



INTERNATIONAL UNION OF GEOLOGICAL SCIENCES
INTERNATIONAL COMMISSION ON STRATIGRAPHY



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ANNUAL REPORT 2014

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 Executive Task Groups 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 and 16 Subcommissions that deal with the major chronostratigraphic units and aspects of stratigraphic classification. The ICS Executive has initiated two new Executive Task Groups on geochronology and web-page development. The web-age task group has produced revisions to the ICS website and encouraged the rejuvenation of websites for several subcommissions. Members are being recruited for the geochronology task group.

Subcommissions:

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

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

The subcommissions of ICS together have more than 350 titular members. When the corresponding members of Subcommissions are added, several thousand stratigraphers worldwide participate in the activities of ICS, and several thousand more over the 45-year history of ICS. In addition, ICS maintains contacts with many national stratigraphic committees. The members of the Full Commission (i.e. the 3 members of the Executive and the chairs of the 15 Subcommissions) represent six countries: United Kingdom (6 members), Canada (4), Italy (3), USA (2), China (2), and Australia (1). Among all subcommission officers and the ICS executive, 15 countries are represented: United Kingdom (9 members), Canada (9), USA (8), China (7), Italy (6), Australia (3), Spain (2), Russia (2), Belgium (1), Czech Republic (1), Estonia (1), France (1), Germany (1), Sweden (1), Switzerland (1). The voting members of ICS, i.e. all voting members of all subcommissions including officers represent 40 countries: USA (58), China (37), United Kingdom (32), Russia (31), Canada (25), Germany (24), Italy (21), Australia (16), Spain (13), France (12), Japan (10), New Zealand (8), Argentina (7), Belgium (7), Netherlands (7), Brazil (6), Poland (6), Czech Republic (5), Denmark (5), Sweden (5), Switzerland (5), Hungary (4), India (3), Korea (3), South Africa (3), Tunisia (2), Austria (2), Estonia (2), Finland (2), Iran (2), Bulgaria (1), Colombia (1), Croatia (1), Greece (1), Lithuania (1), Namibia (1), Norway (1), Portugal (1), Turkey (1), and Ukraine (1).

ICS and its subcommissions maintain websites; the URLs of the websites are as follows:

Websites:

ICS main site	www.stratigraphy.org
Quaternary	www.quaternary.stratigraphy.org
Neogene	www.geo.uu.nl/SNS
Paleogene	wzar.unizar.es/isps/
Cretaceous	www.univ-brest.fr/geoscience/?ISCS/
Jurassic	www.jurassic.stratigraphy.org
Triassic	paleo.cortland.edu/sts/
Permian (newsletter)	www.permian.stratigraphy.org
Carboniferous	www.stratigraphy.org/carboniferous/
Devonian	www.unica.it/sds/
Silurian	www.silurian.stratigraphy.org
Ordovician	www.ordovician.stratigraphy.org
Cambrian	www.palaeontology.geo.uu.se/ISCS/ISCS_home.html
Ediacaran	www.paleo.geos.vt.edu/Ediacaran/
Cryogenian	<i>being established</i>
Precambrian	www.precambrian.stratigraphy.org
Stratigraphic Classification	http://users.unimi.it/issc

ICS Executive Officers for 2012-2016:

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 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

In 2013, ICS was awarded a grant for \$75,000 (\$25,000/year for 3 years) from the U.S. National Sciences Foundation. Only a few of the subcommissions have formal financial contributions from external sources other than IUGS (through ICS), and these are very limited and 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 private companies and professional organizations. 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. In 2015, ICS will likely be awarded a grant of \$50,000 from the U.S. National Science Foundation for a workshop titled ‘Archiving the Stratigraphic Record’. ICS will take the lead role in developing a decades long project to archive stratigraphic information, both new and historical, in an internet-based, readily accessible database.

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 with the Commission for the Geological Map of the World (*CGMW*) in Paris regarding standardization of chronostratigraphy and its color scheme on charts, as well as producing the *ICS International Chronostratigraphic Chart*. In addition, ICS is collaborating with the IUGS Commission on Geoscience Information (CGI) as it develops GeoSciML as an interchange format for geoscience data. 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: 572, 575, 580, 587, 591, 596, and 599, and others serve on IGCP national committees and the scientific board. 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

Quaternary:

- Base Holocene Series
- Base Calabrian Stage
- Base Gelasian Stage (= Base Pleistocene Series and Base Quaternary System)

Neogene:

- Base Piacenzian Stage
- Base Zanclean Stage (= Base Pliocene Series)
- Base Messinian Stage
- Base Tortonian Stage
- Base Serravallian Stage
- Base Aquitanian Stage (= Base Miocene Series and Base Neogene System)

Paleogene:

- Base Rupelian Stage (= Base Oligocene Series)
- Base Lutetian Stage
- Base Ypresian Stage (= Base Eocene Series)
- Base Thanetian Stage
- Base Selandian Stage
- Base Danian Stage (= Base Paleocene Series and Base Paleogene System)

Cretaceous:

- Base Maastrichtian Stage
- Base Santonian Stage
- Base Turonian Stage
- Base Cenomanian Stage (= Base Upper Cretaceous Series and Base Cretaceous System)

Jurassic:

- Base Bathonian Stage
- Base Bajocian Stage
- Base Aalenian Stage (= Base of Middle Jurassic Series)
- Base Toarcian Stage
- Base Pliensbachian Stage
- Base Sinemurian Stage
- Base Hittangian Stage (= Base Lower Jurassic System and Base Jurassic Series)

Triassic:

- Base Carnian Stage (= Base Upper Triassic System)
- Base Ladinian Stage
- Base Induan Stage (= Base Triassic System)

Permian:

- Base Changhsingian Stage
- Base Wuchiapingian Stage (= Base Lopingian Series)
- Base Capitanian Stage
- Base Wordian Stage
- Base Roadian Stage (= Base Guadalupian Series)
- Base Asselian Stage (= Base Cisuralian Series and Base Permian System)

Carboniferous:

- Base of Bashkirian Stage (= Base Lower Pennsylvanian Series and Base Pennsylvanian Subsystem)
- Base Viséan Stage
- Base Tournaisian Stage (= Base Lower Mississippian Series and Base Mississippian Subsystem and Base Carboniferous System)

Devonian:

- Base Famennian Stage
- Base Frasnian Stage (= Base Upper Devonian Series)
- Base Givetian Stage
- Base Eifelian Stage (= Base Middle Devonian Series)
- Base Emsian Stage
- Base Pragian Stage
- Base Lochkovian Stage (= Base Lower Devonian Series and Base Devonian System)

Silurian:

- Base Pridoli Series
- Base Ludfordian Stage
- Base Gorstian Stage (= Base Ludlow Series)
- Base Homerian Stage
- Base Sheinwoodian Stage (= Base Wenlock Series)
- Base Telychian Stage
- Base Aeronian Stage
- Base Rhuddanian Stage (= Base Llandovery Series and Base Silurian System)

Ordovician:

- Base Hirnantian Stage
- Base Katian Stage
- Base Sandbian Stage (= Base Upper Ordovician Series)
- Base Darriwilian Stage
- Base Dapingian Stage (= Base Middle Ordovician Series)
- Base Floian Stage
- Base Tremadocian Stage (= Base Lower Ordovician Series and Base Ordovician System)

Cambrian:

- Base Jiangshanian Stage
- Base Paibian Stage (= Base Furongian Series)
- Base Guzhangian Stage
- Base Drumian Stage
- Name Terreneuvian Series
- Base Fortunian Stage (= Base Terreneuvian Series and Base Cambrian System)

Neoproterozoic:

