly successful 11th International Ordovician Symposium – **Alan Owen** (U.K.), and **Leonid Popov** (U.K.). Unfortunately the collective experience of the current Subcommittee has also been diminished over the past year by the resignations of **Chuck Mitchell** (U.S.A.) and **Godfrey Nowlan** (Canada), both of whom have found that the increased workload of their managerial/administrative positions have left them no time to devote to Ordovician research. Their resignations, accepted with regret by the Subcommittee Executive, and the impending retirements of the other three Titular Members, have opened up the opportunity for five new specialists to be elected to the Ordovician Subcommittee. In early 2012, a vote was held amongst the current Titular Members, resulting in the following new Titular Members being elected with effect from the 34th IGC in Brisbane in August 2012.

Dan Goldman (U.S.A.)

Mansoureh Ghobadi Pour (Iran)

Artur Sa (Portugal)

Tatiana Tolmacheva (Russia)

Mark Williams (U.K.)

The incoming Vice Chairman of the Subcommittee will be **Andrei Dronov** (Russia) who will take up his post in August 2012.

Venue decided for 12th International Symposium on the Ordovician System in 2015

The International Symposium on the Ordovician System is held every four years in a city or town that has suitable facilities to host the meeting, together with access to nearby or regional Ordovician outcrops (to facilitate field trips). Forward planning for the 12th ISOS commenced during the recent 11th ISOS in Spain, when representatives from two countries (U.S.A. and Russia) started to formulate proposals that were subsequently submitted to the Corresponding Members of the Ordovician Subcommittee to be voted on in late 2011. A very narrow majority was recorded for the proposal submitted by the team based at James Madison University in Virginia, where the 12th ISOS will be held in mid-2015 (see Preliminary Announcement elsewhere in this issue of *Ordovician News*). Given the substantial support evident for the Russian proposal, for the ISOS to be based in either St Petersburg or Novosibirsk, it was decided that the right of first refusal to hold the subsequent ISOS in 2019 will be offered to the Russian team.

REPORT ON THE 11th INTERNATIONAL SYMPOSIUM ON THE ORDOVICIAN SYSTEM, Alcalá de Henares, Spain, May 2011

This highly successful symposium attracted nearly 100 registrants from 23 countries, with the majority of participants coming from western Europe. Delegates received at registration the proceedings volume of 679 pages entitled “Ordovician of the World”, containing 100 short papers and abstracts given at the symposium. This substantial publication (entirely in English) of the Spanish Geological Survey can be downloaded free from their website. The very instructive field guides were similarly of excellent quality, printed in full colour to allow copious use of field photographs.

The symposium venue was the Cisnerian University in Alcalá de Henares, a picturesque historic town (home to Cervantes, author of “Don Quixote”). Here, accommodation charges were much more moderate than in Madrid just 30 kms away. Many registrants stayed in comfortable single rooms in the University Residencia (student accommodation hall); others were accommodated in local hotels. The symposium was held in an adjacent building of the university, dating back to the mid 16th Century.

Considering the dire economic circumstances afflicting both Spain and Portugal, the organisers of the 11th ISOS did an exceptional job to secure sponsorship from a number of organisations, including the Geological Surveys of both countries, the Spanish Ministry of Science and Innovation, the Spanish Research Council, six universities in Spain and Portugal, five city councils in Portugal (who provided evening receptions on the pre-symposium field trip, thereby subsidising food costs) and a number of national parks, geoparks and tourist heritage mines who waived or subsidised entrance fees. As well, major corporate sponsorship was provided by Spain’s largest oil company (Repsol), together with several other corporate sponsors.

pre-symposium field excursion to Portugal & Spain (May 3rd – 8th)

The pre-symposium field excursion (with a total of 29 participants) commenced in Madrid and proceeded by bus westwards to central Portugal. Four days were spent examining Ordovician exposures in central and northern Portugal. Highlights included a traverse on foot through the most complete section of Ordovician strata in Portugal (at Rio Ceira), a visit to the Arouca Geopark (also known as the Park of the Giant Trilobites) to inspect specimens of the world’s largest known trilobites, and stops at several sites within the Valongo Palaeozoic Park (which attracted the attention of the local television and print media who covered our visit). Participants also donned hard hats and toured the underground excavations left by the Romans who mined gold from quartz veins cutting through the Ordovician rocks. On the last day the pre-symposium excursion crossed back into Spain, stopping to view the thickest development of Late Ordovician limestones there in the Sil River canyon, before proceeding to Las Medulas, site of another Roman gold mine (this one based on hydraulic mining of alluvial gold from Miocene to Pliocene fluvial and alluvial gravels) which is now a UNESCO World Heritage site.

intra-symposium field excursion to south-central Spain (May 12th – 13th)

The intra-symposium field excursion was open to all conference registrants, with transport, food and accommodation covered as part of the registration fee. About 75 attendees (plus leaders and support staff) participated in the excursion, which commenced in Madrid and proceeded by bus to a region south of the city of Toledo in Ciudad Real Province. This region contains the most extensive development of

Ordovician strata in Spain. Highlights on the first day included a 3 km traverse on foot through Lower Ordovician rocks including a bedding plane exposing probably the largest fossil worm burrow known anywhere (see cover photo), and on the second day a visit to the Almaden Mining Park – formerly the world’s largest mercury mine that had been exploited since Roman times. The mining operation closed in 2003 but has now been redeveloped as a tourist heritage mine, that includes a descent underground to the 45 m level and an extensive tour through the old galleries.

post-symposium field excursion to north-east Spain (May 14th – 16th)

The post-symposium field excursion (also with 29 participants) commenced in Madrid and proceeded by bus north-eastwards to the Iberian Ranges in Guadalajara, Teruel and Zaragoza provinces. There participants had the opportunity to study in depth some interesting carbonate facies and other rock types (including an abandoned iron ore mine in the Late Ordovician) that were not present in areas examined on the preceding field excursions.

The Organising Committee, editors of the conference volume, field excursion leaders and guidebook contributors, and all the unseen assistants in the background, who made the 11th ISOS the outstanding and memorable success that it was, are to be congratulated on their efforts. Gracias!

[for an extended report on the 11th ISOS, see the paper by Bruton et al. (2011) in *Episodes* 34]



Meeting of Titular Members of the Subcommittee on Ordovician Stratigraphy, held during the 11th ISOS in Alcalá de Henares. From left: Zhang Yuandong, Li Jun, Chuck Mitchell, Steve Leslie, Olda Fatka, Andrei Dronov, Olle Hints, Arne Nielsen, Juan Carlos Gutiérrez-Marco, Thijs Vandembroucke, Thomas Servais, Stan Finney (ICS Chairman), Dave Harper, Ian Percival, Leonid Popov



Post-symposium excursion in the Eastern Iberian Chain of northeast Spain. Excursion leader Enrique Villas (in purple jacket) discusses the stratigraphy of the upper Katian limestones near the village of Fombuena.

(report & photos by Ian Percival)

PRELIMINARY ANNOUNCEMENT: 12th ISOS, JUNE 2015

James Madison University Harrisonburg, Virginia USA Central Appalachian Mountains

Organizing Committee (Preliminary)

Stephen A. Leslie, James Madison University
John Haynes, James Madison University
Achim Herrmann, University of Arizona
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 3-7 June, 2015
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>), 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/>). Richmond, Virginia (airport code RIC) and Washington, D.C. (airport code WAS) are both approximately two hours away by car. Charlottesville (airport code CHO) is one hour away. We plan to have coaches to be available for transportation from Dulles International Airport (airport code IAD; Washington, D.C.) 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 minima of about 15 °C (59°F) at night to maxima of 28°C (83°F) during the day.

Those who enjoy outdoor activities will find many opportunities nearby for getting out. JMU is situated 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, with 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. labspaces 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. Incidentally, 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 trips:

Southern Appalachians

This trip will begin in Birmingham, Alabama on June 3rd and will spend June 4-7th visiting field sites. Initially we will examine the Middle to Late Ordovician carbonate to clastic transition from the Pratt Ferry Formation to the Athens Shale. Next we will travel to the Nashville area in Tennessee to visit the Middle and Late Ordovician platform carbonates exposed in the Nashville Dome. We will then travel east, back into the Appalachian fold and thrust belts where we will examine the development of the Taconic foreland in eastern Tennessee and southwestern Virginia. The trip will end at the conference site at JMU in Harrisonburg, Virginia. Lodging, food and transportation in the field will be covered in the field trip registration. A minimum of 8 and a maximum of 20 participants are required to run this excursion.

Possible trip to Oklahoma (depending on interest)

This trip will visit the extensive Ordovician exposures in Oklahoma along Interstate 35 through the Arbuckle Mountains, including the upper Arbuckle Group (Early Ordovician), Simpson Group (Middle-Late Ordovician) and the Viola Springs Formation, Sylvan Shale, and Keel Limestone (Late Ordovician). 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 Formation, which is the auxiliary Katian GSSP section. This field excursion will meet on June 3rd at the airport in Dallas, Texas. 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 will 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 are required to run this excursion.

Conference Field Trip

The Shenandoah Valley hosts classic Ordovician exposures of the Early, Middle and Late Ordovician. We will examine these during a trip to the classic Tumbling Run section in the Strasburg, Virginia area. We plan to then travel to Washington DC and the National Mall where there will be the opportunity to visit the spectacular museums of the USA National Capital (<http://www.nps.gov/nacc/index.htm>). Conference attendees who 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

This trip will leave from Harrisonburg 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 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 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, 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 are required.

Possible trip to Trail Creek, Idaho (depending on interest)

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 sections that have yielded beautiful graptolite faunas spanning most of the Ordovician Period (Floian to Hirnantian). Participants will also have an opportunity to collect abundant conodonts on bedding plane surfaces, including some bedding plane assemblages. In addition to examining outcrops that have served as biostratigraphic reference sections for western North America, participants can also enjoy the restaurants, art galleries, and pubs of Sun Valley, one of North America's premier winter ski resorts. *Participants need to make their own flight arrangements to and from Idaho.* Arrive Boise, Idaho, June 12th; field excursion June 13-16th; depart Boise, Idaho, on June 17th. Lodging, food and transportation in the field are covered

in the field trip registration. A minimum of 8 and a maximum of 15 participants are required. **This will be an extremely strenuous field excursion in rugged mountainous terrain that will require substantial climbing on talus slopes at elevations 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 organise a one-day trip to Colonial Williamsburg (<http://www.history.org>) or Historic Jamestown (<http://www.historicjamestowne.org>). Alternatively, depending on interest, trips may be scheduled for Monticello, the home of Thomas Jefferson, author of the Declaration of Independence and third president of the United States (<http://www.monticello.org>), and Mountpelier, the home of James Madison, father of the US Constitution and 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 given in the First Circular.

CONFERENCE ANNOUNCEMENTS

IGCP 591 Annual Meeting 2012: Foerste Symposium Cincinnati, Ohio, USA July 22-28, 2012

Organized by B. Cramer & C.E. Brett. Pre-conference excursion to Katian-Wenlock - Southern Appalachian Basin (KY, OH, IN); post-conference excursion to Wenlock-Lochkovian - Illinois Basin/Michigan Basin (IL, IN). Special volume in *Stratigraphy* (eds. Cramer & Melchin). For more details, visit the IGCP 591 website: <http://www.igcp591.org/meetings.php>.

3rd International Conodont Symposium: “Conodonts from the Andes”

Argentina was selected as host for the next international meeting of conodont workers. **The 3rd International Conodont Symposium** will be held in Mendoza, July 15-19, 2013. Mendoza, the capital city of Mendoza Province, is located in a region of foothills and high plains, on the eastern side of the Andes. This conference will be held in conjunction with the **Regional Field Meeting of IGCP 591**.

Contact **Guillermo L. Albanesi**, CONICET - Universidad Nacional de Córdoba, Casilla de Correo 1598, 5000 Córdoba, ARGENTINA,
E-mail: galbanesi@arnet.com.ar, Tel.: 00 54-351-4694703, Fax: 00 54-351-4216350.
Secretariat e-mail: 3ICOS@efn.uncor.edu

IGCP Project 591 3rd Annual Meeting
9-19 June 2013, Lund, Sweden

To be held jointly with
International Subcommittee on Cambrian Stratigraphy (ISCS)
International Subcommittee on Ordovician Stratigraphy (ISOS)
International Subcommittee on Silurian Stratigraphy (ISSS)

Sponsored by the Department of Geology, Lund University, Geological Survey of Sweden,
the Geological Society of Sweden, and the Swedish Research Council

General information

The third annual meeting of IGCP 591 will be hosted by the Department of Geology at Lund University, southernmost Sweden. The meeting is co-arranged with the subcommittees on Cambrian, Ordovician and Silurian Stratigraphy, and will form an excellent platform for scientific discussions among the entire Lower Palaeozoic research community. The formal theme of the meeting will be '*Early Palaeozoic Global Change*'. Scientific sessions in Lund will be followed by a regional field trip to visit Lower Palaeozoic localities in Skåne and Västergötland provinces, southern Sweden, as well as in the Oslo area of southern Norway. The localities to be visited include well-exposed Cambrian sandstone and alum shale formations, the basal Floian and Sandbian GSSP's in the Ordovician, the classical Orthoceratite Limestone of Baltoscandia as well as important Ordovician-Silurian boundary sections and most of the Silurian succession. The final excursion route covers the time interval from the second stage of the Cambrian through the latest Silurian and will be published in the second circular in early June 2012.

