



INTERNATIONAL UNION OF GEOLOGICAL SCIENCES  
INTERNATIONAL COMMISSION ON STRATIGRAPHY



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## 1. TITLE OF CONSTITUENT BODY

### International Commission on Stratigraphy (ICS)

*Summary and compilation of subcommission reports submitted jointly by:*

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## 2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

### Objectives

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 worldwide.
- 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 15 Subcommissions that deal with the major chronostratigraphic units and aspects of stratigraphic classification and time scales.

### **Subcommissions:**

Quaternary	Triassic	Ordovician
Neogene	Permian	Cambrian
Paleogene	Carboniferous	Neoproterozoic
Cretaceous	Devonian	Precambrian
Jurassic	Silurian	Stratigraphic Classification

The *Executive Task Group*: Stratigraphic Information Services had been approved for Subcommittee status in 1997, but the officers were inactive and little was produced. More recently, previous ICS Secretary-General Jim Ogg was appointed to lead the task group.

The reports of each Subcommittee and the task group are appended to this ICS summary compilation.

The subcommittees of ICS together have about 350 titular members. When the corresponding members of Subcommittees are added, several thousand stratigraphers worldwide participate in the activities of ICS. In addition, many countries have national stratigraphic committees, with which ICS establishes or maintains contacts. The members of the Full Commission (i.e. the 3 members of the Executive and the chairs of the 15 Subcommittees and task group) and the other subcommittee officers (vice-chairs and secretaries) come from 18 countries: Australia, Belgium, Canada, China, Denmark, Estonia, France, Germany, Great Britain, Hungary, Italy, Morocco, Netherlands, Poland, Spain, Sweden, Switzerland and the United States. The voting memberships of the aggregate subcommittees include at least 30 more nations.

### Websites:

ICS main site	<a href="http://www.stratigraphy.org">www.stratigraphy.org</a>
Quaternary	<a href="http://www.quaternary.stratigraphy.org.uk">www.quaternary.stratigraphy.org.uk</a>
Neogene	<a href="http://www.geo.uu.nl/SNS">www.geo.uu.nl/SNS</a>
Paleogene	<a href="http://wzar.unizar.es/isps/index.htm">wzar.unizar.es/isps/index.htm</a>
Lutetian GSSP task group	<a href="http://wzar.unizar.es/perso/emolina/ypresian.html">wzar.unizar.es/perso/emolina/ypresian.html</a>
Jurassic	<a href="http://jurassic.earth.ox.ac.uk/">http://jurassic.earth.ox.ac.uk/</a>
Triassic	<a href="http://paleo.cortland.edu/sts/">paleo.cortland.edu/sts/</a>
<i>Albertiana</i> newsletter:	<a href="http://www.bio.uu.nl/%7Epalaeo/Albertiana/Albertiana01.htm">www.bio.uu.nl/%7Epalaeo/Albertiana/Albertiana01.htm</a>
Permian (newsletter)	<a href="http://www.nigpas.ac.cn/permian/web/index.asp">www.nigpas.ac.cn/permian/web/index.asp</a>
Devonian	<a href="http://www.unica.it/sds/">www.unica.it/sds/</a>
Silurian	<a href="http://www.silurian.cn/home.asp">www.silurian.cn/home.asp</a>
Ordovician	<a href="http://www.ordovician.cn">www.ordovician.cn</a>
Cambrian	<a href="http://www.uni-wuerzburg.de/palaeontologie/ISCS/index.html">www.uni-wuerzburg.de/palaeontologie/ISCS/index.html</a>
Neoproterozoic	<a href="http://www.stratigraphy.org/bak/ediacaran/">www.stratigraphy.org/bak/ediacaran/</a>
Precambrian	<a href="http://www.stratigraphy.org/bak/precambrian/">www.stratigraphy.org/bak/precambrian/</a>
Stratigraphic Classification	<a href="http://users.unimi.it/issc">http://users.unimi.it/issc</a>
Stratigraphic Information Systems	<a href="http://stratigraphy.science.purdue.edu/">http://stratigraphy.science.purdue.edu/</a>
CHRONOS database	<a href="http://www.chronos.org">www.chronos.org</a>
(concept posted at:)	<a href="http://www.eas.purdue.edu/chronos">www.eas.purdue.edu/chronos</a>
<i>PaleoStrat</i> database network	<a href="http://www.paleostrat.org">www.paleostrat.org</a>

### ICS Executive Officers for 2008-2012:

Chair: **Stanley Finney** (California, USA)  
 Vice-Chair: **Shanchi Peng** (Nanjing, China)  
 Secretary: **Paul Bown** (London, UK)

### ICS Subcommittee officers:

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

#### 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 as distributing charts of the Geologic Time Scale and placing this information onto public websites, have received some support from petroleum companies 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 maintains a strong link with the International Quaternary Association (*INQUA*) Commission on Stratigraphy regarding the stratigraphy of the Quaternary, and to Commission for the Geological Map of the World (*CGMW*) in Paris regarding standardization of chronostratigraphy and its color scheme on charts. ICS subcommissions are traditionally affiliated with a considerable number of **IUGS** and **IGCP** activities. For example, ICS members lead or participate in numerous, active IGCP projects: 478, 493, 497, 499, 503, 506, 507, 508, 512, and 572. ICS members maintains active links with international research groups, including The Micropalaeontology Society (**TMS**), the North American Micropaleontology Society (**NAMS**), International Nannoplankton Association (**INA**) and the Association of American Stratigraphic Palynologists (**AASP**), and international paleontological research groups on Graptolites, Conodonts, Ammonites, Radiolarians (**Interrad**), Nannofossils, Foraminifers, etc., and many ICS members serve on national stratigraphic commissions and as editors of journals. There are close links between many ICS stratigraphers and the International Ocean Drilling Project (**IODP**). 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. The designation of GSSPs necessitates close interaction with local and international groups concerned with conservation, such as **UNESCO** (Geoparks Program), **IUGS** (Geosites Program) and **ProGEO** (Geosites and Geoparks initiatives).

#### 6. CHRONOSTRATIGRAPHIC STAGE AND SERIES NAMES AND DEFINITIONS ESTABLISHED IN ICS SINCE 2000

Quaternary	Base Holocene Series Base Quaternary/Pleistocene defined at the Base of the Gelasian Stage, c. 2.558 Ma
Neogene:	Base Zanclean Stage (Base Pliocene Series) Base Messinian Stage Base Tortonian Stage Base Serravallian Stage

- Paleogene: Base Ypresian Stage (Base Eocene Series)  
Base Thanetian Stage  
Base Selandian Stage
- Cretaceous: Base Maastrichtian Stage  
Base Turonian Stage  
Base Cenomanian Stage
- Jurassic: Base Bathonian Stage  
Base Aalenian Stage  
Base Pliensbachian Stage  
Base Sinemurian Stage
- Triassic: Base Carnian Stage  
Base Ladinian Stage  
Base Induan Stage (Base Triassic System)
- Permian: Name and Base Changhsingian Stage  
Name and Base Wuchiapingian Stage and Lopingian Series  
Base Capitanian Stage  
Base Wordian Stage  
Base Roadian Stage and Guadalupian Series
- Carboniferous: Mississippian and Pennsylvanian subsystem Names  
and Lower, Middle and Upper series subdivision of each  
and stage nomenclature for each  
Base Viséan Stage
- Silurian: Base redefinition for Ruedinian Stage (Base Silurian)
- Ordovician: Name and Base Hirnantian Stage  
Name and Base Katian Stage  
Name and Base Sandbian Stage  
Name and Base Dapingian Stage  
Name and Base Floian Stage  
Base Tremadocian Stage
- Cambrian: Name and Base Furongian Series  
Name and Base Paibian Stage  
Name and Base Guzhangian Stage  
Name and Base Drumian Stage  
Name Terreneuvian Series  
Name Fortunian Stage
- Neoproterozoic: Name and Base Ediacaran System

