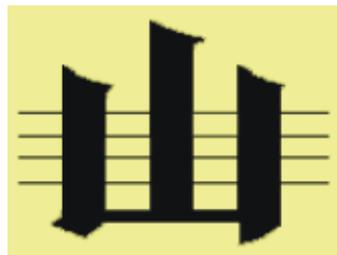


ORDOVICIAN NEWS

SUBCOMMISSION ON ORDOVICIAN STRATIGRAPHY
INTERNATIONAL COMMISSION ON STRATIGRAPHY

Number 26 (2009)

Edited by Ian G. Percival



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Cover photo (submitted by Juan Carlos Gutiérrez-Marco):
Participants on the field excursion to the Russian Altai,
30th June–11th July, 2008 – for full report see page 20 of this issue.

ORDOVICIAN NEWS NUMBER 26 (2009)

CHAIRMAN'S MESSAGE

Dear Colleagues,

It was a great personal privilege to assume the role of Chair of the International Subcommission on Ordovician Stratigraphy during the 33rd International Geological Congress in Oslo. In the last decade the Subcommission has achieved a huge amount through the dedicated work of particularly the last two chairmen, Stan Finney and Chen Xu, and its many active titular and corresponding members. All our international stages are in place and their definition and correlation have been reviewed by Bergstrom et al. (2009: *Lethaia*). Now, however, it is extremely important that we begin to develop new aspirations and new targets. The Subcommission has never tried to direct research nor should it. Nevertheless we can help our researchers by providing a strong infrastructure and today this involves more than just an accurate chronostratigraphy for the system and its divisions. The first phase of the Commissions' work has provided an enviable and robust international chronostratigraphic scheme at the stage level. This framework together with some of the intensive work on the boundary levels within the system and those with the adjacent Cambrian and Silurian systems has helped generate much new data for major research programmes such as the Great Ordovician Biodiversification Event (GOBE) and the end-Ordovician extinction events. Over the last few months I have been able to discuss the future of our Subcommission with many colleagues. It is clear that to maintain the influence and usefulness of the Subcommission we will have to develop some new areas of infrastructure and some new products. There are number of areas that the Subcommission can develop with the help of yourselves.

There may be a requirement soon to evaluate the efficacy and utility of our stages and stage boundaries. Nevertheless the Subcommission can now move with some confidence towards confirming and establishing finer divisions of Ordovician time. In this respect Bergström et al. (2009: *Lethaia*) have divided our international stages into stage slices based mainly on existing biozones. Finer time slices were also proposed by Webby (2004: *The Great Ordovician Biodiversification Event*, Columbia University Press) and used effectively in developing data for the GOBE. As these time divisions are more widely adopted, it would be useful to confirm their definition and status.

Over the last few years we have neglected somewhat the role of the regional groups and the many important regional and diverse stratigraphies that make our system so exciting. A number of the key regional successions were included in the correlation charts provided by Bergström et al. (2009), but there are more that require calibration with our new stages. Moreover a few regions such as Baltoscandia and SE Asia were never formally published. This is a priority for our system and work that can involve everyone.

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. A more difficult area is sea-level or water-depth curves for the period. There

have been a number of curves proposed for the Ordovician and many more for particular parts of the period. It would be useful to examine these curves and the criteria upon which they are based more carefully as a step towards developing more standardised curves for the Ordovician.

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 involved in the reconstruction of past geography to develop a more standard set of base maps for the period. 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 process occurring during the period.

Finally 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 largest oil exploration company in China) to support research into Ordovician biostratigraphy.

I am delighted to report that the system's website will remain in Nanjing (<http://www.ordovician.cn/>), directed by Fan Junxuan and I hope in the coming months that it will continue to expand as a focal point for our discussions and proposals.

In late August and early September we are holding the absolutely final meeting of our very successful partner IGCP project 503, Early Palaeozoic biogeography and palaeogeography, in Copenhagen (see also <http://snm.ku.dk/english/IGCP503/> and <http://sarv.gi.ee/igcp503/>). This will be supported by the Subcommittee and I hope as many of you as possible can join us to discuss our future plans, participate in our programmes and enjoy the world-famous smørrebrød and Danish beer in Wonderful Copenhagen.

The high spot of our calendar is of course ISOS (International Symposium on the Ordovician System) now held once every four years. Our 11th meeting will be located in the beautiful and historic surroundings of Alcalá de Henares, a stone's throw from Madrid, from 9th-13th May 2011. Juan Carlos Gutiérrez-Marco and his team have most of the events in place including field excursions around the Iberian Peninsula and to neighbouring North Africa. Details of this congress are printed elsewhere in the 'News'.

Finally I thank all of you, particularly Ian Percival and Juan Carlos, for your important input and thank the members of the previous Subcommittee, not least our past chairman Chen Xu and past Secretary Guillermo Albanesi, for steering the System through an exciting time in its development.

With all good wishes,

Dave Harper
Chair, International Subcommittee on Ordovician Stratigraphy



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

ANNUAL REPORT 2008

1. Name of constituent body:

Subcommission on Ordovician Stratigraphy (SOS)

Submitted by:

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31st October, 2008

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

The Subcommittee promotes international cooperation on all aspects of Ordovician Stratigraphy.

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>P. acuminatus</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-Fågelsång)
		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 (Denmark)
 - 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).

The Subcommittee officers and voting members have been agreed for the next term from 2008-2011. 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).

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.

6. Chief accomplishments and products in 2008

a. The next International Symposium on the Ordovician System will take place in Spain during May, 2011. The conference itself and associated business meetings and workshops will be held in the environs of Madrid with field excursions to various parts of the Iberian Peninsula including the Iberian Chains and northern Portugal. A major post-conference excursion to Morocco will also be offered.

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 has been sought and a further meeting on 'Early Palaeozoic Palaeogeography' will be held in Copenhagen during September 2009.

The Subcommittee supported and was represented at three further major conferences: 7th Baltic Stratigraphic Conference, Tallinn, and associated field excursions, May 2008, '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; and the 33rd IGC in Oslo during August 2008.

b. The Subcommittee completed its GSSP research programme 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. A colour reprint of the Global Ordovician Chronostratigraphy (The Ordovician Time Table) chart will be distributed to colleagues in different countries if funding permits.

c. *Ordovician News No. 25* was produced and posted on the Subcommittee website and is available for download.

7. Chief problems encountered in 2008

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 although some support has been offered from Chen Xu's research project.

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 SOS business meeting. This problem will undoubtedly continue during 2009, when a workshop is planned for the Subcommittee in Copenhagen.

8. Summary of expenditure from August 2008

TOTAL INCOME (from ICS): \$ 400
Support for production of newsletter (Albanesi) \$ 500

(During the past number of years the Subcommittee has provided \$ 500 support each year to Albanesi for production costs).

TOTAL EXPENDITURE \$ 500

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

The new Subcommittee came into force only a couple of months ago during the 33rd IGC in Oslo. Plans for the Subcommittee's future work thus lack precise detail and time constraints.

- 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).
- b. Will establish a forum to assess the efficacy and utility of the newly-established international stages.
- 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.
- 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. 26* in 2009.
- e. Management of Subcommittee website will remain based in Nanjing; this will be expanded.

10. Budget and ICS component for 2009

- a. *Ordovician News No. 26* production: 500USD
- b. Management of Subcommittee website: 500USD
- c. Preparation of an Ordovician Time Table: 1000USD
- d. Support for a SOS workshop in September 2009 in Copenhagen (during the IGCP 503 'Early Palaeozoic Palaeogeography' conference): 2000 USD
- e. Support for production of revised regional correlation charts: 2500 USD

TOTAL 2008 BUDGET: 5500USD
REQUESTED FROM ICS: 2500USD

Potential funding sources outside IUGS

The IGCP Project 503, “Ordovician Palaeogeography and Palaeoclimate”, co-funded the four meetings (with related field trips) in 2007 in China with the 10th Ordovician conference. This project will provide 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.

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

The Subcommittee officers are also supported by their research projects for some of their activities.

11. Review chief accomplishments over last seven years (2001-2008)

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. 17-25 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 WOGOGO 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.

*Note that in the preceding Report, the Summary table of Ordovician subdivisions on page 7 shows the base of the Silurian as corresponding to the base of the *Parakidograptus acuminatus* Zone. The currently accepted level, recently ratified by ICS, is now the base of the succeeding *Akidograptus ascensus* Zone (Rong et al. 2008, *Episodes*).

Preliminary Announcement
11th International Symposium on the Ordovician System
Alcalá de Henares (Madrid, Spain), May 9-13, 2011

Following the decision taken in Nanjing during the last Ordovician Symposium, the next ISOS will be held in Spain in early May, 2011. Provisional dates for the working sessions are the 9-13 May (Monday to Friday), including 1 or 2 intra-symposium field trips, depending on the final number of oral presentations and lectures.

The intra-symposium field trip(s) will visit Ordovician outcrops in the Toledo Mountains and northern Sierra Morena areas (central Spain), with ichnological localities in the Armorican Quartzite (Floian), richly fossiliferous Darriwilian shales of the Tristani-beds, and Katian sandstones and limestones.

A pre-Symposium field trip (May 3-8), starting from Madrid and ending in Alcalá de Henares by the time of the meeting, is planned to visit important Ordovician localities in central and northern Portugal and in NW Spain. This includes the famous sections and fossil localities of the Serra de Bussaco, the southern flank of the Valongo anticline, the Arouca Geopark with the quarry of the giant trilobites, and the Sil river canyon.

The post-symposium field trip (May 14-19) will be to the Moroccan Anti-Atlas. It will start and end in Madrid with flights via Marrakech and then with transportation in 4WD tracks and jeeps. This trip will focus on Tremadocian to Floian fossiliferous shales, Darriwilian to Katian sandstones and shales, and Hirnantian glacial surfaces and diamictites of the Gondwana margin.

Alcalá de Henares, approximately 30 km northeast of Madrid and only 14 km from the International Airport of Madrid-Barajas, is an important cultural and industrial city that was declared a World Heritage Site by UNESCO in 1998. Its Historic Quarter is today one of the most beautiful and best Renaissance and Baroque urban ensemble preserved in Europe. Alcalá was an important city of the Three Cultures, where Christians, Jews and Muslims lived peacefully together for centuries. It has a university founded in 1499 by the Cardinal Cisneros, editor of the first polyglot Bible. Alcalá, birthplace of Cervantes, author of “El Quixote”, is the cultural tourism capital in Madrid region.

Travel to Madrid City is by train with departures every 7 minutes. The train station and the various available hotels are all within walking distance of Victoria Square, where the meeting will take place within the Historic Quarter.

The proceedings volume and the field trip guides will be published jointly by the Spanish Geological Survey and will be presented at the time of the conference.

This symposium, organized by the International Subcommittee on Ordovician Stratigraphy, is sponsored by the Spanish Council for Scientific Research (CSIC), the Spanish Geological Survey (IGME), the Portuguese Geological Survey (LNEG), the Alcalá de Henares and Arouca municipalities, and by the madrilenian Alcalá de Henares and Complutense universities. The initial executive committee is composed of Juan Carlos Gutiérrez-Marco (CSIC, Madrid), Isabel Rábano (IGME, Madrid), Artur Abreu Sá (UTAD, Vila Real), José Manuel Piçarra (LNEG, Beja), Diego García-Bellido (CSIC, Madrid), Naïma Hamoumi (UMV, Rabat), Enrique Villas (UNIZAR, Zaragoza) and Amelia Calonge (UAH, Alcalá de Henares).

The first circular with definitive dates and fees is scheduled for January 2010.

On behalf of the Organizing Committee

Juan Carlos Gutiérrez-Marco

IGCP 503 – FORTHCOMING ACTIVITIES

All related IGCP 503 information is on the website: <http://www.igcp503.org>

April 2009:

EGU2009 at Vienna, Austria, April 19-24.

The following session has been scheduled:

SSP4 – The Great Ordovician Biodiversification: causes and consequences (co-sponsored by PalAss)

Convener: T. Servais; Co-Conveners: D. Harper, H. Armstrong

Please use the following link to register and submit your abstract:

<http://meetingorganizer.copernicus.org/EGU2009/session/924>

You can also contact one of the conveners for further information.

June 2009:

Time and Life in the Silurian: a multidisciplinary approach, Sardinia, June 4-11.

The second circular and the registration form of the Subcommittee on Silurian Stratigraphy field meeting 2009 in Sardinia is now available. This meeting is open to all Silurian workers. The leaders of IGCP 503 will contact the organizers in order to sponsor a session related to our project. Additional information is available on the meeting website: www.unica.it/silurian2009

June 2009:

North American Paleontological Convention (NAPC), Cincinnati, Ohio, June 21-26. The second circular is available now. Field trips will be organized to the type-Cincinnatian (Upper Ordovician type area of North America). Several symposia concern the Ordovician and Silurian, of which one is directly related to and sponsored by IGCP 503 – Symposium S22 : The Cambrian-Ordovician radiation: the geological and biological context (convenors Thomas Servais, Peter Sheehan).