Registration and excursion fees

Following are estimates (final costs will be sent out with the second circular).
Registration fee for the scientific sessions at Lund University will be approximately **US\$ 100** (covering registration, the abstract proceedings, printed field guidebook, handouts, icebreaker snacks and drinks, conference dinner, and all coffee breaks).
The fee for the post-Conference excursion (limited to 60 participants) in southern Sweden and Norway is estimated at **US\$ 1,000** for senior researchers (**US\$ 700** for PhD students) and includes bus travel through southernmost Sweden and Norway, and costs from June 14-19, including hotels and meals.

Publications

1. Abstract (750 words, including references, and one line figure or photograph) proceedings published in Swedish scientific journal GFF Vol. 135(2) in 2013 (Ed. Lindskog & Mehlqvist). GFF proofs will be handed out during the scientific sessions. *Deadline March 30 2013.*
2. Thematic short papers published in Swedish scientific journal GFF Vol. 135(4) or Vol. 136(1) in 2014 (Ed. Calner, Albanesi, Lehnert). *Deadline June 1 2013.*
3. Field Guide published in Swedish Geological Survey publications (Ed. Calner, Lehnert, Ahlberg, Wickström, Erlström).

Further details – see First Circular (distributed separately to *Ordovician News* mailing list) or contact Mikael Calner <mikael.calner@geol.lu.se>

NEW CAMBRO-ORDOVICIAN STUDIES VOLUME

Laurie, J.R., Paterson, J.R. & Brock, G.A. (eds), 2011. Cambro-Ordovician Studies IV. *Memoirs of the Association of Australasian Palaeontologists* 42, 492pp. (A\$160)

CONTENTS

- Richard A. Fortey:** The first known complete lichakephalid trilobite, Lower Ordovician of Morocco
- Loren E. Babcock:** Exceptionally preserved *Conchopeltis* (Cnidaria) from the Ordovician of New York, USA: taphonomic inferences
- James B. Jago, Christopher J. Bentley & Roger A. Cooper:** A Cambrian Series 3 (Guzhangian) fauna with *Centropleura* from Northern Victoria Land, Antarctica
- Rebecca L. Freeman & James F. Miller:** Lingulate brachiopods from the upper Cambrian (Sunwaptan) Hellnmaria Member of the Notch Peak Formation, western Utah, USA
- Zhou Zhiqiang, Zhou Zhiyi & Yuan Wenwei:** Late Ordovician (Hirnantian) *Mucronaspis* (*Songxites*)-dominant trilobite fauna from northwestern Zhejiang, China
- Adrian W.A. Rushton:** The mid-Cambrian (Drumian) centropleurid trilobite *Luhops* and its relatives from the Abbey Shale Formation near Nuneaton, central England
- Soo Yeun Ahn, Loren E. Babcock & J. Stewart Hollingsworth:** Revised stratigraphic nomenclature for parts of the Ediacaran-Cambrian Series 2 succession in the southern Great Basin, USA
- M. Franco Tortello:** Late middle Cambrian trilobites from El Totoral, Mendoza, Argentina
- Loren E. Babcock, Shanchi Peng, Gregory J. Wasserman & Richard A. Robison:** Exceptionally preserved biota from a carbonate lithofacies, Huaqiao Formation (Cambrian: Drumian Stage), Hunan, China
- Olaf Elicki:** First skeletal microfauna from the Cambrian Series 3 of the Jordan Rift Valley (Middle East)
- Lee Ann Hally:** The Cambrian trilobite *Rhysometopus*, with taxonomic revision of Guzhangian species from Queensland, Australia
- Leonid E. Popov, Mansoureh Ghobadi Pour, Mohammad Reza Kebria-Ee Zadeh & Saeid Shahbeik:** First record of silicified Cambrian (Furongian) rhynchonelliform brachiopods from the Mila Formation, Alborz Range, Iran
- Stephen R. Westrop & Ed Landing:** Lower Cambrian (Branchian) eodiscoid trilobites from the lower Brigus Formation, Avalon Peninsula, Newfoundland, Canada
- Mansoureh Ghobadi Pour, Leonid E. Popov, Mohammad Reza Kebria-Ee Zadeh & Christian Baars:** Middle Ordovician (Darriwilian) brachiopods associated with the *Neseuretus* biofacies, eastern Alborz Mountains, Iran
- Yong Yi Zhen, Roger A. Cooper, John E. Simes & Ian G. Percival:** Darriwilian (Middle Ordovician) conodonts from the Maruia-Springs Junction area, New Zealand
- Jonathan M. Adrain, Neo E.B. McAdams & Stephen R. Westrop:** Affinities of the Lower Ordovician (Tulean; lower Floian) trilobite *Gladiatoria*, with species from the Great Basin, western United States
- Jonathan M. Adrain, Neo E.B. McAdams, Stephen R. Westrop & Talia S. Karim:** Systematics and affinity of the Lower Ordovician (Tulean; lower Floian) trilobite *Psalikilopsis*
- James D. Loch & John F. Taylor:** New symphysurid trilobites from the Cambrian-Ordovician boundary interval in the western United States
- Yong Yi Zhen, John R. Laurie & Robert S. Nicoll:** Cambrian and Ordovician stratigraphy and biostratigraphy of the Arafura Basin, offshore Northern Territory
- Ian G. Percival, John E. Simes, Roger A. Cooper & Yong Yi Zhen:** Middle Ordovician linguliformean brachiopods from the Maruia-Springs Junction area, New Zealand

This and previously published *AAP Memoirs* (including earlier Cambro-Ordovician Studies) are available from the **Geological Society of Australia, Inc.** See the GSA homepage: www.gsa.org.au for details of prices and postage.

MEMORIAL NOTICES

June Phillips Ross 1931-2012



June Rosa Pitt Ross passed away peacefully on March 10, 2012 at Mt. Baker Care Center in Washington State (USA) where she was so well cared for in her last days. She was 80; born May 2, 1931, in Taree, New South Wales, Australia, the second of three children born to Bernard and Adeline Patti (Nind) Phillips, all of whom have predeceased her. She attended Gosford High School in NSW, where she was an active competitive swimmer and elected 'Captain' of her class. At the University of Sydney June earned her BSc and PhD degrees, and subsequently gained a DSc from that institution for her corpus of research. She was awarded two post-doctorate opportunities, the '1851 Scholarship' to study at Cambridge University in the UK, or an American Association of University Women Scholarship tenable in the United States. She chose the AAUW scholarship and studied at the Peabody Museum of Natural History at Yale University where she met Charles, her husband of 52 years (and collaborator in research into Ordovician sea levels in Laurentia).

June was a Professor in the Biology Department at Western Washington University for 37 years and was Chair of the Biology Department for several years. She retired as Emeritus Professor in 2004. June greatly enjoyed teaching and worked at challenging both undergraduate and graduate students to work through problems fully and to excel in answering questions directly. She also served several years on the WWU Faculty Senate and was President of the Senate for one term.

June's special interest was marine biology and especially bryozoans, particularly those of the Ordovician Period in which she was a world expert. She published extensively (more than 160 articles) on bryozoans in various scientific journals and received many awards for her work. Much of her research was supported by the National Science Foundation, the American Chemical Society's Petroleum Research Fund, and the Bureau for Faculty Research at Western Washington University. She enjoyed travel and her interest in bryozoans took her to many parts of the world to collect specimens for her own research and to study other collections. These included a number of trips around the U.S.A., the Bahamas, Canada, the Great Barrier Reef, Australia, New Zealand, most countries in Europe, the former Soviet Union, Japan, and China. June belonged to a number of scientific societies. For several years she served on the Council, and then as President, of the International Association of Bryozoologists. She also was active in the Paleontological Society, serving on the P.S. Council and for six years was P.S. Treasurer.

In addition, she was instrumental in the planning, and establishment of the local Family Planning Council, and its successor, Planned Parenthood of Whatcom County (now Mt. Baker Planned Parenthood). She served as the first director of the P.P. clinic which was located in the former St. Lukes Hospital.

June led a very full and productive life, and was a devoted, loving wife and an eminent scientific colleague. Her quiet, infectious enthusiasm will be greatly missed by her many coworkers, students, friends and especially by her husband.

(Obituary contributed by Charles A. Ross, June's husband)

A.D. (Tony) Wright (1934-2011)

Professor A.D. (Tony) Wright passed away peacefully on the 29th July 2011 at his home in Leicestershire after a long illness. Formerly Professor and Head of Geology in Queen's University Belfast, he made some fundamental and substantial contributions to our understanding of Ordovician brachiopods and stratigraphy.

Following three years of obligatory national service with the RAF, Tony went up to Nottingham in 1954 where he graduated with 1st class honours in Geology in 1958. These were interesting years. The British geology departments were consolidating prior to the massive expansion of the university sector in the 1960s. Nottingham was no exception and here Tony followed a solid menu of courses but more importantly came under the wing of Dr Albert 'Bert' Rowell, at that time assembling data for the 'inarticulate' brachiopod chapter for the *Treatise on Invertebrate Paleontology*. Tony was already fascinated by the phylum Brachiopoda and if he were to continue his studies, Queen's University, Belfast was the obvious choice. Alwyn Williams had been appointed to the chair in Geology a few years previously and had already written a number of significant papers on the phylum. In addition he had assumed the role of editor for the two volume set of the *Treatise on the phylum* and was currently experimenting with the importance of shell structure to the classification and phylogeny of the group, and statistical methodologies for systematic descriptions and analyses. There could be no better mentor.

Tony joined the staff at Queen's in 1958 as Alwyn's research assistant. Alwyn enjoyed recounting the tale that Tony turned up for his first day of work on a Saturday morning. This was particularly fortunate since Alwyn too worked Saturdays and thus began a long and fruitful relationship. Tony was immediately sent south of the border to commence work on the Ashgill Portrane Limestone for his PhD (He also attacked the Kildare Limestone with dynamite, though little of that material reached print). The Portrane fauna was silicified and the large blocks of limestone were broken up and digested in acid using techniques pioneered by G. Arthur Cooper in the States and refined by Alwyn in his studies of the older Tourmakeady Limestone from western Ireland. Tony's detailed study of this fauna, published in a series of bulletins of the British Museum (published in 1963 and 1964), set the bar high in terms of his detailed descriptions, good illustrations and careful statistical analyses. But Tony was also engaged in a number of parallel studies. His first paper on the quirky brachiopod *Streptis* presented an exceptionally detailed statistical analysis of this asymmetric triplesiid, serving as model for the use of bivariate methods in systematic palaeontology. At this time apart from his own chapters on the *Treatise*, notably the punctuate orthides and the triplesiides, Tony operated as Alwyn's assistant on a range of other groups and joint publications appeared on the brachiopod loop and punctuation. Tony assisted with many of Alwyn's statistical analyses on the morphometrics of brachiopods themselves (using a mechanical calculating machine) and the biogeographic distribution of the group using the gigantic mainframe computer. A considerable amount of his time, however, was to be spent with the Scanning Electron Microscope where Alwyn was pioneering its use in elucidating the shell ultrastructure of the phylum.

In 1963 Tony was awarded his PhD and was appointed lecturer in that year. During the 1960s and early 1970s he continued to publish on brachiopods and the Ordovician, establishing the widespread distribution of the late Ordovician *Hirnantia* brachiopod fauna, a stage division (with Keith Ingham) for the Ashgill Series and a

paradigm shift (with Alwyn Williams) on our understanding of the shell structure of the craniiform brachiopods. Promotion to reader followed.

After Alwyn's departure to the University of Birmingham as Pro-Vice Chancellor, Tony was appointed Professor of Geology and Head of Department in 1974. In some circles the appointment was viewed as controversial and Tony never enjoyed the full support of his staff. He inherited a diverse array of exceptional characters, talented colleagues who unfortunately were never the full sum of all their parts. His tenure coincided with some of the worst years of the 'Troubles', providing additional obstacles to the recruitment of both staff and students. In the same year Tony convened the First International Symposium on the Ordovician System in Birmingham with field excursions to all the key sections of the classic British series. This was a monumental event, setting the agenda for some 35 years subsequent research on the Ordovician System and its global stages and series.

Back in Belfast, Tony took his job as head of department seriously. He rarely missed a Faculty meeting and cohorts of students enjoyed evenings at home hosted by Tony together with his wife Catherine and children Olivia, Virginia and Edward. Excellent food was complemented by fine wines, quaffed to the strains of Gilbert and Sullivan or even Mozart. At a national and international level he was involved with a number of organizations including the International Geological Congress, Irish Geology Week and as secretary for the Committee of Heads of UK Geology departments. His research continued, preparing work for the 2nd edition of the *Treatise* (this time unravelling the clitambonitidines and triplesiides), engaging with the problems of the broader classification of the phylum and focussing too on Ordovician-Silurian boundary problems, particularly in the North of England. His research was recognized by election as honorary member of the Geological Society of Sweden, and late in his career by conferment of a D.Sc. by the University of Nottingham.

As a PhD supervisor, Tony was always generous with his time but his students had a free reign to develop their projects and publications as they wished. Final manuscripts were, nevertheless, always carefully scrutinized; no comma could be out of place, every ornamental rib on the brachiopod shell accurately counted and photographic plates crisp and carefully aligned. On occasion, after a gruelling interrogation of a first draft, the hapless research student might be met with the remarks, 'Well, I don't think it's too bad, would you like a glass of sherry?'.



Following his retirement from Queen's, Tony left Belfast, returning to his native Midlands where he found happiness with his partner Mona Mason. Here he continued his systematic studies on various Ashgill brachiopod faunas but was easily diverted by his great passion for gardening and devotion to the wines of Burgundy. Tony left a legacy of careful and meticulous systematic and stratigraphic research, a high degree of scholarship rarely equalled today and a huge enthusiasm for his subject. His initiation of ISOS meetings set Ordovician research on a course he certainly did not imagine but clearly enjoyed.