## 7. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2009

### **Full Commission**

- During 2009, the attention of ICS was focused on consideration of proposals regarding formal definition of the Quaternary and possible redefinition of the Pleistocene. Following an open discussion meeting at the 33<sup>rd</sup> IGC, submission of proposals, and extensive internet-based discussions, formal balloting resulted in the matters being settled with the base of the Quaternary System formally defined at the base of the Gelasian Stage and with the base of the Pleistocene extended downward and redefined also at the base of the Gelasian. These recommendations, forwarded to the IUGS EC, were subsequently ratified.
- Approval by ICS of the GSSP proposal for the base Hettangian Stage (Triassic-Jurassic boundary).
- The ICS website was significantly re-designed and accommodated extended discussions on the Quaternary and Pleistocene issues and the base-Jurassic GSSP proposal before voting by the ICS bureau.
- New ICS executive officers as well as seven new subcommission chairs completed their first year in office.
- The ICS executive initiated actions to communicate with all national stratigraphic commissions with the ICS chair meeting with the officers of the Russian and French stratigraphic committees and being appointed as the representative of the Geological Society of America to the North American Committee on Stratigraphic Nomenclature.
- The ICS chair met with the executive offices of the Commission on the Geological Map of the World to ensure continued collaboration between the two scientific groups and will make a presentation at the 2010 General Assembly of the CCGM-CGMW.

### **Quaternary Subcommission**

- Approval by ICS and ratification by IUGS of the proposal for redefinition of the base-Pleistocene and formal definition of the base Quaternary at the level corresponding to the base of the Gelasian Stage.
- Continued deliberation of candidate GSSPs for Lower-Middle Pleistocene boundary resulted in elimination of one of three.
- Subcommission voted to approve redefinition of the bases of the Quaternary System and Pleistocene Series to base of Gelasian Stage and to reject proposal to extend Neogene to present.
- Publication in the *Journal of Quaternary Science* of GSSP proposal for base Holocene, which was approved by ICS and ratified by IUGS.
- Establishment of the Anthropocene Working Group.
- Expansion of scope of subcommission website.

### **Neogene Subcommission**

- Publication of ratified base-Serravallian GSSP in *Episodes*.
- Detailed descriptions and astronomical tuning of two candidates for base-Langhian GSSP were published.

### **Paleogene Subcommission**

- GSSPs for Selandian and Thanetian stages ratified by IUGS.

- Formal proposal for base-Lutitian GSSP was completed and submitted to subcommission for approval.
- Proposal prepared (and in press) for base-Priabonian GSSP.
- Significant progress on a major revision of Oligocene planktonic foraminifera.

### **Cretaceous Subcommission**

- The *8th International Symposium on Cretaceous System* was held in Plymouth (6-12 September 2009) with two sessions dedicated to the “Cretaceous Stratigraphy and Stage Boundaries” and with a third session that concerned specifically “The Jurassic/Cretaceous Boundary”.
- Considerable progress was made on evaluation of candidates for the base-Valanginian, base-Barremian, and base-Coniacian GSSPs.
- A wealth of revised biostratigraphic data, as well as carbon isotope curves and cyclostratigraphy, has been compiled for the base-Aptian GSSP.
- The working group on the Jurassic-Cretaceous Boundary (base-Berriasian Stage) met at the University of Milan (Italy), 4-6 March, and made considerable progress by deciding to abandon ammonite biostratigraphy for defining the boundary and to use instead a paleomagnetic reversal within a stratigraphic interval that can also be characterized by biostratigraphy and carbon-isotope stratigraphy.
- The working group on the Santonian Stage voted on the Olazagutia (Spain) GSSP proposal, but it did not attain the minimum majority for approval.

### **Jurassic Subcommission**

- Approval by the subcommission and ICS of the base-Jurassic (Lower Jurassic, Hettangian) GSSP.
- Preparation of formal proposal for base-Toarcian GSSP and re-organization of the Working Group.
- Level (biohorizon) and section approved by Working Group for base-Kimmeridgian GSSP.
- Website revised substantially.
- Publication of the Proceedings of the 7<sup>th</sup> International Congress on the Jurassic System in vol. 6 of *Volumina Jurassica*.

### **Triassic Subcommission**

- Re-evaluation of conodont biostratigraphy of proposed base-Olenekian GSSP completed.
- Completed study of ammonid biostratigraphy of section with proposed base-Anisian GSSP, which indicated deficiencies that require new sections to be considered.
- Taxonomic and biostratigraphic studies of conodonts and bivalves from two, candidate base-Norian GSSPs completed.
- Studies of conodont biostratigraphy and magnetostratigraphy completed on candidate for base-Rhaetian GSSP and the proposed boundary level was shown to be correlative with high resolution in sections of marine strata nearly worldwide.
- “The Triassic Timescale” S.G. Lucas (ed.), Geological Society of London Special Publications, submitted for publication in 2010.

### **Permian Subcommission**

- Studies of conodont biostratigraphy and carbon-isotope stratigraphy were completed on sections in Russia that are candidates for the base-Sakmarian and base-Artinskian GSSPs, and formal proposals are being prepared for both.
- Study of the Russian GSSP candidate for the base-Kungurian has shown it to be seriously deficient, and two sections in North America are now under consideration.

### **Carboniferous Subcommittee**

- Following realization of correlation difficulties of the present Devonian-Carboniferous boundary, restudy of conodont lineages used to define and correlate the D-C boundary is underway.
- Several field evaluations of sections and laboratory studies of conodont lineages and of ammonoid and foraminiferal biostratigraphy for defining GSSPs of the Viséan-Serpukhovian, Bashkirian-Moscovian, and Moscovian-Kasimovian stage boundaries are nearing completion.
- The event marker (the FAD of a conodont species) has been selected for defining the Kasimovian-Gzhelian boundary and candidate stratotype sections are being evaluated.
- Website established.

### **Devonian Subcommittee**

- The new Devonian-Carboniferous Boundary Working Group has begun discussion on re-defining the GSSP.
- Significant progress on biostratigraphic studies necessary for revision of the basal Emsian GSSP in Uzbekistan.
- Decisions made on biohorizons for defining substages of Pragian, Givetian, Frasnian, and Famennian stages

### **Silurian Subcommittee**

- Workshop held in Sardinia to establish new subcommittee initiative on study of environment, climate, and sea-level changes during Silurian Period.
- Preliminary study completed for proposal for new GSSP for base of the Wenlock Series.
- Collaborated with the British Geological Survey on refinement of, and evaluation of, GSSPs for almost all stages of Silurian, which are located in Wales and the Welsh borderland, including the Aeronian, Telychian, Wenlock (Sheinwoodian), Homerian, Ludlow (Gorstian), and Ludfordian.

### **Ordovician Subcommittee**

- Subcommittee members made major contributions to the final meeting of IGCP 503 'Early Palaeozoic Palaeogeography' held in Copenhagen.
- A color chart - *The Ordovician Time Table* - has been prepared and is ready for publication.