For further information, visit the conference website: <http://www.napc2009.org/>

September 2009:

Final meeting, IGCP 503, Copenhagen, Denmark, August 31-September 4.

The schedule for this, the main annual meeting of IGCP 503 in 2009, will include

1. Conference 31st August - 4th September in the Geological Museum, Copenhagen
2. Pre conference excursion to Västergötland, Sweden and the Oslo Region, Norway, 25th-31st August
3. Mid conference excursion to Stevns Klint and Faxe Quarry (and museum) 3rd September

The First Circular is now available on the IGCP 503 website: <http://www.igcp503.org> and is copied below for your information.

We look forward to seeing you at one or more of these meetings in 2009.

On behalf of the co-leaders of IGCP 503 “Ordovician Palaeogeography and Palaeoclimates”: Thomas Servais, David Harper, Li Jun, Axel Munnecke, Alan Owen and Peter Sheehan.

FIRST CIRCULAR

IGCP 503

Early Palaeozoic biogeography and palaeogeography

COPENHAGEN 2009
31st August-4th September

This is the first circular and call for papers for the absolutely final meeting of project **IGCP 503**. The meeting will be held in the Natural History Museum of Denmark (Geological Museum, Øster Voldgade 5–7, 1350 Copenhagen K) with the congress banquet in Tivoli Gardens. The focus of the meeting will be Early Palaeozoic biogeography and palaeogeography, but presentations on any aspects of Lower Palaeozoic geology are, of course, very welcome.

1. **Conference homepage:** Within the next few weeks all kinds of useful information will appear on our conference homepage. This will be updated within the coming months and prior to the conference, the programme and book of abstracts will be available on the net. Please check:
<http://snm.ku.dk/english/IGCP503>
2. **Conference E Mail address:** All final registration forms, abstracts and other communications regarding the conference should be sent to our congress E Mail address: **IGCP503@snm.ku.dk**.
3. **Registration:** Please complete the simple form attached below and return this by email, preferably as a pdf. Full registration includes a copy of the conference abstract book, congress banquet, midweek fieldtrip and the icebreaker party.
4. **Field Excursion:** A pre Congress field excursion is planned to some classic sections in Västergötland, Sweden and the Oslo Region, Norway including the margins of the Caledonian mountain belt. The group will drive from Copenhagen through Sweden to Norway and travel back to Copenhagen on the overnight ferry from Oslo.
5. **Payment:** Registration fees and costs for field excursions should be transferred directly to the following bank account:

Københavns Universitet
Danske Bank
Holmens Kanal 2-12
1092 København K.
Swift address: DABADKKK
IBAN number: DK4130004115212125

Please add: Sted No. 5290, Projekt No. 27962 and your name to the bank payment advice.

Payment should be made in Danish Crowns (DKK) or Euro (€) and **you** are asked to cover any associated bank charges.

6. **Abstracts:** The deadline for abstracts is **Friday 29th May 2009**. Abstracts must not exceed 250 words. Please use the following layout indicating at the top of the page if the presentation is a talk or poster.

POSTER

Diversity fluctuations in the Cenozoic brachiopod faunas of the greater Caribbean region

David A.T. Harper¹ and Roger W. Portell²

¹Geological Museum, University of Copenhagen, Øster Voldgade 5-7, DK-1350 Copenhagen K, Denmark <dharper@snm.ku.dk> and ²Invertebrate Paleontology Division, Florida Museum of Natural History, PO Box 117800, University of Florida, Gainesville, Florida 32611-7800, USA <portell@flmnh.ufl.edu>

A compilation of new and existing brachiopod data from the Caribbean islands of Antigua, Barbados, Carriacou, Cuba, Curacao, Dominican Republic, Haiti, Jamaica, Puerto Rico, St. Bartholomew and Trinidad together with Costa Rica, Panama, Venezuela and SE USA has established some clear biotic patterns within the Cenozoic rocks of the Caribbean basin.....

Abstracts should be sent electronically to the conference E Mail address:
IGCP503@snm.ku.dk.

7. **Publication:** During the project the clade teams have been revising the biogeography of most Early Palaeozoic fossil groups. These results will be published in 2011 as a Memoir of the Geological Society, 21 years after the much-cited McKerrow and Scotese green book. If for some reason you have not been part of the process and wish to share your data, please contact Dave Harper or Thomas Servais, who can put you in contact with the relevant clade master.
8. **Accommodation:** In our experience it is now cheaper to book your own accommodation from outside Denmark using the various internet travel agencies. We are providing a list of hotels on the congress homepage that are in reasonable proximity to the museum.
9. **Travel Grants:** A limited number of travel grants up to the value of 300 Euro will be available to help the participation of younger presenters of talks or posters with limited or no access to financial support. There is no formal application form but intending applicants should contact Jan Audun Rasmussen (janr@snm.ku.dk) for further information.

REGISTRATION

(To be sent electronically to the conference E Mail address: **IGCP503@snm.ku.dk**)

Name: TICK

I will be attending the IGCP 503 congress: Early Palaeozoic biogeography and palaeogeography

and will participate in the following events:

Pre congress field excursion: 25th August–31st August 2009 [further information from Svend Stouge: Svends@snm.ku.dk] 4000 DKK or 535 Euro

Ice-breaker party: Monday 31st August, Geological Museum Free

Midweek field excursion to Stevns Klint and Faxø Quarry: Thursday 3rd September Free

Conference banquet in Tivoli Gardens: Wednesday 2nd September 250 DKK or 35 Euro

[Please indicate if vegetarian/vegan or other]

Registration (early-bird) [Full: 1000 DKK=135 Euro; Student: 750 DKK=100 Euro]

I am bringing an accompanying member (750 DKK=100 Euro)
Name:

Total to be sent to Københavns Universitet (see above)

I wish to apply for some financial assistance [Please attach further information]

Deadline for early-bird registration with payment: 30th April 2009

Deadline for abstracts: 29th May 2009

MEMORIAL NOTICE

Edsel Daniel Brussa (1961-2008)

We would like to share this remembrance of Edsel as he would have wanted to be remembered. Although his sudden illness and his premature death on September 11, 2008 was very sad and hard to overcome for all who shared with him a piece of his life and work, those shared moments inspire us to keep ourselves going.

Edsel Daniel Brussa was born in 1961 in the province of Cordoba, Argentina. He graduated as a geologist and got his PhD in Geological Sciences in 1994 at the Universidad Nacional de Córdoba. He dedicated his life to the research and teaching of geology and paleontology.

He obtained all the categories of fellowships within CONICET (the National Research Council of Argentina). His successful career in paleontology led in 1998 to a permanent position within CONICET.

Before getting his degree in geology, Edsel devoted all his efforts to the study of graptolites. He was a pioneer in developing the knowledge on this group of fossils in Argentina in times when very little money was available for research. His enthusiasm and tenacity allowed him to make one of the largest and most valuable Ordovician and Silurian graptolite collections of the Argentinean Precordillera. He participated in numerous multidisciplinary projects, mainly led by Luis Benedetto and Teresa Sanchez, who were his mentors. His motivation and vision led him to get in contact with other graptolite workers around the world. After getting his PhD, he obtained support from CONICET to develop joint projects in the United States of America in collaboration with Chuck Mitchell and Jörg Maletz of the State University of New York at Buffalo. He also actively participated in international projects about phyllocarids and associated graptolites, developed with Patrick Racheboeuf in Lyon, France and Argentina.

His hard work is evidenced by the large amount and high quality of his scientific publications as well as by the high level of appreciation of his work from colleagues in Argentina and around the world. He was a member of the board of the Asociación Paleontológica Argentina and actively participated in the editing committee of the *Ameghiniana* (the paleontological journal of Argentina). He published more than 50 papers in highly regarded international journals, and he was a co-author in numerous books regarding paleontological and biostratigraphic aspects of the graptolites of Argentina, such as “Advances in Ordovician Geology”, “Ordovician fossils of Argentina” and “Invertebrados fósiles”. He actively participated in numerous graptolite symposia and meetings (Argentinean Geological Congresses, conferences of the Graptolite Working Group, the meetings of the International Symposium of the Ordovician System, etc.). Many colleagues will remember how happy and enthusiastic he was during the recent 2007 ISOS in China.

Teaching was another of his passions. He started teaching paleontology when he was a young student. During the course of his career he became Professor of paleontology at the Universidad Nacional de La Pampa, where he gained the respect and affection of colleagues and students.

Beyond his great contribution to the Argentinean graptolite knowledge his presence will remain among us, his colleagues and friends, because of his honesty, generosity and willingness to help everybody at any moment.

Blanca Toro

It seems to me that Edsel took great pleasure in his life and was eager to learn from the world around him. He worked at achieving his goals with a dignified grace and uncommon insight. As a result, he achieved a high level of excellence in his research and satisfaction from his life.

I have many wonderful memories of him and the work we did together – work in the field and in lab – and memories of chatting at the end of the day, but strongest is my memory of his smiling face as we met again, coming together to work on graptolites in Argentina, or in the USA, or when we took part in the ISOS meetings. Edsel was a wonderful, kind man.

Indeed, it was at the 1995 ISOS meeting in Las Vegas that I first met Edsel. I am very grateful for the work of the many friends of the Ordovician who helped to give us this opportunity. Most especially, I am very grateful for the chance I had to know and learn from Edsel. These gifts have greatly enriched my life.

Chuck Mitchell



Edsel Brussa at the pre-conference excursion of the 10th ISOS / 3rd ISSS, China, June 2007

**Report on the International Conference
“Development of Early Paleozoic biodiversity: role of biotic and abiotic factors,
and event correlation” (Moscow, Russia, 26–28 June, 2008), with a post-
conference field excursion to the Russian Altai (30 June–11 July, 2008)**

This interesting meeting was organized by the Borissiak Paleontological Institute (PIN RAS) and the Trofimuk Institute of Petroleum Geology and Geophysics (IPGG SB RAS), within the framework of IGCP Project 503, the scientific research programs numbers 11 and 18 of the Presidium of the Russian Academy of Sciences, and also in collaboration with the International Ordovician and Silurian subcommissions of the ICS-IUGS.

The three-day scientific programme, held in the Paleontological Institute of the Russian Academy of Sciences, was attended by more than 30 participants from about 10 countries, who presented forty communications on the stratigraphy and palaeontology of the Early Palaeozoic. The participants discussed the environmental changes in climate, sea level, volcanism, plate movements, terrestrial influences on biodiversity trends in the Ordovician and Early Silurian, evolutionary palaeoecology of the Palaeozoic, correlation of the international and regional stratigraphic scales, and new data on various fossil groups from Siberia, Baltica, Laurentia and Gondwanan. An abstract volume of 126 pages was edited by KMK Scientific Press, Moscow (ISBN 978-5-87317-477-5). The conference volume with selected contributions is being published as a Supplement of the *Paleontological Journal* and will be issued in 2009. The results of the conference will be useful to geologists and biologists interested in the evolution of biodiversity and the influence of geological and climatic factors during the Early Palaeozoic.

The social programme of the meeting included a guided tour of the impressive Paleontological Museum with its huge collection of famous vertebrate fossils of all ages and an excellent excursion to the Moscow Kremlin (plus the Armoury Chamber and Diamond Fund) on June 28th. Accommodation was arranged in the vicinity of the Institute (“Academicheskaja” hotel).

The meeting was followed by the OSSA-2008 post-conference field excursion, which started and ended in Novosibirsk and was attended by 25 people from eight countries. During 13 days, we visited diverse Ordovician-Silurian key sections in the Gorny Altai area, belonging to the western part of the Altai-Sayan Fold Belt of the Siberian palaeocontinent. The subjects emphasized during the field trip were the sedimentary basins and environments, bio- and sedimentary events, palaeogeographic and palaeoclimatic reconstructions, Siberian regional stages (= horizons, in Russian terminology) and the problem of their correlation. The fossil localities examined in situ have yielded mainly graptolites, trilobites, brachiopods, corals and bryozoans. The studied sections belong to several palaeogeographic sub-basins representative of diverse Ordovician and Silurian near-shore, inner shelf, inner slope of the carbonate platform, central part and outer slope of the carbonate platform, deep-water shelf and continental slope environments. A fully-illustrated guidebook of 156 pages, edited by N.V. Sennikov and A.V. Kanygin, was produced by the Publishing House of the Siberian Branch of the Russian Academy of Sciences (ISBN 978-5-7692-1003-7). This is an extremely useful book that provides a thorough and valuable summary of the Early Palaeozoic geology of the Altai-Salair Basin, especially for non-Russian speaking scientists.