David A.T. Harper

Professor A.D. (Tony) Wright at summer graduation at Queen's University, Belfast in 1974 (Photo courtesy of Gareth Ll. Jones, Conodate, Dublin)

W.I. (Ian) Mitchell (1947-2011)

Ian Mitchell's academic career was forged at Queen's University in Belfast where he was awarded a PhD in 1972 for his work under Professor Alwyn Williams on the Ordovician brachiopod fauna of the Pomeroy Inlier. Ian participated fully in Departmental life and as demonstrator he passed on his enthusiasm for and knowledge of palaeontology and stratigraphy to undergraduates. Ian also participated fully in student life and was a memorable and deceptively skilful winger in the GeolSoc football team.

Ian joined the British Geological Survey (then Institute of Geological Sciences) in 1972 and was initially posted to the Geological Survey of Northern Ireland (GSNI) where, with the exception of a spell on overseas duty in Bolivia, he was to spend his long and very productive professional career.

For most people, Ian would have appeared from out of the mist smiling; a man of average height and light build, dressed in black corduroy trousers, Wellington boots and sometimes a navy blue cagoule. If the rain was really pouring, his small (and usually broken) umbrella would have offered some protection to his field maps, proffered for explanation whilst clutching an over-sized hammer under his other arm. Ian was an extraordinarily fine survey geologist, who could engage with whomever he encountered and leave them with a feeling of wonder. Fieldwork was a huge and essential part of Ian's career - it was geological survey (or mapping) that formed his natural foundation and enabled him to write the majority of, and edit, *The Geology of Northern Ireland* - GSNI's flagship and much acclaimed, regional publication. During his 39 years with the GSNI, he mapped across all six counties of Northern Ireland's bedrock and superficial deposits. He had a remarkable ability to move quickly through overgrown and apparently inaccessible stream sections (this may have been a skill learned during his time in Bolivia) - the image of him disappearing into the shaded tangle of undergrowth will never fade.



Though he thrived on all aspects of geology, his specialist area was palaeontology. If fossils were to be found in an interval of rock strata he would retrieve them, usually through his skill but sometimes through sheer persistence. The value of biostratigraphy was not lost on Ian, the relative age constraints that they released and his ability to read the environments of sediment deposition in which these animals had lived, were tools that allowed him to become one of the leading proponents of Carboniferous geology in Ireland. The chapter on Northern Ireland in the *Geological Society Special Report: A Revised Correlation of Carboniferous Rocks in the British Isles*, was a career topping outcome of Ian's work; its timely receipt, just before he passed away, gave him much comfort in that he was transferring this knowledge on to future generations.

The staff of the GSNI, DETI, BGS and many other people within organisations throughout the UK, Ireland and beyond will miss Mitch; not just for his geological expertise, but because he was enthusiastic and passionate about geology.

Footnote: Apart from his survey work and his comprehensive knowledge of the Carboniferous, Mitch also made some substantial contributions to Ordovician geology. His PhD on the Katian brachiopod faunas of Pomeroy was published by Palaeontographical Society in 1977. This monograph contains many new taxa, described in detail and well illustrated, and remains a key source of reference for brachiopod workers involved in Lower Palaeozoic studies. Parallel studies in Portugal published earlier in 1972 established some new genera and a raised awareness of this important Iberian fauna, previously described by Delgado many years earlier. His stratigraphic paper with Hilary Carlisle, Norton Hiller and Bob Addison on the Ordovician of SE Ireland, published in 1972, provided new constraints on the correlation of these uncompromising rocks, building the foundation for future work in the region. Although much involved in survey work, Mitch returned to his brachiopod studies in the 1980s publishing with David Harper some new Irish Upper Ordovician faunas from Herbertstown, Oriel Brook and Pomeroy. Together all Ian's studies have contributed greatly to our understanding of the complex Ordovician geology of Ireland, and added much to our knowledge of the distribution of Early Palaeozoic brachiopod faunas.

[Main text by Mark Cooper and Terry Johnston (based on a version previously published in ES2K) with a footnote added by David Harper.]

RESEARCH REPORTS & CONTACT DETAILS (in alphabetical order)

F. Gilberto ACEÑOLAZA (Argentina) is actively working on the Ordovician biostratigraphy, chronostratigraphy and correlation of the Ordovician sequences of Northern and Western Argentina. I am continuing research on major fossil associations and the meaning of them into the palaeogeographic puzzle of the Ordovician Andean sequences. Research is being done on the framework of projects supported by the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), the Agencia Nacional de Promoción Científica y Tecnológica and the Universidad Nacional de Tucumán. Please note that we have organized a free-download and open-access library of our two referred publications (*Serie de Correlación Geológica* and *Miscelanea INSUGEO*), many of them dealing with Ordovician geology, at http://www.insugeo.org.ar/publicaciones_correlacion.php.

F. Gilberto Aceñolaza

Instituto Superior de Correlación Geológica (INSUGEO) – CONICET
Universidad Nacional de Tucumán
Miguel Lillo 205, 4000 Tucumán. Argentina.
E-mail: facenola@infovia.com.ar
Webpage: <http://www.insugeo.org.ar/index.php>

Guillermo ACEÑOLAZA (Argentina) is currently working on the biostratigraphy of Cambro-Ordovician strata in NW Argentina. Recent projects were approved by the CONICET and the National University of Tucumán to focus on the less known Ordovician sequences of the Puna region. The main subject of these projects are the trace fossil associations and associated faunas. Additional work is being carried out in collaboration with Enrique Villas and Juan Carlos Gutiérrez-Marco (Spain), Robert Frei (Denmark) and Argentine colleagues Susana Heredia, Franco Tortello, Susana Esteban and María Vergel.

Guillermo F. Aceñolaza

INSUGEO (Instituto Superior de Correlación Geológica)
CONICET - Universidad Nacional de Tucumán
Miguel Lillo 205, Tucumán, 4000. Argentina.
E-mail: acecha@webmail.unt.edu.ar; acevolving@hotmail.com
Tel-Fax: + 54 381 4253053 / 4236395
<http://www.insugeo.org.ar/>

Jonathan M. ADRAIN (USA) is working on a comprehensive field-based reinvestigation of the Lower and lower Middle Ordovician faunas of the Great Basin, western USA. Published thus far is a new trilobite biostratigraphy for the Floian of Laurentia as well as a number of systematic papers and monographs. An extremely well-resolved trilobite biostratigraphy is emerging, which can be tied to other regions and paleocontinents through the documentation of the most complete sequence of

widely distributed pegalic trilobites (the telephinids *Carolinites* and *Opipeuterella*) known from anywhere in the world. My PhD student Neo McAdams and my former student Talia Karim (University of Colorado Museum of Natural History) are the main current collaborators, along with Steve Westrop (University of Oklahoma & Oklahoma Museum of Natural History). I am also working on a major silicified Darriwilian trilobite fauna from the Table Cove Formation in western Newfoundland, Canada.

Jonathan M. Adrain

Department of Geoscience

121 Trowbridge Hall

University of Iowa

Iowa City, Iowa 52242, USA

tel (319) 335-1539

fax (319) 335-1821

<http://paleo.iowa.uiowa.edu/Adrainlab/>

Hussain AL AJMI (Saudi Arabia) is working on the sedimentology of the Paleozoic Wajid Sandstone of Saudi Arabia with special emphasis on the Cambrian and Ordovician sediments. Together with Martin Keller and Matthias Hinderer, a new lithostratigraphic subdivision of the entire Paleozoic siliciclastic succession is being developed and will be published soon.

Hussain Al Ajmi

Ministry of Water and Electricity, Water Resources Development Department, Riyadh, 11233. Kingdom of Saudi Arabia.

Tel: +966-1-2052733

Fax: +966-1-2052735

Mobile +966 5066 62263

hussain.alajmi@yahoo.com

Guillermo ALBANESI (Argentina) is participating, together with Gladys Ortega and colleagues from universities of Argentina and other countries, in joint projects on diverse topics of historical geology from the Lower Paleozoic of South America, including conodont biostratigraphy, chemostratigraphy, events, and paleothermometry. He continues developing his project on early Paleozoic conodont faunas from the Eastern Cordillera and Puna of northwestern Argentina, which involves a working team from different universities, including a PhD student associated to the project for the next years, María Eugenia Giuliano. Post-doctoral students G. Voldman and F. Zeballo are carrying out their projects on Cambrian-Ordovician conodont biostratigraphy, paleoenvironments and paleothermometry of Argentine basins under his supervision. CONICET scholarships were awarded to F. Serra and N. Feltes, who are beginning studies on conodont biostratigraphy and paleoenvironments of mixed carbonate-siliciclastic sequences from the Ordovician System of the Argentine Precordillera, under his direction. As regional co-leader for the IGCP 591, "The Early to Middle Paleozoic Revolution", he is organizing the regional field meeting to be held in Mendoza, Argentina, July 2013, together with the

3rd International Conodont Symposium, “Conodonts from the Andes” (web site: www.efn.uncor.edu/3icos). A special thematic issue of *Geological Journal* on Early Palaeozoic faunas of South America is being completed together with G. Ortega as guest editors.

Guillermo Luis Albanesi

Casilla de Correo 1598, Córdoba 5000, Argentina
Telephone: 54-351-4332098, int. 256; 54-351-4694703
Fax: 54-351-4332097
E-mail: galbanes@com.uncor.edu

Dick ALDRIDGE (UK), with colleagues, has at last completed and submitted a paper on a 17-element conodont apparatus from the Soom Shale Lagerstätte, South Africa. Work on other animals from the Soom continues with Sarah Gabbott and Hannes Theron.

Richard J. Aldridge

Department of Geology
University of Leicester
Leicester LE1 7RH United Kingdom
Phone: 0044 116 252 3610
Fax: +116 252 3918
E-mail: ral2@le.ac.uk

Javier ALVARO (Spain) is now working on a new project focused on the Ordovician volcanosedimentary rocks of Montagne Noire (France) and the Late Ordovician replacement of benthic communities in different parts of the Mediterranean region, such as Morocco, Iberian Peninsula and Montagne Noire.

Javier Alvaro (Spain)

Centro de Astrobiología (CSIC/INTA),
Ctra. de Torrejón a Ajalvir km 4, 28850 Torrejón de Ardoz, Spain
alvarobjj@cab.inta-csic.es

Anna ANTOSHKINA (Russia) is actively working on study of the Paleozoic reefs and Lower Paleozoic sedimentation of the north-eastern European Platform.

Anna I. Antoshkina

Institute of Geology, Komi Science Centre, Ural Branch, RAS,
Syktyvkar, Pervomayskaya st., 54, 167982, Russia
antoshkina@geo.komisc.ru

Lucía ARÁOZ (Argentina) is currently working on Early Paleozoic palynomorphs (acritarchs) from Cordillera Oriental and Puna of NW Argentina. My Doctoral Thesis focuses on the record of Ordovician microfloras from Sierra de Zenta (Salta and Jujuy provinces), and biostratigraphics aspects, with special emphasis on the Tremadocian – Arenigian transition and Ordovician – Silurian boundary.

Lucía Aráoz

CONICET - INSUGEO

Universidad Nacional de Tucumán

Miguel Lillo 205 – San Miguel de Tucumán – C.P. 4000 - Argentina

Tel.: 54-(0)381-4253053

E-mail: insugeohm@tucbbs.com.ar; lucia_araoz@yahoo.com.ar

Webpage: <http://www.insugeo.org.ar/index.php>

Chris BARNES (Canada) retired after a decade as Director of the NEPTUNE Canada cabled ocean observatory in June 2011 and is currently completing several Lower Paleozoic conodont studies as Emeritus Professor back in SEOS at the University of Victoria. Collaboration 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. A recently published study involves Late Ordovician conodonts from southern Ontario (with Shunxin Zhang and Glen Tarrant). Current work with Annalisa Ferretti (University of Modena) and Stig Bergström (Ohio State University) is completing a study of Late Ordovician conodonts from the Sholeshook Formation, Whitland, south Wales. The geochemistry of Lower Paleozoic conodonts, particularly oxygen isotopes, is being pursued further in collaboration with Julie Trotter (University of Western Australia).

Chris Barnes

School of Earth and Ocean Sciences,

University of Victoria,

P.O. Box 3065, STN CSC,

Victoria, BC V8W 3V6, Canada

Telephone: (1) (250) 920-8382

Fax: (1) (250) 721-6200

E-mail: crbarnes@uvic.ca

Denis BATES (United Kingdom) is working on the graptolite genus *Cryptograptus*.

Denis Bates

Institute of Geography and Earth Sciences

Aberystwyth University, Aberystwyth

Ceredigion SY23 3QQ. United Kingdom.

(44)1970617667

deb@aber.ac.uk

Jeff BAUER (USA) is working on Ordovician conodonts and correlation of strata in the southern Midcontinent of North America.

Jeff Bauer

Department of Natural Sciences, Shawnee State University,
940 Second Street, Portsmouth, OH 45662 (USA)
Telephone number: 1-740-351-3421
E-mail address: jbauer@shawnee.edu

Juan L. BENEDETTO (Argentina) is working on the taxonomy and phylogeny of Tremadocian-Dapingian brachiopods from the Central Andean basin, in particular the punctate orthide *Lipanorthis* and related forms recently discovered in different localities of NW Argentina. Particular interest is being devoted to the early diversification and phylogeny of orthoids and plectorthoids and their bearing on the taxonomy of rhynchonelliformean brachiopods. In addition, research is continuing on the Lower-early Middle Ordovician brachiopod faunas from the volcano-sedimentary successions of the Famatina Range and their biogeographic relationships with other coeval assemblages. As regards the Precordilleran faunas, the work is currently oriented to the deep water assemblages recovered from the upper San Juan Formation and Las Chacritas formations. A taxonomic and phylogenetic study of a new lower Darriwilian plectambonitoid from the uppermost San Juan Formation is in press.