### **Cambrian Subcommittee**

- A Field Conference for evaluating candidate GSSPs was held in South Kazakhstan with considerable discussion on Siberian sections for base of lower half of Cambrian.
- Appointment of working groups to investigate potential GSSP horizons for base of Cambrian stages 2, 3, and 4.
- A vote was initiated on a GSSP proposal for the base of Stage 9.
- Proposals being prepared for GSSP for base of Cambrian Stage 5 (and Series 3).

### **Neoproterozoic (Ediacaran and Cryogenian) Subcommission**

- Decision made on criteria to define base of Cryogenian System at first level of oldest glacial deposits in a Neoproterozoic succession.
- Discussions on-going for subdivision of Ediacaran.

### **Precambrian Subcommission**

- Investigated sections in South Africa and Australia for defining Archean-Proterozoic boundary.
- Website updated.

### **Stratigraphic Classification Subcommission**

- “Magnetostratigraphy – concepts, definitions, and applications” completed and submitted for publication to *Newsletters on Stratigraphy*, the third in a series of publications that elaborate on the major subdisciplines of stratigraphy.
- First draft of “Chronostratigraphy” nearing completion.
- Considered and rejected by overwhelming vote the recommendation on “Convention on the use of SI units in Earth Sciences” from the IUPAC-IUGS Task Group on Isotope Data. Subcommission members favored retaining separate units of geological time for measured dates and spans of time. Subcommission decision forwarded to ICS for approval.

### **Stratigraphic Information Task Group**

- Continued development of, and updating of information on, RSS-feed for One-Geology and Time-Scale Creator.
- Updated International Chronostratigraphic Chart and GSSP table with information on GSSPs approved in 2009.

## **8. CHIEF PROBLEMS ENCOUNTERED IN 2009**

### **Full Commission**

- Funding for ICS decreased significantly over the last four years. As a result, almost no travel money is available for members of boundary task groups, which greatly impedes progress on GSSPs.
- Stratigraphy is given low priority for funding by national granting agencies, thus making it difficult, if not impossible, to obtain support for research necessary to propose GSSPs.
- New names proposed for subdivisions of some systems (e.g. Cambrian and Ordovician) have caused concern among some in the geoscience community who do not understand the underlying reasoning and what they consider to be a lack of consultation.
- Stratigraphic terminology, particularly the inconsistent and mixed usage of chronostratigraphic versus geochronologic terms, results in confusion even those these terms were precisely defined in 1881 at the 2<sup>nd</sup> International Geological Congress. This issue was further confused by the proposal from the Stratigraphic Commission of the Geological Society of London to use a single, rather than a dual, classification.

- Some GSSP proposals forwarded to ICS for approval were seriously deficient and required considerable revision.

### **Quaternary Subcommission**

- None mentioned.

### **Neogene Subcommission**

- Lack of suitable sections in the Mediterranean for defining the Burdigalian Stage GSSP in an astronomically-tuned, deep-marine section.

### **Paleogene Subcommission**

- Subcommission budgets are inadequate to support travel necessary for boundary working groups to make significant progress, nor to support regional committees in under-developed regions (e.g. Africa, Indian subcontinent, SE Asia).

### **Cretaceous Subcommission**

- Reinvestigation of candidate stratotype sections for several stages to document magnetostratigraphy, stable isotope stratigraphy, etc. and to integrate multiple stratigraphies has demonstrated that candidate sections for some boundaries are unsuitable as GSSPs. This means that new sections must be considered.

### **Jurassic Subcommission**

- There simply isn't enough self-motivation in most of the task groups to finish their business in a reasonable time, if not for the encouragement and active involvement of the subcommission executive. However, the officers themselves are over-committed.

### **Triassic Subcommission**

- IGCP 467 has supported GSSP activities of many subcommission members. Since the end of this project, many boundary task group members have been without support to continue their activities, thus delaying progress on GSSPs.

### **Permian Subcommission**

- No major problems encountered in 2009, but the decision to reject one of the potential GSSP sites will delay the completion of GSSP activity.

### **Carboniferous Subcommission**

- Multiple task group duties for some members hinder their ability to focus their time and efforts, making progress difficult.
- Selection of biohorizons and candidate stratotype sections for GSSPs is hindered by endemism in key conodont and foraminiferal lineages.
- The project for upper Paleozoic boreal biota, stratigraphy and biogeography, work that is very important for establishing global Carboniferous correlations, has collapsed, requiring new leadership and a revised mandate.

### **Devonian Subcommission**

- Large number of meetings and preparation of papers for thematic volumes left little time to consider formal substage proposals.
- Lack of formal members from a range of countries with extensive and important Devonian outcrop, such as Algeria, Libya, Brazil, Bolivia, Argentina, Turkey, and Caucasian countries.

#### **Silurian Subcommission**

- Low priority given to stratigraphic studies by national, grant-awarding agencies make it difficult, if not impossible, to obtain grants to support research on GSSPs.

#### **Ordovician Subcommission**

- Lack of financial support to print and distribute *The Ordovician Time Table*, a color chart.

#### **Cambrian Subcommission**

- Difficulty of subcommission members obtaining financial support for basic research on key stratigraphic intervals (potential GSSP horizons and sections).
- Limited funds for travel by working groups to inspect and evaluate candidate GSSPs.

#### **Neoproterozoic (Ediacaran and Cryogenian) Subcommission**

- Continuing inadequacy of geochronological control in key sections.
- Continuing difficulties communicating with Russian voting members.
- Inconsistent correlation of the ‘Wonoka/Shuram’ negative isotope excursion(s), ‘Gaskiers’ glaciation and microfossil events for the Ediacaran Period.
- Poor state of field-based research and research funding on the Cryogenian and Ediacaran of Australia, which hosts not only the basal Ediacaran GSSP but also potential contenders for the basal Cryogenian GSSP.
- Difficulty in finding excursion leaders and the necessary finances to prepare for a subcommission visit to Australia.

#### **Precambrian Subcommission**

- Other commitments of subcommission chair slowed progress on organizing new boundary working groups.

#### **Stratigraphic Classification Subcommission**

- The ICS budget allocation was very small, particularly given the overall importance and significance of the subcommission.
- Little progress was made on chapters on Lithostratigraphy and biostratigraphy due to over-commitments of the authors, including the ICS Chair.

#### **Stratigraphic Information Task Group**

- The task group consists of a very small core group of dedicated researchers and students who produced almost all of the products. It is essential that more researchers and students become involved and contribute to the products.

### **9. SUMMARY OF EXPENDITURES IN 2009:**

The ICS Executive established the following budget for April 2009 – March 2010 after

consideration for relative needs, planned activities, and funding requests of the subcommissions; and re-allocated funds based on the final amount received from IUGS. Funds were maintained by Stan Finney (ICS chair) using a special account in the USA from which subcommission allocations were distributed with each subcommission then maintaining its own account and budgeting for its allocated funds (as listed below). Itemized financial reports of individual subcommissions are contained within their attached annual reports. All amounts are in \$US.

