

- A distinct role of a '*Bureau of Standards*' to preserve and communicate our GSSPs and other stratotypes, and to start to more actively focus on intra-stage standardization.
- Councilors for regional contacts, and improved coordination with INQUA and IODP, and with the radiogenic isotope community.
- Special projects section of ICS to collaborate with national Geologic Surveys, Industry, BRGM and Geology Sections in Academies of Sciences
- Favored status for two journals: *Episodes* for news, forum, GSSPs, etc., and *Stratigraphy* for major science items.
- An "International Association of Stratigraphic Geologists" that would have a complementary role to ICS in Earth history activities and promotion.
- Addition of two stratigraphic awards: Steno Award for Best Stratigraphic Study and an ICS Student Award. These two awards, which might be awarded every second year, will complement the existing Digby MacLaren Award and the ICS Award, which are awarded every 4 years as part of the open ceremony of the IGC.

Therefore, ICS is planning to set up an 'ICS - Quo Vadis' task force to report in mid-2006. This task force will flesh out the strategic-planning discussions that started at the ICS meeting on 'Future Directions in Stratigraphy II' in September 2005.

On the financial side, we already explained at the IUGS-review in Paris that present funding levels (especially the 25% reduction that was incurred between 2004 and 2005 in just the basic "operating" support) to ICS are insufficient, and greatly slow down the planned and projected GSSP completion in 2008. Several of the subcommissions have vividly complained about these cutbacks (*see excerpts in Part 7 of the Annual Report*). We have aggressively pursued other sources of funds for our ICS-wide projects, but it is important that the "core IUGS support" be returned to pre-2005 levels or higher.

We kindly request that IUGS considers our 'bare bones' 2006 budget of \$40K to be the 'bare bones' for 100% funding. This amount already represents nearly a 50% reduction in the budgets submitted by our component subcommissions (*detailed in Part 10*).

With best regards

Yours Sincerely

Felix M. Gradstein *and* James G. Ogg

International Commission on Stratigraphy (ICS)

1. TITLE OF CONSTITUENT BODY

International Commission on Stratigraphy (ICS)

Submitted Jointly by:

Felix GRADSTEIN [ICS Chair]

Museum of Natural History, University of Oslo
P.O. Box 1172 Blindern, N-0318 Oslo, Norway
Tel: 47-22-851663 (home tel. 47-67-540966); Fax: 47-22-851832;
E-mail: felix.gradstein@nhm.uio.no

James OGG [ICS Secretary-General]

Dept. Earth and Atmospheric Sciences, Purdue University, 550 Stadium Mall Drive, West Lafayette, Indiana, 47907-2051, USA.
Tel: 1-765-494-8681 (off.), 1-765-494-0257 (lab); Fax: 1-765-496-1210, Home tel: 1-765-743-0400;
e-mail: jogg@purdue.edu

November, 2005

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

The International Commission on Stratigraphy (ICS) is a body of expert stratigraphers founded for the purpose of promoting and coordinating long-term international cooperation and establishing standards in stratigraphy. Its principal objectives are:

- (a) Establishment and publication of a standard global stratigraphic time scale and the preparation and publication of global correlation charts, with explanatory notes.
- (b) Compilation and maintenance of a stratigraphic data base center for the global earth sciences.
- (c) Unification of regional chronostratigraphic nomenclature by organizing and documenting stratigraphic units on a global database.
- (d) Promotion of education in stratigraphic methods, and the dissemination of stratigraphic knowledge.
- (e) Evaluation of new stratigraphic methods and their integration into a multidisciplinary stratigraphy.
- (f) Definition of principles of stratigraphic classification, terminology and procedure and their publication in guides and glossaries.

Fit within IUGS Science Policy

The objectives satisfy the IUGS mandates of:

- Fostering international agreement on nomenclature and classification in stratigraphy
- Facilitating international co-operation in geological research
- Improving publication, dissemination, and use of geological information internationally

- Encouraging new relationships between and among disciplines of science that relate to geology world-wide
- Attracting competent students and research workers to the discipline
- Fostering an increased awareness among individual scientists worldwide of what related programs are being undertaken.

In particular, the current objectives of ICS relate to three main aspects of IUGS policy:

- (a) Development of an internationally agreed scale of chronostratigraphic units, fully defined by Global Stratotype Sections and Points (GSSPs) where appropriate and related to a hierarchy of units to maximize resolution throughout geological time.
- (b) Promotion of international consensus on stratigraphic classification and terminology, which is essential for advancement of earth-science research and education.
- (c) Establishment of frameworks and systems to encourage international collaboration in understanding the evolution of the Earth.

3. ORGANIZATION

ICS is organized in two types of constituent bodies: Subcommissions for longer-term study, and Committees for more limited, shorter-term tasks. ICS is managed by the Executive Committee, which consists of elected and appointed officers. The current structure of ICS consists of the Executive Committee, an executive task group (Stratigraphic Information Services), and 14 Subcommissions that deal with the major chronostratigraphic units and aspects of stratigraphic classification and time scales.

The reports of each Subcommission are appended to this ICS summary compilation.

Subcommissions:

Quaternary
 Neogene
 Paleogene
 Cretaceous
 Jurassic
 Triassic
 Permian
 Carboniferous
 Devonian
 Silurian
 Ordovician
 Cambrian
 Ediacaran
 Precambrian (*organized 2003*)
 Stratigraphic Classification

Executive Task Group: Stratigraphic Information Services

The subcommissions of ICS together have about 350 titular members. When the corresponding members of Subcommissions are added, several thousand stratigraphers worldwide participate in the activities of ICS. In addition, many countries have national stratigraphic committees, with which ICS tries to establish or maintain contacts. The members of the Full Commission (i.e. the 3 members of the Executive + webmaster and the officers of the 15 Subcommissions and task group) come from 21 countries: Argentina, Australia, Belgium, Brazil, Canada, China, France, Germany, Great Britain, Ireland, Italy, Morocco, Netherlands, New Zealand, Norway, Poland, Romania, Russia, Spain, Sweden, and USA. The voting memberships of the aggregate subcommissions include at least 30 more nations.

Websites:

ICS main site	www.stratigraphy.org
Quaternary	www.quaternary.stratigraphy.org.uk
Neogene	www.geo.uu.nl/sns
Paleogene	wzar.unizar.es/isps/index.htm
Lutetian GSSP task group	wzar.unizar.es/perso/emolina/ypresian.html
Jurassic	www.es.ucl.ac.uk/people/bown/ISJSwebsite.htm
Triassic	paleo.cortland.edu/sts/
<i>Albertiana</i> newsletter:	www.bio.uu.nl/%7Epalaeo/Albertiana/Albertiana01.htm
Permian (newsletter)	pri.boisestate.edu/Permophiles/
Link to Permian research:	www.geo.ucalgary.ca/asrg
Devonian	sds.uta.edu/
Silurian	www.silurian.cn/home.asp
Previous newsletters	iago.stfx.ca/people/mmelchin/SILURIAN.HTM
Ordovician	www.ordovician.cn
GSSP discussion site	seis.natsci.csulb.edu/ordstrat2/default.htm
Cambrian	www.uni-wuerzburg.de/palaeontologie/ISCS/index.html
Precambrian	www.stratigraphy.org/precambrian
Stratigraphic Classification	www.geocities.com/issc_arg (commercial site)
Stratigraphic Information Systems	
CHRONOS database network	www.chronos.org
(<i>concept posted at:</i>)	www.eas.purdue.edu/chronos

3a. Elected ICS Officers for 2004-2008:

(1) ICS Executive

Chair: Felix Gradstein (Oslo, Norway) <i>is serving a second and last term</i> Vice-Chair: Stanley Finney (California, USA) <i>is serving a second and last term</i> Secretary (<i>appointed by Chair</i>): James Ogg (Indiana, USA)

The next IGC organizing committee will appoint a 4th executive (Vice-Chair at large) later this year. This officer's role is primarily to assist the ICS and its subcommissions in organizing activities, promotion and field trips associated with that International Geological Congress.

(2) ICS Subcommission officers

All subcommissions had changes in their officers and memberships during 2004, with new chairs being selected for the majority. Those subcommissions with re-elected chairs who will serve

a second (and last) term are: Quaternary, Jurassic, Carboniferous, Silurian, Precambrian and Stratigraphic Classification.

A full listing of all officers (with addresses, telephones, e-mails) is at the end of this main ICS report. The individual subcommission reports include a listing of all voting members (typically 20 in each subcommission).

4. EXTENT OF NATIONAL/REGIONAL/GLOBAL SUPPORT FROM SOURCES OTHER THAN IUGS

Only a few of the subcommissions have formal financial contributions from external sources other than IUGS (through ICS), and these are listed in the individual reports.

Some activities that are associated with ICS goals, such distributing charts of the Geologic Time Scale 2004 and placing this information onto public websites, receive some support from petroleum companies (e.g., GTS2004 chart printing) and the National Science Foundation of USA through its CHRONOS database consortium funding.

Informally, every officer and member of ICS donates their own time, office space, institutional facilities, and other components to the activities of the organization. No officer or executive receives any salary compensation from IUGS or other ICS funds. Indeed, most officers personally contribute toward their own travel and operational expenses.

5. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

Active and highly fruitful interfaces with many international organizations and geo-projects are a standard feature of ICS activities.

ICS has an active link to the NSF (Washington) scientific database initiative called “*CHRONOS*”, and to INQUA regarding the stratigraphy of the Quaternary, to CGMW in Paris regarding standardisation of chronostratigraphy and its colour scheme on charts, and to the International Association for Mathematical Geology (IAMG).

ICS subcommissions are traditionally affiliated with a considerable number of IUGS and IGCP activities. Details of these are given in each subcommission’s annual reports.

ICS members maintains active links with international research groups, including The (British) Micropaleontology Society, the North American Micropaleontology Society, and the Association of American Stratigraphic Palynologists, and international paleontological research groups on Graptolites, Conodonts, Ammonites, Radiolarians (Interrad), Nannofossils, Foraminifers, etc.

There are close links of many ICS stratigraphers with the Ocean Drilling Project (ODP). The latter is presently undertaking a major re-organization with focus on ultra-deep drilling using riser systems (in Japan 's subduction zones), non-riser high-resolution grid drilling, riser and non-riser continental margin drilling, and mobile platform Arctic Ocean drilling (the last major stratigraphic frontier, for which an initial successful drilling campaign occurred during 2004). ODP cores routinely test the global correlation potential of a great number of bio-events since the Jurassic, and this record is vital to develop integrated timescales at several scales of resolution, and global paleo-climate models.

6. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

The following are a few highlights of the numerous activities of the ICS Executive Commission and the detailed reports of each subcommission. See the individual subcommission reports for details.

ICS Executive Committee

The Executive notes with satisfaction that ICS is a rather stable organization with a dedicated and loyal membership and with good coherence, which leads to fruitful scientific and educational developments. Through its website, ICS has become a well-known brand name for authoritative stratigraphic information. The Executive seeks to maintain this energy and momentum of this truly global organization during 2006 and beyond (*see section on new initiatives*).

The following is a partial summary of achievements during 2005:

- Ongoing standardization of the International Chronostratigraphic Scale
 - Approval and ratification of the GSSPs for the Pliensbachian (early Jurassic), for the Ladinian (middle Triassic), for the Changhsingian (late Permian) and for the Hirnantian (late Ordovician).
 - To ensure even broader stratigraphic standardization, closer cooperation is being planned with the CGMW (World Geological Map) in Paris and the Russian Interdepartmental Stratigraphic Committee. Keynote lectures on ICS and GTS2004 by Gradstein during the Menner Memorial Symposium in Moscow in November 2005, and in Paris during the CGMW Annual Conference in February 2006, are paving the way.
 - ICS is helping CGMW's drive to establish a single global colour scheme for all chronostratigraphic charts, thus simplifying map and chart (re-)productions.
 - A JAVA package "*Time-Scale Creator*" was unveiled on the ICS website. The software incorporates a database of over 6000 biostratigraphic, magnetic and geochemical datums and zones that are tied to the Geologic Time Scale 2004 age-model. The package enables both on-screen visualization of user-selected time intervals (with choice of columns to display, etc.) and downloading of final publication-quality charts for printing. Future versions with enhance databases and plotting capabilities are outlines under the ICS plan for 2006.
- New initiatives in organization, publication and outreach
 - Strategic planning, especially the role of ICS in the post-GSSP (after 2008) period, is moving ahead. The ICS had a major planning workshop on "Future Directions in Stratigraphy", chaired by Stan Finney in Sept 2005 in Leuven, Belgium.
 - The Stratigraphic Commission of the Geological Society, London held a meeting with the chair of ICS to discuss a wide range of stratigraphic issues and ICS policy. A special task force may be formed to look into a clearer focus in ICS on the 'Bureau of Stratigraphic Standards' to preserve and maintain GSSP sections and other stratotypes.

- Selected Major Products under ICS Executive
 - Publication of *Geologic Time Scale 2004* (GTS2004, by Cambridge University Press, ~600 pages). This massive compilation is the culmination of a six-year effort that involved nearly 40 ICS collaborators. The time-scale program had active sponsorship from IUGS, the petroleum industry, the Commission for the Geological Map of the World, *CHRONOS*, Geological Survey of Canada, U.S. Geological Survey, and Cambridge University Press. Virtually all Phanerozoic stage boundaries have clear descriptions and much better defined ages, including estimation of uncertainties. The entire time scale is illustrated by color graphics at various scales, formats, and audiences. The price of the softcover edition of the book was kept to a minimum to ensure wide access. Sales of the book are formidable.
 - ICS is assisting revision of the Offshore Norwegian Lithostratigraphy (NORLEX website).

Quaternary Subcommittee (jointly with INQUA)

- ICS vote that the Quaternary began at 2.6 Ma (equivalent to base of Gelasian stage of upper Pliocene), and should become a formal unit of the international geologic scale. The request to establish a Quaternary (sub-era ranking) has been submitted to INQUA/IUGS for ratification.
- GSSP proposals were published for base-Late Pleistocene sub-series (Amsterdam-Terminal borehole) and base-Holocene (NorthGRIP ice core, at 11,784 years before AD 2000).
- An international correlation chart for the most commonly used regional stratigraphic units and isotope stages was published in early 2005.

Neogene Subcommittee

- Base-Serravalian GSSP candidate at Ras il Pellegrin on Malta has astronomical tuning completed, which is a prime requisite for proposing the GSSP level, and a proposal to define the GSSP at the base of the Blue Clay will be submitted to a vote of the Neogene subcommittee by Feb 2006.
- A vast majority of the members voted to accept the proposal (Aubry et al., 2005, *Episodes*) that the Neogene as a Period extends to the Present, and that the Quaternary should be established as a Sub-Era covering the last 2.6 Ma.

Paleogene Subcommittee

- In 2005, good progress has been made in the search for the remaining GSSPs.

Cretaceous Subcommittee

- The Lower Cretaceous standard ammonite zonation has been constructed for the Tethyan region, where most proposed GSSPs for Lower Cretaceous stages are all situated. Zonations from Boreal and Austral domains should be correlated to this standard.
- GSSP proposals for Hauterivian and Barremian should undergo Subcommittee voting during earliest 2006.

Jurassic Subcommittee

- **Pliensbachian** GSSP proposal of the Wine Haven section in Yorkshire (E. England) was ratified by IUGS in 2005.
- Four GSSP proposals are in final stages of preparation and pre-voting publication.

- IGCP Project 506 *Marine and Non-marine Jurassic: Global Correlation and Major Geological Events* held its first major symposium in Nanjing (Nov 2005).

Triassic Subcommittee

- Base-Ladinian (middle Triassic) GSSP was approved by ICS and ratified by IUGS.
- The proposed base-Olenekian (early Triassic) GSSP at Chaohu City (China) was a major topic of the *International Symposium on Triassic Chronostratigraphy and Biotic Recovery* in that town.
- A flurry of newsletters, workshops and external publications are maintaining a high level of energy of international workers in solving the remaining boundary issues.

Permian Subcommittee

- Base-Changhsingian (latest Permian) GSSP was approved by ICS and ratified by IUGS.

Carboniferous Subcommittee

- Base-Tournaisian GSSP proposal for the Pengchong section (South China) is being voted within the Subcommittee.

Devonian Subcommittee

- Ballot on subdivision of the Givetian, Frasnian and Famennian stages.

Silurian Subcommittee

- Restudy of GSSPs for base-Silurian and base-Wenlockian led to recognition that the GSSP-level is not suitable for global correlation, but another level within each GSSP site would have more global applicability. Therefore, the Silurian subcommittee will recommend revision of the GSSP levels during 2006.

Ordovician Subcommittee

- GSSP for base-Hirnantian (latest Ordovician) submitted to ICS for approval.
- GSSP for “Sixth Stage” (middle stage of Upper Ordovician Series) submitted to ICS for approval.
- GSSP proposals were prepared for the two boundaries remaining to be defined: the base of the Middle Ordovician Series and its lower stage (the 4th Stage, yet to be named); and the base of the base of the middle stage of the Upper Ordovician Series (the 6th Stage, yet to be named).

Cambrian Subcommittee

- Subcommittee voted to subdivide the Cambrian into **four series**, with **ten stages**.
- Tentative primary markers and GSSP candidates sections were identified for the majority of stages.

Ediacaran Subcommittee

- Official unveiling of the Ediacaran GSSP by the Premier of South Australia in April 2005. This new Period attracted worldwide attention in the geological Press.
- An international field trip took place to the Avalon Peninsula, Newfoundland, after which a subcommittee meeting was held to discuss the Cryogenian Period and stage subdivision of the Ediacaran.

Precambrian Subcommittee

- An initial international workshop was convened in Perth, Western Australia, in September. A clear majority voted to complete the time scale (e.g. the Hadean), formalizing the Archean, and refining the definitions of lower rank units. A lesser number of participants, but nevertheless a majority, embraced the general GSSP concept for ultimate subdivision of the Precambrian time scale.

International Stratigraphic Classification Subcommittee

- Series of discussion newsletters on various aspects of stratigraphy.

Stratigraphic Information System

- The ICS website, initiated in 2006, was continually updated, and has established an international reputation for providing authoritative information on divisions of geologic time, summary posters of the International Geologic Chart (in different standardized color schemes), and other items. The ICS website has a phenomenal hit and download rate from over 85 countries, reaching several million per year -- most interest is in the GSSP summary, the ICS chronostratigraphic chart and PDF files and graphics that detail GTS2004.
- The past chair of SIS is editor of the 2005 book – *Applied Stratigraphy* (Springer Verlag), which has excellent chapters for teaching of modern stratigraphy.

7. CHIEF PROBLEMS ENCOUNTERED IN 2005

The following is a summary of problems or concerns of the ICS Executive Commission and a compilation of key items noted in the detailed reports of each subcommission.

ICS Executive Committee

- The Executive considers that its limited funding does not serve its membership.
- ICS leans too much on developed, ‘western’ universities and surveys, especially those of Europe, North America and China. Incorporation of more active participation from African, Middle East, Asian and South American nations in field meetings and workshops will require an order of magnitude increase in budget to subsidize their travel and research needs.
- Many subcommission chairs and other officers in 2005-06 have a retired status (e.g., the chairs of Jurassic, Carboniferous, and Stratigraphic Classification subcommissions). As a result, although they can often maintain a more active role without interruptions by teaching and other administrative duties, they no longer enjoy a university-supported subsidy for travel, website design, and mailing.
- Progress on Global Stratotype Section and Point (GSSP) selection did not proceed in the timely manner indicated by several subcommission projections.
- Despite the fact that over 30 Russian stratigraphers are voting members in the ICS subcommissions, the Russian Interdepartmental Stratigraphic Committee considers that ICS is actively cooperating with their vast regional body. ICS will actively look into this, but notes that ICS invited and paid the travel for Russian stratigraphers to attend the ICS

workshops on 'Future Directions in Stratigraphy' in 2003 in Urbino and in 2005 in Leuven. Regional membership in ICS is not a realistic option, since ICS is an international body of scientific specialists, and not of countries. Philosophical misunderstandings in Russia between the global GSSP concept and the regional unit stratotype concept should be addressed, and ICS is preparing a special set of stratigraphic charts and spreadsheets showing correlations and calibrations of regional chronostratigraphic units to the global standard.

Quaternary Subcommittee (joint with INQUA)

- No major problems on GSSPs.

Neogene Subcommittee

- An important signaled problem is the possible lack of suitable sections in the Mediterranean for defining the remaining Neogene GSSPs, namely the **Langhian** and **Burdigalian** GSSPs. The option to have these boundaries defined in ODP cores is presently under study.

Paleogene Subcommittee

- Reduced funding levels were insufficient for supporting working groups and regional committees (especially in lesser developed regions). The informal publication outside the standard channels of ICS of a new mini-stage by two subcommittee members is being monitored; the situation indicates a local confusion about the roles of regional lithostratigraphy and standard chronostratigraphy.

Cretaceous Subcommittee

- While many scientists are happy to join our working groups, it is becoming more difficult to get people to commit time to preparing the documentation for GSSPs. The important Jurassic/Cretaceous boundary WG has been quasi-dormant, making the Jurassic the only Period without a formal definition, thereby hampering geochronology.

Jurassic Subcommittee

- Difficulties in obtaining grants for research on stratigraphical topics and travel to meetings of Working Groups. It would be helpful if IUGS emphasized to its member countries the importance it attaches to the GSSP program and encouraged the relevant research funding bodies to give priority to funding relevant basic research.

Triassic Subcommittee

- Lack of funds for travel to GSSP candidates and research-support problems face most task group members and the Chair.

Permian Subcommittee

- No major problems.

Carboniferous Subcommittee

- Endemism of conodont and foram lineages between Eurasia and North America is seriously hampering the potential for global correlation for the Viséan, Serpulkhovian and Moscovian stage boundaries; which, in turn, has slowed the choice of GSSP levels.

Devonian Subcommittee

- No major problems.

Silurian Subcommittee

- No major problems.

Ordovician Subcommittee

- Requests for additional study and evaluation of candidate GSSPs for the base of the Middle Ordovician Series delayed formal ballot.

Cambrian Subcommittee

- Obtaining funding to support travel and basic research on key stratigraphic intervals (potential GSSP horizons and sections). A modest increase in funding for the coming year would be of great benefit to members of some of the Working Groups on key horizons who have limited access to funding through nationally competitive research grants.

Ediacaran Subcommittee

- No major problems.

Precambrian Subcommittee

- No major problems.

International Stratigraphic Classification Subcommittee

- No major problems.

Stratigraphic Information System

- No major problems.

8. SUMMARY OF EXPENDITURES IN 2005 (ANTICIPATED THROUGH MARCH 2006):

The ICS Executive Bureau established the following budget for April 2005 – March 2006 after consideration for relative needs, planned activities, and funding requests of the subcommittees; and re-allocating based on the final (reduced) amount received from IUGS. All Subcommittees were limited to a maximum of \$750 for communications and administration costs. Funds and distributions are maintained by James Ogg (ICS secretary-treasurer) using a special account in the USA; and each subcommittee maintains its own account and budgeting for its allocated funds (as listed below). Itemized financial reports of individual subcommittees are contained within their attached annual reports. Note that these budget reports include projected expenditures through March 2006 (e.g., another four months), which is the month when the next annual (“2006”) funding suite is typically received from IUGS.

All amounts are in \$US; although most Subcommittee maintain accounting in Euro or other currency.

(A) ICS Operating Budgets and expenditures for 2005:

	Requested by ICS 2005	IUGS 2005 Allocation	<i>Comments on distribution</i>
Quaternary	\$1000	\$500	
Neogene	500	\$300	
Paleogene	2500	\$1500	<i>Field workshops for potential GSSP evaluation</i>
Cretaceous	2200	\$1500	<i>Support for Cretaceous symposium</i>
Jurassic	3500	\$2000	<i>Field workshops for potential GSSP evaluation</i>
Triassic	3500	\$2000	<i>Field workshops for potential GSSP evaluation</i>
Permian	1000	\$750	
Carboniferous	1000	\$750	
Devonian	800	\$500	
Silurian	1000	\$600	
Ordovician	2500	\$1500	<i>Field workshops for potential GSSP evaluation</i>
Cambrian	2000	\$1200	
Ediacaran	3000	\$1200	
Precambrian	1500	\$1000	
Classification	200	\$400	
Strat. Info. System	2500	\$2000	<i>Webmaster, web software, GSSP database (PaleoStrat) support, etc..</i>
Subcommission Total	\$26,700	\$18,500	
ICS Executive	3500	\$2500	<i>Meeting travel (e.g. ICS executive to Leuven strategic meeting.), wire-transfers, mailings, etc.</i>
<i>Special travel needs (*)</i>	5000	\$3000	<i>Funded special requests as these arise – e.g., subsidies for workshops, GSSP field work (e.g., Triassic);</i>
<i>Publications and Contingency</i>	4500	\$3000	<i>Drafting of educational chart; Special Subcommission and ICS needs; partial subsidy of travel to ICS strategic planning meeting in Leuven.</i>
SPECIAL – Strategic Planning	5000	3000	<i>Accommodation and food for all ICS subcommission chairs, local transport, etc.</i>
TOTAL (\$ USD)	45,000	\$30,000	<i>[A 30% reduction from planned ICS operating levels.]</i>

(*) Several subcommissions had indicated a pressing need for travel funds allowing key workers from less affluent countries or officers on pension status to participate in meetings and symposia. More and more researchers from poorer countries were becoming marginal to the main stream of research because of financial reasons. We had grouped these requests into a special line-item “travel funds” (to be dispersed by

the ICS secretary-treasurer according to various needs, rather than allocate to individual subcommissions). These funds are re-allocated to subcommissions in approximately \$800 grants by the ICS secretary-treasurer.

The ICS maintains a small contingency fund (last line on the budget above), maintained by the Executive Secretary, which is used for unforeseen expenses of subcommissions, special publication costs, and for initiating “special opportunity” projects that may arise during the fiscal year.

9. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED FOR April 2006-March 2007:

The following is a summary of plans of the ICS Executive Commission and a compilation of key goals noted in the detailed reports of each subcommission. Details of the subcommission goals are given in their attached annual reports.

ICS Executive Committee

- Updated Mesozoic-Cenozoic global chronostratigraphic charts (biostratigraphy, sequences, geochemistry, magnetics, etc.), and an Atlas of the Standard Geologic Time Scale
- A JAVA-application for user-defined detailed time-scale graphics to be hosted on www.stratigraphy.org, and linked to other stratigraphic websites such as NORGES and *CHRONOS*.
- Several subcommissions will have topical sessions, formal membership meetings, or field excursions in conjunction with the 2nd International Palaeontological Congress in Beijing (June, 2006).
- Special Symposium in September 2006 on ‘*Astronomical Tuning of the Geologic Time Scale*’, in Liege, Belgium, at the Annual International Association of Mathematical Geology (IAMG) Conference. This special symposium of the International Commission on Stratigraphy in collaboration with IAMG focuses on present status, new applications, and problems and challenges in cycle tuning of the geologic record and calibrating the next-generation Geologic Time Scale

Quaternary Subcommission

- Formalization of GSSPs for the base of the Holocene Series/Epoch, and base of the Upper Pleistocene sub-series.
- The Regional Stratigraphic Committee of Italy is planning a tripartite subdivision of the Mediterranean Pleistocene in three regional stages, which will improve intra-Pleistocene correlations in that classical region.

Neogene Subcommittee

- The proposal to define the Serravallian GSSP at the formation boundary between the Globigerina Limestone and the Blue Clay in the Ras il Pellegrin section on Malta will be submitted to ICS/IUGS.

Paleogene Subcommittee

- Complete GSSPs proposals for the base of the Priabonian and Chattian.

Cretaceous Subcommittee

- At least five GSSP proposals will be completed for voting by the Subcommittee and ICS.

Jurassic Subcommittee

- The 7th International Jurassic Congress (Symposium) will be held in Poland in September 2006. Stage Working Groups which have not yet proposed GSSPs for the bases of the Stages have been asked to submit proposals to the Subcommittee during or soon after the Congress.

Triassic Subcommittee

- Olenekian and Rhaetian GSSPs will be prepared for voting.

Permian Subcommittee

- Cisuralian Working Group Workshop to be conducted in July 24-August 4, 2006; followed by analysis of the samples. A proposal for the base-Sakmarian GSSP will be prepared.

Carboniferous Subcommittee

- Tournaisian GSSP will be submitted to ICS for approval.
- Moscovian GSSP candidate will be prepared.

Devonian Subcommittee

- Publication of the use of substages of the Givetian, Frasnian and Famennian in *Episodes* and *Geological Quarterly*.

Silurian Subcommittee

- Forwarding proposals for revised GSSPs for base-Silurian and base-Wenlockian to ICS and IUGS for ratification.
- Discussion on possible re-study of other “problem” Silurian GSSPs.

Ordovician Subcommittee

- Hirnantian and Sixth-Stage GSSPs voted by ICS and submitted to IUGS for ratification.
- Voting of Huanghuachang and Niquivil GSSPs for base of Middle Ordovician Series, discussion, and ballot on proposals. Submission of approved GSSP to ICS.
- Selection of names for 2nd, 3th, 5th and 6th stages of the Ordovician System.

Cambrian Subcommittee

- Vote on a stage-level GSSP at the horizon of the FAD of the cosmopolitan agnostoid trilobite *Ptychagnostus atavus*. This horizon is one of the most recognizable in the Cambrian, and it is well constrained by a variety of stratigraphic correlation tools.

- Development of proposals for two stage-level GSSPs at the horizons of the agnostoid trilobites *Lejopyge laevigata* and *Agnostotes orientalis*.

Ediacaran Subcommission

- Preliminary proposals for a Cryogenian GSSP and Ediacaran series/stage subdivisions.

Precambrian Subcommission

- Publication of concept papers on the Precambrian time scale philosophy, and a GSSP-based Archean-Proterozoic boundary.
- Firming up Indian and full Russian participation on the Subcommission before the GSSP-definition process is launched.

International Stratigraphic Classification Subcommission

- Task groups on Sequence Stratigraphy and on Cyclostratigraphy will make recommendations for standardizing concepts and nomenclature.
- Adoption of Stratigraphic Guide revision/rewrite plan, and assignment of lead authors.

Stratigraphic Information Services

- Promote TimeScale Creator visualization package for exploring Earth history.

Communications: Websites, Newsletters and Special Publications by ICS Subcommissions

In addition to the main website "www.stratigraphy.org" of ICS, most of the subcommissions have established websites that have placed an impressive amount of virtual information on geological time into the public domain. These are listed under Section #3 (above)

Nearly all subcommissions of ICS publish regularly newsletters or circulars of a high scientific caliber. These constitute an important international platform for publicizing the work of ICS bodies, allowing the stratigraphic community outside ICS to participate in discussions about boundary definitions. Most of them are circulated electronically or posted on subcommission websites, but hard copies are still necessary for distribution in countries without the necessary computer equipment.

10. BUDGET REQUEST TO IUGS FOR 2006 (\$ US)

The following budget request is for operations and special initiatives through March 2007 (funds are generally transferred from IUGS to ICS in April; which implies ICS subcommissions must operate on an April-to-March fiscal year).

It is important to note that the 2005 allocations of all subcommissions and other programs were reduced by almost 10% in 2005 (ICS had requested a total of \$38,200; and IUGS granted a total of \$36,000, but one must then include the drop in the value of the \$US dollar between the submission of "dollar-adjusted" requests and the receipt in funds – see re-allocation table and other remarks in Item #8 above). The column of "Initial Subcomm Request 2006" is taken from each Subcommission annual report of 2005 (*already adjusted for projected residual balances through*

March 2006; with Nov 2005 exchange ranges of 1Euro=\$1.25 or 1 Pound=\$2.00, including conversion costs). We (ICS Executive) have added an additional column of “ICS recommended allocation” based on past budgets and performance of the subcommissions and their itemized work plans for the next fiscal year.

Special Budget Categories:

We have grouped some aspects of the subcommission requests into aggregate categories of “Special travel needs” and “Contingency” categories. The funds will be redistributed by the ICS secretary-treasurer according to the final budget received from IUGS and needs of the subcommissions as their activities occur during 2006 and early 2007. The ICS Contingency Fund is designed to support additional special needs of subcommission as these arise in the later part of 2006-2007. The Special Travel Needs fund is explained in Section #8 (see above), and is solely for subcommission use (not for ICS executive officers).

Budget Summary:

The initial total of all Subcommission and ICS Executive budget requests is **\$62,600**. These amounts have already been adjusted for external funding sources. As can be seen in the following table, each subcommission requested substantially more than it received in 2005. This partially reflects the financial hardships that each subcommission suffered when their 2005 budgets (total of \$18K) were forced to be cut to less than half of their submitted needs (\$49K). Therefore, the subcommissions wish to recover some of their debts and regain their pre-2005 level of activities.

The ICS Chair and Secretary-General have adjusted these initial requests based on past year’s expenditures and allocations (*a total of \$21K decrease in the initial subcommission requests*), but with consideration of special programs, as indicated in the comments on the following table. Much of the necessary subcommission travel and uncertain required funding has been pooled into special funds. We have tried to make the composite request for 2006 “routine subcommission & ICS operation” (\$39,000) similar to the funding levels in 2004 (\$36,000).

We therefore request a total allocation of **\$40,350**.

	Final 2005 Allocation (Item#8 above)	Initial Subcomm Requests 2006	ICS recommended allocation	Comments on “<i>ICS recommended allocation</i>” to initial subcommission requests
Quaternary	\$500	500	\$500	
Neogene	\$300	5750	\$1500	GSSP-study field trip requests moved to Special travel contingency
Paleogene	\$1500	6250	\$2500	Non-specific requests for task group support moved to contingency
Cretaceous	\$1500	1500	\$1500	
Jurassic	\$2000	6050	\$4500	Major Jurassic symposium associated with several GSSP decisions. Non-specific requests for task group support moved to contingency
Triassic	\$2000	3000	\$2000	Travel subsidies moved to “ <i>Special travel needs</i> ”
Permian	\$750	1400	\$1400	Major suite of GSSP preparations

Carboniferous	\$750	1200	\$1200	
Devonian	\$500	1250	\$750	Travel subsidies moved to “ <i>Special travel needs</i> ”
Silurian	\$600	500	\$500	Travel subsidies moved to “ <i>Special travel needs</i> ”
Ordovician	\$1500	2100	\$1500	-specific requests for task group support moved to contingency
Cambrian	\$1200	7600	\$2000	Major Working group meeting in Australia. Other travel subsidies moved to “ <i>Special travel needs</i> ”
Ediacaran	\$2000	3000	\$3000	”
Precambrian	\$1000	3000	\$500	Travel subsidies moved to “ <i>Special travel needs</i> ”
Classification	\$400	2500	\$500	Excessive initial request. Travel subsidies moved to “ <i>Special travel needs</i> ” to be allocated on a case-by-case evaluation.
Strat. Info. System	\$2000	3000	\$2500	<i>ICS web development support</i> . Travel subsidies moved to “ <i>Special travel needs</i> ”
<i>Subcommission Total</i>	18,500	48,600	\$26,350	
ICS Executive	2500	3500	\$3500	Educational chart drafting/printing will be a major expense
<i>Special travel needs</i>	3000	5000	\$5000	<i>See explanation above. Pooled requests.</i>
<i>Publications and Contingency</i>	3000	4500	\$4500	<i>Reserved for posters, subcommission workshops, GSSP evaluations, and other special projects.</i>
<i>SPECIAL – Year of Earth</i>	3000	1000	\$1000	<i>Printing/mailing of special brochures and posters on TimeScale and GSSPs for Year of Earth</i>
TOTAL (in USD)	30,000	62,600	40,350	[NOTE: This is the approximate level received in 2004 (before IUGS granted an additional \$10K for Florence-IGC-related costs for a total ICS budget of \$50K in 2004).]

11. REVIEW CHIEF ACCOMPLISHMENTS OVER LAST FIVE YEARS (2000-2005)

A combined 4-year review was compiled as part of the ICS report for 2004, and the accomplishments for 2004 are listed in Item #7 above. A subset of major accomplishments is reproduced here. More details are in the individual subcommission reports.

A. GSSPs (boundary-stratotypes) created since 2000 (*listed in stratigraphic order*)

Neogene

- base of the **Zanclean** Stage and of the **Pliocene** Series at Eraclea Minoa, Italy (2000)
- base of the **Messinian** Stage at Oued Akrech, Morocco (2000)
- base of the **Tortonian** Stage at the Monte dei Corvi beach section near Ancona, Italy (2003).

Paleogene

- base of the **Eocene** Series (and Ypresian Stage) in the Dababiya Section near Luxor, Egypt (2003).

Cretaceous

- base of the **Maastrichtian** Stage at Tercis, France (2000)
- base of the **Turonian** Stage at Pueblo, Colorado, USA (2003)
- base of the **Cenomanian** Stage and of the Late Cretaceous Series, at Risou, France (2002)

Jurassic

- base of the **Pliensbachian** Stage at Robin Hood Bay, England (2004)
- base of the **Aalenian** Stage and of the Middle Jurassic Series at Fuentalsaz, Spain (2000).
- base of the **Sinemurian** Stage at East Somerset, England (2001).

Triassic

- base of the **Ladinian** Stage at Bagolino, Italy (2005).
- base of the **Triassic** System at Meishan, China (2001).

Permian

- base of the **Changhsingian** Stage at Meishan, China (2005).
- base of the **Lopingian** Series (Wuchiapingian stage) in China (2004).
- base of the **Guadalupian** Series (Middle Permian) and component **Roadian**, **Wordian** and **Capitanian** Stages in Guadalupian mountains, USA (2001).

Carboniferous

- agreement on Series-level divisions (2004)

Devonian

- all Devonian stage boundaries are defined by a GSSP
- publication of two volumes (*Courier Forschungsinstitut Senckenberg*, 220 (205 pp.) and 225 (347 pp.) in 2000, in which the GSSPs of all Devonian stages have been updated and their relative value for worldwide correlation is demonstrated.

Silurian

- all Silurian stage boundaries are defined by a GSSP; however, some of these appear to be more useful for regional correlation, rather than having global applicability.

Ordovician

- base of the Hirnantian Stage in China (2005).
- base of the **Upper Ordovician** Series (un-named stage) at Fågelsång in Sweden (2002).
- base of the upper stage of the **Lower Ordovician** Series at Diabasbrottet in southern Sweden (2002).
- base of the **Ordovician** System and of the **Tremadocian** stage at Green Point, Newfoundland, Canada (2000).

Cambrian

- base of the **Paibian** Stage and the **Furongian Series** (uppermost series of Cambrian) in the Paibi section, NW Hunan province, south China (2003).
- vote to subdivide the Cambrian into **four series** and **10 stages**.

Proterozoic Era

- base of the **Ediacaran Period** (uppermost period of Proterozoic) in the Flinders Range, Australia (2004).

B. The International Stratigraphic Chart

The International Stratigraphic Chart (divisions of geologic time) highlights all units that are formally defined by a GSSP or anticipated by a future GSSP decision, plus presents the ratified nomenclature of global chronostratigraphy. Two color schemes are available: the International Geological Map of the World conventions or those of the U.S. Geological Survey. This chart is continually updated, and public graphics can be downloaded in either color scheme at www.stratigraphy.org.

12. OBJECTIVES AND WORK PLAN FOR NEXT 3 YEARS (2006-2008)

The following is a summary of objectives of the ICS Executive Commission and a selection of key goals noted in the detailed reports of each subcommission. See Section 9 for a summary of objectives for 2006-2007.