The organizers deserve special commendation for successfully arranging the very complex logistics required for such a long field trip, which included

transportation in 4WD tracks and jeeps, field meals and the installation of four camps with distances between them of about 250-650 km. Excursion costs, other than guide book and transportation, included complete provision of food, beverages (vodka a gogo during dinners!) and all types of unexpected facilities when traversing wide empty areas of impressive mountainous or desert landscapes (accommodation in tents, bathing in cold rivers, improvised warm sauna for ladies). The weather conditions were optimal during the trip (occasional rain was restricted to a single day), which evolved in a scientific and friendly way and included much celebration and singing around the bonfire every night.

A cultural programme developed for the trip included visits to archaeological monuments such as the Scythians burial mounds (IV-III centuries B.C.) and the Denisova Cave, one of the most ancient dwelling places of early humans in central Asia, as well as the Kalashnikov birth place and the Kolyvan stone working factory, producer of world-famous giant ovoid jasper vases for the main European royal palaces at the beginning of 19th century. The excursion ended with a pleasant boat trip across Teletskoye Lake, a 70 km long, narrow and deep lake known as the “Altaian Baikal”.

The participants are very much indebted to co-Chairmen Sergei V. Rozhnov (Moscow) and Nikolai V. Sennikov (Novosibirsk) and to the scientific secretaries Veronika Kushlina and Olga Obut for the organization of this successful and memorable meeting. Special thanks are also due to the staff and the enthusiastic young people from the Trofimuk Institute of Novosibirsk for taking care of us during the difficult, but well arranged field trip in southern Siberia.

Juan Carlos Gutiérrez-Marco, Madrid.

[Photo shows conference participants outside the Paleontological Museum, Moscow]



Upper Ordovician enigmatic fossils

E. Nardin and F. Paris

The enigmatic fossils occur in the Katian strata of Algeria, as accumulation beds. Fossils are subdivided in two parts: the first corresponds to a centrally perforate disc (with concentric lines interpreted as growth lines; Fig. 1A), and the second, to a truncated pyramid with strong and narrow ridges and no openings (Fig. 1C). The first part could be basal, because lots of those printings exist in the slab (Fig. 1B). Associated fauna seems to be rare in these accumulation beds (e.g. few echinoderm plates, bryozoans, Fig. 1C).

We have no idea about the taxonomic attribution of these fossils. They could play an important biostratigraphical role in Algeria because those accumulation beds are widespread in all the Upper Ordovician part of the country and are clearly identified. Moreover, this type of fossils seems to be relatively rare in other countries and could mark a specificity of the Algerian basin.

If you have any idea about the fossils, please send us your comments or your questions (elnardin@gmail.com or florentin.paris@univ-rennes1.fr).

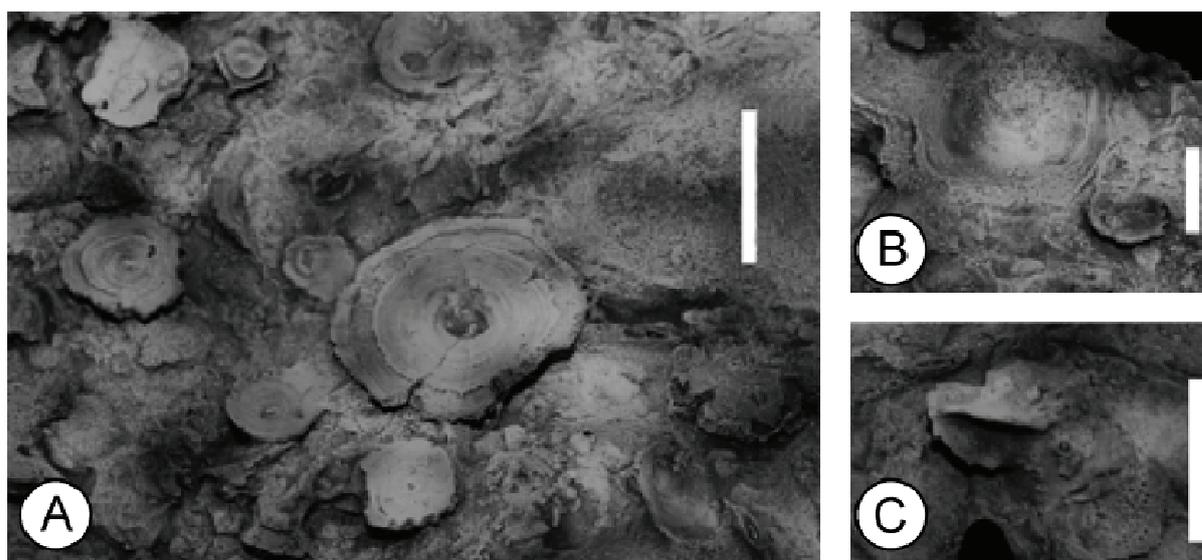


Fig. 1. A. Cast of basal disc. B. Disc printing. C. Latex cast of the truncated pyramidal part, encrusted by bryozoans. Scale bar: 1cm.

INDIVIDUAL RESEARCH REPORTS

A

Guillermo L. ALBANESI (Argentina) continues working on lower Palaeozoic conodont faunas from western and northwestern Argentine basins, as well as particular localities in other regions of South America. He is leading an extensive project on high-resolution conodont-graptolite biostratigraphy for the Argentine basins, in cooperation with Gladys Ortega and other colleagues. Projects on conodont palaeothermometry from the Precordillera, and biostratigraphy and palaeoenvironments from the Eastern Cordillera are being carried out by PhD students G. Voldman and F. Zeballo, respectively, under my supervision. I continue collaborating with colleagues from different universities of Argentina and other countries on diverse topics of historical geology from the lower Palaeozoic of South America by means of conodont biostratigraphy, palaeothermometry and chemostratigraphy.

Richard J. ALDRIDGE (U.K.) reports that work on the Upper Ordovician Soom Shale Lagerstätte of South Africa has been pretty productive this year, with papers submitted on the scolecodonts (Whittle et al., in press, *Journal of Micropalaeontology*), a lobopod (Whittle et al., in press, *Palaeontology*), the chitinozoans (Vandenbroucke et al., submitted, *Journal of Micropalaeontology*) and the sedimentology (Gabbott et al., submitted, *Geology*). A manuscript on new conodont apparatuses from the Soom is well advanced and will be submitted early in 2009.

J. Javier ÁLVARO (Spain): During the last year my research has been focused on early and late Ordovician aspects, including the analysis of benthic community replacements, chemostratigraphy, volcanism, and glaciogenic imprint throughout SW Europe and NW Africa. Several projects are in progress related to early Ordovician trilobites and echinoderms (in collaboration with Daniel Vizcaïno and Samuel Zamora) and Hirnantian glaciogenic sedimentary architectures. One of my main targets is to improve the identification of the Furongian-Tremadocian boundary interval in SW Europe.

Anna ANTOSHKINA (Russia) is actively working on problems of the Ordovician-Silurian boundary and Palaeozoic reefs of the Ural Mountains.

Howard ARMSTRONG (U.K.): Ordovician research and the Palaeozoic Environments Research Group have expanded significantly during the past two years. We have been particularly interested in trying to understand the duration and dynamics of the Gondwana ice sheet from the Sahara Platform to Arabia, with the aim of correlating into far field, low latitude climate proxy records.

Thijs Vandenbroucke has joined the Palaeozoic Environments Group for a six-months visiting fellowship, as part of his post doc project. His main efforts focus on understanding how graptolite and chitinozoan palaeobiogeography and $\delta^{13}\text{C}_{\text{org}}$ from these fossils to reconstruct Ordovician water masses and hence climate. This is a collaborative project with Dr M. Williams at the University of Leicester.

Charles Wilson (PhD) is funded by StatoilHydro and is working up the mid-Ordovician sedimentary evolution of the Gondwana margin in Jordan and Libya (Al Kufra Basin).

Aaron Howie (PhD) is funded by ENI and is undertaking a detailed study of the Silurian “Upper” hot shales in Arabia and North Africa. He is particularly interested in using geochemical proxies to test for the role of glaciation in the deposition of potential petroleum source rocks.

William I. AUSICH (USA) is working on projects concerning Ordovician crinoids and end-Ordovician carbon isotopes. I have a monograph in press on the Katian to Telychian crinoids from Anticosti Island, Quebec. This should be published in 2009. I am also working, slowly, on other echinoderms from Anticosti Island. We have a paper submitted for review on organic carbon and carbonate carbon comparisons at the O-S boundary on Anticosti Island and elsewhere. An abstract by O'Malley et al (see References to this Ordovician News) summarizes our work on biomarkers from Palaeozoic echinoderms, including some from the Ordovician.

B

Jeff BAUER (USA) has finished a report on conodonts from the Joins and Oil Creek formations (Middle Ordovician) in southern Oklahoma, which should be published in 2009.

Chris BARNES (Canada): Work with Shunxin Zhang is 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 Palaeozoic. Several joint papers have appeared recently with others in press and preparation, which deal with Ordovician and Silurian conodont taxonomy, evolution, palaeoecology, and the response of the conodont communities to eustatic change. The geochemistry of conodonts is being pursued further in collaboration with Julie Trotter (Australian National University and CSIRO). Other work in press includes: Late Ordovician-Early Silurian conodonts from the Edgewood Group, Missouri-Illinois (with Tyler Kuhn and Felicity O'Brien). Other work nearing completion includes: Late Ordovician conodonts from southern Ontario (with Shunxin Zhang and Glen Tarrant); Ashgill-Wenlock conodonts from the Canadian Arctic with David Jowett; and Ashgill conodonts from the Whitland section, South Wales with Annalisa Ferretti.

Juan L. BENEDETTO (Argentina) is working on the Lower Ordovician brachiopods from the Santa Victoria Group of northwestern Argentina. I have submitted a paper on a new lower Tremadocian billingsellid including a cladistic analysis to shed shed light on the complex and still not well-resolved phylogenetic relationships among billingsellids, as well as on their relationships with basal rhynchonelliformeans. I am also working on some assemblages of small brachiopods recovered from the Darriwilian graptolitic black shales of the Precordillera terrane, which is thought to have inhabited dysoxic environments. I am putting the final touches on the manuscript of a book (written in Spanish) entitled ‘The Gondwana continent through time: an introduction to Geologic History’.

Matilde Sylvia BERESI (Argentina) is actively working on Ordovician biostratigraphy from several carbonate and siliciclastic sequences of Mendoza and

San Juan Provinces, western Argentina. I am involved in ongoing collaborations with Susana Heredia (conodonts) on biostratigraphy, microfacies, and sedimentary environments of the carbonate sequences of the Central and Eastern Precordillera of San Juan. In the Mendoza Province, we continue working on the siliciclastic sequence of the San Isidro area, Precordillera. At present I am describing an association of Cambrian and Ordovician sponge spicules from Mendoza Precordillera and an Ordovician nautiloid fauna of the San Juan Precordillera.

Stig BERGSTROM (USA): Although formally retired I continue my research and work in the office on a daily basis. The past year has been productive with seven published articles and four meeting abstracts. Several reports are in press and three more will be submitted very soon. They deal with a variety of topics from fossil meteorites to K-bentonites to conodonts to ^{13}C chemostratigraphy. During the past two years I have spent a great deal of time on studies in the latter field that have resulted in much new and interesting data. At the present time, I have active Ordovician projects underway in the USA, Canada, Argentina, Norway, Sweden, China, and Malaysia.

Carlton E. BRETT (USA): During 2008 I continued to work on several projects related to Ordovician stratigraphy and palaeoecology with present and former students. Co-workers include Patrick and Susie McLaughlin (Wisconsin Geological Survey) and Ben Dattilo (Indiana-Purdue University, Ft. Wayne, Indiana). We continued to work on high-resolution sequence stratigraphy of the Upper Ordovician in the Cincinnati region. Masters student, Nathan Marshall and I have begun systematic sampling of geochemistry and silt content of Ordovician shales to determine patterns of siliciclastic input to the basin as a partial test of a previous hypothesis of formation of limestone-shale cycles by alternating periods of sediment starvation. I am now working with Pat McLaughlin and Ben Dattilo on sequence and event stratigraphy of the Upper Ordovician Richmond Group.

With several graduate and undergraduate students I am working on comparative taphonomy and sedimentology of meter-scale cycles in the Kanosh Shale (Middle Ordovician) of the Confusion Range, Utah vs. those in the Late Ordovician Kope Formation in Kentucky-Ohio. Also, graduate student Trisha Smrecak completed a Masters thesis on encrusting epibiont facies on Ordovician brachiopods. Professor Klaus Vogel and I have completed research on microendoliths in Upper Ordovician brachiopods, and doctoral student Sean Cornell completed a dissertation titled: *“Last Stand of the Great American Carbonate Bank: Activation of the Late Ordovician Passive Margin, Eastern North America.”*

I have also just received a grant from the National Science Foundation for collaborative research with Steve Westrop and Lisa Amati for study of foreland basin development and biotic change in Late Ordovician trilobite faunas of eastern North America. We will initiate field study during the summer of 2009.