- Base Ediacaran System

7. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2014

Full Commission

- Organized 30 special technical sessions for STRATI 2015 - 2nd International Congress on Stratigraphy, which will be held in Graz, Austria, 19-23 July 2015, co-sponsored with SEPM (Society of Sedimentary Geology).
- Awarded \$19,580 from U.S. National Science Foundation grant to ICS as follows: \$4000 to Quaternary Subcommittee for travel of two Japanese experts to attend field meeting in Italy; \$4980 to Paleogene to design and build new website; \$6600 to Silurian Subcommittee for field investigation in China of two potential GSSPs; \$4000 to Ediacaran and Cryogenian Subcommittees for joint field workshop in China.
- Wrote and submitted a \$50,000 grant proposal to the U.S. National Science Foundation to support a Joint ICS-NSF Workshop “Archiving the Stratigraphic Record” to be held in conjunction with STRATI 2015. Understand that it will be awarded.
- 2014 version of ICS Chronostratigraphic Chart, which includes revised numerical ages, was posted on the ICS website.
- GSSP proposal for base of Toarcian Stage (Lower Jurassic Series, Jurassic System) ratified by IUGS Executive Committee.
- Approval by ICS, based on recommendation of Cryogenian Subcommittee, of revised numerical age for base of Cryogenian System (revised from 850 Ma to ~720 Ma).
- At the invitation of the Director General of the Servicio Geológico Colombiana, the ICS Chair visited Bogotá in December 2014 in order to give advice on the establishment of a national stratigraphic commission for Colombia. He also gave two lectures: “The International Commission on Stratigraphy: 50 years of international collaboration and cooperation” and “The ‘Anthropocene Epoch’: A scientific decision or a political statement”.
- In January 2015, the ICS Chair gave the lecture “The ‘Anthropocene Epoch’: A scientific decision or a political statement” at the Facultad de Ciencias Geológicas at Universidad Complutense de Madrid, Madrid, Spain.
- The ICS Chair was interviewed by journalists of several different publications regarding consideration of the “Anthropocene Epoch” by ICS.
- Several authors, university professors and other educators, and professional societies were granted permission to use and reproduce the ICS International Chronostratigraphic Chart in their productions.
- The ICS Chair successfully negotiated with the Director of the Geological Survey of Spain, the government of Navarra, and a private company to acquire private land on which is located the recently ratified GSSP for the Santonian Stage (Cretaceous) and to plan an access route to the site, develop a protocol for future scientific study of the stratotype section, and to place a permanent marker on the site.
- Gave the invited presentation “The International Commission on Stratigraphy – Dedicating and Preserving its International Geostandards” at the General Assembly meeting of the Commission for the Geological Map of the World, Paris, February 2014.

Quaternary Subcommission

- First International Meeting of the SQS Anthropocene Working Group, Berlin, Germany, October 16–18, 2014. Members agreed that the Anthropocene should be formalized with an onset some time in the mid-20th century.
- SQS / INTIMATE Working Group exploring the formal subdivision of the Holocene, comments were solicited from the wider stratigraphic community during 2013–14. The Working Group is now moving towards the subdivision of the Holocene into named stages corresponding to the widespread but inconsistent informal usage of a tripartite division of the Holocene ('early', 'middle' and 'late'). Each stage is to be defined by a GSSP, the highest two with their timing now agreed at 8.2 ka BP and 4.2 ka BP.
- Field excursion to the Middle–Upper Pleistocene Fronte section, Taranto, Italy, October 14, 2014 allowed the detailed inspection of the marine Fronte section, a candidate GSSP for the Upper Pleistocene Subseries boundary, and numerous associated deposits.
- Field Workshop on the Lower–Middle Pleistocene Transition in Italy. University of Bari Aldo Moro, Bari, Italy, October 11–13, 2014. A three-day international meeting co-sponsored by SQS involving a one-day symposium of invited talks in Bari, followed by two days spent visiting two candidate GSSP sections, Montalbano Jonico and the Valle di Manche, and the coeval lacustrine Sant'Arcangelo section.
- Waters, C. N., Zalasiewicz, J. A., Williams, M., Ellis, M. A. & Snelling, A. M. (eds) 2014. A Stratigraphical Basis for the Anthropocene. *Geological Society, London, Special Publications*, 395. Edited by members of the Anthropocene Working Group (AWG) and containing 17 papers of which many are authored or coauthored by members of the AWG.
- The new journal *Anthropocene Review*, published by SAGE, was launched in 2014 (<http://anr.sagepub.com>) with many of the editorial board, including the Editor-in-Chief, serving also on the AWG. AWG members have published in the journals *Anthropocene*, *Anthropocene Review*, *Nature Geoscience*, *Rendiconti Lincei*, *Continental Shelf Research*, *Science of the Total Environment*, and *Climate Law*.

Neogene Subcommission

- Selected a new chair of the working group for the remaining GSSPs, base-Langhian and base-Burdigalian. Also membership of working group completed.
- Further studies are were carried out on the stable isotope stratigraphy and cyclostratigraphy and astronomical tuning of the La Vedova beach section in northern Italy and St. Peter's Pool on Malta, which are the candidate GSSPs for the base Langhian GSSP.

Paleogene Subcommission

- The Subcommission was deeply involved into the Climate and Biotic Events of the Paleogene (CBEP) conference in Ferrara (1-6 July 2014). Numerous voting and corresponding members attended the meeting and contribute with oral and poster presentations.
- A new website for the subcommission was designed and will soon be operative.
- A new calcareous nannofossil biozonation for the Paleogene has been published by Agnini and co-authors in 2014, based on data acquired on last three decades from key low to middle latitude deep-sea drilling sequences and Tethyan on-land pelagic sections. A new code system has been suggested: 11 Paleocene biozones (CNP1–CNP11), 21 Eocene biozones (CNE1–CNE21), and 6 Oligocene biozones (CNO1–CNO6).
- A geological fieldtrip in Armenia was been organized by the Armenian and Russian colleagues from August 24th to September 8th on “ The Bartonian, Priabonian and Rupelian

boundaries in Southern Armenia. Problems and solutions”. Twenty researchers attended the well organized, and successful field trip. The sections visited are promising for correlating shallow to deep-water settings with magnetostratigraphy and plankton stratigraphy.

- The Alano section (Belluno Province, NE Italy) was the focus of the post-conference field-trip of the Climatic and Biotic Events of the Paleogene 2014 (CBEP 2014) Congress, held in Ferrara (Italy) in July 1-6, 2014. A field-trip guide entitled “THE PALEOGENE RECORD OF THE VENETO REGION (NE ITALY)” was specifically prepared. The Alano Working Group is preparing the proposal to be submitted to ISPS by the end of this year.
- Seven important papers published in 2014 (see Subcommittee Report).

Cretaceous Subcommittee

- The inscription of the Stevns Peninsula (Denmark) on the UNESCO World Heritage List. The Stevns Peninsula was ‘inaugurated’ at a reception on the 22nd October 2014, graced by Her Royal Highness Princess Marie of Denmark. The 10th meeting of the Berriasian and J/K boundary WG was held in Perugia (Italy), May 2013.
- The working group on the Jurassic-Cretaceous boundary and the Berriasian-Stage GSSP was very active with considerable biostratigraphic and magnetostratigraphic investigations at numerous sections around the world, including Spain, Italy, France, United Kingdom, Slovakia, Bulgaria, Ukraine, Tunisia, Iran, Caucasus, India, Tibet, Russian Platform and Siberia, South and North Primorye, Kurdistan, Greenland, Argentina, Mexico, and California.
- Studies continued on candidate stratotype sections for GSSP for Valanginian Stage.
- Summary completed of the formal proposal of the Río Argos section as GSSP of the Barremian Stage, which will be submitted shortly to the Sub-commission for approval.
- A multi-disciplinary paper dealing with the new criteria for identifying the base Albian is now published and being voted on by the working group before being presented to the subcommission.
- Turonian/Coniacian sections were investigated in the US and Canadian Western Interior, northern Mexico, and in Mangyshlak Mountains, Kazakhstan for their potential as stratotype sections for the base Coniacian GSSP.
- *Episodes* published article on Santonian GSSP, and arrangements were made for preparation and dedication of GSSP in 2015.

Jurassic Subcommittee

- GSSP proposal for the Toarcian Stage, Peniche section, Portugal was approved by ICS and ratified by the IUGS Executive Committee.

- The 9th International Congress on the Jurassic System was held from 6th to 9th January 2014 in Jaipur, the capital city of the state of Rajasthan, India. The congress included excursions on Middle and Upper Jurassic rocks of the Kachchh Basin (one week) and Middle and Upper Jurassic rocks of the Jaisalmer Basin (one week)
- Base Oxfordian field workshop, Redcliff, Dorset, June 2014. Significant progress and clarification of issues was achieved which should lead to a coherent proposal being submitted to the ISJS in the next 24 months.
- The full account of the candidate base Oxfordian GSSP section has been published in *Volumina Jurassica* (Pellenard, P. et al. 2014. Integrated stratigraphy of the Oxfordian global stratotype section and point (GSSP) candidate in the Subalpine Basin (SE France). *Volumina Jurassica* 12, www.voluminajurassica.org/index.php/volumina/article/view/147).
- Base Callovian Task Group. The convenor of the task group Eckhard MÖNNIG has published a summary of history and progress on base-Callovian definition in *Volumina Jurassica* (www.voluminajurassica.org/index.php/volumina/issue/view/15).