ICS Executive Committee

- Define GSSP sections for all stages of the Phanerozoic Era, and solidify subdivisions of the Precambrian. **All GSSPs will be ratified by 2008**. The schedules for ICS/IUGS voting/ratification of the remaining GSSPs in each period is detailed below.

- Develop a suite of web-accessible international databases on all aspects of chronostratigraphy (paleontology, isotopes, cycles, magnetics, etc.).
- Produce the '*Atlas of the Geologic Time Scale*' in pocket (A4) book and digital formats.

Quaternary Subcommittee

- GSSPs for base of Holocene Epoch and for Pleistocene subdivisions.
- Compiling regional sequences throughout the Quaternary.
- Classify and formalize, where necessary, divisions based on very short-term events.
- Detailed correlation charts for specific time periods or specific regions, e.g. Weichselian Late-glacial to Holocene (15 ky); or the last 250 ky in Europe.

Neogene Subcommittee

- Selection of boundary criteria and sections for the definition of the 2 remaining Miocene stage boundaries, namely the base-**Langhian** and base-**Burdigalian**.

Paleogene Subcommittee

- Complete and publish the GSSPs of the Paleogene. We hope to present proposals for most of the remaining GSSPs before the Geological Congress in Oslo, 2008.
- Produce an updated and integrated Paleogene time scale.
- Produce a state-of-the-art review of the stratigraphic tools used in the Paleogene.
- Preparation of standardized regional correlation charts and paleogeographic maps by the Regional Committees.

Cretaceous Subcommittee

- To bring recommendations for the remaining 9 GSSPs before ICS as soon as possible, and not later than 2008.
- To communicate the results as widely as possible.
- To develop new directions for the Subcommittee as GSSP proposals are completed..

Jurassic Subcommittee

- Stage Working Groups to standardise and propose GSSPs for Substages as appropriate, but named ONLY as Lower/Middle/Upper. We do not want to clutter up the nomenclature with named Substages such as Carixian, Domerian etc. These will be approved by the Jurassic Subcommittee, but ICS and IUGS have no current plans for involvement with Substages.
- Asking the Stage Working Groups to define the bases of the Standard (Ammonite) Zones in terms not only of the correlation marker event but also to propose a stratotype point for the basal boundary in the same way as for the Stages. Similar definition of Regional Zones and maximising the detail of correlation with the Standard Zones would be very valuable.
- Involvement in the aims and objectives of IGCP Project 506, targetted on developing means of correlation between marine and non-marine Jurassic successions. In recent decades, the latter have been recognised to be very widespread and economically important in several regions, with exciting terrestrial faunas and floras.
- Developing and expanding the Thematic Working Groups, some of which have been very successful. For this to work they need to be given more specific projects and targets - 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 506.

- Investigate the establishment of **data-bases** which would bring together and make available information from all sources associated with the "members and friends" of the Jurassic.

Triassic Subcommittee

- Completion of Triassic GSSPs
 - 2006 – Olenekian and Anisian.
 - 2007 – Carnian, Norian and Rhaetian.
 - 2008 – Summary volume of all Triassic GSSPs. Emphasis switches to choice of non-marine auxiliary sections.

Permian Subcommittee

- Completion of Permian GSSPs
 - 2007 – Sakmarian, Artinskian and Kungurian.
- Correlations into Continental deposits, and across provincial boundaries.
- Detailed documentation of the geologic evolution of the Earth during the Permian with respect to the established chronostratigraphic framework.

Carboniferous Subcommittee

- International Carboniferous Congress is 2007 in Nanjing, China.
- Selecting all GSSPs by 2008.

Devonian Subcommittee

- Formalize the substage subdivision of stages.

Silurian Subcommittee

- Restudy of previous GSSPs that are difficult to use for global correlation (e.g., Llandovery/Wenlock).
- *Integrated Silurian Stratigraphy* -- in which all studies on refinement of biozonal schemes, sequence and cyclo-stratigraphy, stable isotope curve are combined.

Ordovician Subcommittee

- Completion of selection of GSSPs for all stages.
- Selection of names for 2nd, 3rd, 5th and 6th stages of Ordovician System.
- Refocusing of Subcommittee to address the global Ordovician Earth system.
- 10th International Symposium on the Ordovician System to be held in Nanjing, China in summer 2007.
- Editing of a new Ordovician Time Table.

Cambrian Subcommittee

- The principal objective of the Subcommittee over the next four years is the identification of the best horizons for establishing stage-level and series-level GSSPs within the Cambrian System.
- A secondary objective of the Subcommittee is to develop and publish regional correlation charts for the Cambrian.

Ediacaran Subcommittee

- 2006 – Preliminary proposals for Cryogenian GSSP and Ediacaran subdivision.
- 2007 – Voting on base of Cryogenian System GSSP.
- 2008 – Intra-Ediacaran subdivisions (series, stages) and GSSP decisions.

Precambrian Subcommittee

- A complete Precambrian time scale in place, with formalized Hadean and Archean eons.
- Formal GSSP for the bases of the Archean and Proterozoic.
- Natural subdivision of the Archean Eon, with GSSPs for each era-rank subdivision (Eo-, Paleo-, Meso-, and Neoproterozoic).
- Full incorporation of latest insights from planetary science in the earliest part of the terrestrial Precambrian time scale. Compare and contrast the time scales of Earth with those of other planetary bodies, specifically the Moon and Mars.

International Stratigraphic Classification Subcommittee

- A new *International Guidebook* for stratigraphic classification printed for the 33th IGC (Oslo, 2008). The book is conceived as a user's friendly, simple, very well illustrated manual with schemes and color photographs full of real examples from various continents and from various parts of the stratigraphic column.

Stratigraphic Information Services

- Comprehensive and authoritative user-friendly time-scale charts (and plotting tools), GSSP databases, and stratigraphic software will make the ICS website a popular “one-stop-shopping” hub for global geoscientists, educators and the public.

INTERNATIONAL COMMISSION ON STRATIGRAPHY (ICS)

DIRECTORY OF OFFICERS 2005-2006

15 Nov 2005

COMMISSION EXECUTIVE

Chair: Prof. Felix M. Gradstein

Museum of Natural History, University of Oslo
P.O.Box 1172 Blindern, N-0318 Oslo, Norway
Tel 47-22-851663; Fax: 47-22-851832, E-mail: felix.gradstein@nhm.uio.no

Vice Chair: Prof. Stanley Finney

Department of Geological Sciences, California State University at Long Beach,
Long Beach, CA 90840, USA
Tel: 1-562-985-8637; Fax: 1-562-985-8638; E-mail: scfinney@csulb.edu

NORDIC liaison to 33rd IGC (Oslo, 2008): *to be appointed*
[Potentially, Prof. Birger Schmitz, Gotenborg.]

Secretary General: Prof. James G. Ogg

Dept. Earth and Atmospheric Sciences, Civil Eng. Bldg., 550 Stadium Mall Drive
Purdue University, West Lafayette, Indiana, 47907-2051, USA
Tel: 1-765-494-8681 (off.), 1-765-494-0257 (lab); Fax: 1-765-496-1210
Home tel: 1-765-743-0400; E-mail: jogg@purdue.edu

ICS Webmaster (not an officer): Prof. Sorin Filipescu

Dept. of Geology, Babes-Bolyai University
Str. Kogalniceanu 1, 3400 Cluj-Napoca, Romania
Tel. 40-92-849544, Fax. 40-64-191906; E-mail: sorin@bioge.ubbcluj.ro

SUBCOMMISSION ON QUATERNARY STRATIGRAPHY

Chair: Dr. Philip Gibbard

Godwin Institute of Quaternary Research, Department of Geography
University of Cambridge, Downing Street, Cambridge CB2 3EN, England
E-mail: plg1@cus.cam.ac.uk

Vice-Chair: Dr. Jerry McManus

Wood's Hole Oceanographic Institute
Wood's Hole, MA, USA
E-mail: jmcmamus@whoi.edu

2nd Vice-Chair: Dr. John van Couvering
 American Museum of Natural History
 Central Park West at 79 St., New York, NY 10024 USA
 Tel: 212-769-5657; Fax: 212-769-5653
 E-mail: vanc@amnh.org

Secretary: Dr. Thijs van Kolfschoten
 Faculty of Archaeology, Leiden University
 Reuvenplaats 4, 2300 RA Leiden, The Netherlands
 E-mail: T.van.Kolfschoten@rulpre.leidenuniv.nl

SUBCOMMISSION ON NEOGENE STRATIGRAPHY

Chair: Dr. Frederik J. Hilgen
 Institute of Earth Sciences, University of Utrecht, Budapestlaan 4, POB 80021,
 3584 TA Utrecht, The Netherlands
 Tel: 31-30-2535186/2535122, Fax: 31-30-2532648; E-mail: fhilgen@geo.uu.nl

Vice-Chair: David Hodell
 Department of Geological Sciences, University of Florida,
 Gainesville, FL 32611, USA.
 E-mail: dhodell@geology.ufl.edu

Vice-Chair: Francisco Javier Sierro Sánchez,
 Departamento de Geología, Facultad de Ciencias, Universidad de Salamanca,
 37008 Salamanca, España.
 E-mail: sierro@usal.es

Secretary: Elena Turco,
 Dipartimento di Scienze della Terra, Università degli Studi di Parma,
 Parco Area delle Scienze 157, 43100, Parma, Italia.
 E-mail: elena.turco@unipr.it

SUBCOMMISSION OF PALEOGENE STRATIGRAPHY

Chair: Eustoquio Molina
 Departamento de Ciencias de la Tierra, Universidad de Zaragoza
 Calle Pedro Cerbuna, 12, E-50009 Zaragoza, Spain
 Tel. 34 976 761077, Fax. 34 976 761106; E-mail: emolina@unizar.es

Vice-Chairman: Jan Hardenbol
 Global Sequence Chronostratigraphy Inc.
 826, Plainwood Drive, Houston, Texas 77079-4227, USA
 E-mail: jhardenbol@aol.com

Secretary: Dr. Noël VandenBerghe
 Departement Geografie-Geologie, Afdeling Historische Geologie
 Redingenstraat 16, B-3000 Leuven-België, Belgium
 E-mail: noel.vandenbergh@geo.kuleuven.ac.be

SUBCOMMISSION OF CRETACEOUS STRATIGRAPHY

Chair: Prof. Isaabella Premoli Silva

University of Milano, Dipartimento di Scienze della Terra “Ardito Desio”
Via Mangiagalli, 34; I-20133 MILANO, Italy

Tel: 39-02 503-15528 (direct line); Fax-Tel 39-02 503-15494; Email: isabella.premoli@unimi.it

Vice Chair: Dr. I. Walaszczyk

University of Warsaw, Warsaw, Poland

E-mail: walas@geo.uw.edu.pl

Secretary: Dr Silvia Gardin

ESA-CNRS 7073, Laboratoire de Micropaléontologie, case 104, Université Pierre et Marie Curie,
4 Place Jussieu, F-75252 Paris 05, France

E-mail: gardin@ccr.jussieu.fr

SUBCOMMISSION ON JURASSIC STRATIGRAPHY

Chair: Dr. Nicol Morton

Le Chardon, Quartier Brugière

F-07200 Vogüé, France

Tel: +33-4 75 37 03 80; E-mail: NICOL.MORTON@wanadoo.fr

Vice Chair: Prof. Paul L. Smith

Earth and Ocean Sciences, University of British Columbia,

6339 Stores Road, Vancouver, B. C. V6T 1Z4, Canada

Tel: 1-604-822-6456; Fax: 1-604-822-6088; E-mail: psmith@eos.ubc.ca

Secretary: Dr. Paul R. Bown

Department of Geological Sciences, University College London,

Gower Street, London WC1E 6BT, Great Britain

Tel: 44-0-20-7504-2431; Fax: 44-0-20-7388-7614; E-mail: p.bown@ucl.ac.uk

SUBCOMMISSION OF TRIASSIC STRATIGRAPHY

Chair: Dr. Michael J. Orchard

Geological Survey of Canada, 101-605 Robson Str.,

Vancouver, British Columbia, V6B 5J3, Canada

Tel: 1-604-666-0409; Fax: 1-604-666-1124; E-mail: morchard@nrcan.gc.ca

Vice Chair: Yin Hongfu

China University of Geosciences, Yujiashan,

Wuhan, Hubei, 430074, Peoples Republic of China.

E-mail: hfyin@cug.edu.cn

Vice Chair: Marco Balini

Dipartimento di Scienze della Terra,

via Mangiagalli 34, I-20133 Milano, Italy.

E-mail: Marco.Balini@unimi.it

Secretary/ STS web: Christopher A. McRoberts

Department of Geology, State University of New York at Cortland, P.O. Box 2000,
Cortland, New York 13045 USA.
E-mail: microberts@cortland.edu

Albertiana Editor/ Webmaster: Wolfram M. Kuerschner

Laboratory of Palaeobotany and Palynology, Utrecht University, Budapestlaan 4,
3584 CD Utrecht, The Netherlands.
e-mail: W..M.Kuerschner@bio.uu.nl

SUBCOMMISSION ON PERMIAN STRATIGRAPHY

Chair: Dr. Charles Henderson

Department of Geology and Geophysics, University of Calgary, Calgary, AB Canada T2N 1N4
Phone: 403-220-6170; Fax: 403-284-0074; Email: charles.henderson@ucalgary.ca;
Website: www.geo.ucalgary.ca/asrg

Vice Chair: Dr. Vladimir Davydov

Department of Geosciences, Boise State University
1910 University Drive, Boise ID 83725 USA

Secretary: Dr. Shuzhong Shen

Nanjing Institute of Geology and Palaeontology, 39 East Beijing Rd.
Nanjing, Jiangsu, China 210008

SUBCOMMISSION ON CARBONIFEROUS STRATIGRAPHY

Chair: Dr. Philip H. Heckel

Department of Geoscience, University of Iowa,
Iowa City, Iowa 52242, USA
Tel: 1-319-335-1804; Fax: 1-319-335-1821; E-mail: Philip-heckel@uiowa.edu

Vice-Chair: Dr Geoffrey Clayton

Department of Geology, Trinity College
Dublin 2, IRELAND
Fax: +353 1 671 1199; E-mail: gclayton@tcd.ie

Secretary: Dr. David M. Work

Maine State Museum, 83 State House Station
Augusta, ME 04333-0083 USA
Fax: +1 207 287 6633; E-mail: david.work@maine.gov

SUBCOMMISSION ON DEVONIAN STRATIGRAPHY

Chair: Dr. Thomas Becker

Geologisch-Paläontologisches Institut, Westfälische Wilhelm-Universität
Correnstrasse 24, D-48149 Münster, Germany
Tel: 49-30-2093-8580, Fax: 49-30-2093-8868; E-mail: rbecker@uni-muenster.de

Vice-Chair: Dr Almed El Hassani

Département de Géologie, Institut Scientifique, B.P 703-Rabat-Agdal, Morocco
E-mail: elhassani@israbat.ac.ma

Secretary: John E.A. Marshall

School of Ocean and Earth Science, Univ. Southampton, Southampton Oceanography Centre
European Way, Southampton, SO14 3ZH, United Kingdom
E-mail: jeam@soc.soton.ac.uk

SDS Newsletter editor and **Webmaster**: Rex E. Crick

Department of Geology, UTA Box 19049
University of Texas at Arlington, TX 76019-0049 USA
crick@uta.edu

SUBCOMMISSION OF SILURIAN STRATIGRAPHY

Chair: Dr. Rong Jia-yu

Nanjing Institute of Geology and Paleontology, Academia Sinica,
39 East Beijing Road, Nanjing 210008, China
Tel: 86-25-3282 169; Fax: +86-25 3357 026; E-mail: jyrong@nigpas.ac.cn

Vice-Chair: Dr. Tatjana N. Koren'

All Russian Geological Research Institute -VSEGEI, Sredny Pr. 74,
199026, St. Petersburg, Russia
E-mail: koren@vsegei.sp.ru

Secretary: Dr. Michael J. Melchin (*ending Dec 2004*)

Department of Earth Sciences, St. Francis Xavier University
P.O. Box 5000, Antigonish, Nova Scotia B2G 2V5, Canada
Phone: 902-867-5177; Fax: 902-867-2457; E-mail: mmelchin@stfx.ca

Secretary: Dr. Jacques Verniers (*beginning Jan 2005*)

Research Unit Palaeontology, Department of Geology and Pedology, Gent University
Krijgslaan 281 S8, B-9000, Gent, Belgium
E-mail: Jacques.Verniers@rug.ac.be

SUBCOMMISSION ON ORDOVICIAN STRATIGRAPHY

Chair: Prof. Chen Xu

State Key Laboratory of Stratigraphy and Palaeobiology, Nanjing Institute of Geology & Paleontology
Chinese Academia of Sciences, 39 East Beijing Road, Nanjing, 210008, China
Tel & Fax: 86-25-8333-75157, E-mail: xu1936@yahoo.com

Vice Chairman: Juan Carlos Gutierrez-Marco

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

Secretary: Dr. Guillermo L. Albanesi

Museo de Paleontología, Universidad Nacional de Córdoba, Casilla de Correo 1598
5000 Córdoba, Argentina
Tel.: +54-(0)351-4719575, Fax.: +54-(0)351-4216350
E-mail: *galbanesi@arnet.com.ar*, and *galbanes@com.uncor.edu*

SUBCOMMISSION OF CAMBRIAN STRATIGRAPHY

Chairman: Shanchi Peng

Nanjing Institute of Geology and Palaeontology, The Chinese Academy of Sciences,
39 East Beijing Street, Nanjing 210008, China,
Email: *scpeng@nigpas.ac.cn*

First Vice Chair: Malgorzata Moczydlowska-Vidal

Department of Earth Sciences, Palaeobiology, Uppsala University,
Norbyvägen 22, Box 558, 752 36 Uppsala, Sweden,
Email: *malgo.vidal@pal.uu.se*

Vice-Chair (and webmaster): Prof. Dr. Gerd Geyer

Institut für Paläontologie, Bayerische Julius-Maximilians-Universität, Pleicherwall 1
D-97070 Würzburg, Germany
Tel: 49-931-312599, Fax: 49-931-312378; E-mail: *palo001@rzroe.uni-wuerzburg.de*

Secretary: Loren E. Babcock

Department of Geological Sciences, 125 South Oval Mall, The Ohio State University
Columbus, OH 43210, USA
E-mail: *babcock.5@osu.edu*

SUBCOMMISSION ON EDIACARAN STRATIGRAPHY

Chairman: James Gehling

South Australian Museum, North Terrace, Adelaide, 5000 Australia.
Tel. +61-8-8207-7441, email *jgehling@ozemail.com*

Vice-Chairman: Shuhai Xiao

Department of Geological Sciences, Virginia Polytechnical Institute and University, 4044 Derring Hall,
Blacksburg, VA 24061-0420, USA.
Tel. +1-540-231-1336, email *xiao@vt.edu*

Secretary: Graham Shields

School of Earth Sciences, James Cook University,
Townsville, Queensland 4814, Australia
Tel. +61-7-4781-5008 email *graham.shields@jcu.edu.au*

SUBCOMMISSION ON PRECAMBRIAN STRATIGRAPHY

Chair: Dr. Wouter Bleeker

Geological Survey of Canada, 601 Booth Street
Ottawa, Ontario K1A 0E8, Canada
Tel: (613) 943-7277; Fax: (613) 995-9273; E-mail: wbleeker@nrca.gc.ca

Vice Chair: Dr. Martin Van Kranendonk

Geological Survey of Western Australia,
Mineral House, 100 Plain Street, East Perth, Western Australia 6004, Australia
Tel: (08) 9222-3631; Fax: (08) 9222-3633; E-mail: martin.vankranendonk@doir.wa.gov.au

Secretary: Dr. Robert Rainbird

Geological Survey of Canada, 601 Booth Street
Ottawa, Ontario K1A 0E8, Canada
Tel: (613) 943-2212; Fax: (613) 995-9273; E-mail: rrainbir@nrca.gc.ca

SUBCOMMISSION ON STRATIGRAPHIC CLASSIFICATION

Chair: Prof. Maria Bianca Cita Sironi

Dept. Scienze della Terra, Università di Milano, via Mangiagalli 34
I-20133 Milano, Italy
Tel: +39-02-503-15529, Fax: 39-02-503-15494; E-mail: maria.cita@unimi.it

Vice Chair: Dr. Aston Embry

Institute of Sedimentary and Petroleum Geology Geological Survey of Canada,
3303 33rd St. N.W., Calgary, Alberta T2L 2A7, Canada
E-mail: AEmbry@NRCan.gc.ca

Secretary and Webmaster: M.R. Petrizzo,

University of Milano, Dept. Earth Sciences, via Mangiagalli 34,
I-20133, Milano, Italy
E-mail: mrose.petrizzo@unimi.it

TASK GROUP: STRATIGRAPHY INFORMATION SERVICES

James S. Crampton

Institute of Geological and Nuclear Sciences, Gracefield Research Centre
69 Gracefield Road, Lower Hutt, New Zealand.
E-mail: j.crampton@gns.cri.nz

Simone Galeotti

Istituto di Geologia, Università degli Studi di Urbino, Campus Scientifico,
Località Crocicchia, 61029 Urbino, Italy.
E-mail: s.galeotti@uniurb.it

Webmaster: Sorin Filipescu

Department of Geology, Babes-Bolyai University, Str. Kogalniceanu 1, 3400
Cluj-Napoca, Romania.
E-mail: sorin@bioge.ubbcluj.ro



International Commission on Stratigraphy Subcommission on Quaternary Stratigraphy

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

Subcommission on Quaternary Stratigraphy (SQS)

Submitted by:

Philip Gibbard *Chair, SQS*

Godwin Institute of Quaternary Research, Department of Geography,
University of Cambridge, Downing Street, CAMBRIDGE CB2 3EN, England.

Tel: +44 (0)1223 333924; Fax: +44 (0)1223 333392, E-mail: plg1@cus.cam.ac.uk

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

- Rationalization of global chronostratigraphical classification.
- Intercalibration of fossil biostratigraphies, integrated zonation and recognition of global datum points.
- Definition of Subseries/Series boundaries and selection of global stratotype sections.
- Correlation of Quaternary rock successions and events, including terrestrial to marine sequences.

The objectives satisfy the IUGS mandate of fostering international agreement on nomenclature and classification in stratigraphy; facilitating international co-operation in geological research; improving publication, dissemination, and use of geological information internationally; encouraging new relationships between and among disciplines of science that relate to Quaternary geology world-wide; attracting competent students and research workers to the discipline; and fostering an increased awareness among individual scientists world-wide of what related programmes are being undertaken.

3. ORGANIZATION

SQS is a Subcommission of the International Commission on Stratigraphy.

Officers (chairman, two vice-chairmen, secretary), voting members (20). (*see Appendix for complete listing*). There are currently three Working Groups established the remit of which is their definition of GSSPs for the Early-Middle, Middle/Late Pleistocene and Late Pleistocene/Holocene boundaries.

These individuals represent a broad spectrum of specialized stratigraphical disciplines from throughout the World. Publication of information is by website.

Officers for 2004-2008:

Chairman: Dr. Philip Gibbard

Godwin Institute of Quaternary Research, Department of Geography, University of Cambridge
Downing Street, Cambridge CB2 3EN, England
E-mail: plg1@cus.cam.ac.uk

Vice-Chair: Dr. Jerry McManus

Wood's Hole Oceanographic Institute, Wood's Hole, MA, USA
E-mail: jmcmanus@whoi.edu

2nd Vice-Chair: Dr. John van Couvering

American Museum of Natural History, Central Park West at 79 St., New York, NY 10024 USA
Tel: 212-769-5657; Fax: 212-769-5653
E-mail: vanc@amnh.org

Secretary: Dr. Thijs van Kolfschoten

Faculty of Archaeology, Leiden University, Reuvenplaats 4, 2300 RA Leiden, The Netherlands
E-mail: T.van.Kolfschoten@rulpre.leidenuniv.nl

Website: www.quaternary.stratigraphy.org.uk

This site is used as the main line of communication for the Subcommittee. The pages are maintained by Phil Gibbard.

4. EXTENT OF NATIONAL/REGIONAL/GLOBAL SUPPORT FROM SOURCES OTHER THAN IUGS

Support of the chairman's university (University of Cambridge), and the International Quaternary Association (INQUA).

5. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

The Quaternary Subcommittee is directly affiliated with the International Quaternary Association (INQUA).

In order to strengthen the interchange of information between the INQUA Commission on Stratigraphy and Geochronology, the Secretary Valerie Hall (Queen's University, Belfast) was invited by Phil Gibbard to become an *ex-officio* member of the Subcommittee.

6. CHIEF ACCOMPLISHMENTS IN 2005

a. Global chronostratigraphic correlation table for the last 2.7 Ma.

Printed in *Boreas*, issue 1, 2005 (originally prepared in July 2004)

b. Progress on GSSPs

Three GSSP Working Groups are established.

(1) Lower-Middle Pleistocene Sub-series Boundary

The *Working Group on Lower-Middle Pleistocene boundary* (chaired by Brad Pillans, Australia)) has agreed on two significant resolutions:

1. That the Early-Middle Pleistocene boundary be defined in a marine section **at a point “close to” the Matuyama/Brunhes magnetic boundary.**
2. That a GSSP should not be defined in a marine core, but in a marine section exposed on-land.

Two candidate GSSPs in southern Italy were described – **Montalbano Jorica** section and **Valle di Manche** section, and one section in Japan -- the **Chiba** section in Japan. A fourth potential candidate section (Castlecliff, Wanganui Basin, New Zealand) is ruled out because it is a shallow-water section and contains significant unconformities. Other potential GSSPs may be considered if they are brought to the attention of the working group within the near future.

An extensive review has just been published as major publication – *Early-Middle Pleistocene Subseries Boundary* (Geological Society, Special Publication **247**, edited by Martin J. Head and Phil L. Gibbard, 2005).

(2) Middle-Late Pleistocene Sub-series Boundary

The goal of the *Working group on the Middle/Late Pleistocene boundary* (chaired by Professor Thomas Litt, Bonn, Germany) is to select sites for a potential boundary stratotype. A meeting in October 2005 initiated a proposal for submission to ICS.

This boundary is not formally defined, but has been placed at the **beginning of the Last Interglacial** (Eemian, Mikulino, Sangamonian etc.), since the 1930s. More recently, it has been placed at the base of Marine Isotope Stage (MIS) 5 by Richmond (1996). Although it may seem attractive to define the boundary in an ocean sediment sequence, the inherent imprecision of most of such sequences, resulting from slow sedimentation rate, combined with the effects of bioturbation, suggests that for high-resolution stratigraphical purposes they are generally unsuitable for the definition of golden spike-type, time-plane boundaries. It is therefore proposed that the **Saalian-Eemian stage boundary**, and thus the Middle-Upper Pleistocene Subseries boundary-stratotype be defined from a terrestrial locality (**Amsterdam-Terminal borehole**). This parastratotype locality is also to be proposed as the Eemian Stage unit-stratotype for NW Europe. The parastratotype locality is at 63.5 m below surface in the Amsterdam-Terminal borehole, The Netherlands (52E0913: 52° 22' 45"N; 4° 54' 52"E), which is the best for the Eemian in the Netherlands (summarized by Aleid Bosch, Utrecht).

The final discussion has shown that the difficulties posed by using boreholes as type-localities, because of potential problems arising for access and lateral correlation etc., should not be underestimated. However, the lack of exposures in the type area necessitate the use of a reference borehole for this purpose. Therefore, it was agreed that it is important to select several parastratotypes for the Middle/Upper Pleistocene boundary both in the continental and marine environment.

To make further progress and to get financial support for regular annual meetings and workshops, Thomas Litt will prepare a proposal which will be sent to DFG (German Research Foundation) and eventually to IGCP.

(3) **Pleistocene-Holocene Series Boundary**

The *Working Group on the Pleistocene-Holocene boundary* is chaired by Professor Mike Walker (University of Wales, Lampeter). The Working Group draws on the expertise of the INTIMATE (Integration of Ice-core, Marine and Terrestrial Records) Group which is, in turn, a Working Group of the INQUA Palaeoclimate Commission. Accordingly, it includes ice-core, marine and terrestrial scientists. The intention is to define the GSSP/GSSA for the base of the Holocene in the new **NorthGRIP ice core** (*Nature*, 2004, 431, 147-151) from which a high-resolution, multi-parameter proxy climate record has been generated. The base of the Holocene is the first signs of climatic amelioration at the end of the Younger Dryas/Greenland Stadial 1 cold phase and is reflected first in a shift in deuterium excess values, followed closely by changes in $\delta^{18}\text{O}$, dust concentration, a range of chemical species, and by a change in annual layer thickness. The aim is to define the base of the Holocene with a temporal resolution of 10 yr, or possibly even less.

A formal proposal for the Global Stratotype Section and Point (GSSP) and Global Standard Stratigraphic Age (GSSA) for the base of the Holocene Series/Epoch has been prepared by Mike Walker et al (15 authors). A timescale based multi-parameter annual layer counting provides an age of 11,784 yr b2k (before AD2000) for the base of the Holocene, with a counting uncertainty of 69 yr.

Once that boundary has been defined, it is intended to bring forward proposals for suitable parastratotypes in marine and terrestrial sequences in both the northern and southern hemispheres. The broad technical and geographical expertise of the Working Group should ensure that the most appropriate parastratotypes are designated.

7. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED IN NEXT 2 YEARS (2006-2008)

- a. Formalization of Global Stratotype section and Points (GSSP) for the Lower/Middle and for the Middle/Upper subseries/subepoch boundaries of the Pleistocene Series/Epoch. The formal nomenclature for the subseries/subepoch divisions of the Pleistocene will be Lower/Early, Middle/Mid, and Upper/Late.
- b. Formalization of a GSSA for the base of the Holocene Series/Epoch.
- c. The establishment of a working group to compile regional sequences. There were many regional stage division systems for the Quaternary and it is desirable to assemble, catalogue and cross-correlate these schemes. Dr Wim Westerhoff (NITG, The Netherlands) has agreed to establish a working group for this enterprise.
- d. Possible working group to be established to classify and formalise, where necessary, divisions based on very short-term events, etc. - possibly jointly with ISSC?
- e. Possible compilation of additional correlation charts for specific time periods or specific regions, e.g. Weichselian Late-glacial to Holocene (15 ky); or the last 250 ky in Europe.

8. BUDGET FROM ICS IN 2005 AND REQUESTED FOR 2006

Currency in British Pounds (£), based on an exchange rate of £1 GBP = 1.9 US\$

Actual costs 2005

Amount carried over from 2004	£1073
Amount received from ICS	£255
General office expenses	£100
Contribution towards cost of web-site	£10
Travel costs	£450
Current bank balance	£1549

Proposed costs for 2006

General office expenses	£140
Contribution towards cost of website	£10
Contributions to Working Groups	£300
Support for meetings	£350
Total 2005 budget	£800 (\$1376)
AMOUNT REQUESTED from ICS	£250 (\$430)

Potential funding sources outside IUGS

Financial support will be sought by individual members from their grant-awarding bodies for specific projects such as research projects and meetings, but support has also been received from INQUA through interaction with the INQUA Commission on Stratigraphy and Geochronology.

P.L. GIBBARD (Cambridge)

APPENDIX [Names and Addresses of Current Officers and Voting Members]

Chair: Dr. Philip Gibbard

Godwin Institute of Quaternary Research, Department of Geography, University of Cambridge
Downing Street, Cambridge CB2 3EN, England
E-mail: plg1@cus.cam.ac.uk

Vice-Chair: Dr. Jerry McManus

Wood's Hole Oceanographic Institute, Wood's Hole, MA, USA
E-mail: jmcmanus@whoi.edu

2nd Vice-Chair: Dr. John van Couvering

American Museum of Natural History, Central Park West at 79 St., New York, NY 10024 USA
Tel: 212-769-5657; Fax: 212-769-5653
E-mail: vanc@amnh.org

Secretary: Dr. Thijs van Kolfschoten

Faculty of Archaeology, Leiden University, Reuvenplaats 4, 2300 RA Leiden, The Netherlands

E-mail: T.van.Kolfschoten@rulpre.leidenuniv.nl

List of Voting Members

Dr Brent Alloway
Senior Research Scientist
Institute of Geological & Nuclear Sciences,
Wairakei Research Centre,
State Highway 1, Private Bag 2000,
Taupo, New Zealand
Phone: +64-7-374-8211
Direct: +64-7-376-0160
Fax: : +64-7-374-8199
E-mail: b.alloway@gns.cri.nz

Dr Alan Glenn Beu
Paleontologist
Institute of Geological & Nuclear Sciences
P O Box 30368, Lower Hutt, New Zealand
[Courier address: Gracefield Research Centre
69 Gracefield Road, Lower Hutt, New Zealand]
Direct phone: +64-4-570 4847
Fax: +64-4-570 4600
E-mail: a.beu@gns.cri.nz

Dr Davide Castradori
Eni/Agip Division
via Emilia 1
20097 San Donato Milanese, Italy
tel: +39-(0)2-52063731;
fax: +39-(0)2-52063844;
E-mail: davide.castradori@agip.it

Professor Mauro Coltorti
Dipartimento di Scienze della Terra
Via di Laterina, 8
53100 Siena, Italy
tel +39- (0)577-233814
fax +39-(0)577-233938
email: coltorti@unisi.it

Dr Andrey Dodonov,
Geological Institute RAS,
Pyzhevsky, 7, 119017
Moscow, Russia.
Phone: +7 (095) 230 81 31
Fax: +7 (095) 953 07 60
E-mail: dodonov@geo.tv-sign.ru

Dr Martin J. Head
Department of Geography
University of Cambridge
Downing Place,
Cambridge CB2 3EN, England, U.K.
Phone: +44 (0)1223 339751
Fax: +44 (0)1223 333392
Email: mh300@cam.ac.uk

Professor Dr.Liu Jiaqi
Institute of Geology and Geophysics
Chinese Academy of Sciences
Beituchenglu,Qijiahuozhi
P.O.Box 9825, Beijing
100029 China
Tel. +86 10 62008005(0)/62008240(h)
Fax. +86 10 62052184/62010846
email:liujq@mail.igcas.ac.cn
liujiaqi2001@yahoo.com.cn

Professor Karen Luise Knudsen
Department of Earth Sciences
University of Aarhus
C.F. Mollers Alle 120
DK-8000 Aarhus C, Denmark
Tel: +45 8942 3557
Fax: +45 8618 3936
E-mail: karenluise.knudsen@geo.au.dk

Professor Thomas Litt
Institute of Paleontology
University of Bonn
Nussallee 8
D-53115 Bonn, Germany
Phone: 0049 228 732736
Fax: 0049 228 733509
E-mail: t.litt@uni-bonn.de

Professor Tim Partridge
Climatology Research Group
University of the Witwatersrand
12 Cluny Road, Forest Town
Johannesburg 2193, South Africa
Phone (+2711) 646-3324
Fax (+2711) 486-1689

Dr Brad Pillans
 Research School of Earth Sciences
 The Australian National University
 Canberra, Act, 0200, Australia
 Ph: +61-2-6125 9644 (Office)
 +61-2-6249 1507 (Lab)
 +61-2-6232 4687 (Home)
 Fax: +61-2-6125 3683

Professor Sir Nick Shackleton
 Godwin Institute of Quaternary Research,
 Department of Earth Sciences,
 University of Cambridge
 Godwin Laboratory
 Pembroke Street
 Cambridge CB2 3SA, UK
 Phone: (+44) 1223 334876
 Secretary 1223 334872
 Fax 1223 334871
 E-mail njs5@cam.ac.uk

Professor Jean-Pierre Suc
 Directeur de Recherche CNRS
 Laboratoire Paléoenvironnements et Paleobiosphère
 Université Claude Bernard - Lyon 1
 27-43 boulevard du 11 Novembre
 F 69622 Villeurbanne Cedex, France
 Tel. (33).(0)4.72.44.85.90
 Fax. (33).(0)4.72.44.83.82
 E-mail: jean-pierre.suc@univ-lyon1.fr
jean-pierre.suc@wanadoo.fr

Dr. Charles Turner,
 Department of Earth Sciences,
 The Open University,
 Milton Keynes MK7 6AA, UK
 Tel: +44 1908 652889
 Fax +44 1908 655151
 E-mail c.turner@open.ac.uk

Professor M.J.C. Walker
 Department of Archaeology
 University of Wales, Lampeter
 Ceredigion, SA48 7ED, Wales, UK
 Email: walker@lamp.ac.uk
 Phone: +44 1570 424736
 Fax: +44 1570 423669

Professor Cari Zazo
 Departamento de Geología
 Museo Nacional de Ciencias Naturales (CSIC)
 Jose Gutierrez Abascal 28006-Madrid (Spain)
 Tel. -++34.91.4111328 (ext.11899)
 Fax. -++34.91.5644740
e-mail.-mcnzc65@mncn.csic.es

Working group leaders and corresponding members

Working Group on the Pleistocene/Holocene Boundary

convenor: Professor M.J.C. Walker (Lampeter)

members:

Chairman, and INQUA Palaeoclimate Commission: John Lowe (UK)

INTIMATE Convenor: Wim Hoek (The Netherlands)

Ice core community:

NorthGRIP: Sigfus Johnsen (Denmark)
 Jørgen-Peder Steffensen (Denmark)

Antarctica: Jakob Schwander (Switzerland)

Oceanographical community: Konrad Hughen (USA)
 John Andrews (USA)

Dendrochronological community: Bernd Kromer (Germany)

Terrestrial community:

Europe: Thomas Litt (Germany)
 North America: Les Cwynar (Canada)
 Asia: Takeshi Nakagawa (Japan)
 Australasia: Peter Kershaw (Australia)
 Rewi Newnham (New Zealand)

Working Group on the Middle/Late Pleistocene Boundary

convenor: Professor Thomas Litt (Bonn, Germany) t.litt@uni-bonn.de

members:

Dr. Art Bettis (Iowa, USA) art-bettis@uiowa.edu

Dr. Aleid Bosch (Zwolle, The Netherlands) A.Bosch@nitg.tno.nl

Dr. Andrey Dodonov (Moscow, Russia) dodonov@geo.tv-sign.ru

Dr. Philip Gibbard (Cambridge, UK) plg1@cus.cam.ac.uk

Prof. Liu Jiaqi (Beijing, China) liujiaqi2001@yahoo.com.cn

Prof. Peter Kershaw (Clayton, Australia) Peter.Kershaw@arts.monash.edu.au

Prof. Wighart von Koenigswald (Bonn, Germany) koenigswald@uni-bonn.de

Dr. Jerry McManus (Wood's Hole, USA) jmcmanus@whoi.edu

Prof. Tim Partridge (Johannesburg (South Africa)

Dr. Charles Turner (Milton Keynes, UK) c.turner@open.ac.uk

Working Group on the Early/Middle Pleistocene Boundary

convenor: Dr Brad Pillans (Canberra)

members:

Dr Thijs Van Kolfshoten (Leiden),

Dr Andrei Dodonov (Moscow),

Professor Anastasia Markova (Moscow),

Professor Jiaqi Lui (Beijing),

Dr Charles Turner (Cambridge),

Professor Luc Lourens (Utrecht),

Dr Martin Head (Cambridge),

Dr Cesare Ravazzi (Bergamo),

Dr Craig Feibel (New Jersey)

Dr Tom Meijer (Utrecht),



International Commission on Stratigraphy Subcommission on Neogene Stratigraphy

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

Subcommission on Neogene Stratigraphy (SNS)

Submitted by:

Fredrik Johan Hilgen, Chairman SNS
 Faculty of Geosciences, Utrecht University, P.O. Box 80021, 3508 TA Utrecht, Netherlands
 E-mail: fhilgen@geo.uu.nl.