Pat McLaughlin and I plan to lead a two-day, pre-meeting field trip on sequence stratigraphy and palaeoecology of the Upper Ordovician Lexington Formation and Cincinnati strata of the Cincinnati region for the North American Paleontological Convention hosted at the University of Cincinnati, June 19 and 20, 2009.

Finally, a book on the sequence and event stratigraphy of the Upper Ordovician of the Cincinnati Arch Region has just been published by the Cincinnati Museum: McLaughlin, P.I., Brett, C.E., Holland, S.M. and Storrs, G., (eds.)

Stratigraphic Renaissance in the Cincinnati Arch: Implications for Upper Ordovician Paleontology and Paleoecology. Cincinnati. Museum Center Special Publication 2. This book represents largely papers and field guides produced for IGCP 503 Field conference in June 14-16, 2005.

C

Mikael CALNER (Sweden): After rather many years in the Silurian I have expanded my research and recently started to work in the Upper Ordovician of Sweden (together with Oliver Lehnert and Jaak Nõlvak). One of my Ordovician sub-projects is primarily based on a drillcore that was recovered from the Borensult area in Motala, Sweden in the summer of 2007. The core permits study of a continuous section through the Sandbian-Hirnantian of this part of Baltoscandia. Within a broad international group of researchers we aim to make an integrated high-resolution study of the development of carbon and oxygen stable isotopes, micro- and macrofauna, sedimentology and sequence stratigraphy through this interval. The core will function as an important reference section for this time interval in Baltoscandia.

In another sub-project I work on the same stratigraphical interval in the classical Siljan district of central Sweden. I made one field trip last summer and will continue in the coming summer. One manuscript dealing with (part of) the Upper Ordovician sedimentology and carbon isotope stratigraphy of this area is currently under review.

Marcelo G. CARRERA (Argentina) is actively working on the evolutionary history of lower Palaeozoic sponges. I am beginning the study of taxonomy, palaeoecology and palaeobiogeographic significance of the bryozoan fauna of the Argentine Precordillera (in cooperation with Dr Andrej Ernst, Germany).

CHEN Xu (China): In the past year my research work has mostly involved leading a major research project on <Marine Strata of China> supported by the largest Chinese petroleum company SINOPEC. Although I have stepped down from my role as Subcommission chairman, I am still happy to contribute as a corresponding member.

Carlos Alberto CINGOLANI (Argentina) is actively working with a group composed of researchers, graduate and postgraduate students from La Plata University, on provenance and tectono-stratigraphic evolution on the Ordovician of the Argentine Precordillera (Cuyania) Terrane. Petrography, geochemistry, isotope geology and geochronology on detrital minerals are the main tools used for provenance analysis in well documented stratigraphic sequences. Research topics are: a. Upper Ordovician from San Rafael Block, Mendoza, as a part of the Precordillera terrane. The study of heavy minerals on the siliciclastic Pavón Formation suggests that MORB and continental intraplate flood basalts were among the source rocks for the detrital record. The Pavón Formation was deposited on the disputed exotic Precordillera (Cuyania) terrane. Provenance studies on this formation revealed sedimentary rocks characterized by an upper continental crust component mixed with a mafic source, where the latter could not be described. The detrital chromian spinels discovered provide more information about this component. New U-Pb on detrital zircons were obtained, the ages are mainly from a Grenvillian-age source. On the Ponón Trehué Formation (Middle to Upper Ordovician), silico-carbonate platform immature sediments,

which are in contact with the Grenvillian-age basement, we carried out some geochemical and isotopic data. The provenance permits characterization of the basement of the Precordillera terrane enabling comparison to other areas. Paulina Abre's PhD thesis was finalized on this region.

b. Upper Ordovician of the Northern part of Precordillera terrane. The first isotopic U-Pb ages on detrital zircons from the siliciclastic Río Bonete Formation were obtained. Mafic rocks were intercalated within the sedimentary sequence. The northern extensions of the outcrops are along the Potrerillos creek, where the unit is intruded by Carboniferous granitoids. The main peaks of detrital zircon ages are: 440 Ma (boundary between Ordovician and Silurian) and 1100 Ma (Mesoproterozoic or Grenvillian-age). Paula Frigerio as a postgraduate student still continues to work in this area.

c. Frontal Cordillera of Mendoza Province, where a folded sedimentary unit known as Las Lagunitas Formation, is exposed. In the upper part of the sequence, the sandstones show intercalations of laminated black shales bearing regularly preserved graptolites from the *Climacograptus bicornis* Biozone. This is a new locality of Ordovician sedimentary rocks and we will continue to work in it.

Robin COCKS (U.K.) has had another effective year, which saw the substantial review of British Lower Palaeozoic brachiopods through the press to publication. Brachiopod work continued on strophomenoids and plectambonitoids from the Caradoc of the Anglo-Welsh area, and the submission of a paper with Luis Benedetto (Cordoba) describing a Rhuddanian fauna from Argentina. Palaeogeographical work with Trond Torsvik (Trondheim) included submission and publication of a paper (also with Bernhard Steinberger and Kevin Burke) linking Large Igneous Provinces (LIPs) with plumes originating near heterogeneities at the core-mantle boundary, thus enabling an objective assessment of palaeolatitudes of old LIPs before the Mesozoic for the first time. Another paper submitted with Trond unravels the Variscides and has produced Palaeozoic palaeogeographical maps for southern and central Europe; and new work has started on a review of the palaeogeography of the Palaeozoic of Laurentia/Laurussia and adjacent terranes.

Barry COOPER (Australia) reports that he is far from active in Ordovician research these days but retains an interest. I am now heavily involved in studies into the history of geology, and last year Walt Sweet and I published a paper which may be of interest to Ordovician enthusiasts entitled:

Classic Paper: C.H. Pander's (1856) Introduction to Conodonts. *Episodes* 31: 431-436

Helena COUTO (Portugal) is working on the study of Palaeozoic stratigraphy, palaeontology and gold-antimony mineralization in Baixo-Douro area of North Portugal. These studies aim to contribute to a better knowledge of the Palaeozoic stratigraphy, tectono-sedimentary and palaeogeographic evolution of the Lower Palaeozoic, so defining prospecting guides for metals. Concerning the Ordovician, detailed studies were and are being developed on the transition between Cambrian-Lower Ordovician, Lower Ordovician volcano-sedimentary layers and ironstones (with organic matter, hydrocarbons, fossil algæ and bryozoa) that exert a control of gold mineralization, and on the Upper Ordovician deposits related with the Late Ordovician glaciation.

D

Andrei DRONOV (Russia) continues research on comparative analysis of the biotic events, basin evolution and sea-level changes on the Russian and Siberian platforms during the Ordovician. The team includes Alexandr Kanygin, Alexandr Timokhin, Taras Gonta (all from Novosibirsk), Tatiana Tolmacheva and Elena Raevskaya (from St. Petersburg). I also continue my studies of the Ordovician trace fossils and ichnofabrics from St. Petersburg region and Siberia (together with Radek Mikuláš and Richard Bromley). I am finishing reconstruction of detailed facies profile and sea-level curve for North-Estonian Confacies belt in the Ordovician basin of Baltoscandia (together with Dimitri Kaljo, Tõnu Meidla, Leho Ainsaar, Tõnis Saadre and Rein Einasto).

Svetlana DUBININA (Russia) is actively working on Early to Late Ordovician conodonts from various rock assemblages of the Ordovician convergent margin investigated in the Southern Urals structure. I elaborated a first variant of the Ordovician conodont scale of the Southern Urals. In this topic I continue to collaborate with structural geologists Aleksei Ryazantsev and Anastasiya Belova, Moscow, GIN RAS. Besides, I and my colleagues Korchagin, O.A., Zlobin, V.L., Lyapunov, S.M., (Moscow, GIN RAS) and Tsel'movich, V.A. (Geophysical Observatory Borok – Branch of Institute of Physics of the Earth, RAS, Borok) repeat the investigation of the Batyrbay section, Malyi Karatau of south Kazakhstan, because today we see an increasing interest in revising of volumes and boundaries of Stages in the Upper Cambrian, as well as in the events of the Late Cambrian. Firstly, we described iron spherules and particles found in the deep-water limestone layer in the middle part of the conodont *Cordylodus primitivus* Zone in the Upper Cambrian of the Batyrbay section that formed during the time of global sea-level changes known as the Lange Ranch Eustatic Event (LREE). Finds of iron spherules and particles may provide evidence about a new unknown Event of cosmic origin, i.e. falling of a meteorite on Earth in the Late Cambrian. This Event was called the Batyrbay Impact Event (BIE). Secondly, we have shown that the Batyrbay Impact Event, the start of the LREE (middle *C. primitivus* Zone) and faunal changes at the base of the *C. proavus* Zone were not synchronous events. Two abiotic events were succeeded by the third, i.e. biotic event after a very short time interval corresponding to the second phase of the *C. primitivus* time. The more precise definition of the LREE commencement shows that rearrangement of conodont and trilobite communities at the base of the *C. proavus* Zone can be regarded as a direct consequence of the LREE, the beginning of which coincides with the Batyrbay Impact Event.

Jerzy DZIK (Poland) is working on Tremadoc nautiloids from the Angara River region of Siberia and on conodonts from Ordovician sections of the Angara and Lena rivers.

E

Jan Ove R. EBBESTAD (Sweden) for the last year and a half has held the curator position for the palaeontological collections at the Museum of Evolution, Uppsala University. That means everything from foraminifera to dinosaurs. It is a fantastic job, but research has been neglected. I am, however, continuing work on Ordovician gastropods and stratigraphy. Down the pipeline lies a study on a fauna from the GSSP

section of the Sandbian in Fågelsång, as well as a study on the regional stratigraphy of the Boda Limestone mounds in central Sweden. A rather interesting paragastropod from the Lower Ordovician of Morocco is also being studied with colleagues. I am otherwise engaged in the palaeobiogeography project of IGCP 503.

Bob ELIAS (Canada) together with Boo-Young Bae (Gwacheon National Science Museum, Korea) and Dong-Jin Lee (Andong National University, Korea), is continuing palaeobiologic studies of tabulate chain-corals from the Ordovician of Manitoba. In collaboration with Mari-Ann Mõtus (Tallinn University of Technology, Estonia), similar work is underway on the Ordovician tabulate coral *Eofletcheria* from Estonia. Ordovician coralline fossils from China are being studied by Ning Sun (Andong National University, Korea), together with Dong-Jin, me, and Xiangdong Wang (Nanjing Institute of Geology and Palaeontology, China). I, along with Graham Young (adjunct professor), welcome inquiries and applications from students interested in graduate studies at University of Manitoba. M.Sc. and Ph.D. projects are available on Ordovician corals, palaeoecology, and stratigraphy [see umanitoba.ca/geoscience/people/faculty/elias/elias.html]. Adam Melzak's Ph.D. dissertation on rugose corals of the Late Ordovician to earliest Silurian Vaureal, Ellis Bay, and Becscie formations of Anticosti Island, Quebec, is being prepared for publication. Lori Stewart is doing a M.Sc. thesis on the stratigraphy, palaeoenvironments, and palaeoecology of a fascinating Upper Ordovician section in Manitoba. Matt Demski has started a B.Sc. thesis on a newly exposed Ordovician-Silurian boundary section in Manitoba.

Mats ERIKSSON (Sweden): My research still largely focuses on various aspects of jawed polychaetes and their most common fossil remains, namely the scolecodonts. I have several ongoing projects together with Olle Hints (Tallinn) and we just finished a paper on Upper Ordovician scolecodonts from mud-mounds of subsurface Gotland, Sweden, that will appear in *Geological Magazine*. During the last year I have been deeply involved in a project on Darriwilian faunal dynamics and their links to extraterrestrial influx. This project is headed by Birger Schmitz (Lund) and involves several colleagues and PhD students from Sweden and abroad. Because my current position at Lund University terminates in March 2009 it was with great pleasure that I found out in November 2008 that I have received a new three-year grant from the Swedish Science Council, allowing me to stay in the Academia for a little longer.