Triassic Subcommittee

- 11th International Field Workshop on Triassic: NW Gondwana margin of the Neo-Tethys (Negev, southern Israel), February 2014. About 30 participants attended the field workshop that was very well organized by the Geological Survey of Israel.
- 9th International Symposium Cephalopods – Present and Past ISCPP 9, Zurich, Switzerland, September 2014. The Session 5 was dedicated to the Triassic cephalopods; fifteen Triassic cephalopod workers attended this meeting and discussed new data. New high-resolution chronostratigraphic scales were discussed for the earliest Triassic, the Dinerian and the Induan/Olenekian boundary, and the late Olenekian. A new Ladinian/Carnian boundary succession from South China was also illustrated.
- GSA Annual Meeting in Vancouver. Session T195. Extreme Environmental Conditions and Biotic Responses during the Permian-Triassic Boundary Crisis and Early Triassic Recovery. Several tens of specialists from North America, Europe and Asia attended this session, whose program included 23 oral presentations. Some presentations directly dealt with conodonts and ammonoids, the key groups for the definition of the Induan/Olenekian boundary. One of them was on the Nammal Nala section in Pakistan, one of the two candidate sections for the GSSP of the Olenekian stage.
- **Albertiana, n. 41.** This issue has been printed in May 2014 and consists of 81 pages. It is the first issue edited by Chris McRoberts, in cooperation with the new editorial board, composed of 10 members. Volume 41 includes 4 papers on the P/T boundary and Lower Triassic, as well as an overview of the Triassic timescales.
- **New Mexico Museum on Natural History and Science Bulletin 61.** “The Triassic System: New Developments in Stratigraphy and Paleontology”, Edited by Lawrence H. Tanner, Justin A. Spielmann and Spencer G. Lucas. This very thick volume of slightly more than 600 pages, comprises 44 papers on Triassic vertebrates and invertebrates, biostratigraphy and chronostratigraphy, marine-land correlations.
- **New Mexico Museum on Natural History and Science Bulletin 64,** “Conodonts from the Carnian/Norian boundary (Upper Triassic) of Black Bear Ridge, northeastern British Columbia, Canada,” by M.J. Orchard. This outstanding monograph (139 pages, 55 plates, several tens of range charts) is the main contribution to the study of the Carnian/Norian boundary in 2014.

Permian Subcommittee

- Proposals of the Sakmarian-base and Artinskian-base GSSPs were published in *Permophiles* (Issue 58). After the proposals were published, we received a couple of comments and discussions on the conodont taxonomy for the index species and quality of the sections from the working group members, which have also been published in the subsequent *Permophiles* 59. Because of disagreements in the working groups on the taxonomy of conodonts and selection of the conodont index species for the definition of the two GSSPs, voting for the proposals has been postponed.
- An updated Permian timescale was published in the proceeding volume of STRATI 2013 by Shen and Henderson (2014).

Carboniferous Subcommittee

- Important studies published and further investigations underway on several important Viséan-Serpukhovian boundary interval sections in Russia and China (see subcommittee report).
- Field investigations and documentation of key evolutionary lineages for definition and correlation of GSSP levels continue for the Bashkirian-Moscovian, Moscovian-Kasimovian, Kasimovian-Gzhelian boundaries.
- Field Meeting on Carboniferous and Permian Nonmarine-Marine Correlation, a joint meeting of the SCCS and SPS, was held in Freiberg, Germany on the 21-27 of July 2014. It included five days of field trips to the most important Carboniferous and Permian outcrops in East Germany and the Czech Republic.
- The Kazan Golovkinsky Stratigraphic Meeting was held in Kazan, Russia in October 2014.
- The Golovkinsky Stratigraphic Meeting covered all aspects of Carboniferous and Permian stratigraphy, bioevents and the evolution of sedimentary basins and their resources.

Devonian Subcommittee

- A subcommittee business meeting was held at the 4th International Palaeontological Congress in Mendoza, Argentina in October 2014.
- Plans were finalized for a field investigation in Uzbekistan in 2015 with the goal of resolving serious problems with the base Emsian Stage GSSP.
- Publication of SDS Newsletter 30.

Silurian Subcommittee

- Silurian Times No. 21 produced and distributed and posted on ISSS website
- The IGCP Project 591, Field Workshop 2014, was held jointly with the International Subcommittee on Silurian Stratigraphy (ISSS), the International Subcommittee on Ordovician Stratigraphy (ISOS) and the International Subcommittee on Cambrian Stratigraphy (ISCS), 12–21 August, 2014, in Kunming, China.
- Work proceeds on the restudy of potential GSSP candidate sections for the Base of Wenlock and the Base of Aeronian and new work has begun on restudy of the base of the Telychian Stage. Seven papers were presented at the IGCP 591/ISSS meeting in Kunming pertaining to recent progress related to these boundaries. An associated field excursion visited important sections under investigation for redefinition of the base Aeronian and Telychian GSSPs.
- The subcommittee established an award to be given at the ISSS, which meets every four years, to honor outstanding research contributions by young Silurian researchers.

Ordovician Subcommittee

- Ordovician News No. 31 was produced, distributed and posted on the Subcommission website. www.ordovician.stratigraphy.org.
- The Subcommission participated in, and supported the annual meeting of IGCP 591 in Tartu, Estonia, June 2014 and has contributed to the conference proceedings published in the *Estonian Journal of Earth Sciences*.
- The Subcommission participated in, and supported the annual field meeting of IGCP 591 in Kunming, China, August 2014 and is contributing to the conference proceedings to be published in *Palaeoworld*.
- The Subcommission convened a thematic session on ‘*Ordovician biotas of Gondwana: responses to global climatic and eustatic events, and their biogeographic relationships within the Ordovician World*’ at the 4th International Geological Congress in Mendoza, Argentina, October 2014.

Cambrian Subcommission

- The 19th International Field Conference on Cambrian Stage Subdivisions was held in association with a meeting of the Ediacaran Subcommission (ISES) in September 2014 in Ouarzazate, Morocco. An abstract volume and a field guide (*Stratigraphic overview of the Ediacaran and Cambrian from the Anti-Atlas, Morocco*. University of Lille 1, France. 85 pp.) and a special issue (*Geological Evolution of the Ediacaran and Cambrian in the High Atlas and Anti-Atlas Ranges, Morocco*) of *Journal of African Earth Sciences* were published.
- The Subcommission participated in, and supported the annual field meeting of IGCP 591 in Kunming, China, August 2014 and is contributing to the conference proceedings to be published in *Palaeoworld*.
- Possible solutions to the problems surrounding the current definition of the base Cambrian (Paleozoic) GSSP definition are addressed in a paper published in 2014 (Babcock, L.E. et al.: Proposed reassessment of the Cambrian GSSP. *Journal of African Earth Sciences* 98, 3–10) in hopes that the global scientific community will actively participate in developing a well-reasoned and practical solution that will stand the test of time.
- The Cambrian Subcommission’s webpage was updated in 2014.

Ediacaran Subcommission

- The second annual newsletter of the Subcommission was disseminated in February 2014.
- The Subcommission established two working groups to focus on the second stage and the terminal stage of the Ediacaran System.
- The Subcommission sponsored the 2014 International Field Workshop on the Marwar Supergroup, Rajasthan, western India, which was held on 20th-28th January 2014. This field trip examined Ediacaran and Cambrian successions in Rajasthan. A report has been published in *Episodes*.
- The Subcommission sponsored and organized the 2014 Subcommission field workshop “*International Symposium and Field Workshop on Ediacaran and Cryogenian Stratigraphy*” in South China (June 11-22, 2014). Nearly 60 scientists from Australia, Brazil, China, Germany, Mongolia, Russia, UK, and USA participated in this field workshop. A symposium was also organized as part of the field workshop, and there were 31 oral presentations and 20 poster presentations at the symposium. A report has been published in *Episodes*.

- The Subcommittee co-sponsored a field workshop on the Ediacaran-Cambrian stratigraphy of Morocco (September 15-24, 2014; Ouarzazate, Morocco). A special volume entitled “*Geological Evolution of the Ediacaran and Cambrian in the High Atlas and Anti-Atlas Ranges, Morocco*” was published in the October 2014 issue of “*Journal of African Earth Sciences*”.
- Corresponding member James D. Schiffbauer and Chair-person Shuhai Xiao assembled a *Journal of Paleontology* special issue on the Ediacaran-Cambrian transition (*Journal of Paleontology*, 2014, vol. 88, no. 2).
- Secretary Marc Laflamme and corresponding members James D. Schiffbauer and Simon A.F. Darroch organized a short course on exceptional preservation—“*Reading and Writing the Fossil Record: Preservation Pathways to Exceptional Fossilization*”—at the 2014 Geological Society of America annual meeting. This short course included several papers associated with the Ediacaran/Cambrian transition.
- Voting members Jim Gehling and Guy Narbonne organized a symposium entitled “*Neoproterozoic palaeobiology: preservation, palaeobiology, environments and phylogeny*” at the 4th International Paleontological Congress (September 28 - October 3, 2014; Mendoza, Argentina).
- Secretary Marc Laflamme organized a symposium entitled “*Ediacaran Environments and Ecosystems*” at the 10th North American Paleontological Convention (February 15-18, 2014; Gainesville, Florida).
- 72 publications (see Subcommittee report).