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

The SNS is the primary body responsible for providing optimum clarity and stability in the Neogene Chronostratigraphic Scale by selecting and defining Global Stratotype Sections and Points (GSSPs) for Series and Stages.

3. ORGANIZATION

The SNS is a subcommission of the ICS, founded in 1971. Reference is made to the annual report of 1995 for a brief historical resume of the SNS. The subcommission has four regional committees (Mediterranean, Pacific, Atlantic and Nordic) and keeps close contacts with the Russian Neogene Commission chaired by Prof. Yuri B. Gladenkov.

Officers for 2004-2008:

Chair: Frits Hilgen (Netherlands)
2 Vice-Chairs: Javier Sierro (Spain) and David Hodell (USA)
Secretary: Elena Turco (Italy)

Apart from the executive bureau, the SNS has 20 voting members and 38 corresponding members (see Appendix for full list of officers and voting members). (*see Appendix for full list of officers and voting members*).

The SNS has presently 3 working groups:

- 1) WG on Miocene Time Scale chaired by Nick Shackleton,
- 2) WG for defining GSSP sections for the Serravallian chaired by Frits Hilgen, and
- 3) WG for defining GSSP sections for the Langhian and Burdigalian chaired by Isabella Raffi.

Website: www.geo.uu.nl/SNS -- s used for news releases and contains the following sections: Home, News, Board, Members, Newsletters, GSSPs, and Links.

4. EXTENT OF NATIONAL/REGIONAL/GLOBAL SUPPORT FROM SOURCES OTHER THAN IUGS

Support of the Chairman's Institute (Faculty of Geosciences, Utrecht University). This institute also hosts the SNS web-site.

5. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

There is a close link with (I)ODP because of its important role in the development of integrated time scales for the Neogene, in testing the global correlation potential of bioevents, and in a better understanding of climate and ocean history during this time span.

6. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

The integrated stratigraphy and astronomical tuning of the Ras il Pellegrin section on Malta, the prime GSSP candidate for the **Langhian-Serravallian boundary**, has now been published (Abels et al., 2005, *Paleoceanography*). This publication follows significant publications by Italian research groups in the "*Rivista Italiana di Paleontologia e Stratigrafia*" in 2002 (vol. 108). Uncertainties in the tuning of the upper Blue Clay part of the section have been reduced to ± 1 precession cycle due to optimizing the cyclicity using chemical element analysis and by calibrating the Maltese section to the partly time-equivalent and well-tuned Italian sections of Monte dei Corvi and Tremiti. The Ras il Pellegrin section in addition yielded a good magnetostratigraphy that can reliably be calibrated to the GPTS while the excellent preservation of the calcareous microfossils will allow the retrieval of first rate stable isotope data. High-quality carbonate and (bulk) stable isotope records have already been published by Abels et al. (2005), and by John and others (*Geol. Soc. Am. Bull.*, v. 115, 2003) for parallel sections located on the nearby island of Gozo. These records allow the straightforward identification of the main mid-Miocene oxygen isotope shift (Mi-3b) towards heavier values across the formation boundary between the Globigerina Limestone and Blue Clay. The new tuning indicates that the event corresponds to the marked coincidence of minimum amplitude variations in obliquity related to the 1.2 myr cycle and minimum eccentricity related to the 400-kyr cycle (Abels et al., 2005). This Mi-3b event is proposed to serve as the prime criterion to delineate the boundary. A proposal to define the Serravallian GSSP at the base of the Blue Clay in the Ras il Pellegrin section on Malta is presently being written and will be completed by January 2006.

The SNS chair participated in the **Task Force on the Quaternary** definition. Related to the Task Force contribution, a questionnaire about the status and rank of the Quaternary sent to the SNS members in preparation of the ICS workshop in Leuven was another important product. The outcome was evident with a vast majority of the members accepting the compromise proposal published by Aubry et al. (2005, *Episodes*) with the Quaternary as a Sub-Era covering the last 2.6 Ma and the Neogene as a Period extending to the recent.

The Neogene view on Unit-Stratotypes for Global Stages was presented at the ICS workshop in Leuven. A paper on this approach has been accepted for publication in *Earth Science Reviews*.

7. CHIEF PROBLEMS ENCOUNTERED IN 2005

The frustrating settlement of the Quaternary issue after the formal voting and clear outcome at the ICS workshop in Leuven. The SNS does not have the intention to put more effort in this issue.

An important signaled problem is the possible lack of suitable sections in the Mediterranean for defining the remaining Neogene GSSPs, namely the **Langhian** and **Burdigalian** GSSPs. This is certainly the case if we prefer to have the boundaries defined in astronomically tuned deep marine sections that underlie the geologic time scale. One potentially suitable section for the Langhian has been identified, namely the La Vedova section near Ancona. However, it will cost a considerable amount of research effort and money before this section has been studied in sufficient detail to be promoted as Langhian GSSP. In addition the section will only be studied if it is also interesting from other points of view than a GSSP (e.g., astronomical time scale, paleoceanography). The option to have these boundaries defined in ODP cores is presently under study.

8. SUMMARY OF EXPENDITURES IN 2005 (ANTICIPATED THROUGH MARCH 2006):

Credit on July 2005 = Euro 4865	
Contribution 2005 ICS to SNS= Euro 1500 (\$ 1900)	
<i>Expenditures</i>	
Contribution 2005 SNS to RCNPS	Euro 300
Contribution 2005 SNS to RCMNS	Euro 300
Finalizing measuring and sampling of candidate section base-Serravallian on Malta (late 2005)	Euro 1500

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

The formal proposal to define the **Serravallian GSSP** at the formation boundary between the Globigerina Limestone and the Blue Clay in the Ras il Pellegrin section on Malta will be submitted to SNS voting members in the beginning of 2006.

Intensification of the search for suitable sections/cores to define the remaining GSSPs of the **Langhian** and **Burdigalian**. A pilot study of the La Vedova section, a potential candidate for the Langhian GSSP, will be carried out to see whether the section is suitable for establishing a reliable magnetostratigraphy. Although preservation is not perfect, the section is suitable for establishing a high-resolution calcareous plankton biostratigraphy.

10. BUDGET AND ICS COMPONENT FOR 2004

Field meeting on Malta (base-Serravallian GSSP)	Euro 1500
Organization workshop on base-Langhian and base-Burdigalian	Euro 1500
Field trip to La Vedova (base-Langhian)	Euro 1000
Contribution 2004 to RCPNS and RCMNS	<u>Euro 600</u>
TOTAL	Euro 4600

11. REVIEW CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (2001-2005)

See Accomplishments in 2005 (above) for additional details.

2001

Establishment of WG for base Tortonian and Serravallian (chaired by F.J.Hilgen)
Establishment of WG for base Langhian and Burdigalian (chaired by I. Raffi)

Launching of the SNS web-site

2003

Ratification of the base-**Tortonian** GSSP by the IUGS. Ongoing magnetostratigraphic studies of the boundary interval in the Monte dei Corvi section have confirmed the close association of the Tortonian GSSP with Subchron C5r.2n (unpubl. data).

2004

Publication of a revised Neogene Time Scale (Lourens et al., 2004 in Gradstein et al., 2004. *Geologic Time Scale 2004*. Cambridge University Press, ~500 pages).

12. OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2005-2008)

Submission of a proposal for the **Serravallian** GSSP - early 2006.

Organization of a workshop on the selection of boundary criteria and sections for the definition of the 2 remaining Miocene stage boundaries, namely the base-**Langhian** and base-**Burdigalian**. Suitable sections in the Mediterranean region that may serve as GSSP sections for these boundaries have not yet been identified although the La Vedova might be a suitable candidate for the Serravallian GSSP. Most candidate sections specifically fail in the matter of potential for astronomical tuning. A crucial question to be answered during the workshop(s) is whether we should abandon the ambition of having also these GSSPs directly tied within an astrochronologic framework and having these GSSPs defined in land-sections without possibilities of tuning or whether we should have these GSSPs defined in the drilled sequence at Ceara Rise or any other tuned sequence drilled by (I)ODP

Appendix

Subcommission officers

Chairman: Frederik J. Hilgen

Faculty of Geosciences, Utrecht University, P.O.Box 80021, 3508 TA Utrecht, The Netherlands, e-mail: fhilgen@geo.uu.nl

Vice Chairman: David Hodell

Department of Geological Sciences, University of Florida, Gainesville, FL 32611, USA.
Email: dhodell@geology.ufl.edu

Vice Chairman: Francisco Javier Sierro Sánchez

Departamento de Geología, Facultad de Ciencias, Universidad de Salamanca, 37008 Salamanca, España.
Email: sierro@usal.es

Secretary: Elena Turco

Dipartimento di Scienze della Terra, Università degli Studi di Parma, Parco Area delle Scienze 157, 43100, Parma, Italia.
Email: elena.turco@unipr.it

List of Voting Members

Aubry, M.P., USA, aubry@rci.rutgers.edu
Backman, J. Sweden, backman@geo.su.se
Berggren, W.A., USA, wberggren@whoi.edu
Bernor, R., USA, rbernor@Howard.edu
Beu, A.G., New Zealand, a.beu@gns.cri.nz
Castradori, D., Italy, davide.castradori@agip.it

Gladenkov, Y.B., Russia, gladenkov@geo.tv-sign.ru
Hilgen, F.J., Netherlands, fhilgen@geo.uu.nl
Kent, D.V., USA, dvk@ldeo.columbia.edu
Meyer, K.J., Germany, ----
Nagymarosy, A., Hungary, gtorfo@ludens.elte.hu
Semenenko, V.N., Russia, ----

Shackleton, N.J., UK, njs5@cam.ac.uk
Sierro, F.J., Spain, sierro@gugu.usal.es
Sprovieri, R., Italy, rspr@unipa.it
Augusti, J., Spain, agustibj@diba.es
Vai, G.B., Italy, vai@geomin.unibo.it
Van Couvering, J., USA, vanc@amnh.org
Wang, P., China, pxwang@online.sh.cn
Zachariasse, W.J., Netherlands, jwzach@geo.uu.nl



International Commission on Stratigraphy Subcommission on Paleogene Stratigraphy

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

International Subcommission on Paleogene Stratigraphy (ISPS)

Submitted by:

Eustoquio Molina, Chairman
 Departamento de Ciencias de la Tierra, Universidad de Zaragoza
 Calle Pedro Cerbuna, 12; 50009 Zaragoza, Spain.
 Tel. 34 976 761077, Fax. 34 976 761106
 Email: emolina@unizar.es

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

Mission statement

The Subcommission is the primary body for facilitation of international communication and scientific cooperation in Paleogene Stratigraphy, defined in the broad sense of multidisciplinary activities directed towards better understanding of the evolution of the Earth during the Paleogene Period. Its first priority is the unambiguous definition, by means of agreed GSSPs, of a hierarchy of chronostratigraphic units, which provide the framework for global correlation.

Goals

- a) to agree on an international set of stages and series for the Paleogene.
- b) to establish boundary stratotypes of the Paleogene stages and series.
- c) to encourage research into the Paleogene by setting up and supporting Working Groups and Regional Committees to study and report on specific problems.
- d) to organize symposia and workshops on subjects of Paleogene stratigraphy.
- e) to maintain a website informing on progress and coming events in Paleogene stratigraphy.

Fit within IUGS Science Policy

A set of Paleogene stages has been voted and agreed on by the ISPS in 1989. Subsequently, Working Groups have been set up to find a Global Stratotype Sections and Points (GSSPs) for the boundary of each of these stages.

3. ORGANIZATION

Officers: Chairman: Eustoquio Molina, Spain,
 Vice-Chairman: Jan Hardenbol, U.S.A.
 Secretary: Noël Vandenberghe, Belgium.

20 Voting Members (*Akhmetiev, Aubry, Cosovic, Fluegeman, Gingerich, Gladenkov, Hardenbol, Hooker, Hottinger, Malumian, Miller, Molina, Monechi, Premoli Silva, Schmitz, Strong, Strougo, Thomas, and Vandenberghe*) and 84 Corresponding Members.

Voting and Corresponding Members are selected regionally to provide expertise in the Paleogene stratigraphy of each major area and according to their speciality in order to cover the main fields of stratigraphic tools used in the Paleogene.

Under the umbrella of the Subcommittee, we have set up the following Working Groups and Regional Committees:

- 1) Paleocene Working Group. Chairman: B.Schmitz, Sweden.
- 2) Ypresian/Lutetian Boundary Stratotype Working Group. Chairman: E.Molina, Spain. Secretary: C.Gonzalvo, Spain.
- 3) Lutetian/Bartonian Boundary Stratotype Working Group. Chairman: R.Fluegeman, USA.
- 4) Bartonian/Priabonian Boundary Stratotype Working Group. Chairwoman: I.Premoli Silva, Italy.
- 5) Rupelian/Chattian Boundary Stratotype Working Group. Chairwoman: I.Premoli Silva, Italy
- 6) Paleogene Planktonic Foraminifera Working Group. Chairman: P.Pearson, UK. Secretary: B.Huber.
- 7) Paleogene Benthos Working Group. Chairman: L.Hottinger, Switzerland .
- 8) Regional Committee in North-European Paleogene Stratigraphy. Chairman: G.Vestegaard Laursen, Norway. Secretary: J.W.Verbeek, Netherlands.
- 9) South-American Regional Committee on Paleogene Stratigraphy. Chairman: N.Malumian, Argentina. Secretary: C.Nañez, Argentina.
- 10) Russian Paleogene Commission. Chairman: M.A.Akhmetiev, Russia. Secretary: G.N. Aleksandrova.
- 11) Working Group on Paleogene Stratigraphy of the North Pacific. Chairman: Y.B.Gladenkov, Russia.
- 12) Middle East Regional Committee on Paleogene Stratigraphy. Chairman: A.Strougo, Egypt.
- 13) Regional Committee on Pacific Paleogene Stratigraphy. Chairman: E.Fordyce, New Zealand.

Website: <http://wzar.unizar.es/isps/index.htm>

The web site content is the following: Home (*overall objectives, organization*), Past & Future (*accomplishments, problems and plans*), Working Groups and Regional Committees (*annual reports*), Literature (*a selection of monographies on the Paleogene*), News/Books (two monographies on *Paleogene Stratigraphy* edited by Luterbacher and Vandenberghe in 2004), and News/Events (next Meeting on *Climate and Biota of the Early Paleogene in Bilbao, Spain, June 2006*).

4. EXTENT OF NATIONAL/REGIONAL/GLOBAL SUPPORT FROM SOURCES OTHER THAN IUGS

The ISPS does not receive financial support from outside the IUGS/ICS. National and regional support is derived from the participating members funded by national or European research agencies, *via* Working Groups and Regional Committees, global support for research undertaken

via world wide projects such as the Ocean Drilling Program (ODP) or the International Geological Correlation Projects (IGCP). However, most funding agencies attribute very low priority to research in stratigraphic problems.

5. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

Some of our members participate also in the work of the Ocean Drilling Programme, International Subcommissions on Cretaceous and Neogene Stratigraphy.

6. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

The main event in 2005 has been the “Future Directions in Stratigraphy III” held in Leuven (Belgium) on September 1-5, locally organized by our secretary Noël Vandenberghe and during the morning of September 3 was presented a report of the ISPS by Eustoquio Molina.

The web site of ISPS has been periodically updated and replaces the Newsletter. In this ISPS web site (<http://wzar.unizar.es/isps/index.htm>) can be found the annual reports of the Working Groups and Regional Committees and some other accomplishments and information.

7. CHIEF PROBLEMS ENCOUNTERED IN 2005

The problems encountered this year are essentially the same as those discussed in the previous annual reports. ISPS can support only very insufficiently its working groups and regional committees. In particular, we would need a substantial increase in our budget in order to support and in part to reactivate regional committees in poorer areas (e.g. Africa, Indian Subcontinent, SE Asia). Most of the secretarial and other expenses have been covered by the institutions of the officers and other members of ISPS. Since money becomes tighter everywhere, these sources may dry up.

8. SUMMARY OF EXPENDITURES IN 2005 (ANTICIPATED THROUGH MARCH 2006):

INCOME

Carried forward from 2004	Euro 0
ICS Allocation	<u>Euro 1128</u>
TOTAL	Euro 1128

EXPENDITURE FROM 2005 BUDGET

General office expenses	Euro 28
Professional help with the website	Euro 600
Support for Working Groups and Regional Committees	<u>Euro 1100</u>
TOTAL	Euro 1728

To be carried forward to 2006	Euro - 600
-------------------------------	------------

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

- Complete the work on the GSSPs of the base of the Priabonian and Chattian.
- Screen and rejuvenate the list of the Corresponding Members.
- Reactivate or close those Regional Committees and Working Groups which are asleep.
- Update periodically the ISPS website.
- Support the organization of the next Meeting on Climate and Biota of the Early Paleogene (CBEP2006), which will be held in Bilbao, N Spain, 12-20 June 2006. The CBEP2006 will be organized by members of the Basque Country University assisted by researchers from other institutions and will be supported by a prestigious Scientific Committee and the ISPS.
- Publish the GSSP for the base Danian and base Cenozoic, with details of the alternate section nearby El Kef, the latter being in poor shape for study and sampling.

10. BUDGET AND ICS COMPONENT FOR 2006

Projected Budget for 2006:

Carry over from 2005	Euro 600
General office expenses	Euro 500
Professional help with the website	Euro 600
Contributions to Officers travel costs	Euro 800
Support for Working Groups and Regional Committees	Euro 2500

TOTAL BUDGET PROJECTED	Euro 5000

Please note that the financial situation has deteriorated in recent years, particularly in Latin America and the former Soviet Union; an increase would help us to support the corresponding Regional Committees more actively. We also will need some seed money to start new regional committees in regions like Africa and the Indian Subcontinent.

11. REVIEW CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (2001-2005)

At present, the GSSPs for the bases of:

Aquitanian (= Paleogene/Neogene Boundary)

Rupelian (= Eocene/Oligocene Boundary)

Ypresian (= Paleocene/Eocene Boundary)

Danian (= Cretaceous/Paleogene Boundary)

have been established and ratified by the International Union of Geological Sciences.

In 2005, good progress has been made in the search for the remaining GSSPs.

12. OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2006-2008)

Complete and publish the GSSPs of the Paleogene. We hope to present proposals for most of the remaining GSSPs before the Geological Congress in Oslo, 2008.

Produce an updated version of an integrated Paleogene time scale.

Produce a state-of-the-art review of the stratigraphic tools used in the Paleogene.

Preparation of standardized regional correlation charts and paleogeographic maps by the Regional Committees.

APPENDIX #1 [Names and Addresses of Current Officers and Voting Members, 2004-2008] INTERNATIONAL SUBCOMMISSION ON PALEOGENE STRATIGRAPHY

Subcommission officers

Chair: Eustoquio Molina

Departamento de Ciencias de la Tierra, Universidad de Zaragoza, Calle Pedro Cerbuna, 12

E-50009 Zaragoza, Spain

emolina@unizar.es

Vice-Chairman: Jan Hardenbol

Global Sequence Chronostratigraphy Inc.

826, Plainwood Drive, Houston, Texas 77079-4227, USA

jhardenbol@aol.com

Secretary: Noël Vandenberghe

Departement Geografie-Geologie, Afdeling Historische Geologie, Redingenstraat, 16

B-3000 Leuven, Belgium

noel.vandenberghe@geo.kuleuven.ac.be

Task Group officers

Paleocene Working Group. Chairman: B.Schmitz, Sweden. birger.schmitz@geol.lu.se

Ypresian/Lutetian Boundary Stratotype Working Group. Chairman: E.Molina, Spain. emolina@unizar.es

Secretary: C.Gonzalvo, Spain. concha@unizar.es

Lutetian/Bartonian Boundary Stratotype Working Group. Chairman: R.Fluegeman, USA. fluegem@bsu.edu

Bartonian/Priabonian Boundary Stratotype Working Group. Chairwoman: I.Premoli Silva, Italy.

isabella.Premoli@unimi.it

Rupelian/Chattian Boundary Stratotype Working Group. Chairwoman: I.Premoli Silva, Italy.

isabella.Premoli@unimi.it

Paleogene Planktonic Foraminifera Working Group. Chairman: P.Pearson, UK. Paul.Pearson@earth.cf.ac.uk.

Secretary: B. Huber. huber.brian@nmnh.si.edu

Paleogene Benthos Working Group. Chairman: L.Hottinger, Switzerland. lukas.hottinger@unibas.ch

Regional Committee in North-European Paleogene Stratigraphy. Chairman: G.Vestegaard Laursen, Norway.

gila@statoil.com Secretary: J.W.Verbeek, Netherlands. j.verbeek@nitg.tno.nl

South-American Regional Committee on Paleogene Stratigraphy. Chairman: N.Malumian, Argentina.

malumian@mpgeol.gov.ar Secretary: C.Nañez, Argentina. cnaniez@mpgeol.gov.ar

Russian Paleogene Commission. Chairman: M.A.Akhmetiev, Russia. akhmetiev@ginras.ru Secretary: G.N. Aleksandrova

Working Group on Paleogene Stratigraphy of the North Pacific. Chairman: Y.B.Gladenkov, Russia.

gladenkov@ginras.ru

Middle East Regional Committee on Paleogene Stratigraphy. Chairman: A.Strougo, Egypt.

aminstrougo@yahoo.com

Regional Committee on Pacific Paleogene Stratigraphy. Chairman: E.Fordyce, New Zealand.
ewan.fordyce@stonebow.otago.ac.nz

Voting Members

Mikhail Akhmetiev, Russian Academy of Science, Moscow, Russia, akhmetiev@ginras.ru
Mary Pierre Aubry, Rutgers University, New Jersey, USA, aubry@rci.rutgers.edu
Vlasta Cosovic, University of Zagreb, Croatia, vlasta.cosovic@jagor.srce.hr
Richard H. Fluegeman, Ball State University, Indiana, USA, fluegem@bsu.edu
Jean Pierre Gély, Museum d'Histoire naturelle Paris, France jean-pierre.gelv@gazdefrance.com
Philip D. Gingerich, University of Michigan, USA, gingeric@umich.edu
Yuri B. Gladenkov, Russian Academy of Science, Moscow, Russia, gladenkov@ginras.ru
Jan Hardenbol, Global Sequence Chronostratigraphy, Houston, USA, jhardenbol@aol.com
Jerry J. Hooker, Natural History Museum, London, UK, jjh@nhm.ac.uk
Lukas Hottinger, Naturhistorisches Museum Basel, Switzerland, lukas.hottinger@unibas.ch
Norberto Malumian, Servicio Geológico, BuenosAires, Argentina, malumian@mpgeol.gov.ar
Kenneth G. Miller, Rutgers University, New Jersey, USA, kgm@rci.rutgers.edu
Eustoquio Molina, Universidad de Zaragoza, Spain, emolina@unizar.es
Simonetta Monechi, Università di Firenze, Italy, monechi@geo.unifi.it
Isabella Premoli Silva, Università di Milano, Italy, isabella.Premoli@unimi.it
Birger Schmitz, University of Lund, Sweden, birger.schmitz@geol.lu.se
Percy Strong, Institute of Geological Sciences, Lower Hutt, New Zealand, p.strong@gns.cri.nz
Amin Strougo, Ain Shams University, Cairo, Egypt, aminstrougo@yahoo.com
Ellen Thomas, Wesleyan University, Connecticut, USA, ethomas@wesleyan.edu
Noël Vandenberghe, K.U. Leuven, Belgium, noel.vandenberghe@geo.kuleuven.be

APPENDIX #2 - Summary Reports of GSSP Working Groups

<p>[Detailed reports of GSSP Working Groups, and other task groups are found on the webpage of the International Subcommittee on Paleogene Stratigraphy: wzar.unizar.es/isps/index.htm].</p>



International Commission on Stratigraphy Subcommission on Cretaceous Stratigraphy

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

International Subcommission on Cretaceous Stratigraphy (SCS)

Submitted by:

Professor Isabella Premoli Silva, Chair
 University of Milano, Dipartimento di Scienze della Terra “Ardito Desio”
 Via Mangiagalli, 34; I-20133 MILANO, Italy
 Tel: 39-02 5031 5528 (direct line); F□□□ 39-02 5031 5494
 Email: isabella.premoli@unimi.it

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

- To facilitate international communication in all aspects of Cretaceous stratigraphy and correlation*
- To establish a standard global stratigraphic subdivision and nomenclature for the Cretaceous, as part of the ICS standard global stratigraphic scale;*
- To produce a stratigraphic table displaying agreed subdivision to substage level and intervals of disagreement, marking boundaries that are defined by a GSSP.*

The Subcommission’s objectives reflect the IUGS’ aims of developing international correlation in understanding the evolution of the Earth, and in particular in developing an internationally agreed relative timescale based on rigorously defined GSSPs.

3. ORGANIZATION

SCS is a Subcommission of the International Commission on Stratigraphy.

There are an additional **15 Voting** Members of the Subcommission, from all the continents. Over 130 Cretaceous scientists from all over the world and in many different disciplines belong to one or more of the 12 Stage Working Groups of the SCS, or to the Kilian Group. All WG members are treated as Corresponding Members of the Subcommission. Effectively, anyone with interest and expertise that can contribute to our objectives is welcome to do so. *The great bulk of the Subcommission's work is carried out by these Working Groups.*

Officers for 2004-2008:

Chair: Professor Isabella Premoli Silva (Milan, Italy)

Vice-Chair: Dr. Irek Walaszczyk (Warsaw, Poland)
Secretary: Dr Silvia Gardin (Paris, France)

4. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

The Subcommittee has liaised with successive meetings of the *International Cretaceous Symposium*, which until now have been promoted by the German *Subkommission für Kreide-Stratigraphie*. The SCS has now taken over the responsibility for selection of future venues, though the successful applicants will organize individual congresses.

The Subcommittee also liaises closely with the Subcommittee on Jurassic Stratigraphy, especially over the definition of the Jurassic/Cretaceous boundary.

When appropriate, the Subcommittee liaises also with IGCP projects.

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

The seventh Cretaceous Congress took place in Neuchâtel, Switzerland, 5-9 September 2005, and included several sessions directly related to GSSP definition, global correlation and other subcommittee activities.

Although no formal proposals have yet been made for Lower Cretaceous GSSPs, the provisional proposals made at the Brussels Meeting generated a lot of further research, much of which has now been published. Hence two formal proposals (Hauterivian and Barremian) are in preparation and some others should follow soon. But the Jurassic/Cretaceous boundary remains a major problem should be resolved by using a non-biostratigraphic marker that is common to Tethyan and Boreal realms.

Major progress has been made by the “Kilian Group” in constructing the Lower Cretaceous standard ammonite zonation for the Tethyan region, where the stratotypes of the Lower Cretaceous are all situated except that of the Albian. All the other zonations from Boreal and Austral domains should be calibrated and correlated to this standard. The main changes recently introduced to the previous zonation concern the Valanginian, uppermost Hauterivian and Lower Barremian and have been already incorporated in the “*A Geologic Time Scale 2004*”.

6. CHIEF PROBLEMS ENCOUNTERED IN 2005

The preliminary recommendations of the 1995 Brussels Meeting on Cretaceous GSSPs have led to considerable further research. Some of the newly published results have raised unforeseen problems that are delaying decisions; this applies especially to the base of the Aptian and the base of the Albian where some very conflicting opinions are emerging. Another example is the proposed Campanian GSSP at Waxahachie, Texas – even though the studies are well advanced, there is a problem about its poor suitability as GSSP, due to the incompleteness at the top of the section and the ownership of the land and access to it.

While many scientists are happy to join our working groups, it is becoming more difficult to get people to commit time to preparing the documentation for GSSPs. And there have been very few volunteers to join the important Berriasian (Jurassic/Cretaceous boundary) WG.

- To communicate the results as widely as possible.
- To develop new directions for the Subcommittee as GSSP proposals are completed.

Work Plan

2006 Finalize proposals for Valanginian, Hauterivian, Barremian, Albian, Santonian and Campanian. Present latest results to 7th *International Cretaceous Symposium*, Neuchâtel, Switzerland.

2007 Finalize proposals for Aptian and Coniacian

2008 Finalize proposal for Berriasian (Jurassic/Cretaceous boundary)

APPENDIX [Names and Addresses of Current Officers and Voting Members, 2004-2008] INTERNATIONAL SUBCOMMISSION ON CRETACEOUS STRATIGRAPHY

Subcommission officers

Chair: Prof. I. Premoli Silva

Dipartimento di Scienze della Terra “A. Desio”, Via Mangiagalli, 34, 20133 Milano, Italy
Isabella.premoli@unimi.it

Vice Chair: Dr. I. Walaszczyk

University of Warsaw, Warsaw, Poland
walas@geo.uw.edu.pl

Secretary: Dr Silvia Gardin

ESA-CNRS 7073, Laboratoire de Micropaléontologie, case 104, Université Pierre et Marie Curie, 4 Place Jussieu, F-75252 Paris 05, France.
gardin@ccr.jussieu.fr

List of Working (Task) Groups and their officers

Maastrichtian WG: GSSP ratified. Giles Odin, France. gilodin@moka.ccr.jussieu.fr

Campanian WG: to be agreed

Santonian WG: Marcos Lamolda, Spain. gpplapam@lg.ehu.es

Coniacian WG: Irek Walaszczyk, Poland. walas@geo.uw.edu.pl

Turonian WG: GSSP ratified. No chairman at present.

Cenomanian WG: GSSP ratified. No chairman at present.

Albian WG: Malcolm Hart, UK. mhart@plymouth.ac.uk

Aptian WG: Elisabetta Erba, Italy. Elisabetta.erba@unimi.it

Barremian WG: Peter Rawson, UK. p.rawson@ucl.ac.uk

Hauterivian WG: Jörg Mutterlose, Germany. Joerg.Mutterlose@rz.ruhr-uni-bochum.de

Valanginian WG: Luc Bulot, France. lgbulot@yahoo.fr

Berriasian (J/K boundary) WG: to be agreed

Kilian Group [formerly Lower Cretaceous ammonite WG]: Philip Hoedemaeker, Netherlands.
Hoedemaeker@naturalis.nnm.nl



International Commission on Stratigraphy Subcommission on Jurassic Stratigraphy

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

International Subcommission on Jurassic Stratigraphy

Submitted by:

Dr Nicol MORTON, Chairman
Le Chardon, Quartier Brugière, F-07200 Vogüé, France
Tel. ** 33 4 75 37 03 80
Email NICOL.MORTON@wanadoo.fr

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

Mission statement

The Subcommission is the primary body for facilitation of international communication and scientific cooperation in Jurassic stratigraphy, defined in the broad sense of multidisciplinary activities directed towards better understanding of the evolution of the Earth during the Jurassic Period. Its first priority remains the unambiguous definition, by means of agreed GSSPs, of a hierarchy of chronostratigraphic units which provide the framework for global correlation. This mission is well advanced at Stage level, and future plans for formal definitions of Substages (but only as Lower/Middle/Upper as appropriate) and perhaps Standard (Ammonite) Zones are being considered.

Goals

These fall into two main areas:

- (a) The definition of basal boundary stratotypes (GSSPs) and the refinement of standard chronostratigraphical scales, through the establishment of multidisciplinary Working Groups;
- (b) Application, where possible, of cyclic stratigraphy to develop orbital tuning estimates of durations of chronostratigraphic units, and integration of radiometric dates to improve the linear time-scale of the Jurassic;
- (c) During IGCP Project 506, initiated by the Subcommission, the development of methods of correlation between the units of the standard chronostratigraphic scale, established in marine Jurassic successions, and non-marine successions, to enable reconstruction of the history of the global biosphere and the lithosphere during the Jurassic Period;

- (d) International coordination of and collaboration in research on Jurassic environments, through the establishment of Thematic Working Groups, for example on Paleobiogeography, Paleoclimate, Sequence Stratigraphy and Tectonics.

In addition the Subcommittee has developed lines of communication with a wider public through two initiatives (also called Working Groups for simplicity): one is concerned with conservation of Jurassic geological sites such as those selected as GSSPs or ASPs; the second encourages collaboration and liaison with non-professionals, mainly fossil collectors, who have valuable data to contribute towards the Subcommittee's goals.

Fit within IUGS Science Policy

The objectives of the Subcommittee 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 Subcommittee also has links to the Management Group of the UNESCO East Devon and Dorset Coast (The Jurassic Coast) World Heritage Site.

3. ORGANIZATION

The Subcommittee 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 twenty other Voting Members. The Voting Members are not elected to represent a country or region, but for their personal expertise and experience. Each has agreed defined areas of responsibility, which are published in the Subcommittee Directory.

The objectives of the Subcommittee are pursued by Working Groups, both Stratigraphical and Thematic, and each group is organized by a Convenor, sometimes assisted by a Secretary, who are Voting or Corresponding Members. [*The Subcommittee has not adopted the term Task Group.*]

In addition to the Voting Members, there is a network of Corresponding Members, who have a responsibility for communication in both directions between the Subcommittee and researchers on Jurassic topics in their region. Most are also active in one or more Working Groups.

The Subcommittee sponsors an International Symposium/Congress on the Jurassic System every four years. The Chairman of the Organizing Committee is normally a Voting Member of the Subcommittee, but the Committee is independent of the Subcommittee.

Officers for 2004-2008:

Chair:	Dr. Nicol MORTON, France
Vice-Chair:	Prof. Paul SMITH, Canada
Secretary:	Dr. Paul BOWN, UK

Website: <http://www.es.ucl.ac.uk/people/bown/ISJSwebsite.htm>

4. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

Members of the Jurassic Subcommittee are involved in a number of international projects, normally in an individual capacity but sometimes facilitated by contacts through activities related to the Subcommittee such as its Working Groups and the Jurassic Symposia.

4a. International Geoscience Programme (IGCP).

IGCP Project 458: Triassic - Jurassic Boundary Events. This Project was proposed independently of the Jurassic Subcommittee but there has always been close liaison, with originally one and later all three co-leaders as Voting (Stephen HESSELBO, UK, and Jozsef PALFY, Hungary) or Corresponding (Chris. McROBERTS, USA) Members of the Jurassic Subcommittee. *Inter alia*, the Project has contributed much valuable data and information relevant to the ISJS Working Group on the Triassic/Jurassic Boundary, and there are many members in common, including the Convenor (Geoff WARRINGTON, UK) and Secretary (Gert BLOOS, Germany) of the Triassic/Jurassic Boundary Working Group.

IGCP Project 506: Marine and Non-marine Jurassic: Global correlation and major geological events. This Project was initiated by the Jurassic Subcommittee and was proposed formally and is led by one of the Voting Members (SHA Jingeng, China). The co-leaders include one Voting (Nicol MORTON, France) and five Corresponding (Paul OLSEN, USA, Greg PIENKOWSKI, Poland, Alberto RICCARDI, Argentina, WANG Wongdong, China and Bill WIMBLEDON, UK) Members. The first Symposium and first Project business meeting was held in Nanjing, China, November 2005.

4b. ProGEO, Geosites and Geoparks Initiatives.

ProGEO and Geosites. The Subcommittee Geoconservation Working Group (Convenor Voting Member Kevin PAGE, UK) has several links (including himself and Corresponding Members Maria Helena HENRIQUES, Portugal, Platon TCHOUMATCHENKO, Bulgaria and Bill WIMBLEDON, UK) and the. A special session on conservation issues was organized by the Group during the 6th International Jurassic Symposium in Mondello, Italy, in September 2002 (see below).

European and UNESCO Geoparks Programme. National systems of Geoparks have been established in several countries. The Subcommittee representatives for those which feature Jurassic sites include Bulgaria (Platon TCHOUMATCHENKO) and Portugal (Maria Helena HENRIQUES).

4c. UNESCO World Heritage Sites.

“Jurassic Coast” World Heritage Site. Several members of the Subcommittee, including Voting Member Kevin PAGE, UK, Corresponding Members Robert CHANDLER, UK, and John CALLOMON, UK, and others, act as advisors to the Management Group of the UNESCO East Devon and Dorset Coast (informally known as the Jurassic Coast) World Heritage Site. There are ongoing consultations and discussions about the balance of public outreach (with, for example, guided fossil-collecting days for the public) and the geoconservation of important sensitive sites.

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

The year 2005 has been mainly a year of preparation for 7th International Jurassic Congress which will be held in Krakow, Poland, in September 2006. This date and event has been set by the Subcommission as the deadline for decisions on sections and submission of Stage GSSP proposals.

5a. 7th International Congress on the Jurassic System, Kraków, Poland, September 2006.

The 7th International Jurassic Congress (Symposium) will be held in Poland in September 2006. Scientific sessions will be held in the Jagiellonian University Conference Centre in Kraków on 11th to 14th September, with a Pre-Congress field trip on 6th to 10th September and four Post-Congress field trips on 15th to 19th September. Planning by the Organizing Committee, under the Chairmanship of Andrzej WIERZBOWSKI, is well under way. The Second Circular is ready for final checking before distribution and the Field Guide, of some 300 pages, will be published this year. A special feature of this Congress will be the involvement of Slovakia and Slovak geologists. A Congress website at www2.uj.edu.pl/ING/jurassica has been established for information.

5b. Progress with selection of GSSPs for Jurassic Stages.

A deadline of September 2006, the date of the 7th International Jurassic Congress, has been set by the Jurassic Subcommission for decisions on all remaining Stage GSSPs, followed by proposals to the Subcommission in 2006 or 2007.

Hettangian and Triassic/Jurassic Boundary. There is general agreement that none of the four proposed candidate sections (in Peru, USA, Canada and UK) for GSSP fulfills all the requirements. In September this year, a possible fifth candidate section, in Austria, emerged but has not yet been documented and proposed. The Working Group voting membership has been reorganised in preparation for voting procedures in 2006 and a special session, in conjunction with the conclusion of IGCP Project 458 will be held during the 7th International Jurassic Congress in Krakow, Poland, in September 2006.

Sinemurian. The Sinemurian GSSP in Somerset (S.W. England) was ratified by IUGS in 2000 and published in *Episodes* 25/1, 22-28, 2002.

Pliensbachian. The GSSP proposal of the Wine Haven section in Yorkshire (E. England) was ratified by IUGS in 2005; the preliminary proposal was published in 2003 and the revised proposal will be submitted to *Episodes* this year.

Toarcian. The Working Group held a field meeting in Peniche, Portugal, in June 2005 and confirmed selection of the Peniche section for proposal as GSSP. Some details remain to be established and will be presented during the 7th International Jurassic Congress in Krakow in September 2006. A GSSP proposal is in preparation.

Aalenian and Lower/Middle Jurassic Boundary. GSSP proposal of Fuentelsaz section (Spain) ratified by IUGS in 2000 and published in *Episodes* 24/3, 166-175.

Bajocian. Proposal of GSSP at Cabo Mondego section (Portugal) and ASP at Bearreraig, Isle of Skye section (NW Scotland) was ratified by IUGS in 1996 and published in *Episodes* 20/1, 16-22

Bathonian. Working Group meetings were held in Lyon, France, in March 2005 and in Torino, Italy, in September 2005. Investigations of possible new candidate sections for the Bathonian GSSP, especially in Iberia, as alternatives to the already proposed section near Digne, Hautes-Alpes (S.E. France), are continuing. GSSP proposal in preparation and will be presented during the 7th International Jurassic Congress in Krakow in September 2006.

