International Commission on Stratigraphy

Subcommission on Cambrian Stratigraphy

ANNUAL REPORT 2020

1. TITLE OF CONSTITUENT BODY

International Subcommission on Cambrian Stratigraphy

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2. OVERALL OBJECTIVES AND FIT WITHIN IUGS SCIENCE POLICY

2.a. Mission Statement

The Subcommission is the primary body for facilitation of international communication and scientific cooperation on Cambrian stratigraphy.

2.b. Goals

The two principal goals of the Subcommission are:
1) To develop a global stage-level and series-level chronostratigraphic classification of the Cambrian System.
2) To complete and publish regional and global correlation charts for the Cambrian System.

2.c. Fit within IUGS Science Policy

The objectives of the Subcommission fall within three main areas of IUGS policy:
1) The development of an internationally agreed scale of chronostratigraphic units, fully defined by GSSPs where appropriate (stages and series), and related to a hierarchy of units (zones) to maximize relative time resolution within the Cambrian Period.
2) Establishment of frameworks and systems to encourage international collaboration in understanding the evolution of the Earth during the Cambrian Period.
3) Working towards an international policy concerning conservation of geologically and paleontologically important sites such as GSSPs and Fossil-Lagerstätten.

3. ORGANISATION

3.a. Interface with other international projects/groups

The Cambrian Subcommission is involved jointly with the Ordovician Subcommission in *IGCP Project 653: The onset of the Great Ordovician Biodiversification Event.*

The Cambrian Subcommission is working jointly with the Ediacaran Subcommission on restudy of the Cambrian base. Members of both subcommissions comprise the membership of

the Terreneuvian/Fortunian Working Group. During recent years, for instance in 2017 and 2019, joint meetings of the Ediacaran and Cambrian subcommissions have been organized.

3.b. Current officers for 2020–2024

Chair: Per Ahlberg (Sweden) per.ahlberg@geol.lu.se
Vice-Chair: Maoyan Zhu (China) myzhu@nigpas.ac.cn
Secretary: Anna Żylińska (Poland) anna.zylinska@uw.edu.pl

Webperson: Michael Streng (Uppsala, Sweden) michael.streng@geo.uu.se

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

N/A

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2020

- The Cambrian chapter ('The Cambrian Period' by Peng, S.C., Babcock, L.E. & Ahlberg, P.) for the book *Geologic Time Scale 2020* was completed and the entire volume was published by Elsevier in November 2020. The chapter has been updated, contains a wealth of new information, and will form a basis for discussions on how to define the remaining undefined series and stages.
- In November 2020, the Working Group on Cambrian Stage 10 provided its recommendation on which stratigraphic horizon to be used to mark the stage. Two options were considered: at the FAD of *Lotagnostus americanus* and at the FAD *Eoconodontus notchpeakensis*. The WG overwhelmingly recommended that the base of provisional Stage 10 should be at the FAD of *Lotagnostus americanus* (sensu Peng et al. 2015), and the FAD of *Eoconodontus notchpeakensis* should be used for subdividing Stage 10 into two substages.
- Landing et al. (2020) and Officers of the Subcommission (Zhu et al. 2020) attempted to clarify the carbon isotope stratigraphy in the uppermost Cambrian and the concept of the TOCE and HERB excursions in two separate papers published in *Geological Magazine*, albeit with different views (see https://doi.org/10.1017/S0016756820000382 and https://doi.org/10.1017/S0016756820001120).

6. SUMMARY OF EXPENDITURE IN 2020

Since this has been an exceptional year because of the covid-19 pandemic, we had to cancel a number of activities, including an Annual meeting. For the same, and other reasons, we also had to postpone a planned Cambrian field conference in Siberia. This implies that the expenditures for 2020 is zero dollars.	$ 00.00
SUBTOTAL 2020 expenditures	$ 00.00
To be carried forward to 2021	$ 4845.00

7. SUMMARY OF INCOME IN 2020

Carried forward from 2019	$ 1345.00
ICS Allocation	$ 3500.00

SUBTOTAL 2020 income	$ 4845.00

8. BUDGET REQUESTS FROM ICS IN 2021

Since it has been an exceptional year and we had to cancel all activities, including an Annual meeting, a considerable amount of money is left from 2020, and the budget request for 2021 is therefore modest (USD 2000). The covid-19 pandemic will likely continue for a long time and we plan to hold a virtual Annual meeting, perhaps located in Poland or Spain. If it is possible to arrange for small groups of colleagues to produce virtual field trips, the online meeting can include such field trips.

The money carried forward from 2020 will be saved for a Cambrian field conference in Siberia, which will hopefully be organized in 2022 by Pavel Yu. Parkhaev, Moscow. At this expensive field meeting, we will have the opportunity to examine and discuss stratigraphic issues surrounding the remaining undefined stages and the base of the Cambrian GSSP.

PLANNED EXPENDITURES FOR 2021	
Virtual conference and Annual meeting, including virtual field trip(s)	$ 2000.00
TOTAL 2021 PLANNED EXPENSES	$ 2000.00
ICS 2021 BUDGET REQUEST	$ 2000.00

9. OBJECTIVES AND WORK PLAN FOR NEXT YEAR (2021)

In 2021 the Cambrian Subcommission will continue work toward defining GSSPs for its remaining provisional stages.