Cryogenian Subcommittee

- Ediacaran-Cryogenian subcommittees joint field excursion/workshop/conference in South China (June 11-22, 2014). There were 45 participants (6 voting members) on the Cryogenian field trip that resulted in an abstract volume, field guide and workshop report.
- The second Cryogenian Subcommittee field workshop was held in Death Valley, California, December 12-14th.
- A formal application was submitted to and approved by the ICS to remove the numerical age of 850 Ma for the base of the Cryogenian, and to replace it with a rock-based GSSP whose age is yet to be determined, but is approximately ~720 Ma.

Precambrian Subcommittee

- No subcommittee accomplishments to report.

Stratigraphic Classification Subcommittee

- The Subcommittee SC organized the session SSP2.1 Earth Systems History – the Need for Integrated Stratigraphy at the EGU General Assembly 2014 (27 April–02 May 2014, Vienna, Austria).
- ISSC Newsletter nos. 20 was produced and distributed.

8. CHIEF PROBLEMS ENCOUNTERED IN 2014

Full Commission

- Some subcommittees appear to be making no progress developing GSSP proposals. For some subcommittees this is due to a global shortage of qualified experts. For others it is due to inadequate leadership of the officers, particularly for the Precambrian Subcommittee.

- Some boundary task group leaders have been inactive; some boundary task groups need rejuvenation.
- Webpages of several subcommissions are very out of date and lack information on GSSPs.
- Lack of funding from national research councils greatly limits investigations of potential GSSPs. The grant to ICS from the U.S. National Science Foundation is partially relieving this problem.
- Some subcommissions that refer to lack of funding as a problem did not submit proposals for support from the NSF grant to ICS.

Quaternary Subcommission

- The Working Group on the Upper Pleistocene Subseries Boundary, after five years of inactivity, is now beginning to make progress, with the proposal of a new candidate GSSP, the Fronte section, in Taranto, Italy, and a field trip to this section (see above). But finding such a recent GSSP (~130 ka) in marine deposits on land that do not display facies changes at the boundary presents special challenges. Therefore a search for additional candidate GSSPs is underway.

Neogene Subcommission

- Lack of suitable sections in the Mediterranean for defining the Burdigalian Stage GSSP in an astronomically-tuned, deep-marine section. The newly reconstituted boundary working group will consider defining the boundary in (I)ODP cores or to highlight the problem of survival of the Burdigalian as a chronostratigraphic unit.

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.
- Lack of funding in most countries for carrying out studies strictly stratigraphic for attending workshops and field conferences.

Jurassic Subcommission

- There have been problems launching a new website for the subcommission. This should be solved by the end of 2014.

Triassic Subcommission

- Severe budget cuts for research in many countries, due to the global economic crisis, reduce not only research in the field but also the possibility of Task Group members attending meetings and workshops necessary for progress on GSSP definitions.
- There are still difficulties in recruiting new young members, because young Triassic workers quite often do not have full position. The number of retired professors/academic is increasing, and some of them passed away.

- The major and new problem of the STS in 2014, no doubts has been the lack of connection with the new IGCP 630 “Permian-Triassic climatic and environmental extremes and biotic response” has been approved by UNESCO in 2014, (<http://www.unesco.org/new/en/natural-sciences/environment/earth-sciences/international-geoscience-programme/igcp-projects/global-change/project-630/>). Some of the goals of this new project fully overlap with the mission and the activities of the STS, as demonstrated by the theme of the first field workshop of this project (November 17-22, 2014): The Permian-Triassic transition in the Kashmir Valley (leaders A. Baud and G. Bhat; field guidebook of 37 pp.). Surprisingly, the Triassic Subcommittee was not asked for any support and cooperation neither during the preparation of the IGCP proposal nor after its approval. The consequence of this lack of cooperation are very severe especially for the Induan/Olenekian boundary Working Group. This WG, that is in charge on one of the most difficult GSSP of the Triassic system, is going to be emptied by the new IGCP. A formal letter will be sent to both the Project Leader of the IGCP 630 and the IGCP Scientific Board.

Permian Subcommittee

- Discrepancies in conodont taxonomy and selection of the index species have halted progress on proposals for the base Sakmarian and base Artinskian GSSPs.
- The base Lopingian GSSP will be flooded after a dam to be completed in 5 years for electronic power in the downstream of the Hongshui River in Guangxi, South China. We have extensively discussed with the local government and a detailed plan for searching the replacement of the GSSP section nearby the GSSP has been made.

Carboniferous Subcommittee

- The most significant issue confronting the SCCS has been the difficult and time-consuming task of locating suitable evolutionary lineages and first occurrences for boundary definition. Within the Carboniferous, the endemism of conodont, foraminiferal and ammonoid lineages between Eurasia and North America continues to hamper the choice of the boundary levels for the Viséan-Serpukhovian and Bashkirian-Moscovian boundaries. The problem is being overcome somewhat by correlating other fossil groups to bracket the boundary levels in major regions where the boundary-event taxa have not been found.
- Progress by the project group on Carboniferous magnetostratigraphy has been hampered by a shortage of members, insufficient funding, and a lack of integration with the activities of the other task groups.
- Essentially all lineages being chosen for GSSP definition are conodont based and have the most utility in carbonate-dominant lower-slope and basin deposits containing few other taxa than ammonoids that are suitable for global correlations. The best of the known deeper water successions in terms of abundance and diversity of conodonts and continuity of outcrop are in southern China and the southern Urals. The direction the current work of the SCCS is advancing indicates all of the remaining GSSPs will be placed in south China and Russia.

Devonian Subcommittee

- The rarity of polygnathids at Zinzilban in the critical interval for a re-definition of the Emsian GSSP.
- The still unpublished early siphonodellids from the Uppermost Famennian of Franconia/Thuringia

- Lack of formal members from a range of countries with extensive and important Devonian outcrop, such as Algeria, Libya, Brazil, Bolivia, Argentine, Turkey, and Caucasian countries.
- The decline of Devonian stratigraphy in other countries (e.g., Canada, Australia) by the lack of replacement of retiring specialists by new active researchers.

Silurian Subcommittee

- There remains the old problem related to difficulties in obtaining grants for research on stratigraphical topics and travel to meetings of Subcommittee. Applications are often given low priority by national grant-awarding agencies.

Ordovician Subcommittee

- Critical to the development of the research on the system is the improvement of regional chronostratigraphies, isotope curves, palaeogeographies and zonal schemes. The coming years will see an emphasis on renewed data collection and its integration with the global standard. But this will require global participation of all our regional groups. It is also clear that the system has few reliable, absolute dates.

Cambrian Subcommittee

- The principal difficulty encountered in 2013 was lack of funding to support basic research on key stratigraphic intervals (potential GSSP horizons and sections) and to support travel to field business meetings.

Ediacaran Subcommittee

- none

Cryogenian Subcommittee

- none

Precambrian Subcommittee

- The Chair has been somewhat overcommitted during 2013-14, setting up a new career in academia. His time has been taken up with setting up new courses and attracting funds and Higher Degree Research students. Those elements are all now in place and the chair is committed to applying significant time to the Subcommittee in the foreseeable future.
- Conflicts between officers of subcommittee.

Stratigraphic Classification Subcommittee

- The ICS budget allocation was very small, particularly given the overall importance and significance of the Subcommittee.
- Progress is somewhat slow but sure, and headway is being made in the preparation of the three remaining chapters on facets of Stratigraphy

9. SUMMARY OF EXPENDITURES IN 2014:

In its 2013 Annual Report, the ICS Executive requested \$95,453, which was reduced from \$105,353 that included full amounts requested by Subcommittees. The ICS request was almost 50% more than its budget allocation of ~\$50,000 for the last several years. The IUGS Executive Committee awarded ICS a budget of \$50,000 for 2014, reducing significantly the requests of the

subcommissions and the ICS Executive. However, \$19,580 was awarded from the ICS-NSF grant to the Quaternary, Paleogene, Silurian, Ediacaran, and Cryogenian Subcommissions. Thus, \$69,580 was available for ICS activities in 2014.