Juan L. Benedetto

CICTERRA (Centro de Investigaciones en Ciencias de la Tierra)
CONICET-Universidad Nacional de Córdoba
Av. Velez Sarsfield 299, X5000JJC, Córdoba, Argentina.
jbenedetto@efn.uncor.edu

Carys BENNETT (France) is working as a Post Doctoral assistant with Thijs Vandenbroucke at the University of Lille. I am studying the geochemistry of the eyes of pelagic trilobites to determine if oxygen isotopes, extracted from the eye calcitic lenses, can be used as a proxy for sea surface temperatures. This study is part of a wider research effort to understand the palaeoclimate of the early-mid Ordovician. The study so far has examined well-preserved material from Spitsbergen, Arenig in age, from Richard Fortey's work. I am new to Ordovician research, having previously studied Carboniferous ostracods and other fossils for my PhD. **Special request:** The project is now moving on to study new material from across the early-mid Ordovician globally, so if you have any spare pelagic trilobites such as *Carolinites* or *Telephina* with eye lenses preserved that you might be kind enough to donate to a good research cause, I would love to hear from you.

Carys Elizabeth Bennett

Géosystèmes, UMR 8217 du CNRS,
Université de Lille1, Bâtiment SN5,

Villeneuve d'Ascq, 59655, France.
Telephone number: 0033(0)320337116
E-mail address: carys.bennett@univ-lille1.fr

Matilde Sylvia BERESI (Argentina) continues working on the stratigraphy, microfacies, and palaeoenvironments of the Ordovician carbonate platform, in the Precordillera of western Argentina, together with S.Heredia and A. Mestre (conodonts) from the San Juan University.

I have described the first spicules from the Silurian of the Argentina (published online in the *Geological Journal*) and also, together with Dr. J. Keith Rigby, a Middle Cambrian sponge fauna of the Precordillera of Mendoza Province. A paper on the Cambrian, Ordovician and Silurian distributions of non-stromatoporoid sponges has been completed in collaboration with J. Botting, L. Muir and M. Carrera (to be published in the forthcoming Geological Society Memoir on Early Palaeozoic Palaeobiogeography and Palaeogeography).

Matilde Sylvia Beresi

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

Stig M. BERGSTROM (USA) has had a busy year. Most of his research activities have been in the Ordovician, especially the Ordovician-Silurian boundary in North America, Europe, and China. Two projects during 2011 have been the stratigraphy and $\delta^{13}\text{C}$ chemostratigraphy of the Borenshult drillcore from southern Sweden that penetrates an interesting succession from the upper Rhuddanian to the upper Darriwilian. One paper was recently published and another is in press. A long-term study with Mark Kleffner and Birger Schmitz on the well-known Manitoulin Formation in southern Ontario, a unit always considered to represent the early Silurian, showed it to contain the Hirnantian $\delta^{13}\text{C}$ excursion (HICE), and accordingly it is of latest Ordovician age. The results of this study were recently published in the Canadian Journal of Earth Sciences. Another paper, on the chemostratigraphy of the Ordovician-Silurian boundary interval in the Upper Mississippi Valley, is in press. With almost a dozen co-workers I am currently involved in several Ordovician projects in Argentina, Sweden, Wales, USA, China, and Austria. I had the pleasure to participate in the 2011 Ordovician Symposium meeting in Spain and greatly enjoyed both the hospitality and the most interesting geology demonstrated during the Spain-Portugal fieldtrip.

An unexpected but most pleasant experience this fall was that I received the Paleontological Society Medal 2011, the highest award in paleontology in America, at the annual meeting of the Geological Society of America in Minneapolis. Details about this may be found the March 2012 issue of the *Journal of Paleontology*.

Stig M. Bergstrom

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

Carlton E. BRETT (USA) reports that he and University of Cincinnati graduate students continue to work together with Patrick McLaughlin on a number of Ordovician projects in eastern North America with collaborators from around the region.

Ongoing NSF research with Steve Westrop (University of Oklahoma), Lisa Amati (SUNY at Pottsdam), and Patrick McLaughlin (University of Wisconsin) is focused on investigating sequence stratigraphic, geochemical, and biotic patterns through the Late Ordovician in eastern North America. Results of stratigraphic studies on the Upper Ordovician Sandbian to Katian strata, in collaboration with Westrop, Amati, and McLaughlin, include the following:

- A) Upper Ordovician Bromide-Viola strata in Oklahoma and the probably coeval Lebanon-Carters-Hermitage succession of the Nashville Dome, Tennessee and Highbridge, Lexington and lower Cincinnati (Edenian-Maysvillian) strata of the Cincinnati Arch, Kentucky have been subdivided into third- and fourth-order depositional sequences with the recognition of through-going sequence boundaries, maximum flooding surfaces, and systems tracts. Preliminary results indicate strong similarities, including shared sequence boundaries, flooding surfaces and highstand marker beds.
- B) Distinctive patterns of magnetic susceptibility have been recognized and correlated among outcrops and a floating-point time-scale is being developed based on time-series analysis of these data.
- C) Stable carbon isotope results show incredibly uniform isotope signatures between closely spaced localities. Close sample spacing through individual stratigraphic sections reveals many profound high-frequency features including flat-line offsets and negative spikes indicative of unconformities and meteoric diagenesis, as well as larger magnitude positive and negative excursions. These fine-scale (10-100 Kyr) features of the carbon cycle show a positive correlation with sea level, whereas the large-scale (1-10 My) structure does not. These fine-scale features have been overlooked in nearly all Paleozoic C-isotope studies.
- D) These results are providing a high-resolution framework for examination of changes in trilobite biofacies, as well as a detailed record of sea level, climatic and carbon-cycle changes during the Late Ordovician in eastern Laurentia.

Two of my Masters students at University of Cincinnati completed theses dealing with Upper Ordovician sequence stratigraphy, sedimentary environments, and geochemistry. Nathan Marshall completed his sequence stratigraphic and geochemical study of the Edenian Kope Formation of the Cincinnati Arch, and Thomas Schramm completed a thesis on detailed sequence stratigraphic and magnetic susceptibility study on the type Maysvillian strata of Ohio, Kentucky, and Indiana.

We are working closely with Don Mikulic, Joanne Kluessendorf, and Brian Witzke on the Ordovician-Silurian boundary interval across eastern North America with many new insights and surprising results (stay tuned).

In the upcoming summer, Brad Cramer and I will co-host, with, a field conference for IGCP 591: *The Early to Middle Paleozoic Revolution*, at the University of Cincinnati and a variety of field locations in Ohio, Kentucky, Indiana, and Illinois.

Carlton E. Brett

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

Yves CANDELA (Scotland) is now free from major exhibition duties after the successful completion and re-opening of the Royal Museum (now National Museum of Scotland) on 29th July 2011 (1 millionth visitor by November 2011). I am able to devote most of my time to the study of brachiopods, but am not restricted to this. I am currently working with David Harper (Durham University, England) on a project reviewing relationships, using the cladistic method, within the Plectambonitoidea. I am also working, in collaboration with Joseph Botting (Nanjing Institute of Geology and Palaeontology), 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.

Yves Candela

National Museums Scotland
Chambers Street
Edinburgh EH1 1JF. U.K.
Tel +44 (0)131 247 4280
Fax +44 (0)131 551 4106
y.candela@nms.ac.uk

Josefina CARLOROSI (Argentina) is completing a PhD on Lower and Middle Ordovician conodonts of the Cordillera Oriental, Argentina; this was developed with a CONICET grant and is directed by Drs Susana Heredia and Guillermo Aceñolaza. I expect to present my Doctoral Thesis in the National University of Tucumán, Argentina.

Josefina María Carlorosi

INSUGEO- CONICET- UNT
Miguel Lillo, 205. San Miguel de Tucumán
Tucumán- CP 4000, Argentina.
E-mail: josefinacarlrosi77@gmail.com

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

Marcelo G. Carrera

CICTERRA-CONICET Facultad Ciencias Exactas Físicas y Naturales,
Universidad Nacional de Córdoba
Av. Velez Sarsfield 299 (5000) Córdoba, Argentina
Telephone number: 54-0351-4332098 (office code 251)
Fax number: 54-0351-4332097
E-mail address: mcarrera@efn.uncor.edu

Chen Xu

State Key Laboratory of Palaeobiology & Stratigraphy
Nanjing Institute of Geology & Palaeontology,
Chinese Academy of Sciences
39 East Beijing Road, Nanjing, P.R. China
Tel. & Fax. 0086-25-83375157 (Office)
Mobile 13512511007
Please note change of email address to xu1936@gmail.com, xuchen@nigpas.ac.cn

Carlos CINGOLANI (Argentina) continues working with PhD students and coworkers on provenance and tectono-stratigraphic evolution on the Ordovician and Silurian units of the Argentine Precordillera (Cuyania) Terrane and Sierra de la Ventana (Argentina). Petrography, geochemistry, isotope geology and geochronology on detrital minerals are the main tools used for provenance analysis in well documented stratigraphic sequences. Another project on Ordovician-Silurian units of the Paraná Basin (Paraguay) was developed. A new graptolite fauna recorded from the Eusebio Ayala Formation (part of the Itacurubí Group) was described by M. Alfaro and N. Uriz and co-authors.

Main research topics are:

- a. *Provenance and tectonic setting of Ordovician to Silurian siliciclastic units of the Argentine Precordillera.* A long paper was submitted to an international journal (Paulina Abre and co-authors).
- b. *Ordovician K-bentonites.* A PhD thesis (Andrea Bidone) was submitted at the University of La Plata on Ordovician K-bentonites from the Precordillera Terrane. Isotopic studies on volcanogenic minerals are the main focus of this thesis.
- c. *Sierra de la Ventana (Buenos Aires province) Ordovician-Silurian sequences.* U-Pb geochronological studies have been carried out on detrital zircons.
- d. *Intracratonic Paraná Basin of Eastern Paraguay.* A new graptolite fauna from the Eusebio Ayala Formation was recorded, associated with a low diversity fauna including brachiopods, bivalves, trilobites and cephalopods. Two papers were submitted to international journals.

Carlos Cingolani

Centro de Investigaciones Geológicas- University of La Plata

calle 1 n. 644, La Plata (1900), Argentina.

Telephone number: 0054 221 4215677

E-mail address: cyingola@cig.museo.unlp.edu.ar; carloscingolani@yahoo.com

Robin (L.R.M.) COCKS (England) has had a busy year, partly working on Palaeozoic global palaeogeography with Trond Torsvik and partly continuing systematic work on Ordovician and Silurian brachiopods. Two Late Cambrian to Permian palaeogeographical papers were published, one on Laurentia and the other on the central part of Gondwana, which included all of Africa and India and much of the Middle East, Antarctica and South America. Work is now in progress on eastern Asia between Siberia and Gondwana, which includes North and South China, Annamia, Sibumasu and Tarim, each of which had numerous adjacent microcontinents and island arcs – the eventual submitted paper is unlikely to be definitive! Brachiopod work included a small paper on Cambrian to Devonian genera helpful in analysing palaeogeography, and the acceptance of a paper (as third author) with Huang Bing and Rong Jiayu on the global earliest Silurian (Lower Rhuddanian) radiation after the Hirnantian setbacks. More substantial papers on the Late Katian and Hirnantian faunas of southwest Wales (solo) and of the Chingiz Terrane of Kazakhstan (with Leonid Popov) are well advanced.

Dr L. Robin M. Cocks

Department of Palaeontology, The Natural History Museum,
Cromwell Road, London SW7 5BD, U.K.

Tel 0047 (0) 20 7942 5140

r.cocks@nhm.ac.uk

Roger COOPER (New Zealand) reports that the first results of his analysis of evolutionary rates in graptolites, with Peter Sadler (U.C. Riverside), are out (Sadler et al. 2011). Precise per capita extinction and origination rates have been derived from the global CONOP composite of graptolite species (533 sections, 2000+ species). The sharp contrast in evolutionary dynamics between the Ordovician and the Silurian and the good correlation in extinction and origination curves with the global $\delta^{13}\text{C}$ curve, supports the view that ice house marine climatic conditions prevailed during the Silurian, in contrast to the dominantly greenhouse conditions of the Ordovician, and that the transition between the two occurred in the Katian. The data set used, and the methodology and assumptions of the CONOP analysis are fully described in a paper by Sadler et al. (in the Rickards commemorative issue), which also presents a 'running standing' species diversity curve for the graptolite clade. A review of graptoloid paleoecology, with David Loydell, Sue Rigby and Denis Bates, is in press (*Earth Science Reviews*). With Ian Percival and Yong Yi Zhen, the Darriwilian conodont and brachiopod assemblages of the Maruia area in the South Island of New Zealand have been described (Percival et al. 2011, and Zhen et al. 2011).

Roger Cooper

GNS Science, PO Box 30368,
Lower Hutt, New Zealand.

Ph +(4) 5704853
r.cooper@gns.cri.nz

Paul COPPER (Canada) is active on the revision of the stratigraphy and paleontology of the O/S boundary sequence of Anticosti Island, and working on papers revising the existing nomenclature of the present formation and members, and taxonomy of the atrypid, athyrid and spiriferid brachiopods, and updating the taxonomy of the Katian-Hirnantian aulacerid stromatoproids. With Jin Jisuo I am plotting the latest data base for species loss and gains around the O/S extinction boundary of all Anticosti invertebrate taxa.