David EVANS (U.K.) is in the process of completing a manuscript (hopefully to be published as a *Palaeontographical Society Monograph*) on the cephalopod faunas of the Durness Limestone (Lower Ordovician) of northwest Scotland. This work indicates that the cephalopod assemblages (particularly those of the Floian) are far more diverse than previously recorded, whilst differing significantly in composition to those of the Laurentian margin in the southwestern United States. In particular this assemblage provides new evidence relevant to the origin and early evolution of the Orthoceratoidea. As my full-time employment involves aspects of geology that have little to do with the Ordovician, most of my spare time during the past four years has been concentrated on the Durness Limestone. With the end of this project in sight, I am now starting work on a number of projects. These include a study of some late Ordovician cephalopod accumulations from northern England (environmental settings and composition of assemblages), and a revision of the early Upper Ordovician cephalopod assemblages of the Builth and Llandrindod Inlier, central Wales, where

recent collecting has yielded sufficient additional well-preserved material to assess the palaeobiogeographical relationships of this fauna. I am hoping to complete a long-standing study of the systematics of endocerids and pilocerids with Andy King (Sri Lanka). I am starting work with Björn Kröger (Museum für Naturkunde, Humboldt Universität Berlin) on the early Ordovician cephalopod assemblages of the Montagne Noire, which we believe may significantly improve our understanding of the early development of the Orthoceratoidea, as well as contributing to our knowledge of the composition and palaeobiogeography of the cephalopod faunas of high latitude Gondwana. Later this year, I am proposing to initiate a revision of the cephalopod faunas of the Girvan Inlier (south-west Scotland). I expect this to take several years to complete.

F

FENG Hongzhen (China): In 2008, I and my colleagues continued to centre on palaeontology and biostratigraphy of Early Ordovician graptolites from the Jiangnan Slope in South China. A paper titled 'Succession and global correlation of Late Tremadoc graptolite zones from South China' is in press in *Science in China (Series D)*, and another on 'Biozonation of Floian (Lower Ordovician) graptolites from Yiyang, Hunan' will be published in *Journal of Stratigraphy* also in 2009.

Annalisa FERRETTI (Italy): My Ordovician research continues to be concentrated on conodont faunas from South Europe. A taxonomic revision of the genus *Teridontus* (with Enrico Serpagli, Robert Nicoll and Paolo Serventi) was proposed from the Tremadocian of the southern Montagne Noire, France. I was also involved, together with Alessandra Negri, Phil Meyers, and Thomas Wagner, in editing a Special Issue of *Palaeogeography, Palaeoclimatology, Palaeoecology* concerning "Organic carbon rich sediments through the Phanerozoic: Processes, Progress and Perspectives".

Stan FINNEY (USA): In August 2008, I began a 4-year term as chair of the International Commission on Stratigraphy. Among other commitments, this position is consuming much of my available time.

Åsa M. FRISK (Sweden): The primary objective of my PhD project is to identify faunal recovery patterns after bolide impacts in the Ordovician Baltoscandian epicontinental sea, with emphasis on successions in the Lockne and Tvären craters. By recognizing how the abundance of species changed in relation to the varied environments we will be able to reconstruct how the pre-impact faunal groups recovered gradually as life returned onto the sterile seafloor. Also I have an ongoing project on the distribution and biostratigraphy of the Björkåsholmen Formation and I am working on a project on the Upper Ordovician of the Siljan District (Sweden).

G

G. Robert GANIS (USA) has a continuing interest in utilizing graptolite biostratigraphy as a means to study tectonics and stratigraphy of the Appalachian Taconic foreland. Pending funding, I will be working with the Pennsylvania Geological Survey as a biostratigrapher for a quadrangle mapping project involving

the Martinsburg and Dauphin formations in the Martinsburg foreland near Harrisburg and Hershey, Pennsylvania.

Mansoureh GHOBADI POUR (Iran) continues her studies of various aspects of Ordovician faunas, biostratigraphy and biofacies of Iran and central Asia. My ongoing research projects include (1) studies of the Late Ordovician trilobites from Kazakhstan and Uzbekistan, (2) Middle Ordovician (Darriwilian) trilobites and brachiopods of the eastern Alborz Mountains in northern Iran, and (3) taxonomy, biofacies and biodiversity patterns of the trilobites, brachiopods and associated faunas across the Ordovician-Silurian transition in north-eastern and southern Iran. I continue my research cooperation with Leonid Popov from the National Museum of Wales and with colleagues from the Geological Survey of Uzbekistan.

Maurizio GNOLI (Italy) is continuing to work on Ordovician cephalopod systematics from the Carnic Alps and peri-Gondwana area.

M. Cemal GONCUOGLU (Turkey) is actively working on the stratigraphy of the Ordovician successions of the Taurides and the Istanbul-Zonguldak terranes in Turkey with the biostratigraphic contributions of colleagues from the Bulgarian Academy of Sciences (I. Lakova, V. Sachanski and I. Boncheva).

Juan Carlos GUTIÉRREZ-MARCO (Spain) during 2008 continued working with my Portuguese colleagues Artur Sá and José Manuel Piçarra (former PhD students) in the submission of the candidature for a new Iberian Geopark with important Ordovician fossils (recently cited by Richard Fortey as the “geopark of the giant trilobites”) and with a commemorative exhibition of the centennial of the death of J.F. Nery Delgado (a famous Palaeozoic worker, partly contemporaneous with Barrande). Also I am working under the direction of Isabel Rábano in the study of the Ordovician outcrops within some Iberian natural and national parks, in order to promote geotourism. In the same sense, our team has contributed with a first selection of Ordovician and Silurian Spanish localities to the Global Geosites Project, among other actions promoting the Ordovician heritage at provincial or local level.

With Iberian and Argentinian colleagues I have produced 15 communications in 9 different national or international meetings, as well as one invited lecture on the Peruvian Ordovician, for the XIII Latin-American Geological Congress held in Lima.

During 2008 I carried out some field work in Spain, Portugal, Libya and Peru, resulting in some important Ordovician finds that will be published in the near future. I also continue with the study of Hirnantian diamictites in northern Spain, started in 2007 with E. Bernárdez as a result of the construction of a tunnel (25 km long) for the high-speed train, and which led to additional discoveries of the *Hirnantia* Fauna in the Cantabrian Zone, now being studied by E. Villas.

Expected achievements for 2009, besides bureaucracy, science divulgation and direction of PhD students, will include the start of preparation of the next Ordovician Symposium (Spain, May 2011) and trying to find time to finish some papers started years ago, as well as others dealing with last-minute novelties on palaeontological groups, the Hirnantian glaciation and the dating of a giant Ordovician ash fall in Iberia.

H

Thomas HANSEN (Denmark). During the years 2003 to 2007 extensive research was carried out at the Natural History Museum, University of Oslo, on the Darriwilian trilobites from the Elnes Formation of southern Norway. The fauna has been completely revised, revealing close to 100 taxa, most of them belonging to a muddy environment just above storm wave base. Some of the more important conclusions (paper in press in *Fossils & Strata*, Volume 56 at the end of February 2009) are summarized below.

The trilobite fauna is highly endemic, containing many species which are not known elsewhere. Only four species may have originated from other continents. Two of these have a clear Laurentian origin. Systematic descriptions are given for *Ampyx*, *Asaphus*, *Atractopyge*, *Botrioides*, *Bronteopsis*, *Cnemidopyge*, *Cybelleta*, *Cybelurus*, *Cyrtometopus*, *Geragnostus*, *Gravicalymene*, *Icelorobergia* n. gen. (type species *Robergiella brevilingua* Fortey, 1980), *Illaeus*, *Lonchodomas*, *Megistaspis*, *Metopolichas*, *Nileus*, *Niobe*, *Ogmasaphus*, *Ogygiocaris*, *Pliomera*, *Porterfieldia*, *Primaspis*, *Proetus*, *Pseudasaphus*, *Pseudobasilicus*, *Pseudomegalaspis*, *Pterygometopus*, *Robergia*, *Scotoharpes*, *Sculptaspis*, *Sculptella*, *Sphaerocoryphe*, *Sthenarocalymene*, *Telephina*, *Raymondaspis* (*Cyrtocybe*) and *Volchovites*. Nine new taxa belonging to the genera *Asaphus*, *Lonchodomas*, *Megistaspis* (*Megistaspidella*), *Ogmasaphus*, *Ogygiocaris* and *Pseudasaphus* are described, while arguments are presented that suggest the subgenus *Megistaspis* (*Heraspis*) Wandås is a junior subjective synonym of *M.* (*Megistaspidella*) Jaanusson. *Valdaites* Balashova and *Mischynogorites* Balashova are considered junior subjective synonyms of *Pseudasaphus* Schmidt. The asaphid genus *Ogygiocaris* Angelin includes only Scandinavian taxa, numbering seven species and two subspecies. *Lonchodomas striolatus* Månsson and *Ampyx clavifrons* Hadding are considered subjective synonyms of *L. rostratus* Sars and *A. mammilatus* Sars respectively, while the trinucleid *Botrioides efflorescens* Hadding is considered the ancestor of *B. foveolatus* Angelin. The range of *Atractopyge dentata* (Esmark) is reduced to the upper Darriwilian to lower Sandbian of Norway, while the Upper Ordovician specimens from Norway and the United Kingdom are reassigned to *Cybelleta grewingki* (Schmidt).

Jesper HANSEN (Norway) is currently working on taxonomy, biostratigraphy and ecology of the Cambrian and Ordovician brachiopods from the Svalbard archipelago, with special focus on the fauna in NE Spitsbergen. The study is based on collections housed at museums and on new material collected during a joint international scientific expedition last summer lead by Nils-Martin Hanken and Jesper Kresten Nielsen (Norway). The brachiopod work is in collaboration with Lars E. Holmer (Sweden).

David A.T. HARPER (Denmark) continues research on Ordovician stratigraphy and faunas in Scotland (with Yves Candela, Euan Clarkson and Alan Owen), Ireland (with Matthew Parkes, George Sevastopulo and Svend Stouge), Greenland (with Jan Audun Rasmussen, Christian Mc Ørum Rasmussen, Jin Jisuo and Svend Stouge), western Russia (with Christian Mac Ørum Rasmussen and Arne Thorshøj Nielsen) and the greater Himalayan region (with Nigel Hughes and Lars Holmer). Work continues with Rong Jia-yu, Chen Xu, Zhan Ren-bin and Huang Bing on refining events during the late Ordovician and early Silurian in South China, a critical area for the understanding of the Hirnantian Substage, the late Ordovician extinctions and early Silurian recovery. A new project has been developed with Fredrik Terfelt and his colleagues in

Lund on the changeover between the Cambrian and Palaeozoic evolutionary faunas particularly in Scandinavia. Further additions to PAST by Øyvind Hammer have continued to enhance the popularity of this free software package for palaeontologists (*PAST - PAleontological STatistics Software. Version 1.89* is available at <http://folk.uio.no/ohammer/past>).

The success of the Ordovician IGCP (503) 'Ordovician palaeogeography and palaeoclimate' continues; newsletters are available (<http://sarv.gi.ee/igcp503/>). Within the frame of the project Harper and Servais are currently assembling a group of specialists to investigate the relationships biogeography and palaeogeography in the Early Palaeozoic. These results will be presented this year in Copenhagen (see below) and will form the basis for a *Geological Society of London Memoir* to be published in 2011. A thematic issue of *Lethaia* was published in 2008 that includes contributions from the successful Glasgow meeting in August 2006. Although the final meeting of the project was held in Lille (August 2008: <http://www.igcp503.org/pdfs/Lille2.pdf>) an absolutely final meeting is planned for Copenhagen in early September (see <http://www.igcp503.org>). The focus will be Early Palaeozoic Biogeography and Palaeogeography but the conference will include all aspects of Lower Palaeozoic, especially Ordovician, geology.

Susana HEREDIA (Argentina) is actively working on the Middle Ordovician conodont biostratigraphy of the Central Precordillera. Also I am working on the Lower and Middle Ordovician conodonts of the Eastern Cordillera. Studies on Lower and Middle Ordovician conodont Biostratigraphy of the Precordillera and NW Argentina are being carried out by PhD students: Ana Mestre, Josefina Carlorosi and Cecilia Rodríguez, under my supervision. I continue collaborating with F.G. Aceñolaza, G. Aceñolaza, M. Beresi, G. Sarmiento, J.P. Milana, G. Nestell and others on diverse topics including conodonts (biostratigraphy, biofacies and CAI), foraminifers, sedimentology, carbonate microfacies and field geology.

Linda HINTS (Estonia) is actively working on stratigraphy and brachiopod fauna of the uppermost Ordovician Porkuni (Hirnantian) Stage of the East Baltic. In collaboration with colleagues from our institute a study of different groups of macro- and microfossils from one section in western Latvia is in progress. However, studies on the Vormsi Stage (upper Katian) and some brachiopods from lowermost Upper Ordovician have not yet completed.

Olle HINTS (Estonia) is continuing studies on Ordovician-Silurian jawed polychaetes (scolecodonts) and other organic-walled microfossils. Ordovician and Silurian stratigraphy, especially that is related to the Baltic region, continues to be of interest too.

