

The 13th International Field Conference of the Cambrian Stage Subdivision Working Group

Siberian Platform, Western Yakutia, Russia,
July 20– August 1, 2008

The 13th International Field Conference of the Cambrian Stage Subdivision Working Group took place from 20 July–1 August, 2008 in Sakha Republic (Yakutia), Russia. The main goal of the conference was the demonstration of stratotype and reference sections of the Cambrian System on the Siberian Platform. Some of them are proposed or currently in preparation as GSSPs for Cambrian stages and series in the International Stratigraphic Scale.

The conference was organized and sponsored by the Ministry of Natural Resources of the Russian Federation, the Russian Academy of the Sciences, the Government of Sakha Republic (Yakutia), the National Natural Park 'Lena Pillars', ALROSA Co. Ltd, Nizhne-Lenskoe Co., and the International Subcommission on Cambrian Stratigraphy (ISCS).

The meeting was attended by more than eighty specialists from eight countries all over the world (China—15, Germany—3, Kazakhstan—1, Russia—42, Spain—3, Sweden—3, United Kingdom—1, USA—6 (Figure 1). It included three excursions: to the northern Siberian Platform (Molodo and Khos-Nelege Rivers) (1), to the south eastern part of the platform (Aldan River) (2), and to the Lena River middle reaches (3).

The first excursion (21–24 July) focused on the observation of the reference section of the Amgan Stage and its lower boundary on the Molodo River, and the reference section of the 9th and 10th Upper Cambrian stages in the Khos-Nelege River, north of Zhigansk, Northern Yakutia. Unfortunately, due to weather conditions, the flight

to the Khos-Nelege River section had to be cancelled and only the Molodo River section was examined (Figure 2). This section is proposed by Russian specialists as a GSSP stratotype for the base of the 5th Cambrian Stage (Molodian) and the base of Series 3. The excursion was well attended by more than twenty participants from all countries listed above, including leaders of the ISCS Working Group on the Series 2–Series 3 boundary (F.A. Sundberg and L.B. McCollum). On the last day in Zhigansk the excursion was concluded by a lively discussion led by K.L. Pack on the varied problems of this particular boundary and different approaches to it, and there was useful input from the audience. In spite of negative points such as distant location and the difficult accessibility of the proposed section, along with its condensed sequence, it was still agreed that the Molodo River section is one of the best in the world for this stratigraphical interval. At the same time Chinese members of the Working Group on the Series 2–Series 3 boundary mentioned that the Chinese section proposed as a stratotype of the Series 3 lower boundary is, in contrast to the Yakutian one, not condensed, is easily accessible for study, and some other groups of fauna besides trilobites have already been studied from the section. Consequently, a firmer correlation with other sections in the world and the paleontological study of all sections proposed for the stratotype should be continued. By the end of the discussion F.A. Sundberg agreed to prepare a monograph that would include all necessary information about four sections from USA, China, Spain and Russia — all potential can-



Figure 2 Inspection of the Kuonamka Formation in Molodo River section: the proposed section for stratotype of the lower boundary of Series 3.

didates for the GSSP at this level. The idea is to present data on the proposed sections in a single publication, according to a common plan of description, which would help direct comparison and objective evaluation of the sites on key points before making a final decision.

On the second excursion (24 July) the famous 'Dvortsy' section on the Aldan River was visited, where the stratotypes of the Tommotian Stage, its lower boundary (Bed 14: 0.3 m below the top of Yudoma Formation), and the lowermost Tommotian *Nochoroicyathus sunnaginicus* Zone were located (Figure 3).

During the third excursion (25 July–1 August) the reference sections of the Tommotian, Atdabanian, Botomian and Toyonian stages of the traditional Lower Cambrian were observed in the middle reaches of the Lena River at a distance of about 150 km (Figure 4). In particular, the following sections were examined: **Isit** (the Tommotian–Atdabanian interval, parastratotype of the Tommotian Stage, stratotypes of the *Dokidocyathus regularis* and *Dokidocyathus lenaicus*–*Tumulolynthus primigenius* zones), **Tiktirikteekh** (middle Tommotian bioherms), **Bydyangaya** (bore-hole and middle Tommotian bioherms), **Zhurinsky Mys** (Tommotian–Botomian interval, stratotypes of the Atdabanian Stage and its lower boundary, the *Retecoscinus zegebarti*, *Profallotaspis jakutensis*, *Repinaella*, and *Delgadella anabara* zones), **Oy–Muran** (Atdabanian–Botomian interval, Oy–Muran reef, stratotypes of the *Leptosocyathus polyseptus* and *Laticephalus–Erbilla* zones), **Bachyk** (Atdabanian interval, Bachyk bioherms), **Achagyi–Kyyry–Taas** (Atdabanian–Botomian interval, stratotypes of the *Judomia*, *Carinacyathus pinus*, *Nochoroicyathus kokoulini*, and *Fansycyathus lermontovae* zones), **Ulakhan–Kyyry–Taas** (Atdabanian–Botomian interval, stratotypes of the lower Botomian boundary, the *Bergeroniellus micmacciformis–Erbilla*, *Carinacyathus squamosus–Botomocyathus zelenovi* zones), **Ulakhan–Tuoydakh** (Atdabanian–Botomian interval, Sinsk Lagerstätte), **Labaia** (Botomian interval, stratotype of the



Figure 1 Participants of the Conference on the board 'Dem'yan Bednyi' on the Lena River.