Paul Copper

Professor Emeritus, Department of Earth Sciences,
Laurentian University,
Sudbury, Canada P3E 2C6

<http://earthsciences.laurentian.ca/Laurentian/Home/Departments/Earth+Sciences/People/Emeritus+Faculty>

Home address: Loupicoubas, 46220 Prayssac, France
home phone from outside Europe: 011-33-565-226-581
home phone within France: 05 65 22 65 81 [within Europe 00-33-565-226-581]
email: pcopper@laurentian.ca

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 Cambro-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. The Hot Cathodoluminescence equipment (Geology Centre, University of Porto) evidences to be an important tool in these studies.

Helena Couto

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

Andrei DRONOV (Russia) continued his work on facies and tectonic evolution, biotic events and sea-level changes on the Russian and Siberian platforms during the

Ordovician. These studies proceed within a framework of a 3-year project “Comparative analysis of the biotic evolution in the Ordovician paleobasins of the Siberian and Russian platforms in connection with changes of paleogeographical conditions”. The project’s team includes Alexander Kanygin, Taras Gonta, Alexandr Timokhin, Veronica Kushlina, Elena Raevskaya and Tatiana Tolmacheva. I am also collaborating with Warren Huff and Bryan Sell in studies of newly discovered K-bentonite beds from the Upper Ordovician of Siberian platform. Trace fossils are investigated in cooperation with Radek Mikuláš and Richard Bromley.

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

Jan Ove R. EBBESTAD (Sweden) is involved in the CISP project (Concentric Impact Structures of the Palaeozoic) which aims at getting funding for two deep drilling through the Ordovician Siljan and Lockne craters. Updates and information is available on the project home page (<http://www.sddp.se/CISP>). Other activities during 2011 involved a chapter on gastropods, tergomyans and mimospirids in the up coming IGCP 503 book. This contribution is co-authored by a number of researchers interested in these groups. Current research also aims at working up a number of Ordovician-related projects that have been on hold for a while.

Jan Ove R. Ebbestad
Museum of Evolution, Uppsala University,
Norbyvägen 16, SE 752 36 Uppsala, Sweden
Telephone number: +46184712709
E-mail address: jan-ove.ebbestad@em.uu.se

Bob ELIAS (Canada) continues to study coral faunas during the great Ordovician biodiversification, end-Ordovician mass extinction, and Early Silurian recovery. A major paper on “Coral biogeography in the Late Ordovician (Cincinnatian) of Laurentia”, coauthored with Graham Young (Manitoba Museum), Dong-Jin Lee (Andong National University) and Boo-Young Bae (Seoul National Science Museum), will be published in a Geological Society Memoir on Early Palaeozoic Palaeobiogeography and Palaeogeography. Manuscripts on the paleobiology of Ordovician tabulate corals are in preparation with Boo-Young, Dong-Jin, and students at Andong National University. I and Graham Young (adjunct professor) welcome inquiries regarding graduate studies at University of Manitoba [see www.umanitoba.ca/geoscience/program/gradstudies/brochure%202011.pdf]. Lori Stewart and Matt Demski are doing M.Sc. theses on an Upper Ordovician section in central Manitoba, and on the Ordovician-Silurian boundary interval in the Williston

Basin area of Manitoba and Saskatchewan. Ben Wheadon finished a B.Sc. thesis on the O-S boundary interval in the Hudson Bay Basin near Churchill, Manitoba. Together, these are the first studies of the uppermost Ordovician and O-S boundary in Manitoba and Saskatchewan to integrate litho-, chemo-, and biostratigraphy, including conodont analyses by Godfrey Nowlan (Geological Survey of Canada). Some preliminary results were presented in 2011 at GAC-MAC in Ottawa and GSA in Minneapolis. Other B.Sc. theses that expand on this work are in progress.

Bob Elias

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

Susana B. ESTEBAN (Argentina) is working on Cambrian-Ordovician fine clastic rocks of west and northwest Argentine basins. Our approach is based on the integration of sedimentologic and biostratigraphic data within a sequence stratigraphic framework. This work is being done in cooperation with Franco Tortello (Universidad de La Plata). We are now involved in the study of black shale facies and associated trilobite faunas.

Susana B. Esteban

Facultad de Ciencias Naturales e IML
Miguel Lillo 205- 4000 Tucumán. Argentina
Telephone number: 0054-0381-4236395
Fax number: 0054-0381-4236395
E-mail: susana_esteban2003@yahoo.com.ar

Ray ETHINGTON (USA) is working (with Jim Miller and others) on conodonts from three sections in western Utah that comprise the Kanosh Shale through Crystal Peak Dolomite and underlie the Eureka Quartzite to document the conodont succession across the boundary between the Sauk and Tippecanoe Sequences. He is the co-author (with John Repetski and Jim Derby) of a manuscript summarizing the pre- Saint Peter Sandstone section in the Ozark region of northern Arkansas and southern Missouri which includes unpublished conodont data. This report will be a chapter in a major study of the Cambrian-Early Ordovician stratigraphy of the Great American Carbonate Bank to be published by the American Association of Petroleum Geologists in honor of the late James C. Wilson. In addition, he continues work on collections of conodonts from the Great Basin, Rocky Mountains, and central North America.

Raymond L. Ethington

Department of Geological Sciences
University of Missouri
Columbia, Missouri 65211

United States
Telephone 01-573-882-6470
FAX 01-573 882-5458
e-mail ethingtonr@missouri.edu

David EVANS (United Kingdom) has completed a monograph on the cephalopod fauna of the Durness Group of North-West Scotland, and is in the process of completing a study of several cephalopod assemblages from the Ordovician of the Alborz, Derenjial and Zagros Mountains of Iran (with Mansoureh Ghobadi Pour and Leonid Popov). He then plans to investigate the Silurian assemblages. David has been working with Andrew King on the systematics of the order Endocerida, concluding that the group is polyphyletic, and they have proposed a new order for those taxa excluded from Endocerida. David intends to resume work on the late Darriwilian and early Sandbian faunas of the Llanfawr Mudstones of central Wales, and the rare cephalopod limestones occurring in Late Ordovician sediments of northern England.

David Evans
Technical Advice and Designations Team,
Natural England
3rd Floor, Touthill Close, City Road,
Peterborough
PE1 1UA UK
Tel: 44(0)300 060 0899
david.evans@naturalengland.org.uk
devanscephs@gmail.com

Annalisa FERRETTI (Italy) continues to concentrate her Ordovician research on conodont faunas from South Europe. I spent November and December as a Visiting Scientist at The Ohio State University, conducting cooperative research with Stig Bergström on conodonts from Wales (together with Chris Barnes) and the Carnic Alps (together with Hans Peter Schönlaub).

I am involved (with K. Histon, P. McLaughlin and C. Brett) in editing a Special Issue of *Paleogeography, Palaeoclimatology, Palaeoecology* on "Time-Specific Facies: The Colour and Texture of Biotic Events", including papers dealing with the Ordovician.

Annalisa Ferretti
Dipartimento di Scienze della Terra
Università degli Studi di Modena e Reggio Emilia
L.go S. Eufemia 19
I-41121 Modena, Italy
Tel.: ++39-059-2055868
e-mail: ferretti@unimore.it
<http://www.prg.unimore.it>

Stanley C. FINNEY (USA). Having been elected to a second 4-year term as ICS chair, ICS matters consume much of my time these days, but I am still most fond of the Ordovician. Work with Chuck Mitchell, Mike Melchin, Petr Storch, and Chris Holmden continues on the Hirnantian based on my sections in Nevada. I am writing a manuscript on a major Permian-Triassic thrust fault in north-central Nevada, which has important implications for oil and gas and mineral exploration. Recognition of this thrust required detailed mapping of the structure within the Roberts Mountains allocthon, which could only be done with the aid of graptolite and conodont biostratigraphy of the Ordovician (and some Devonian) strata.

Stanley C. Finney

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

Barry FORDHAM (Australia) hopes, in 2012, to work with Bob Nicoll (Australian National University) on a couple of regionally useful Ordovician conodont collections from Queensland, Australia.

Barry Fordham

Research School of Earth Sciences
Jaeger Building 8
Building 61, 1 Mills Road
Australian National University
ACT 0200 Australia
Telephone number: +61 (0)2 6248 9374
Fax number: + 61(0)2 6125 7739
E-mail address: barry.fordham@anu.edu.au

Mansoureh GHOBADI POUR (Iran) is currently working on the Ordovician trilobites and associated faunas from northern Iran and Central Asia as well as general trilobite taxonomy, biostratigraphy, paleobiogeography and biofacies. My ongoing research projects include studies of the Lower to Middle Ordovician trilobites and brachiopods from the eastern Alborz Mountains in northern Iran, Devonian asterpygine trilobites of Central Iran and Late Ordovician (Sandbian to early Katian) raphiophorid trilobite associations of Central Kazakhstan.

Mansoureh Ghobadi Pour

Geology Department, Faculty of Sciences,
Golestan University, Gorgan 49138-15739, Iran.
Telephone number: +98 171 4427173-4, internal 170
Fax: +98 171 4427176,
Mobile: +98 913 2654300
E-mail address: mghobadipour@yahoo.co.uk and m.ghobadipour@gu.ac.ir

Dan GOLDMAN (USA) is currently working with Chuck Mitchell, Mike Melchin, Shuang-Ye Wu, Dave Sheets, and Fan Junxuan on a large National Science Foundation funded project to study graptolite biogeography. We are particularly interested in the relationship between graptolite geographic range and evolutionary patterns (species longevity, heritability of range, and hierarchical models of selection). Our research will: 1) compile a biogeographic database that includes detailed stratigraphic, geographic, and lithofacies information for Ordovician and Silurian graptolites; 2) employ this database to test hypotheses regarding the relationship between the geographic range of graptolite species and their ecological and evolutionary patterns; and 3) develop a new set of analytical methods to conduct a set of rigorous statistical tests of these biogeographic hypotheses. I have also been working with Stig Bergström, Jaak Nõlvak, Teresa Podhalańska, and Dave Sheets in constructing an integrated biostratigraphic framework for the Middle and Upper Ordovician rocks of Baltoscandia. We are using Peter Sadler's program CONOP9 to compile and integrate graptolite, conodont, chitinozoan, and ostracod ranges into a correlation model that cuts across litho- and biofacies. In this correlation model we are examining the biodiversity dynamics (biodiversity, speciation rate, extinction rate) of these different groups.

Daniel Goldman

Department of Geology
University of Dayton
300 College Park
Dayton, OH 45469. USA
(+1) 937-229-5637
dgoldman1@udayton.edu

David A.T. HARPER (UK) has recently moved to Durham University as Professor of Palaeontology in Earth Sciences and Principal of Van Mildert College. Research, nevertheless, continues on Ordovician stratigraphy and faunas in Scotland (with Yves Candela, Euan Clarkson and Alan Owen), Ireland (with Matthew Parkes, 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 with Rong Jiayu, Zhan Renbin and Huang Bing is in press in *Special Papers in Palaeontology*. A similarly large study of the later Ordovician brachiopods of Alaska has just been published in *Fossils and Strata*. Work continues on the Ordovician of southern Tibet and Xinjiang with Zhan Renbin (Nanjing), Liu Jianbo (Beijing), Lars Stemmerik and Svend Stouge (Copenhagen). The Palaeozoic group in Copenhagen together with Glenn Brock and his colleagues in Macquarie have ongoing investigations in the Ordovician of the Amadeus Basin, central Australia. Within the frame of the now completed IGCP 503 project, Dave Harper and Thomas Servais are currently editing over 30 manuscripts that address the relationships between biogeography and palaeogeography in the Early Palaeozoic. These results will be published this year 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. It is now, but not all authors and author groups work at the same pace!

Steve Donovan and Dave Harper have co edited a volume of papers (the majority based on Ordovician biotas) dedicated to the late Pat Brenchley who had a major impact on Ordovician research not least for his visionary work on the end Ordovician extinction.

David A.T. Harper

Principal of Van Mildert College
Professor of Palaeontology
Department of Earth Sciences
Durham University
Durham DH1 3LE, UK
Tel. 0044 1913347143
Fax 0044 1913345991
Mobile 0044 7900607167
E mail: david.harper@durham.ac.uk

Susana HEREDIA (Argentina) is working on taxonomy and biofacies of conodonts of the Middle Ordovician Eoplacognathus suecicus Zone in the Central Precordillera. Lower and Upper Ordovician conodonts from Precordillera are still under study. Josefina Carlorosi and I are studying Ordovician conodonts from the Eastern Cordillera (NW Argentina). Susana shares interests on Ordovician matters with Ana Mestre, Graciela Sarmiento, Matilde Beresi, Guillermo Aceñolaza, Gilberto Aceñolaza, Juan Pablo Milana, and Galina Nestell.

Susana Heredia

CONICET- CIGEOBIO
Instituto de Investigaciones Mineras
Facultad de Ingeniería, Universidad Nacional de San Juan
Urquiza y Libertador
5400- San Juan, Argentina
sheredia@unsj.edu.ar

Linda HINTS (Estonia) is continuing her investigations of East Baltic Upper Ordovician brachiopods. In collaboration with Helje Pärnaste the manuscript “*Hirnantia sagittifera* (Brachiopoda) and *Mucronaspis mucronata s.l.* (Trilobita) in the Upper Ordovician of the East Baltic: taxonomy and distribution” is in press. A study of small silicified brachiopods from the type section of the Porkuni Regional Stage revealed four new species, among them first Ordovician representatives of the genera *Sigmelasma* and *Tyronella* in the East Baltic areas. In preparation is a manuscript on the commoner Hirnantian brachiopods in the East Baltic.