Subcommission	Request from subcommissions for 2014 USD	ICS Recommendation to IUGS for 2014 USD	Final Allocations to Subcommission & Executive
Quaternary	5500.00	5500.00	1750.00
Neogene	2730.00	2730.00	2000.00
Paleogene	6400.00	6400.00	4000.00
Cretaceous	11567.00	11567.00	7500.00
Jurassic	3275.00	3275.00	2750.00
Triassic	5500.00	5500.00	3250.00
Permian	5000.00	5000.00	3500.00
Carboniferous	0.00	1000.00	1000.00
Devonian	3100.00	3100.00	1750.00
Silurian	12681.00	12681.00	4500.00
Ordovician	6000.00	6000.00	2000.00
Cambrian	6100.00	6100.00	3500.00
Ediacaran	13000.00	5100.00	4000.00
Cryogenian	4000.00	4000.00	2000.00
Precambrian	0.00	0.00	0.00
Stratigraphic Classific.	5000.00	5000.00	2000.00
ICS Executive (3)	7500.00	7500.00	4500.0
Reserve	8000.00	5000.00	0.00
Total	\$105,353	\$95,453.00	\$50,000.00

10. WORK PLAN, CRITICAL MILESTONES, and ANTICIPATED RESULTS TO BE ACHIEVED FOR March 2015-February 2016:

ICS Executive Committee

- The primary attention of the ICS Executive will be to promote progress on GSSPs by the Subcommissions. The ICS budget and the NSF grant will be allocated among Subcommissions to support those boundary-working groups that demonstrate the potential to make significant progress.
- STRATI2015 – the 2nd International Congress on Stratigraphy is expected to be a most noteworthy event. This Congress is now established as the premier international meeting for stratigraphers worldwide. 30 technical sessions are planned; most of them are sponsored by subcommissions of ICS. The Congress will be the venue for important business meetings and workshops of ICS, most of its subcommissions, and numerous boundary working groups. A most important concern will be preparing for election of new executive officers of ICS and all

- subcommissions and recruitment and selection of new voting members for all subcommissions. The ICS Stratigraphic Prizes will be awarded at the opening ceremony.
- Organize the Joint ICS-NSF Workshop ‘Archiving the Stratigraphic Record’, which will be held over two days immediately following STRATI2015 in Graz, Austria. The goal is to plan the initiation of a multi-decade project to archive information from measured stratigraphic sections worldwide into a readily accessible, digital database.
 - Election of new Chair and Vice-Chair for terms beginning in August 2016.
 - Encourage timely elections of new executive officers and selection of new voting members for all subcommissions for terms beginning in August 2016.
 - Dedication of GSSPs for Santonian Stage at Olazagutia, Navarra, Spain and for Toarcian Stage at Penice, Portugal.
 - Encourage recruitment of colleagues from under-represented groups, particularly young workers, to field meetings of ICS subcommissions.
 - 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.
 - Set up system of regular notification to all relevant parties, including national stratigraphic commissions and professional societies, concerning new GSSP proposals being considered by subcommissions so that interested parties are invited to discussions of GSSP proposals by means web-based discussion pages for input on proposals; Rejuvenate the discussion page on the ICS website.
 - Initiate consultations with the greater stratigraphic community as the first step in producing a new edition of the *International Stratigraphic Guide*.
 - Maintain the permanent archive of the ICS global standards (GSSPs and the International Chronostratigraphic Chart) on the ICS website, www.stratigraphy.org.
 - The ICS executive will work closely with the chair of the IUGS Commission on the Management and Application of Geoscience Information to further incorporate the ICS International Chronostratigraphic Chart into the computer language being used to store, access, and archive geoscience information.
 - The ICS executive will work closely with the President of the CGMW (Commission on Geologic Map of the World) to produce regular updates and translations of the ICS International Chronostratigraphic Chart/Geologic Time Scale.
 - Establish an ICS Executive Task Group on Geochronology and recruit experienced colleagues with expertise in a range of techniques to participate with the goal of providing ICS Executive and Subcommission Chairs on numerical ages to apply to the ICS International Chronostratigraphic Chart
 - The ICS Executive Task Group on ICS Webpages will continue to assist Subcommissions with developing and maintaining excellent websites as they become the primary source of information on the activities and accomplishments of the Subcommissions.
 - Further develop the relationship with the Geobiodiversity Database so that it evolves into a widely used site for the archiving and use of stratigraphic data produced in developing GSSP proposals.
 - Set up system for effective communication between ICS Executive and voting and corresponding members of all subcommissions.

- Determine those ratified GSSPs that are not marked by a plaque and work with relevant, national stratigraphic committees, geological surveys, governmental organizations, and private landowners to install plaques and, if possible, erect educational exhibits.
- Collaborate with the World Heritage Committee of UNESCO for recognition of all GSSPs as sites of the World Natural Heritage.

Quaternary Subcommission

- Special issue of *Quaternary International*, editors: M.J. Head, P.L. Gibbard, and T. van Kolfschoten, to be finalized early in 2015. This is based on papers presented at “The Quaternary System/Period and its Formal Subdivision” during STRATI 2013.
- The 19th INQUA (International Union for Quaternary Research) Congress, to be held in Nagoya, Japan, July 27–August 2, 2015, will be the premier event for Quaternarists in 2015. M.J. Head (SQS chair) is to give a plenary keynote talk at the Congress on the work of the SQS. Three events are being sponsored by SQS: 1) a special symposium “The Early–Middle Pleistocene transition: local records, global correlations” co-convened by M.J. Head and others; 2) a Business Meeting of the SQS; and 3) a two-day trip to see the Chiba Section, a candidate GSSP for the Middle Pleistocene Subseries boundary.
- SQS will co-sponsor the following special session “Neogene–Quaternary Integrated Stratigraphy: SQS-SNS-RCMNS joint session” at STRATI 2015 in Graz, Austria, in July, 2015.
- Proponents of the three candidate GSSPs for the Middle Pleistocene Subseries boundary (two in Italy, one in Japan) will be asked late in 2015 to provide a timetable for submitting formal proposals to SQS, with the hope that a decision by SQS on this GSSP can be accomplished by 2016.
- The SQS / INTIMATE Working Group on the formal subdivision of the Holocene will be working towards submitting a formal proposal to subdivide the Holocene into three named stages defined by GSSP, with the two highest at 8.2 ka BP and 4.2 ka BP.

Neogene Subcommission

- The study of the two potential boundary stratotype sections of La Vedova and St. Peter’s Pool for defining the Langhian GSSP will be continued and focus on the astronomical tuning of the sections and the construction of a stable isotope record for St. Peter’s Pool. It is anticipated that a workshop will be held as soon as the two studies are completed. Following these studies a decision regarding which section and criterion are most suitable for defining the Langhian GSSP should be made in 2014.
- Selection of most suitable section/ODP core and guiding criteria for defining the Burdigalian GSSPs

Paleogene Subcommission

- Prepare and submit to the Subcommission the proposals for the establishment of GSSPs for the Priabonian and Chattian.
- Field workshop of the Bartonian WG in Central Italy and southern England to evaluate the potential value, as GSSP, of three potential candidate sections.
- Organize and support a meeting of the Paleogene Subcommission in STRATI2015
- Field workshop in the Gubbio area (Central Italy) to evaluate auxiliary sections for the GSSP of the Selandian.
- Screen and rejuvenate the list of the Corresponding Members.

- Reactivate or close those Regional Committees and Working Groups that have long been inactive.
- Update and renew the ISPS website.

Cretaceous Subcommittee

- Dedication of the base Santonian GSSP at Olazagutia, Navarra, Spain.
- Approval of a GSSP for the Albian Stage by the boundary working group and the subcommission.
- Vote on the Coniacian GSSP.
- Vote on the Hauterivian GSSP.
- Decision on the criteria for identifying the base of the Berriasian Stage and the J/K boundary.

Jurassic Subcommittee

- *A meeting of the Kimmeridgian Working Group will take place 18th - 21st May 2015, in Warsaw, Poland.*
- Dedication of the base Toarcian GSSP at Peniche, Portugal.
- Completion of a formal proposal for the base Oxfordian GSSP.
- Focused support of the subcommission on the work of the Kimmeridgian task Group.
- Continued work on the base Tithonian and base Callovian GSSPs.

Triassic Subcommittee

- STRATI 2015, 2nd International Congress on Stratigraphy, July 19-23, Graz, Austria will include a session on “Progress in Triassic stratigraphy”. The program of the Congress includes a 3-day field trip (FT 5) to the Upper Triassic of the Northern Alps will visit the T/J GSSP and the Norian/Rhaetian GSSP candidate section at Stenibergkogel.
- 2nd Boreal Triassic Conference 2015, Svalbard and 12th International Workshop on the Permo-Triassic, Svalbard August 27 – September 1, 2015. The rich program of the workshop includes two days of presentations and two days of excursions. The focused topics include Boreal Triassic biostratigraphy, palynology, sedimentology, and vertebrates.
- Decision on a GSSP for the Rhaetian Stage with two sections under consideration. Vote by working group in early 2015 and preparation of final GSSP proposal before end of 2015.
- The base Norian GSSP will be discussed at STRATI2015 with the goal of deciding the boundary marker and evaluating the two candidate stratotype sections.
- Revision of Subcommittee website.