### ICS Budget April 2009-April 2010

	Recommended to IUGS Jan'09	Final ICS Allocation	comments, info.
Quaternary	850.00	1000	mtg attendance
Neogene	4,000.00	2000	2 field excursions
Paleogene	4,500.00	2500	workshops and mtgs
Cretaceous	5,000.00	2500	Milan mtg + Plymouth mtg
Jurassic	4,000.00	2500	Tithonian mtg
Triassic	4,000.00	2500	group mtgs
Permian	2,800.00	2000	conodont mtg
Carboniferous	800.00	800	group mtgs
Devonian	2,000.00	1600	mtg + excursion
Silurian	4,000.00	2000	Sardinia mtg + excursion
Ordovician	2,500.00	2000	Copenhagen mtg., correlation charts
Cambrian	5,000.00	3000	Kazakhstan mtg
Neoproterozoic	5,000.00	3500	Svalbard, Australia, Russia travel
Precambrian	1,000.00	1000	Australia field excursion
Classification	4,500.00	1500	group mtgs

Strat. Info. System	4,700.00	2000	software, IT support
<b>Subcommissions Total</b>	<b>54,650</b>	<b>32,400</b>	
Special travel needs		3,000	
ICS Executive	7,000	4,600	
<b>TOTAL (in USD)</b>	<b>61,650</b>	<b>40,000</b>	

***Special Budget Categories:***

Some aspects of the subcommission requests were aggregated into “*Special travel needs*”, which were held by ICS executive and redistributed to subcommissions for special requests that facilitated progress on GSSPs.

## **10. WORK PLAN, CRITICAL MILESTONES, and ANTICIPATED RESULTS TO BE ACHIEVED FOR March 2010-February 2011:**

### **ICS Executive Committee**

- The primary attention of the ICS Chair will be to promote progress on GSSPs by the subcommissions. The ICS budget will be used to encourage and support those boundary working groups that demonstrate the potential to make significant progress. The ICS Chair and Secretary-General will collaborate extensively with chairs of the Cambrian, Carboniferous, Jurassic, and Cretaceous subcommissions to stimulate more progress than has hitherto been made.
- ICS executive officers will re-evaluate their individual roles and responsibility in providing leadership and representing ICS, with regard to overseeing the work of the subcommissions, in collaborating with external, national and international geoscience organizations, and in developing educational materials.
- Prague 2010 – ICS Workshop, 30 May to 3 June: Planning for this workshop is far advanced. This workshop is critical for addressing a variety of ICS issues, such as, assessing the success of the GSSP process, revising long-established stratigraphic nomenclature, developing leadership skills of subcommission chairs, and promoting the active participation of all members of ICS subcommissions. The Second Circular with the workshop agenda follows as Appendix I.
- Maintain and further develop communication between ICS and important parts of the geoscience community it serves; complete and maintain a current contact list for all national stratigraphic commissions so that all can be informed of deliberations related to selection of GSSPs and definition and redefinition of international chronostratigraphic units.
- Initiate planning of ICS-sponsored symposia, activities and subcommission meetings for the 34<sup>th</sup> International Geological Congress in 2012.
- Although the ICS website was significantly revised in 2009, there remains considerable room for improvements, which will be made in 2010.

### **Quaternary Subcommittee**

- The GSSP proposal for Middle-Upper Pleistocene Subseries boundary will be revised and resubmitted to ICS for re-approval and, if successful, to IUGS for ratification.
- The Pleistocene-Holocene boundary working group will refocus its activities on subdivision of the Holocene.
- A new working group will be established to consider the definition and status of the term Anthropocene.

### **Neogene Subcommittee**

- Complete study of candidate GSSPs for base Langhian.
- Explore option of defining base-Burdigalian GSSP in an ODP core.

### **Paleogene Subcommittee**

- Following subcommittee approval, forward base-Lutitian GSSP proposal to ICS for approval.
- Discuss and deliberate base-Priabonian GSSP proposal and possibly approve it.

### **Cretaceous Subcommittee**

- To vote on the base-Santonian GSSP proposal.
- To vote on the base-Albian GSSP proposal.
- Finalize the proposal for the base of Berriasian (Jurassic/Cretaceous boundary).
- Finalize proposals for the base of Valanginian, Hauterivian, Barremian, Aptian, Coniacian, and Campanian.

### **Jurassic Subcommittee**

- Complete formal GSSP proposals and vote in working groups on base-Toarcian, Callovian, and Kimmeridgian GSSPs.
- Organize working group on base-Oxfordian GSSP.

### **Triassic Subcommittee**

- Two field meetings to evaluate the two candidate GSSPs for base Norian and, thereafter, preparation of formal GSSP proposal.
- Vote on base-Olenekian GSSP.
- Submission of formal proposal for base Rhaetian GSSP.
- Publication in 2010 of Special Issue of *Palaeogeography, Palaeoclimatology, Palaeoecology* of proceedings of “The Triassic Climate” workshop, Bolzano/Bozen, 2008.

### **Permian Subcommittee**

- Subcommittee votes on base-Sakmarian and base-Artinskian GSSPs.
- Completion of new GSSP proposal for base-Kungurian.

### **Carboniferous Subcommittee**

- Resolve conodont lineages that may best allow for re-definition of D-C boundary.
- Continue study of conodont lineages and candidate sections for defining GSSPs for Viséan-Serpukhovian, Bashkirian-Moscovian, and Moscovian-Kasimovian stage boundaries.

### **Devonian Subcommittee**

- Compilation of results from the various specialists groups that re-sampled the interval for a revised basal Emsian GSSP in the Zinzilban Gorge.
- Finalize and submit proposals for the formal definition of Givetian and Frasnian substages to ICS for ratification.
- Formal vote on uppermost Famennian substage.
- Publication of volume on Middle Devonian stratigraphy and multi-disciplinary correlation in *Palaeogeography, Palaeoclimatology, Palaeoecology*.

### **Silurian Subcommittee**

- Continued collaboration in the process of full integration of the various regional and global biostratigraphic, lithostratigraphic, sequence stratigraphic, and chemostratigraphic scales. This integration is essential for refinement of the Silurian time scale and high-resolution correlation of Silurian events.
- Generation of new, high-resolution radiometric dates that are well constrained within the Silurian time scale.
- Continued progress on refining GSSPs and determination of those that may need replacement.
- Update website.

### **Ordovician Subcommittee**

- Print the new Ordovician Time Table.
- Production of revised regional correlation charts.
- Assess new stages.
- Evaluate chronozones for definition and status of high-resolution time slices.
- Encourage acquisition of more robust absolute dates.
- Re-design website.

### **Cambrian Subcommittee**

- Vote on GSSP proposal for base of Stage 5 (and Series 3)
- Workshop in Cambridge focused on stages for lower part of Cambrian

### **Neoproterozoic (Ediacaran and Cryogenian) Subcommittee**

- Evaluation of proposals for base-Cryogenian GSSP.
- Vote on criteria for subdivision of the Ediacaran System.
- Solicitation of GSSP proposals for subdivision of Ediacaran.

### **Precambrian Subcommittee**

- Establishment of working group to formalize the Hadean.
- Consideration of potential GSSPs for the Archean-Proterozoic boundary.

### **Stratigraphic Classification Subcommittee**

- Paper on Magnetostratigraphy will be published in *Newsletters in Stratigraphy* in 2010.
- First drafts of papers on Biostratigraphy, Chronostratigraphy, and Lithostratigraphy will be completed and distributed for review.

### **Stratigraphic Information Task Group**

- Print revised Time Scale cards.
- Coordinate preparation of comprehensive *Geologic Time Scale 2012*.
- Produce a comprehensive summary of all GSSPs.
- Redesign the stratigraphic-information part of the ICS website.
- Add more datapacks to *TimeScale Creator* for public usage.

