

SILURIAN TIMES No. 14

Year 2006 (prepared in June 2007)

**A NEWSLETTER OF THE
INTERNATIONAL SUBCOMMISSION ON SILURIAN STRATIGRAPHY (ISSS)
INTERNATIONAL COMMISSION ON STRATIGRAPHY
INTERNATIONAL UNION OF GEOLOGICAL SCIENCES**
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Secretary General: Dr. Peter T. Bobrowsky (Canada)
<http://www.iugs.org/>

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INTERNATIONAL SUBCOMMISSION ON SILURIAN STRATIGRAPHY (ISSS)
Chairman: Rong Jia-yu (China)
Vice-Chairman: T.N. Koren' (Russia)
Secretary: J. Verniers (Belgium)

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M.E. Johnson (USA)	D. Holloway (Australia)
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CHAIRMAN'S CORNER

Dear all colleagues,

12 June, 2007

I am very pleased to see this new issue of the <Silurian Times> from which you will know recent situations and contributions to Silurian investigations from the world during the last year. I am grateful to all who replied to Jacques's requests and to Jacques for his careful and fine edition for this issue.

As you know, the 10th International Symposium on the Ordovician System and the 3rd International Symposium on the Silurian System, joined with the 4th IGCP 503 Annual meeting (the Yangtze Conference) will be held in Nanjing soon. This is the first time to join the Ordovician and Silurian symposiums at the same time and place and to have such a meeting in China. More than 110 participants from 24 countries will take part in the conference. A supplement issue of *Acta Palaeontologica Sinica* will be published before the conference. It includes 88 short papers covering almost all aspects of the geology of Ordovician and Silurian as indicated by its name "The Global Ordovician and Silurian" (edited by Li *et al.*). Additional two guide books (written by Zhang *et al.* and by Zhan and Jin) respectively for pre- and post-conference field trips are involved for the participants in the conference. All scientists who study the Ordovician and Silurian can purchase them after the conference. We wish this meeting would be successful and the participants would enjoy their stay in China.

The second thing I would like to express herein is that a final report of our restudy of the GSSP for the base of the Silurian System has been submitted to ICS (International Commission of Stratigraphy). The revised definition makes the boundary assignment at the base of the *Akidograptus ascensus* Biozone, defined by the first appearance of *A. ascensus*. All of our voting members cast their vote to accept this proposal derived from Mike Melchin. It is important to note that this proposal is only for a change in the biostratigraphic definition of the GSSP, whereas the location and stratigraphic level will not be changed. This is the first effort ever to formally restudy a defined GSSP, and as a result, there are no formal procedures in place. A preliminary procedure for further discussion has also been suggested by the ISSS and submitted to ICS.

As science goes forward, Silurian study has achieved a new step. Fine stratigraphy and palaeontological fundamental works continue to play a crucial role in international high-resolution correlation and in an interpretation of environmental changes. The view of the Silurian as a time of stable greenhouse conditions has been successively challenged during the last decade. New investigation shows that the global carbon cycle anomalies can be related to sea-level changes that appear to be global in many cases (see Calner and Eriksson, 2006 in GFF). Non-traditional research areas, like chemo-stratigraphy, sequence stratigraphy, and others, may integrate tightly with those basic fields to improve the quality and level of research works in the near future. Any comments and suggestions for investigation of the Silurian are most welcome.

The next field excursion of the ISSS will be held in Sardinia, Italy in June 2009. Dr. Carlo Corradini and his colleagues have been spending their time and energy for organization and preparation. I thank him very much for doing this job. I hope that many scientists of the ISSS will attend and enjoy this meeting.

Rong Jia-yu
Chairman ISSS

EDITOR'S NOTES

I wish to thank all of those who contributed to this issue and apologise to anyone whose contributions I may have inadvertently left out. We have received the current projects and recent publications of 44 voting or corresponding members. The list of Silurian workers who showed an interest to receive "Silurian Times" contains close to xxx persons. Possibly more researchers could send the Silurian community about their current projects and publications. My apologies for the delay in assembling this newsletter.

Jacques Verniers, Secretary

SCIENTIFIC QUESTION RAISED BY PHILIPPE LEGRAND

Philippe Legrand raised two questions to the Silurian community in the previous Newsletter but he received only one answer. Therefore he raises the problem again: He was concerned by this question because he encounters difficulties to let the FAD's coincide at the base of the Silurian. Maybe the vague definition of the biozone could be the origin of this problem.

Philippe Legrand (January 2007): "Two scientific questions (continuation): Only one young colleague has showed an interest in my two questions put in Silurian Times n°13.

What must I conclude?

A: Nobody knows a section in which *Akidograptus ascensus* and *Spinachitina fragilis* have been collected in the same bed and nobody knows a section in which *Parakidograptus acuminatus* and *Spinachitina fragilis* have been collected in the same bed. In this case, the equivalence of the biozones based on these fossils seems slightly suspicious or imprecise or/and

B: Nobody has an interest in this problem, but in this case is it reasonable to continue talking of high-resolution stratigraphy?"

REQUEST FROM MIKE MELCHIN

Dear Silurian Colleagues,

I am currently in the process of updating the Silurian chapter of the Geologic Time Scale, last published in 2004. I would greatly appreciate any comments, suggestions for updates for the correlation charts, information on new references that would help me to improve this chapter. Please send any information by e-mail to: mmelchin@stfx.ca or by mail to:

Thank you in advance,

Michael J. Melchin

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THE WEB SITE FOR THE SILURIAN SUBCOMMISSION

All members of the Silurian Subcommittee are now aware of our new website for the ISSS prepared by Fan Juanxuan and Zhao Hui at the Nanjing Institute of Geology and Palaeontology, with input from the ISSS executive. <http://www.silurian.cn/>.

ANNUAL REPORT OF THE INTERNATIONAL SUBCOMMISSION ON SILURIAN STRATIGRAPHY (ISSS) OF THE INTERNATIONAL COMMISSION ON STRATIGRAPHY FOR



International Commission on Stratigraphy
Subcommission on Silurian Stratigraphy
ANNUAL REPORT 2006

1. TITLE OF CONSTITUENT BODY

International Subcommission on Silurian Stratigraphy ISSS

Submitted by:

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2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

Mission statement

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

- (1) The development of an internationally agreed scale of chronostratigraphic units, fully defined by GSSPs at Series and Stage levels and related to a hierarchy of units (Substages, Standard Zones, Subzones etc.) to maximize relative time resolution within the Jurassic Period;
- (2) Establishment of frameworks and mechanisms to encourage international collaboration in understanding the evolution of the Earth during the Jurassic Period;
- (3) Working towards an international policy concerning conservation of geologically and palaeontologically important sites such as GSSPs. This relates to, *inter alia*, the IUGS Geosites Programme and the UNESCO Geoparks Programme. The Subcommission also has links to the Management Group of the UNESCO East Devon and Dorset Coast (The Jurassic Coast) World Heritage Site.

Goals

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

3. ORGANIZATION

The ISSS is a Subcommission of the Commission on Stratigraphy. The Subcommission is organized by an Executive consisting of Chairman, Vice-Chairman and Secretary, who are all Voting Members

of the Subcommittee. In the new Subcommittee elected for 2004-2008 there are twelve other Voting Members and Corresponding Members (50). (See Appendix for complete listing). The network of Corresponding Members has first of all a responsibility for communication in both directions between the Subcommittee and researchers on Silurian topics in their region. Secondly they represent a broad spectrum of specialized stratigraphical disciplines from those countries or regions where Silurian rocks are extensively studied in relation to fundamental and/or applied geological research.