Callovian. GSSP candidate section at Albstadt-Pfeffingen, Swabia (S. Germany) has been selected (paper published 2000 in Proceedings of 5th International Jurassic Symposium) and was

confirmed during meeting in Stuttgart (Germany) in June 2005. Proposal in preparation for presentation during the 7th International Jurassic Congress in Krakow in September 2006.

Oxfordian and Middle/Upper Jurassic Boundary. Proposal as GSSP of a section near Savouron, Provence (S.E. France) has been published. A field meeting on an alternative section at Redcliffe Point, Dorset (S.W. England) was held in 2003 and multidisciplinary analyses of samples collected are now well advanced. A small meeting to resolve problems of ammonite taxonomy and detailed biostratigraphy was held in Zaragoza (Spain) in June 2005 to coordinate ammonite biostratigraphy. One section is expected to be proposed as GSSP and the other as ASP during the 7th International Jurassic Congress in Krakow in September 2006.

Kimmeridgian. A Working Group meeting was held in Stuttgart (Germany) in June 2005. Some details of correlation of ammonite horizons between the candidate sections in the Boreal/Subboreal Realm (Flodigarry, Isle of Skye, N.W. Scotland), and in the Tethyan/Mediterranean Realm (Mt. Crussol, Ardeche, S.E. France) remain to be finalized. For reasons of historical priority, the Flodigarry section will be proposed as Kimmeridgian GSSP during the 7th International Jurassic Congress in Krakow in September 2006.

Tithonian. A Working Group meeting was held in Stuttgart (Germany) in June, 2005. Proposal of the Fornazzo section, Sicily (S. Italy) as candidate GSSP was published in 2004 (Proceedings of 6th International Jurassic Symposium). Completion of work on other candidate sections at Canjuers and Mt. Crussol (S.E. France) has been delayed by personal problems of a key contributor.

5c. Jurassic Newsletter no. 32.

The Jurassic Newsletter of the International Subcommittee on Jurassic Stratigraphy is the principle organ of communication between the Subcommittee and those with an interest in the Jurassic. *Newsletter* 32 for 2005, edited by Nicol MORTON (France) and Paul BOWN (UK), was published electronically in August 2005 and circulated as an email attachment to all Honorary, Voting and Corresponding Members of the Subcommittee, who are expected to forward it on to others. This *Newsletter* has 45 pages, and includes reports by the Chairman and the Convenors of twelve of the Working Groups, nine items of discussion or report by correspondence, two announcements about future meetings, reports on two IGCP Projects 458 and 506, and memorial tributes to three recently deceased members (including former Chairman of ICS Jürgen Remane).

5d. Jurassic Subcommittee Directory.

At the same time as the publication and distribution of Jurassic Newsletter no. 32, the Directory of members of the Jurassic Subcommittee for 2004 – 2008 was distributed, also as an email attachment. This gives the addresses, telephone/fax numbers and email addresses of all members of the Subcommittee, including Voting, Corresponding and Honorary Members. For the Subcommittee Bureau and the Voting Members the research interests and Subcommittee responsibilities are also listed. Also listed are the details of the Convenors of the Working Groups (who are all Voting or Corresponding Members). Some additional Corresponding Members will be added to the list.

5e. ISJS Website.

The website for the International Subcommittee on Jurassic Stratigraphy was established in August 2005 by Paul BOWN (UK), Secretary of the Subcommittee. The content of the site is still under development, but includes information on the goals and objectives of the

Subcommission, details (with photographs) of the Voting Members and recent Jurassic Newsletters. The current address is <http://www.es.ucl.ac.uk/people/bown/ISJSwebsite.htm>.

5f. IGCP Project 506: Marine and Non-marine Jurassic: Global correlation and major geological events.

The opening meeting of this Project, a *Symposium on Jurassic Boundary Events*, was held in Nanjing, China, on 1–4 November 2005, organised by SHA Jingeng (China) (Voting Member of Jurassic Subcommission and Leader of IGCP Project 506), WANG Yongdong (China) (Corresponding Member of Jurassic Subcommission and Secretary of IGCP Project 506) and colleagues. The programme included eighteen invited talks and eight oral/poster sessions with 42 papers presented, a half-day visit to Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences and a full-day fieldtrip and cultural visit in Nanjing and surrounding area. An abstract volume (122 pages) was produced and the edited papers will be published in a Special Issue of the journal *Progress in Natural Science*.

6. CHIEF PROBLEMS ENCOUNTERED IN 2005

These remain as they have been in recent years, and relate mainly to difficulties in obtaining grants for research on stratigraphical topics and travel to meetings of Working Groups. 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. For example, recent applications for projects on the palaeomagnetic stratigraphy of key sections, including those selected as GSSPs, have been refused funding.

7. SUMMARY OF EXPENDITURES IN 2005 (ANTICIPATED THROUGH MARCH 2005): INCOME

Carried forward from 2004		≈1500
ICS Allocation	<i>US\$2000 converted to €1553,24 less bank charges of €30 =</i>	€1523
	TOTAL	≈3023

EXPENDITURE FROM 2005 BUDGET

General office expenses		≈ 250
ISJS Newsletter 32 preparation		≈ 100
Support for preparation of 7 th International Jurassic Congress, Krakow, Poland, September 2006		€1500
Support for Toarcian WG meeting, Peniche		≈ 750
Support for Tithonian and Kimmeridgian meeting, Stuttgart		≈ 500
	TOTAL	≈3100

Deficit to be carried forward to 2005 - ≈ 77

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

8a. 7th International Congress on the Jurassic System, Krakow, Poland, 6 – 19 September 2006.

The four-yearly International Jurassic Symposia/Congresses are the most important events in the Subcommittee calendar. The next will be held in Krakow, Poland, in September 2006. This Congress will include general sessions and special sessions on specific themes such as on the Triassic/Jurassic Boundary. The list of other themes is not yet available, but can be expected to relate to the activities of some of the Thematic Working Groups. The Stage Working Groups which have not yet proposed GSSPs for the bases of the Stages have been asked to reach decisions during the Congress and submit proposals to the Subcommittee during or soon after the Congress. None has indicated that this will not be possible. Therefore the anticipated results include base GSSP proposals for remaining Jurassic Stages. Other publications will include an up-to-date description of the Jurassic of Poland and adjacent parts of neighbouring countries, notably Slovakia, in the form of a fieldtrip guidebook, an abstracts volume and a proceedings volume which will include the refereed and edited texts of papers presented. Other publications are planned.

8b. Revised membership of Jurassic Subcommittee.

The Voting Membership of the Jurassic Subcommittee was renewed during 2004, with each of the six new Voting Members allocated specific areas of responsibility on behalf of the Subcommittee. Details of these were given in the new Subcommittee Directory distributed in August 2005. The list of Corresponding Members was revised in early 2005, to ensure improved subject and geographical coverage, and reflect also a few changes to the Convenors of the Working Groups. Details were also given in the Subcommittee Directory. Some additions to the Corresponding Membership remain to be finalised.

8c. Improvement of website for Jurassic Subcommittee.

The long-awaited website for the Jurassic Subcommittee was established by Secretary Paul BOWN (UK) in August 2005. This, remarkably, was achieved without the additional help and advice that had been hoped for. During the coming year, improvements will be made and additional features will be added to the website.

8d. Publication of Jurassic Newsletter 33:

The principle organ of communication is the ISJS Jurassic Newsletter, which publishes (electronically) reports of all the Working Group and other articles, of varying length. This is emailed to all Honorary, Voting and Corresponding Members and should be forwarded to others who have an interest in Jurassic geology. This has been shown to work well in some countries, but less well in others. Distribution of the next *Newsletter* (33) should be in Spring or early Summer of 2006 and it will also be available for downloading from the website.

8e. IGCP Project 506 Marine and Non-marine Jurassic: Global Correlation and Major Geological Events.

This Project will be pursued at many stratigraphical levels, from the Triassic/Jurassic Boundary to the Jurassic/Cretaceous Boundary. There are numerous examples in Lower, Middle and Upper Jurassic where calibration of the sequences of continental floras and faunas against marine faunal changes will provide valuable insights into the geological and biological evolution of

Earth during the Jurassic Period. The opening Symposium and first planning meeting were held in Nanjing, China, in November 2005. The meetings to be held in 2006 include:

Field workshop in South-west England in July. The discussion sessions will be held in Bristol with fieldtrips to the Triassic/Jurassic succession in Somerset and to the Jurassic/Cretaceous succession in Dorset.

Symposium session and fieldtrip in southern Poland in September. This meeting will be held as a Special Session of the 7th International Jurassic Congress in Krakow, with post-Congress fieldtrip on the sequence stratigraphy and correlation of Triassic/Jurassic boundary strata in central/west Poland.

9. BUDGET AND ICS COMPONENT FOR 2005

For the year 2006 the main activities of the Jurassic Subcommittee will be focussed on the the annual Jurassic Newsletter, the 7th Jurassic Symposium in Poland in 2006 and related projects which will include business meetings of all the Working Groups. During the final session of the Congress an open meeting of the Jurassic Subcommittee will receive the Working Group report and decide the location of the 8th International Jurassic Symposium, which is expected to be held in 2010.

Budget request.

Provision is requested in the budget for special field and laboratory work to resolve remaining problems with Stage GSSP proposals before and after the Congress, notably those for the Kimmeridgian and Tithonian Stages. [Most of the financial activities of the Subcommittee occur within the European Euro zone; therefore, projections are expressed in the Euro currency.]

Projected Budget for 2006:

General office expenses	⊞ 250
Preparation and production of Newsletter 33	⊞ 100
Contributions to Officers' travel costs	⊞ 600
Support for Working Groups (meetings etc.)	⊞2000
Deficit from 2005 budget	€ 77

TOTAL BUDGET PROJECTED	⊞3027

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 Poland (2006) 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 (2001-2005)

For most geologists involved in research on Jurassic rocks the most significant accomplishment of the Jurassic Subcommittee has been, and will continue to be, the International Jurassic Symposia which are held every three or four years - Erlangen (Germany) 1984, Lisbon

(Portugal) 1987, Poitiers (France) 1991, Mendoza (Argentina) 1994, Vancouver (Canada) 1998, Mondello (Sicily) 2002. These are noted for the friendly "family" atmosphere. During the last Symposium the location of the next Symposium was decided by democratic vote of those present. Four invitations were received and Poland was selected as the venue for the 2006 Symposium. A similar exercise will be carried out to decide the location of the 8th Symposium/Congress. The interval of the Symposia has become fixed at four years, timed to be midway between the International Geological Congresses so that this Symposium is expected to be held in 2010.

For each Symposium the resultant Field Trip Guidebooks are important reference publications, often with much new previously unpublished information, while the Symposium Proceedings are frequently quoted basic references on Jurassic geology. Within the five-year period 2001-2005, the proceedings of the Mondello Symposium (2002) were published in 2004. The Guidebook for the field excursions was published in 2002, as was also a revision of the classical volumes by Gemellaro on Jurassic ammonites. It would take too long to describe all the other publications, books and individual papers, which derive from meetings and other activities of Subcommittee Working Groups and Members, reported in the Jurassic Newsletter (see next paragraph).

The second most important accomplishment of the Subcommittee would be regarded by most as the annual ISJS Jurassic Newsletter. This is edited by the Chairman and Secretary of the Subcommittee and includes annual reports by the Subcommittee and the Convenors of the Working Groups, news items on current or recently completed research projects news and comments and discussion submitted by members and "friends". Previously the Newsletters were duplicated and distributed by post, but more recently have been distributed electronically as email attachments to all Honorary, Voting and Corresponding Members. In many countries these Members have established a network for onward forwarding so that the Newsletter should reach all with an interest. However, in other countries the onward distribution needs improvement.

For IUGS and ICS the most important achievements of the Jurassic Subcommittee concern the definition of boundary stratotypes (GSSPs) for the bases of the Jurassic System and Stages. Four of the ten are now established, the most recent ratified by IUGS in 2005. A deadline has been established within the Subcommittee for the project to be completed by the Jurassic Congress in 2006, well before the IUGS deadline of 2008.

The Jurassic Subcommittee anticipated by several years the review by the International Commission on Stratigraphy of its role within IUGS after completion of the International Chronostratigraphic Scale project. The Subcommittee started to broaden its role in 1995 by establishing thematic Working Groups, notably in Jurassic Sequence Stratigraphy. The number of these thematic "Working Groups" has been increased since 1999 and this trend will be continued.

11. OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2005-2008)

The primary objectives for the immediate future for the Jurassic Subcommittee remain the completion of the long-standing project for definition of the Stages by GSSPs. This is expected to be completed during 2006-2007. Other objectives and plans proposed for the period up to 2008 will be further discussed and refined during the 7th International Jurassic Congress in 2006.

Box 11a Proposed objectives of Jurassic Subcommittee for 2005-2008

For those of us who are interested in the geology of the Jurassic the four-yearly International Symposia/Congresses are a priority and these will be "officially" supported and sponsored. So also will other meetings as far as resources allow.

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

1. Stage Working Groups to standardise and propose **GSSPs for Substages** as appropriate, but named **ONLY** as Lower/Middle/Upper. We do not want to clutter up the nomenclature with named Substages such as Carixian, Domerian etc. These will be approved by the Jurassic Subcommittee, but ICS and IUGS have no current plans for involvement with Substages.
2. Asking the Stage Working Groups to define the **bases of the Standard (Ammonite) Zones** in terms not only of the correlation marker event but also to propose a stratotype point for the basal boundary in the same way as for the Stages. Similar definition of Regional Zones and maximising the detail of correlation with the Standard Zones would be very valuable.
3. Involvement in the aims and objectives of **IGCP Project 506**, targetted on developing means of correlation between **marine and non-marine** Jurassic successions. In recent decades the latter have been recognised to be very widespread and economically important in several regions, with exciting terrestrial faunas and floras.
4. Developing and expanding the **Thematic Working Groups**, some of which have been very successful. For this to work they need to be given more specific projects and targets - 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 506.
5. Investigate the establishment of **data-bases** which would bring together and make available information from all sources associated with the "members and friends" of the Jurassic.

The schedule of meetings already planned includes the following:

1. November, 2005 - Nanjing, China; inaugural meeting and workshop of IGCP Project 506 on Marine/Non-marine Correlation; focussing on methods of correlation and case histories.
2. July 2006 – Bristol, England; field workshop of IGCP Project 506 with particular reference to Triassic/Jurassic and Jurassic/Cretaceous boundaries.
3. September 2006 - 7th International Symposium on the Jurassic System, Poland, with field trips to Czestochova-Cracow Upland in central Poland, and in Pieniny and Tatra Mountains in southern Poland and northern Slovakia; although planned as a general Symposium, thematic sessions will be a major feature, with related field trips in some cases; Field Guides and Abstracts Volume will be produced for the Symposium and a Symposium Proceedings volume will be published subsequently.
4. To be decided, 2007 – western USA; field meeting of IGCP Project 506, with particular reference to Middle Jurassic non-marine successions and dinosaur faunas.
5. August 2008 – Scania, southern Sweden – meeting of IGCP Project 506, with particular reference to Triassic/Jurassic boundary successions and to correlation of Middle Jurassic in northern North Sea and adjacent regions.

Details of other meetings are not yet available.

APPENDIX [Names and Addresses of Current Officers and Voting Members, 2004-2008] INTERNATIONAL SUBCOMMISSION ON JURASSIC STRATIGRAPHY

Subcommission officers

- Chairman:** Nicol MORTON, Le Chardon, Quartier Brugière, 07200 Vogüé, France;
Tel. ** 33 4 75 37 03 80, email NICOL.MORTON@wanadoo.fr
(formerly Birkbeck, University of London, UK)
- Vice-Chairman:** Paul L. SMITH, Earth & Ocean Sciences, University of British Columbia,
6339 Stores Road, Vancouver, British Columbia V6T 1Z4, Canada
tel. ** 1 604 822 6456, email psmith@eos.ubc.ca
- Secretary:** Paul R. BOWN, Geological Sciences, University College, London,
Gower Street, London WC1E 6BT, UK
Tel. ** 44 20 7679 2431 email p.bown@ucl.ac.uk

List of Working (Task) Groups and their officers

- Hettangian (base Jurassic):** Convenor Geoffrey WARRINGTON, Leicester, UK gw47@leicester.ac.uk; Secretary
Gert Bloos, Stuttgart, Germany bloos.smns@naturkundemuseum-bw.de
- Sinemurian:** Convenor Gert Bloos, Stuttgart, Germany bloos.smns@naturkundemuseum-bw.de
- Pliensbachian:** Convenor Christian Meister, Geneva, Switzerland christian.meister@mhn.ville-ge.ch
- Toarcian:** Convenor Serge Elmi, Lyon, France Serge.Elmi@univ-lyon1.fr
- Aalenian:** to be arranged
- Bajocian:** Convenor András Galacz, Budapest, Hungary galacz@ludens.elte.hu
- Bathonian:** Convenor Sixto Fernandez Lopez, Madrid, Spain sixto@geo.ucm.es
- Callovian:** Convenor John Callomon, London, UK johncallomon@lineone.net
- Oxfordian:** Convenor Guillermo Melendez, Zaragoza, Spain gmelende@posta.unizar.es
- Kimmeridgian:** Convenor Andrzej Wierzbowski, Warszawa, Poland Andrzej.Wierzbowski@uw.edu.pl
- Tithonian:** Convenor Federico Oloriz, Granada, Spain foloriz@goliat.ugr.es
Secretary Guenter Schweigert, Stuttgart, Germany schweigert.smns@naturkundemuseum-bw.de
- Geoconservation:** Convenor Kevin Page, Plymouth, UK KevinP@bello-page.fsnet.co.uk
- Isotope Stratigraphy:** Convenor Stephen Hesselbo, Oxford, UK Stephen.Hesselbo@earth.ox.ac.uk
- Liaison:** Convenor Robert Chandler, Whyteleafe, UK aalenian@aol.com
- Magnetostratigraphy:** Convenor James Ogg, Indiana, USA jogg@purdue.edu
- Microfossils:** Convenor Susanne Feist Burkhardt, London, UK S.Fiest-Burkhardt@nhm.ac.uk
- Palaeobiogeography:** Convenor Fabrizio Cecca, Paris, France cecca@ccr.jussieu.fr
- Palaeoclimate:** Convenor Bruce Sellwood, Reading, UK b.w.sellwood@reading.ac.uk
- Sequence Stratigraphy:** Convenor Angela Coe, Milton Keynes, UK A.L.Coe@open.ac.uk
- Time Scale:** Convenor Jozsef Palfy, Budapest, Hungary palfy@nhmus.hu

List of Voting Members

- Elizabeth S. CARTER, Sisters OR, USA cartermicro@earthlink.net
- Fabrizio CECCA, Paris, France cecca@ccr.jussieu.fr
- Susana DAMBORENEA, La Plata, Argentina sdambore@fcnym.unlp.edu.ar
- Gerd DIETL, Stuttgart, Germany g.dietl.smns@naturkundemuseum-bw.de
- Serge ELMI, Lyon, France Serge.Elmi@univ-lyon1.fr
- Bouza FEDAN, Rabat, Morocco fedan@israbat.ac.ma
- Sixto FERNANDEZ LOPEZ, Madrid, Spain sixto@geo.ucm.es
- Stephen HESSELBO, Oxford, UK Stephen.Hesselbo@earth.ox.ac.uk
- Axel von HILLEBRANDT, Berlin, Germany hil10632@mailbox.tu-berlin.de
- Francis HIRSCH, Naruto, Japan francis-hirsch@mrj.biglobe.ne.jp
- James G. OGG, West Lafayette IN, USA jogg@purdue.edu
- Kevin N. PAGE, Crediton, UK KevinP@bellopage.fsnet.co.uk
- Jozsef PALFY, Budapest, Hungary palfy@nhmus.hu
- Giulio PAVIA, Torino, Italy giulio.pavia@unito.it
- Jingeng SHA, Nanjing, China jgsha@nigpas.ac.cn
- Xiaoying SHI, Beijing, China shixyb@cugb.edu.cn

Boris SHURYGIN, Novosibirsk, Russia ShuryginBN@uiggm.nsc.ru

Geoffrey WARRINGTON, Leicester, UK gw47@leicester.ac.uk

Andrzej WIERZBOWSKI, Warsaw, Poland Andrzej.Wierzbowski@uw.edu.pl

Akira YAO, Osaka, Japan yao@sci.osaka-cu.ac.jp



**International Commission on Stratigraphy
Subcommission on Triassic Stratigraphy**

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

International Subcommission on Triassic Stratigraphy (STS)

Submitted by:

Dr Michael ORCHARD, Chairman
101-605 Robson Street, Vancouver, BC, V6B 5J3, Canada
Tel. ** 604 666 0409
Email morchard@nrca.gc.ca

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

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 selection of global stratotype sections.
Correlation of Triassic rock successions and events, including marine to non-marine.
Climatic evolution and modeling.

The objectives satisfy the IUGS mandate of fostering international agreement on nomenclature and classification in stratigraphy; facilitating international co-operation in geological research; improving publication, dissemination, and use of geological information internationally; encouraging new relationships between and among disciplines of science that relate to Triassic geology world-wide; attracting competent students and research workers to the discipline; and fostering an increased awareness among individual scientists world-wide of what related programs are being undertaken.

3. ORGANIZATION

STS is a Subcommission of the Commission on Stratigraphy.

Officers (chairman, two vice-chairmen, secretary), Editor/ Webmaster of newsletter *Albertiana*, voting members (24), and corresponding members (~100). The Secretary hosts a web site for STS announcements and task group discussions.

Subcommission members represent a broad spectrum of specialized stratigraphical disciplines from those countries or regions where Triassic rocks are extensively studied in relation

to fundamental and/or applied geological research. Current research activities and future plans are communicated through publication of the bi-annual STS newsletter *Albertiana* as both hardcopy and web release.

Officers for 2004-2008:

Chair: Dr. Michael J. Orchard, Canada
 Vice-Chair: Prof. Yin Hongfu, China
 Vice-Chair: Prof. Marco Balini, Italy
 Secretary: Prof. Christopher R. McRoberts, USA

WEB address for Subcommission site; and indication of contents

<http://www.bio.uu.nl/%7Epalaeo/Albertiana/Albertiana01.htm> - *Albertiana* issues for access and download.

<http://paleo.cortland.edu/sts/> - STS information, task group discussions.

4. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

IGCP Project 467: Triassic time and trans-Panthalassan correlations

IGCP Project 458: Triassic/ Jurassic Boundary Events.

CHRONOS/ SPS: co-sponsors of Wuhan meeting 2005.

InterRad group: Joint meeting planned for 2006.

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

Newsletter and Website

Three/Four issues of *Albertiana*, the official newsletter of the Triassic Subcommission, were published in 2005. The primary aim of *Albertiana* is to promote the interdisciplinary collaboration and understanding among members of the Subcommission and within this scope serves as a platform for announcements, meeting reports, business minutes, reviews, and Triassic literature compilations as well as preliminary notes, progress reports, and articles on Triassic research. Electronic versions are also available in PDF format at

<http://www.bio.uu.nl/%7Epalaeo/Albertiana/Albertiana01.htm>.

Albertiana 32 (77 pages) was published in April 2005. It includes a list of the 2004-2008 STS Voting and Corresponding Members. Papers include a new data on the Norian-Rhaetian, Olenekian-Anisian, and Triassic-Jurassic boundaries.

Albertiana 33 was published in May 2005 in two parts to accompany and document the meeting in Chaohu, China and associated and fieldtrips.

33, Part 1 (117 pages): comprised Program and Abstracts 68 abstracts were included.

33, Part 2 (70 pages): comprised field guides for pre-meeting (P-T boundary at Meishan), mid- meeting (Induan-Olenekian GSSP prospect in Chaohu), and post-meeting (Great Bank of Guizhou) excursions.

Albertiana 34 – in press.

The **STS website** established by the new STS Secretary to accommodate discussion notice boards for each of the current boundary task groups has had some limited success.

Meetings

(1) Meeting on **Triassic Chronostratigraphy and Biotic Recovery**.

This International Symposium was held at the Tang Shan Hotel in Chaohu City, Anhui Province, China on 23-25 May, 2005 with about 70 colleagues from 14 countries in attendance. The Symposium was co-sponsored by the Subcommission on Triassic Stratigraphy, IGCP-467, Task Group on Induan-Olenekian Boundary, Subcommission on Permian Stratigraphy, the CHRONOS Project, as well as the National Natural Science Foundation of China and China National Commission of Stratigraphy. It was organized by the China University of Geosciences and hosted by the Government of Chaohu City and Office of Land and Resources, Anhui Province. Dr. Mike Orchard acted as the chairman and Drs. Yuri Zakharov (Russia) and Yin Hongfu (China) as the vice-chairmen, while Dr. Tong Jinnan (China) served as the secretary.

47 oral reports were presented at 13 sessions during two and half days, and 15 posters were displayed at the Symposium. Field Excursions associated with the symposium included a Pre-Symposium Field Excursion on 21-22 May attracted 27 participants from 10 countries in a trip from Hangzhou–Meishan–Nanjing–Chaohu. A post-Symposium Field Excursion on 26-29 May attracted 28 participants from 11 countries and focused on southern Guizhou Province.

The symposium received 68 abstracts, which are all published in two volumes of the Triassic subcommission newsletter *Albertiana* (issue #33), together with the symposium program and all field excursion guides. The symposium and field excursions attracted good attention from the local news media with news from the symposium and excursions featured on the front pages of the local newspapers, and reported continuously by the local newscast and television stations. Scientific highlights of the meeting have been published in the International Geoscience journal *Episodes* (20: 1-2). The Lower Triassic in general, and the I-O boundary in particular were the focus of the meeting. Presentation of I-O biostratigraphic results from China, Spiti, and North America were included and the prospect of a second GSSP candidate at Muth was tabled.

The proceedings of the Chaohu meeting were offered to the journal *Paleo3* as a special volume on the **Permo-Triassic Boundary Event and Early Triassic Biotic Recovery**. The publishers (Elsevier) have agreed to produce a volume we have about 40 volunteered manuscripts in preparation with a deadline this winter. Co-editors: Thomas Algeo, Daniel Lehrmann, Mike Orchard, and Tong Jinnan.

(2) An International Field Workshop on the **Triassic of Germany** and surrounding countries took place 14–20 July, 2005. Organized by G. H. Bachmann, G. Beutler, M. Szurlies, J. Barnasch, & M. Franz.

Organization of **future meetings**:

March 19-24, 2006. **Circum-Pacific Triassic Stratigraphy and Correlation**, Wellington, New Zealand. 2nd Circular published in *Albertiana* 32. To date the meeting has attracted 102 early registrants from 18 countries, and 27 Triassic abstracts have been received so far.

July 17-21, 2006. **First International Conodont Symposium (ICOS1)**, Leicester, England. A special session on Triassic conodont zonation is being arranged.

August 16-20, 2006 **The Boreal Triassic**, Svalbard, Norway. 1st announcement published in *Albertiana* 32. The preliminary program includes a two day conference with a one day excursion. An extended abstract series called "*Abstracts and Proceedings of the Geological Society of Norway*", and a conference volume in *Polar Research* is under plan.

Progress on Triassic GSSPs:

Base of Induan/ Triassic – completed.

Induan-Olenekian - A proposal for the I/O boundary GSSP at the Chaohu section in Anhui Province of East China, within the low-latitude Tethyan Realm, was published in *Albertiana* #29 (2004). This boundary and proposed GSSP was the focus of a meeting held in China during June 2005. Many members of the task group were able to examine the section. The FAD of conodont *Neospathodus waageni* subsp. is the proposed index to define the I/O boundary: this datum lies 26 cm below the FAD of the flemingitid ammonoids, and is located slightly prior to the top of the second Triassic normal magnetozone, and the peak of the first Triassic positive excursion of $\delta^{13}\text{C}$. An alternate GSSP candidate at Muth, Spiti, has a superior ammonoid record but lacks magnetostratigraphy; however, it has recently yielded preliminary chemostratigraphic results including an anomaly. Conodonts from both sections are under study by Orchard in collaboration with Zhao (Chaohu) and Krystyn (Muth) and have yielded the following: the *N. waageni* group diversified into several morphotypes or subspecies near the beginning of its range and the appearance of the undifferentiated species may be a suitable datum for the I-O boundary; the origin of the species may lie in either *Ns. dieneri* or *Ns. pakistanensis*; evolution in the *Ns. pakistansensis* – *Ns. spitiensis* group provides additional indices for boundary recognition; *Chengyuania nepalensis* ranges into the Olenekian and is not a reliable guide to Induan strata.

Olenekian-Anisian - There has been a long standing but informal agreement to use the FAD of the conodont *Chiosella timorensis* at Desli Caira, in Dobrogea, Romania as the GSSP for the O/A boundary. This corresponds to a significant change in the ammonoid fauna, and the peak of a negative C isotope anomaly, and falls within a short reversed polarity interval situated between two short normal intervals that follow the longer reversed interval Kç1r in the upper Spathian. A full proposal has yet to be tabled but it is promised next year; the STS Chair has stressed the urgency for this to happen soon. Remaining obstacles identified are the need for taxonomic clarification of *Chiosella*, and missing geochemistry from a thin interval. An alternative GSSP section is identified in Guangdo, Guizhou Province, China should a proposal fail to materialize next year. This locality lacks the rich ammonoid fauna of the Romanian section, but it is relatively expanded and has an excellent conodont succession and numerous dated ash beds (e.g. ~247 Ma.). Bed by bed re-sampling of the Guangdo section for conodonts was done in the spring of 2005.

Anisian-Ladinian – Following agreement within STS on the A/L GSSP at the base of the Curionii Zone at Bagolino, Italy, the ICS voted in favor and the IUGS ratified the choice on 21st March 2005. The GSSP is thus defined at the top of "Chiesense groove", located about 5 m above the base of the Buchenstein Beds at Bagolino, northern Italy; the lower surface of the overlying thick limestone bed has the lowest occurrence of the ammonoid *Eoprotrachyceras curionii*. Secondary global markers in the uppermost Anisian include the lowest occurrence of conodont *Neogondolella praehungarica* and a brief normal-polarity magnetic zone. The GSSP level is bracketed by U-Pb single zircon age data, indicating that the boundary age is within the range 240-242Ma. A description of the GSSP was prepared for publication in *Episodes*.

Ladinian-Carnian - Work continued on sections in the Dolomites of northern Italy, Spiti in India, and South Canyon in Nevada, USA. A very heavy resampling of the Prati di Stuores section in Italy by A. Nicora, Milano, resulted in a single incomplete specimen of *M. polygnathiformis* near the bed with the FAD of *Daxatina*. Meanwhile, the Padova research group (P. Mietto and co-workers) are now looking for other sections in Eastern Dolomites to

better document the interval between the top of *Daxatina* beds and base of *Trachyceras aon*. In Spiti, *Daxatina* appears towards the top of the range interval of the genus *Frankites*, and *Trachyceras* overlaps with highest *Daxatina*. This is the same sequence as in Prati di Stuores. The FAD of the conodont *Metapolygnathus polygnathiformis* predates the oncoming of *Daxatina* by several meters. Doubtful *Halobia* still appear within the *Frankites* beds but well established occurrences are higher, within the beds with *Trachyceras*. The pros of Spiti sections are the concurrent record of ammonoids, conodonts and bivalves, which allows the intercalibration of the bioevents. The cons are the remagnetization of the section, the cooked out content in palynomorphs, and the accessibility limited to the summer months, due to the altitude. In the successions in New Pass, Nevada, *Frankites sutherlandi* overlaps the lower part of the range of *Trachyceras* gr. *T. desatoyense*, several meters above the FAD of *desatoyense*. *Halobia* appears in the same beds from where *sutherlandi* was recovered and possibly is even older. The conodonts are currently being studied. The richest beds in ammonoids of the South Canyon section overlie a sudden facies change, with the drowning of a carbonate platform. South Canyon does not appear to be a possible GSSP candidate mostly because of the facies change and the remagnetization due to the nearby Cenozoic volcanic rocks. The section is, however, of great significance for large-scale correlations of North America with the Tethyan realm.

Carnian-Norian - synthesis of C/N boundary data for the Black Bear Ridge section in British Columbia and description of new conodont taxa and zonation is nearing completion. The next step will be to attempt to apply the new taxonomic distinctions and zonation to the faunal successions of Tethyan sections, particularly in Sicily. Through the latter, the zonation can be directly linked to magnetostratigraphy, and hence to the nonmarine Triassic, although the latter correlation, and hence the duration of Upper Triassic stages remains a contentious issue.

Norian-Rhaetian - Work continues on the section in the Zlambach Formation in Austria where ammonoid, pelagic bivalve, conodont, radiolarian, and palynomorph occurrences are intercalibrated and a magnetostratigraphy is available. A distinct and widely recognized dinoflagellate change (FO of *Rhaetogonyaulax rhaetica*) occurs midway through the section and is potentially applicable in shallow marine and/or high latitude basins. This level corresponds also to the FAD of the conodont *Misikella posthernsteini*. A field workshop in the Gabbs Valley Range of Nevada in March 2005 included sampling of both N/R and T/J boundary strata. Palynology results were disappointing, but the presence of the 'Tethyan' conodont *Misikella* was confirmed - a first for the North American autochthon.

Non-marine Group – helped organize a theme meeting on the nonmarine Triassic-Jurassic transition, in St. George, Utah during March 2005.

6. CHIEF PROBLEMS ENCOUNTERED IN 2005

As last year, the Chair's ability to fulfil his STS duties is compromised by the new program structure and lack of funds for foreign travel. Similar financial problems face most task group members. Progress on the O-A boundary GSSP was hampered by poor communication within the task group.

7. SUMMARY OF EXPENDITURES IN 2005 (ANTICIPATED THROUGH MARCH 2006):ICS FUNDING (*values in \$U.S.*)

Subcommission allocation	2000
Supplement travel grant for China	<u>1200</u>
TOTAL	3200

STS EXPENDITURES

Travel grant, McRoberts (STS Secretary)	1200
Albertiana - STS Newsletter	1000
Support for Chaohu-China meeting	500
Support for Wellington-NZ meeting	<u>500</u>
TOTAL	3200

8. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR (2006):**(1) Olenekian GSSP**

Completion of I-O boundary studies, and tabling of GSSP proposals for both Chaohu and Muth. Publication of conodont data from Chaohu and Spiti, including new taxa. GSSP task group decision. Production of Special Volume of *Paleo3* on the Lower Triassic.

(2) Other GSSP projects in 2006

Anisian: Clarification of Chiosella taxonomy; completion of geochemistry at Desli Cairra; compilation of the O-A GSSP proposal for Desli Cairra. Additional work on ash beds and conodonts from Guandao: potential for alternate proposal.

Carnian: Publication and further work on ammonoid and conodont material from the L-C boundary sections in Italy and Nevada.

Norian: Completion of manuscripts and production of synthesis volume on the C-N boundary at Black Bear Ridge, British Columbia: includes papers on new conodont taxa and zonation, lithostratigraphy and paleoenvironment, and Upper Triassic bivalve monograph. Subsequent distribution of conodont framework to European workers in order to test applicability to Tethyan sections, and determine suitability of taxa for intercontinental correlation prior to choice of GSSP index.

Rhaetian: Further work on N-R sections in Austria and a proposal for a N-R GSSP at Steinbergkogel is anticipated in 2006.

9. BUDGET AND ICS COMPONENT FOR 2006(*values in \$ U.S.*)

Albertiana - STS Newsletter production	1000
Support for Svalbard meeting, August 2006	1000
Task group expenses	<u>1000</u>
TOTAL	3000

Potential funding sources outside IUGS

Cost sharing with IGCP Project 467, Triassic time and trans-Panthalassan correlation.

Department of Geosciences at the University of Utrecht provides facilities for the production of *Albertiana* and hosts its web-site.

National research and travel grants provide support to individuals, and host institutions provide in-kind support to the executive and task group chairs.

10. REVIEW CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (2001-2005)

See Accomplishments in 2004 (above) for additional details.

Organization

Renewal of STS voting and corresponding membership in 2001. Voting membership was reduced from 31 to 26, and a broader geographical and disciplinary base established. This was the first significant turnover of voting members since the inception of the STS. A summary of all members' research interests was published in *Albertiana* 26. Four new GSSP Task Group chairs were appointed.

A second renewal took place in the Fall of 2004 with 11 new voting members amongst 25: this addressed the ICS recommended limit for terms served (max. 6 years) as well as lapsed members. A second web site was created to supplement that of *Albertiana* and host discussion groups.

Meetings/ workshops

- a. Field meeting in Tulcea, Dobrogea, Romania, 7-10 June, 2000. Prospective O-A boundary.
- b. International Symposium on the Global Stratotype of the Permian-Triassic boundary and the Paleozoic-Mesozoic events. Changxing, South China, August 2001
- c. International Conference in Oman: Permo-Triassic deposits: from shallow water to base of slope.
- d. Field workshop on Middle Triassic boundaries, Veszprum, Hungary, September, 2002.
- e. *Extinction events, faunal turnovers, and natural boundaries within and around the Late Triassic.* Vancouver, Canada. May 25th -28th, 2003. Conodont workshop on the Carnian-Norian boundary.
- f. *Triassic geochronology and cyclostratigraphy* a field symposium, September 11th -15th 2003. Focus on Secada core research and Middle Triassic time scales. Conodont workshop on the Olenekian-Anisian boundary.
- g. Field workshop in Spiti, India, 26th June-6th July 2004. Conodont workshop on the Ladinian-Carnian boundary.
- h. International Geological Congress, Florence, Italy, August 20-28, 2004. G22-06: *Triassic in Tethys Realm*; DWO-09: *Upper Triassic boundaries*.
- i. Meeting on *Triassic Chronostratigraphy and Biotic Recovery*. Chaohu, China, May 23-25, 2005. Focus on I-O boundary.

Publications

- a. 11 issues of *Albertiana* (#24-33) were published in 2000 thru 2004. Each of these issues were made available for download from the web.
- b. Abstract volumes/ field guides prepared for meetings in Romania, Oman, Stuores, Felseors, Vancouver, St Cristina, Spiti, and Chaohu.

Task groups

The **Permian-Triassic boundary** was agreed and ratified: the first appearance of the conodont *Hindeodus parvus* in the middle of bed 27, within the Yinkeng Formation at Meishan,

Changxing County, Zhejiang Province, South China. A formal celebration at the GSSP took place during August 2001.

The **Induan-Olenekian boundary** Task Group, formed in 1997, reviewed the options for a GSSP in the Russian Far East but found them lacking. A section in Chaohu, Anhui Province, China became the focus of intensive study. Ammonoid and conodonts biostratigraphy, magnetostratigraphy, and chemostratigraphy were undertaken. The FAD of the conodont *Neospathodus waageni* was identified as a potential GSSP datum: it lies 26 cm below the FAD of the Flemingitid ammonoids, and is located slightly prior to the top of the second Triassic normal magnetozone, and the peak of the first Triassic positive excursion of $d^{13}C$. Conodont biostratigraphy in Chaohu was summarized in *Albertiana* #29, and the ammonoids described in *Albertiana* #31. After 2004, field work carried out in Muth, Spiti, and evaluation of the Mikin Fm. for establishing an Induan-Olenekian boundary GSSP candidate was begun. The rocks include top *Gyronites*, complete *Flemingites*, and basal *Euflemingites* ammonoid intervals. Three boundary options based in ammonoids have been suggested and tied to the FAD of *Neospathodus waageni* subsp.