## **11. BUDGET REQUEST TO IUGS FOR 2010 (\$ US)**

The following budget request is for operations and special initiatives through March 2011 (funds are generally transferred from IUGS to ICS in April; which implies ICS subcommissions must operate on an April-to-March fiscal year).

### **ICS Budget 2010**

	<b>Allocated budget 2009 (USD)</b>	<b>Budget requests 2010 (USD)</b>	<b>comments, info.</b>
Quaternary	1000	500	website, mtg and groups
Neogene	2000	4000	workshop, fieldtrip
Paleogene	2500	5000	website, travel, groups
Cretaceous	2500	2500	J/K boundary mtg
Jurassic	2500	1000	Jurassic mtg, China
Triassic	2500	3500	excursion, workshop
Permian	2000	500	travel
Carboniferous	800	1000	workshops, Russia, Europe
Devonian	1600	1000	workshop, London
Silurian	2000	500	travel
Ordovician	2000	1500	workshop, London + publications
Cambrian	3000	5000	travel, working groups
Neoproterozoic	3500	4000	workshops, India, Russia

Precambrian	1000	500	workshop, Australia
Classification	1500	500	website, newsletter
Strat. Info. System	2000	800	website, programming
<b>Subcommissions Total</b>	<b>32,400</b>	<b>31,800</b>	
ICS Workshop funds		20000	
Outreach and web funds		5000	
Special travel needs	3,000	5000	
ICS Executive	4,600	5000	
<b>TOTAL (in USD)</b>	<b>40,000</b>	<b>66,800</b>	

## 12. REVIEW CHIEF ACCOMPLISHMENTS SINCE 2000

A combined 4-year review was compiled as part of the ICS report for 2004, and the accomplishments for 2009 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*)

#### Quaternary

1. base of the **Holocene** Series in archived Greenland NorthGRIP (NGRIP) ice core (2008)
2. base of **Quaternary** Period formally defined at base of Gelasian Stage (2009)
3. base of **Pleistocene** Epoch redefined at base of Gelasian Stage with Gelasian transferred from Neogene (2009)

#### Neogene

4. base of the **Zanclean** Stage and of the **Pliocene** Series at Eraclea Minoa, Italy (2000)
5. base of the **Messinian** Stage at Oued Akrech ,Morocco (2000)
6. base of the **Tortonian** Stage at the Monte dei Corvi beach section near Ancona, Italy (2003)
7. base of the **Serravallian** Stage at Ras il Pellegrin section on Malta (2006)

#### Paleogene

8. base of the **Eocene** Series (and **Ypresian** Stage) in the Dababiya Section near Luxor, Egypt (2003).
9. base of the **Thanetian** Stage at Zumaia, Spain (2008)
10. base of the **Selandian** Stage at Zumaia, Spain (2008)

## Cretaceous

11. base of the *Maastrichtian* Stage at Tercis, France (2000)
12. base of the *Turonian* Stage at Pueblo, Colorado, USA (2003)
13. base of the *Cenomanian* Stage and of the **Upper Cretaceous** Series, at Risou, France (2002)

## Jurassic

14. base of the *Pliensbachian* Stage at Robin Hood Bay, England (2004)
15. base of the *Aalenian* Stage and of the **Middle Jurassic** Series at Fuentalsaz, Spain (2000)
16. base of the *Sinemurian* Stage at East Somerset, England (2001)
17. base of the *Bathonian* Stage at Ravin du Bès, Bas Auran, near Digne, France (2008)

## Triassic

18. base of the *Carnian* Stage at Prati di Stuoeres, Italy (2008)
19. base of the *Ladinian* Stage at Bagolino, Italy (2005).
20. base of the **Triassic** System at Meishan, China (2001)

## Permian

21. base of the *Changhsingian* Stage at Meishan, China (2005)
22. base of the *Wuchiapingian* Stage and of the **Lopingian** Series (Upper Permian) in China (2004)
23. base of the **Guadalupian** Series (Middle Permian) and component *Roadian*, *Wordian* and *Capitanian* Stages in Guadalupian Mountains, USA (2001)

## Carboniferous

24. agreement on Series-level divisions (2004)
25. ratification of Series names, and Stage names (2006)
26. base of **Visean** Stage in Guangxi, China (2008)

## Devonian

27. all Devonian stage boundaries are defined by a GSSP
28. 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 correlative value for worldwide correlation is demonstrated.

## Silurian

29. 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.
30. Revision to taxonomy and biostratigraphy of graptolites used to define base-**Rhuddanian** (**Ordovician-Silurian** boundary and **Llandovery** Series) in stratotype section, Dob's Linn, Scotland.

## **Ordovician**

31. base of the *Hirnantian* Stage in China (2005).
32. base of the *Katian* Stage in Oklahoma, USA (2006)
33. base of the *Sandian* Stage and the **Upper Ordovician** Series at Fågelsång in Sweden (2002).
34. base of *Dapingian* Stage and the **Middle Ordovician** Series in China (2006, named 2007)
35. base of the *Floian* Stage at Diabasbrottet in southern Sweden (2002).
36. base of the **Ordovician** System and the **Lower Ordovician** Series and of the *Tremadocian* Stage at Green Point, Newfoundland, Canada (2000).

## **Cambrian**

37. base of the *Paibian* Stage and the **Furongian Series** (uppermost series of Cambrian) in the Paibi section, NW Hunan province, south China (2003).
38. base of *Guzhangian* Stage (Series 3) in China (2007)
39. base of *Drumian* Stage (Series 3) in USA (2007)
40. vote to subdivide the Cambrian into **four series** and **10 stages**.
41. Vote to name lowest series and stage as **Terreneuvian** and **Fortunian**, respectively.

## **Proterozoic Era**

42. base of the **Ediacaran System** (uppermost system of Proterozoic) in the Flinders Range, Australia (2004).

## **B. Stratigraphic Classification**

Publication in *Newsletters on Stratigraphy* of papers on Cyclostratigraphy (2006), Chemostratigraphy (2008), and Magnetostratigraphy (in press, 2010).

## **C. 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. This chart is continually updated, and public graphics can be downloaded at [www.stratigraphy.org](http://www.stratigraphy.org).

## **D. The Concise Geologic Time Scale**

Published in 2008, this is a condensed and updated version of *Geologic Time Scale 2004* that compiles the then current status of all ratified divisions of geologic time, diagrammed the main biologic, magnetic and geochemical events within each period, and indicated the best-available interpolation of ages for all major events in the Phanerozoic.

### 13. OBJECTIVES AND WORK PLAN FOR NEXT 5 YEARS (2010-2015)

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 10 for a summary of objectives for 2010-2011.