Linda Hints

Institute of Geology at Tallinn University of Technology,
Ehitajate tee 5, 19086 Tallinn, Estonia.
Telephone number: +372 620 3035

Fax number: +372 620 3011
E-mail address: Linda.Hints@gi.ee

Olle HINTS (Estonia) is continuing studies primarily on Ordovician-Silurian microfossils. Together with colleagues in Tallinn, he is employing a quantitative stratigraphic approach, primarily based on CONOP9, in order to model the distribution and biodiversity patterns of Baltic Ordovician-Silurian chitinozoans and conodonts. In collaboration with Mats E. Eriksson (Lund) and Petra Tonarova (Prague), several projects on Paleozoic scolecodonts are in progress. Together with Marco Vecoli (Lille) and Aurelien Delabroye (Toulouse), two papers on latest Ordovician acritarchs and cryptospores from Estonia were published in 2011. Olle also 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>.

Olle Hints

Institute of Geology at Tallinn University of Technology
Ehitajate tee 5, 19086 Tallinn
Estonia
+372 620 30 27 (office)
+372 620 30 11 (fax)
+372 5130157 (mobile)
olle.hints@gi.ee, olle.hints@gmail.com

Jisuo JIN (Canada) is currently working on the following projects: Dalmanelloid brachiopod taxonomy and evolution; Late Ordovician brachiopod faunal gradient from subtropical to equatorial zones of Laurentia; Brachiopod endemism and extinction in the Late Ordovician.

Jisuo Jin

Department of Earth Sciences,
University of Western Ontario,
London, ON N6A 5B7, Canada
jjin@uwo.ca

Dimitri KALJO (Estonia) continues work on the Ordovician and Silurian bio- and chemostratigraphy of Baltica and elsewhere for comparison. A team work on this topic (mostly conodonts and C isotopes) of the upper Ordovician - lowermost Silurian of the Mirny Creek area, NE Russia, is nearly ready to be submitted to the *Estonian Journal of Earth Sciences* (www.eap.ee/earthsciences).

Dimitri Kaljo

Institute of Geology
Tallinn University of Technology
5 Ehitajate tee,

19086 Tallinn, Estonia
Tel.: 372 6203016
Fax: 372 6203011
E-mail: kaljo@gi.ee

Martin KELLER (Germany) is working on the Cambrian – Ordovician succession of Saudi Arabia together with Matthias Hinderer (Germany) and Hussain Al Ajmi (Saudi Arabia). A new lithostratigraphic subdivision of the entire Paleozoic siliciclastic succession is being developed and will be published soon. One paper on both Paleozoic glaciations has already been published. In addition, sedimentologic work continues on the Ordovician glacial deposits in northwestern Spain.

Martin Keller

Geozentrum Nordbayern, Abt. Krustendynamik
Universität Erlangen-Nürnberg
Schlossgarten 5
D-91054 Erlangen, Germany
Tel. +49 9131 852 2701

Present Address:

Rub' Al Khali Water Resources Study
giz International Services / Dornier Consulting
P.O. Box 2730, Riyadh 11461
Saudi Arabia
mobile : + 966 (0) 50 50 802942
phone : + 966 (0) 1 479 1802
fax : + 966 (0) 1 479 2068
e-mail : martin.keller@gizdco.com

Marcus M. KEY, Jr.

Department of Earth Sciences, Dickinson College
P.O. Box 1773
Carlisle, PA 17013-2896
U.S.A.

Phone: +1 (1) 717-245-1448

Fax: +1 (1) 717-245-1971

Email: key@dickinson.edu

Web: http://www2.dickinson.edu/departments/geol/Faculty/key_contact.html

Erika KIDO (Austria) is working on the Late Ordovician corals of the neritic sequence of Spiti, NW Himalaya, India. Together with Thomas J. Suttner a manuscript on the Late Ordovician corals from Spiti is in progress. Recently I also work on magnetic susceptibility, with the annual meeting of IGCP 580 in 2012 to be held in Graz.

Erika Kido

Commission for the Palaeontological and Stratigraphical Research of Austria c/o
University of Graz, Institute for Earth Sciences (Geology and Paleontology),
Heinrichstrasse 26, A-8010 Graz, Austria
Telephone number: ++43 (0)316 380 8735
Fax number: ++43 (0)316 380 9871
E-mail: erika.kido@uni-graz.at

Philippe LEGRAND (France) is working on the Upper Ordovician Formations of the Algerian Sahara and studying their macrofauna.

Philippe Legrand

"Tauzia"
216, cours Général de Gaulle
33170 Gradignan, France
Tél/Fax : (0)5-56-89-33-24
E-mail : legrandblain@wanadoo.fr

Steve LESLIE (USA) is primarily working on Middle and Late Ordovician conodont biostratigraphy and integrating the biostratigraphy with studies of Ordovician paleoclimate change. He 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 Bergström, Ken Foland, Alyssa Bancroft, and Amanda Howard (Ohio State University), as well as John Repetski (USGS) and Seth Young (Indiana University). Steve is also working with Bryan Sell (University of Michigan), Chuck Mitchell (University of Buffalo), and Scott Samson (Syracuse University) 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 (University of Arizona) 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. He 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.

Stephen A. Leslie

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

Li JUN (China) continues working on Ordovician acritarchs from China. He participated in the 11th International Symposium on the Ordovician System in Spain.

LI Jun

Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences,
Nanjing 210008, China.

Tel.: 86-25-83282153

Fax: 86-25-83357026

Email: junli@nigpas.ac.cn

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 in cooperation with other researchers on Ordovician piperocks (published in 2012), on the paleoenvironmental significance of the Middle Cambrian to Early Ordovician dolomitic deposition (one paper in press, another submitted), on Mg/Ca composition of the Ordovician echinoderms (in preparation), and the Tremadocian sea-level changes in South China (in progress). Studies on the Phanerozoic microbialites are still in progress with Hongfei Hou (Chinese Academy of Geological Sciences, China), Yoichi Ezaki and Natsuko Adachi.

Jianbo Liu

School of Earth and Space Sciences

Peking University

Beijing 100871, P. R. China

Tel: +86-10-62754151

Fax: +86-10-62751159

Email: jbliu@pku.edu.cn

Anita LÖFGREN (Sweden) is currently at work on Ordovician conodonts, mainly with biostratigraphical aspects and in Baltoscandia.

Anita Löfgren

Institute of Geology, Lund University

Sölvegatan 12

SE- 22362 Lund, Sweden

tel. +46-4615 24 06

E-mail: anita.lofgren@geol.lu.se

Jörg MALETZ (Germany) is back in Germany after 10 years in the US and Canada, working at Freie Universität Berlin since October 2011 in the DFG Forschergruppe 736 (*The Precambrian-Cambrian Ecosphere (R)evolution: Insights from Chinese*

Microcontinents). In connection with this group, interesting work is progressing on the recognition, taxonomy and evolution of Cambrian hemichordates (Enteropneusta & Graptolithina), together with Michael Steiner (FU Berlin).

Jörg is working mainly on faunal dynamics, biogeography and taxonomy of graptolite and radiolarian faunas in the Lower Palaeozoic (Cambrian-Silurian), trying to understand the marine ecosystem of the Early Palaeozoic oceans from various directions. A large portion of his time is taken by the revision of the Graptolite Treatise for which he is the coordinating author and organizer since September 2010, producing a Treatise Newsletter twice a year to show the progress of the project (If anyone is interested, please contact Jörg by email). The Treatise work also includes many smaller projects to revise the taxonomy of various graptolite groups, involving in part cladistics methods (with Chuck Mitchell, Buffalo; Mike Melchin, Antigonish).

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, among others). 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 under way.

Jörg Maletz

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

Peep MÄNNIK (Estonia) is working on evolution, taxonomy and palaeoecology of conodonts, conodont-based high-resolution stratigraphy, bioevents and palaeogeography. He is also interested in sequence stratigraphy and evolution of sedimentary basins. His studies continue under 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.

Peep Männik

Institute of Geology at Tallinn University of Technology
Ehitajate tee 5
19086 Tallinn. Estonia
e-Mail: mannik@gi.ee
tel.: + 372 6203041
fax: + 372 6203011

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

Alexander (Sandy) D. McCracken

Geological Survey of Canada
3303-33rd St. NW, Calgary, Alberta T2L 2A7
Telephone 403-292-7130
Fax 403-292-4961
E-mail samccrac@NRCan.gc.ca

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

Tõnu Meidla

Department of Geology, Institute of Ecology and Earth Sciences,
University of Tartu,
Ravila 14a, Tartu 50411, Estonia.
E-Mail: Tonu.Meidla@ut.ee

Ana MESTRE (Argentina) is working on taxonomy and biofacies of Middle Ordovician conodonts of the *Yangtzeplacognathus crassus* and *Eoplacognathus pseudoplanus* Zones in the Central and Eastern Precordillera. Lower Ordovician Conodonts from Precordillera are still under study. Ana shares interests on Ordovician matters with Susana Heredia, Matilde Beresi, Graciela Sarmiento, Juan Pablo Milana, Josefina Carlorosi and Galina Nestell.

Ana Isabel Mestre García

CONICET-CIGEOBIO-IIM
Laboratorio de Micropaleontología
Facultad de Ingeniería - Universidad Nacional de San Juan
Av. Libertador Gral. San Martín y Urquiza
Tel-Fax:++540264421700 - interno: 221
CP: 5400- San Juan- Argentina
amestre@unsj.edu.ar

Tatiana L. MODZALEVSKAYA (St. Petersburg, Russia) continues work on the project: "Ordovician and Silurian Palaeogeography of the East-European Platform".

In collaboration with Leonid Popov (UK) and Mansouret Ghobadi Pour (Iran) I am studying Cambrian, Ordovician and Silurian brachiopods of Iran, with a paper in press on *Stegocornu* and associated brachiopods from the Silurian (Llandovery) of

Central Iran. Together with Prof. Fernando Alvarez (Spain) we shall prepare a manuscript about Palaeozoic plicathyrinins of Kuzbass (Russia).

Tatiana L. Modzalevskaya

All-Russian Geological Institute (VSEGEI)

Department of Stratigraphy and Palaeontology

Sredny pr. 74

St.Petesburg, 199106, Russia

E-mail: TModzalevskaya@vsegei.ru (office); modz@IB2567.spb.edu (home)

Axel MUNNECKE (Germany): My current Silurian- and Late Ordovician-related research includes studies on stable carbon isotopes from organic material from Gotland (together with Thijs Vandenbroucke, Lille, and Olle Hints, Tallin), and from limestones from China (together with Zhang Yuandong from NIGPAS, Nanjing). In collaboration with Brad Cramer (Geol. Survey, Kansas), Dave Boon (BGS), Carlos Aiken (Univ. of Texas) and Dave Schofield (BGS) I am working on the Digital Integrated Stratigraphy Project (DISP). The aim of this project is to produce precise 3-D digital renderings of stratigraphically important Silurian outcrops using Terrestrial Laser Scanning (TLS) LiDAR, Real-Time Kinematic (RTK) GPS, overlain digital photography, and GIS software.

Axel Munnecke

GeoZentrum Nordbayern, Fachgruppe Paläoumwelt,

Loewenichstrasse 28, 91054 Erlangen

Germany

Telephone number: 0049 (0)9131 8526957

Fax number: 0049 (0)9131 8522690

E-mail address: axel.munnecke@gzn.uni-erlangen.de

Elise NARDIN (France) is working on faunal dynamics and the interactions between the geosphere and biosphere during the early-middle Paleozoic and the Cretaceous. The diversification dynamics research focuses on processes of blastozoan diversification. The first approach is 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. Secondly is the question of the impact of the paleogeography and environmental factors on the diversity dynamics of Palaeozoic fauna (in collaboration with B. Lefebvre (Univ.-Lyon, France), M. Aretz (Univ.-Toulouse, France), J. Bohatý (Univ.-Cologne, Germany)). I am also modeling the influence of geodynamic events on Paleozoic diversification, paleoclimate and paleobioproductivity. I am also concerned with boundary conditions and processes at the onset of anoxic events (collaboration with G. Dera and Y. Godd ris (Univ.-Toulouse, France), Y. Donnadi u (LSCE, France), E. Puc at (Univ. Dijon, France), and G. Le Hir (IGCP, France)), and their impact on marine life.

Elise Nardin

UMR CNRS Geosciences Environment Toulouse

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

Godfrey NOWLAN (Canada) was involved for almost all of 2011 in a management position within GSC. I continue to work on conodonts and complete reports on Cambrian - Silurian biostratigraphy, paleoecology, paleogeography and thermal maturity for samples submitted from projects taking place across Canada. I am also working on aspects of the Ordovician - Silurian boundary in cratonic settings in North America with Bob Elias and students (University of Manitoba) and Graham Young (Manitoba Museum).

Godfrey Nowlan
Geological Survey of Canada
3303 - 33rd Street NW
Calgary, Alberta, Canada T2L 2A7
Phone: +1-403-292-7079
Fax: +1-403-292-7049
E-Mail: gnowlan@NRCan.gc.ca

Gladys ORTEGA (Argentina) continues working with taxonomy and biostratigraphy of Tremadocian graptolites from sierra de Zenta, Eastern Cordillera, and Darriwilian faunas from sierra de Lina, western Puna, in northwestern Argentina, and Ordovician (Floian to Katian) graptolites from Precordillera of San Juan, western Argentina. Moreover, I am progressing a manuscript about machaeridians of Darriwilian and Sandbian age from the Precordillera with G. Albanesi and F. Zeballo (to be submitted to *Geological Journal*). I am supervising the scholarship programs of M.E. Giuliano, F. Serra, and N. Feltes.

I participated with G. Albanesi as guest editor of a special volume of *Geological Journal* entitled 'Lower Palaeozoic fossils, biostratigraphy and events from western Gondwana'. I am also 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.