- Arrival at a decision on how to define Stage 10 in 2021 (two options: at the FAD of the agnostoid *Lotagnostus americanus* or at the FAD of the conodont *Eoconodontus notchpeakensis*); then to arrive at decisions on stages 2, 3, and 4 in subsequent years.
- Continue examining issues surrounding definition of the Cambrian GSSP.

10. KEY OBJECTIVES AND WORK PLAN FOR THE NEXT FOUR YEARS (2021–2025)

The principal objective of the Subcommission is to narrow possibilities for horizons and GSSP stratotypes for the remaining undefined stages, which are provisionally identified as stages 2, 3, 4, and 10. The ISCS has developed a prioritized plan for formalizing definition of the remaining undefined GSSPs. The plan is:

- Provisional Stage 10 is expected to be defined next, and a decision on a GSSP will likely be made in 2021.
- 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 ISCS is approaching work toward definition of the three stages as closely linked.

- A more long-term objective is re-examination of the Cambrian GSSP (Terreneuvian Series, Fortunian Stage). Imprecision in correlating the lower boundary of the Cambrian System has been encountered on all palaeocontinents, and the ISCS is now engaged in seeking a practical solution to remedy the problem (see Babcock, L.E. et al. 2014: Proposed reassessment of the Cambrian GSSP. *J. of African Earth Sci. 98*, 3–10). 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.

APPENDIX

Subcommission officers (2020–2024)

Chairman: Per Ahlberg, Department of Geology, Sölvegatan 12, SE-223 62 Lund, Sweden; Tel. +46 46 2227870, +4679 532 92 09 (mobile); per.ahlberg@geol.lu.se
Vice-Chair: Maoyan Zhu, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, 39 East Beijing Road, Nanjing, 210008, China); Tel. 0086-25-83282159; myzhu@nigpas.ac.cn
Secretary: Anna Żylińska, Department of Historical Geology, Regional Geology and Palaeontology, Faculty of Geology, University of Warsaw, Żwirki i Wigury 93, PL-02-089 Warszawa, Poland; Tel. +48 225540448, +48 5011828678 (mobile); anna.zylinska@uw.edu.pl

List of Voting Members (including officers) for 2020–2024

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9. Peter (‘Pierre’) D. Kruse, South Australian Museum, Adelaide, SA, 5000, Australia; archaeo.kruse@gmail.com
10. Malgorzata Moczydlowska-Vidal, Department of Earth Sciences, Palaeobiology, Uppsala University, Villavägen 16, SE 752 36 Uppsala, Sweden; Tel. + 46 18-471 2743; malgo.vidal@pal.uu.se
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12. Shanchi Peng, State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, 39 East Beijing Road Nanjing 210008, China; scpeng@nigpas.ac.cn
13. Tae-Yoon S. Park, Division of Polar Earth-System Sciences, Korea Polar Research Institute, 26 Songdomirae-ro Yeonsu-gu, Incheon 21990, Republic of Korea; typark@kopri.re.kr
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15. John R. Paterson, School of Environmental & Rural Science, University of New England, Armidale NSW 2351, Australia; Tel. +61-2-6773 2101; jpater20@une.edu.au
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19. Michael Steiner, Institut für Geologische Wissenschaften, FU Berlin, Malteserstraße 74-100, Haus D, 12249 Berlin, Germany; Tel. +49 30 838 70272; michael.steiner@FU-Berlin.de
20. Alexey I. Varlamov, Federal State Unitary Enterprise «All-Russian Research Geological Oil Institute», 105118, shosse Entuziastov, 36, Moscow, Russia; varlamov@vnigni.ru, info@vnigni.ru
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List of Working (Task) Groups and their officers

1. WG on Stage 10 GSSP, chaired by Per Ahlberg, Department of Geology, Sölvegatan 12, SE-223 62 Lund, Sweden; Tel. +46 46 2227870, +4679 532 92 09 (mobile); per.ahlberg@geol.lu.se
2. WG on Stage 4 GSSP, chaired by James B. Jago, School of Natural and Built Environments, University of South Australia, Mawson Lakes, SA, 5095, Australia; Jim.Jago@unisa.edu.au
3. WG on Stage 3 GSSP, chaired by Xingliang Zhang, Shaanxi Key Laboratory of Early Life and Environment, State Key Laboratory of Continental Dynamics, and Department of Geology, Northwest University, Xian 710069, China; xzhang69@nwu.edu.cn
4. WG on Stage 2 GSSP, chaired by Michael Steiner, Institut für Geologische Wissenschaften, FU Berlin, Malteserstraße 74-100, Haus D, 12249 Berlin, Germany; Tel. +49 30 838 70272; michael.steiner@FU-Berlin.de
5. Cambrian GSSP, chaired by Zhu Maoyan, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, 39 East Beijing Road, Nanjing, 210008, China); Tel. 0086-25-83282159; myzhu@nigpas.ac.cn