#### **ICS Executive Committee**

1. Define GSSP sections for all stages of the Phanerozoic Era, and solidify subdivisions of the Precambrian. **All GSSPs are to be ratified by 2014** (IUGS mandate in 2000 was completion by 2008; but IUGS Ad Hoc review indicated in 2006 that a strict deadline should not be enforced.). A realistic schedule for ICS/IUGS voting/ratification of the remaining GSSPs in each period is detailed below. This schedule is based on the realization of a successful subcommission chair (S. Finney – Ordovician) of the limitations, problems, and other roadblocks that are inherent in the process.
2. Encourage subcommissions to regularly re-assess GSSPs and to develop new initiatives and projects that utilize the refined International Stratigraphic Chart.
3. Produce a new *International Guidebook* for stratigraphic classification that covers all subdisciplines of stratigraphy and printed in 2012. The book is conceived as a user 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.
4. Have a strong presence at the 34<sup>th</sup> IGC in 2012 with exciting symposia, varied field excursions, business meetings, and other activities sponsored by ICS and its subcommissions.
5. Develop a suite of web-accessible international databases on all aspects of chronostratigraphy (paleontology, isotopes, cycles, magnetics, etc.).
6. Maintain close collaboration with all national stratigraphic commissions.
7. Cooperate with One-Geology and the Commission on the Geologic Map of the World to ensure that these projects continually incorporate the latest revisions to the International Stratigraphic Chart.
8. Serve as the primary international body setting global standards and illustrating best practices in stratigraphy.
9. Produce web-based educational materials ranging from introductory to advanced topics in stratigraphy.

#### **Quaternary Subcommission**

1. GSSPs for bases of Pleistocene subdivisions.
2. Compiling regional sequences throughout the Quaternary.
3. Classify and formalize, where necessary, divisions based on very short-term events.
4. 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 Subcommission**

1. Selection of boundary criteria and sections for the definition of the 2 remaining Miocene stage boundaries, namely the base-**Langhian** and base-**Burdigalian**.
2. Apply high-resolution integrated stratigraphies to global aspects of the Earth system.

#### **Paleogene Subcommission**

1. Complete and publish the GSSPs of the Lutitian (2010), Bartonian (2011), Priabonian (2011), and Chattian (2012) stages.

2. Produce an updated and integrated Paleogene time scale.
3. Produce a state-of-the-art review of the stratigraphic tools used in the Paleogene.
4. Preparation of standardized regional correlation charts and paleogeographic maps by the Regional Committees.

### **Cretaceous Subcommittee**

1. 2010 to 2013 - Approval proposals for the bases of the Albian and Santonian stages in 2010, and of the Valanginian, Hauterivian, Barremian, Aptian, Coniacian, and Campanian stages by 2013.
2. 2010 - Finalize proposal for the base of Berriasian (Jurassic/Cretaceous boundary).
3. 2013 to 2015 – Define substages.

### **Jurassic Subcommittee**

1. 2010 - Ratification of base of Hettangian (Triassic/Jurassic boundary) by IUGS and GSSP dedication.
2. 2010-2014 - Finalize proposals for the bases of the Toarcian, Bathonian, Callovian, Oxfordian, Kimmeridgian, and Tithonian stages.
3. Stage Working Groups to standardise and propose GSSPs for Substages as appropriate, but named ONLY as Lower/Middle/Upper.
4. 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.
5. Developing and expanding the Thematic Working Groups, some of which have been very successful.

### **Triassic Subcommittee**

1. Completion of Triassic GSSPs: 2010 – Olenekian, Anisian, and Rhaetian; 2011 –Norian.
2. 2012 – Summary volume of all Triassic GSSPs. Emphasis switches to choice of non- marine auxiliary sections; and standardized substages.

### **Permian Subcommittee**

1. Completion of Permian GSSPs: Sakmarian proposal will be completed in 2010; Artinskian in 2010; and Kungurian by 2012.
2. Correlations into continental deposits and across provincial boundaries.
3. Detailed documentation of the geologic evolution of the Earth during the Permian with respect to the established chronostratigraphic framework.

### **Carboniferous Subcommittee**

1. Completion of GSSPs: Serpukhovian in 2012, Moscovian in 2012, Kasimovian in 2012, and Gzhelian in 2011.
2. Consider and finalize subdivision of Viséan into two new stages by 2014

### **Devonian Subcommittee**

1. Formalize the substage subdivision of stages.

### **Silurian Subcommittee**

1. Restudy of previous GSSPs that are difficult to use for global correlation (e.g., base of Wenlock).

2. *Integrated Silurian Stratigraphy* -- in which all studies on refinement of biozonal schemes, sequence and cyclo-stratigraphy, stable isotope curve are combined.

### **Ordovician Subcommittee**

1. Publication of an Ordovician time table.
2. Publication of the special volume of “*The global Ordovician Earth system*” in 2010.
3. Refocusing of Subcommittee to address the global Ordovician Earth system.

### **Cambrian Subcommittee**

1. 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.
2. All stages of the upper half of the Cambrian will be defined by GSSPs by 2012. Stages of the lower half of the Cambrian are expected to be defined by GSSPs by 2014.
3. A secondary objective of the Subcommittee is to develop and publish regional correlation charts for the Cambrian.

### **Neoproterozoic (Ediacaran-Cryogenian) Subcommittee**

1. 2012 – approval of formal definition of the base of the Cryogenian System and subdivision of the Ediacaran into two or more series.

### **Precambrian Subcommittee**

1. A complete Precambrian time scale in place, with formalized Hadean and Archean eons.
2. Formal GSSP for the base of the Proterozoic.
3. Natural subdivisions of the Archean Eon, with GSSPs for each era-rank subdivision, where possible (Eo-, Paleo-, Meso-, and Neoproterozoic).
4. Creation and formal definition of an Eoproterozoic Era.
5. 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**

1. Publication of a new *International Guidebook* for stratigraphic classification printed in 2012. The book is conceived as a user 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. It will consist of chapters on each major subdiscipline of stratigraphy, which were first published as separate papers in *Newsletters on Stratigraphy*.
2. Following Prague 2010-ICS Workshop, Subcommittee will prepare paper on “Suggestions to editors and authors on best practices in use of stratigraphic terminology”, which will include not only guidelines but also examples as a means of fostering consistent, correct usage.

### **Stratigraphic Information Services**

1. 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.



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## **SUBCOMMISSION OF SILURIAN STRATIGRAPHY**

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Vice-Chair: to be appointed CHECK

Secretary: Dr. Jacques Verniers

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## **SUBCOMMISSION ON ORDOVICIAN STRATIGRAPHY**

**Chair: David A.T. Harper**

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## **SUBCOMMISSION OF CAMBRIAN STRATIGRAPHY**

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

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**Secretary: Loren E. Babcock**

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## **SUBCOMMISSION ON NEOPROTEROZOIC (EDIACARAN- CRYOGENIAN) STRATIGRAPHY**

**Chairman: James Gehling**

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## **SUBCOMMISSION ON PRECAMBRIAN STRATIGRAPHY**

**Chair: Dr. Martin Van Kranendonk**

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**Vice-Chairman: Wouter Bleeker**

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**Secretary: Dr. Robert Rainbird**

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## **SUBCOMMISSION ON STRATIGRAPHIC CLASSIFICATION**

**Chair: Brian Pratt**

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## **EXECUTIVE TASK GROUP ON STRATIGRAPHIC INFORMATION**

**Co-ordinator: James Ogg**

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## Appendix I. 2<sup>nd</sup> Circular for Prague 2010 – ICS Workshop



INTERNATIONAL  
COMMISSION  
ON  
STRATIGRAPHY



# *Prague 2010 - ICS Workshop*

## **The GSSP Concept**

Prague, Czech Republic  
30 May – 3 June 2010

## 2<sup>nd</sup> Circular

### **Invitation**

The Organizing Committee warmly invites all members of the full commission of ICS (ICS executive officers and chairs of all subcommissions), all members of ICS subcommissions (both titular and corresponding) and other interested members of the stratigraphic community, including young scientists, to attend the ICS workshop in Prague. Both plenary, topical, and subcommissions workshops will be held in lecture rooms of the Geoscience Building of the Faculty of Science of Charles University in Prague. Field trip scheduled for the second day will bring participants to Lower Paleozoic GSSPs situated near Prague along with some Carboniferous, Cretaceous and Quaternary outcrops of stratigraphic importance.