Permian Subcommittee

- Complete Subcommittee vote on GSSP for Kungurian Stage and forward to ICS.
- The priority of 2014 is to decide which index species will be used for definitions of the base Sakmarian and base Artinskian GSSPs. The index species must be formally described and published before votes on GSSP proposals can be held..

Carboniferous Subcommittee

- XVIII International Congress on the Carboniferous and Permian (XVIII ICCP) in Kazan, Russia, August 2015. All boundary work groups will hold important business meeting in addition to that of the Subcommittee.
- Completion of varied stratigraphic datasets for The Hangenberg Event sections worldwide for evaluation at workshops on redefinition of the Devonian-Carboniferous boundary that will be

held at the August XIVIII ICCP in Kazan, Russia and the July (STRATI 2015) in Graz, Austria.

- Completion of GSSP proposal for Tournaisian-Visean boundary.
- Working group will prepare a proposal on the definition of the Visean-Serpukhovian boundary for discussion at a workshop associated with the XVII ICCP in Kazan, Russia. The working group also will select the best candidate section for the GSSP. The best two candidate sections are the Naqing (Nashui) section by the village of Naqing in southern Guizhou Province, China and the Verkhnyaya Kardailovka section on the Ural River in southern Russia.
- Selection of a conodont lineage and taxon suitable for definition of the Bashkirian-Moscovian boundary and a continued search for suitable GSSP candidate sections particularly in South China, southern Urals, and the Donets Basin.
- Preparation of a proposal for using the conodont *I. heckeli* to define the Moscovian-Kasimovian boundary and a discussion of the proposal during a business meeting at the XVIII International Congress on the Carboniferous and Permian in Kazan, Russia.
- Search for a suitable section for the GSSP for the Ksaimovian-Gzhelian boundary.

Devonian Subcommittee

- Annual Business Meeting, jointly with IGCP 596 in Brussels, Belgium (September 2015).
- Organising a Symposium in July at STRATI 2015 on *Devonian Events, Correlation and Time*
- Editorial work for a volume on *Devonian Climate, Sea Level and Evolutionary Events* as a Special Publication of the Geological Society of London. Papers to be submitted by end January 2014
- Publication of SDS Newsletter 30 in June 2015.
- Update of SDS homepage (pdf files of former SDS Newsletters and new GSSP illustrations).
- Active participation in joint Devonian/Carboniferous Boundary Task Group with a focus on conodont revisions and pelagic-neritic correlations.
- Manuscript on Givetian and Frasnian substages for *Lethaia*.
- Field investigation in Uzbekistan to resolve problems with base Emsian Stage GSSP.
- Progress on Famennian substage definitions.

Silurian Subcommittee

- Update and add content to redesigned website
- Publication of Silurian Times Newsletter 22.
- The 5th International Symposium on the Silurian System will be held jointly with the 5th Annual Meeting of the IGCP 591 in Quebec City, Canada, July 8 – 10, 2015
- Implementation and presentation of an award that recognizes outstanding contributions to Silurian stratigraphy by a young scientist (under age of 40).
- Participation in STRATI 2015 - 2nd International Congress on Stratigraphy to be held in Graz, Austria, 19–23 July.
- Immediately following STRATI 2015, the ISSS is planning a joint Aeronian-Telychian boundary GSSP working group field workshop in Prague. Tentative plans include an indoor session of talks and examination of research collections, visits to GSSP candidate and associated sections for the Base of Aeronian in the Prague region, followed by a trip to SW Spain to visit a candidate section for the Base of Telychian
- ISSS members continue to collaborate on the process of full integration of the various regional and global biostratigraphic, lithostratigraphic, sequence stratigraphic, and

chemostratigraphic scales for the entire Silurian. This integration is essential for refinement of the Silurian time scale and high-resolution correlation of Silurian events. In addition, some ISSS members are focusing on generation of new, high-resolution radiometric dates that are well constrained within the Silurian time scale. This is essential to achieve better calibration of time scale, which has been a serious weakness for the Silurian System.

- Implement a new, innovative approach to consideration of GSSP candidate sections and improving correlation among sections. It is proposed that as the data from each candidate section are assembled, all of the biostratigraphic, chemostratigraphic, and other data useful for correlation, will be assembled into a database (the Geobiodiversity Database), along with data from other sections, globally. These data will then be studied using quantitative correlation methods, such as CONOP9 and Horizon Annealing. These methods allow for simultaneous correlation of many sections using a range of different types of stratigraphic data, producing a high-resolution correlation between all sections. This approach permits integration of data from different fossil groups that only rarely co-occur, as well as chemo- and lithostratigraphic and radiometric data, thus permitting correlation between different facies and paleogeographic regions. They also permit quantitative assessment of the precision with which particular levels at any given section can be placed within the composite succession. We feel that this may be a good approach to find a GSSP level that can be correlated globally with the highest level of precision and confidence.

Ordovician Subcommittee

- 12th International Symposium on the Ordovician System, Harrisonburg, Virginia, USA, 3-18 June 2015.
- Execution of a programme of radiogenic dating of key Ordovician horizons (using Pb-Pb isotopes) making use of the state-of-the-art StarPlan laboratory in the University of Copenhagen.
- Stimulate where relevant the production of revised regional correlation charts on the basis of new regional stratigraphic data and their relationship to the newly established international stages. In additional regional isotope and sea-level data will be added.
- During the Prague meeting in May those present agreed to begin discussions in their own regions regarding the possibilities of providing simple correlation charts, linking regional chronostratigraphies to the global stages.
- The Subcommittee can now move with some confidence towards confirming and establishing finer divisions of Ordovician time. In this respect Bergström et al. (2009: *Lethaia*) have divided our international stages into stage slices based mainly on existing biozones.

Cambrian Subcommittee

- 20th Cambrian Stage Subdivision Working Group Conference in Newfoundland.
- Symposium on base Cambrian (Paleozoic) GSSP at STRATI2015 in Austria.
- Continue work toward defining GSSPs for provisional stages 2, 3, 4, 5, and 10.
- During 2015, provisional Stage 5 (and Series 3) is expected to be defined.
- Examine issues surrounding possible redefinition of the Cambrian GSSP.

Ediacaran Subcommittee

- Subcommittee business meeting at STRATI 2015.

- The Ediacaran, Cryogenian, and Precambrian subcommissions will sponsor and organize a joint symposium entitled “Precambrian Stratigraphy and Earth System History” at the STRATI 2015 meeting (19-23 July 2015, Graz, Austria).
- Formalize the membership of two working groups to focus on the second stage and the terminal stage of the Ediacaran System.
- The Subcommission will likely organize and sponsor two or three field workshops, each focusing on the second stage and the terminal stage of the Ediacaran System. Likely field sites include Ediacaran successions in South Australia, Oman, and possibly Russia.
- Symposium “Neoproterozoic palaeobiology: preservation, palaeobiology, environments and phylogeny” at the 4th International Paleontological Congress, 28 September - 3 October 2014, Mendoza, Argentina.
- Continue to update Subcommission webpage and to produce and distribute Annual Newsletter

Cryogenian Subcommission

- ‘Precambrian Stratigraphy and Earth System History’ session and subcommission meeting at the STRATI 2015 meeting in Graz (July 19-23, 2015). A major focus of this meeting will be to move forward on establishment of Precambrian GSSPs together with the Precambrian and Ediacaran subcommissions.
- Preparation of an application for a special issue of Precambrian Research devoted to articles on regional Cryogenian stratigraphy. Submission is envisaged during 2015 with publication of most articles by IGC 2016.
- Preparation for future logistically challenging field visits to the Yukon (possibly in 2016).
- Subcommission meeting at AGU/GSA in December 2014.
- Update of Subcommission webpage to be hosted at NIGPAS, Nanjing, China – upload all field workshop guidebooks from past decade.

Precambrian Subcommission

- Update the Precambrian Subcommission Voting Membership
- Establish the base of the timescale, at T_0 , following the consensus reached by the Hadean Working Group
- Continue dialogue regarding the upper boundary for the Hadean and put a boundary to a vote.
- Establish an Archean-Proterozoic boundary working group from active researchers in the field and commence discussions on the definition of the Archean-Proterozoic boundary.

Stratigraphic Classification Subcommission

- First drafts of papers on Biostratigraphy, Chronostratigraphy, and Lithostratigraphy will be completed and distributed for review.
- ISSC Newsletter No. 20 will be produced and distributed.
- Membership will be updated.