Figure 3 Observation of contact between Yudoma and Pestrotsvet formations and the Lower Tommotian boundary in the Dvortsy Section, Aldan River.

Bergeroniaspis ornata Zone), **Tit–Ary** and **Elanka** (Botomian–Amgan interval, stratotype of the Toyonian Stage, its zones and the lower boundary).

All visited sections present richly fossiliferous, continuous, and uninterrupted sedimentary sequence, where the principal boundaries are mostly restricted to transgressive sequence tract. An excellent exposure, the absence of tectonic dislocations, and the presence of numerous marker beds traceable for dozens of kilometers provided a clear geological picture of the region. These unique features exemplified by the Siberian sections were noted by many participants. However, some specialists (e.g., F. Sundberg and M. Steiner) also noted gaps in fossil content adjacent to some lower boundary horizons, such as the lower Atdabanian boundary, and some number on interformational breaks (F. Sundberg).

Every day, an evening scientific session was held after the fieldwork. In all twenty-eight oral and nine poster reports were presented. The reports were devoted to various problems of Cambrian stratigraphy and paleontology touching fauna and strata from different parts of the world. Additionally, the participants discussed the results of the work done by the Chinese–Russian Lower Cambrian Working Group during its two-years of activity and emphasized the methodological approach in the Lower Cambrian subdivision, i.e. GSSP definitions vs stage stratotype



Figure 4 Participants of the excursion examine the Cambrian succession along the Lena River.

definitions. The necessity of stage stratotypes for real stratigraphic practice was stressed by many speakers. J.S. Hollingsworth, Maoyan Zhu, M. Steiner and J.A. Gámez Vintaned underlined the importance of SSF for defining the bases of the so-called Stage 2 and Stage 3. Once again, many specialists criticized the ratified lower boundary of the Cambrian System placed on the Burin Peninsula, Newfoundland, arguing that this level can not be reliably recognized in any section of the world except the type one! However, the Subcommittee leaders asserted that it was possible to initiate any changes with the already ratified boundary only when the entire Cambrian Timescale is constructed.

The Russian part of the Chinese–Russian Lower Cambrian Working Group suggested a working model for the subdivision of the lower part of Cambrian System (Figure 5). The suggestion attempts to compromise both traditional 3-series Cambrian subdivision (with Siberian stages comprising the lower series) and a new idea of 4-series subdivision of the Cambrian System recently introduced by the ISCS. The principal idea of this working model is in establishing of a more stable and convenient base for a further development of the Cambrian scale. This proposal is favoured by the fact that the Siberian stage nomenclature has been widely used for over twenty-five years. Subcommittee officials, the Chairman Peng Shanchi and Secretary L.E. Babcock, completely and irrevocably rejected the working model, claiming that the further use of the Siberian nomenclature would contradict the Subcommittee rules, in accordance with which only new stages bearing new names should be proposed.

However, this position was strongly criticized by many specialists (A. Yu. Rozanov, K.L. Pack, A. Yu. Zhuravlev, G. Kh. Ergaliev, J. A. Gámez Vintaned, and others), who referred to the achievements of other subcommissions and argued in favour of the preservation of some traditional names for the sake of stratigraphic stability and

‘inheritance’. In addition, Maoyan Zhu pointed out, that Siberian stage names still are the best choice until new GSSPs have been defined.

The new idea of a 4-series Cambrian subdivision itself was repeatedly criticized by many of the workers in practical stratigraphy, who mentioned that such a change would create significant difficulties for geological documentation and could present difficulties for geomapping and for the already published geological maps all over the world.

It is noteworthy, that by the end of the discussion all participants agreed with the necessity to continue work on Cambrian subdivision and correlation, which should be opened to researches from all over the world.

We are grateful to all our colleagues who sent us critical remarks, additions and valuable comments for the present, namely Guo Qingjun, Lin Jihpai, S. Menéndez, Jin Peng, F. Sundberg, M. Steiner, Xinglian Yang, Jinliang Yuan, Yuanlong Zhao, and Maoyan Zhu.

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SERIES	STAGES
FURONGIAN	STAGE 11 (10)
	STAGE 10 (9)
	PAIBIAN
SERIES 3	GUZHANGIAN
	DRUMIAN
	MOLODIAN, JILOCAN
YAKUTIAN (SERIES 2)	TOYONIAN
	BOTOMIAN
	ATDABANIAN
TERRENEUVIAN	TOMMOTIAN
	FORTUNIAN (–MEISHUCUNIAN)

Figure 5 The working model for the subdivision of the lower part of the Cambrian System, suggested by the Russian specialists (units and nomenclature given in bold italics are proposed during the excursion, shaded units are already ratified subdivisions).