### **Sponsors:**

International Commission on Stratigraphy; International Union of Geological Sciences; Institute of Geology and Palaeontology, Charles University; Institute of Geology, Academy of Sciences of the Czech Republic; National Museum, Prague; Stratigraphic Commission of the Czech Republic; Czech National Geological Committee

### **Organizing Committee:**

Stan Finney (Chair – ICS); Shanchi Peng (Vice-chair – ICS); Paul Bown (Secretary – ICS); Petr Kraft (Inst. of Geology and Palaeontology, Charles University, Prague); Petr Storch (Inst. of Geology, Academy of Sciences of the Czech Republic, Prague)

## **Objectives:**

The goals of the workshop are expressed in the list of agenda items. The primary focus is on the success of the GSSP process. Discussion will include examples of successes and their broader implications, but also problems that have arisen will be discussed with suggestions for best addressing them. Preparing GSSP proposals, leading ICS subcommissions, resolving differences in usage of stratigraphic nomenclature and classifications, revising ICS statutes, setting ICS standards are additional topics that will receive considerable attention. If possible, recommendations will be made on some of these issues and formal votes may be taken on them by the ICS full commission.

## **Format of Workshop:**

No abstracts will be submitted; no publications will be produced directly from the workshop. The format will be open discussions in both full meetings of all participants and smaller groups focusing on specific agenda items. Of course, we will recruit specific presentations that lead or open discussions, and we will consider requests of participants to make specific presentations, but these will be accepted and organized solely for promotion of the agenda. Focused group discussions on agenda items should result, in most instances, in recommendations to the ICS full commission on the closing day of the workshop and possibly formal votes on them. Of course, publications based upon these recommendations may be produced after the workshop.

## **Agenda Items:**

1. The GSSP Concept: its success, its shortcomings, problems that have arisen, difficult boundary issues remaining.
2. The exemplary GSSP proposal – essential components, definition and correlation; how best to present a GSSP proposal.
3. Leadership of ICS subcommissions: ensuring progress on GSSPs; addressing difficult boundaries; managing conflicts, rivalries, and difficult personalities. (restricted to subcommission chairs)
4. New subcommission initiatives.
5. Future of ICS and its role in IUGS.
6. Dual versus single stratigraphic classification of geologic time and time-rock units.
7. Dual usage of “Stage”.
8. Integration of varied stratigraphic records and calibrated ages with the International Chronostratigraphic Chart.
9. Revisions to ICS statutes.
10. Collaboration with national stratigraphic committees.
11. The ICS website and educational products and outreach.
12. Suggestions for additional items are welcome.

## **Program:**

30 May	Welcoming Reception (evening) at National Museum central hall
31 May	Opening ceremony, Review of ICS and Subcommission matters; Discussion groups address agenda items (afternoon)
1 June	Discussion groups address agenda items (morning); Discussion groups report to full meeting (afternoon);

ICS Commission considers recommendations of discussion groups; Walking tour of Old Town, Prague (evening)

- 2 June Field Excursion (base Devonian GSSP at Klonk, base Pridoli GSSP at Pozary, base Pragian GSSP at Velka Chuchle, Silurian succession in Kosov Quarry, Upper Carboniferous and Upper Cretaceous in Pecinov Quarry, Quaternary at Svaty Jan). Two alternative routes will be organized in case of larger number of participants.
- 3 June Full meeting for final discussion of workshop recommendations and votes, if appropriate; directives for further deliberations (morning);  
Workshop Dinner (evening)

### **Patrons:**

Each system-based subcommission chair can rely on Czech or Slovak advisor or patron – a person familiar with local stratigraphy and research on the respective “System”. Principal task of such patrons will be to arrange for special meetings and requirements of the subcommissions. Subcommission chairs are encouraged to get in touch with respective patrons in advance.

Precambrian and Neoproterozoic -	Doc. Václav Kachlík;	<a href="mailto:kachlik@natur.cuni.cz">kachlik@natur.cuni.cz</a>
Cambrian –	Doc. Olda Fatka;	<a href="mailto:fatka@natur.cuni.cz">fatka@natur.cuni.cz</a>
Ordovician –	Doc. Petr Kraft;	<a href="mailto:kraft@natur.cuni.cz">kraft@natur.cuni.cz</a>
Silurian –	Dr. Petr Štorch;	<a href="mailto:storch@gli.cas.cz">storch@gli.cas.cz</a>
Devonian –	Dr. Petr Budil;	<a href="mailto:petr.budil@geology.cz">petr.budil@geology.cz</a>
Carboniferous –	Prof. Jiří Kalvoda (marine);	<a href="mailto:dino@sci.muni.cz">dino@sci.muni.cz</a>
	Doc. Stanislav Opluštěl (continental)	<a href="mailto:oplustil@natur.cuni.cz">oplustil@natur.cuni.cz</a>
Permian –	Dr. Jaroslav Zajíc;	<a href="mailto:zajic@gli.cas.cz">zajic@gli.cas.cz</a>
Triassic –	Doc. Jozef Michalík;	<a href="mailto:geolmich@savba.sk">geolmich@savba.sk</a>
Jurassic –	Doc. Petr Skupien;	<a href="mailto:petr.skupien@vsb.cz">petr.skupien@vsb.cz</a>
Cretaceous –	Doc. Martin Košťák (marine);	<a href="mailto:kostys@centrum.cz">kostys@centrum.cz</a>
	Dr. Jiří Kvaček (continental);	<a href="mailto:jiri_kvacek@nm.cz">jiri_kvacek@nm.cz</a>
Paleogene –	Doc. Ján Soták;	<a href="mailto:sotak@savbb.sk">sotak@savbb.sk</a>
Neogene –	Doc. Katarina Holcová;	<a href="mailto:holcova@natur.cuni.cz">holcova@natur.cuni.cz</a>
Quaternary–	Dr. Jaroslav Kadlec;	<a href="mailto:kadlec@gli.cas.cz">kadlec@gli.cas.cz</a>

Subcommission on Stratigraphic Classification and Subcommission for Stratigraphic Information will be supported by Petr Storch ([storch@gli.cas.cz](mailto:storch@gli.cas.cz)) and Petr Kraft ([kraft@natur.cuni.cz](mailto:kraft@natur.cuni.cz)).

## **Registration and fee:**

**Registration fee 250 USD** involves costs of Welcoming Reception, Workshop Dinner, public transportation in Prague, workshop materials, and one-day field excursion. Accommodation will be paid separately.

**\*\*\*\*\*Registration form in the attached file\*\*\*\*\***

## **Payment:**

Payments must arrive before March 31, 2010 by **international bank transfer** on the following bank account. Cheques and credit card payments are not accepted. Transfer costs must be covered by participants.