Officers for 2004-2008:

Chair:	Rong Jiayu, Nanjing, China.
Vice-Chair:	T. N. Koren', St. Petersburg, Russia.
Secretary:	J. Verniers, Ghent, Belgium (<i>began, Jan. 2005</i>)

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

Websites: <http://www.silurian.cn/home.asp> contains newsletters, meeting announcements, discussion posting-boards, bibliography of Silurian articles, links to related sites, and other information. The former web site for the Silurian Subcommittee:
<http://iago.stfx.ca/people/mmelchin/SILURIAN.HTML> has access to pre-2005 issues of *Silurian Times* in PDF format.

4. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

Jointly with the **International Subcommittee on Ordovician Stratigraphy** there will be a joint meeting of the ISSS in Nanjing in 2007.

Collaboration on an IGCP Project N° 503 entitled “*Ordovician Palaeogeography and Palaeoclimate*”.

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2006

The year 2006 has been mainly a year of preparation for the 3rd International Symposium on the Silurian System and the IGCP 503 4th Annual meeting both in Nanjing, China, 27 – 30 June, 2007, which will be held together with the 10th International Symposium on the Ordovician System and is called the “Yangtze Conference on Ordovician and Silurian”. All authors presenting a talk or poster will have their extended abstracts submitted to the organizers by the end of 2006.

In June 2006 we saw the rapid publication in the international journal GFF of selected talks and posters presented at the Silurian Field Meeting in Gotland, Sweden August (15-22, 2005). Titles and authors can be found on <http://www.gff-online.se/site/part.asp?partID=38>. The theme for the field meeting was the global dynamics of the Silurian Period. In particular, the meeting and field trips focussed on important events of biotic and palaeoenvironmental changes as represented in the fossil, sedimentological, and chemostratigraphical record associated with their interpretation. The guest editors Mikael Calner and Mats E. Eriksson did an excellent job in the production of this high level publication, in less than a year after the symposium.

Silurian Times No 14 will be edited by the secretary in later 2006, and circulated as an email attachment to all Honorary, Voting and Corresponding Members of the Subcommittee in early 2007. It will contain the result of the votes on the base of the Silurian, the final report on the restudy of the base of the Wenlock, the second

circular for the 3rd International Symposium on the Silurian System and the IGCP 503 4th Annual meeting both in Nanjing, China, 27 – 30 June, 2007 and the latest news on Silurian research,

The new web site for the ISSS at <http://www.silurian.cn/home.asp>, created in 2005 by Fan Juanxuan and Zhao Hui at the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, under the direction of Rong Jiayu, ISSS Chair, has been updated with the Silurian Times No.13 (2005), the Second Circular of the Yangtze Conference on Ordovician and Silurian (27-30 June, 2007), and news about oncoming meeting.

6. CHIEF PROBLEMS ENCOUNTERED IN 2006

No major problems except for the old problem related to difficulties in obtaining grants for research on stratigraphical topics and travel to meetings of Subcommittee. Applications are often given low priority by National grant-awarding agencies. It would be helpful if IUGS emphasized to its member countries the importance it attaches to the GSSP programme and encouraged the relevant research funding bodies to give priority to funding relevant basic research.

7. SUMMARY OF EXPENDITURES IN 2006

INCOME

Carried forward from 2005		00.00
ICS Allocation	US\$300 converted to	€236.16
	Less bank charges of € 6.05 =	€230.11
TOTAL		€230.11

EXPENDITURE FROM 2006 BUDGET

General office expenses	□	130.11
ISSS Newsletter 13 preparation	□	100.00
TOTAL	□	230.11

8. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR:

8.a Preparation of the Yangtze Conference on Ordovician and Silurian (Nanjing, China, 27 – 30 June, 2007) with our 3rd International Symposium on the Silurian System, in collaboration with the 10th International Symposium on the Ordovician System and the IGCP 503 4th Annual meeting. A considerable work on the organization of this major symposium has been preparing by Chinese colleagues at Nanjing since 2004. The preparation is going very well and we believe that the conference will be held in Nanjing very smoothly next year.

8b. Regular updating the website for Silurian Subcommittee.

8c. Publication of Silurian Newsletter 15 (2007):

8d. IGCP Project 503:

South European Regional Team Meeting, Field workshop, Zaragoza, Spain September 2007

9. BUDGET AND ICS COMPONENT FOR 2007

Transportation, accommodation & registration to participate in the Yangtze Conference in Nanjing 2007 \$1000.00

Note that Dr. Koren had no funds for international travel from her institute in Russia.

General office expenses	\$100.00
ISSS Newsletter 14 preparation	\$100.00
Total:	<u>\$1200.00</u>

Potential funding sources outside IUGS

Most of the costs of Working Group meetings and other activities will be met by local support from host institutions and participation by individuals by national research and travel grants from their own authorities. It is hoped that the major meeting in Nanjing China (2007) will receive financial support from the respective national Ministries, but extent and purposes of this cannot be predicted at this stage.

10. CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (2002-2006)

Over the period of 2002-2006 the Subcommittee on Silurian Stratigraphy was active in several respects.

1) New York State Museum Bulletin 493 (Title: "*Silurian Lands and Seas---Paleogeography Outside of Laurentia*") was released in May 2003. The Bulletin consists of eleven contributed papers that cover Silurian palaeogeography, plate tectonic assembly, stratigraphy, and biogeography in North Africa, southern and central Europe, China, Kazakhstan, the Baltic region (including Scandinavia), Avalon, the Russian "Far East," northern Siberia, Australia and New Guinea, and the Himalayan countries and southeast Asia.

2) The field meeting of the ISSS was held in San Juan, Argentina in August, 2003, in connection with an International Symposium on the Ordovician System and an International Graptolite Conference. Field trips and the conference sessions were well organized and well attended. Accompanying this conference was the publication of the volume entitled "*Proceedings of the 7th International Graptolite Conference & Field Meeting of the International Subcommittee on Silurian Stratigraphy. INSUGEO, Serie Correlación Geológica. 18 Comunicarte Editorial, Córdoba, Argentina*" edited by G. Ortega and G.F. Aceñolaza.

3) The Silurian Field Meeting of the SSS was held in Gotland, Sweden between August 15 and 22, 2005. A three day symposium followed by five days excursion was organized by Eriksson, M.E., Calner, M. and L. Jeppsson (Lund University and support of the Swedish Geological Survey). The field guide and the abstract book were published in the volume "*The Dynamic Silurian Earth*". In: Eriksson, M.E., Calner, M. (Eds.), *Field Meeting of the Subcommittee on Silurian Stratigraphy 2005, Gotland, Rapportur och meddelanden-Sveriges Geologiska Undersökning vol. 121, pp.1-99*.

4) The restudy of the base of the Silurian System. A restudy of the GSSP for the **Base of Silurian** was prepared in 2002 (?) by a working group under the leadership of Mike Melchin. Through 3 year work, the working group has unanimously agreed that the current GSSP, at 1.6 m above the base of the Birkhill Shale, at Dob's Linn, Scotland, should be maintained as the GSSP, but the biostratigraphical definition of the boundary needs to be revised. The GSSP should be regarded as coinciding with the first appearance of *Akidograptus ascensus*, defining the base of the *A. ascensus* Biozone at that GSSP section. By the middle of March 2006 all titular members have voted in favour of the proposal of Mike Melchin for the base of the Silurian at Dob's Linn.