Together with Florentin Paris (Rennes) and Sa'id Al Hajri (Dhahran) a small project was run in 2008 to describe scolecodonts from a Saudi Arabian drill core. This small collection turned out to be the richest scolecodont assemblage from the entire Gondwana so far. Together with Thomas Servais, Marco Vecoli and Aurelien Delabroye (Lille), and Jaak Nõlvak (Tallinn) we are continuing a joint study on Ordovician palynomorphs. In 2008 the first Ordovician cryptospores (evidencing early land plants) were recovered from Baltica and rich acritarch assemblages are being described from the Darriwilian and Hirnantian of Estonia.

Jointly with Jaak Nõlvak, Viive Viira and Mairy Tammekänd (Tallinn) we are continuing a project on Darriwilian chitinozoans, scolecodonts and conodonts from

Estonia. Some new material has been collected during the last field season and new results are expected in 2009.

Additionally I have got involved in some recently started projects on geochemistry of Ordovician rocks and fossils (together with colleagues from Germany, Belgium and Canada).

Warren D. HUFF (USA): My Ordovician-related activities during the past year have focussed on a collaborative project with one of my former PhD students, Funda Inanli. We have used crystal size distribution theory to examine the eruption dynamics of the Late Ordovician Millbrig K-bentonite in North America. A brief summary of our activities can be expressed as follows: Crystal size distribution (CSD) analysis has been applied to quartz crystals of the Ordovician Millbrig K-bentonite, which represents one of the largest known fallout ash deposits in the Phanerozoic Era, to establish crystal growth histories and conditions in the magma chamber prior to eruption. Specific CSDs were examined for crystal growth conditions. All Millbrig samples exhibit lognormal concave-down shapes in agreement with previously reported CSDs on large silicic systems but in contrast to more mafic systems characterized by linear CSDs. Concave down CSDs are possibly an intrinsic property of phenocryst growth in large volume silicic magmas as documented in the literature. Quartz crystals of the Millbrig must have been produced by surface-controlled, size-dependent growth with a minor Ostwald ripening component, which could have easily changed to supply controlled growth due to a limited supply of nutrients, as the crystals grew larger. CSDs were also used to examine the possible origin of multiple ash beds in the Millbrig. These ash beds appear to be a product of a series of separate eruptions that represent separate magma layers or batches, each with slightly different crystal growth conditions.

J

Jisuo JIN (Canada) is currently working on the origin, radiation, and extinction of various Ordovician brachiopod faunas of Anticosti Island, Manitoulin Island (with PhD student Chris Stott), and Western Canada. Also, my collaborative research with Jan Bergström (Swedish Museum of Natural History) and Renbin Zhan (NIGP, China) on Ordovician brachiopods is ongoing.

K

Dimitri KALJO (Estonia) continues working on the Ordovician and Silurian bio- and chemostratigraphy of Baltica and elsewhere for comparison. Some projects (team works) reported earlier are still in progress, but some results about the uppermost Silurian of Podolia and the Hirnantian of the Mirny Creek region should be published in 2009. I am pleased to report that beginning with 2007 the *Estonian Journal of Earth Sciences* is indexed in Science Citation Index Expanded (ISI Web of Science) and all papers are freely available as pdf files at www.eap.ee/earthsciences. This journal accepts internationally interesting (peer reviewed) papers, especially on the Ordovician and Silurian, from any geographical region.

Tatiana KOREN (Russia): Together with Anna Suyarkova we study graptolites from the Asery to Idavery regional stages (the Darriwilian and Sandbian) of the St. Petersburg area, based on new collections. The graptolite biostratigraphy has been

presented at the 7th Baltic Stratigraphic Conference and will be published in *Estonian Journal of Earth Sciences* (Suyarkova A.A. and Koren' T.N. Advances in the Ordovician graptolite biostratigraphy of the St. Petersburg area, Russia. in press). Taxonomic description of graptolites from the *Pterograptus elegans*, *Hustedograptus teretiusculus*, *Nemagraptus gracilis* and *Diplograptus foliaceus* zones is under way.

Petr KRAFT (Czech Republic) focused on research at several Dapingian and Sandbian localities in the Prague Basin to assemble data on stratigraphy, graptolites and other fossils. I worked on a database and correlation of Lower and Middle Ordovician graptolites from Bohemia.

Jiri KRIZ (Czech Republic) is actively working on the systematic study of the Hirnantian bivalves from the Prague Basin (Bohemia), together with Marika Steinova from the Czech Geological Survey. Our study is based on a relatively diversified bivalve community from the uppermost Hirnantian, collected during the last 50 years.

Björn KRÖGER (Germany) currently is concentrating on the Ordovician expansion of cephalopod life habit and habitat. An article together with Ed Landing, reviewing the faunal evolution of the Lower Ordovician Beekmantown Group of New York in the context of the Ordovician Radiation, is close to completion. A paper on the origin and early rise of planktonic cephalopods is in preparation. Descriptions of new cephalopod faunas from New York (USA), Morocco and the Montagne Noire (France) are planned for 2009. I am searching for new cephalopod occurrences in offshore depositional environments and in black shales. I am especially interested in the phylogenetic pathway of orthoconic cephalopods such as the Orthocerida, Lituitida, Pseudorthocerida and Dissidocerida. Future projects will include descriptions and ecological analysis of Late Ordovician cephalopod faunas from the Baltoscandian Boda and Vasalemma reefs. My cephalopod research aims for a better understanding of the dynamics of the Ordovician Radiation. I actively cooperate with Bertrand Lefebvre (Lyon, France), David Evans (Peterborough, UK), Ed Landing (Albany, New York, USA), Jan Ove Ebbestad (Uppsala, Sweden), Mare Isakar (Tartu, Estonia), Thomas Servais (Lille, France), and Zhang Yunbai (Nanjing, China).

L

Oliver LEHNERT (Germany): Recent studies of oxygen isotopes from conodont phosphate (Cambrian through Silurian) for palaeoclimate reconstructions involve a lot of biostratigraphic conodont work. I collected already a large dataset which will be published in the context of extinction events and biodiversifications and to document glacial events. Analysed material derives from different palaeocontinents and palaeolatitudes and the conodont faunas will be partly described. My current activities include research on different topics like facies development, sea-level changes and stable isotope stratigraphy in the Early Palaeozoic of the Baltic Basin, Prague Basin and other areas.

LI Jun (China) is working on IGCP 503. I worked in April to mid-May with Thomas Servais in Lille, France and then visited Tallinn, Estonia to work with Olle Hints, and participated in the Seventh Baltic Stratigraphical Conference in Tallinn.

LI Ming (China) is actively working on Tremadocian-Floian graptolites.

Anita LÖFGREN (Sweden) is continuing work on Ordovician conodonts (now concentrating on the Lower Ordovician). I cooperate with several colleagues abroad.

M

Peep MÄNNIK (Estonia) is actively working on evolution, taxonomy and palaeoecology of conodonts, conodont-based high-resolution stratigraphy, bioevents and palaeogeography. I am also interested in sequence stratigraphy and evolution of sedimentary basins. In Estonia, I am busy with three projects: “Upper Ordovician–Lower Silurian conodont biostratigraphy in stratigraphic sequences” (a four-year project, started in 2007), “Ordovician–Silurian boundary in the Baltic area” (a four-year project, started in 2008) and “Ordovician and Silurian biodiversity in Baltica: evolution and impact of the changing environment” (a six-year project, started in 2008). Also, joint studies together with colleagues from Estonia, Germany, Russia, Sweden, U.K. and USA on evolution and high-resolution stratigraphy of the Early Palaeozoic sedimentary basins on Baltica and Siberia palaeocontinents are ongoing. In summer 2008 I participated in field work (organized by Trofimuk Institute of Petroleum Geology and Geophysics, Novosibirsk) in Siberia. We studied and sampled Upper Ordovician and lowermost Silurian sections on the Podkamennaya Tunguska River.

Alexander (Sandy) D. MCCRACKEN (Canada) has been Acting Head of Stratigraphy, Paleontology & Sedimentology Subdivision, and Leader of GSC PaleoLab project since April 2007, which limits the time I have to work on Middle to Upper Ordovician, Silurian and Devonian conodonts from various locations in Canada.

Patrick I. MCLAUGHLIN (USA): Though I've been focusing primarily on Silurian sequence stratigraphy for the past few years, I am continuing to work on completion of three manuscripts on high-resolution sequence stratigraphy of the Chatfieldian (= lower Katian) age Lexington Limestone in central Kentucky with Susie Taha McLaughlin and Carl Brett. These manuscripts focus on sequence architecture and the magnitude of facies change in this supposedly greenhouse interval. High-frequency facies changes suggest sea level fluctuations of several tens of meters over short durations (approximately 400,000 years) during much of the GICE interval.

My Silurian studies have also included the Ordovician-Silurian boundary interval across a broad portion of eastern North America.

The next phase of my Ordovician studies in North America will focus on Maysvillian and Richmondian age strata as well as improving the carbon isotope record. Collaborations are planned with Carl Brett, Don Mikulic, Joanne Kluessendorf, Ben Dattilo, and Rob Ripperdan.

I will be running pre-meeting and post-meeting field trips for the North American Paleontological Convention to be held in Cincinnati in June of 2009. The pre-meeting field trip will be run with Carl Brett and focus on sequence and event stratigraphy of the Lexington Limestone and Cincinnati Series during and postdating the GICE Excursion. The post-meeting field trip will be run with Don Mikulic and Joanne Kluessendorf and will focus on the Ordovician-Silurian boundary and overlying Silurian strata from the margin of the Appalachian Basin near Cincinnati to the margin of the Michigan Basin near Chicago.

Sören MEISEL (Germany) has recently furnished a small laboratory for separation and preparation of microfossils. Furthermore I am increasingly busy with Palaeozoic plate reconstruction models.

Michal MERGL (Czech Republic) is actively working on brachiopods from the Hirnantian/Rawtheyan boundary beds (Králov Dvůr Formation) and brachiopods from the Letná Formation (Berounian) in the Barrandian of Czech Republic). Another activity concerns evolution of discinid brachiopods of Ordovician to Devonian age.

Radek MIKULAS (Czech Republic) continued the ichnological documentation of the Ordovician temporary outcrops in the Barrandian area, Czech Republic. I introduced a student, Jan Doucek, into the Ordovician ichnology, to be his supervisor in the study of the Ordovician trace fossils of the Železné hory Mountains (central to eastern Bohemia, Czech Republic). I made little progress in preparing a huge set of data from the Middle Ordovician of the Baltic Region (altogether with Andrei Dronov and Richard Bromley – papers in review or in preparation). I contributed (by ichnological comments) to the preliminary interpretation of field data from the Irkutsk Region, Siberia, Russia (a project by Andrei Dronov et al.). I looked at my old brachiopod material (Strophomenidina, genus *Aegiromena*) to compare the field data with the still controversial theory of “Frozen Evolution” published by J. Flegr.

Tatiana MODZALEVSKAYA (Russia) is actively working on national projects which include the Regional Stratotypes of Silurian stages in Russia.

The lower boundary of the Rhuddanian Stage was fixed most certainly in the bottom of the Chalmak horizon in the Mirny section (basin of the Kolyma River). This section is offered as a regional stratotype and point of the Ordovician/Silurian Boundary in the open shelf facies (Koren and Sobalevskaya, 2008). Type sections of the shelf facies may serve the sections of Gornyy Altai (Inya and Gromatukha rivers) and East slope of Polar Urals (Kozym River). Here as additional reference points of the Ordovician/Silurian boundary are used the disappearance of the dalmanitino-hirnantian benthic fauna and appearance of the conodont *Oulodus? nathani* (Sennikov et al., 2008; Besnosova et al., 2006).

Axel MUNNECKE (Germany) is currently working together with Zhang Yuandong (NIGPAS, Nanjing) on Ordovician stable carbon isotope stratigraphy in China. In addition I am involved in a project (together with Paul Copper, Marco Vecoli, Aurelien Delabroye, and Michael Joachimski) investigating the Ellis Bay Formation on Anticosti Island.