A field workshop was held at Desli Caira, in Dobrogea, Romania, in June 2000, to view the **Olenekian-Anisian boundary** candidate. Major work was undertaken on ammonoid, nautiloid, conodont, and foraminiferid biostratigraphy. Both chemo- and magneto-stratigraphic analyses were largely completed. At the 2003 field workshop in St Christina, a conodont workshop amongst task group members agreed that the appearance of the conodont *Chiosella timorensis* at the base of bed 7 was a suitable datum for GSSP definition. Further geochemical sampling was undertaken in 2004 to fill a perceived gap in the coverage at the principal section. Further work has been undertaken on correlative sections in South China, Spiti, and South Primorye, Russia. In particular, a section at Guangdo in the Nanpanjiang Basin of South China produced an excellent dataset, including isotopic dates from about this boundary (~247 Ma).

Intensive research was undertaken on **Anisian-Ladinian boundary** GSSP candidate sections in Italy and Hungary. A dedicated task group was formed in 2001 and presentations focused on the GSSP options in the Hungary meeting of 2002. A formal task group voting membership and a schedule for the choice of base-Ladinian stratotype was agreed at the St Christina Meeting in 2003, and three alternate proposals were published in *Albertiana* #28. The choice was concluded in a series of votes within STS during 2004.

A field workshop in the Italian Dolomites during July 1998 focused on the section at Prati di Stuares, the subject of a formal **Ladinian-Carnian boundary** GSSP proposal. A dedicated task group was established in 2001. Subsequently fieldwork was carried out in two other regions: Spiti and Nevada. Studies in Spiti have included four expeditions, with two in Nevada. Crucial biostratigraphic data concerns the distinction between prospective index ammonoids *Daxatina* and *Trachyceras*, the FAD of the prospective conodont species *polygnathiformis*, and the appearance of the bivalve *Halobia*.

The task group on the **Carnian-Norian boundary** was established in 2001. Key sections in Canada, Sicily, Slovakia, Turkey, and Oman have been studied resulting in an integrated bio-, magneto- and chemostratigraphic cross-correlation of key sections in the Tethys. The Pizzo Mondello section in Sicily contributes a magnetostratigraphic profile tied to a preliminary conodont zonation for the C-N boundary interval in Tethys. Alternate views of its correlation with the cyclostratigraphically calibrated Newark non-marine successions, place the base of the Norian at about 214 Ma or 228 Ma. A preliminary new conodont zonation from a potential GSSP at Black Bear Ridge, Western Canada was presented during a formal Workshop on Upper Triassic boundaries at the IGC in Florence in 2004.

A **Norian-Rhaetian boundary** task group was formed in 2001. Sections in western Canada, USA, and Austria were studied and produced important ammonoid, bivalve, and conodont data. Magnetostratigraphic and chemostratigraphic studies were undertaken in western North America: the former was unsuccessful, the latter identified an isotopic anomaly at the boundary. In Austria, a section in the Zlambach Formation produced good ammonoids, pelagic bivalves, conodonts, radiolarians, and palynomorphs: a distinctive dinoflagellate change occurs midway through the section. Radiolarians from western North America show distinctive faunal change at a level corresponding to the FAD of the conodont *Epigondolella mosheri*, which approximates the Amoenum Zone in North America.

11. OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2006-2008)

GSSPs task group deliberations concluded.

Induan/ Olenekian GSSP decision in 2006

Olenekian/ Anisian and Ladinian/ Carnian GSSP decision by 2007

Carnian/ Norian and Norian/ Rhaetian decision by 2008.

Meeting/field workshop schedule with themes and anticipated results.

March 19-24, 2006. **Circum-Panthalassa Triassic Faunas and Sequences.** *Te Papa Tongarewa*, Museum of New Zealand, in Wellington, Wellington, **New Zealand**. The conference is co-sponsored by InterRad, IGCP Project 467, the Subcommittee on Triassic Stratigraphy (STS), and the Institute of Geological and Nuclear Sciences (GNS).

Theme: Southern high latitudes Triassic correlations and circum-Pacific correlations. A post-conference excursion will provide an opportunity to examine the type sections for New Zealand Triassic stages. The conference program and abstracts volume and field excursion guide will be published within the GNS information series. Articles based on conference papers will be published as a special issue of one international and one Australasian journal.

July 17-21, 2006. **First International Conodont Symposium (ICOS1)**, Leicester, **England**. A special session on Triassic conodont zonation is arranged.

August 16-20, 2006. **The Boreal Triassic.** Longyearbyen, Svalbard, **Arctic Norway**. Joint meeting with IGCP 467. The UNIS (University studies on Svalbard) Institute will host the meeting.

Theme: Northern high latitudes Triassic correlations and boundary recognition. An on-ship excursion is planned to the famous Festningen section displaying the entire Triassic succession in sea-shore cliffs. An extended abstract series in "Abstracts and Proceedings of the Geological Society of Norway", and a conference volume in Polar Research are planned.

May, 2007. **The Global Triassic.** Albuquerque, New Mexico, **USA**. Publication of the symposia proceedings, a volume on the Triassic timescale funded by New Mexico Museum of Natural History.

**APPENDIX [Names and Addresses of Current Officers and Voting Members, 2004-2008]
SUBCOMMISSION ON TRIASSIC STRATIGRAPHY**

Subcommission officers

Chairman: M. J. Orchard, Geological Survey of Canada, 101-605 Robson Street, Vancouver, B.C. V6B 5J3, Canada, e-mail: morchard@nrcan.gc.ca

Vice Chairman: Yin Hongfu, China University of Geosciences, Yujiashan, Wuhan, Hubei, 430074, Peoples Republic of China. hfyin@cug.edu.cn

Vice Chairman: Marco Balini, Dipartimento di Scienze della Terra, via Mangiagalli 34, I-20133 Milano, Italy. Marco.Balini@unimi.it

Secretary/ STS web: Christopher A. McRoberts, Department of Geology, State University of New York at Cortland, P.O. Box 2000, Cortland, New York 13045 USA.
<mailto:mcroberts@cortland.edu>

Albertiana Editor/ Webmaster: Wolfram M. Kuerschner, Laboratory of Palaeobotany and Palynology, Utrecht University, Budapestlaan 4, 3584 CD Utrecht, The Netherlands.
e-mail: W..M.Kuerschner@bio.uu.nl

Task Groups and their officers

Base Induan (Triassic): Yin Hongfu, China. hfyin@cug.edu.cn

Base Olenekian: Y. Zakharov, Russia. fegi@online.marine.su

Base Anisian: E. Gradinaru, Romania. egradin@geo.edu.ro

Base Ladinian: A. Baud, Switzerland. Aymon.Baud@sst.unil.ch

Base Carnian: M. Gaetani, Italy. maurizio.gaetani@unimi.it

Base Norian: M. Orchard, Canada. morchard@nrcan.gc.ca

Base Rhaetian: L. Krystyn, Austria. leopold.krystyn@univie.ac.at

Non-marina auxiliaries: S. Lucas, USA. SLucas@nmmnh.state.nm.us

List of Voting Members

Yoshiaki Aita, Utsunomiya, JAPAN

Marco Balini, Milan, ITALY

Om N. Bhargava, INDIA

Hugo Bucher, Zurich, SWITZERLAND

Hamish Campbell, Dunedin, NEW ZEALAND

Mark Hounslow, Lancaster, ENGLAND

Dennis Kent, Palisades, USA.

Heinz W. Kozur, Budapest, HUNGARY

Leopold Krystyn, Vienna, AUSTRIA

Wolfram M. Kuerschner, Utrecht, NETHERLANDS

Max Langer, BRAZIL

Spencer Lucas, Albuquerque, USA.

Christopher R. McRoberts, Cortland, USA

Manfred Menning, Potsdam, GERMANY

Paolo Mietto, Padova, ITALY

Alda Nicora, Milano, ITALY

Michael J. Orchard, Vancouver, CANADA

Bruce Rubidge, Wits, SOUTH AFRICA

Kazem Seyed-Emami, Tehran, IRAN

Michael A. Shishkin, Moscow, RUSSIA

Jinnan Tong, Hubei, CHINA

aida@cc.utsunomiya-u.ac.jp

marco@e35.gp.terra.unimi.it

onbhargava@yahoo.co

Hugo.Bucher@pim.unizh.ch

H.Campbell@gns.cri.nz

m.hounslow@lancaster.ac.uk

dvk@rci.rutgers.edu

kozurh@helka.iif.hu

leopold.krystyn@univie.ac.at

w.m.kuerschner@bio.uu.nl

mclanger@ffclrp.usp.br

SLucas@nmmnh.state.nm.us

mcroberts@cortland.edu

menne@gfz-potsdam.de

mietto@epidote.dmp.unipd.it

Alda.nicora@unimi.it

morchard@nrcan.gc.ca

106gar@cosmos.wits.ac.za

k.seyedemami@kavosh.net

schsz@orc.ru

jntong@cug.edu.cn

Attila Voros, Budapest, HUNGARY

Wolfgang Weitschat, Hamburg, GERMANY

Hongfu Yin, Hubei, CHINA

Yuri D. Zakharov, Vladivostok, RUSSIA

voros@zoo.zoo.nhmus.hu

weitschat@geowiss.uni-hamburg.de

hfyin@cug.edu.cn

zakharov@fegi.ru



International Commission on Stratigraphy Subcommission on Permian Stratigraphy

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

International Subcommission on Permian Stratigraphy (SPS)

Submitted by:

Charles M. Henderson, Chairman SPS

Department of Geology and Geophysics, University of Calgary, Calgary, AB Canada T2N 1N4

Phone: 403-220-6170; Fax: 403-284-0074; Email: charles.henderson@ucalgary.ca;

Website: www.geo.ucalgary.ca/asrg

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

The Subcommission's primary objective is to define the series and stages of the Permian, by means of internationally agreed GSSPs, and to provide the international forum for scientific discussion and interchange on all aspects of the Permian, but specifically on refined regional correlations.

Fit within IUGS Science Policy: The objectives of the Subcommission involve two main aspects of IUGS policy:

1. The development of an internationally agreed chronostratigraphic scale with units defined by GSSPs where appropriate and related to a hierarchy of units to maximize relative time resolution within the Permian System; *and*
2. Establishment of frameworks and systems to encourage international collaboration in understanding the evolution of the Earth during the Permian Period.

3. ORGANIZATION

The Subcommission has an Executive consisting of a Chairman, a Vice-Chairman, and a Secretary; all three are Voting Members of the Subcommission. These three executive positions are new as of the IGC meeting in Florence in August 2004. There are sixteen total Voting Members representing most regions of the world where Permian rocks are exposed.

The objectives of the Subcommission are pursued by both stratigraphic and thematic Working Groups that are disbanded upon completion of their directed task. For example, the Working Groups on the Carboniferous-Permian Boundary, on the Guadalupian stages (Middle Permian), on the base-Lopingian boundary (base-Wuchiapingian Stage), and on base-Changhsingian have been disbanded on the successful establishment of their defining GSSP's and ratification by IUGS.

The current working groups include:

1. Cisuralian stages
2. Continental Permian
3. Transitional biotas as gateways for global correlation
4. Neotethys, Palaeotethys, and S. China intraplateau basin correlation

The Subcommittee also supports a special project titled “*The Permian: from glaciation to global warming and mass extinction*”.

Officers for 2004-2008:

Chair: Professor Charles M. Henderson, University of Calgary

Vice-Chair: Dr. Vladimir Davydov, Boise State University

Secretary: Dr. Shuzhong Shen, Nanjing Institute of Geology and Palaeontology

Website: <http://pri.boisestate.edu/Permophiles/>. This site includes all back issues of *Permophiles* in downloadable PDF format (#1 in 1978 to #46 Dec. 2005). A link to *Permophiles*/Permian research has also been established at <http://www.geo.ucalgary.ca/asrg>.

4. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

SPS interacts with many international projects on formal and informal levels. SPS is taking an active role on the development of integrated chronostratigraphic databases by participating with CHRONOS and PALEOSTRAT, which are NSF funded initiatives. Bruce Wardlaw and Vladimir Davydov are concentrating on the Permian-Triassic Time Slice Project and the development of improved taxonomic dictionaries, database sharing and manipulation with PALEOSTRAT.

SPS is also involved in core study from a drilling project of the Permian-Triassic boundary at Meishan, China; this project is an international collaboration investigating the signature and causes of the P-T extinction. SPS co-sponsored meetings on *Triassic Chronostratigraphy and Biotic Recovery* in Chaohu, China in May 2005 and on the *Nonmarine Permian* in Albuquerque, New Mexico in October 2005 and will meet at the 2nd *International Palaeontology Congress* in Beijing, China in June 2006.

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

GSSP's: The proposal for the base-Changhsingian was voted and ratified by ICS/IUGS in 2005.

Publications: The June 2005 issue of *Permophiles* (#45) was produced at Nanjing China during June 2005 and distributed to a mailing list of 280. The December 2005 issue of *Permophiles* (#46) was produced at the University of Calgary during November 2005 and distributed as a pdf on our website. In addition the remaining back issues of *Permophiles* were scanned and added to our website providing a complete series of communications by *Permophiles* since 1978.

Meetings: The SPS conducted two business meetings in 2005 including at the Triassic Chronostratigraphy and Biotic Recovery meeting in Chaohu, China on May 23, 2005 with 27 in attendance and at the Non-marine Permian Conference at Albuquerque New Mexico on Oct. 23, 2005 with 28 in attendance. This latter conference was organized by Spencer Lucas and was very successful with 68 people in attendance from 12 countries.

Membership: Significant changes were made to our voting membership in 2004, but only one change in voting membership occurred in 2005. Professor Giuseppe Cassinis of Italy retired

as a voting member and Dr. Marc Durand of Universite de Nancy, France was voted by the executive as a replacement. The SPS executive created a new membership category in 2004, Honourary Members, to reflect the significant past and continuing contributions of some retiring voting members. Professor Cassinis was added to that list in 2005. Honourary Members will receive GSSP proposals and be invited to comment on the merits of the proposal, but they will not vote on the proposal. The revisions suggested by Honourary Members will be included in subsequent versions of the proposal.

6. CHIEF PROBLEMS ENCOUNTERED IN 2005

There were no major problems in 2005.

7. SUMMARY OF EXPENDITURES IN 2005 (ANTICIPATED THROUGH MARCH 2006): INCOME

Donations:	\$ 600
University of Calgary support (1):	\$4,500
NIGPAS (2):	\$1,000
ICS (3):	\$ 900

TOTAL: \$7,000 (quoted in US\$ using 0.84 as the conversion from Canadian\$)

- (1) University of Calgary support from NSERC grant to Charles Henderson.
- (2) NIGPAS (Nanjing Institute of Geology and Palaeontology) support from NSF-C grant to Shuzhong Shen.
- (3) University account includes revenue from ICS and donations minus printing and postage. Current balance is a deficit of \$245.49 CAN (\$207US).

EXPENDITURES:

Printing and Mailing of <i>Permophiles</i> (1):	\$1,707.00
Travel support for <i>Permophiles</i> Production (2):	\$1,000.00
Support for travel for SPS sponsored international meetings and fieldwork (3):	\$4,500.00

TOTAL: \$7,207.00 (quoted in US\$ using .84 as the conversion from Canadian\$)

BALANCE: -\$207.00

- (1) paid by donations and ICS support
- (2) Shen to Calgary
- (3) Henderson to Chaohu and Nanjing China and Albuquerque NM

8. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR (2006):

1. Cisuralian Working Group Workshop to be conducted in July 24-August 4, 2006.
2. Analysis of samples collected by working group in #1.
3. Preparation of proposal by Cisuralian Working Group on base-Sakmarian GSSP.
4. Production of *Permophiles* #47 in Nanjing during June 2006.
5. Business meeting to be held during IPC in Beijing June 2006.
6. Production of *Permophiles* #48 in Calgary during November 2006.

9. BUDGET AND ICS COMPONENT FOR 2006

Cisuralian Working Group Field Excursion (1)	\$34,000
Annual Business Meeting, Beijing, IPC (2)	\$ 2,500
<i>Permophiles</i> and GSSP printing and postage	\$ 1,900
<i>Permophiles</i> travel (3)	<u>\$ 1,000</u>
TOTAL 2006 BUDGET	\$40,000

Support from University of Calgary (Henderson; NSERC)	\$ 5,000
Support from NIGPAS (Shen; NSF-C)	\$ 3,000
Fieldtrip Participants to form Cisuralian Working Group	\$30,000
Anticipated donations for <i>Permophiles</i>	<u>\$ 600</u>
TOTAL BUDGET REQUEST (ICS)	\$ 1,400

- (1) Based on \$800.00/participant internal costs in Russia for 20 participants (includes Russians) and average airfare of \$1,200 times 15 international participants.
- (2) Cost of travel to IPC meeting for Executive
- (3) Cost of Shen travel to Calgary in November

10. REVIEW CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (2001-2005)

The SPS has approved the general divisions of the Permian and has now had 6 GSSP's ratified by ICS and IUGS (Asselian, Roadian, Wordian, Capitanian, Wuchiapingian, Changhsingian). Support for documentation (fieldwork and publications) of the various chronostratigraphic methods for the establishment of the GSSP's has been the most outstanding and differentiating character of this Subcommittee. *Permophiles* has become an internationally respected newsletter and bears an ISSN designation (1684-5927) and is deposited in the National Library of Canada; nine issues were published during the five-year period. *See Accomplishments in 2005 (above) for additional details.*

11. OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2005-2008)

The primary objective is to complete the GSSP process by 2008. We currently anticipate that the last three GSSP's (Sakmarian, Artinskian, and Kungurian) should be ratified by 2007. In order to achieve this, the SPS executive is preparing an International Workshop for July 24-August 4, 2006 at the probable Cisuralian GSSP sites along the west flank of the Urals. This field workshop will be limited to twenty researchers and they will be charged with completing analysis of new samples and producing first drafts of GSSP proposals by early to mid-2007. New samples will document geochemical signatures and augment extensive geochronologic work, and conodont samples will highlight the accessibility of the sections and reproducibility of the chosen potential points. The trip will end at Aidaralash, Kazakhstan to celebrate the production of a permanent display for the base-Permian GSSP.

We anticipate the following schedule:

1. A vote by SPS on the **Sakmarian** proposal may be conducted during early 2007.
2. A vote by SPS on the **Artinskian** is anticipated during late 2007.
3. A vote by SPS on the **Kungurian** is anticipated during late 2007.

Once this process is completed SPS will shift focus toward three directions:

1. Correlations into **Continental deposits**,
2. Correlations **across provincial boundaries** and within the Tethys region,

3. Detailed documentation of the **geologic evolution** of the Earth during the Permian with respect to the established chronostratigraphic framework.

**APPENDIX [Names and Addresses of Current Officers and Voting Members, 2004-2008]
SUBCOMMISSION ON PERMIAN STRATIGRAPHY**

Officers and Voting Members

Dr. Boris I. Chuvashov

Institute of Geology and Geochemistry
Urals Branch of Russian Academy of Science
Pochtovy per 7
Ekaterinburg 620154 Russia

Dr. Vladimir Davydov, SPS Vice-Chairman

Department of Geosciences
Boise State University
1910 University Drive
Boise ID 83725 USA

Dr. Marc Durand

Universite de Nancy-I, GES, BP239
54506 Vandoeuvre-les-Nancy cedex
France

Dr. Yoichi Ezaki

Department of Geosciences
Osaka City University
Sugimoto 3-3-138
Sumiyoshi-Ku, Osaka, 558-8585, Japan

Dr. Clinton B. Foster

Australian Geological Survey Organization
G.P.O. Box 378
Canberra 2601 Australia

Prof. Charles M. Henderson, SPS Chairman

Dept. of Geology and Geophysics
University of Calgary
Calgary, Alberta, Canada T2N1N4

Prof. Yugan Jin

Nanjing Institute of Geology and
Paleontology, 39 East Beijing Rd.
Nanjing, Jiangsu, China 210008

Dr. Galina Kotlyar

All-Russian Geological Research Institute
Sredny pr. 74
St. Petersburg 199026 Russia

Prof. Ernst Ya. Leven

Geological Institute

Russian Academy of Sciences
Pyjevskiy 7
Moscow 109017 Russia

Dr. Tamra A. Schiappa

Department of Geography, Geology and the
Environment
Slippery Rock University
Slippery Rock, PA 16057 USA

Prof. Joerg W. Schneider

Freiberg University of Mining and Technology
Institute of Geology, Dept. of Palaeontology,
Bernhard-von-Cotta-Str.2
Freiberg, D-09596, Germany

Dr. Shuzhong Shen, SPS Secretary

Nanjing Institute of Geology and
Paleontology, 39 East Beijing Rd.
Nanjing, Jiangsu, China 210008

Dr. Guang Shi

Deakin University, Resden Campus
School of Aquatic Science and Natural Res.
Management
662 Blackburn Rd.
Clayton, Victoria, Australia 3168

Dr. John Utting

Geological Survey of Canada
3303 - 33rd Street N.W.
Calgary Alberta T2L2A7 Canada

Dr. Xiangdong Wang

Nanjing Institute of Geology and
Paleontology, 39 East Beijing Rd.

Dr. Bruce R. Wardlaw

U.S. Geological Survey
926A National Center
Reston, VA 20192-0001 USA

Honourary Members

Prof. Giuseppe Cassinis

Earth Sciences Dept.
via Abbiategrosso N. 217
Pavia 27100 Italy

Prof. Brian F. Glenister
Department of Geology
University of Iowa
Iowa City, IA 52242 USA

Dr. Heinz Kozur
Rezsü u 83

Budapest H-1029 Hungary

Prof. Claude Spinosa
Department of Geosciences
Boise State University
1910 University Drive
Boise ID 83725 USA

List of Working Groups and their officers

1. Cisuralian stages; Chairman is **Boris Chuvashov**
2. base-Changhsingian Stage; Chairman is **Yugan Jin**
3. Continental Permian Correlations; Chairman is **Joerg Schneider**
4. Transitional biotas as gateways for global correlation; Chairman is **Guang Shi**
5. Neotethys, Palaeotethys, and S. China intraplatform basin correlation; Co-Chairmen are **Vladimir Davydov** and **Heinz Kozur**.



**International Commission on Stratigraphy
Subcommission on Carboniferous Stratigraphy**

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

Subcommission on Carboniferous Stratigraphy (SCCS)

Submitted by:

Philip H. Heckel, Chair of SCCS
Department of Geoscience, University of Iowa
Iowa City, IA 52242
Phone: 319-335-1804, Fax: 319-335-1821
Philip-heckel@uiowa.edu

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

The SCCS promotes and coordinates international cooperation among various geologic specialists for the purpose of defining standard global chronostratigraphic boundaries within the Carboniferous System. The Devonian-Carboniferous boundary at the base has been selected in southern France, and the Carboniferous-Permian boundary at the top has been selected in northern Kazakhstan. The Mid-Carboniferous boundary has been selected in Nevada, USA, and subdivides the Carboniferous into two subsystems, the Mississippian Subsystem below and the Pennsylvanian Subsystem above.

The immediate goal now is to coordinate and further refine biostratigraphic correlation and to select the best stage boundaries within the two Carboniferous subsystems that will facilitate global correlation within the system. The ultimate goal is to calibrate biostratigraphic with other methods of correlation, such as chemostratigraphy, magnetostratigraphy, and radiometric dating, so that the successions dominated by terrestrial and endemic cold-water marine biotas in the Gondwana and Angara regions can be correlated with the biostratigraphic framework of the pan-tropical standard succession.

3. ORGANIZATION

Officers for 2004-2008:

Chair: Philip H. Heckel (USA)
Vice-Chair: Geoffrey Clayton (Ireland)
Secretary: David M. Work (USA)

Website: {The SCCS currently has no website}

SCCS has a total of 21 voting members (see list at end of report), and approximately 350-400 corresponding members. Meetings of the SCCS are held every two years, both at the quadrennial meetings of the International Carboniferous-Permian Congress, and at a Field Meeting convened by the SCCS alone midway between the Congresses.

SCCS has four current Task Groups and two exploratory Project Groups:

Task Group to establish the Tournaisian-Visean Boundary [which is also the base of the Middle Mississippian Series], chaired by George Sevastopulo (Ireland), who summarized the recent work of the group in this year's Carboniferous Newsletter [v. 23, p. 6-7].

Task Group to establish the Visean-Serpukhonian Boundary [which is also the base of the Upper Mississippian Series], chaired by Barry Richards (Canada), who summarized the recent work of the group in this year's Carboniferous Newsletter [v. 23, p. 7-8].

Task Group to establish the Bashkirian-Moscovian Boundary [which is also the base of the Middle Pennsylvanian Series], chaired by John Groves (USA), who summarized the recent work of the group in this year's Carboniferous Newsletter [v. 23, p. 8-9].

Task Group to establish the Moscovian-Kasimovian Boundary [which is also the base of the Upper Pennsylvanian Series], and the **Kasimovian-Gzhelian Boundary**, chaired by Elisa Villa (Spain), who summarized the recent work of the group in this year's Carboniferous Newsletter [v. 23, p. 9-10].

Project Group on Upper Palaeozoic boreal biota. Stratigraphy and biogeography, chaired by Marina Durante (Russia), who summarized the recent work of the group in this year's Carboniferous Newsletter [v. 23, p. 10-11].

Project Group on Carboniferous magnetostratigraphy, chaired by Mark Hounslow (Britain), who summarized the recent work of the group in this year's Carboniferous Newsletter [v. 23, p. 11-12].

4. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

The SCCS has worked with the Subcommissions and Working Groups on Devonian and Permian Stratigraphy to establish the common boundaries with the Carboniferous. The SCCS expects to be cooperating soon with the new Chronos initiative, which is in the process of being established, with a website at www.chronos.org. It also has established a working relationship with the Permian Research Group at Boise State University, which has initiated a program of obtaining precise ID-TIMS U-Pb radiometric dates from biostratigraphically constrained Carboniferous-Permian successions in the Ural Mountains.

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

Newsletter on Carboniferous Stratigraphy, Volume 23, published in July 2005. Its 60 pages include commentary by the Chair on various current issues, reports of the task groups for 2004-5 [typically containing much current detail], and 12 articles on various topics of interest, including: Correlation of the base of the Visean Stage in the type Mississippian region of North America; Report of the first meeting on Upper Paleozoic chronostratigraphy of South America; An essay on the necessity of regional stages in Gondwana; A report on the new German Carboniferous correlation table; Bivalve biostratigraphy of the Kulm Facies in central Europe; Sediments and fauna across the Tournaisian-Visean boundary in southern Tien Shan in Kyrgyzstan; Visean-

Serpukhovian transition in the Middle Tien Shan; Advances in correlation of the Visean-Serpukhovian boundary in the South Urals; Correlation of Visean plant-bearing deposits on the Russian Platform; Geography and succession of Visean European floras; Cyclothem correlation and biostratigraphy across the Moscovian-Kasimovian and Kasimovian-Gzhelian boundaries in North America and Eurasia; Lower Kasimovian correlation at Donskaya Luka in southern Russia. As usual, it provides a significant outlet for timely presentation and discussion of useful information relating to boundary selection, often from areas that are not typically covered in other journal venues.

Summary of Task Group Reports

[Full text of all reports updated from the Newsletter is provided in Appendix B at the end]

Task Group to establish the Tournaisian-Visean boundary is in the final stages of polishing the GSSP proposal for the T-V boundary at the Pengchong section in south China for submittal to the SCCS for the ballot. Further work has refined correlation around this boundary within Eurasia, and with the type Mississippian in North America (as reported by Sevastopulo and Devuyst in 2005 *Newsletter on Carboniferous Stratigraphy*, v. 23, p. 12-15). Radiometric dating is being undertaken in biostratigraphically constrained parts of the Visean.

Task Group to establish the Visean-Serpukhovian boundary has concluded that the first evolutionary appearance of the conodont *Lochriea ziegleri* in the lineage *Lochriea nodosa*—*Lochriea ziegleri* currently presents the best potential for boundary definition. Recently, Nikolaeva et al. (2005 *Newsletter on Carboniferous Stratigraphy*, v. 23, p. 27-30) recognized this lineage in a condensed, relatively deep-water carbonate section near Verkhnyaya Kardailovka on the eastern slope of the southern Urals. This section is rich in ammonoids, conodonts, and ostracodes, and contains sufficient foraminifers for a complete succession of ammonoid, conodont, ostracode, and foramifer zones to be identified in a single outcrop, thus making this section a good potential candidate for the GSSP. Work initiated by Barry Richards and Alan Titus on conodonts, ammonoids, foraminifers, and stable isotope geochemistry in sections that cross the V-S boundary in western North America is continuing on the Chainman Formation in Utah, the Battleship Wash Formation in southern Nevada, and on the Etherington Formation in the Canadian Rockies, where a newer, deeper water section is currently being described. This work should provide better correlation potential for the various fossil groups across this boundary, along with more opportunities for discovery of the *Lochriea* lineage, which is so far unknown in North America.

Task Group to establish the Bashkirian-Moscovian boundary has narrowed the search for an event level down to two conodont lineages: 1) derivation of *Idiognathoides postsulcatus* from *Id. sulcatus*; 2) derivation of *Declinognathodus donetzianus* from *D. marginodosus*. Although the former lineage was initially favored because it had been reported from 9 of the 11 geographic regions where this boundary has been studied, the recent determination that its occurrence in North America was misidentified, and particularly reports of possible *Idiognathoides postsulcatus* from lower Bashkirian strata in Japan, has refocused attention on the second lineage under consideration. Therefore efforts in the coming year will be refocused on evaluating the biostratigraphic integrity of *D. donetzianus* as well as reassessing the identity of the Japanese morphotypes thought to be *Id. postsulcatus*. Because *D. donetzianus* apparently is not present in Spain, Japan, South China, or cratonic North America, the task group will need to demonstrate how the Bashkirian-Moscovian boundary can be correlated into these areas by means of auxiliary taxa and nonbiostratigraphic events.

Task Group to establish the Moscovian-Kasimovian and Kasimovian-Gzhelian boundaries met in St. Petersburg, Russia, in August 2005, with 12 members in attendance. Substantial progress was made on correlation of cyclothems as sequence-stratigraphic units across both boundaries in the regions (Midcontinent U.S; Moscow Basin; Donets Basin) where they can be recognized, based on scale of the cyclothems in conjunction with biostratigraphy of the conodont and fusuline faunas. The biostratigraphic data also allow correlation with sections from areas where cyclothems are not yet recognized, in the southern Urals, northern Spain, and the Carnic Alps. These correlations are shown in charts and text published by P.H. Heckel and 13 coauthors in the 2005 *Newsletter on Carboniferous Stratigraphy* [v. 23, p. 36-44]. Between the two possible levels under consideration for the M-K boundary, attention has become more focused on the higher level marked by the appearance of the conodont *Idiognathodus sagittalis* and the fusuline *Montiparus*, but problems remain with characterizing the taxonomic variation in *I. sagittalis* and determining if a lineage exists within which a morphological event can be identified. Restudy of fusuline collections stimulated by the correlation chart helped fusuline workers to resolve some old correlation problems between the Donets and Moscow basins. In addition to new information on fusuline and conodont faunas from the Donskaya Luka section reported by Isakova et al. in the 2005 Newsletter [v. 23, p. 44-47], new sections are being studied in central Russia, New Mexico, and South China with the hope of expediting solutions to these problems. The task group has generally agreed that the K-G boundary will be based on the first appearance of the conodont *Idiognathodus simulator* [*sensu stricto*], which is known from the Midcontinent, Illinois and Appalachian basins, and north Texas in North America, and from the Moscow and Donets basins and several sections in the southern Urals in Eurasia. The taxonomy of *I. simulator* and its ancestor *I. aff. simulator* is being worked up by J.E. Barrick and colleagues. The first appearance of *I. simulator* in the Moscow area is also accompanied by the first appearance of an advanced morphotype of the fusuline *Rauserites rossicus*, which has been reported from many parts of Eurasia, and will aid in recognizing this boundary in areas of Eurasia where conodonts are scarce, once the taxonomy of the two morphotypes is resolved.

6. CHIEF PROBLEMS ENCOUNTERED IN 2005

No administrative problems were encountered in 2005.

However, at the scientific level, it is becoming increasingly apparent that for the three lower stage boundaries under consideration [T-V, V-S, B-M], endemism of conodont and foram lineages between Eurasia and North America is seriously hampering the potential for global correlation. This in turn, is slowing down the choice of the boundary level, and ultimately the submittal of well-researched GSSPs to the SCCS and ICS. This issue delayed the T-V boundary GSSP, for which the event level has been selected for some time. In the case of the higher two boundary levels [M-K, K-G], there are enough conodont species in common between the regions to achieve what appear to be fairly good correlations based on comparing the scales of cyclothems in conjunction with biostratigraphy [published in this year's Newsletter, p. 36-44]. However, the strong glacial-eustatic control over sedimentation and consequent widespread disconformities across entire shelves that aids in this 'digital' correlation, will seriously hamper the selection of acceptable GSSPs, which require relatively continuous sedimentation.

7. SUMMARY OF EXPENDITURES IN 2005 (ANTICIPATED THROUGH MARCH 2006):

Prepared by David Work, Secretary
(Definitive accounts maintained in US currency)

INCOME (Oct. 31, 2004 – Oct. 31, 2005)

IUGS-ICS Grant 2005	\$750.00
Donations from Members	345.00
Interest	<u>6.32</u>
TOTAL INCOME	\$1101.32

EXPENDITURE

Newsletter 23 (printing)	\$645.60
Postage for bulk mailings	470.05
Mailing/Office Supplies	90.90
Bank Charges	<u>120.00</u>
TOTAL EXPENDITURE	\$1326.55

BALANCE SHEET (2004 – 2005)

Funds carried forward from 2003 – 2004	\$1754.74
PLUS Income 2004 – 2005	1101.32
LESS Expenditure 2004 – 2005	<u>-1326.55</u>
CREDIT balance carried forward to 2006	\$1529.51

8. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR (2006):

The following activities are planned in the task groups, as distilled from the task group reports in # 5 above, for which the full texts appear in Appendix B:

Tournaisian-Visean boundary. This task group voted approval of the GSSP at Pengchong in south China in 2005, and plans to submit the proposal soon to the SCCS for a vote, which then will forward it to the ICS for ratification in 2006.

Visean-Serpukhovian boundary. Identification of the conodont lineage *Lochriea nodosa*—*Lochriea zieglerei* along with recognition of the conodont, ammonoid, ostracode, and foram zones in the richly fossiliferous section near Verkhnyaya Kardailovka in the southern Urals has initiated an upgrading of correlations across this boundary elsewhere, and establishes this section as a strong candidate for a GSSP. Field work in Utah, Nevada, and the Canadian Rockies also will continue this coming year, with the hope of better characterizing the conodont and ammonoid faunas and stable isotope signatures of the succession spanning this boundary in North America, with the ultimate goal of better correlation with the succession in Eurasia.

Bashkirian-Moscovian boundary. After further investigation of the initially favored *Idioghathoides sulcatus*—*Id. postsulcatus* lineage resulted in the discovery that the event taxon was misidentified in cratonic North America, and also may occur in strata well below the boundary in Japan, attention has become focused on reassessing the identity of the older specimens in Japan, and on evaluation of the second possible lineage for defining an event level. Because the event taxon in this lineage, *D. donetzius*, is so far unknown in Spain,

Japan, South China, or cratonic North America, the task group will focus on correlating the Bashkirian-Moscovian boundary into these areas using other groups, other conodont taxa, and nonbiostratigraphic events.

Moscovian-Kasimovian boundary. At the 2005 St. Petersburg meeting, the cyclothem correlation chart of strata across this boundary was presented and generally agreed upon with minor adjustment, and attention is now focused on refining the taxonomy of the *Idiognathodus sagittalis* group of morphotypes in order to identify a possible boundary event level. To provide more information, Russian members will process samples from across the boundary in an apparently more complete section in the Oka-Tsna swell region of central Russia, Barrick and colleagues will collect and process samples from the Big Hatchet Mountains of southwestern New Mexico, and Chinese colleagues will provide more detailed information on the conodont succession at the Nashui section near Luodian in Guizhou, southern China. As much of this work as possible will be presented at a task group meeting planned for Ljubljana, Slovenia, in July/August 2006.

Kasimovian-Gzhelian boundary. At the 2005 St. Petersburg meeting, the cyclothem correlation chart of strata across this boundary was presented and generally agreed upon. This chart and the preliminary taxonomic work presented on the conodont lineage *Idiognathodus* aff. *simulator*—*I. simulator [sensu stricto]* strongly supported the consensus that the first appearance of *I. simulator [sensu stricto]* is the best possible boundary-defining event, because it is also consistent with both the working ammonoid definition of this boundary and with the first appearance of the advanced morphotype of the fusuline *Rauserites rossicus* in the Moscow region and possibly the Donets Basin. Taxonomic work on this conodont lineage will be submitted for publication, and taxonomic work on the succession of fusuline morphotypes that have been assigned to *R. rossicus* in eastern Europe will be presented for discussion at the Ljubljana task group meeting in July/August 2006.

Much of the work that is ongoing in all task and project groups will be published in Volume 24 of the *Newsletter on Carboniferous Stratigraphy* in July 2006.

9. BUDGET AND ICS COMPONENT FOR 2006

PROJECTED EXPENSES

Newsletter printing (est. 400 copies @ 70 pages at commercial rates [~0.05])	\$1400*
Postage for bulk and individual mailings of Newsletters	\$800**
Mailing and office supplies	\$200**
Bank charges for international account	\$200
TOTAL PROJECTED EXPENSES	\$2600

INCOME

Carryover (from CREDIT balance in section # 7 above)*** [\$255***]	\$1530
Estimated donations [pace this year is close to that of last year]	\$400
TOTAL PROJECTED INCOME	\$1930

BALANCE

Estimated deficit from above***	[((\$1945)***)]	(\$670)
BUDGET REQUEST FROM ICS for 2006		\$1200

*This estimate is higher than actual expense last year because the Secretary was again able to get a special rate in Portland, some distance from his home in Augusta, and this may not be repeatable.

**These estimates are higher than the actual expenses last year because although the system of bulk mailing to certain members overseas [who then distribute the Newsletters to members in their areas] has stabilized somewhat [thus limiting the number of copies mailed individually], the costs of some bulk mailings were absorbed by the Secretary's institution on a one-time basis.

***Because the carryover includes 2 items that were one-time-only contributions [one the \$~775 surplus from the 2001 St. Louis field trip, and the other the unused \$500 supplement for my uncompleted trip to Urbino in 2002, for a total of \$1275; see section # 10 in the 2002 report], the deficit would have been \$1945 under ordinary circumstances. Therefore I am requesting more than what might appear necessary in order to accommodate anticipated Newsletter expenses for future years, as the carryover has been diminishing steadily from year to year, since the one-time-only contributions.

Potential funding sources outside IUGS

No direct funding sources for SCCS exist beyond voluntary donations from some SCCS members, which fluctuate from year to year. Last year's donations were less than in the previous year, and the Secretary/Treasurer reports that the pace of donations since the books closed this year is closer to that of last year than to that of the previous year.