11. BUDGET REQUEST TO IUGS FOR 2015 (\$ US)

The following table is based on the budget requests from all Subcommissions submitting annual reports and the ICS Executive. The total amount is \$94,453. In past years, the ICS Executive has evaluated these requests and reduced them so that the total amount is closer to the \$50,000 normally allocated to ICS (except for years with IGCs). This year reduced amounts have not been determined. For 2015, such determinations will be done after the ICS allocation has been set by the IUGS Executive Committee, and consideration will be given to allocation of funds from the NSF grant to ICS. In some instances, a Subcommission reduced the total budget planned for 2015 by the carryover from its 2014 budget allocation.

Subcommission	Request for 2014 USD	Justification
Quaternary	5000.00	GSSP workshop - Japan, STRATI2015
Neogene	1750.00	GSSP Burdigalian field meeting, STRATI2015
Paleogene	6300.00	GSSP meetings - Italy & UK, STRATI2015
Cretaceous	5000.00	J/K boundary meetng, STRATI2015
Jurassic	3035.00	Kimmeridgian GSSP field meeting
Triassic	7000.00	Boreal Trias meeting, STRATI2015
Permian	4300.00	Urals field excursion, IGCP meeting, Nanjing visit
Carboniferous	1500.00	ICCP meeting, STRATI2015
Devonian	2100.00	STRATI2015
Silurian	7610.00	ISSS Canada, STRATI2015, student award
Ordovician	6500.00	ISOS USA, STRATI2015
Cambrian	6100.00	GSSP meeting - Newfoundland
Ediacaran	4011.00	Field meetings, STRATI2015
Cryogenian	4000.00	STRATI2015
Precambrian	5000.00	STRATI2015
Stratigraphic Classific.	5000.00	STRATI2015
ICS Executive (3)	7500.00	
Reserve	3000.00	
Total	\$80,706.00	

Requests from some subcommissions have been reduced by support that will be provided from ICS-NSF grant.

12. REVIEW CHIEF ACCOMPLISHMENTS SINCE 2000

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 **Calabrian** Age formally defined at Vrica, Calabria, Italy at the GSSP that defined the base of the Pleistocene Epoch from 1984 to 2009
4. base of **Pleistocene** Epoch redefined at base of Gelasian Stage with Gelasian transferred from Neogene (2009)

Neogene

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

Paleogene

9. base of the *Lutetian* Stage at Gorrondatxe, Spain (2011)
10. base of the **Eocene** Series (and *Ypresian* Stage) in the Dababiya Section near Luxor, Egypt (2003)
11. base of the *Thanetian* Stage at Zumaia, Spain (2008)
12. base of the *Selandian* Stage at Zumaia, Spain (2008)

Cretaceous

13. base of the *Maastrichtian* Stage at Tercis, France (2000)
14. base of the *Santonian* Stage at Olazagutia, Spain (2013)
15. base of the *Turonian* Stage at Pueblo, Colorado, USA (2003)
16. base of the *Cenomanian* Stage and of the **Upper Cretaceous** Series, at Risou, France (2002)

Jurassic

17. base of the *Bathonian* Stage at Ravin du Bès, Bas Auran, near Digne, France (2008)
18. base of the *Aalenian* Stage and of the **Middle Jurassic** Series at Fuentalsaz, Spain (2000)
19. base of the *Toarcian* Stage at Peniche, Portugal (2014).
20. base of the *Pliensbachian* Stage at Robin Hood Bay, England (2004)
21. base of the *Sinemurian* Stage at East Somerset, England (2001)
22. base of the *Hittangian* Stage and of the **Lower Jurassic** Series and **Jurassic** System at Kuhjoch, Northern Calcareous Alps, Tyrol, Austria (2010)

Triassic

23. base of the *Carnian* Stage at Prati di Stuares, Italy (2008)
24. base of the *Ladinian* Stage at Bagolino, Italy (2005).
25. base of the **Triassic** System and of **Lower Triassic** Series and of *Induan* Stage at Meishan, China (2001)

Permian

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

Carboniferous

29. agreement on Series-level divisions (2004)

- 30. ratification of Series names, and Stage names (2006)
- 31. base of *Visean* Stage in Guangxi, China (2008)

Devonian

- 32. all Devonian stage boundaries are defined by a GSSP
- 33. 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

- 34. 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.
- 35. 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

- 36. base of the *Hirnantian* Stage in China (2005).
- 37. base of the *Katian* Stage in Oklahoma, USA (2006)
- 38. base of the *Sandian* Stage and the **Upper Ordovician** Series at Fågelsång in Sweden (2002).
- 39. base of *Dapingian* Stage and the **Middle Ordovician** Series in China (2006, named 2007)
- 40. base of the *Floian* Stage at Diabasbrottet in southern Sweden (2002).
- 41. base of the **Ordovician** System and the **Lower Ordovician** Series and of the *Tremadocian* Stage at Green Point, Newfoundland, Canada (2000).

Cambrian

- 42. base of the *Jiangshanian* Stage at Duibian, China (2011)
- 43. base of the *Paibian* Stage and the **Furongian Series** (uppermost series of Cambrian) in the Paibi section, NW Hunan province, south China (2003)
- 44. base of *Guzhangian* Stage (Series 3) in China (2007)
- 45. base of *Drumian* Stage (Series 3) in USA (2007)
- 46. vote to subdivide the Cambrian into **four series** and **10 stages** (2004)
- 47. Vote to name lowest series and stage as **Terreneuvian** and *Fortunian*, respectively (2007)

Proterozoic Era

- 48. 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), Magnetostratigraphy (2010), and Sequence Stratigraphy (2011).

C. The International Stratigraphic Chart

The ICS International Chronostratigraphic Chart 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. The Chart is regularly updated, and translations into a number of

languages have been prepared. The Chart and translations can be downloaded at www.stratigraphy.org. The January 2013 version was published along with an explanatory text in the September 2013 issue of Episodes. A 2014 version is posted on the ICS website. The Chart and all its prior versions together with the Table of GSSPs on www.stratigraphy.org comprise the recognized archive of the international geostandards developed by the International Commission on Stratigraphy.

13. OBJECTIVES AND WORK PLAN FOR NEXT 5 YEARS (2015-2020)

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 2015.**

ICS Executive Committee

1. Define a substantial number of GSSPs, particularly for stage in the Carboniferous, Triassic, Jurassic, Cretaceous, and Cambrian systems; re-evaluate GSSPs for the several Silurian stages and the Devonian-Carboniferous boundary, and of the Cambrian System (Paleozoic Erathem, Phanerozoic Eonothem), and select GSSP-defined subdivisions of the Precambrian.
2. Maintain website and its formal, permanent archive of the global geostandards - GSSPs and the ICS International Chronostratigraphic Chart.
3. Coordinate websites and the information they contain among all subcommissions and the Commission in order that they become the primary global web-based entry point to information on the activities and accomplishments of the subcommissions and ICS.
4. Encourage subcommissions to regularly re-assess GSSPs and to develop new initiatives and projects that utilize the refined International Stratigraphic Chart.
5. Encourage the recruitment by subcommissions of members from under-represented countries/regions and of those at early career stages.
6. Promote the preservation of GSSPs by local communities and national stratigraphic commissions and dedication ceremonies, including the placement of permanent markers, at all ratified GSSPs.
7. Produce a new edition of the *International Stratigraphic Guide* with its joint publication by IUGS and the Geological Society of America
8. Have a strong presence at the 35th IGC in 2016 with exciting symposia, varied field excursions, business meetings, and other activities sponsored by ICS and its subcommissions, and hold a ICS workshop..
9. Develop a strong link between ICS and the Geobiodiversity DataBase at the Nanjing Institute of Geology & Palaeontology
10. Maintain close collaboration with all national stratigraphic commissions.
11. 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.
12. Serve as the primary international body setting global standards and illustrating best practices in stratigraphy.

Quaternary Subcommission

1. GSSP definition for the Middle Pleistocene Stage/Subseries boundary.
2. GSSP definition for the Upper Pleistocene Stage/Subseries boundary.

3. Nominate two GSSPs to subdivide the Holocene Series into three named stages.
4. Explore further chronostratigraphic subdivision of the Quaternary System/Period, including the duration and status of the “Anthropocene”.