5) Regarding the restudy of the base of the Wenlock Series. The working group to restudy the **Base of the Wenlock Series** (base of Sheinwoodian Stage) was led by David Loydell, looked at potential GSSP sections in the Czech Republic and Wales, as possible alternatives to the current GSSP in England. The primary marker for the base-Wenlock was a graptolite, but the GSSP in England is notably poor in allowing exact determination of their ranges. Recent evidence has shown that the current GSSP does not coincide with the base of the *Cyrtograptus centrifugus* Biozone, as was supposed when the GSSP was defined. It has been

suggested to retain the GSSP location in England but revise the level of the GSSP slightly to coincide with a conodont event -- the Ireviken conodont datum 2, which coincides approximately with the base of the lower *murchisoni* graptolite biozone (instead of the current *centrifugus* graptolite zone). Alternatively, another GSSP locality with a precise base of the *Cyrtograptus centrifugus* Biozone could be chosen (e.g., potential sections in Great Britain and the Czech Republic), but this process would be quite lengthy. The report of this work at the Silurian Field Meeting in Gotland, in August, 2005, was discussed over the winter and spring, 2006. Most voting members appreciated very much the amount of work by the working group and especially the leader of the group. But most felt that for the moment that no good alternative for the previous GSSP can be proposed. It was decided not to propose a new GSSP and stick for the time being to the old GSSP, although it had many shortcomings, until new studies can propose a better alternative. This time consuming study could however not be effectuated before the deadline of the ISC, ending at the International Geological Congress in Oslo summer 2008.

6) An International Conference on the Silurian System is planned for Nanjing, China, in 2007, to be hosted by the Nanjing Institute of Geology and Palaeontology. The work on preparation and organization for this meeting has been carried out effectively and smoothly.

OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2007-2010)

For those of us who are interested in the geology of the Silurian, the four-yearly International Symposium is a priority and these will be "officially" supported and sponsored as resources allow.

The priorities (not in order of merit) proposed for the Silurian Subcommittee for the next four years include:

1. Substage Working Groups to propose GSSPs for Substages as appropriate,
2. Involvement in the aims and objectives of IGCP Project 503
3. Developing and expanding the Thematic Working Groups: for example, searching for and interpreting data from all sources relevant to reconstructing the palaeobiogeography or the climate of one or more specific time-intervals. In part this will be given further impetus by involvement in IGCP Project 503.
4. Investigate the establishment of data-bases which would bring together and make available information from all sources associated with the Silurian researchers.

2007

- a. Discussion on possible re-study of other Silurian GSSP's.
- b. Nanjing meeting and field excursion for the Ordovician and Silurian Subcommittee on Stratigraphy in Nanjing and Southwest China (upper Yangtze Platform: mainly Llandovery--Rhuddanian, Aeronian, and Telychian)
Continued discussion on **Llandovery/Wenlock boundary**
Further work on possible new GSSP re-studies
New members for next four years
- c. Silurian *Times* (edited by the secretary)

2008

- a. Possible vote on **Llandovery/Wenlock boundary**
- b. Possible continued further re-study of other GSSP's.
- c. Election of new officers and members
- d. Silurian *Times* (edited by the secretary)

FUTURE MEETINGS

INTERNATIONAL SYMPOSIUM ON THE SILURIAN SYSTEM, NANJING, CHINA, 2007

This symposium will very soon be held in conjunction with an International Symposium on the Ordovician System. Field trips will focus on classic Silurian sections in South China.

Latest news on the website of the ISSS: <http://www.silurian.cn/>

SILURIAN FIELD MEETING IN SARDINIA, ITALY, IN 2009.

(Already announced in newsletter 13)

"Time and life in the Silurian: a multidisciplinary approach". Petr Storch, Enrico Serpagli and Annalisa Ferretti announce the ISSS field-meeting in Sardinia 2009.

We are pleased to invite you to participate in a Subcommittee on Silurian Stratigraphy meeting and field trip in the June 2009 in Cagliari (Sardinia, Italy). Final dates are not yet fixed, but the most probable period would be the first half of June. A preliminary schedule includes three days of scientific sessions and the Subcommittee business meeting. Main emphasis will be paid to integrated multidisciplinary studies in Silurian rocks and fossil biota. Scientific sessions will be followed by three days of field trip: relatively deep water limestone and black shale facies will be demonstrated in a selected number of outcrops and sections. The first circular can be expected in early 2007.

All information: Prof. Carlo Corradini Dipartimento di Scienze della Terra Università di Cagliari via Trentino 51 - I-09127 Cagliari (Italy) ph. (+39) 070 6757744; fax. (+39) 070 282236 corradin@unica.it

Final Report of the Subcommittee on Silurian Stratigraphy Restudying the Global Stratotype for the base of the Silurian:

A Report of the restudy of the defined global stratotype of the base of the Silurian System

A GSSP should be defined at a point in a section that affords the potential for confident, precise, and high-resolution correlation into as many facies worldwide as possible. The GSSPs of the Silurian System were defined in the 1980s (Cocks, 1985; Holland, 1985). Unfortunately, there are serious problems for some of these, mainly because many of the stratotypes have biostratigraphic deficiencies and even lack the key index fossils continuously below and above the boundary. We agree that in order to maintain stability, the whole framework of the Silurian System (Llandovery Series, Wenlock Series, Ludlow Series and their subdivisions, and the Prídolí Series) would best remain as defined for the past two decades (Holland et al., 2003). However, it is our view that maintenance of a poorly defined GSSP does not lead to stability (Melchin et al., 2004).

1. Discussion on a restudy of the base of the Silurian

In the business meeting of the Subcommittee on Silurian Stratigraphy (SSS) held in Orange, Australia on 13 July, 2000, a number of participants suggested that the most important business should be to begin a re-examination of some of the stratotypes of the Silurian System and its subdivisions. Having conscientiously discussed the issues there was a general agreement that two that were specifically named as in need of restudy are the base of the Silurian System and the base of the Wenlock Series. Both the section and the zonation on which the GSSPs are based need to be reconsidered in the process.

2. Agreement of the restudy within the SSS

Since there were six titular members of the Silurian Subcommittee at the Australia meeting the preliminary suggestion mentioned above went to all titular members for their vote. As a result, this proposal to restudy these GSSPs received no objections from the voting membership of the SSS. Therefore, the SSS decided to restudy these two GSSPs.

3. Establishment of a joint working group for the restudy

When the subcommittee decided to restudy the base of the Silurian it agreed that a working group for the restudy must be established and scientists from both the Ordovician and Silurian subcommittees should be involved in the group. Dr. Mike Melchin was asked by the Chair of the SSS to organize a joint working group of the SSS and SOS to study this proposal. The working group led by Dr. Mike Melchin, was established in 2002 and include 24 members from Argentina, Australia, Belgium, Canada, China, Denmark, France, Puerto Rico, Russia, UK, and USA ("Silurian Times" No.10). The list of the group membership was sent to the titular membership of the SSS for approval and there are no objections afterwards.

The move to form working group to restudy of the boundary stratotype for the base of the Silurian System was presented to the executive of the ICS at its meeting in Urbino, Italy in the summer, 2002. The ICS gave its approval for the working group to proceed.

4. A report outlining the results of this work

The Rhuddanian Stage, the lowest stage the Silurian System, is named for the Cefn-Rhuddan Farm in the Llandovery area. However, its lower boundary stratotype section and point are located at Dob's Linn in the southern uplands of Scotland. It was defined at a point 1.6 m above the base of the Birkhill Shale in the Linn Branch Trench section (Williams, 1983, 1988). This point was regarded as coincident with the local base of the *Parakidograptus acuminatus* Zone (Cocks 1985), marked by the first appearances of *P. acuminatus* s.l. and *Akidograptus ascensus* (Williams, 1983). However, in several other regions where both taxa occur, *A. ascensus* first appears below *P. acuminatus*, and some authors have marked the base of the Silurian as occurring at the first appearance of the former whereas others have used the latter to define the base of the Silurian. Therefore, this has not been a "stable" situation, with different workers using different and conflicting criteria to define the boundary in their respective regions.