**IBAN :** CZ76 0100 0000 0000 3853 3021  
**SWIFT :** KOMBCZPP  
**Bank Name:** Komerční banka a.s.  
**Bank address:** Václavské nám. 42, Prague 1  
**Account Name:** Přírodovědecká fakulta UK  
**Account Address:** Albertov 6, Prague 2  
**Account number:** 38533021/0100  
**ID number:** 90-910 599  
 Posting text: your name (important to recognize sender)

**\*\*\*\*\*Registration and payment are due until March 31, 2010.\*\*\*\*\***

***Please register early!***

## **Venue:**

Lecture rooms at Faculty of Science of the Charles University, Albertov 6, Praha 2

## **Lodging:**

Participants are encouraged to make hotel reservation on their own. A broad selection of housing facilities is available in the city of Prague

## **Downtown hotels in a close vicinity of the Faculty of Sciences:**

Best Western City Hotel Moran \*\*\*\* 100,- EUR (No 7 on the map)  
[http://www.bestwestern.at/hotels/Česká\\_republika-Praha-City\\_Hotel\\_Moran-rates-66-cz.html](http://www.bestwestern.at/hotels/Česká_republika-Praha-City_Hotel_Moran-rates-66-cz.html)

Hotel U Šemíka \*\*\* 100,- EUR (No 8 on the map)  
<http://www.usemika.cz/en/hotel/>

Hotel U Sv. Jana Accom plus \*\*\* 70,- EUR (No 3 on the map)

<http://www.accomprague.cz/praha-hotel-u-sv-jana.htm>

Green garden hotel \*\*\*\* 70,- EUR (No 4 on the map)

<http://www.hotelgreengarden.cz/index.html?page=home>

Royal Court Boutique Hotel and Spa \*\*\*\* 70,- EUR (No 5 on the map)

<http://www.hotel-praha-ubytovani.cz/praha-2/royalcourt/>

Hotel Standard \*\*\* 60,- EUR (No 6 on the map)

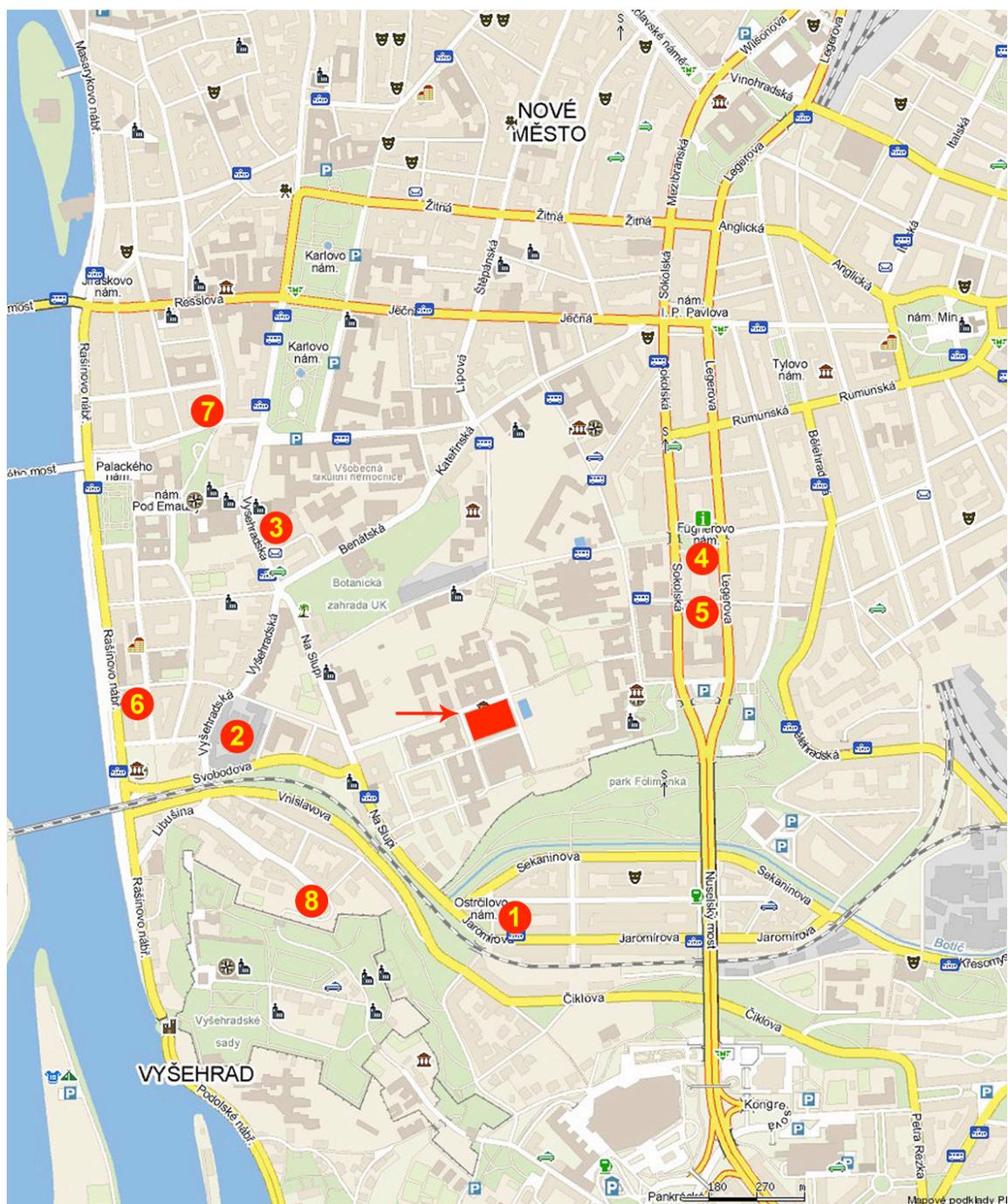
<http://www.hotele.cz/praha-2-hotel-standard,detail-c-standardhotel.cz.html>

Park Inn Prague \*\*\*\* 70,- EUR (No 2 on the map)

<http://www.prague.parkinn.cz/>

Hotel Union Praha \*\*\*\* 60,- EUR (No 1 on the map)

<http://www.hotelunion.cz/>



**Other hotels of interest (outside of the map):**

Hotel Kampa Garden Accom tgravel \*\*\* 85,- EUR (hotel situated in historical and quiet part of Mala Strana district)

<http://www.hotelsprague.cz/kampagarden>

Hotel Krystal \*\*\* 45,- EUR (University hotel in Praha 6, on the way to Prague Airport)

<http://www.ubytovani-hotel-krystal.cz/>

**Many more hotels can be found on the following web addresses:**

<http://www.booking.com/city/cz/prague.html?aid=320737&label=GEOczech>

<http://www.hrs.com/web3/>

<http://www.book-travel-prague.com/accommodation/hotels/prague-2/>

**University Host House** (bed and breakfast 430.- Kč : ca **24 USD**) will be reserved by organizers. If applicable, e-mail to conference secretary Mrs Ilona Horychova: [horycho@natur.cuni.cz](mailto:horycho@natur.cuni.cz)

### **Dining:**

Neighboring student dining hall offers daily menu for about 4 EUR or 5 USD. There are also various restaurants in the walking distance from the Faculty with lunch menu for almost the same price.

### **Transportation:**

Prague Airport is offering direct flights from 108 destinations in 50 countries. Transfer from the airport involves taxi, shuttle minivans or buses. Visitors can take advantage of dense network of public transport based on trams and underground (metro).

### **Third circular:**

***Third circular with detailed program and excursion itinerary will be distributed in April 2010.***

Participants will be encouraged to register and pay the fee as soon as possible since the number of the workshop participant is limited to 150.

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