10. SUMMARY OF CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (2001-2005)

This summary is updated from the information provided last year, and from the task group reports published in the Newsletter on Carboniferous Stratigraphy, which were updated in early November. *See Accomplishments in 2005 (above) for additional details. [Also see the full texts of the task group reports in Appendix B below]*

An initial 1997 ballot on the **naming of the two subdivisions** of the Carboniferous System resulted in a close vote that rejected the names Lower and Upper, and approved the names **Mississippian** and **Pennsylvanian**, but just short of the required 60% majority to be declared final. After a long period of wrangling over procedure as well as the nomenclatural issues, the final ballot was ultimately taken at the mandate of former ICS Chair Jurgen Remane in late 1999. As reported in the 2000 *Carboniferous Newsletter* [v. 18, p. 3], this ballot resulted in approval of the names Mississippian and Pennsylvanian by a 76% majority, along with a reconfirmation of the previous decisions of the SCCS to regard their rank as subsystems, by the same 76% majority. In 2003 the SCCS voted to classify the two subsystems into Lower, Middle, and Upper Mississippian Series and Lower, Middle, and Upper Pennsylvanian Series, by a 74% majority of those 90% of the total membership who voted. This vote plus its implicit acceptance of the stage names used in Russia as the global stage names for the Carboniferous now provides the Carboniferous with all its official global series and stage names, and all effort is now being focused on selecting events and GSSPs for stage boundaries.

Work on the **Tournaisian-Viséan boundary** in the lower part of the Mississippian Subsystem was reported in 1997, 2000, and 2001 as well as in other publications mentioned in the 2002 report of this working group. These efforts progressed to the point that its biostratigraphic definition was approved in 2002 by a vote of 19 to 0, with 2 non-responses [as reported in the Secretary-Editor's Report in the 2002 *Carboniferous Newsletter*, p. 2-4]. Field work progressed to the point that a proposal for the GSSP in south China was published in the June 2003 issue of *Episodes*. Supplementary information requested by the SCCS chair on correlating this boundary into regions where the defining taxa do not occur was published in the 2004 *Carboniferous*

Newsletter [v. 22, p. 8-11], and further updated and summarized in the full text of this task group report in Appendix B in the 2004 report. **The task group voted unanimously to approve the Pengchong GSSP in southern China in 2004**, and further refined correlation with the type Mississippian in 2005, and it plans to present the formal proposal to the SCCS in 2006.

The status of current work was uncertain on the next higher boundary in the Mississippian, for which project groups were approved in 1995 and 1999. Since an informative article in the 1997 *Carboniferous Newsletter* [v.15, p. 19-22], official reports in the 1999 and 2000 *Carboniferous Newsletters* [v. 17, p. 6; v. 18, p. 7] were brief, and I received no report from the project groups' Chair in either late 2000 or 2001. As a result, in 2002, we established a new Task Group on a Boundary close to the existing **Visean-Serpukhovian Boundary** under the leadership of Barry Richards, for which membership was selected and work started for presentation and discussion at the Utrecht Congress in 2003. This Task Group initially considered several conodont and foram lineages for potential boundary-defining events, but in 2004 focused most attention on one conodont lineage, *Lochriea nodosa*—*Lochriea ziegleri*, for further work, particularly in regions where the succession is poorly known. In 2005, identification of this conodont lineage along with recognition of the conodont, ammonoid, ostracode, and foram zones in the richly fossiliferous section near Verkhnyaya Kardailovka in the southern Urals initiated an upgrading of correlations across this boundary elsewhere, and establishes this section as a strong candidate for a GSSP.

Work on characterization and subdivision of the type Bashkirian [the lower stage of the Pennsylvanian Subsystem] in the southern Urals was reported from 1997 through 2001 by a Project Group. Russian workers made illustrated verbal presentations on their most recent progress at the September 2001 SCCS meeting in St. Louis, and some of this work was published as separate articles in the 2001 Newsletter. In 2002, we established a Task Group on a Boundary close to the existing **Bashkirian-Moscovian Boundary** under the leadership of John Groves, for which membership was selected and work started for presentation and discussion at the Utrecht Congress in 2003. This Task Group initially considered several conodont and foram lineages, but after the Chair asked for formal boundary-defining events by April 2004, proposals for only three conodont lineages were received. More recent consensus suggested that only two conodont lineages are viable, and work became concentrated on them. Three new Spanish members who have received funding for work on this boundary in the Cantabrian Mountains have now been added to this task group. After further investigation of the *Idiognathoides sulcatus*—*Id. postsulcatus* lineage [the most favored of the two remaining proposals for boundary-defining events] resulted in discovery that the event taxon was misidentified in cratonic North America, and also may occur in strata well below the boundary in Japan, attention has become focused on reassessing the identity of the older specimens in Japan, and on evaluation of the second possible lineage for defining an event level.

Work on the **Moscovian-Kasimovian boundary** has been extensively reported in all recent Newsletters. Delineation of the **Kasimovian-Gzhelian boundary** was added to this task group's work load in 1998. Much new work has been stimulated on both fusulines and conodonts as a result of the collaboration engendered within the Task Group at its nearly annual meetings in Ukraine in 1996, Spain in 1997, Moscow region of Russia in 1998, Midcontinent USA in 1999, Spain again in 2000, the Southern Urals region of Russia in 2002, Spain again in 2004, and St. Petersburg, Russia in 2005. Fusuline workers have recognized that problems of provincialism in much of the Kasimovian part of the succession in Eurasia probably precludes the use of this group to define either boundary, although two fusuline events [one readily identified, but the other more dependent on preservation] appear to coincide with events in conodont appearances near the M-K boundary. Conodont workers are in the process of clearing up the serious taxonomic problems that have stymied progress within that group. Despite the recognition of more provincialism than was once thought to exist between Eurasian and North American conodont lineages during late Moscovian,

Kasimovian and early Gzhelian [late Desmoinesian, Missourian and early Virgilian] time, more widespread conodont appearances are now being clarified, and one soon may be able to define the **Moscovian-Kasimovian boundary**. The conodont lineage *Idiognathodus* aff. *simulator*—*I. simulator* [*sensu stricto*] is now being worked up to define the **Kasimovian-Gzhelian boundary**, which has met with general consensus. Correlation charts based on the scale of glacio-eustatic inundations as well as biostratigraphic events for the successions across both boundaries, in order to clarify which events are more globally correlatable, were published in the 2005 Carboniferous Newsletter. All this work has engendered more new work in Russia, southwestern U.S., and southwestern China.

Radiometric dating throughout the Carboniferous, most of it published in detail elsewhere, was summarized in the Newsletter several times by Manfred Menning and his colleagues [see especially 2001]. They have shown that use of different methods in different places, many on samples from sections without good marine biostratigraphic constraints, has resulted in inconsistencies [for example, of up to 7.5 million years at the Mid-Carboniferous boundary]. A new laboratory dating paleocaliches and fresh-water limestones at SUNY Stony Brook produced some new dates on upper Pennsylvanian units in the Appalachian Basin where there is good marine biostratigraphic control, but these are inconsistent with previous dates of supposedly the same interval in areas where accurate marine biostratigraphy is lacking. **More precise radiometric U-Pb zircon dating now being undertaken by the Permian Research Group at Boise State University on ash beds from conodont-bearing intervals in the Pennsylvanian-Permian succession in the south Urals has recently provided new dates on the Carboniferous-Permian boundary and the late Moscovian with error bars of ± 0.2 Ma.** The volunteered **Project Group on Carboniferous Magentostratigraphy**, formed in 2004 to research the potential for identifying correlatable magnetostratigraphic events in the Carboniferous, reported on some aspects of this approach in both 2004 and 2005 issues of the *Carboniferous Newsletter*.

11. OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2005-2008)

This is based mainly on trends that I perceive now within the SCCS. I am strongly encouraging all members to maintain progress on researching and selecting defining events and GSSP boundaries, keeping in mind the emphasis on selecting readily correlatable boundaries expressed by Remane et al. (1996), along with the call for selecting all GSSPs by 2008.

The Tournaisian-Visean Boundary GSSP should be voted upon in 2006, now that the faunal definition has been approved, and the proposal for the GSSP that was published in the June 2003 issue of Episodes has been supplemented by more information on correlating the boundary into areas where the defining taxa are not present.

The Visean-Serpukhovian Boundary Task Group has focused study onto the most promising conodont lineage *Lochriea nodosa*—*Lochriea zieglerei*, which, like all the others, is not yet known in North America. Identification of this conodont lineage and recognition of the conodont, ammonoid, ostracode, and foram zones in the richly fossiliferous section near Verkhnyaya Kardailovka in the southern Urals establishes this section as a strong candidate for a GSSP. This, along with field work being carried out in western North America across this boundary interval in order to identify correlatable conodont and ammonoid faunas and possible stable carbon and oxygen isotope signatures, suggests that 2007 may be a realistic goal for selection of this boundary.

The Bashkirian-Moscovian Boundary Task Group has focused on two potentially useful conodont lineages for further study, but discovery that the event taxon in the most favored lineage was misidentified in cratonic North America, and that it also may occur in strata well below the boundary in Japan, has caused attention to become focused both on reassessing the identity of the

older specimens in Japan, and on evaluation of the second possible lineage for defining an event level. Nevertheless, 2008 is still a reasonable goal for GSSP selection.

The Moscovian-Kasimovian Boundary and Kasimovian-Gzhelian Boundary Task Group is moving ahead as the previously muddled conodont taxonomic problems are slowly being clarified and resolved. Construction of the correlation charts based on scale of glacio-eustatic cyclothem as well as biostratigraphic events in the successions across both these boundaries in North America [Midcontinent] and two places in Europe where disconformity-bounded cyclothem units are identified [Moscow region, Donets Basin] have increased the potential for selecting the events that can be identified in as many of the most complete successions of this age as possible [such as also in the southern Urals and northern Spain, where cyclothem units are not yet identified]. While the event for the M-K boundary still needs to achieve consensus, there is apparent consensus suggesting that the K-G boundary event may be selected in 2006 as soon as the taxonomic work on the conodont lineage is published and taxonomic work distinguishes the morphotype of the fusuline that accompanies it in Eurasia. The existence of the widespread glacio-eustatic disconformities across nearly all of the well-known regions and the resulting lack of continuously deposited sections will present the greatest problems for selection of GSSPs by 2008, but further work in possibly more complete sections in Russia and New Mexico, and particularly on the upper slope succession in southern China hopefully may provide more appropriate sections for potential GSSPs.

I am hopeful that ongoing work in chemostratigraphy and magnetostratigraphy will identify events that can be used to at least supplement the boundaries that will be defined by means of faunal events, and eventually will provide the basis for correlating these boundaries into the northern-hemisphere Angara region and the southern-hemisphere Gondwana region, where the pan-tropical biotas are replaced by provincial cold-climate communities.

I am also hopeful that new, more coordinated precise radiometric dating on biostratigraphically well-constrained marine successions, such as are being reported from the southern Urals by the Boise State group, and preliminarily from Belgium by another group, will both narrow the age disparities that currently exist within much of the Carboniferous and also provide better correlation with more precise modern radiometric dates that will hopefully be obtained from the Angara and Gondwana regions.

Meeting/field workshop schedule with themes and anticipated results.

The Moscovian-Kasimovian and Kasimovian-Gzhelian boundary task group will meet in Ljubljana, Slovenia, in July/August 2006. I will encourage the other task groups to have field meetings as soon as good exposures containing the fossil lineages that are now being considered have been identified. At the 2005 Field Meeting hosted by Belgian colleagues in the Dinantian type region of the Tournaisian and Visean Stages, Russian colleagues first announced their significant work on the potential Visean-Serpukhovian GSSP near Verkhnyaya Kardailovka in the southern Urals. I expect meetings of all task groups to take place at the next International Carboniferous Congress scheduled for 2007 in Nanjing, China. This congress will hopefully have field trips to good successions across as many of the as yet unselected stage boundaries as possible in China. This should enhance the global correlation of potential boundary-level events, and will allow examination of potential GSSPs for levels where no acceptable GSSP has yet been agreed upon. In this light, it is possible that some GSSPs will only have been informally agreed upon in late 2007, but all will hopefully be at least in the process of finalization by 2008.

**APPENDIX A [Names and Addresses of Current Officers and Voting Members, 2004-2008]
SUBCOMMISSION ON CARBONIFEROUS STRATIGRAPHY**

Subcommission officers

Chairman: Philip H. Heckel

Department of Geology, University of Iowa, Iowa City, Iowa 52242 U.S.A.
FAX: +1 319 335 1821
Email: philip-heckel@uiowa.edu

Vice-Chairman: Geoffrey Clayton

Department of Geology, Trinity College, Dublin 2, IRELAND
FAX: +353 1 671 1199
Email: gclayton@tcd.ie

Secretary/Editor: David M. Work

Maine State Museum, 83 State House Station, Augusta, ME 04333-0083 U.S.A.
FAX: +1 207 287 6633
Email: david.work@maine.gov

List of Task Groups and their officers

Base Visean (base Middle Mississippian): George Sevastopulo, Ireland. gsvstpul@tcd.ie

Base Serpukhovian (base Upper Mississippian): Barry Richards, Canada. brichard@nrcan.gc.ca

Base Moscovian (base Middle Pennsylvanian): John Groves, USA. john.groves@uni.edu

Base Kasimovian (base Upper Pennsylvanian) and base Gzhelian: Elisa Villa, Spain.
evilla@geol.uniovi.es

List of Voting Members [2004-2008]

Alexander S. Alekseev, Moscow, RUSSIA

Email: aaleks@geol.msu.ru

Demir Altiner, Ankara, TURKEY

Email: demir@metu.edu.tr

Darwin R. Boardman, Stillwater, U.S.A.

Email: amm0001@okstate.edu

John R. Groves, Cedar Falls, U.S.A.

Email: john.groves@uni.edu

Luc Hance, BELGIUM

Email: luc.hance@skynet.be

Jin Xiao-chi, Beijing, CHINA

Email: jinxchi@cags.net.cn

Jiri Kalvoda, Brno, CZECH Republic

Email: dino@sci.muni.cz

Dieter Korn, Berlin, Germany

Email: dieter.korn@museum.hu-berlin.de

Olga L. Kossovaya, St. Petersburg, RUSSIA

Email: koss@mail.wplus.net

Elena I. Kulagina, Ufa, RUSSIA

Email: kulagina@anrb.ru

Ian Metcalfe, AUSTRALIA

Email: imetcalf@une.edu.au

Tamara I. Nemirovska, UKRAINE

Email: tnemyrov@i.com.ua

Svetlana Nikolaeva, Moscow, RUSSIA

Email: 44svniko@mtu-net.ru

Barry C. Richards, CANADA

Email: brichard@nrcan.gc.ca

Nicholas J. Riley, U.K.

Email: N.Riley@bgs.ac.uk

Katsumi Ueno, JAPAN

E-mail: katsumi@fukuoka-u.ac.jp

Elisa Villa, SPAIN

Email: evilla@geol.uniovi.es

Wang Xiang-dong, Nanjing, CHINA

Email: xdwang@nigpas.ac.cn

APPENDIX B. [Full text of Task Group Reports of Carboniferous subcommission]

The **Task Group to establish the Tournaisian-Viséan boundary**, chaired by George Sevastopulo, has continued work on the proposed GSSP at Pengchong and other sections in south China and has refined correlations within Eurasia. Correlation with the type Mississippian has been refined, but still more work is needed on the North American sections. A detailed $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ curve has been produced for the Pengchong section (late Tournaisian [top of *S. anchoralis* Zone] to early Livian [post-entry of *Pojarkovella nibelis*]). There is no significant excursion in the $\delta^{13}\text{C}$ record but the sedimentological context of the Pengchong section is not ideal for isotope study. More recent work on the classic Bastion section in Belgium has revealed a short lived excursion of $\delta^{13}\text{C}$ at a level that we correlate with the base of the Viséan. Further work is planned to evaluate the significance of this. Preparatory work is being undertaken to bracket the base of the Viséan with radiometric dates. A formal proposal to recognize the GSSP for the base of the Viséan at Pengchong, Guangxi Province, China will be made to the SCCS for transmission to the Commission on Stratigraphy of the IUGS in the next few months. Once the GSSP is ratified the task group will be disbanded.

The **Task Group to establish the Viséan-Serpukhovian boundary**, chaired by Barry Richards, reports that the process for selecting a GSSP for the base of the Serpukhovian Stage is well under way. The working group has concluded that the first evolutionary appearance of the conodont *Lochriea ziegleri* in the lineage *Lochriea nodosa* - *Lochriea ziegleri* currently presents the best potential for boundary definition. Several members of the task group along with associate members are currently conducting high-resolution biostratigraphic, lithostratigraphic and stable-isotope geochemical studies across the Viséan/Serpukhovian boundary in several regions including the southern Urals (Nikolaeva et al., 2005) and Moscow Basin in Russia (Kabanov 2004), southern Peoples Republic of China (Wang and Qi, 2003), southern Rocky Mountains of southwestern Canada, and southern Nevada in the southwestern United States (Richards et al., 2005).

L. ziegleri appears near the middle of the Brigantian Substage, which is slightly below the current base of the Serpukhovian. The lineage, best documented from relatively deep-water sections, has been identified in several European sections (Nemirovskaya et al., 1994; Skompski et al., 1995). In addition, one of the task group, Qi Yu-ping, recently recognized the lineage *L. nodosa* - *L. ziegleri* and other lineages within the *Lochriea* group of species in the Nashui section near the town of Luodian, Guizhou, southern Peoples Republic of China (Wang and Qi, 2003). In the Zaborie quarry section, *Lochriea ziegleri* appears with *Lochriea senckenbergica* in the basal bed (about 65 cm thick) of the type Serpukhovian (Nikolaeva et al., 2002), but this is not a first evolutionary appearance.

Nikolaeva et al (2005) have recognized the *L. nodosa* - *L. ziegleri* lineage in a condensed, relatively deep-water carbonate section along the Ural River opposite the village of Verkhnyaya Kardailovka in the southern Urals. According to Nikolaeva et al. (2005), this section is rich in ammonoids, conodonts and ostracodes, and with sufficient foraminifers for a complete succession of ammonoid, conodont, ostracode and foramiferal zones to be identified in a single outcrop. Therefore this section is a good potential candidate section for the GSSP at the base of the Serpukhovian.

Kabanov (2004), an associate member of the working group, carefully restudied the type section Serpukhovian type section in the Zaborie quarry in the Moscow Basin, focusing on the major depositional and biostratigraphic events recorded by the lower part of the section.

Recent work of team member Alan Titus on conodont assemblages in several sections of basinal facies in the Chainman Formation of western Utah and eastern Nevada suggests the recognition of the *L. nodosa* - *L. ziegleri* lineage in North America is unlikely. If we use the first evolutionary appearance of *L. ziegleri* for boundary definition, it will be necessary to use either geochemical data or other species (conodont, foraminifer or ammonoid) that appear concomitantly with the Eurasian *L. ziegleri* to achieve a precise correlation with North America. With this in mind, Alan Titus indicated that ammonoids could be used to facilitate a precise correlation between Eurasia and North America. Ammonoid-based geochronology is well developed near the level of the Viséan-Serpukhovian boundary because beds near the boundary contain numerous very distinct ammonoid morphotypes.

In October 2004, team members Titus and Richards examined several sections of the Chainman Formation in western Utah in search of ammonoid- and conodont-bearing sections that might permit an exact correlation with Eurasian sections preserving first appearances of *Lochriea ziegleri*. A well-exposed upper Viséan to lower Serpukhovian (Asbian to Pendleian) section at Jensen Wash, Utah was considered to be the best in the region and plans have been made to study and sample that section in detail for ammonoids, conodonts and samples for stable isotope (carbon and oxygen) geochemistry. During late November of 2004, shelf carbonates that are correlative with the Chainman and widely preserved in the upper Viséan and Serpukhovian Battleship Wash Formation of southern Nevada were measured and sampled for conodonts, ammonoids, and foraminifers.

Carbonate ramp lithofacies of the upper Viséan and Serpukhovian Etherington Formation have been recently measured at six localities in the Canadian Rocky Mountains and sampled for conodonts, foraminifers and geochemistry.

A seventh section, consisting of somewhat deeper water carbonates than those in the other six sections, is currently being measured and sampled. From the study of the Etherington sections and those through the Chainman and Battleship Wash formations, the working group hopes to better understand the carbon stable-isotope signature of the Brigantian and Pendleian succession; in addition the work will provide another opportunity to look for the *L. nodosa* - *L. zieglerei* lineage in western North America.

References

- Kabanov, P.B. 2004. Serpukhovian Stage Stratotype in the Zaborje quarry (Moscow region), Part II. subaerial exposure profiles and cyclicity. *Stratigraphy and Geological Correlation* 12 (3): 253-261.
- Nemirovskaya, T., Perret, M.-F. and Meischner, D. 1994. *Lochriea zieglerei* and *Lochriea senckenbergica* – new conodont species from the latest Viséan and Serpukhovian in Europe. *Courier Forschungsinstitut Senckenberg*, 168: 311-317.
- Nikolaeva, S.V., Gibshman, N.B., Kulagina, E.I., Barskov, I.S. and Pazukhin, V.N. 2002. Correlation of the Viséan-Serpukhovian boundary in its type region (Moscow Basin) and the South Urals and a proposal of boundary markers (ammonoids, foraminifers, conodonts). *Newsletter on Carboniferous Stratigraphy*, 20:16-21.
- Nikolaeva, S.V., Kulagina, E.I., Pazukhin, V.I., Kucheva, N.A., Stepanova, T.I., Kochetova, N.N., Gibshman, N.B., Amon, E.O., Konovalova, V.A., and Zainakaeva, G.F. 2005. Advances in understanding of the Viséan-Serpukhovian boundary in the South Urals and its correlation. *Newsletter on Carboniferous Stratigraphy*, 23, 27-30.
- Richards B.C. and Viséan-Serpukhovian boundary Task Group 2005. The Viséan-Serpukhovian boundary: a summary of progress made on research goals established at the XVICCP Carboniferous workshop in Utrecht. *Newsletter on Carboniferous Stratigraphy*, 23, 7-8.
- Wang, Zhi-hao and Qi, Yu-ping 2003. Report on the upper Viséan-Serpukhovian conodont zonation in south China. *Newsletter on Carboniferous Stratigraphy*, 21: 22-24.

The **Task Group to establish the Bashkirian-Moscovian boundary**, chaired by John Groves, reports the following: Prior to last year's annual summary, members of the Bashkirian-Moscovian boundary task group had identified three conodont evolutionary events as potential datums for boundary definition: 1) the derivation of *Idiognathoides postsulcatus* from *Id. sulcatus*; 2) the derivation of *Declinognathodus donetzianus* from *D. marginodosus*; and 3) the derivation of an advance morphotype of *Neognathodus nataliae* from a less advanced morphotype of the same nominal species. Efforts during the past year have focused on evaluating the global biostratigraphic integrity of the first two datums, while the third has been abandoned because of insufficient taxonomic documentation. Evolutionary events within other biotic groups (e.g., fusulinoideans) have been considered but ruled out because of provinciality and diachronism.

An informal and nonbinding poll of the task group revealed slightly stronger support for the appearance of *Id. postsulcatus* than for *D. donetzianus* because the former apparently achieved wider geographic distribution (see table, below).

Known occurrences of potential marker taxa	Donets Basin	Mos-cow Basin	Urals	Great Britain	North-ern Spain	Central Japan	South China	Alaska (terr-anes)	Arctic Canada	South America	cratonic North America
<i>Id. postsulcatus</i>	+		+	+	+	+	+	+	+		+
<i>D. donetzianus</i>	+	+	+	+				+		+	

In August of 2005, a conodont specialist examined one of the few known specimens of *Id. postsulcatus* from cratonic North America and determined that it probably is not referable to *Id. postsulcatus*, but rather closely related to *Declinognathodus* ex gr. *marginodosus* (T. Nemyrovska, written communication). Thus, there are no unequivocal occurrences of *Id. postsulcatus* in cratonic North America. Separately, it has been determined that occurrences of *Id. postsulcatus* in central Japan are Bashkirian in age, possibly early Bashkirian, and thus considerably older than the boundary in question (K. Ueno, written communication). For these reasons, the appearance of *Id. postsulcatus* is a less attractive potential datum than previously thought, and *D. donetzianus* has emerged as the most likely boundary marker.

Efforts in the coming year will continue to evaluate the biostratigraphic integrity of *D. donetzi*. Because this taxon apparently is not present in Japan, South China, or cratonic North America, the task group will need to demonstrate how the Bashkirian-Moscovian boundary can be approximated in these areas by means of auxiliary taxa and/or nonbiostratigraphic events.

The **Task Group to establish the Moscovian-Kasimovian and Kasimovian-Gzhelian boundaries**, chaired by Elisa Villa, has continued studies on fossil lineages and potential levels of correlation within the interval from the upper Moscovian into the lower Gzhelian. In August, the group held a meeting with presentations, workshops, and discussions at the VSEGEI in St. Petersburg, Russia, which was organized by voting member Olga Kossovaya and was attended by task group members A. Alekseev, H. Forke, N. Goreva, P. Heckel, T. Isakova, O. Kossovaya, C. Méndez, T. Nemyrovska, S. Remizova, K. Ueno, and E. Villa. Substantial progress was made on correlation of cyclothem units across both boundaries, and on definition of the K-G boundary. The task group has generally agreed upon a rather detailed correlation of the sequence-stratigraphic units called cyclothem in the regions (Midcontinent U.S.; Moscow Basin; Donets Basin) where they can be recognized in strata across these boundaries, based on scale of the cyclothem in conjunction with biostratigraphy of the conodont and fusuline faunas. The biostratigraphic data also allow correlation with sections from those areas where cyclothem are not yet recognized, in the southern Urals, Cantabrian region of northern Spain, and the Carnic Alps. These correlations are shown in charts and text published by P. Heckel and 13 other task group members in the 2005 *Newsletter on Carboniferous Stratigraphy*, v. 23, p. 36-44.

Moscovian-Kasimovian boundary

During the St. Petersburg meeting, the Moscovian-Kasimovian chart was refined, with new data from the classical sections (Afanasiovo in the Moscow Basin; Kalinovo in the Donets Basin; Las Llacerias in the Cantabrian Mountains) as well as new information from new sections at Donskaya Luka on the Russian Platform, more recently studied by the Moscow group. This chart will be updated for future publication.

Discussions and joint work during the meeting provided noteworthy progress in fusuline correlation between the Moscow Basin (MB) and Donets basins (DB), which are key Eurasian sections in Pennsylvanian chronostratigraphy. Deposition in these two areas occurred under rather different environmental conditions during latest Moscovian and Kasimovian, producing different compositions of the fusuline and conodont assemblages, which had led to previous confusion in correlation. Detailed studies on additional fusuline materials shed new light on these problems and provide support for the following correlations: a) equivalence of the Upper Peski Formation (MB) and the N₃ limestone (DB) ; b) equivalence of the Voskresensk Fm (MB) and the N₃³ limestone; c) equivalence of the upper Neverovo Fm (MB) and the O₂ limestone (DB). It also better established the age of the O₁ limestone, which was formerly thought to be in the upper part of the *Protriticites* zone (late Krevyakinian), but after discovery of undoubted *Montiparus*, is now assigned to the lower part of the *Montiparus* zone (early Khamovnikian). This younger age of the O₁ limestone more closely aligns the correlations based on fusulines and conodonts.

In the search for a convenient marker, data obtained so far suggest that the most widespread taxa are conodonts occurring around a stratigraphic interval within the Hertha and Swope cyclothem in the North American Midcontinent, the lower (not basal) and middle Neverovo Formation in the Moscow Basin, and the N₅¹ and O₁ limestones in the Donets Basin. A level of correlation within that interval would raise the classical position of the Moscovian-Kasimovian boundary. The most promising taxon so far may be the conodont *Idiognathodus sagittalis*, but its potential value must be confirmed after data gathered from coming studies. The Moscow group has samples from a more complete section in the Oka-Tsna swell on the Russian Platform southeast of Moscow. J. Barrick and colleagues plan to collect detailed samples across this boundary in the Big Hatchet Mountains of New Mexico. Chinese colleagues are working on the Nashui section near Luodian in Guizhou (south China), which appears to be an upper slope succession that may be more complete than many other sections, and for which general information on conodont zonation has become available. It will be necessary to clarify the phylogenetic relationships among several *I. sagittalis*-like morphotypes and to define the morphological changes within this lineage, so that *I. sagittalis* [sensu stricto] could be separated from its ancestor and its first appearance used to recognize the boundary.

Kasimovian-Gzhelian boundary

It is generally agreed that the Kasimovian-Gzhelian boundary will be based on the occurrence of the conodont *Idiognathodus simulator*, which is known from a number of relevant sections in areas representing both the American and Eurasian paleobiogeographic provinces. This level is situated in the Oread cyclothem (Mid-Continent), Finis Shale (Texas), and Shumway cyclothem (Illinois Basin) in North America, in the Upper Rusavkino Formation (Moscow Basin), O7 limestone (Donets Basin), in eastern Europe, and in bed 46 of the Dalniy Tyulkas section, bed 4-2 of the

Usolka section, and bed 7 of the Nikolsky section in the Southern Urals. The proposed boundary is slightly higher than the traditional lower Gzhelian and lower Virgilian boundaries.

This correlation is reinforced in Eurasia by the appearance of the fusulinid *Rauserites rossicus* at a level very close to first appearance of *I. simulator*. This fusulinid has been so far reported from Moscow Basin, Samarskaya Luka and Trans-Volga region, Northern Timan, Timan-Petchora, North Greenland, Donets Basin, Urals, Carnic Alps, Northern Fergana, Darvas, and the Cantabrian Mountains. Therefore, *Rauserites rossicus* may be a tool of prime importance for correlation within Eurasia in conjunction with *Idiognathodus simulator*. However, two possible morphotypes seem to exist within the *Rauserites rossicus* plexus: one of them (morphotype A) is older than the other (morphotype B), and only the latter is coincident with the new position of the Kasimovian-Gzhelian boundary. This idea needs to be confirmed through further studies and revision of the available collections of *Rauserites rossicus* specimens.

Coming steps

To continue discussions and laboratory workshops, the group will meet again during summer 2006. This meeting probably will be held in Ljubljana (Slovenia), with a field trip to relevant sections in the Carnic Alps and Karavanke Mountains.



International Commission on Stratigraphy Subcommission on Devonian Stratigraphy

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

Subcommission on Devonian Stratigraphy (SDS)

Submitted by:

Pierre Bultynck, *Outgoing Chair of SDS*

Royal Belgian Institute of Natural Sciences, rue Vautier 29, B-1000 Bruxelles

Tel: +32(0)2 627 44 86; E-mail: pierre.bultynck@belgacom.net

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

- * Establishment of an internationally agreed time framework which is as fine as possible, including definition of substages.
- * Correlation between scales based on different methods: biostratigraphy, magnetostratigraphy, chemo- and sequence stratigraph; establishment of databases.
- * Correlation of pelagic, neritic and continental Devonian successions.
- * Stimulate and coordinate scientific research improving the understanding of Earth History during Devonian time.
- * Dissemination of progress realized by SDS: Newsletter that can also be viewed in an electronic published format via the SDS worldwide website.

These objectives fit into directions recommended by ICS and IUGS: promotion of new stratigraphic methods and their integration into a multidisciplinary stratigraphic knowledge as a basis for better understanding of Earth History, including Global Change.

3. ORGANIZATION

Officers for 2004-2008:

Chair: Thomas Becker (Germany)

Vice-Chair: Ahmed El Hassani (Morocco)

Secretary: John E.A. Marshall (United Kingdom)

SDS Website: <http://sds.uta.edu>

4. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

IGCP Project 499: Devonian land-sea interaction - Evolution of ecosystems and climate (DEVEC)

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

Ballot on the final proposals concerning the subdivision of the Givetian, Frasnian and Famennian stages early 2005.

Proceedings of the Rabat Meeting (March 2004) was published Geological Society *Special Publications* Series. The volume was dedicated to the late M. House (TH. Becker and B. Kirckgasser will be guest editors).

Summer 2005, SDS business meeting in Novosibirsk and field trip to Salair and Altai Mountains organized by E.A. Yolkin and N. Izokh (Institute of Petroleum Geology, Siberian branch of RAS). SDS meeting in conjunction with IGCP project 499. The field trip was relevant to the correlation between inner and outer shelf deposits.

6. CHIEF PROBLEMS ENCOUNTERED IN 2005

None

7. SUMMARY OF EXPENDITURES IN 2005 (ANTICIPATED THROUGH MARCH 2006):

Income US\$

IUGS subvention May 2005-April 2006	800.00
-------------------------------------	--------

Expenses

<i>Balance from 2004</i>	<i>00</i>
Secretary expenses	250
Support for attending Novosibirsk meeting	<u>1000</u>
Total	1250

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

Short contribution in *Episodes* recommending the use of the substages of the Givetian, Frasnian and Famennian.

Three substantial manuscripts concerning the subdivision of the Givetian, Frasnian and Famennian will be submitted to *Geological Quarterly* (Polish Geological Institute) in early 2006.

2006 Annual Business Meeting in conjunction with ECOS IX will take place in England. The secretary J. Marshall will organize a long outstanding field trip to the Devonian of the Old Red Continent, which should enhance our understanding of cross facies and terrestrial correlations.

Participation in the 2nd International Palaeontological Congress in Beijing (June, 2006) including a topical session " *Devonian land sea interaction: evolution of ecosystems and climate*"-IGCP 499. There will be also fieldtrips.

9. BUDGET AND ICS COMPONENT FOR 2006

<i>Balance from 2005</i>	<i>00</i>
Secretary expenses	250
Support for attending Annual meeting in England	500
Support for attending Beijing PC	<u>500</u>
Total	1250

10. CHIEF ACCOMPLISHMENTS OVER LAST FIVE YEARS (2000-2004)

See Accomplishments in 2005 (above) for additional details.

In 2000, SDS published two volumes (*Courier Forschungsinstitut Senckenberg*, 220 (205 pp.) and 225 (347), in which the GSSPs of all Devonian stages have been updated and their correlative value for worldwide correlation is demonstrated.

11. OBJECTIVES AND WORK PLAN FOR NEXT 3 YEARS (2006-2008)

2007: North American SDS members will organize a symposium in Seattle, followed by a fieldtrip in the Interior Basin, with focus on Nevada.

2008: still open.

APPENDIX [*Names and Addresses of Current Officers and Voting Members, 2004-2008*] SUBCOMMISSION ON DEVONIAN STRATIGRAPHY

Subcommission Officers

Chairman: R.T. **Becker**, Westfälische Wilhelm-Universität, Geologisch-Paläontologisches Institut, Correnstr., 24, D-48149 Münster, Germany
rbecker@uni-muenster.de

Vice-Chairman: A. **El Hassani**, Département de Géologie, Institut Scientifique, B.P 703-Rabat-Agdal
elhassani@israbat.ac.ma

Secretary: J. **Marshall**, School of Ocean and Earth Science, Univ. Southampton, Southampton Oceanography Centre, European Way, Southampton, SO14 3ZH, United Kingdom
jeam@soc.soton.ac.uk

SDS Newsletter editor and **Webmaster:** Rex E. **Crick**, Department of Geology, UTA Box 19049, University of Texas at Arlington, TX USA 76019-0049,
crick@uta.edu

List of Working (Task) Groups and their officers

Subdivision of the **Emsian**: R. Mawson, Australia. *rmawson@laurel.ocs.mq.edu.au*

Subdivision of the **Givetian**: P. Bultynck, Belgium. *pierre.bultynck@belgacom.net*

Subdivision of the **Frasnian**: J. Over, USA. *over@uno.cc.geneseo.edu*

Subdivision of the **Famennian**: Th. Becker, Germany. *rbecker@uni-muenster.de*
Uppermost Famennian: M. Streef, Belgium. *maurice.streef@ulg.ac.be*

List of Voting Members

A. Blicek (France) *Alain.Blicek@univ-lille1.fr*
 C.E. Brett (USA) *carlton.brett@uc.edu*
 J.-G. Casier (Belgium) *casier@naturalsciences.be*
 Chen Xiuqin (China) *chenxq@public1.ptt.js.cn*
 Rex Crick (USA) *crick@uta.edu*
 J. Hladil (Czechia) *hladil@gli.cas.cz*
 R. Mawson (Australia)
 rmawson@laurel.ocs.mq.edu.au
 Ma Xueping (China) *maxp@pku.edu.cn*
 J. Over (USA) *over@uno.cc.geneseo.edu*
 M.C. Perri (Italy) *perri@geomin.unibo.it*
 G. Racki (Poland) *racki@us.edu.pl*

C.A. Sandberg (USA) *casandberg@attbi.com*
 E. Schindler (Germany)
 eberhard.schindler@senckenberg.de
 V. Tsyganko (Russia) *tsyganko@geo.komisc.ru*
 T. Uyeno (Canada) *TUyeno@NRCon.gc.ca*
 J.I. Valenzuela Rios (Spain) *Jose.I.Valenzuela@uv.es*
 K. Weddige (Germany)
 karsten.weddige@senckenberg.de
 E.A. Yolkin (Russia) *YolkinEA@uiggm.nsc.ru*
 G. Young (Australia) *gyoung@geology.anu.edu.au*
 Zhu Min (China) *zhumin@ivpp.ac.cn*



**International Commission on Stratigraphy
Subcommission on Silurian Stratigraphy**

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

Subcommission on Silurian Stratigraphy

Submitted by:

Rong Jiayu, Chairman, SSS

Nanjing Institute of Geology and Palaeontology, 39 East Beijing Road

Nanjing, 210008, P R China

Telephone: 025-3282169, Telefax: 025-3357026

e-mail: jyrong@nigpas.ac.cn

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

- 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.
- Climatic evolution and modeling.

The objectives satisfy the IUGS mandate of fostering international agreement on nomenclature and classification in stratigraphy; facilitating international co-operation in geological research; improving publication, dissemination, and use of geological information internationally; encouraging new relationships between and among disciplines of science that relate to Triassic geology world-wide; attracting competent students and research workers to the discipline; and fostering an increased awareness among individual scientists world-wide of what related programs are being undertaken.

3. ORGANIZATION

SSS is a Subcommission of the Commission on Stratigraphy.

Officers (chair, one vice-chair, secretary), voting members (15), and corresponding members (50). (*see Appendix for complete listing*)

Officers for 2004-2008:

Chair: Rong Jiayu, Nanjing, China.
 Vice-Chair: T. N. Koren', St. Petersburg, Russia.
 Secretary: J. Verniers, Gent, Belgium (*began, Jan. 2005*)
former Secr.: M. J. Melchin, Antigonish, Canada (*ended Dec, 2004*)

Subcommission members 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. Current research activities and future plans are communicated through publication of an annual SSS newsletter *Silurian Times* in both hardcopy 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 Subcommission:

<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 **Subcommission on Ordovician Stratigraphy**.

- Co-sponsored meeting in Argentina and planning a joint meeting in Nanjing in 2007.
- Joint working group on the restudy of the Ordovician-Silurian Boundary.
- Collaboration on a IGCP Project entitled "*Ordovician Palaeogeography and Palaeoclimate*".

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

A new web site for the SSS was prepared by Fan Juanxuan and Zhao Hui at the Nanjing Institute of Geology and Palaeontology, under the direction of Rong Jiayu, SSS Chair. The web site at <http://www.silurian.cn/home.asp> has a format and design that follows closely those of the new site for the Ordovician Subcommission: <http://www.ordovician.cn/home.asp>.

Silurian Field Meeting in Gotland, Sweden August 15-22, 2005. Information can be found at: <http://www.geol.lu.se/events/silconf.htm>. 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 paleoenvironmental change as represented in the fossil, sedimentological, and chemostratigraphic record and their interpretation

Silurian Times: edited by Jacques Verniers in late 2005, with a progress report on restudy of the Base of Wenlock.