Resampling and systematic revisions have shown that *A. ascensus* first appears at the level of the GSSP at Dob's Linn, and that *P. acuminatus* s.s. first occurs 1.5 m higher in the section (Melchin and Williams 2000) (**Fig. 1**). Therefore, they proposed that the graptolite zonation at Dob's Linn be revised to include a lower *A. ascensus* Zone and a higher *P. acuminatus* Zone. The base of the *A. ascensus* Zone, marked by the first occurrences of *A. ascensus* and *Parakidograptus praematurus* [the latter was identified by Williams (1983) as *P. acuminatus* sensu lato], should be regarded as the biostratigraphic horizon that marks the base of the Silurian System.

Akidograptus ascensus is a species known from several different paleocontinents and paleolatitudes (**see Appendix 1**). It has been reported from South China (Mu, 1988; Chen Xu et al. 2000), Kazakhstan (Koren' et al., 1980), north-eastern Siberia (Koren' et al., 1983), several regions within Peri-Gondwanan Europe (Storch, 1996) and Sweden (Koren' et al., 2003). Therefore, this species has a very high value for global biostratigraphic correlation. In addition, the occurrence of additional taxa at and just above the GSSP level, particularly *Normalograptus lubricus*, permit correlation with some regions that lack akidograptids, such as Arctic Canada (Melchin et al., 1991) and Uzbekistan (Koren' and Melchin, 2000), where the first appearance of *A. ascensus* is delayed as a result of biofacies controls. This restudy has also shown that the graptolite faunas are significantly more diverse in both the *N. persculptus* and *A. ascensus* zones than previously suspected.

Sampling for palynomorphs has shown that biostratigraphically useful chitinozoans occur in the GSSP interval, which can be used for correlation between graptolitic shale and carbonate shelf biofacies (Verniers et al., 2005, Verniers and Vandenbroucke, 2006).

As a result of three years of work, the working group has agreed that the current GSSP, at 1.6 m above the base of the Birkhill Shale, at Dob's Linn, Scotland, should be maintained as the GSSP, but the biostratigraphical definition of the boundary needs to be revised. The GSSP should be regarded as coinciding with the first appearance of *A. ascensus*, defining the base of the *A. ascensus* Biozone at that GSSP section.

It is important to note that this proposal is only for a change in the biostratigraphic definition of the GSSP. The location and stratigraphic level will not change, nor will its age with respect to the radiometric time scale.

5. Vote in favor of the new proposal within the subcommission

The report outlining the results of the restudy work was submitted to the titular membership of the SSS for a vote to accept this proposal. The votes from the titular members were organized in late 2005. By the middle of March 2006 all titular members voted in favor of Mike Melchin's proposal for the revision of the biostratigraphic definition of the base of the Silurian at Dob's Linn. No one was opposed, no one abstained. Thus, it is widely agreed among the titular membership of the SSS. This restudy will move forward our better understanding of the stratigraphy of the boundary interval and improve the resolution with which it can be correlated globally.

6. Report to ICS for ratification

Having been approved by the SSS membership, this report with the results of the votes and final conclusion for approval is going to the ICS for ratification.

Regarding procedure proposed for the restudy of a GSSP

This is the first effort ever to formally restudy a defined GSSP, and, as a result, there are no formal procedures in place. The following preliminary procedure for further discussion may be applicable.

First, there should be a general agreement that a particular defined stratotype is in a real need of restudy. A working group to restudy the boundary should be created, and given the task of undertaking this research and preparing a report to the relevant subcommission(s).

Second, a report outlining the results of the restudy work should be submitted to the restudy working group and then to the titular membership of the SSS for a vote to accept this proposal. The voting should take place first within the boundary restudy working group, and then within the voting membership of the ICS subcommission for the particular system.

Third, the results of these votes should then be forwarded to the ICS for consideration and approval (see Silurian Times No.11, p. 11; Mike Melchin with contributions from Rong Jiayu, David Loydell, Felix Gradstein and Stan Finney).

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- This report has been provided by Rong Jiayu (Chairman of the SSS), Mike Melchin (Chair of the restudy working group for the Ordovician and Silurian boundary), Tatyana Koren (Vice-Chairman of the SSS) and Jacques Verniers (the secretary of the SSS).

Appendix 1

Geographical distribution of *Akidograptus ascensus*:

1. Dob's Linn, Scotland (Williams, 1983; Melchin and Williams, 2000)
2. Scania, Sweden (Koren et al., 2003)
3. Thuringia, Germany (Jaeger, 1988)
4. Poland (Teller, 1969)
5. Bohemia (Storch, 1996)
6. Bulgaria (Storch, 1996)
7. Spain (Gutierrez-Marco et al., 1998)
8. Portugal (Gutierrez-Marco et al., 1998)
9. Sardinia, Italy (Storch, 1996)
10. Kazakhstan (Koren et al., 1979; in Apollonov et al. 1980; Koren' and Rickards, 1996)
11. Gornyi Altai (Yolkin et al., 1988)
12. Kolyma (Koren et al., 1983)
13. Many places in S China, such as Wangjiawan, Yichang (Mu, 1988; Chen Xu et al., 2000)
14. Xainza, Tibet (Mu and Ni, 1983)
15. England (Hutt, 1974; Harper and Williams, 2002)
16. Uzbekistan (Koren' and Melchin, 2000).

SILURIAN RESEARCH 2006

Dick Aldridge (U.K.). My recent activities and publications have centred on Cambrian and Ordovician Lagerstätten, but I am making steady progress with Wang Cheng-Yuan on a big paper on Silurian conodonts from South China; I hope this will be finished by the end of 2007.

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 Paleozoic. Several joint papers have appeared recently with others in press and preparation, which deal with (Ordovician and) Silurian conodont taxonomy, evolution, paleoecology, cladistic analyses and the response of the conodont communities to eustatic change. The geochemistry of Lower Paleozoic 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); Late Ordovician-Early Silurian conodonts from the Kolyma Terrane, NE Russia (with Shunxin Zhang). Other work nearing completion includes: Ordovician-Silurian conodonts from Hudson Bay (with Shunxin Zhang); and Ashgill-Wenlock conodonts from the Canadian Arctic with David Jowett.

Denis Bates (U.K.): I am working on a number of retiolitid graptolites, in collaboration with Anna Kozłowska, Alf Lenz and Jörg Maletz. Following publication in 2006, of a paper on the genus *Plectograptus*, genera being worked on include *Holoretiolites* and *Paraplectograptus*. With Anna Kozłowska, a paper on a new retiolitid genus has just been submitted for publication. Work on the ultrastructure of a number of dendroid genera, with Adam Urbanek, is nearing completion. A paper on the ultrastructure, and the stolon system, of *Desmograptus*, with Kate Saunders, Joanne Kluessendorf and Donald Mikulic, has been submitted for publication, and is currently being revised. Work continues on other graptolites, including the Ordovician genus *Cryptograptus*.

James E. Barrick (U.S.A.): I am working with Mark Kleffner on an NSF-sponsored project to study the record of Silurian episodes and events through the Wenlock-Ludlow interval across the central United States. My work continues also on Llandovery conodont faunas from Oklahoma, Texas, and New Mexico with several different colleagues.

