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The Subcommission on Cambrian Stratigraphy:
the status quo

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BRIEF HISTORY

Following proposals accepted at the Norden International Geological Congress (IGC) at Copenhagen in 1960, the Subcommission on Cambrian Stratigraphy (SCS) was established in 1961 with the late Sir James Stubblefield as founding Chairman. One of the initial tasks of the Subcommission was to define the Precambrian-Cambrian boundary. Accordingly, a Working Group on the Precambrian-Cambrian Boundary, with John Cowie as Chairman, was formed at the Canadian IGC (Montreal) in 1972. This WG, whose primary task was to select a Global Stratotype Section and Boundary Point (GSSP), held 23 field meetings between 1973-1990 in France, Siberia, Australia, China, USA, Canada, England, Sweden, Morocco, Portugal and Spain. During that period, this WG, augmented by International Geological Correlation Projects 29 and 303, generated a huge amount of biostratigraphic, magnetostratigraphic, chemosтратigraphic and chronometric information, largely summarized by Cowie and Brasier (1989). A GSSP for the base of the Cambrian was finally ratified in 1992 at the base of the Trichophycus pedum (=Phycodes pedum) Zone at the Fortune Head, on the Burin Peninsula, southeastern Newfoundland (Cowie, 1992; Landing, 1992, 1998).

To tackle the upper boundary of the Cambrian System, a Working Group on the Cambrian-Ordovician Boundary (COBWG I) was established in 1974, and regrouped as COBWG II in 1993. This WG also generated a voluminous quantity of multidisciplinary stratigraphic information as a result of visiting candidate GSSPs in Australia, Kazakhstan, China, Scandinavia, UK, Canada and USA. A proposed GSSP for the base of the Ordovician System, hence top of the Cambrian, is at Green Point, in the lower Broom Point Member of the Green Point Formation, at the first appearance of the conodont \textit{Iapetognathus fluctivagus} NICOLL, MILLER, NOWLAN, REPETSKI and ETHINGTON, 1999 (Cooper and Nowlan, 1999). This proposal has been endorsed by the Subcommission on Ordovician Stratigraphy, the Bureau of the Commission on Stratigraphy, and has been ratified by the International Union of Geological Sciences.

In the 1970s the International Subcommission on Cambrian Stratigraphy temporarily established Working Groups on the Lower-Middle and Middle-Upper Cambrian boundaries. However, these WGs were not able to develop sufficient dynamics to overcome the enormous problems arising from regionally different stratigraphic philosophies, simple deficiencies of knowledge, and lack of interest during these times.

Other Working Groups currently operating in SCS include the Cambrian Correlations WG, and the Cambrian Stage Subdivision WG, which includes the Cambrian Global Subdivision Project (CGSP). Correlation Charts and Explanatory Notes have been already published for The Near and Middle East (IUGS Publication 15, 1983), Australia, New Zealand and Antarctica (IUGS Publication
The base of the Huaqiao Formation in the Paibi section (Peng et al., 2001) corresponds to a position 369.06 m above the base of the Huaqiao Formation according to the measured section of Peng et al. (2001b).

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FUTURE TASKS AND RECENT DEVELOPMENTS

The major future task, demanded by the International Commission on Stratigraphy, is to establish GSSPs for internationally agreed Cambrian Stages. Currently, the Cambrian and Carboniferous Systems lack defined GSSPs internally. Response for polled Voting Members of the SCS, suggest that there is majority support for defining the first Cambrian GSSP at the level of *Glyptagnostus reticulatus*. It is therefore necessary to commence assessment of suitable sections. According to the Guidelines for the establishment of GSSPs (Remane et al., 1996), geological requirements to be satisfied include exposure over an adequate thickness, continuous sedimentation, sufficiently rapid sedimentation rate, absence of metamorphism and diagenesis. Biological requirements are for abundance and diversity of well preserved fossils, absence of vertical facies changes and favourable facies for long-range correlation. Other desirable requirements are suitability for radioisotope dating, magnetostratigraphy, chemosтратigraphy and sequence stratigraphy, by a permanently fixed marker, avoidance of very remote locations, free access by researchers regardless of nationality, free access for research and permanent site protection. Ideally, then, undeformed carbonate sections are required, which rules out sections in Baltic for example, but favours sections in Siberia, south-central China and western Queensland, Australia.

An examination of potential GSSPs took place during the field excursions of the China 2001 conference, when the occurrence of *Glyptagnostus reticulatus* and the rock successions were studied in Hunan, accompanied with examination of various aspects critical for the value of these sections for international correlation. The scientific session offered contribution to the *G. reticulatus* level issue. Coupled with South China 2001 were field activities of the Working Group on a *Glyptagnostus reticulatus* level GSSP.

Discussions during the South China 2001 conference showed that only the Hunan sections and the sections in the Maly Karatau were generally regarded as suitable for a GSSP. A multi-person team performed additional studies in the Paibi section, Hunan, and submitted a formal proposal for a GSSP in this section to the International Subcommission on Cambrian Stratigraphy by January 2002.

This “Proposed Global Standard Stratotype-Section and Point for the Paibian Stage and Furongian Series” recommended the base of the first calcilutite layer containing the cosmopolitan agnostoid trilobite *Glyptagnostus reticulatus* in the Huaqiao Formation in the Paibi section (Peng et al., 2001a) as the base of a newly established *Paibian Stage* and of the equally new *Furongian Series* (as a synonym of the revised Upper Cambrian). The FAD of *G. reticulatus* in the Paibi section corresponds to a position 369.06 m above the base of the Huaqiao Formation according to the measured section of Peng et al. (2001b).
This base of the Paibian Stage and Furongian Series corresponds to the base of the Waergangian Stage and Hunanian Series as used in South China (Peng and Robison, 2000; Peng and Babcock, 2001).

The Paibian GSSP was the subject of a ballot by the Subcommission held in February-March 2002, which ended with a 82.4 percent agreement and thus the approval of the proposal. The proposal was submitted to the International Commission on Stratigraphy and was accepted by the ICS bureau at the meeting in Urbino, Italy, mid-June 2002 and passed for the final ratification.

The clear majority support for defining the Cambrian GSSP at the level of Ptychagnostus (or Acidusus) atavus and the Cordyulus proavus level led to a ballot for an approval of formal Working Groups. Both suggested WGs were approved in June/July 2002. New data on the potential GSSP of the Ptychagnostus (or Acidusus) atavus level in the Drum Mountains, Utah, were presented at the meeting in Caunes, Montagne Noire, southern France, in September 2002, and submitted for publication.

Readers of this document who may wish to keep up with activities generated by the SCS are invited to access the Subcommission’s internet homepage at http://www.uni-wuerzburg.de/palaeontologie/ISCS/index.html, which is maintained by Gerd Geyer.

REFERENCES