Revision of base-Silurian and base-Wenlock GSSPs

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 as possible worldwide. Unfortunately, there are many serious problems for the GSSPs of the Silurian as defined in the 1980's. Now,

fifteen years later, SSS has restudied two of these poorly defined GSSPs. This GSSP restudy had no objections from the voting membership.

A restudy of the GSSP for the **Base of Silurian** was prepared by a working group under the leadership of Mike Melchin. 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 biostratigraphic 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 section. Once approved by the SSS membership this recommendation will be forwarded to ICS.

The working group to restudy the **Base of the Wenlock Series** (base of Sheinwoodian Stage) is led by David Lovdell, and is currently in the process of studying 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. A report of this work was made at the Silurian Field Meeting in Gotland, in August, 2005.

There was a general agreement that there is no time left to rediscuss the bases of the other stages (such as Aeronian, Telychian, Ludlow, and Ludfordian), although many participants considered that all these GSSP have serious problems.

6. CHIEF PROBLEMS ENCOUNTERED IN 2005

No major problems.

7. SUMMARY OF EXPENDITURES IN 2005 (ANTICIPATED THROUGH MARCH 2006):

Travel for SSS Vice-Chair (Dr. Koren) to SSS Field Meeting in Gotland.

Transportation, accommodation, food, registration **\$1200**

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

All costs associated with the production of *Silurian Times* are currently paid by St. Francis Xavier University, the host institution of the SSS secretary.

8. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR (2006):

(1) Reconsideration of the **Ordovician-Silurian boundary** Proposal:

Global spike GSSP should stay, but GSSP redefined as base of *ascensus* graptolite Zone

Vote of titular members **in December 05**

(2) Vote on proposals for revision of the GSSP for the **Base of the Wenlock** by **May 2006**.

9. BUDGET AND ICS COMPONENT FOR 2006

Partial support for Working Groups **\$ 500**

NOTE: All travel costs for the SSS Chair, Secretary and other titular members will be paid by their own research funds. It is anticipated that all costs associated with the production of *Silurian Times* will continue to be paid by the host institution of the SSS secretary.

10. REVIEW CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (2001-2005)

See Accomplishments in 2005 (above) for additional details.

Over the period of 2002-2004, the Subcommittee on Silurian Stratigraphy was active in several respects. The field meeting of the SSS, 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. Comunicarte Editorial, Tucumán, Argentina*" edited by G. Ortega and G.F. Aceñolaza.

Two upcoming meetings of the SSS have been planned. The first circular for a Silurian Field Meeting in Gotland, Sweden, August 15-22, 2005, has been recently released at <http://www.geol.lu.se/events/silconf.htm>. An International Symposium on the Silurian System is planned for Nanjing, China, in 2007, to be hosted by the Nanjing Institute of Geology and Palaeontology.

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 paleogeography, 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.

11. OBJECTIVES AND WORK PLAN FOR NEXT 3 YEARS (2006-2008)

September 06--August 07

- a. Discussion on possible re-study of other Silurian GSSPs.
- 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, Telychian)
Discussion on **Llandovery/Wenlock boundary**
Further work on possible on new GSSP re-studies
New members for next four years
- c. *Silurian Times* (edited by Jacques Verniers)

September 07--August 08

- a. *Silurian Times* (edited by Jacques Verniers)
- b. Vote on **Llandovery/Wenlock boundary**

- c. Possible continued further re-study of other GSSPs.
- d. New officers and members

Integrated Silurian Stratigraphy, in which all studies on refinement of biozonal schemes, sequence and cyclo-stratigraphy, stable isotope curve are combined. This will allow researchers to apply national or other research money when their projects are framed in this large international project, patronized by the SSS.

**APPENDIX [Names and Addresses of Current Officers and Voting Members, 2004-2008]
SUBCOMMISSION ON SILURIAN STRATIGRAPHY**

Subcommission officers

Chairman: Rong Jiayu, Nanjing Institute of Geology and Palaeontology, 39 East Beijing Road, Nanjing, 210008, P R China, e-mail: jyrong@nigpas.ac.cn

Vice Chairman: Tatiana Koren', All-Russia Geological Research Institute (VSEGEI), Sredny Pr. 74, 199026, St. Petersburg, Russia, e-mail: koren@vsegei.sp.ru

Secretary (until Dec. 04): Michael Melchin, Department of Earth Sciences, St. Francis Xavier University, Antigonish, Nova Scotia, Canada, B2G 2W5, e-mail: mmelchin@stfx.ca

Secretary (beginning Jan. 05): Jacques Verniers, Research Unit Palaeontology, Department of Geology and Pedology, Gent University, Krijgslaan 281 S8, B-9000, Gent, Belgium, e-mail: Jacques.Verniers@rug.ac.be.

List of Task Groups and their officers

Base of Silurian: Mike Melchin, Canada: mmelchin@stfx.ca

Base of Wenlock: David Loydell, England: david.loydell@port.ac.uk

List of Voting Members

C.E. Brett, Cininnati, USA, brettce@email.uc.edu

L.R.M. Cocks, London, UK, R.Cocks@nhm.ac.uk

D. Holloway, Melbourne, Australia, dhollow@museum.vic.gov.au

Jin Jisuo, London, Canada, jjin@uwo.ca

M.E. Johnson, Williamstown, USA, Markes.E.Johnson@williams.edu

T.N. Koren', St. Petersburg, Russia, koren@vsegei.sp.ru

J. Kríž, Prague, Czech Republic, kriz@cgu.cz

A. Le Hérisse, Brest, France, alain.le.herisse@univ-brest.fr

D.K. Loydell, Portsmouth, UK, david.loydell@port.ac.uk

P. Mannik, Tallinn, Estonia, mannik@gi.ee

M.J. Melchin, Antigonish, Canada, mmelchin@stfx.ca

S. Peralta, San Juan, Argentina, speralta@unsj.edu.ar

Rong Jiayu, Nanjing, China, jyrong@nigpas.ac.cn

P. Štorch, Prague, Czech Republic, storch@gli.cas.cz

J. Verniers, Ghent, Belgium, Jacques.Verniers@rug.ac.be



International Commission on Stratigraphy Subcommission on Ordovician Stratigraphy

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

Subcommission on Ordovician Stratigraphy (SOS)

Submitted by:

Chen Xu *Chairman, SOS*

State Key Laboratory of Stratigraphy and Palaeobiology, Nanjing Institute of Geology and Palaeontology,
Chinese Academia of Sciences, Nanjing 210008, P.R. China
Tel. & Fax. +86 25 833375157; Email. xu1936@yahoo.com

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

The Subcommission promotes international cooperation in 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), and the nomenclature of the subdivisions.
- b. To promote regular international meetings on 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 (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.

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

3. ORGANIZATION

Subcommission Executive

Chairman: Chen Xu (P.R.China)

Vice Chairman: Juan Carlos Gutiérrez-Marco (Spain)

Secretary: G.L. Albanesi (Argentina)

16 other Voting Members, over 100 Corresponding Members

Website: www.ordovician.cn

<http://seis.natsci.csulb.edu/ISOS> (remains active for facilitating discussion of GSSP proposals)

4. 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** was proposed 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 objective is 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.) of the Ordovician biodiversification, the end-Ordovician extinction, and the Silurian radiation.

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

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)
			← <i>N. extraordinarius</i> (Wangjiawan North*)
			← <i>D. caudatus</i> (Black Knob Ridge*)
	MIDDLE	DARRIWILIAN	← <i>N. gracilis</i> (GSSP-Fågelsång)
			← <i>U. austrodentatus</i> (GSSP-Huangnitang)
	LOWER		← <i>B. triangularis</i> (C), or <i>P. aranda</i> (C) (in discussion)
			← <i>T. approximatus</i> (GSSP-Diabasbrottet)
		TREMADOCIAN	← <i>I. fluctivagus</i> (C) (GSSP-Green Point)

*already voted by ISOS

- The Wangjiawan section, Yichang, China, has been elected as GSSP for the base of the **Hirnantian Stage**, the uppermost stage of the Upper Ordovician Series, defined at the level of the FAD of the graptolite *N. extraordinarius*. A final report will be submitted to the ICS for final ratification and approval by the IUGS executive.
- The Black Knob Ridge section, Oklahoma, USA, has been elected as GSSP for the base of the **middle stage of the Upper Ordovician Series** (the **6th Stage**, yet to be named) defined at the level of the FAD of the graptolite *D. caudatus*. The officers of the ISOS proceeded to submit this result to the International Commission on Stratigraphy for final ratification and approval by the IUGS executive.
- Two GSSP proposals for the boundary remaining to be defined, the **base of the Middle Ordovician Series**, and its lower stage (the **3th Stage**, yet to be named), were submitted for final consideration. These proposals refer to the level of the FAD of the conodont *B. ? triangularis* in the Huanghuachang section in China, and the level of the FAD of the conodont *C. aranda* in the Niquivil section in Argentina.
- A discussion page on the Subcommittee's website was further developed to allow for wide dissemination of the GSSP proposals and for extensive discussion of them.

- e. The Subcommittee sponsored the symposium session “*Global Ordovician Earth System*” at the 32nd International Geological Congress in Florence, Italy in August 2005, whose results will be published in a *Special Paper volume* of the Geological Society of America.
- f. *Ordovician News No. 22* was produced and posted on the Subcommittee web site in June 2005.

6. CHIEF PROBLEMS ENCOUNTERED IN 2005

Most subcommittee members requested that additional study and evaluation be given to the GSSPs for the base of the Middle Ordovician Series, which were accomplished during 2005, before final discussions and voting.

As always, the lack of travel support limits the participation of Voting Members in field meetings to evaluate potential stratotype sections. Although the Subcommittee supports investigations of potential GSSPs, the amount available is so limited that most of these investigations must be supported by other sources.

7. SUMMARY OF EXPENDITURES IN 2005 (ANTICIPATED THROUGH MARCH 2006):

TOTAL: \$ 1500

Support to the production of newsletter (Albanesi)	500 USD
Support to the development of new website (Fan Junxuan).....	300 USD
Support the additional work on the Niquivil section (Albanesi)	200 USD
Support the additional work on the Huanghuachang section (Wang Xiaofeng)	200 USD
Support to the additional work on the Black Knob Ridge section (Goldman)	200 USD
Support to the additional work on the Wangjiawan section (Chen Xu)	<u>100 USD</u>

TOTAL 1500 USD

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

- Voting of Huanghuachang and Niquivil GSSPs for **base of Middle Ordovician Series**, discussion, and ballot on proposals. Submission of approved GSSP to ICS.
- Selection of **names** for **2nd, 3th, 5th** and **6th** stages of the Ordovician System.
- Production and internet distribution of *Ordovician News* No. 23 in May 2006.
- Management of the Subcommittee website.

9. BUDGET AND ICS COMPONENT FOR 2005

<i>Ordovician News</i> No. 23 production costs:	\$ 500
Travel subsidies for executive members to attend GSSP dedication ceremonies or conferences	\$ 500
Plaques for GSSPs to be dedicated in 2006	\$ 200
Support to the preparing work of the organization committee for the 2007 Ordovician conference	\$ 300
Management of the Subcommittee website	\$ 300
Preparing an Ordovician Time Table	<u>\$ 300</u>

TOTAL 2005 BUDGET REQUEST **\$2100** (through Mar, 2007)

Potential funding sources outside IUGS

Already in its second year, IGCP Project 503, “Ordovician Palaeogeography and Palaeoclimate”, funded a successful four meetings (with related field trips) in 2005 (General Meeting in Milwaukee, June; Brachiopod session in Copenhagen, July; Baltic Stratigraphic Symposium in St. Petersburg, August; and the Gondwana 12 meeting, Mendoza, in November 2005). 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 Academia of Sciences provides a server for the Subcommittee website.

The Subcommittee officers are also supported by their research project for parts of their activities.

10. CHIEF ACCOMPLISHMENTS OVER LAST FIVE YEARS (2000-2005)

- 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. Significant progress on definition of series and stages for the Ordovician System with only two GSSPs remaining to be selected and approved by the Subcommittee, following change in strategy for stages of Upper Ordovician Series in August 2003.
- d. With publication in 2000 of *A Revised Correlation of Ordovician Rocks in the British Isles*, correlation charts have been completed for Ordovician rocks on all continents.
- e. International Symposium on the Ordovician System 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.
- e. Publication of *Ordovician News* nos. 17-21 and their posting on the Subcommittee’s web site.
- f. 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*.

- g. 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.
- h. Sponsorship at the 31st International Geological Congress of the symposium "*Paleontological, stratigraphical, and paleogeographical relations among South America, Laurentia, Avalonia, and Baltica during the Ordovician.*"
- i. Sponsorship at the 32nd International Geological congress of the symposium "*The Global Ordovician Earth System.*"
- j. 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.
- k. Sponsorship of special symposium on the Ordovician System at the Geological Society of America Annual Meeting in 2000, of WOGOGOB 2001 in Copenhagen, and of the meeting and field excursion "*The Gondwanan Platform in Ordovician times: Climatic, eustatic and geodynamic evolution*", in Morocco in February 2001.

11. OBJECTIVES AND WORK PLAN FOR NEXT 3 YEARS (2006-2008)

- a. Selection of GSSPs for base of the **Hirnantian Stage**, the base of the **second Stage of the Upper Ordovician** and the base of the **Middle Ordovician** Series.
- b. Selection of names for 2nd, 3rd, 5th and 6th stages of Ordovician System
- c. Completion of selection of GSSPs for all stages.
- d. Publication of papers presented at "The global Ordovician Earth system" symposium at the 32nd IGC.
- e. Refocusing of Subcommittee to address the global Ordovician Earth system.
- f. Development of a new website with transfer of subcommittee executive to new chair.
- g. 10th International Symposium on the Ordovician System to be held in Nanjing, China in summer 2007.
- h. Editing of a new Ordovician Time Table.

APPENDIX [*Names and Addresses of Current Officers and Voting Members, 2004-2008*] SUBCOMMISSION ON ORDOVICIAN STRATIGRAPHY

Subcommission Officers

Chairman: Chen Xu

State Key Laboratory of Stratigraphy and Palaeobiology, Nanjing Institute of Geology & Palaeontology, Chinese Academy of Sciences, Nanjing 210008, P.R. CHINA
Tel. & Fax: +86 25 83375157; Email: xu1936@yahoo.com

Vice Chairman: Juan Carlos Gutierrez-Marco

Instituto de Geología Económica (CSIC-UCM), Facultad de Ciencias Geológicas, 28040 Madrid, SPAIN

Tel.: +34-915 44 54 59, Fax: +34-913 94 48 74 e-mail: jcgrapto@geo.ucm.es

URL: <http://www.ucm.es/info/paleo/personal/gutierrez.htm>

Secretary: Guillermo L. Albanesi

CONICET - Museo de Paleontologia, Universidad Nacional de Cordoba, Casilla de Correo
1598, 5000 Córdoba, ARGENTINA

Tel.: +54-(0)351-4719575, Fax.: +54-(0)351-4216350, e-mails: galbanesi@arnet.com.ar, or
galbanes@com.uncor.edu

List of Voting Members

Florencio G. Acenolaza, Tucuman, ARGENTINA facenola@satlink.com

Andrej V. Dronov, St. Petersburg, RUSSIA dronov@GG2686.spb.edu

Olda Fatka, Prague, CZECH REPUBLIC fatka@prfdec.natur.cuni.cz

Stanley C. Finney, Long Beach, USA scfinney@csulb.edu

Richard A. Fortey, London, UNITED KINGDOM raf@nhm.ac.uk

David A. T. Harper, Copenhagen, DENMARK धारपर@savik.geomus.ku.dk

Warren D. Huff, Cincinnati, USA warren.huff@uc.edu

Li Jun, Nanjing, CHINA junli@nigpas.ac.cn

Charles E. Mitchell, Buffalo, USA cem@acsu.buffalo.edu

Robert S. Nicoll, Flynn, AUSTRALIA bnicoll@goldweb.com.au

Godfrey S. Nowlan, Calgary, CANADA GNowlan@NRCan.gc.ca

Alan W. Owen, Glasgow, UNITED KINGDOM awo@geology.gla.ac.uk

Florentin Paris, Rennes, FRANCE florentin.paris@univ-rennes1.fr

Ian G. Percival, Lidcombe, AUSTRALIA ian.percival@minerals.nsw.gov.au

Leonid E. Popov, Cardiff, UNITED KINGDOM Leonid.Popov@nmgw.ac.uk

Matthew R. Saltzman, Columbus, USA saltzman.11@osu.edu



International Commission on Stratigraphy Subcommission on Cambrian Stratigraphy

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

International Subcommission on Cambrian Stratigraphy

Submitted by:

Prof. Loren E. BABCOCK, Secretary
 Department of Geological Sciences, 125 South Oval Mall
 The Ohio State University, Columbus, OH 43210, USA
 Tel. 01 614-292-0358
 Email babcock.5@osu.edu

and by:

Prof. Shanchi Peng, Chair
 Nanjing Institute of Geology and Palaeontology, The Chinese Academy of Sciences
 39 East Beijing Street, Nanjing 210008, China
 Email: scpeng@nigpas.ac.cn

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

Mission statement

The Subcommission is the primary body for facilitation of international communication and scientific cooperation in Cambrian stratigraphy.

Goals

The goals of the Subcommission fall into two main areas:

- (1) To develop a global stage-level and series-level chronostratigraphic classification of the Cambrian System. Until recently, the Cambrian was without formally agreed international stages. Research in progress on trilobites and other fossils, and especially in combination with other stratigraphic indicators, show promise for long-range correlation and definition of stages.
- (2) To complete and publish regional correlation charts for the Cambrian System.

Fit within IUGS Science Policy

The objectives of the Subcommission fall within three main areas of IUGS policy:

- (1) The development of an internationally agreed scale of chronostratigraphic units, fully defined by GSSPs where appropriate (stages and series), and related to a hierarchy of units (zones) to maximize relative time resolution within the Cambrian Period.

- (2) Establishment of frameworks and systems to encourage international collaboration in understanding the evolution of the Earth during the Cambrian Period.
- (3) Working towards an international policy concerning conservation of geologically and paleontologically important sites such as GSSPs.

3. ORGANIZATION

The Subcommittee is organized by an Executive consisting of Chairman, two Vice-Chairs, and Secretary, who are all Voting Members of the Subcommittee. There are currently 15 other Voting Members. The Voting Members are elected for their expertise and experience, but also represent a diversity of countries and regions.

Officers for 2004-2008:

Chairman:	Prof. Shanchi Peng (China)
First Vice-Chair:	Prof. Malgorzata Moczydlowska-Vidal (Sweden)
Second Vice-Chair:	Prof. Gerd Geyer (Germany)
Secretary:	Prof. Loren E. Babcock (USA)

Website: www.uni-wuerzburg.de/palaeontologie/ISCS/index.htm

The website contains detailed information pertaining to Subcommittee business, including recent decisions and opinions regarding intra-Cambrian correlation, recent publications, etc.

The objectives of the Subcommittee are pursued by Working Groups, both stratigraphic and thematic. Each Working Group is organized by a Chair, who is a Voting or Corresponding Member.

The Subcommittee sponsors an International Symposium on the Cambrian System at irregular intervals, and sponsors Field Conferences of the Cambrian Stage Subdivision Working Group at one- or two-year intervals. The Chair of the Organizing Committee of each of the meetings is normally a Voting Member, Honorary Member, or Corresponding Member of the Subcommittee.

4. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

Members of the Cambrian Subcommittee are involved in a number of international projects, normally in an individual capacity but sometimes facilitated by contacts through activities related to the Subcommittee.

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

a. Results of the IX Conference of the Cambrian Stage Working Group (held in Taebaek, South Korea, under the chairmanship of Duck Choi, 2004) were published as a series of papers in a thematic issue of *Geosciences Journal*.

A plan has been devised (Loren Babcock, Shanchi Peng, Gerd Geyer and John Shergold; *Geosciences Journal*, 2005) for subdivision of the Cambrian System into **four series**, each representing roughly equal time intervals. The **lowermost two series**, which approximately correspond to the **traditional lower Cambrian**, are each expected to be divided into two nearly equal stages. The uppermost two series are each expected to be divided into three nearly equal stages. The plan received overwhelming support from ISCS Voting Members.

b. In a ballot submitted to Voting Members (VMs) of the Cambrian Subcommittee in December 2004, VMs approved a working model for subdivision of the Cambrian System that comprises **four series**. In a second ballot, VMs approved **three key horizons** defining stage bases. E-ballots were sent to all 19 VMs of the ISCS, and 16 members returned votes; 3 VMs (*Brasier*, *Ergaliev*, *Khomentovsky*) did not reply. Results of the ballots are as follows:

Ballot 1 – Cambrian Series

Should the Cambrian System be subdivided into four series?

Total:	yes	no	abstain	non-voting
	14	2	0	3

Result: 88% in favor, 12% against, 0% abstaining; ballot item passes.

Ballot 2 – Target levels for GSSPs

1. Should a stage-level GSSP be established at the level of *Lejopyge laevigata* or another fossil in a comparable stratigraphic position?

Total:	yes	no	abstain	non-voting
	16	0	0	3

Result: 100% in favor, 0% against, 0% abstaining; ballot item passes.

2. Should a stage-level GSSP be established at the level of *Agnostotes clavata* or another fossil in a comparable stratigraphic position?

Total:	yes	no	abstain	non-voting
	15	0	1	3

Result: 94% in favor, 0% against, 6% abstaining; ballot item passes.

3. Should a stage-level GSSP be established at the level of *Lotagnostus trisectus* or another fossil in a comparable stratigraphic position?

Total:	yes	no	abstain	non-voting
	11	1	4	3 (<i>Brasier</i> , <i>Ergaliev</i> , <i>Khomentovsky</i>)

Result: 69% in favor, 6% against, 25% abstaining; ballot item passes.

NOTE: *Agnostotes orientalis* = senior synonym of *A. clavata*.

c. The X Conference of the Cambrian Stage Working Group – The Fourth International Symposium on the Cambrian System together with the X Conference of the Cambrian Stage Working Group were held in Nanjing, China, under the chairmanship of Shanchi Peng. The symposium included topical sessions on various themes, including continuing discussion of refining correlation within the system and development of adequate tools for intercontinental correlation. Decisions were made at the ISCS workshop during the symposium to establish a number of new working groups whose responsibility is to investigate key stratigraphic horizons. In addition, the symposium had associated with it a number of field trips to important Cambrian sections in China and Korea. Abstracts of papers and short papers delivered at the meeting were published in a special issue of *Acta Micropaleontologica Sinica*. A guide to field trip excursions was published as a separate edited volume (Shanchi Peng, Loren E. Babcock, Maoyan Zhu, editors, “*Cambrian System of China and Korea*”).

6. CHIEF PROBLEMS ENCOUNTERED IN 2005

The principal difficulties encountered in 2005 were:

- (1) Obtaining funding to support basic research on key stratigraphic intervals (potential GSSP horizons and sections).
- (2) Obtaining funding to support travel. A modest increase in funding for the coming year would be of great benefit to members of some of the Working Groups on key horizons who have limited access to funding through nationally competitive research grants.

7. SUMMARY OF EXPENDITURES IN 2005:

INCOME

Carried forward from 2004, 4057.21 Euro	\$ 4787.45
ICS Allocation	\$ 1200.00
SUBTOTAL 2005 income	\$ 5987.45

EXPENDITURE FROM 2005 BUDGET

Check printing	\$ 19.00
Contribution to officer's travel expenses	\$ 905.10
Support for field expenses, 4057.21 Euros	\$ 4787.45
SUBTOTAL 2005 expenditures	\$ 5711.55

To be carried forward to 2005	\$ 275.90
-------------------------------	-----------

8. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR (2005):

In 2006, the Subcommittee expects to vote on a proposal for a stage-level GSSP to be placed at the horizon of the FAD of the cosmopolitan agnostoid trilobite *Ptychagnostus atavus*. This horizon is one of the most recognizable in the Cambrian, and it is well constrained by a variety of stratigraphic correlation tools.

Planning is underway for meetings of the Cambrian Stage Subdivision Working Group in 2006 (Australia), 2007 (New York), and 2008 (Siberia).

The Subcommittee expects to make substantial progress toward development of proposals for two stage-level GSSPs at the horizons of the agnostoid trilobites *Lejopyge laevigata* and *Agnostotes orientalis* (= senior synonym of *A. clavata*).

An annual newsletter, highlighting activities of the Subcommittee, is expected to be issued by email in 2006.

9. BUDGET AND ICS COMPONENT FOR 2006

In order to accelerate the pace of work in establishing GSSPs within the Cambrian, we request a modest increase in funds as compared to previous years. The proposed increased funding is targeted at field research on key stratigraphic intervals by Working Group members and travel by Voting Members to international meetings where much of the decision-making takes place.

INCOME

Carry-over from 2005	\$ 275.90
----------------------	-----------

PLANNED EXPENDITURES FOR 2006

Preparation for the XI Cambrian Stage Subdivision Working Group Meeting (Australia, 2006)	\$ 750.00
Officers' attendance funds for Australia 2006	\$ 2000.00
Executive and VM travel costs	\$ 2000.00
Support for Stage Working Groups (travel to field sites)	\$ 3000.00
General office expenses	\$ 100.00
TOTAL 2006 PLANNED EXPENSES	\$ 7850.00

ICS 2006 BUDGET REQUEST

Total ICS 2005 budget request	\$ 7574.41
--------------------------------------	-------------------

The Cambrian Subcommittee does not receive financial support from outside IUGS-ICS, except for office support (computer, access to Internet services, telephone, etc.) from the host institutions of the Executive. Some members are supported by research grants, normally awarded competitively within individual nations. Specific activities, such as meetings, are sometimes supported in part by small grants to conveners from various sources, such as host institutions, and national and regional authorities of host countries.

10. SUMMARY OF CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (2001-2005)

In 1998, the Cambrian Subcommittee began work to define chronostratigraphic subdivisions (stages and series) within the system. Previously, the base and top of the Cambrian were defined by Working Groups on the Precambrian-Cambrian boundary (1992) and Cambrian-Ordovician boundary (1997). Most of the Subcommittee members share the opinion that **the process of defining and ratifying globally appropriate divisions must begin with an evaluation of potential correlation horizons**. Following this work, evaluation of candidate sections can begin. The Cambrian Stage Subdivision Working Group has made reconnaissance visits to sections in association with international field conferences. Areas visited include Morocco (1995), Spain (1996), eastern Canada (1997), Sweden (1998), the Great Basin, USA (1999), Argentina (2000), South China (2001), France (2002), South Korea (2004) and North and South China (2005).

In a seminal paper, John Shergold and Gerd Geyer (*Episodes*, 2000) reviewed widely recognizable biohorizons having intercontinental correlation value (ones that could potentially serve as stage-level or series-level boundaries for chronostratigraphic units). This work led to a focusing of subsequent effort on the issue of better characterizing potential chronostratigraphic boundary horizons using available stratigraphic tools. A **protocol for identifying GSSPs** within the Cambrian has been established: 1, selection of an horizon suitable for intercontinental correlation (followed by balloting by the Voting Members); then 2, search for the best sections from which to select a GSSP (followed by balloting by the Voting Members).

With the objectives now better focused, and a procedure in place for selecting the best horizons and locations for GSSPs, work has proceeded toward the establishment of several stage-level or series-level GSSPs. The first successful GSSP proposal arising from the Cambrian Subcommittee, which sought approval of the base of the **Paibian Stage** and **Furongian Series**

(authored by Shanchi Peng, Loren Babcock, Dick Robison, Peg Rees, and Matt Saltzman), was ratified by the ICS and IUGS in 2004.

A plan has been devised (Loren Babcock, Shanchi Peng, Gerd Geyer and John Shergold; *Geosciences Journal*, 2005) for subdivision of the Cambrian System into **four series**, each representing roughly equal time intervals. The **lowermost two series**, which approximately correspond to the **traditional lower Cambrian**, are each expected to be divided into two nearly equal stages. The uppermost two series are each expected to be divided into three nearly equal stages. The plan received overwhelming support from ISCS Voting Members.

11. OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2005-2008)

See Accomplishments in 2004 (above) for additional details.

The principal objective of the Subcommittee over the next four years is the identification of the best horizons for establishing stage-level and series-level **GSSPs** within the Cambrian System. Balloting during 2004-2005 resulted in approval of the plan to subdivide the Cambrian into **four series** and **10 stages**. All of the series will be subequal in time duration, and each of the stages within each series will be subequal in time duration. Once the best horizons for intercontinental correlation have been identified, the best sections for establishing GSSPs will proceed, and formal proposals for GSSPs will be written by Working Group members and forwarded to (in successive order) the ISCS, the ICS, and the IUGS for voting. Following ratification of each GSSP, a paper will be submitted to a major journal (e.g., *Episodes* or *Stratigraphy*) for public dissemination of the information.

A secondary objective of the Subcommittee is to develop and publish **regional correlation charts** for the Cambrian.

The Cambrian Subcommittee is deeply committed to establishing GSSPs that are be constrained using a variety of stratigraphic tools: a primary biostratigraphically based horizon used to mark each GSSP will be supplemented by additional biostratigraphic tools, chemostratigraphic information, sequence-stratigraphic information, chronostratigraphic information, and any other stratigraphic information that may be available. A **Working Group on Geochemistry** has been established to help provide the Subcommittee with refined carbon and strontium isotopic curves for the Cambrian System over the next four years.

Members of the Subcommittee will take part in the planning of upcoming meeting addressing themes related to Cambrian stratigraphy. Meetings planned over the next two years are:

- 1, XI Field Conference of the Cambrian Stage Working Group (Australia, **2006**). Planning is under the leadership of Jim Jago.
- 2, XII Field Conference of the Cambrian Stage Working Group (Albany, New York, USA, **2007**). Planning is under the leadership of Ed Landing.

Both meetings will include sessions on Cambrian chronostratigraphy, and will include field trips to sites of significance for chronostratigraphic correlation. Abstracts of papers are expected to be published at the time of each meeting, and special volumes of papers resulting from each meeting are expected to be published afterward.

**APPENDIX [Names and Addresses of Current Officers and Voting Members, 2004-2008]
SUBCOMMISSION ON CAMBRIAN STRATIGRAPHY**

Subcommission Officers

Chairman: Shanchi Peng, Nanjing Institute of Geology and Palaeontology, The Chinese Academy of Sciences, 39 East Beijing Street, Nanjing 210008, China, Email: scpeng@nigpas.ac.cn

First Vice Chair: Malgorzata Moczydlowska-Vidal, Department of Earth Sciences, Palaeobiology, Uppsala University, Norbyvägen 22, Box 558, 752 36 Uppsala, Sweden, Email: malgo.vidal@pal.uu.se

Second Vice-Chair: Gerd Geyer, Institut für Paläontologie, Universität Würzburg, Pleicherwall 1, 97070, Würzburg, Germany, Email: palo001@rzroe.uni-wuerzburg.de

Secretary: Loren E. Babcock, Department of Geological Sciences, 125 South Oval Mall, The Ohio State University, Columbus, OH 43210, USA, babcock.5@osu.edu

List of Voting Members

Per Ahlberg, Lund, Sweden per.ahlberg@geol.lu.se

José-Javier Álvaro, Villeneuve d'Ascq, France Jose-Javier.Alvaro@uni-lille1.fr

Martin D. Brasier, Oxford, UK martin.brasier@earth.ox.ac.uk

Duck K. Choi, Seoul, Korea dkchoi@snu.ac.kr

Gappar Kh. Ergaliev, Almaty, Kazakhstan ergaliev@nursat.kz

James B. Jago, Mawson Lakes, Australia jim.jago@unisa.edu.au

Pierre D. Kruse, Darwin, Australia pierre.kruse@dme.nt.gov.au

Ed Landing, Albany, New York, USA elanding@mail.nysed.gov

Eladio Liñán, Zaragoza, Spain linan@posta.unizar.es

Tatyana V. Pegel, Novosibirsk, Russia pegel@mail.ru

Matthew R. Saltzman, Columbus, Ohio, USA saltzman.11@osu.edu

John H. Shergold (Past Chairperson), La Freunie, France John.Shergold@wanadoo.fr

Stephen R. Westrop, Norman, Oklahoma, USA swest@hoth.gcn.ou.edu

Andrey Yu. Zhuravlev, Moscow, Russia ayzhur@mail.ru

Maoyan Zhu, Nanjing, China myzhu@nigpas.ac.cn

Total number of Voting Members for term 2004-2008: 19.



International Commission on Stratigraphy Subcommission on Ediacaran Stratigraphy

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

Subcommission on Ediacaran Stratigraphy

Submitted by:

Dr James GEHLING, Chairman
 South Australian Museum, North Terrace, Adelaide, 5000, Australia
 Tel. +61-8-8207-7441, Fax. +61-8-8207-7222
 Email jgehling@ozemail.com

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

Mission statement

The Subcommission is the primary body for facilitation of international communication and scientific cooperation in Ediacaran and late Neoproterozoic stratigraphy, defined in the broad sense of multidisciplinary activities directed towards better understanding of the evolution of the Earth during the Ediacaran Period and more generally during the late Neoproterozoic (circa 800 – 542 Ma). Its first priority is the unambiguous definition, by means of agreed GSSPs, of a hierarchy of chronostratigraphic units that provide the framework for global correlation.

Goals

These fall into three main areas:

- (a) The definition of basal boundary stratotypes (GSSPs) and the refinement of standard chronostratigraphic scales, through the establishment of multidisciplinary Working Groups;
- (b) International coordination of and collaboration in research on late Neoproterozoic environments, through the establishment of thematic Working Groups, for example on Neoproterozoic glaciations.
- (c) International coordination of efforts to establish consensus global stratigraphic calibration schemes for the late Neoproterozoic using alternative methods of stratigraphy, such as chemostratigraphy.

In addition, the Subcommission exists to further communication with a wider public through grassroots initiatives to conserve important Ediacaran geological sites, to support International Geological Correlation Programme projects, and to encourage the wider dissemination of research findings on the world wide web or in popular science publications.

Fit within IUGS Science Policy

The objectives of the Subcommittee relate to four main aspects of IUGS policy:

- (1) The development of an internationally agreed scale of chronostratigraphic units, fully defined by GSSPs where appropriate (Stages), and related to a hierarchy of units (Standard Zones, Subzones etc.) to maximize relative time resolution within the Ediacaran period;
- (2) Proceed with a program of workshops and symposia to select criteria, boundary stratotype section, and GSSP for a “Cryogenian” period and system, immediately below the Ediacaran;
- (3) Establishment of frameworks and systems to encourage international collaboration in understanding the evolution of the Earth during the late Neoproterozoic interval. In particular, cooperating with the **Precambrian Subcommittee** (W. Bleeker, chair) to subdivide Precambrian. The Ediacaran Subcommittee will concentrate on the Neoproterozoic, while the Precambrian Subcommittee will work on Archean and older Eras of the Proterozoic. Both subcommittee will seek to establish “natural” or rock-based boundaries that will enable global correlation.
- (4) Working towards an international policy concerning conservation of geologically and paleontologically important sites such as GSSPs. This relates to, *inter alia*, the IUGS Geosites Programme.

3. ORGANIZATION

Officers for 2004-2008:

Chair:	Dr. James Gehling, Australia
Vice-Chair:	Dr. Shuhai Xiao, USA
Secretary:	Dr. Graham Shields, Australia

There are currently 37 other Voting Members, making 40 voting members in total (*see appendix*); there are currently 12 additional corresponding members. The Voting Members have been specifically elected for their international reputations and recognized expertise in an area of geoscience relevant to the subcommittee. Four voting members are required to be officers of the Cambrian and Precambrian Subcommittees. All responded promptly to their nominations by email; ease of contact and promptness of response are prerequisites of being voting members on this subcommittee.

No thematic working groups have yet been established but a fully archived mailing list of both voting and corresponding members has been set up and is being used for dissemination of information relevant to the subcommittee. A proposal has been made for a new IGCP project on Neoproterozoic ice ages, which will form a locus for a subcommittee thematic working group on the global stratigraphic equivalence of Neoproterozoic glacial horizons.

4. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

Members of the Ediacaran Subcommittee are lead investigators and officers in a number of international projects, normally in an individual capacity but sometimes facilitated by contacts through activities related to the Subcommittee:

IGCP 447 (*Proterozoic molar-tooth carbonates*) Subcommittee secretary Graham Shields is the Australian correspondent and geochemistry working group chairman of this project;
 IGCP 478 (*Neoproterozoic-early Paleozoic events in SW Gondwana*) led by voting member Claudio Gaucher;

IGCP 493 (*The Rise and Fall of the Vendian biota*) led by voting member Mikhail Fedonkin (Paleontological Institute, Moscow), Pat Vickers-Rich (Monash Uni.) and Ediacaran Subcommission chairman James Gehling;

IGCP 497 (*The Rheic Ocean: its origin, evolution and correlatives*) led by voting member Ulf Linnemann.

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

The **GSSP for the Terminal Proterozoic Period** at the base of the Nuccaleena Formation *cap dolostone* is immediately above the Elatina glaciogenic diamictite in the Enorama Creek Section, Flinders Ranges, South Australia. Details of the GSSP and its selection process has been published in *Lethaia*, *Episodes*, *Science* and *Nature*. The ratification of the Ediacaran GSSP was reported widely in the international press and in news articles in *Nature* and *Science*. Several groups of geologists have given conducted tours of the late Neoproterozoic succession in the Flinders Ranges National Park, including the GSSP site and Ediacara fossil horizons. An **official unveiling of the GSSP by the Premier of South Australia** was in **April 2005**.

Ediacaran Subcommission was represented at a Time Scale Workshop to be held by the Precambrian Subcommission in conjunction with a final "Supercontinents and Earth Evolution Symposium" organized by the Tectonics Special Research Centre at University of Western Australia/Curtin University, September 26-30, 2005. This followed a field trip across the Capricorn, southern Hamersley Basin, Bangemall Basin, and northern Yilgarn of Western Australia.

At the NAPC meeting in Halifax, Nova Scotia (June 19-26, 2005), the Ediacaran Subcommission and IGCP 493 cosponsored a symposium entitled: "Ediacaran paleobiology: paleontological, molecular, embryological, and ecological constraints". At this meeting subcommission members held discussions on preliminary proposals for Ediacaran Period subdivision. A 5-day pre-conference excursion (June, 2005) was led by Guy Narbonne (Queens, ON) and Doug Boyce (NFLD Survey) to the Ediacaran succession and classic fossil sites of SE Newfoundland.

First annual meeting of the possible new IGCP project at the "Conference on Glacial Sedimentary Processes and Products" at University of Wales, Aberystwyth, August 23rd–27th 2005. This International Association of Sedimentologists conference was organised by Professor Michael Hambrey (UK). The subsequent field excursion to Neoproterozoic glaciogenic successions of western Scotland in Islay and the Garvellachs (e.g. Arnaud, 2004) were led by Dr Emmanuelle Arnaud (Canada). At this meeting subcommission members held discussions on preliminary proposals for Cryogenian period GSSPs and the thematic working group on Neoproterozoic glaciations met to plan their future work.

Several members of the subcommission attended the national GSA meeting in Salt Lake City (Oct-16-18) with a fieldtrip to the mid-Neoproterozoic rocks of northeastern Utah between Oct 12-15 run by Carol Dehler and followed by Paul Link running a trip to see the Pocatello Fm in southeastern Idaho.