Gladys Ortega
Museo de Paleontología, Universidad Nacional de Córdoba, CC 1598
Argentina
Tel: 0054-351-4694703
E-mail: gcortega@arnet.com.ar

Alan OWEN (UK) is continuing his investigations of the Great Ordovician Biodiversification Event in general and of deep water faunas in particular. The description and analysis of the deep water trilobites of the Upper Ordovician Pyle

Mountain Argillite in Maine with David Bruton (Oslo) is at last in press (in *Geological Magazine*). Papers on the fine scale crystallography and chemistry of trilobite eyes with Martin Lee (Glasgow) and former research student Clare Torney are in various stages of preparation and there is collaboration with Thijs Vandenbroucke and Carys Bennett (Lille) 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 an abnormal encrinurid trilobite specimen from the Upper Ordovician of South Wales is still in progress with Patrick McDermott (St Clears, South Wales). A study with Howard Armstrong (Durham) and Geoff Tanner (Glasgow) of the Rare Earth Element geochemistry of Ordovician cherts from the Scottish Highland Border Complex is nearing completion after many years of quiescence.

Alan W. Owen

School of Geographical & Earth Sciences
University of Glasgow
Gregory Building
Lilybank Gardens
Glasgow G12 8QQ, Scotland U.K.
Tel: +44 (0)141-330-5461
Fax: +44 (0)141-330-4817
E-mail address: Alan.Owen@glasgow.ac.uk

Florentin PARIS (France) is retired for more than one year but he continues his investigations on Ordovician chitinozoans from North Africa and Middle East (a manuscript is completed on Late Ordovician Chitinozoans from Saudi Arabia).

Florentin Paris

4 Rue des Jonquilles, 35235 Thorigné-Fouillard, France
(33) (0)2 99 62 07 66
florentin.paris@orange.fr

Helje PÄRNASTE (Estonia) is actively working on comparison of the Ordovician trilobite faunas of the eastern and western sides (in modern sense) of the Baltic Sea together with Jan Bergström (Stockholm). My student Adrian Popp has successfully defended his PhD thesis on the Ordovician proetid trilobites from Baltoscandia and Germany, and we continue with some Upper Ordovician genera in co-operation with Robert Owens (Cardiff).

Helje Pärnaste

Institute of Geology at Tallinn University of Technology
Ehitajate tee 5
19086 Tallinn, Estonia
e-Mail: helje@gi.ee
<http://www.gi.ee/~helje/>
tel.: + 372 6203019
fax: + 372 6203011

Ian PERCIVAL (Australia) continues research on Ordovician conodonts and brachiopods of eastern Gondwana and biogeographically associated regions. I contributed to a paper by Balthasar et al. that pushed back evidence for the earliest known preservation of aragonite in brachiopod shells (trimerellides) by about 150 million years into the Late Ordovician. Together with colleagues from the NSW Geological Survey, I published a review of all Cambrian and Ordovician stratigraphic units throughout the state, and coauthored a paper reassessing Ordovician stratigraphy in the Wellington region of central NSW (with description of a new genus of tritoechid brachiopod). During 2011 I continued collaboration with Yong Yi Zhen (Australian Museum) on Ordovician conodont biostratigraphy of China, and (with Yong Yi, Roger Cooper and John Simes) described Darriwilian brachiopods and conodonts from the Maruia area in the South Island of New Zealand (for the recent *AAP Memoir on Cambro-Ordovician Studies IV*) – further study of this fauna is ongoing. A paper was published online (print version later this year) in *Palaeogeography, Palaeoclimatology, Palaeoecology* documenting the diverse deepwater biota preserved in Ordovician cherts of the Lachlan Orogen in central and southern NSW. Current work involves finalising several systematic studies on Ordovician brachiopods from NSW that have for various reasons remained uncompleted for far too long. A project has recently commenced, involving Vic Semeniuk, Barry Webby and myself, to undertake a detailed and hopefully definitive analysis of facies and palaeoenvironments in Upper Ordovician limestones of central western NSW. Also underway is a study of the geochemistry of Ordovician cherts in the Lachlan Orogen, which may help resolve competing tectonic models for the evolution of this region. Research continues with Yong Yi Zhen on Ordovician conodont biostratigraphy in eastern Australia, and with Petr Kraft on several Ordovician graptolite faunas from NSW.

Ian Percival

Geological Survey of NSW
WB Clarke Geoscience Centre
947-953 Londonderry Rd,
Londonderry. NSW Australia 2753
tel. +612 4777 0315
e-mail: ian.percival@industry.nsw.gov.au

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

José Manuel Piçarra d'Almeida

LNEG - LGM (Laboratório Nacional de Energia e Geologia – Laboratório de Geologia e Minas). Unidade de Geologia e Cartografia Geológica
Ap. 104 , 7801-902 Beja Codex , Portugal
tel.: 351 284311314; fax:351 284325974
e.mail: jose.picarra@lneg.pt

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

Leonid E. Popov

Department of Geology, National Museum of Wales,
Cathays Park, Cardiff CF10 3NP, United Kingdom.
Telephone number: +44(0)2920573158
E-mail address: leonid.popov@museumwales.ac.uk

Brian R. Pratt

Department of Geological Sciences
University of Saskatchewan
114 Science Place
Saskatoon, Saskatchewan S7N 5E2. Canada
brian.pratt@usask.ca

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. I collaborated on several of the chapters in the forthcoming AAPG Special Volume on the 'Great American Carbonate Bank.' This volume is [finally] in press and may appear during 2012 (containing approximately 50 papers concerning Ordovician topics).

John E. Repetski

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

RONG Jiayu (China), together with Huang Bing, Zhan Renbin and David Harper, has spent more than 8 years collecting and studying a brachiopod fauna of upper Hirnantian-lower Rhuddanian age (mainly *Akidograptus ascensus* Biozone), immediately following the *Hirnantia* fauna in Zhejiang and Jiangxi provinces, China. Unusually for rocks of this age, the fauna is of high diversity, consisting of 37 genera altogether. The manuscript was submitted to the *Special Papers in Palaeontology* series late in 2011, and is currently being revised after peer review.

Rong Jiayu

Nanjing Institute of Geology and Palaeontology
39 East Beijing Road, Nanjing 210008

China
Tel/fax: 0086-25-83282169
E-mail: jyrong@nigpas.ac.cn

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, José Piçara and Nuno Vaz. My work is also focused in the Ordovician Geological Heritage of Portugal (Arouca 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 two Ph.D. students in Middle and Upper Ordovician trilobites of Portugal. I am still working as Scientific Coordinator of the Arouca Geopark (EGN/GGN) and this year I’m responsible for the 11th European Geoparks Conference that will be held in Arouca from 19th to 21st September.

Artur Abreu Sá
Departamento de Geologia
Universidade de Trás-os-Montes e Alto Douro
Ap. 1013, 5001-801 Vila Real. Portugal
Phone: (+351) 259350218
Fax: (+351) 259350480
E-mail: asa@utad.pt

Matthew SALTZMAN (USA) is working with Steve Leslie at James Madison University on the chemostratigraphy of the Ordovician in the Appalachian Basin. We remain focused on the continuity of deposition through the "Sauk-Tippecanoe" and "Knox Unconformity" intervals as estimated from different techniques including conodonts and carbon or strontium isotopes. Several notable carbon isotope trends have been discovered, but correlations of minima and maxima in the curves between sections require further calibration with the conodonts.

I am also working on a collaborative project with Steve Westrop (University of Oklahoma), Lisa Amati (SUNY Potsdam), and Carlton Brett (University of Cincinnati) to understand carbon cycling and faunal changes in response to the Taconic orogeny.

Future work is also planned to understand the transition from latest Cambrian to Early Ordovician "biomere" extinctions to the GOBE, and collaborations are in development with Steve Westrop and Jonathan Adrain, as well as Ben Gill and Lee Kump. Former student Seth Young, current student Cole Edwards and others at Ohio State are involved in these projects as well.

More generally, a chapter on carbon isotopes to be published in 2012 for the new version of the Geologic Time Scale will include an Ordovician C-isotope curve 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. Continued work on the development of the Ordovician $\delta^{13}\text{C}$ reference standard is ongoing.

Matthew R. Saltzman
School of Earth Sciences
125 South Oval Mall
Ohio State University
Columbus OH 43210-1398. USA
phone: 614-292-0481
email: saltzman.11@osu.edu

Vic SEMENIUK (Australia), with Ian Percival and Barry Webby, is working on stratigraphy, palaeo-environmental reconstructions, and palaeoecology of Ordovician limestones of central western New South Wales.

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

Thomas SERVAIS (France) is research director of the CNRS at Lille1 University, where he is currently the head of the 'Geosystèmes' CNRS department. His Ordovician research is focused on collaboration with Li Jun and Yan Kui (Nanjing) on the Ordovician of the Yangtze Platform, but concerns also the regional geology of western Europe (Belgium, France, Germany). From late 2012, a PhD project will be focused on the palynology of the Lagerstätten covering the Cambrian-Ordovician radiation. Thomas is currently President of the International Federation of Palynological Societies (IFPS: 2008-2012) and a Vice-President of the International Paleontological Association (IPA: 2010-2014).

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

Paul SMITH (U.K.). Research is currently focussed on the Early to Middle Ordovician of the Newfoundland-Scotland-Greenland sector of the Laurentian margin, in particular the sequence stratigraphy, conodont biostratigraphy and development of the continental margin. Please note my new address (having moved from Birmingham to Oxford).

Paul Smith
Oxford University Museum of Natural History
Parks Road

Oxford OX1 3PW. UK
E: paul.smith@oum.ox.ac.uk
T: +44 (0)1865 272956

Thomas J. SUTTNER (Austria) is working on Late Ordovician microfossils (Palaeoscolecids, conodonts and tentaculitids) of the neritic sequence of Spiti (NW Himalaya, India). Together with Erika Kido a manuscript on the Late Ordovician corals from Spiti is in progress. Another joint manuscript on graptolites from that area is in preparation with Petr Kraft.

In June 2012, a completely different topic will be a matter of concern: Magnetic Susceptibility! Thomas, together with Erika Kido, Anne-Christine da Silva (Leader of IGCP 580), Carlo Corradini and Werner Piller, will host the 4th Annual Meeting of IGCP 580 in Graz.

Thomas J. Suttner

Commission for the Palaeontological and Stratigraphical Research of Austria c/o University of Graz, Institute for Earth Sciences (Geology and Paleontology), Heinrichstrasse 26, A-8010 Graz, Austria
Telephone number: ++43 (0)316 380 8735
Fax number: ++43 (0)316 380 9871
E-mail address: thomas.suttner@uni-graz.at

John TAYLOR (USA) still divides his time evenly between Upper Cambrian and Lower Ordovician trilobite faunas from various areas of Laurentian North America. Long-standing projects on Ordovician faunas in the Beekmantown Group in the Appalachians, the El Paso Group in the southwestern USA (New Mexico and west Texas), and age-equivalent faunas from more interior sites of the "Great American Carbonate Bank" (GACB), such as central Texas, Colorado, and Minnesota continue to progress. Newer projects on faunas from the Great Basin (Utah and Nevada) and, most recently, eastern Alaska are moving rapidly up the queue as syntheses of the earlier projects are emerging in print. As senior author of the Biostratigraphy and Chronostratigraphy summary chapter, and second author on the Central Appalachians chapter, of the GACB volume (Derby et al., in press), John is looking forward to the release of that publication as a Memoir of the American Association of Petroleum Geologists later this year. A paper published this past year with James D. Loch is the first of many that will be required to resolve numerous new species (and genera) currently housed within the overly broad Lower Ordovician genus *Symphysurina*. Work is underway to provide similar refinements in the taxonomy and biostratigraphic utility of associated hystricurid and asaphid (e.g. *Bellefontia*) genera and species. All projects also involve scrutiny of the sedimentary facies that yield the trilobites, extraction of associated conodont faunas, and collection of samples for Carbon isotopic analysis by long-time collaborators (Paul Myrow, John Repetski, and Rob Ripperdan, respectively). Several manuscripts are in preparation describing changes in faunas, lithofacies, and carbonate Carbon isotopic composition across the bases of the Stairsian and Tulean Stages in multiple sedimentary basins.

John F. Taylor
Geoscience Department
Indiana University of Pennsylvania
Indiana, PA 15705
(724) 357-4469
FAX: (724) 357-6208
jftaylor@iup.edu

Oive TINN (Estonia) is working on Ordovician ostracodes (and other microfauna) and Lower Palaeozoic algae.

Oive Tinn
Department of Geology, University of Tartu,
Estonia, Tartu, 50411, Ravila 14a
oive.tinn@ut.ee

Tatiana TOLMACHEVA (Russia) continues to work on conodont collections from Kazakhstan, the central part of the East European Platform (the Moscow Syncline) and the Ural Mountains. A paper on Middle Ordovician conodonts from the Polar Ural was published in 2011 and two others on South Ural conodonts are submitted. The study of a new collection of conodonts from the Ordovician of the Novosibirsk islands is in progress.

Tatiana Tolmacheva
Stratigraphy and Paleontology Department
A.P. Karpinsky Russian Geological Research Institute,
Sredny pr. 74, 199106 Saint Petersburg, Russia
Telephone number: 8 (812) 328 92 10
E-mail address: tatiana_tolmacheva@vsegei.ru

Thijs VANDENBROUCKE (France) integrated the “Géosystèmes” research group of the University of Lille1 (France) as *Chargé de Recherche* of the French CNRS (www.cnrs.fr) in October 2009. His current research projects continue to test the potential of several methods for ground-truthing Ordovician climate models and hypotheses. The main focus stays on using the palaeobiogeography of planktonic chitinozoans and graptolites to ground-truth Early-Mid Ordovician climate model (GCM) predictions of ocean state, in collaboration with Howard Armstrong (Durham University), Mark Williams and Jan Zalasiewicz (University of Leicester), Koen Sabbe (Ghent University), and many others. Currently, we are collecting chitinozoan data from the historical type areas of the Arenig and Llanvirn in the UK, to complete our databases. Carys Bennett integrated the Lille1 research group as a postdoc working on stable oxygen isotopes of the pristine calcitic eyes of epipelagic trilobites (such as *Carolinites*) to reconstruct Sea Surface Temperatures.