Alain Blicek (France): I am supervising Zivile Zigaite's Ph.D. thesis on "Early Vertebrates of the Silurian of North Eurasia and their role in palaeogeographical and palaeoclimatic reconstructions" (Univ. of Vilnius, Lithuania; co-supervisor Dr V.N. Karatajute-Talimaa). This includes common work on the palaeobiogeographic distribution and significance of Silurian vertebrates, and their potential bringing on climatic reconstructions (this part of the work is led by Zivile in connection with the group of geochemists of the University of Erlangen, Germany).

Art Boucot (U.S.A.): Hans Niemyer, Antofagasto, has discovered the first Silurian fossils from Chile! Fernando Alvarez and myself are involved in describing them.

Carl Brett (U.S.A.): I am actively working on Silurian sequence and cycle stratigraphy in Ohio Kentucky and Indiana. Professor Warren Huff and I received a NSF grant to study Silurian sequence stratigraphy and K-bentonites in eastern Laurentia, Avalonia and Baltica. Work during 2006, with Dr. Patrick McLaughlin involved detailed logging of about 20 outcrop sections and all available drill cores for southern Ohio. We are integrating detailed event and sequence stratigraphy with isotopic and conodont biostratigraphic studies of Brad Cramer (Ohio State University) and Mark Kleffer (Ohio State University at Lima, Ohio). We have collected approximately 40 samples of possible K-bentonites, which are being processed; at least five samples show phenocrysts.

This research is permitting a detailed time-slice stratigraphy from the Appalachian Basin into the mid-continent platform. We are able to document patterns of shifting depocenters and areas of regional thinning and stacking of sequence boundaries, indicative of the passage of the basin axis and forebulge. In addition, our work will permit delineation of recurrent faunas in multiple cycles, setting the stage for further testing of the hypothesized ecological-evolutionary subunits in eastern Laurentia. The combination of sequence stratigraphy, geochemistry and detailed paleoecology promises to provide insights into episodes of abrupt faunal change in the late Llandovery and mid Wenlock.

Euan N.K. Clarkson (U.K.): For the last forty years I have much involved with the Silurian Inliers in the southern Midland Valley of Scotland. In particular, the Pentland Hills inliers, close to Edinburgh have been of the greatest interest. We have now submitted an extended manuscript for the Palaeontological Field Guide series, which hopefully will be published in 2007.

Euan Clarkson, David Harper, Cecilia Taylor and Lyall Anderson "Silurian Fossils of the Pentland Hills, near Edinburgh, Scotland". This covers structure, sedimentology, palaeoenvironments and palaeoecology, and contains short systematic descriptions of all the important fossils, covered by experts in various groups. The great bulk of the editorial work was undertaken by Cecilia, who heroically spent from March to the end of October 2006 doing little else.

New excavations in the Gutterford Burn Eurypterid Bed in 2003, masterminded by Lyall Anderson of the National Museum of Scotland, revealed much new information on the geological setting and succession; this will be published in 2007 in *Scottish Journal of Geology*;

Robin Cocks (U.K.) had another busy year in 2006. Papers were finished and submitted on a substantial (41 taxa) Lower Aeronian brachiopod fauna from Newlands, Girvan; on Palaeozoic climate changes; with Trond Torsvik on the Palaeozoic history of Siberia; and with Rong Jia-yu on a survey of Rhuddanian brachiopod genera worldwide to determine how and where they picked up after the Hirnantian glaciation. New work started on compiling a revised review of British and Irish Lower Palaeozoic brachiopods for the *Palaeontographical Society*; a paper with Trond Torsvik on the Lower Palaeozoic palaeogeography of northwestern peri-Gondwana; and with Richard Fortey on the history of Avalonia.

Carlo Corradini (Italy): I'm working on Silurian and Devonian of North Gondwana, mainly in Sardinia and in the Carnic Alps, and I'm organizing the ISSS Field Meeting scheduled in Sardinia in June 2009.

In Sardinia researches are focused on the different Silurian facies cropping out in the island: a paper on graphic correlation in the "Ockerkalk" has been published (with Sofie Gouwy), a project achieving to propose formal stratigraphic units in SE Sardinia is in progress (with E. Serpagli, P. Storch and A. Ferretti), and a study of the graptolite limestones of SW Sardinia, comparing graptolite and conodont faunas for biostratigraphic purposes, is started (with S. Piras).

In the Carnic Alps I'm investigating the Orthoceras Limestones in the Italian side of the chain, and several sections are in study in the Lake Wolayer, Mt. Zermula and Mt. Cocco areas (with L. Simonetto, P. Serventi and M. Pondrelli). Furthermore, a few sections have been preliminary sampled in the Silurian of the Montagne Noire.

Bradley D. Cramer (U.S.A.): My Silurian research continues although I am 'technically' now working on the Permian for my PhD here at The Ohio State University. Our Ordovician-Silurian working group at OSU, which includes Drs. Matt Saltzman, Mark Kleffner, and Stig Bergström, as well as fellow graduate student Seth Young, has been concentrating on two major areas of research. The first is purely stratigraphical. Through the combination of detailed conodont biostratigraphy (Kleffner and Bergström) with high-resolution carbon isotope stratigraphy (Saltzman, Cramer, and Young) we are currently trying to work out some of the long-standing problems with North American Paleozoic stratigraphy, particularly in the biostratigraphically poorly constrained midcontinent. For instance, the placement of the Ordovician-Silurian boundary in the midcontinent has recently been revised for several areas in North America, as has the placement of the

Llandovery-Wenlock boundary. The revised chronostratigraphic positions of these boundaries have significant implications for the interpretation of global climate change during these volatile intervals of earth history.

The second area of focus is the climate changes associated with these unstable time periods. Both the Ordovician-Silurian and the Llandovery-Wenlock boundaries are associated with major changes in climate and a host of explanations have arisen to explain these phenomena. Through the use of coupled isotope proxies (C_{carb} , C_{org} , Sr) we are narrowing down the possible culprits of climate change during the Silurian. Current collaborations exist between our working group and the following other Silurian colleagues: Drs. Axel Munnecke (Erlangen), Lennart Jeppsson (Lund), David Loydell (Portsmouth), Steve Kershaw (Brunel), Carl Brett (Cincinnati), Pat McLaughlin (Bucknell), Enrique Díaz-Martínez (IGME-Madrid) and Su Wen-Bo (Beijing).

Bob Elias (Canada). Together with Graham Young (adjunct professor) I welcome inquiries and applications from students interested in graduate studies at University of Manitoba. M.Sc. and Ph.D. projects are available on corals, paleoecology, and stratigraphy [see http://www.umanitoba.ca/science/geological_sciences/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.

M. Cemal Goncuoglu (Turkey). I'm actively working on the Silurian stratigraphy and paleogeography of Turkey with international contribution.

Helen Hughes (U.K.). I am just beginning my PhD entitled 'Palaeobiology of Silurian trilobites from North Greenland'. I am based at Birmingham and am under the joint supervision of Dr Alan Thomas and Dr Phil Lane.

David Holloway (Australia)

Work with Phil Lane (Keele University, UK) on diverse assemblages of scutellid trilobites from mid-late Wenlock to Ludlow limestones from central western New South Wales, as reported in the last Silurian Times, is nearing completion. We have also commenced an investigation of the trilobite fauna of the Tomcat Creek limestone, an allochthonous unit of late Llandovery age in the Quinton Formation of the Broken River region of north-eastern Queensland. This fauna is dominated by scutelluids and illaenids but also includes representatives of the Aulacopleuridae, Brachymetopidae, Cheiruridae, Lichidae, Odontopleuridae, Proetidae, and very rare Calymenidae and Encrinuridae. I have recently completed papers on early Silurian trilobites of the suborder *Phacopina* from central Victoria (jointly with Andrew Sandford) and a revision of *Protostygina* including a review of the Styginidae.