Neogene Subcommittee

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 Subcommittee

1. Submit the proposals for Priabonian and Chattian GSSPs to the Paleogene Subcommittee voting members, then to ICS and possibly to *Episodes* for publication during 2014-2015.
2. Decide the definition for the base of Bartonian, choose a type section and submit a proposal to Paleogene Subcommittee voting members 2014.
3. Submit the proposed Bartonian GSSP to ICS and possibly to *Episodes* for publication within 2015.
4. Actively participate in STRATI2015 and in the 35th IGC at Cape Town, South Africa.
5. Produce an updated version of an integrated Paleogene time scale.
6. Produce a state-of-the-art review of the stratigraphic tools used in the Paleogene.
7. Preparation of standardized regional correlation charts and paleogeographic maps by the Regional Committees.
8. Revise and find auxiliary sections to better characterize the:
 - a. P/E boundary (i.e Alamedilla, Caravaca, Zumaia, Spain; Forada, Italy, Contessa highway Italy, Polecat Bench (Wyoming),
 - b. Danian/Selandian: Contessa, Bottaccione, Sopelana, Italy; Caravaca, Spain
 - c. Selandian/Thanetian: Contessa, Italy
 - d. Priabonian: Egypt Wadi Hitan Valley, in the Fayum
 - e. E/O: Monte Cagnero, Italy, Fuente Caldera, Spain.

Cretaceous Subcommittee

1. Active participation in 2nd International Congress on Stratigraphy, Graz, Austria, July 2015.
2. Active participation in 35th International Geological Congress, Cape Town, South Africa, August 2016.
3. 10th International Symposium on the Cretaceous System, Vienna or Salzburg, Austria, September 2017.
4. 2014-2015: Approval of GSSP proposals for the bases of the Albian, Valanginian, Hauterivian, Barremian, Aptian, Coniacian, and Campanian stages by 2014.
5. 2015 - Finalize GSSP proposal for the base of Berriasian (Jurassic/Cretaceous boundary).
6. To develop new directions for the Subcommittee as GSSP proposals are completed. This specifically concerns the subdivision of stages, with the definition of substages and related GSSPs.

Jurassic Subcommittee

1. 2014-2018 - Finalize proposals for the bases of the Bathonian, Callovian, Oxfordian, Kimmeridgian, and Tithonian stages.
2. Stage Working Groups to standardise and propose GSSPs for Substages as appropriate, but named ONLY as Lower/Middle/Upper.
3. Develop strategy for integration of cyclostratigraphy and geochronology into knowledge of stages and substages

4. Develop website as forum for exchange ideas in relation to Jurassic stratigraphy

Triassic Subcommittee

1. Complete update of Subcommittee website.
2. Completion of Triassic GSSPs: 2015 – Rhaetian and Norian, 2016 – Olenekian, and 2018 - Anisian.
3. Improvement of numerical calibration of Triassic chronostratigraphic units, particularly the durations of the Induan, Norian, and Rhaetian stages.
4. Improvement of the marine-land correlations, especially as regard the calibration of the correlations between the Newark Basin succession with its superb astrochronological record and the marine successions from the Tethys.
5. Once GSSPs for all stages are ratified, establishment of working groups to define substages.

Permian Subcommittee

1. Completion of Permian GSSPs with voting in 2015 on proposals for the Sakmarian, Artinskian and Kungurian stages, Cisuralian Series.
2. Establish working group on chemostratigraphy and geochronologic calibration of the Guadalupian Series.
3. Publish the *Episodes* articles required as the final step in ratification of the GSSPs for the three stages of the Guadalupian Series, and of the series itself.
4. Correlations into continental deposits and across provincial boundaries.
5. Replacement the base Lopingian GSSP the stratotype section at Penglaitan, Guangxi, South China with another nearby outcrop because the original stratotype section will be flooded in 5-10 years by a dam being built for electronic power.

Carboniferous Subcommittee

1. Select new stratigraphic level and stratotype section for redefinition of the Devonian-Carboniferous boundary.
2. Select biostratigraphic events on which to define stage boundaries for the Serpukhovian, Moscovian, Ksaimovian, and Gzhelian.
3. Investigate candidate stratotype sections for bases of Serpukhovian, Moscovian, Ksaimovian, and Gzhelian stages.
4. Continue studies of chemostratigraphy and magnetostratigraphy for the Carboniferous with the goal of identifying events that can be used to supplement the stage boundaries that will be defined by means of faunal events, and will eventually 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.
5. Continue efforts to obtain new, precise radiometric dates on biostratigraphically well-constrained marine successions.

Devonian Subcommittee

1. Selection of a new GSSP for the Devonian-Carboniferous boundary.
2. Redefine the base of the Emsian Stage following field investigations in Uzbekistan in 2015 and the study of new samples and their evaluation at the ICOS meeting in Valencia in 2017.
3. Formalize the substage subdivision of stages.

Silurian Subcommittee

1. Continue research on bases of Aeronian, Telychian and Sheinwoodian sections in UK, Czech Republic, Spain and China, as part of the process of selection of possible new GSSP sections.
2. International Symposium on the Silurian System, Quebec City, Canada, July 2015. This meeting will be held in association with the annual meeting of IGCP 591 and the International Subcommittee on Cambrian Stratigraphy.
3. Co-sponsor closing meeting of IGCP 591, Ghent, Belgium, 2016.
4. Development of databases that will bring together and make available information from all sources associated with the Silurian researchers.

Ordovician Subcommittee

1. Production of revised correlation charts, linking regional chronostratigraphic schemes to the global stages for each major paleogeographic region.
2. Develop a global sealevel curve for the Ordovician.
3. Develop a standard set of paleogeographic base maps for the Ordovician.
4. Develop more robust absolute ages for the Ordovician.
5. Rejuvenate regional working groups with the purpose of refining correlations.
6. Evaluate the GSSP for the Cambrian-Ordovician boundary, base of Tremadocian stage.

Cambrian Subcommittee

1. Approval of GSSP proposal and name for Provisional Stage 5 in 2015.
2. Approval of GSSP proposal and name for Provisional Stage 10 by 2017.
3. Following a decision on Stage 10, provisional stages 2, 3, and 4 are expected to be defined in rapid succession. A decision on the preferred GSSP horizon of any one of the three stages will restrict choices for the remaining two stages, so the ICS is approaching work toward definition of the three stages as closely linked.
4. A more long-term objective is re-examination of the Cambrian System (Terreneuvian Series, Fortunian Stage) GSSP. Imprecision in correlating the lower boundary of the Cambrian System has been encountered on all paleocontinents, and the ICS is now engaged in seeking a practical solution to remedy the problem. A decision on how to proceed with the Cambrian GSSP is expected to be made following ratification of GSSPs for stages 2, 3, and 4.

Ediacaran Subcommittee

1. 2015-2016 Additional field trips to be organized to examine potential GSSP sections for Ediacaran subdivisions, and submission and discussion of formal proposals for Ediacaran Stage GSSP(s);
2. 2017: Review and vote on Ediacaran Stage GSSP proposals.
3. 2018: Ratification of Ediacaran Stage GSSP(s).

Cryogenian Subcommittee

1. 2015. Encourage widespread use of new calibrated age for the base of the Cryogenian System with likely publication in *Episodes*.
2. 2015-2016. Ongoing discussion with the ICS and the Precambrian Subcommittee regarding the status of the Tonian System.
3. 2016-2017. Additional field trips to be organized to examine potential GSSP sections in northwest Canada (?), Yukon (2016), Svalbard (?) and/or East Greenland (?) – possibly application for additional funding from the ICS for the Yukon trip.
5. 2017-2018. Review of GSSP ideas using template papers and establishing priorities for field excursions. First GSSP proposal submitted and discussed.

6. 2097-2020: Discussion and voting on Cryogenian GSSP candidates, and ratification of Cryogenian GSSP at 2020 IGC.

Precambrian Subcommittee

1. Create a new, smoothly functioning Subcommittee
2. Update the Subcommittee website
3. Establish a formalised Hadean Eon in the Geological timescale
4. Convene a workshop to discuss and implement change to the Archean-Proterozoic boundary, to commence centring in on a GSSP locality.
5. Continue to advertise and broadcast the work of the subcommittee

International Stratigraphic Classification Subcommittee

1. Publication of separate papers on Lithostratigraphy, Biostratigraphy, and Chronostratigraphy in *Newsletters on Stratigraphy* by 2016.
2. The ULTIMATE GOAL of ISSC is the publication of a new, multi-authored, really multinational *International Stratigraphic Guide*—a guide not a code, simple, clear, concise, user-friendly, for world wide distribution and acceptance.
3. ISSC will continue to participate in GSSP discussions with ICS subcommittees.
4. ISSC continues to interface with national stratigraphic commissions although only in an advisory capacity.
5. ISSC is updating its membership list, in order to eliminate dormant colleagues and incorporate new ones.
6. ISSC will take the initiative to contact journal editors and scholarly book publishers to remind them of the basic tenets in the existing *International Stratigraphic Guide* as well as relevant national codes, as well as the background in the review papers.
7. Potential new executive members will be canvassed from stratigraphically disposed colleagues.
8. (10) The ULTIMATE GOAL of ISSC is the publication of a new, multi-authored, really multinational International Stratigraphic Guide— a guide not a code, simple, clear, concise, user-friendly, for world wide distribution and acceptance.

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