A new line of research is developing with Jean Vannier and Bertrand Lefebvre of the University of Lyon, revolving around an ANR-research grant entitled “The Rise

of Animal Life (Cambrian-Ordovician) - organization and tempo: evidence from exceptionally preserved biotas". A first field campaign targets the southern Moroccan Zagora area (early 2012). Thomas Servais (Lille1) and myself will soon (early-mid 2012) be advertising a fully funded palynology PhD-project linked to this research program.

This is also 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 on one of our meetings during the next 4 years (see announcement of the 2012 Cincinnati meeting elsewhere in this newsletter).

Thijs Vandenbroucke

Université Lille 1 - Sciences et Technologies
UMR 8217 du CNRS: Géosystèmes
Avenue Paul Langevin- bâtiment SN5
59655 Villeneuve d'Ascq cedex. France
(T) + 33 (0)3 20 43 69 00
(E) Thijs.Vandenbroucke@univ-lille1.fr

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

Olev Vinn

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

Viive VIIRA (Estonia) continues work on Ordovician conodonts from Estonia.

Viive Viira

Institute of Geology
Tallinn Technical University
Ehitajate tee 5
19086 Tallinn, Estonia
tel. 372 6203035
e-mail viira@gi.ee

Gustavo VOLDMAN (Argentina) initiated 2012 as Research Assistant of CONICET, committed to elucidate the paleothermometric evolution of the Ordovician

basins of Northwestern Argentina on the basis of biostratigraphic and thermal alteration studies of conodonts. Detailed studies of lower Palaeozoic faunas are being developed together with Fernando Zeballo, Gladys Ortega and Guillermo Albanesi. After a fruitful postdoctoral visit to Chris Barnes in 2010 at UVic for conodont research, intriguing cosmic particles were also studied. A paper on Cosmic Microspherules from the Ordovician of Argentina is in press in *Geological Journal*. Gustavo is actively involved in the organization of the 3rd International Conodont Symposium to be held in Mendoza in July 2013.

Gustavo G. Volman

CICTERRA. Av. Vélez Sarsfield 1611.
X5016GCA – Córdoba, Argentina.
Telephone number: +5493515 095313
E-mail address: gvoldman@efn.uncor.edu

WANG Wenhui (China) continues working on lower Ordovician graptolite and chitinozoan faunas from the Jiangnan Slope, South China. Cross correlated acritarch-chitinozoan-graptolite biozonation in the Tremadocian for this area has been carried out, and will be an important part of my Ph.D. thesis this year. At the beginning of 2012, I'm working on the diversity curves of graptolites, chitinozoans and acritarchs from the Jiangnan Slope, and trying to work out the relationships among them in cooperation with Thijs Vandenbroucke, Marco Vecoli and other colleagues. Research will be conducted from July this year involving a review of the previously established graptolite genera and faunal sequences from the Tarim Plate, China. A stratigraphic correlation of graptolite-bearing beds between Tarim and South China will be established.

Wang Wenhui

School of Geosciences and engineering
Nanjing University
No.22 Hankou Road, Nanjing
P.R. China
Tel: +86 13951830656
Email: wwhever@126.com

Barry D. WEBBY (Australia). We are now into the second year of more rapid progress updating all the sections of the *Treatise on Invertebrate Paleontology*, Part E, Revised volume 4 (Hypercalcified Porifera). This initially involves getting the sections published online in chapters of the *Treatise Online*; this latter project was launched by Paul Selden and Jill Hardesty of the Paleontological Institute in Lawrence, Kansas in October 2010, to get more rapid editorial processing of the contributions by *Treatise* authors. Our group has benefitted considerably as there was a backlog of manuscripts that are now moving quickly into print, and hopefully this will ultimately benefit the palaeontology community by allowing workers to get more easy access to the material that in the past has often been inaccessible for a great many years. As coordinating author of the *Treatise on Invertebrate Paleontology*, Part E, Revised volume 4 (Hypercalcified Porifera) I am having a continuing role in the

processing of chapters on a wide range of topics including the Cambrian archaeocyaths by Pierre Kruse, Francoise Debrenne & Yu Zhuravlev—their initial chapter on the Introduction to archaeocyaths is due to be uploaded to the Treatise Online in early 2012, and virtually all the introductory chapters on the Palaeozoic stromatoporoid—sections, contributed by Colin Stearn, Heldur Nestor, Carl Stock, Steve Kershaw and myself—are now in print or are very close to being uploaded to the *Treatise Online*. Additionally, a chapter on the sphinctozoans and inozoans by Baba Senowbari & J Keith Rigby was published recently, as well as three chapters on the chaetetid sponges by Ron West, and another chapter on the Mesozoic stromatoporoid-type sponges by Rachel Wood. Previously, as I mentioned in last year's report Jean Vacelet & others published a chapter on the living hypercalcified sponges (a small group of living fossils), and additionally I coordinated work on a glossary of terms for all the Treatise taxa—fossil and living hypercalcified sponges. At this stage (early February 2012), 23 of a total of 35 chapters have been published, and there are 12 other chapters in final stages of editing, due to be published very shortly. It is at last possible to confidentially suggest that all online chapters will be in print by the end of 2012, and then, during 2013, it is likely that finally the main, fully integrated, “hard copy” Treatise volume will be published.

In addition, a joint paper on the Ordovician and Silurian biogeography of stromatoporoids with Heldur Nestor remains in press as part of the final IGCP 503 volume on the Lower Palaeozoic palaeobiogeography; hopefully it will be published later this year in the Memoir series of the Geological Society of London. My other current work remains mainly curatorial, involving cataloguing and transferring an extensive Ordovician collection to the two main long-term fossil repositories in the Sydney region (the Australian Museum, and Londonderry laboratory and storage facility of the Geological Survey of New South Wales). Thin-sectioning and preliminary descriptions of a small collection of Ordovician sphinctozoans and other sponges, collected originally by Leonid Popov from Kazakhstan, is continuing with the help of Leonid, Ian Percival, Zhen Yong Yi and others; and I have another small project underway with Vic Semeniuk, examining the diagenetic features and other alteration products of Ordovician labechiid stromatoporoids.

Barry D. Webby

Department of Earth & Planetary Sciences,
Macquarie University,

North Ryde, NSW 2109, Australia

Tel. +61-2-9816-4020

E-mail: bwebby25@gmail.com

Home address: 77 Woolwich Road, Hunters Hill, N.S.W., 2110, Australia

Rongchang WU (China) has been a research assistant in the Nanjing Institute of Geology & Palaeontology, CAS since he obtained his Ph.D. in June 2011. He continues to study Ordovician and Silurian conodonts and their evolution.

Rongchang Wu

Nanjing Institute of Geology and Palaeontology

Chinese Academy of Sciences

39 East Beijing Road

Nanjing 210008, CHINA

Telephone number: +86-25-83282235
E-mail: rcwu@nigpas.ac.cn, wu.rongchang@gmail.com

Graham YOUNG (Canada) is working on Palaeozoic palaeoecology and on the diversity of Ordovician Cnidaria. I am collaborating with Bob Elias, Dave Rudkin, and others to study palaeoenvironments and biotas in the Ordovician rocks of central and northern Manitoba. Graduate students Lori Stewart and Matt Demski, and undergraduate Kathryn Lapenskie (all co-supervised with Bob Elias at the University of Manitoba) are studying palaeoenvironmental change in the Late Ordovician and the Ordovician – Silurian boundary interval. These studies integrate isotopic data with litho- and biostratigraphy. Sean Robson (Manitoba Museum) and I have recently completed revisions to a manuscript describing several conulariid taxa from two sites in Manitoba. Dave Rudkin (Royal Ontario Museum), Michael Cuggy (University of Saskatchewan), and I have submitted the description of the only known Ordovician pycnogonid, which is from the William Lake site in central Manitoba. Dave and I are also co-editing a series of papers in *Geoscience Canada* entitled *Great Canadian Lagerstätten*; this will include general reviews of Ordovician sites.

Graham Young
The Manitoba Museum
190 Rupert Avenue
Winnipeg, MB, Canada R3B 0N2
Phone: 1-204-988-0648
Fax: 1-204-9420-3679
E-mail: gyoung@manitobamuseum.ca

YAN Kui (China) continues research on Ordovician acritarchs. I am still working on the systematics of *Barakella*. I also study the acritarch biostratigraphy in South China and I hope to do some work on the relationship between geochemistry and acritarch assemblages. In May 2011, I attended the 11th International Symposium on the Ordovician System in Alcalá de Henares (Madrid), and visited Ordovician rocks in Portugal and Spain.

Yan Kui
Nanjing Institute of Geology and Palaeontology Academia Sinica
39 East Beijing Road, Nanjing. CHINA
Tel: 86-25-83375214
E-mail: 1) Yankuiboy@hotmail.com 2) Yankuiboy@gmail.com

Jan ZALASIEWICZ (U.K.) reports that the Barrie Rickards volume in the *Proceedings of the Yorkshire Geological Society*, edited by Snelling, Bates and Zalasiewicz, was recently published as a tribute to the eminent graptolite researcher who died in 2009. It includes several papers on Ordovician graptolites by Fortey, Goldman et al., Howe, Loxton et al., Maletz, Melchin et al., Rushton, and Sadler et al. (the whole lot can be accessed via <http://pygs.lyellcollection.org/content/current>).

Jan has been working with the team led by Thijs Vandenbroucke studying the palaeoclimate of the Late Ordovician; several papers have appeared and another has been written for the forthcoming *Geological Society of London Special Publication* (edited by Harper & Servais) on Early Palaeozoic Paleobiogeography and Paleogeography. Jan also contributed to two recent papers on Late Ordovician ostracodes by Mohibullah et al., another on the Soom Shale (Gabbott et al.), and yet another on a nicely-preserved arthropod from the Late Ordovician of Wales (Page et al.). Two works in press, expected out this year, include a book on palaeoclimate (Zalasiewicz & Williams), and a paper on a strange (no other word for it) Late Ordovician graptolite (Zalasiewicz et al.).

Jan Zalasiewicz

Department of Geology,
University of Leicester,
University Road, Leicester, LE1 7RH, UK
jaz1@le.ac.uk

ZHAN Renbin (China) is mainly working on the Great Ordovician Biodiversification Event in South China under a research project from the National Natural Science Foundation of China. Having been working in the central area of the Upper Yangtze platform, South China palaeoplate for about 10 years, we are now moving our major interest to those marginal areas of the platform where very unique Ordovician lithofacies and biofacies have developed, and not much work has been finished on the Ordovician marine red beds in this particular region. We hope some new breakthroughs can be achieved on the coevolution between organisms and the changing environments with the finishing of this project.

Zhan Renbin

State Key Laboratory of Palaeobiology and Stratigraphy
Nanjing Institute of Geology and Palaeontology
Chinese Academy of Sciences
39 East Beijing Road
Nanjing 210008. P.R. CHINA
Tel./Fax: 0086-25-83282132
E-mail: rbzhan@nigpas.ac.cn; zhanrenbin002@yahoo.com.cn

Yuandong ZHANG (China) is 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 of Germany). (2) a systematic description of the graptolites from the Ningkuo and Hulo Formations (Ordovician) in SE China, which will be a monograph with many 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, where the black shale of this interval has been highly potential hydrocarbon source rocks. This work has been financially supported by the Ministry of Science and Technology of China (project entitled “Palaeogeographic reconstruction of some critical intervals of 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).

Yuandong Zhang

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

Yong Yi ZHEN (Australia) during 2011 has been mainly working on (1) Middle-Late Ordovician conodonts from the Dawangou section of the Tarim Basin, northwestern China, (2) an Early Ordovician conodont fauna from subsurface core material of the Arafura Sea, off Northern Australia and (3) a Darriwilian conodont fauna from the Maruia area of New Zealand. In November-December, 2011, I participated in a field trip in western Yunnan, southwest China with colleagues from the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences. Currently I am working with John Laurie, Robert Nicoll and Barry Cooper on the conodonts from the Horn Valley Siltstone of the Amadeus Basin, and with Ian Percival, Roger Cooper and John Simes on the latest Cambrian and earliest Ordovician conodonts and other micro-faunas from the Maruia area of New Zealand. Study of Late Ordovician conodonts from Queensland (Fork Lagoons Beds and the Carriers Well Limestone), jointly with Andrew Simpson, Ruth Mawson, John Talent, Barry Webby and Ian Percival, is also well under way.

Yong Yi Zhen

The Australian Museum
6 College St. Sydney, NSW 2010, Australia
Telephone: 61 2 93206132
Fax: 61 2 93206464
e-mail: yongyi.zhen@austmus.gov.au

ZHOU Zhiyi (China) continues his work on the Ordovician trilobite biofacies of the Yangtze Block and on the Darriwilian–early Katian trilobite faunas of northwestern Tarim, Xinjiang, including those from the Saergan, Kanling and Qilang formations in the Kalpin area and from the Yijianfang, Tumuxiuke and Lianglitag formations in the Bachu area.

Zhiyi Zhou

Nanjing Institute of Geology and Palaeontology
Chinese Academy of Sciences
39 East Beijing Road

Nanjing 210008. China
Tel.: +86-25-83282187
Fax: +86-25-83357026
E-mail: zyizhou@jlonline.com

RECENTLY PUBLISHED ORDOVICIAN (and related) RESEARCH

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