Lennart Jeppsson (Sweden). During 2006 I have continued assembling data about the less well known Silurian events in order to establish a detailed biostratigraphic framework for each of them. Such ones are needed both to identify these, too, globally, and to establish a sequence of localities, needed to open them for studies of other faunal, isotopic, and lithological effects. Field and laboratory work have been concentrated to those events that still are poorly known. That part of the work with the Ansarve and Linde events is now close to be finished. The other poorly known events need more laboratory work, and perhaps fieldwork, too. Regarding publications, see the list. One paper is scheduled to be published in early 2007 [Jeppsson, L., Talent, J.A., Mawson, R., Simpson, A.J., Andrew, A.S., Calner, M., Whitford, D.J., Trotter, J.A., Sandström, O., and Caldon, H.-J.: High-resolution Late Silurian correlations between Gotland, Sweden, and the Broken River region, NE Australia: lithologies, conodonts and isotopes. *Palaeogeography, Palaeoclimatology, Palaeoecology*].

During 2007 I intend to finish further manuscripts about the interval of the Lau Event and, hopefully, also start with one about the Ansarve Event. Laboratory work and, perhaps, fieldwork will continue as during 2006.

I suppose that the Pander Society Medal is not of a Silurian interest unless it reflects that parts of the Silurian conodont stratigraphy has now a resolution that is second to no other one.

Dimitri Kaljo (Estonia): I continue (hopefully a couple of years more) work in two fields - rugose corals of Estonia and application of stable isotopes in the Ordovician and Silurian chemostratigraphy of Baltoscandia, Podolia and Russian Far East. Under the latter different research projects are in progress in co-operation with colleagues from Norway (A. Mörk, H-A. Nakrem, K. Rønning), Russia (T. Koren), Ukraine (V. Gritsenko), USA (S. Young) and our institute (L. Hints, O. Hints, T. Martma M-A. Mõtus, P. Männik, J. Nõlvak, H. Pärnaste, a.o.). We just moved into new premises in the university campus (please note changed address) and got a new mass-spectrometer allowing increase our analysing potential.

Steve Kershaw (U.K.). I'm actively working on Silurian stromatoporoids and stromatoporoid reefs. The publications in the list below show the content of this current work.

Kozłowska Anna (Poland). I'm actively working on morphology, taxonomy and evolution of retiolitid and other Silurian graptolites from Poland, Arctic Canada, Spain and Lithuania. I also contribute in a project of the retiolitid part of the new Graptolite Treatise, together with Denis Bates and Alf Lenz.

Jiri Kriz (Czech Republic). I completed in 2006 and submitted to the Palaeontology my paper on the "Origin, evolution and classification of the new infraclass Nepioconchia (Mollusca, Bivalvia, Lower Palaeozoic)". The Nepioconchia originated probably in the early Silurian as result of r-selection progenesis in the shallow waters of the Peri-Gondwana and Siberia. During the Silurian and early Devonian the infraclass families underwent several diversifications in the recurring cephalopod limestone biofacies characteristic for Peri-Gondwana and adapted to the infaunal, semi-infaunal and epifaunal modes of life in several lineages. The Nepioconchia contain two orders, Praecardioida (Cardiolidae, Slavidae, Praecardiidae and Buchiolidae) and Antipleuroida (Stolidotidae fam. nov., Spanilidae fam. nov. and Antipleuridae). In cooperation with Stepan Manda I continue the project "Environment and palaeocommunities in the Ludlow (Silurian) of the Prague Basin (Perunica, Bohemia)" supported by grant (including artificial exposures) and will be completed in 2008.

Philippe Legrand (France). I am finishing the final description of the Oued In Djerane Ordovician-Silurian graptolites (Algeria). I prepare a comparison between the lowermost Silurian Algerian graptolite and the lowermost Silurian graptolites of other North African Gondwana countries.

Alfred Lenz (Canada). Anna Kozłowska (Poland) and I are continuing with our long-term monographic studies of Arctic isolated graptolites. Following completion of studies of upper Wenlock and higher graptolites, we are now extending our studies into the of earlier Wenlock faunas. We have recently submitted paper on some new and unusual retiolitids from upper Llandovery of Arctic Canada, several of which reveal unexpected morphologic features. 2. Mike. Melchin (Canada) and I are studying the remarkable and unique morphologic similarities between the graptolites *Testograptus testis* (upper Wenlock) and *Cochlograptus veles* (upper Llandovery), trying to understand their evolutionary relationships. 3. Paula Noble (USA) and I have submitted paper on Upper Wenlock Ceratoikiscidae (Radiolaria) from Arctic Canada. With Paula Noble, Chris Holmden (Canada), Monika Masiak (Poland), Matthew Zimmerman (USA), Simon Poulson (USA), and Anna Kozłowska, a paper has been submitted on a summary of isotope geochemistry and plankton response to the Wenlock Ireviken and *Cyrtograptus lundgreni* extinction events in Arctic Canada. 4. Dennis Jackson (UK) and I have submitted paper on Arenig graptolites from northern Yukon, involving more than 50 species.

Steve LoDuca (U.S.A.). As in 2005 work continued on the taphonomy, systematics, and evolution of Silurian noncalcified algae, especially dasyclads, and on the sedimentology and stratigraphy of the distinctive Konservat-Lagerstätten that yield them. Descriptions of several new and surprisingly morphologically complex Silurian noncalcified dasyclad taxa are currently underway in collaboration with Don Mikulic and

Joanne Kluessendorf (Illinois and Wisconsin material), Denis Tetreault (Ontario material), and Mike Melchin (Arctic Canada material). Research also continues in the areas of (1) evolutionary constraints on dasyclad form (using biophysical modelling in conjunction with empirical data from Silurian taxa) with Ernest Behringer (Department of Physics, EMU), and (2) taxon-specific stable carbon isotopic compositions of Silurian "organic macrofossils" (especially algae and graptolites) with Lisa Pratt.

David Loydell (U.K.)

2006 saw the completion of two large projects. The first was on the biostratigraphy of the Williamson Shale of New York (together with Mark Kleffner, Gary Mullins, Anthony Butcher, Damon Matteson and Jim Ebert), integrating graptolite, conodont and chitinozoan data. This work is in press in the Geological Magazine. The second was a study of the Hirnantian-Llandovery graptolites of Jordan which has been accepted for publication as part of the Special Papers in Palaeontology series. This work involved revision of many frequently recorded *Normalograptus* species.

2007 will see the continuation (and I hope completion) of various projects in Spain, Estonia, Sweden and North Africa.

In relation with the revision of the Llandovery-Wenlock boundary, I propose, based on the comments made by the titular members in Silurian Times No. 13, that further discussion of this issue is suspended until study of sections through the Llandovery-Wenlock boundary in the Czech Republic and in Wales has been completed. For the moment, we must accept Hughley Brook as GSSP for the base of the Wenlock, but keep in mind the various problems that this section possesses.

Peep Männik (Estonia). I am actively working on evolution, taxonomy and palaeoecology of Ordovician and Silurian conodonts, conodont-based high-resolution stratigraphy, bioevents and palaeogeography. My studies are mainly concentrated on the Baltic region, Russian Arctic (Severnaya Zemlya, Novaya Zemlya, Timan-northern Ural region, etc.) and Siberia.