N

Elise NARDIN (France) is working on the faunal diversification and interactions between the geosphere and biosphere during the Early Palaeozoic. My palaeontological research focuses on the blastozoan diversification processes. The first approach is the establishment of a phylogeny showing the relationships with contemporaneous echinoderms (e.g., crinoids, edrioasteroids, stylophorans). The result will be the proposition of a new classification for the subphylum Blastozoa, and the understanding of the diversification processes, and its timing. The second approach is the question of the impact of the geodynamic events (orogeny, sea-level

fluctuations, Cambrian substrate revolution) on the morphological changes and the diversity dynamics of echinoderms (collaboration with B. Lefebvre). I am also concerned with modeling of the influence of geodynamic events on the Ordovician palaeoclimate and palaeobioproductivity. I am particularly interested in factors influencing the P and Sr cycles (collaboration with Y. Godd eris, Y. Donnadi eu, and G. Le Hir). To validate the model hypotheses, I also try to estimate the Ordovician biomass based on the approximate quantification of phyto- and zooplankton on different palaeocontinental margins. This part results from collaboration with M. Aretz, F. Paris, M. Vecoli and T. Servais (France), C. Rubinstein (Argentina), C. Wellman (UK), P. Strother (MA), P. Steemans (Belgium) and O. Hints (Estonia).

Jesper Kresten NIELSEN (Norway) is currently working on sedimentology, diagenesis and geochemistry of the Cambrian-Ordovician succession in northeastern Spitsbergen, Svalbard. This is a contribution to a joint international scientific project organized by me and Nils-Martin Hanken (Norway). The field work took place last summer with colleagues from Denmark, India, Norway, Poland and Sweden. The working conditions were quite demanding due to metre-thick snow and ice covering large areas, and combined with heavy winds and snow showers from the North. This field trip resulted nevertheless in a rewarding collection of field data and samples.

Jaak N LVAK (Estonia) continues his work on Ordovician chitinozoans and the biostratigraphy of the East Baltic sections, mainly from core material. One is under preparation: M nnamaa (from Hiiumaa Island). With D. Goldman we concentrate on material (graptolites and chitinozoans together) of middle Ordovician age from one Latvian core section. With Y. Grahn we finished an updated view of chitinozoans from Sweden. Descriptive work on East Baltic sections is in progress.

Godfrey S. NOWLAN (Canada) has a very moderate level of conodont research at the moment. A paper has been submitted with Sue Turner, Alain Blicek and others on the affinities of the conodont animal. Our lab continues to receive samples and reports are prepared for clients. Recent data on Lower Palaeozoic conodonts has been acquired from western Newfoundland, Yukon and Manitoba. New money received by GSC for work in Arctic Canada means that new samples will be arriving from projects in the Arctic Islands, Yukon and Northwest Territories in 2009.

I continue to work mainly in geoscientific outreach, currently focused on the celebration of the International Year of Planet Earth in Canada, which includes a contest for school children, a careers in earth sciences web site and the co-writing and co-editing of a new popular book on the geology of Canada entitled: *Four Billion Years and Counting: Canada's Geological Heritage*.

The following two papers, which have been in press for a number of years, have been greatly delayed in publication:

Lee, C.C., Lehnert, O. & Nowlan G.S. (in press). Sedimentology, stratigraphy and biostratigraphy of the Eureka Sound Group, northeastern Ellesmere Island, Nunavut. *Geological Survey of Canada Bulletin*.

Harrison, J.C., Nowlan, G.S. & Lehnert, O. (in press). Thermal maturity of Cambrian to Devonian rocks of northeastern Ellesmere Island. *Geological Survey of Canada Bulletin*.

O

Gladys ORTEGA (Argentina) continues study of Ordovician graptolite faunas from the Precordillera and northwestern Argentine basins. I participate in projects on biostratigraphy, palaeoenvironments and palaeothermometry of conodonts and graptolites with Guillermo Albanesi and other researchers. At the moment, I am working with other colleagues on Tremadocian graptolites from the Eastern Cordillera and Middle and Upper Ordovician faunas from the Central Precordillera. Besides, I am studying the recent discovery of synrhabdosomes from the Middle-Upper Ordovician of the Precordillera. Currently I am coordinating with G. Albanesi the 2° Simposio de Bioestratigrafía y Eventos del Paleozoico Inferior of the X Congreso Argentino de Paleontología y Bioestratigrafía on be held at La Plata city in 2010.

Alan OWEN (U.K.): My work with David Bruton (Oslo) on Upper Ordovician deep-water trilobites from Maine will be completed this year. It has prompted me to undertake a more wide ranging analysis of Ordovician deep water trilobite faunas and to renew my collaboration with Mike Romano (Sheffield) on material that we collected from Eastern Ireland several years ago. All this and other work on trilobite biogeography is being carried out in the context of IGCP 503 'Ordovician Palaeogeography and Palaeoclimate' of which I am a co-leader and which will have its final meeting later this year. In addition, I am working on a remarkable abnormal encrinurid specimen from the Upper Ordovician with Patrick McDermott of St Clears, South Wales. My current PhD student, Clare Torney, is making fascinating discoveries of the fine scale crystallography and chemistry of trilobite eyes by exploiting recent developments in SEM techniques.

P

Florentin PARIS (France) continues investigations on Ordovician chitinozoans from Saudi Arabia (Qusaiba Shallow core project), Oman (in connection with A. Hewards and G. Booth, from PDO), Algeria (in connection with K. Boumendjel, Sonatrach), Morocco and Sardinia (J.F. Ghienne and A. Loi projects). I completed the $\delta^{13}\text{C}$ analyses on sorted chitinozoans as the carbon source. Before retiring I am completing my database on SEM chitinozoan photos (close to 20.000 digital photos with multi-queries on stratigraphic, geographic, taxonomic data).

Ian PERCIVAL (Australia) has been working both on conodonts and brachiopods this past year, as well as documenting some rarer components of the Late Ordovician fauna of New South Wales such as conulariids, tarphyceratid nautiloids and a rostroconch, all of which are only known from one or two specimens. Papers reporting these studies are in press. As well, he has been describing lingulate brachiopods from New Zealand, the first Middle Ordovician brachiopod fauna to be described from that country, in a joint project with Yongyi Zhen (Australian Museum), Tony Wright (University of Wollongong), and Roger Cooper and John Simes (IGNS, NZ). The resulting paper will be a companion article to one documenting the associated conodonts of early Darriwilian age, to be published in the *Association of Australasian Palaeontologists Memoirs* series of Cambro-Ordovician studies. Ian has also been involved in cooperation with Yongyi Zhen and colleagues in further revision of Ordovician conodont faunas of South China. The opportunity to spend three weeks in Nanjing in March, 2009 working with Zhan Renbin and his Ph.D student will also permit Ian to finalise editing of this issue of *Ordovician News* and hand it over to the ISOS webmaster, Fan Junxuan, at NIGPAS.

José PIÇARRA (Portugal) is actively working on lower Palaeozoic stratigraphy from South Portugal (Ossa Morena Zone) and also on graptolites from Portugal and the French Armorican Massif. I am also involved in studies of the geological and palaeontological heritage of the Barrancos and Arouca regions.

Teresa PODHALAŃSKA (Poland) is actively working on Upper Ordovician stratigraphy, the Ordovician/Silurian boundary in Poland, and palaeontological, geochemical and isotopic records of the Hirnantian event.

Anne PÕLDVERE (Estonia) continues as editor of the journal *Estonian Geological Sections* (issued by the Geological Survey of Estonia). The drill core sections of Estonia range from the Proterozoic (Palaeoproterozoic–Neoproterozoic) to Palaeozoic (Cambrian–Devonian). Nine issues of the journal have been published so far, each dealing with one drill core.

The 2008 issue contains data on the Männamaa (F–367) drill core in the central part of Hiiumaa Island, northwestern Estonia, penetrating Palaeoproterozoic, Cambrian, Ordovician and lowermost Silurian sedimentary rocks. The 4 km wide circular Kärđla meteorite crater, surrounded by an elliptical ring fault up to 15 km in diameter, lies about 10 km northeastward from the Männamaa (F–367) drill hole. The Kärđla impact event, marked by well-preserved ejecta-influenced matter, is also reflected in the Männamaa core. Generally, the investigated section contains sediments of the NW part of the East European Platform.

Contributions were provided by 16 authors. The description of the core was improved using the results of laboratory studies. Additionally, the lithology of 77 selected Cambrian, Ordovician and Silurian intervals was investigated. Provisional data of 35 thin sections were used. The stratigraphic subdivision of the Ordovician section is based on the distribution of chitinozoans and acritarchs (illustrated with range charts). Jaak Nõlvak examined Ordovician and Silurian chitinozoans in 196 samples, whereas 24 samples characterize the Kärđla impact event level and 21 samples are from beds corresponding to the Kinnekulle K-bentonite. Cambrian, Ordovician and Silurian acritarchs (276 species in 131 samples) were identified by Anneli Uutela. Tõnu Meidla and Oive Tinn studied Upper Ordovician ostracods in 30 samples from the Keila to Rakvere stages and the Ordovician–Silurian boundary beds. Leho Ainsaar and Tõnu Meidla contributed carbon ($\delta^{13}\text{C}$) and oxygen ($\delta^{18}\text{O}$) isotope data of the Ordovician and lowermost Silurian rocks, based on the analysis of 149 whole-rock samples. The composition of twelve Upper Ordovician volcanic ash beds was investigated by Tarmo Kiipli, Toivo Kallaste and Kiira Orlova on the basis of 15 XRF analyses. Toivo Kallaste made also four XRD analyses of selected samples. Alla Shogenova and Kazbulat Shogenov provided results of 70 chemical analyses and 54 measurements of physical properties of the Ordovician and Silurian sediments.

The tenth issue of the journal is under preparation and will appear in 2010. It will focus on the Viki drill core penetrating the Ordovician and Silurian sedimentary rocks in the western part of Saaremaa Island, southwestern Estonia.

Leonid E. POPOV (U.K.) continues to work on various aspects of Ordovician brachiopod taxonomy, biogeography and palaeoecology. I am also currently working

on the Lower and Middle Ordovician brachiopods of the Alborz Mountains, Kopet-Dag and Central Iran and on the Late Ordovician (Katian to Hirnantian) brachiopods from the Zagros Mountains in cooperation with Mansoureh Ghobadi Pour (Gorgan University).

Brian PRATT (Canada): Some of my research efforts focus on the Upper Ordovician of subsurface Saskatchewan. These consist of thick carbonates and evaporites that blanket western Canada and much of western and central USA. In the great epicontinental Williston Basin they are termed the Red River and Bighorn Groups. Recently published is a paper describing small microbially dominated patch reefs which are interpreted to record a warming of the epeiric sea and consequently a collapse of the once-flourishing shallow-marine ecosystem. Another project in progress is a study of deformation horizons in part of the succession, hoping to use these as proxies to determine location and times of synsedimentary movement on basement faults.

I am also collaborating with Mariana Raviolo and Osvaldo Bordonaro studying the sedimentology and microbial patch reefs of Lower Ordovician platformal limestones of the Precordillera of western Argentina. The La Silla Formation is unique in that it represents a regional low-energy shoal system dominated by peloidal grainstones.

I would like to draw attention to the new book we (Pratt and Holmden, 2008 – see full citation in Publications list) edited in hopes that readers and/or their libraries will purchase a copy from the Geological Association of Canada. The GAC also publishes the *Palaeontographica Canadiana* series which contains many monographs on Ordovician fossils. Check their website!

R

RONG Jiayu (China) has been recently working on Late Ordovician and Silurian brachiopods, their synecology and palaeobiogeography, and the terminal Ordovician mass extinction and its subsequent aftermath. With colleagues of mine, mainly from our institute and local geologists, I went to Zhejiang, Jiangxi, Guizhou, Chongqing, Hunan and Hubei doing field work, examining rock sequences and collecting fossils.

Sergey ROZHNOV (Russia) together with my student A. Bryantseva has finished a paper about pelmatozoan echinoderm holdfasts from the Early and Middle Ordovician of the St Petersburg region. The article will be published in the *Paleontological Journal* at the end of 2009.

Now I am actively working at the Ordovician Eocrinoids and Paracrinoids from Baltica. The work is based on the vast collection gathered during many years of research and stored in the Borissiak Paleontological Institute in Moscow. The main aim of this project is to describe the morphology, ecology, stratigraphic and biogeographical distribution of all Baltic representatives of these classes. I would be grateful to my colleagues if they could send me any information about recent discoveries of Ordovician eocrinoids and paracrinoids.

S

Teresa M. SÁNCHEZ (Argentina) is continuing work on the early Ordovician bivalves from northwestern Argentina and Bolivia in order to understand the early

stages of bivalve evolution in the context of the early Ordovician radiation on the Gondwana shelves. Research focuses on the taxonomy, phylogeny and palaeoecology, including ecospace occupation through the Ordovician diversification. Together with B. Waisfeld, M. Carrera, and J. Benedetto I am working on Gondwana diversification patterns compared with global Ordovician trends, and also on the next edition of the *Treatise of Paleontology* (bivalve volume). I am in charge of the taxonomy of early Palaeozoic palaeotaxodonts from South America. Work on the early and upper Ordovician radiations of bivalves is in collaboration with Zong-jie Fang, and the palaeoecology and palaeobiogeography of Palaeozoic bivalves is with Andrea Sterren.