6. CHIEF PROBLEMS ENCOUNTERED IN 2005

In order that the discussions over future GSSPs be seen to be consensus decisions by the wider geological community, we have cast our net wider and attracted 40 research-active voting members from 17 different countries. Because of the necessary changed emphasis away from biostratigraphy in future Precambrian stratigraphic subdivision boundary definitions, this group

encompasses expertise from a wide range of relevant fields of geology: chemostratigraphy, glacial sedimentology, carbonate sedimentology, palaeomagnetism and geochronology as well as biostratigraphy.

7. SUMMARY OF EXPENDITURES IN 2005 (ANTICIPATED THROUGH MARCH 2006):

TOTAL RECEIVED from IUGS/ICS = \$1200, which was less than one-fourth of our anticipated needs (\$5500). The following reduced set of activities were supported:

\$600 towards a symposium at NAPC (June 2005) and pre-conference excursion to NFLD, and for travel support. (*J. Gehling and G. Narbonne*)

\$600 towards production of an up-to-date field guide (to Ediacaran Period GSSP in the Flinders Ranges, Australia), postage and handling. (*J. Gehling*)

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

(a) Design and establish web-site for Subcommittee:

This site, which had to be delayed in 2005 due to lack of IUGS/ICS funding, will provide a more widely accessible source of information about the Subcommittee. The site will recent Newsletters, a link to discussion group archives, a Directory of the Executive and other Voting Members, with their allocated areas of responsibility, and Corresponding Members, plus information on the objectives of the Working Groups and contact details for the Convenors. Preliminary work and planning have been carried out and final setting up will be achieved with some professional help.

(b) Preparation of GSSP proposals:

Call for proposals for subdivision of late Neoproterozoic time, including provisional ideas for GSSP's. Establishment of thematic working group on *Neoproterozoic glaciations* and working groups on *Ediacaran subdivision* and the *definition and base of the Cryogenian*.

(c) Possible IGCP Project: Neoproterozoic ice ages

An application for a new IGCP Project on Neoproterozoic ice ages has been submitted by Subcommittee secretary Graham Shields along with over 150 colleagues from 20 different countries. This new project will focus on the number, extent, correlation and environmental consequences of glaciation during the late Neoproterozoic. Future subdivision of the Neoproterozoic will rely greatly on the correlation potential of glaciogenic units worldwide so if successful this project will be important to the goals of the subcommittee. Most of the voting and corresponding members of the Ediacaran Subcommittee are also members of this project and a core body will make up a thematic working group within the subcommittee.

(d) GSSP-related meetings:

- In conjunction with the 2nd *International Palaeontological Congress* to be held in China in 2006, a special session is being planned on the progress of the subcommittee by J. Gehling, S. Xiao and G. Shields. A field workshop to South China in association with the *International Palaeontological Congress in Beijing*, Summer 2006 will be organized by Zhu Maoyan.

- Another important meeting will take place at the “*Snowball Earth 2006 appraisal conference*” at the Centro Stefano Franscini, Ascona, Switzerland, Summer 2006. This conference is organised by Professor Philip Allen, Dr James Etienne and Dr Andrea Cozzi (Switzerland). The conference plans to bring together most of the world’s experts in Neoproterozoic Earth System Science and represents a good moment for the thematic working group on Neoproterozoic ice ages to discuss progress.

10. BUDGET AND ICS COMPONENT FOR 2006

\$2500 towards organizing the field excursions and associated thematic working group meetings on the Correlation of **Neoproterozoic glacial horizons** (G. Shields and E. Arnaud) – which will lead to a subdivision and basal GSSP of the Cryogenian Period, and another set on the definition and potential GSSP for a proposed **Vendian** series for the upper Ediacaran system.

\$500 towards the employment of professional assistance in the setting up of a web page for the subcommission. (J. Gehling)

TOTAL: \$3000

Potential funding sources outside IUGS

The Ediacaran Subcommission does not receive financial support from outside IUGS-ICS, except for office support (computer, access to internet services, telephone, etc.) from the host institutions of the Executive. Most members are supported by national research grants, normally won competitively. Specific activities, such as meetings and some Working Groups, sometimes receive small grants to Convenors and Organizers from various sources, such as host institutions and national and regional authorities of the country where the meeting is being held.

11. REVIEW CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (1999-2003)

See review of 2005 activities.

In September 2003, a 3rd ballot of the Terminal Proterozoic Subcommission resulted in 85% of the votes in favor of a **GSSP for the Terminal Proterozoic Period** at the base of the Nuccaleena Formation *cap dolostone*, immediately above the Elatina glaciogenic diamictite in the Enorama Creek Section, Flinders Ranges, South Australia. The name “**Ediacaran**” received 79% of the votes cast. As a result the Subcommission submitted a proposal to the full International Commission on Stratigraphy (ICS) in December 2003.

On February 16th, 2004, the ICS voted 14:1 in favor (with one abstention) on the GSSP and name for the “Ediacaran System”. The results were submitted to IUGS, which ratified the GSSP and name for the Ediacaran System and Period on March 19th (IUGS E-Bulletin, March 2004).

12. OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2006-2009)

The Ediacaran Subcommission aims to encourage research that will facilitate correlation and subdivision of the late Neoproterozoic (circa 800 – 542 Ma). In particular, field excursions and symposia will be designed to encourage international cooperation and collaboration that will lead to GSSP’s for the base of the “*Cryogenian*”, and subdivision of the Ediacaran. Suggestions for

appropriate successions that would facilitate placement of GSSP's will determine the precise location of future meetings and excursions but some preliminary ideas are outlined below for the years 2005-2008.

2007

- During this year we hope to vote on the **base of the "Cryogenian"**.
- A field workshop is planned to review the Sturtian and Marinoan diamictites and claims for younger diamictites in the Neoproterozoic successions of the northern Flinders Ranges and Kimberley Ranges for June 2007).
- Possible subcommission field excursions and working group meetings include a planned meeting in Dakar, Senegal organized by P. Affaton, G. Shields and M. Deynoux. Another meeting is being planned in Brazil in conjunction with IGCP 478 and organized by the Brazilian contingent of the proposed project (M. Babinski, A. Misi and others). Two meetings will take place in that year – each focussed on a different time-slice (Cryogenian and Ediacaran)

2008

- Possible proposal and ratification of the new **Cryogenian Period GSSP** at the 33rd *International Geological Congress* on 5–14 August in Oslo, Norway to be combined with possible field-trip in Russia.

APPENDIX [*Names and Addresses of Current Officers and Voting Members, 2004-2008*] SUBCOMMISSION ON EDIACARAN STRATIGRAPHY

Subcommission officers

Chairman: James Gehling, South Australian Museum, North Terrace, Adelaide, 5000 Australia.

Tel. +61-8-8207-7441, email jgehling@ozemail.com

Vice-Chairman: Shuhai Xiao, Department of Geological Sciences, Virginia Polytechnical Institute and University, 4044 Derring Hall, Blacksburg, VA 24061-0420, USA.

Tel. +1-540-231-1336, email xiao@vt.edu

Secretary: Graham Shields, School of Earth Sciences, James Cook University, Townsville, Queensland 4814, Australia

Tel. +61-7-4781-5008 email graham.shields@jcu.edu.au

Voting Members

Jose-Javier Alvaro, Lille, France; Jose-Javier.Alvaro@univ-lille1.fr

Emmanuelle Arnaud, Guelph, Canada; earnaud@uoguelph.ca

Wouter Bleeker, Ottawa, Canada; wbleeker@nrcan.gc.ca

Paulo César Boggiani, São Paulo, Brazil; boggiani@usp.br

Martin D. Brasier, Oxford, UK; martin.brasier@earth.ox.ac.uk

Nicholas Butterfield, Cambridge, UK; njb1005@esc.cam.ac.uk

Nicholas Christie-Blick, New York, USA; ncb@ldeo.columbia.edu

Nikolay Chumakov, Moscow, Russia; chumakov@ginras.ru

David A.D. Evans, New Haven, USA; dai.evans@yale.edu

Mikhail Fedonkin, Moscow, Russia; mfedon@paleo.ru
Hartwig Frimmel, Wuerzburg, Germany; hartwig.frimmel@mail.uni-wuerzburg.de
Claudio Gaucher, Montevideo, Uruguay; gaucher@chasque.apc.org
Gerard Germs, Johannesburg, South Africa; gagerms@global.co.za
Dmitriy V. Grazhdankin, Moscow, Russia; dgra99@esc.cam.ac.uk
Kathleen Grey, Perth, Australia; kath.grey@doir.wa.gov.au
John P. Grotzinger, Cambridge, USA; grotz@mit.edu
Karl-Heinz Hoffmann, Windhoek, Namibia; khhoffmann@mme.gov.na
Hans Hofmann, Montreal, Canada; hofmann@eps.mcgill.ca
Mohieddin Jafari, Tehran, Iran; mohieddin300@yahoo.com
Richard Jenkins, Adelaide, Australia; jenkins.richard@saugov.sa.gov.au
Soren Jensen, Spain; soren@guadiana.unex.e
Alan Jay Kaufman, Maryland, USA; kaufman@geol.umd.edu
Vsevolod Khomentovsky, Novosibirsk, Russia; vkhom@uiggm.nsc.ru
Andrew H. Knoll, Cambridge, USA; aknoll@oeb.harvard.edu
Ulf Linnemann, Dresden, Germany; ulf.linnemann@snsd.smwk.sachsen.de
Victor Melezhik, Norway; Victor.Melezhik@ngu.no
Malgorzata Moczydlowska-Vidal, Uppsala, Sweden; malgo.vidal@pal.uu.se
Guy M. Narbonne, Kingston, Canada; narbonne@geol.queensu.ca
Peng Shanchi, Beijing, China; scpeng@nigpas.ac.cn, speng@pub.jlonline.com
Vibhuti Rai, Lucknow, India; vibhutihrai@rediffmail.com
Robert Rainbird, Ottawa, Canada; rrainbir@nrca.gc.ca
Mikhail A. Semikhatov, Moscow Russia; semikhatov@ginras.ru
Sun Weiguo, Nanjing, China; weiguo@jlonline.com
Malcolm Walter, Sydney, Australia; mwalter@els.mq.edu.au
Yin Chongyu, Beijing, China; chongyuyin@cags.net.cn
Yuan Xunlai, Nanjing, China; xlyuan@nigpas.ac.cn
Zhu Maoyan, Nanjing China; myzhu@nigpas.ac.cn



International Commission on Stratigraphy Subcommission on Precambrian Stratigraphy

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

Subcommission on Precambrian Stratigraphy

Submitted by:

Wouter Bleeker, *Chairman*

Geological Survey of Canada, 601 Booth Street, Ottawa, Ontario, Canada, K1A 0E8

Email address: wbleeker@nrcan.gc.ca

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

An international subcommission under ICS that has set as its main goal to construct a ‘natural’ stratigraphy-based time scale for all of the Precambrian, and pin key stratigraphic boundaries with GSSPs (not GSSAs) like in the Phanerozoic.

3. ORGANIZATION

Officers for 2004-2008:

Chair: Dr. Wouter Bleeker, Geological Survey of Canada

Vice-Chair: Dr. Martin Van Kranendonk, Geological Survey of Western Australia

Secretary: Dr. Robert Rainbird, Geological Survey of Canada

Website: www.stratigraphy.org/precambrian -- lists all relevant information, including downloadable pdf files of key papers and reports. The page was constructed and is maintained by Wouter Bleeker and Dr. Sorin Filipescu (Dept. of Geology, Babes-Bolyai University, in Cluj-Napoca, Romania), the ICS webmaster.

4. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

Work of the new Precambrian Subcommission interfaces closely with:

- Subcommission on the Neoproterozoic, currently chaired by Dr. Jim Gehling.
- IGCP Project (509) led by Drs. Steven Reddy (Curtin University, Western Australia) and David Evans (Yale University, USA), et al.: *Paleoproterozoic Tectonics and Global Evolution*.
- A new IGCP Proposal by Dr. Graham Shields et al.: *Neoproterozoic Ice Ages*.

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

- The Subcommittee is now fully operational, with essentially a full complement of voting and corresponding members from around the world. Additional representation from Russia and India is still being sought.
- The Subcommittee's website is up and running (www.stratigraphy.org/precambrian/) and will serve as the main portal for dissemination of information on and by the Subcommittee.
- A first highly successful international workshop was convened in Perth, Western Australia, on September 25, in conjunction with the Supercontinent and Earth Evolution Symposium organized by the Tectonics Special Research Center at the University of Western Australia. The workshop was attended by ca. 30 scientists from around the world and kicked off the debate on how to move forward with the Precambrian Time Scale. After a day of presentations and discussion on issues across the Precambrian part of the time scale, informal votes were held on a number of key questions. A clear majority of those present voted in favor of moving ahead with completing the time scale (e.g. the Hadean), formalizing the Archean, and refining the definitions of lower rank units. A lesser number of participants, but nevertheless a majority, embraced the general GSSP concept for ultimate subdivision of the Precambrian time scale. An interesting division was apparent at the meeting with most younger scientists in favor of a rock-record based GSSP-like approach, whereas several of the older scientists present preferred to stick with the status quo. With the added perspective of discussions at previous workshops (Mt. Tremblant, Canada, 2003), it is clear that a broad-based opinion exists in favor of cautiously moving ahead with GSSP-like definitions of major Precambrian time scale boundaries.
- Following up on the results of the Perth workshop, detailed notes are being distributed, together with a more formal questionnaire, to 1) all workshop participants, 2) all Subcommittee voting and corresponding members, and 3) an additional forum of selected Precambrian specialists. This will allow "sober second thought" to prevail and opinions to be polled from a broad Precambrian constituency. Results of this questionnaire will be collected and compiled over the winter and help guide future progress.
- Tackling the Archean-Proterozoic boundary in terms of a GSSP-based definition is seen as a test case. Initial discussions among a number of participants were in favour of organizing field conferences in the Hamersley Basin (Western Australia) and in the Transvaal Basin (South Africa) to help define the most suitable location for a GSSP at the base of the Proterozoic. Due diligence would require that India (sedimentary successions overlying the Singhbhum craton) and Brazil (2.6-2.2 Ga successions overlying the Sao Francisco craton) are also considered. The first field workshop is likely to take place in the Hamersley Basin, hopefully in 2006.
- An update of the Subcommittee's activities was presented to ICS, in Leuven, September 2005 after which all ICS voting members engaged in thorough discussions and formal votes on a number of issues, including the status of the Quaternary in the modern time scale. Essentially all other Subcommittee chairs enthusiastically endorse the concept and logic of going to GSSP-based subdivisions and boundary definitions for the Precambrian.

6. CHIEF PROBLEMS ENCOUNTERED IN 2005

None. Not enough time in a day!

7. SUMMARY OF EXPENDITURES IN 2005 (ANTICIPATED THROUGH MARCH 2006):

Support received for Subcommittee from ICS treasurer: \$1000 (US\$).

Expenses incurred on behalf of the Subcommittee in convening the September 25 workshop (at the Esplanade Hotel, Fremantle, Western Australia), were \$1390 (US).

Expenses (travel, airfare and ground transportation) to attend the ICS workshop in Leuven in August/September were covered separately by support from ICS.

No further expenses are anticipated prior to the spring of 2006.

8. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR (2006):

- Dissemination of results of the Perth (Fremantle) workshop, including a short summary report to be submitted to *Episodes*.
- Compilation of results from the Questionnaire. These results will be included in the *Episodes* report and will help guide the next steps in the immediate future.
- If results of the Questionnaire are supporting the GSSP-approach, we will start planning of the first field workshops to select suitable sections for a GSSP-based Archean-Proterozoic boundary (Western Australia, South Africa, and lower priority India and Brazil).
- Concept papers on the Precambrian time scale in general, and a GSSP-based Archean-Proterozoic boundary in advanced state of preparation, to be submitted to the new journal "*Stratigraphy*".
- Joint field workshop with IGCP Project 509 on the Huronian Supergroup, Canada. Although less suitable for a GSSP locality, the Huronian Supergroup nevertheless records critical events in the transition between the Archean and Proterozoic eras. Hence, close interaction with IGCP 509 will be beneficial to the Subcommittee's progress.
- Firming up Indian and full Russian participation on the Subcommittee before the GSSP-definition process is launched.
- If an opportunity presents itself, the Subcommittee will convene a second 'concept' workshop, similar to the one in Perth, either in North America, or in Europe, to allow US- and Europe-based researchers, whom could not attend the Perth workshop, to be involved in the Subcommittee's progress.

9. BUDGET AND ICS COMPONENT FOR 2006

Support is requested for travel to and from 2006 workshops: **\$3000** (US\$).

10. REVIEW CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (2001-2005)

- *See 2005 activity summary (above) for recent accomplishments*
- Chapter contributed to GTS2004, the highly successful new comprehensive book on the time scale, edited by Gradstein et al.
- Proposal for new approach published in *Lethaia*.
- Operational links with allied subcommittees (e.g., on the Ediacaran Period) firmly established.

- Previous chairman (Dr. Ken Plumb) was invited to the Perth workshop to help achieve a smooth transition from previous Subcommittee activities to those of the new Subcommittee.

11. OBJECTIVES AND WORK PLAN FOR NEXT 5 YEARS (2004-2008)

- A complete Precambrian time scale in place, with formalized Hadean and Archean eons.
- Formal GSSP for the base of the Archean.
- Formal GSSP for the base of the Proterozoic.
- Natural subdivision of the Archean Eon, with GSSPs for each era-rank subdivision (Eo-, Paleo-, Meso-, and Neoarchean).
- In cooperation with the Neoproterozoic Subcommittee, an advanced plan on how to naturalize the time scale for the Proterozoic.
- Full incorporation of latest insights from planetary science in the earliest part of the terrestrial Precambrian time scale.
- In cooperation with other experts, compare and contrast the time scales of Earth with those of other planetary bodies, specifically the Moon and Mars.
- Prepare appropriate chapters on these topics for the 2008 version of the Geologic Time Scale.

In 2006, we hope to solidify the general consensus on a GSSP-based approach for the Precambrian time scale and to start making preparations for field workshop to tackle in detail the Archean-Proterozoic boundary. Progress is somewhat slower than expected but the reality is that it takes time to build consensus. There is no point in forcing the issue ahead without this consensus clearly established and documented.

APPENDIX [*Names and Addresses of Current Officers and Voting Members, 2004-2008*]

Subcommittee officers:

Chair: Dr. Wouter Bleeker, Geological Survey of Canada, 601 Booth Street, Ottawa, Canada, K1A0E8, e-mail: wbleeker@nrcan.gc.ca

Vice-Chair: Dr. Martin Van Kranendonk, Geological Survey of Western Australia, Mineral House, 100 Plain Street, East Perth, Western Australia 6004, Australia, e-mail: martin.vankranendonk@doir.wa.gov.au

Secretary: Dr. Robert Rainbird, Geological Survey of Canada, 601 Booth Street, Ottawa, Canada, K1A0E8, e-mail: rrainbir@nrcan.gc.ca

List of voting members (grouped by region):**Australia:**

David Nelson, Geological Survey of Western Australia, david.nelson@doir.wa.gov.au
 Allen Nutman, the Australian National University, allen.nutman@anu.edu.au
 Graham Shields, James Cook University, graham.shields@jcu.edu.au
 Ian Tyler, Geological Survey of Western Australia, ian.tyler@doir.wa.gov.au

Brasil:

Reinhardt Fuck, Universidade de Brasília, rfuck@unb.br
 Benjamim Bley Brito Neves, Institute of Geosciences, University of Sao Paulo, bbleybn@usp.br

Cameroon:

Sadrack Félix Toteu, Centre for Geological and Mining Research, sftoteu@yahoo.fr

Canada:

Donald W. Davis, University of Toronto, dond@geology.utoronto.ca
 Mike Hamilton (c), University of Toronto, mahamilton@geology.utoronto.ca
 Sandra Kamo (c), University of Toronto, skamo@geology.utoronto.ca
 Guy Narbonne, Queen's University, narbonne@geol.queensu.ca

China:

Huaikun Li, Chinese Geological Survey, tjlhualkun@cgs.gov.cn
 Songnian Lu, Chinese Geological Survey, tjlsongnian@cgs.gov.cn
 Yusheng Wan, Chinese Academy of Geological Sciences, wanyusheng@bjshrimp.cn
 Huichu Wang, Chinese Geological Survey, tjwhuichu@cgs.gov.cn

Finland:

Petri Peltonen, Geological Survey of Finland, petri.peltonen@gtk.fi

Germany:

Alfred Kröner, University of Mainz, kroener@mail.uni-mainz.de

Russia:

Andrei Khudoley, St. Petersburg State University, khudoley@ah3549.spb.edu

Sweden:

Martin Whitehouse, Swedish Museum of Natural History, martin.whitehouse@nrm.se

United Kingdom:

Stephen Moorbath, Oxford University, United Kingdom, stephenm@earth.ox.ac.uk
 Euan Nisbet, Royal Holloway University of London, nisbet@gl.rhul.ac.uk

United States of America:

Andrey Bekker, Carnegie Institution of Washington, a.bekker@gl.ciw.edu
 David Evans, Yale University, dai.evans@yale.edu
 Don Lowe (c), Stanford University, lowe@pangea.stanford.edu
 Stephen J. Mojzsis, University of Colorado, Stephen.Mojzsis@colorado.edu



International Commission on Stratigraphy Subcommission on Stratigraphic Classification

ANNUAL REPORT 2005

1. TITLE OF CONSTITUENT BODY

Subcommission on Stratigraphic Classification (ISSC)

Submitted by:

Maria Bianca Cita *Chairman, ISSC*

University of Milano, Dept. Earth Sciences, via Mangiagalli 34, 20133 Milano, Italy
Tel +39-02-503 15529; Fax: +39-02-503 15494, E-mail: maria.cita@unimi.it

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

Mission Statement

The Subcommission represents a core business for the International Commission on Stratigraphy because it represents the primary body for creating, discussing, publishing and disseminating an internationally agreed-upon guide on stratigraphic terminology and classification or-in other words standardization of the Stratigraphic Units. Its first priority is to advertise new developments in stratigraphic methods, check that the procedures are carefully followed, and monitor the application of the accepted rules.

Goals

These fall in two categories:

- The world-wide acceptance of the basic rules of stratigraphy, without which no time-scale is meaningful, because of the potential gap between knowledge and concepts;
- Coordination of international application of stratigraphic principles and concepts, with special reference to the most important “users” of stratigraphy, as Geological Surveys, graduate and undergraduate teaching, oil companies, professionals.

Fit within IUGS Science Policy

The objectives of the Subcommission are relevant to IUGS policy because standardization of the stratigraphic terminology is essential to any attempt of global correlation, and requires a large and active international cooperation.

3. ORGANIZATION

Chair: Maria Bianca Cita, Italy

Vice-Chair: Ashton Embry, Canada

Secretary and web-master: Maria Rose Petrizzo, Italy

TASK GROUPS

Sequence stratigraphy

Leader: Ashton Embry (Canada)

Members: Don Owen (USA), Piero Gianolla (Italy), Benoit Beauchamp (Canada), Erik Johannessen (Norway)

Cyclostratigraphy

Leader: Andreas Strasser (Switzerland)

Members: Fritz Hilgen (Holland), Walter Schwazacher (UK)

NATIONAL REPRESENTATIVES (NATIONAL LIAISONS)

Mandate: spread the messages plus instructions given by ISSC in their countries, and report on reactions and acceptance status (via correspondence through ISSC Newsletters)

Provisional list (based on Business Meeting, Florence, August 27, 2004) to be modified and implemented on the basis of later correspondence.

ARGENTINA: A. Riccardi, chairman Stratigraphic Commission of Argentina

AUSTRALIA: Albert T. Brakel national convener, Australian Stratigraphic Names Committee

AUSTRIA: Werner Piller, chairman Stratigraphic Commission of Austria

CANADA: Ashton Embry

GERMANY: Manfred Menning, member of the German Stratigraphic Commission

GREAT BRITAIN: Jan Zalasiewicz, chairman British Stratigraphic Commission

ITALY: Maria Bianca Cita, chairman Italian Stratigraphic Commission

LITHUANIA: A. Grigelis, chairman Stratigraphic Commission of Lithuania

RUSSIA: Yuri Gladenkov, vice-chairman of Stratigraphic Commission of Russia

SPAIN: Hans Peter Luterbacher

SWITZERLAND: Andreas Strasser, chairman Swiss Stratigraphic Commission

USA: Lucy Edwards, past chairman NACSN

STRUCTURAL LIAISONS

Mandate: communicate decisions and orientations of ISSC and report on reactions

Provisional list (based on Business Meeting, Florence, August 27, 2004) to be modified and implemented on the basis of later correspondence.

A. Riccardi IUGS

M. B. Cita ICS

P. Heckel Carboniferous

H. P. Luterbacher Paleogene

M. Menning Permian

P. Gianolla Triassic

4. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

ISSC has always been directly or indirectly linked to international projects such as ODP and IGCP.

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2005

a. *Communications*

The electronic mail proved to be an invaluable means of communication and allowed a break through in revitalizing the Subcommittee. *Newsletters* were distributed electronically and/or via traditional mail in December, March and October, and many comments, proposals, ideas followed.

6. CHIEF PROBLEMS ENCOUNTERED IN 2005

No major problems.

7. SUMMARY OF EXPENDITURES IN 2005:

I. INCOME	US DOLLARS
Carry-over from 2004	-2059.00 USD in red
2005 ICS subvention	370 USD=284.03 EURO
After the Exchange changes	265.96 EURO
II. EXPENDITURES	US DOLLARS
Exchange charges	23.54
Mail	83.00
Office material	95.00
Secretarial help	50.00
Meeting in Fribourg (June 2005)	400.00
Meeting in Louvain (Sept. 2005)	300.00
ISSC Newsletter 6, 7, and 8	200.00
Total Expenses	951.54
Excess expenditures over income	- 685.58

NOTE: The ICS subvention for 2005 was very low (370 USD instead of 400 USD as announced) compared to what ISSC received in 2004 (1350.00 USD), and after the exchange charges (5.16+12.91 EURO = 23.54 USD), the total amount was even lower (346.46 USD).

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

Task groups will update Stratigraphic Guide

Task Group on Sequence Stratigraphy. The energetic Task group leader is Ashton Embry, specialist on shallow water clastics.

Task Group on Cyclostratigraphy

New Working Groups will be appointed – as appropriate- when a realistic plan for the future international guidebook will be prepared within 2006,

- a WG for biostratigraphy,
- a WG for physical stratigraphy,
- a WG for chemical stratigraphy.

No WG is foreseen for chronostratigraphy prior to the settlement of the present intellectualistic debate on time versus time-rock units.

A WG on lithostratigraphy will be appointed only after the sequence stratigraphy is clarified.

Each Task Group and/or Working Group will be lead by an ISSC member and consist of a limited number of scientists with broad international experience. The products of their efforts will be circulated through ISSC newsletter, first among members, then within a larger community through the national liaisons prior to being published in a shared guide.

9. BUDGET AND ICS COMPONENT FOR 2006 (US Dollars)

General office expenses	50.00 US Dollars
ISSC Newsletter n. 9, 10 and 11	100.00 US Dollars
Contribution towards cost of upgrading the web-site	300.00 US Dollars
Contributions to help costs of Task and Working Groups for preparation of the new Stratigraphic Guide	1000.00 US Dollars
Support for meetings for the preparation of the new Stratigraphic Guide	1000.00 US Dollars
Secretarial help	50.00 US Dollars

TOTAL BUDGET REQUEST **2500.00 US Dollars**

NOTE: The **80 %** of the requested budget will be used to support meetings and help costs of Task and Working Groups for the preparation of the **new version of the Stratigraphic Guide "Stratigraphic classification: Definitions, applications of the principles, and real world examples"**.

Potential funding sources outside IUGS

The Subcommittee does not receive financial support from outside IUGS-ICS, except for office support from the host institution (University of Milano). Members obtain individual (personal?) research or conference grants for activities related to the Subcommittee.

As in previous years, financial support will be sought by individual members from their grant-awarding bodies for specific projects such as research projects and meetings.

General support will be provided to the Secretary by University of Milano Department of Earth Sciences for equipment including computers, email access and telephones. The web-site of the International Subcommittee on the Stratigraphic Classification (http://www.geocities.com/issc_arg) will be maintained and updated by the ISSC Secretary in Milano. This will include assistance with setting up and upgrading the software, for a nominal payment.

10. REVIEW CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (2001-2005)

Significant results of the International Subcommittee on Stratigraphic Classification activities are listed below.

Creation and world-wide distribution of ISSC Circulars (average of 2 per year)

Co-organization and co-sponsorship of *Hedberg Conference* (Dallas, Texas, August 26-30, 2001) in "Sequence Stratigraphic and Allostratigraphic Principles and Concepts". The objective of the conference was "To provide input into the deliberations of the ISSC and of the North American Commission on Stratigraphic Nomenclature on allostratigraphic and sequence stratigraphic units for possible amendment to the International Stratigraphic Guide and the North American Stratigraphic Code and to debate the merits of utilizing an integrated allostratigraphic and sequence stratigraphic approach to describe and interpret the stratigraphic record". The flavor of the conference can be summarized using the M. B. Cita words (see her report published in Appendix A, ISSC Circular no. 100): "The Hedberg Conference succeeded to create a good, open discussion on principles and applications, with sedimentologists, micropleontologists, basin analysts, geophysicists, geochemists, field geologists of at least three generations interacting actively. The lesson I learnt is that those who create the rules of stratigraphic terminology must keep some flexibility and incorporate new

developments and methodologies, but should avoid to formalize interpretive definitions. Formalization ensures stability in nomenclature, which is important, but formalization of non observational entities has to be discouraged.”

Participation to the *Urbino Meeting* (June 13-16, 2002) by the ISSC vice-chairman M. B. Cita and presentation of a tentative work-plan or list of problems to be focused: “ISSC purpose is and has been to reach a consensus on stratigraphic terminology and classification by creating, discussing, publishing and disseminating an internationally agreed upon Guide (that means standardization of the stratigraphic units. The Guides are not conceived as treatises on Stratigraphy, but as practical instruments to explain the concepts and their formal applications. Applications of the principles and procedures, as applied in different countries by different entities and within different cultural environments have to be monitored and discussed from time to time”.

Election of 12 new members. Selection/categorization “old” plus “new” members to fulfill (a) the requirements of IUGS approved new statute of ICS, (b) the peculiar requirements of ISSC where there is no voting activities (only for elections once every four years!).

Organization of the first ISSC workshop “POST-HEDBERG DEVELOPMENTS IN STRATIGRAPHIC CLASSIFICATION” during the 32nd IGC in Florence (Italy) sponsored by the International Commission on Stratigraphy (ICS) of IUGS. After an introduction on Background and Motivation of the meeting, we had: (1) a few invited keynote presentations on hot topics; (2) a report on the outcome(s) of DWO 04 on Unconformity bounded stratigraphic units; (3) a series of position papers and/or presentation of documents dealing with stratigraphic classification by national or multinational Stratigraphic Commissions, Geological Surveys and alike; (4) free contributions.

Organization of the ISSC Business meeting during the 32nd IGC in Florence (Italy).

Interaction with NACSN in the coordinated preparation of two workshops organised during the 32nd IGC in Florence.

Participation of vice-chair Ashton Embry to the 59th NACSN Annual Meeting in Denver (November 7, 2004), who gave a summary of ISSC activities. According to his report “everyone was very pleased with the renewed close cooperation between ISSC and NACSN”.

11. OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2006-2009)

ISSC substantially differs from all the other Subcommissions because it is not focused on a definite time-slice, to be identified and correlated world-wide by means of various fossil groups or other chronologically identifiable criteria, which require a certain number of specialists of the various fossil groups (from different bio provinces) and/or of other techniques.

ISSC is concerned with concepts and principles, and with their application in the various continents. Generalists of sedimentary geology with knowledge of conceptual problems as well as field experience are required but also stratigraphers working in Geological Surveys and in oil companies, not only in Academia. Language barriers, cultural barriers, different work styles are expected. No joint activity in the field is foreseen with direct personal contacts. The work is essentially theoretical, and meetings are very seldom organized.

The FINAL GOAL of ISSC for the next four years is to arrive at the 33th IGC to be held in Oslo with a new *International Guidebook* for stratigraphic classification printed. The book is conceived as a user’s friendly, simple, very well illustrated manual with schemes and color photographs full of real examples from various continents and from various parts of the stratigraphic column. The new guide will be multi-authored, with task groups directly involved in the preparation of the various chapters. The target is represented by undergraduate and graduate students, field geologists, professionals. Each chapter will start with an incipit summarizing the

historical development of that peculiar branch of stratigraphy. Basic concepts have to be clearly presented, followed by precise definitions. Then real examples (case – studies) will be briefly discussed, one for the Precambrian (if appropriate), one for the Paleozoic, one or two for the Mesozoic, one for the Cenozoic and one for the Quaternary.

The large and internationally widespread composition of ISSC, the presence of numerous chairmen of national or multinational commissions on Stratigraphy within the Subcommittee, the interactive attitude developed in the last several months guarantee a large degree of acceptance, since all the documents will be widely circulated, commented and revised in an open democratic way.

It is a demanding task but the dice is thrown.

APPENDIX [*Names and Addresses of Current Officers and Voting Members, 2004-2008*]

Subcommission officers

Chairman: Maria Bianca Cita, University of Milano, Dept. Earth Sciences, via Mangiagalli 34, 20133, Milano, Italy, Tel +39-02-503 15529, e-mail: maria.cita@unimi.it

Vice Chairman: Ashton Embry, Institute of Sedimentary and Petroleum Geology Geological Survey of Canada, 3303 33rd St. N.W., Calgary, Alberta T2L 2A7, Canada, Tel +1-403-292 7125, e-mail: AEmbry@NRCan.gc.ca

Secretary and Webmaster: Maria Rose Petrizzo, University of Milano, Dept. Earth Sciences, via Mangiagalli 34, 20133, Milano, Italy, Tel +39-02-503 15531, Fax: +39-02-503 15494 e-mail: mrose.petrizzo@unimi.it

List of Task Groups and their officers

Sequence Stratigraphy -- Leader: Ashton Embry, Canada, AEmbry@NRCan.gc.ca

Cyclostratigraphy -- Leader: Andreas Strasser, Switzerland, andreas.strasser@unifr.ch

List of Members

Anderson Timothy A., San Ramon, USA uandt@pacbell.net

Berggren William A., Woods Hole, USA wberggren@whoi.edu

Brakel Albert T., Canberra, AUSTRALIA abrakel@netspeed.com.au

Bultynck, P. Brussels, BELGIUM bultynck.pal@kbinirsnb.be

Carter R.M., Townsville, AUSTRALIA bob.carter@jcu.edu.au

Chang Ki-Hong, Daegu, REPUBLIC OF KOREA khchang@knu.ac.kr

Choi Duck K., Seoul, KOREA dkchoi@snu.ac.kr

Cita M. B., Milano, ITALY, maria.cita@unimi.it

Cooper Roger A., Lower Hutt, NEW ZEALAND R.Cooper@gns.cri.nz

Csaszar Geza, ELTE University, HUNGARY, csaszar@mafi.hu

Dermitzakis Michael D., Athens, GREECE mdermi@geol.uoa.gr

Edwards Lucy E., Reston, USA leedward@usgs.gov

Embry A., Calgary, CANADA AEmbry@NRCan.gc.ca

Etayo Serna Fernando, Santafé de Bogotá, COLOMBIA hduque@elsitio.net.co

Finney Stanley, Long Beach, CA, USA scfinney@csulb.edu

Gianolla Piero, Ferrara, ITALY piero.gianolla@unife.it

Gladenkov Yuri B., Moscow, RUSSIA gladenkov@ginras.ru

Gradstein Felix, Oslo NORWAY felix.gradstein@nhm.uio.no
Grigelis Algimantas, Vilnius, LITHUANIA grigelis@geologin.lt
Hasegawa Shiro, Kumamoto, JAPAN, shiro@sci.kumamoto-u.ac.jp
Heckel Philip H., Iowa City, Iowa, USA philip-heckel@uiowa.edu
Hilgen Frederik J., Utrecht, THE NETHERLANDS, fhilgen@geo.uu.nl
Hoedemaeker J., Leiden, THE NETHERLANDS Hoedemaeker@naturalis.nnm.nl
Holland Charles H., Dublin, IRELAND hepwholl@tcd.ie
Hongzhen Wang, Beijing, CHINA wangcugb@public.bta.net.cn
Ivanov Marin, Sofia, BULGARIA Amivanov@gea.uni-sofia.bg
Johnson M.R., Pretoria, REPUBLIC OF SOUTH AFRICA mjohnson@geosciences.org.za
Karogodin Yuri N., Novosibirsk, RUSSIA karogod@uiggm.nsc.ru
Kazuo Amano, Ibaraki, JAPAN kam@mito.ipc.ibaraki.ac.jp
Lane H. Richard, Arlington, VA, USA hlane@nsf.gov
Lasca Norman P., Milwaukee, WI, USA nplasca@csd.uwm.edu
Luterbacher H.P., Barcelona, SPAIN, HPLUTER@telefonica.net
Menning Manfred, Potsdam, GERMANY menne@gfz-potsdam.de
Morton Nicol, London, GREAT BRITAIN nicol.morton@ucl.ac.uk
Odin G.S., Paris, FRANCE gilodin@ccr.jussieu.fr
Ogg James G., West Lafayette, Indiana, USA jogg@purdue.edu
Orchard Mike J., Vancouver, British Columbia, CANADA morchard@nrcc.gc.ca
Owen Donald E., Beaumont, USA owende@hal.lamar.edu
Petrizzo Maria Rose, Milano, ITALY, mrose.petrizzo@unimi.it
Piller Werner E., Graz, AUSTRIA werner.piller@uni-graz.at
Rawson P., London, GREAT BRITAIN p.rawson@ucl.ac.uk
Reguant Salvador, Barcelona, SPAIN reguant@geo.ub.es
Riccardi Alberto C., La Plata, ARGENTINA riccardi@museo.fcny.unlp.edu.ar
Riley Nick, Keyworth, U. K. njr@bgs.ac.uk
Robb Laurence, Witwatersrand, SOUTH AFRICA 065LJR@cosmos.wits.ac.za
Rong Jiayu, Nanjing, CHINA jyrong@nigpas.ac.cn
Salvador Amos, Austin, TX, USA amos.salvador@mail.utexas.edu
Sapunov Ivo G., Sofia, BULGARIA sapunov@geology.bas.bg
Schwarzacher W., Belfast, UK w.schwarzacher@Queens-Belfast.AC.UK
Shouxin Zhang, Beijing, PEOPLE'S REPUBLIC OF CHINA shouxinzh@yahoo.com.cn
Steininger Fritz F., Frankfurt am Main, GERMANY fsteinin@senckenberg.de
Strasser Andreas, Fribourg, SWITZERLAND andreas.strasser@unifr.ch
Takayanagi Yokichi, Sendai, JAPAN ytaka@cat-v.ne.jp
Tchoumatchenco P.V., Sofia, BULGARIA platon@lark.vmei.acad.bg
Thierry Jacques, Dijon, FRANCE jthierry@mail.u-bourgogne.fr
Wardlaw Bruce R., Reston, VA, USA bwardlaw@usgs.gov
Waterhouse J.B., Oamaru, NEW ZEALAND Loris@xtra.co.nz
Winter Henk de la R., Johannesburg, SOUTH AFRICA winterh@xconnect.co.za
Zachariasse W.J., Utrecht, THE NETHERLANDS, jwzach@geo.uu.nl
Zalasiewicz Jan, Leicester, U. K. jaz1@leicester.ac.uk
Zhamoida A.I., St. Petersburg, RUSSIA MSK@NK11891.spb.edu