Tiiu Märss (Estonia). I am working on two main projects. (1) The Estonian Silurian osteostracan taxonomy, systematics and distribution (joint work with Henning Blom, Uppsala). We have planned two papers, in one we deal with the sculpture and histology of shields of different taxa. Another paper is devoted to the osteostracan microremains found in many bore core sections of Estonia. (2) The second project is on furcaudids from the northern Canada (joint work with M.V.H. Wilson, Edmonton), and namely on the scale variation in their squamations.

Alexander (Sandy) D. McCracken (Canada). I continue to work on Middle to Upper Ordovician, Silurian, Devonian and Carboniferous conodonts from various locations in Canada. Much of my time is now assigned to outreach and paleontological databases.

Michael J. Melchin (Canada). I am currently focusing my research in several different areas. One of the main projects is quantifying biodiversity changes through the Katian-Hirnantian-Rhuddanian at several sections including Dob's Linn, which I have recently recollected. In addition, my graduate student Jason Loxton, is undertaking a similar study in northern Yukon. This is part of collaborative research project with Charles Mitchell, David Sheets, Stan Finney, Petr Storch, Chen Xu, and Fan Junxuan. Another graduate student, Diane Dawson is completing her study of the morphology and phylogenetic relationships among the earliest monograptids with hooked and hooded thecae. I am also completing a study of the Aeronian graptolite from Arisaig, Nova Scotia.

Tatiana Modzalevskaya (Russia) I'm actively working on Regional Silurian Stratigraphy of Siberian Platform and North-East of Russia, the correlation charts of which with several local different facies sections have been prepared till the end of last year. In collaboration with A.F. Abushik we prepare a manuscript on Silurian and Lower Devonian brachiopods and ostracods of Byelorussia.

The paper on remarkable Silurian stratigraphy and Palaeozoic brachiopod worker, Olga Ivanovna Nikiforova (1905-1994), which had a big influence, not only in the former USSR but internationally, was published in the Journal "Regional'naya geologiya i metallogeniya" N 27, 2006.

Axel Munnecke (Germany). I am currently working on Ordovician and Silurian palaeoclimatology based on stable carbon and oxygen isotopes (co-leader of IGCP 503), on the origin and diagenesis of limestone-marl alternations, and on Palaeozoic calcareous microfossils.

Viiu Nestor (Estonia). I am working on Silurian chitinozoans from the East Baltic drill cores. Recently I finished a study concerning chitinozoan biostratigraphy at the Wenlock-Ludlow boundary beds from the 5 core sections of Estonia, Latvia and Kaliningrad district (a paper has been submitted). A project, devoted to microfossil dynamics in some Upper Llandovery and Wenlock cores (with O. Hints, P. Männik and others), is going on.

Silvio H. Peralta (Argentina). During 2006 Silurian sedimentary rocks of Precordillera have been focused from a tecto-sedimentary point of view. Stratigraphic sections of the Tucunuco Group are under study in the La Invernada and the Alto Arena ranges, on the western flank of the Central Precordillera, but also in the La Dehesa range, between the Talacasto creek and the San Juan River area. Chiefly, significant facies change an correlation studies have been carry out on the Tucunuco Group, formed by the La Chilca Formation (Late Asghill to Early Wenlock) and the Los Espejos Formation (Late Wenlock lo Ludlow but also up to Early (basal) Lochkovian in some sections). As result of such studies, important facies changes have been documented to both, La Chilca and Los Espejos Formation, which are related mainly to extensional tectonic activity during Silurian time. On the other side, recently Albanesi and Ortega (2006), described to the middle and upper part of the Los Espejos Formation significant conodont assemblage belonging to *Kokelella variabilis variabilis*, which is recorded in the Ancha creek at the Talacasto area, Central Precordillera. Such conodont zone indicates lower Ludlow (Gorstian) in agree with data provided by Albanesi and Ortega (2006), and it suggests a correspondence with the Linde Event, which occurred between two consecutive stable episodes.

In the La Dehesa range, the Ph.D. student Estela Pereyra carry out stratigraphic and sedimentological studies on the Lower-early Middle Ordovician carbonate of the San Juan Formation and on the overlying Silurian succession of the Tucunuco Group.

On the other side, two students of Geology, Marcelo Ortiz and Mariano Martínez, are carrying out their thesis degree on different Silurian to Devonian section of Central Precordillera. Both sections are believed as key sections to interpret the geometry and tecto-sedimentary evolution of the Silurian basin in Precordillera.

A Project founded by the National University of San Juan, is running from January 2006 to December 2007, involving Early Ordovician carbonates of San Juan Formation, but also siliciclastic Silurian to Devonian marine deposits outcropping on the Eastern flank of the La Invernada Range, on the western side of the Central Precordillera, at San Juan Province. One of the main subject matter of this project is to map the Silurian and Devonian deposits outcropping along the western flank of the La Invernada range, where the recently redefined as Devonian Los Sombreros Formation occurs. This unite has previously been thought as Middle-Upper Ordovician in age, but study developed in last years demonstrate that it is Devonian in age. (Reference: Albanesi, G. L., Ortega, G. and Hünicken, M. A., 2006. Bioestratigrafía de conodontes y graptolitos silúricos en la sierra de Talacasto, Precordillera de San Juan, Argentina. *Ameghiniana*, v. 43, no 1, pp. 93-112. Buenos Aires).

José Manuel Piçarra (Portugal). I'm actively working on the Lower Palaeozoic stratigraphy of South Portugal (Ossa Morena Zone) and also on the Silurian graptolites from Portugal. A part of my activity was devoid this year in the Palaeozoic Paleontological heritage of the Barrancos area. I have a project with Juan Carlos Gutiérrez-Marco to study the Silurian of the Galiza-Trás os Montes Zone (Portugal-Spain). I am also working in the Silurian graptolites of Armorican Massif (a Portuguese-French project with Rémy. Gourvenec).

Sergio Piras (Italy). I have finish my PhD project on lower Ludlow graptolites of the western part of the Prague Basin (Czech Republic), and now I have two year of post-doc contract with the University of Cagliari (Sardinia, Italy). Actually I'm working on Silurian graptolites of Sardinia and Czech Republic. I'm preparing a large paper on lower Ludlow graptolite fauna of the western part of the Barrandian (Bohemia, Czech Republic) with Petr Storch based on new sections; I'm collaborating with A. Kozłowska to study on a new genus of retiolitid from lower Ludlow of Bohemia (Czech Republic); I'm studying graptolitic sections in Sardinia with P. Storch, and C. Corradini for comparing graptolite and conodont Biozones.

Rong Jiayu (China) has been studying the Ordovician and Silurian brachiopods mainly from China. Papers were finished or submitted with Jin Jisuo, Zhan Rebin and Jan Bergström on a Hirnantian species of *Stegerhynchus* from the Borenshult Fauna in Sweden; with Tony Wright (Wright and Rong) on a new genus in mid Ashgill of Sweden which is similar to *Brevilamnulella*; with Robin Cocks (Cocks and Rong) on a survey of Rhuddanian brachiopod genera worldwide to determine how and where they picked up after the end Ordovician mass extinction; and with Huang Bing, Zhan Renbin, and David Harper on the latest Ordovician deep water brachiopod assemblage from East China. A paper has been preparing on a lower Rhuddanian brachiopod fauna from Zhejiang and Jiangxi provinces, East China to see survival aspects from the end Ordovician extinction.