Thomas SERVAIS (France) is CNRS research director and continues research on organic-walled microphytoplankton from Cambrian to Silurian (but mostly Ordovician) sediments. He is leader of the International Geoscience Programme (IGCP) nr 503 'Ordovician Palaeogeography and Palaeoclimate' that runs from 2004 to 2008 (and hopefully on an extended term in 2009). In August 2008, he organised the closing meeting at Lille university (entitled 'Palaeozoic Climates'), that brought together some 120 scientists from all over the world. Together with several co-workers (see published references) he developed the idea that the increase of organic-walled microphytoplankton was one of the main triggers of the most rapid and most pronounced diversifications of marine invertebrates in Earth History that took place during the Ordovician.

The results of collaborations in the last years with colleagues from Argentina (C.V. Rubinstein), China (Li Jun) and Estonia (O. Hints, J. Nolvak) should be prepared for publication during 2009. These papers include the drawing of diversity curves of Ordovician acritarchs and their interpretation (related to climate, palaeogeography and sea level changes).

Paul SMITH (U.K.) continues work on the palaeontology (particularly conodonts), sedimentology, sequence stratigraphy and tectonic history of the Cambrian and Ordovician in NW Scotland, northern Wales and Greenland.

Lawrence SHERWIN (Australia): Despite having retired officially several years ago, I expect to remain on contract to the Geological Survey of NSW for the remainder of 2009. Having finished my contribution to the Ordovician section of the Goulburn 1:250 000 geological map, I am now working on the graptolite biostratigraphy of the Braidwood 1:100 000 map. Although the outcrop is not outstanding in this area there are some promising sections which span the late Darriwilian to early Bolindian.

SU Wenbo (China) has been actively working on the Ordovician and part of the Silurian in South China in recent years. During 2007 to 2008, I was in charge of two projects related to this period, one from the NSFC, another from the Sinopec Company. Several papers have been published (with kind help from overseas friends), which focused mainly on the Ordovician-Silurian black shale intervals, including the control of the deposition, the tectonic setting of this source-rock interval in South China, and so on. I took part in the Closing Meeting of the IGCP503 at Lille in August of 2008, including both the pre-excursion in Belgium and indoor meeting. It was wonderful to meet all the Ordovician and Silurian friends around the world, in this peaceful and charming city at the northeast border of France.

Thomas J. SUTTNER (Austria) is still working on some manuscripts concentrating on the micro-fauna of the Pin Formation (Ordovician-Silurian, Northern India). In 2008, Carlo Corradini and I organized two workshops with the aim of formalizing the lithostratigraphic names of the pre-Variscan units of the Carnic Alps. One or two more workshops are scheduled for 2009.

T

Blanca A. TORO (Argentina) continues working on taxonomic, biostratigraphic and palaeogeographic aspects of the Ordovician and Silurian graptolites from northwestern Argentina and the southern Precordillera. The research is being carried out in the context of two multidisciplinary projects (founded by CONICET and FONCyT) led by colleagues from CCT-CONICET Mendoza and Cordoba University. Collaborative work with researchers from the State University of New York at Buffalo continues on topics related to the current projects. Early Ordovician graptolite collections from northwestern Argentine basins have been reviewed together with Jörg Maletz. A new graptolite species, its evolutionary and phylogenetic relationships and the re-evaluation of the biostratigraphic graptolite scheme for the Floian strata from the Eastern Cordillera were recently published. In addition, a new scholarship was obtained for a graduate student, who will focus on the palaeobiological, phylogenetic and evolutionary aspects of Early Palaeozoic graptolites of Argentina.

V

Thijs VANDENBROUCKE (Belgium) is currently (until May 2009) working at the Department of Earth Sciences of Durham University, together with Howard Armstrong. See elsewhere in this newsletter for a report on the research group's activities. The main objective of my current postdoc project remains to examine the potential of several methods for ground-truthing Ordovician climate models and hypotheses. Our main focus is to use the palaeobiogeography of planktonic chitinozoans and graptolites to ground-truth Ordovician climate model (GCM) predictions of ocean state. Well-defined time slices in the Upper Ordovician (the *gracilis* biozone, HICE) are currently under scrutiny; our first biotope-distribution models have been presented at several meetings in 2008 (IGCP 503 meeting in Lille; IPC meeting in Bonn; 'Icehouse Symposium' in Utrecht) and now are under review for publication. In addition, the potential of a number of geochemical methods to reconstruct seawater properties is being evaluated. The research is sponsored by the Research Foundation (Flanders) and is conducted at the universities of Leicester (UK), Durham (UK) and Ghent (Belgium), in close cooperation with Mark Williams (University of Leicester), Jan Zalasiewicz (University of Leicester), Howard Armstrong (Durham University), Koen Sabbe (Ghent University), Florentin Paris (University of Rennes), Alex Page (University of Cambridge), Richard Fortey (Natural History Museum) and Jacques Verniers (Ghent University). I also have a couple of irons in the fire looking to solve some outstanding biostratigraphical problems, including the correlation difficulties at and around the *linearis* biozone level: this includes a detailed study of the chitinozoans through the graptolitic Bornholm succession (Denmark, together with Arne Nielsen, Geological Museum, University of Copenhagen) and the Whitehouse Group on the Girvan Foreshore and inland sections (Scotland, together with Keith Ingham, Hunterian Museum).

Last year saw the publication of a series of papers dealing with results from my PhD, amongst others an overview of the new Upper Ordovician chitinozoan biozonation in Great Britain (*Lethaia*), papers on the historical type Caradoc (*Geol. Mag.*) and Hirnantian (*Geol. Jl.*), and a monograph of the Palaeontographical Society formally describing the species used in the new biostratigraphic schemes. Jan Hennissen (University of Toronto) and I have finalised our chitinozoan work on the Chinese Dawangou section, in cooperation with Chen Xu and Tang Peng (NIGPAS). In addition, together with Richard Aldridge, Sarah Gabbott (University of Leicester), Florentin Paris and Johannes Theron, we have submitted a manuscript on the chitinozoans and age of the South African Soom Shale lagerstätte.

Next to the Ordovician projects, I am currently involved in several projects dealing with the Silurian System. Jeremy Davies (BGS), Richard Waters (National Museum of Wales), Stewart Molyneux (BGS), Mark Williams, Jan Zalasiewicz, Jacques Verniers and I are attempting a critical but constructive revision of the stratigraphy and facies architecture of the Llandovery type area in South Wales, as part of a 2 year (2007-2009) BGS project. Together with Olle Hints (University of Tallinn) and Axel Munnecke (Erlangen University), I am trying to evaluate the differences in carbon isotope values between several groups of palynomorphs, using the Ireviken Event on the Isle of Gotland as a test case.

Viive VIIRA (Estonia) is actively working on Ordovician conodonts from borehole sections of Estonia.

W

Reed WICANDER (USA): During the past year I have continued my collaborations with colleagues on Ordovician acritarchs. I presented a paper, in collaboration with Thamer Al-Ameri, on the use of acritarchs in the assessment of the gas generation and potential of the Ordovician Khabour Formation, Western Iraq, at the Joint Meeting of Spores/Pollen and Acritarch Subcommissions, CIMP Lisbon'07 Meeting in September, 2007. This was followed by a paper, in collaboration with Clinton Foster, on an Early Ordovician (Tremadoc-Early Arenig) acritarch assemblage from the Nambheet Formation, Canning Basin, Western Australia, and its palaeogeographic and climatic significance, at the 12th International Palynological Congress in Bonn, Germany in September, 2008. In addition, I had one paper published with Geoffrey Playford on the Upper Ordovician microphytoplankton from the Bill's Creek Shale and Stonington Formation of Michigan.

Anthony David WRIGHT (U.K.) is currently working on a monograph of the 5a brachiopods of Holmenskjaeret, Oslo Fjord.

WU Rongchang (China) is a Ph.D. candidate at the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Science. My research is primarily focused on the Ordovician conodont fauna from South China and its biodiversification, concentrating on conodonts from the Zitai Formation of Floian-Dapingian age.

Y

YAN Kui (China) continues working on Ordovician acritarchs in South China this year with financial support from NSFC for Ordovician acritarch stratigraphy, and is also preparing some Silurian acritarch material.

Graham YOUNG (Canada) continues to work on Palaeozoic palaeoecology and on the diversity of Ordovician Cnidaria. I am collaborating with Bob Elias, David Rudkin, Godfrey Nowlan, and others to study palaeoenvironments and biotas in the Ordovician rocks of central and northern Manitoba. Bob and I recently completed a field guidebook to Upper Ordovician rocks in the Winnipeg area, with co-authors Simon Wong and Ed Dobrzanski. Much of my recent work at the Manitoba Museum has been on the development of a multi-screen animated exhibit that will depict Late Ordovician life along a rocky shore in the Churchill area. Graduate student Lori Stewart and undergraduate student Matt Demski (co-supervised with Bob Elias at the University of Manitoba) are studying palaeoenvironmental change in the interval leading up to the Ordovician – Silurian boundary. I am continuing detailed studies of Ordovician cnidarian medusae from the William Lake site (central Manitoba), and am collaborating with David Rudkin, Michael Cuggy, and Erik Tetlie to study arthropods from the same locality.

Z

ZHAN Renbin (China): Supported by two major research projects from the National Natural Science Foundation of China (40825006) and the Ministry of Science and Technology of China (2006CB806402) respectively, I have been continuously working on the Great Ordovician Biodiversification mainly in South China together with my international colleagues. The Ordovician-Silurian Research Group at the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences (NIGPAS) concentrates on the palaeontological aspects of the research, while some of our colleagues outside NIGPAS are mainly working on the sedimentological and geochemical aspects. We are collaborating together to investigate the co-evolution between the marine organisms and the environments, and the dynamics of the Ordovician Radiation. Some phase-achievements have already been published.

ZHANG Yuandong (China) continues work on: (1) The Ordovician Bio-radiation — the response of graptolites in South China. This work has been supported by NSFC as major project titled “Palaeontological Evidence of Ordovician Bioradiation in South China” (led by Zhang Yuandong). In the project, experts of many key fossil clades in the Ordovician, such as graptolites, brachiopods, trilobites, acritarchs, nautiloids, bryozoans, radiolarians and bivalves, are involved. (2) The environmental background of Ordovician biotic radiation based on evidence from South China (cooperating with Axel Munnecke of Germany). In our joint field excursion in June, 2008, we investigated many sections in the Tarim Block and in the Yangtze Gorges area of South China, and collected systematically Carbon Isotope samples. (3) A refined divisions and correlations of the Ordovician rocks in Middle and Upper Yangtze Region (SW China), and Tarim Region (Xinjiang) where Ordovician black shale acted as important source rocks for petroleum (sponsored by SinoPec). (4) An integrated graptolite and conodont biostratigraphy of South China and Tarim blocks, in cooperation with Drs Wang Zhihao (NIGPAS) and Zhen Yongyi (Australia).

Yongyi ZHEN (Australia) is working on the Ordovician conodonts from New South Wales, Western Australia, Tasmania, New Zealand, and South China. I was invited to visit the Nanjing Institute of Geology and Palaeontology in May to July 2008 and participated in a field trip to the Tarim Basin during my visit.

ZHOU Zhiyi (China) was able to join the Fourth International Trilobite Conference held in Toledo in June of 2008. Thanks to the considerable effort of Dr. Isabel Rábano and her colleagues, the conference met with great success. It provided me a golden opportunity to see the Armorican Ordovician geology and to talk to other trilobite workers. I found it rewarding and profitable. In 2009, work continues on Ordovician trilobite biofacies and on the late Darriwilian–middle Katian (early Ashgill) trilobite faunas from the Pagoda Formation of the Yangtze region (with Zhou Zhiqiang).

Research has been conducted since 1996 involving a review of the previously established trilobite genera and faunal sequences, and a stratigraphic correlation of trilobite-bearing beds between different facies belts, and a monograph was eventually published by the Science Press (Beijing) at the end of 2008. This volume deals with 1677 trilobite genera that occur in the Palaeozoic rocks of China, and, after a critical revision, 1317 of them are considered as valid. All the valid forms are listed with reference to their familial assignments, and chronostratigraphical and geological settings. Based on the updated data of their temporal and spatial distribution, the Cambrian and Ordovician biogeography of China is reviewed. Furthermore, the familial and generic biodiversity changes through the 46 Palaeozoic stages and 71 Cambro-Ordovician time intervals (defined by biozones) in China are depicted, and the fundamental trends in the history of trilobite diversification and macroevolution through the Palaeozoic of China are revealed. The book provides the most complete and consistent data set available for trilobite records in China, and is of great significance for palaeontologists, geologists and biologists who wish to roam about the Chinese trilobite kingdom with ease.

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A

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