Põldvere, Anne (Estonia). I continue as editor of the journal Estonian Geological Sections. The drill core sections of Estonia range from the Proterozoic (Palaeoproterozoic-Neoproterozoic) to Palaeozoic (Cambrian-Devonian). Seven issues of the journal have been published until now, each dealing with one drill core (http://www.egk.ee/egk/?r=r2&ra=r2_1_1&t_id=105). For each section we give the lithological description of the core. The distribution of macro- and microfossils (mainly chitinozoans, conodonts, ostracods, and acanthodians) is described and illustrated with range charts. The results of stable isotope and volcanic ash bed study are given. The chemical composition and physical properties of the rock are analysed. Photos and descriptions of selected intervals and thin sections, laboratory data, and drawings illustrating the relationship of rock types and sedimentary structures in combination with fossil distribution and stratigraphic scale are added (in the last three issues on CD-ROM). The work is carried out by the geologists of the Institute of Geology at Tallinn University of Technology, Institute of Geology of the University of Tartu and Geological Survey of Estonia. Some colleagues from abroad have participated as well.

The 2006 issue deals with the Kerguta (565) drill core in northern Estonia, penetrating the Ordovician and Silurian sedimentary rocks. Contributions were provided by 17 authors: Garmen Bauert, Rein Einasto, Toivo Kallaste, Enli Kiipli, Tarmo Kiipli, Janika Lääts, Tõnu Martma, Jaak Nõlvak, Kiira Orlova, Ivo Paalits, Tõnis Saadre, Alla Shogenova, Kazbulat Shogenov (all from Estonia), Fabio Donadini (Finland), Anita Löfgren and Lisa Sjöstrand (both from Sweden).

The eighth issue of the journal is under preparation and will appear in 2007. It will focus on the Tsiistre (565) drill core penetrating the Furongian (Upper Cambrian), Lower and Middle Ordovician and Lower to Upper Devonian sedimentary rocks in south-eastern Estonia.

Teresa Podhalańska (Poland). I am working on the Ordovician/Silurian boundary beds, biostratigraphy, microfacies, *Hirnantia* fauna, Llandovery graptolites and chemostratigraphy related to eustatic changes in the Late Ordovician and the Early Silurian in Poland. I deal with the interpretation of the oxygen and carbon isotope data from the uppermost Ordovician and the lowermost Silurian. Recently I deal with the litho- and biostratigraphy and facies characteristics in the Ordovician and Silurian of the Pomeranian part of the Trans-European Suture Zone.

David Ray (U.K.). My research has continued to focus upon the Wenlock of the northern half of the Midland Platform (England), with exploratory work beginning within the south. I have manuscripts in preparation focusing on both the sequence stratigraphy and bentonite record for the upper Wenlock between the West Midlands and Wenlock Edge, as well as research in press, correlating lower Wenlock bentonites between the

Lower Hill Farm and Eastnor Park boreholes (Proceedings of the Geologists' Association, issue 2, hopefully). Additional ongoing projects include the establishment of a sequence stratigraphy for the whole of the Wenlock Series of the Midland Platform, including comparisons with contemporaneous strata, and investigations into condensed intervals (bone beds) within the lower Wenlock of the southern Midland Platform. The majority of these projects are collaborative works involving Carl Brett, Mikael Calner, Ken Dorning and Alan Thomas.

Rong Jiayu (China) has been studying the Ordovician and Silurian brachiopods mainly from China. Papers were finished or submitted with Jin Jisuo, Zhan Rebin and Jan Bergström on a Hirnantian species of *Stegerhynchus* from the Borenshult Fauna in Sweden; with Tony Wright (Wright and Rong) on a new genus in mid Ashgill of Sweden which is similar to *Brevilamulella*; with Robin Cocks (Cocks and Rong) on a survey of Rhuddanian brachiopod genera worldwide to determine how and where they picked up after the end Ordovician mass extinction; and with Huang Bing, Zhan Renbin, and David Harper on the latest Ordovician deep water brachiopod assemblage from East China. A paper has been preparing on a lower Rhuddanian brachiopod fauna from Zhejiang and Jiangxi provinces, East China to see survival aspects from the end Ordovician extinction.

Desmond Strusz (Australia) is still working his way through the Yass Syncline brachiopod faunas. A paper on the atrypides is in press with Alcheringa, and one on the athyrides has been submitted for inclusion in an AAP Memoir in honour of the late John Shergold. Detailed work has started on the small but completely undescribed rhynchonellide fauna from Yass. This leaves only the spiriferides to be done, for which preliminary studies have started. In addition, a chapter on the Silurian System in Australasia has been completed as part of a forthcoming revision of the 1996 Geoscience Australia Timescales volume. I am also keeping in touch with Guang Shi over the organisation of the next Brachiopod Congress, currently scheduled for the first week of February 2010 at Deakin University, Melbourne.

David Siveter (UK). I continue to research Silurian ostracods, especially myodocopes, especially from Europe. I have completed a manuscript on the biostratigraphy of British Silurian ostracods that will be published (2007) in a volume published by The Micropaleontological Society. Research on the Silurian Herefordshire Konservat-Lagerstätte (jointly with Derek Siveter, Derek Briggs and Mark Sutton) continues to provide wonderful animals with soft parts (including a new ostracod), as do studies of the Cambrian Chengjiang biota of China (with colleagues from Leicester, Oxford and China).

Derek Siveter (UK). My Silurian research continues to be concentrated on the palaeobiology of the fossils from the Herefordshire Konservat-Lagerstätte. This exceptional preservation horizon is yielding soft-part anatomy in great detail and in three dimensions. The work is being carried out together with Derek Briggs (Yale), David Siveter (Leicester) and Mark Sutton (London). Various arthropods (ostracod, phyllocarid, chelicerate, barnacle, and pycnogonid), a polychaete, a brachiopod, an aplacophoran-like mollusc, a platyceratid gastropod and a starfish have been described so far; other taxa are in various stages of the publication pipeline.

Alan Thomas (U.K.) is collaborating with Liam Herringshaw and Paul Smith in investigating a range of rare and/or problematical organisms from the Much Wenlock Limestone Formation: there are papers on the starfish and on *Cornulites* coming out later this year, and there will be others dealing with the rostroconchs and machaeridia. With Dave Ray, I have recently published a sequence stratigraphic study of the Much Wenlock Limestone, and we are planning to extend this investigation to cover the Wenlock of the Midland Platform. Jane Veevers recently completed her Ph.D. on aspects of Silurian stratigraphy and sedimentology in the Welsh Basin, and the first results of that work will be published shortly. As an extension of this research, NERC funding was obtained to radiometrically date some of the tuffs that occur in the Silurian sequence in South Wales, and the initial results of this work are being written-up currently, with colleagues at NIGL. Two tuffs from the *amorphognathoides* Biozone have yielded U-Pb ages of 248 ± 1.1 Ma and 427 ± 0.82 Ma: these

are the first high-resolution dates to provide a direct estimate of the age of the Llandovery-Wenlock boundary. Helen Hughes started a Ph.D. in September 2006, supervised by Phil Lane and me. She is working on large collections of Silurian trilobites from Greenland, collected during the reconnaissance geological mapping of the area in the late 1970s and early 1980s.

Jacques Verniers (Belgium) - I'm still working on the chitinozoans around the Silurian-Ordovician boundary. This year I started processing the Rostanga borehole (Scania, Sweden) where Tania Koren made a detailed graptolite biozonation. Most chitinozoan work in our research unit is now on the Ordovician. Jan Vanmeirhaeghe finished his PhD in January 2007 on a revision of the lithostratigraphy and biostratigraphy with chitinozoans of the Ordovician and Llandovery of the Condroz inlier (Belgium). Thijs Vandenbroucke (Belgium) started his post-doc position and will work on chitinozoans in the Upper-Ordovician but only rarely in the Silurian. Two MSc students (Jan Hennissen and Jan Mortier) worked/work on Ashgill–Rhuddanian chitinozoans of respectively Wales (Cwm Hirnant) and the Condroz inlier.

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