

2013 WORK PLANS FOR TASK GROUP TO ESTABLISH THE MOSCOVIAN–KASIMOVIAN AND KASIMOVIAN–GZHELIAN BOUNDARIES

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Moscovian-Kasimovian boundary

Introduction

During the November 1st, 2012 - October 31st, 2013 fiscal year, the ongoing biostratigraphic analyses reported for 2012 (Ueno and task group, 2013) will continue particularly in southern China. The task group has concluded the first appearance datums (FADs) of *Idiognathodus sagittalis* Kozitskaya, 1978 and *Idiognathodus turbatus* Rosscoe and Barrick, 2009 have good potential as markers for the base of the Kasimovian (Villa and task group, 2008; Ueno and task group, 2009, 2011). The task-group leader hopes a proposal to use either *I. turbatus* or *I. sagittalis* for boundary definition can be developed in the new fiscal year. After such a proposal is made and voted on, additional taxonomic work and comparison of morphotypes from different regions can be continued. The proposal would be based on specimens from south China and also recognized in the Midcontinent region of the U.S.A., the Moscow Basin, the southern Urals of Russia, and Donets Basin of Ukraine. The use of either species would raise the base of the Kasimovian up one substage from the traditional position at the base of the Russian Krevyakinian Substage, to approximately the base of the Khamovnikian Substage but will facilitate global correlation.

Activities in southern China

During the last several years, Qi Yuping and James Barrick have been studying conodonts from the uppermost Moscovian to lower Gzhelian slope carbonates in the Naqing (Nashui) section, southern Guizhou Province. As a consequence of that work, they consider that the FAD of *Idiognathodus turbatus* is the best potential boundary marker for the base of the Kasimovian. They will continue with intensive studies to provide more detailed information on the conodont succession across the Moscovian-Kasimovian boundary in the Nashui section (Qi *et al.*, 2007, 2009; Barrick *et al.*, 2010) as a potential GSSP locality.

Work on the sedimentology, stable-isotope geochemistry, and geophysical characteristics of the Moscovian-Kasimovian boundary interval at Nashui is less advanced than the paleontological investigations and need to be a focus of the team's field work in 2013-2014. The task group needs to complete a bed-by-bed study through about 10 metres of strata on either side of the proposed Moscovian-Kasimovian boundary level. That work will include taking a continuous sample through about one metre of strata on each side of boundary to determine the location of all principal sedimentary events and the characteristics and origins of the beds.

To place the Nashui section into its sedimentological and paleoenvironmental context and determine the relationship of shallow-water coral, conodont and foraminiferal zones to the deeper-water conodont markers within the Moscovian-Kasimovian transition in south China, the investigation of reference sections including the Zhongdi (Ueno *et al.*, 2007) and the Luokun sections will continue. Like the Nashui section, the exposure at Luokun is essentially 100% complete and dominated by slope carbonates of turbiditic and hemipelagic aspect but the lithofacies are of more proximal aspect. Study of the section will provide another opportunity to see conodonts and foraminifers spanning the Moscovian-Kasimovian transition in the region. Foraminifers are more abundant and better preserved than at Nashui and it is anticipated that a better correlation between conodonts and foraminifers can be achieved by the study of the Luokun section.

Activities in Moscow Basin, Russia

The task group will continue to study specimens from the Stsherbatovka quarry section on the Oka-Tsna Swell of the Ryazan Region, east of the town of Kasimov in the Moscow Basin. In the section, the middle part of the Neverovo Formation (Khamovnikian Substage) contains abundant macrofauna. Conodonts occur as well but are not common and most elements are juveniles of the *Idiognathodus sagittalis*-*I. turbatus* group. *Idiognathodus sulciferus* was also identified. The Stsherbatovka section, situated about 250 km southeast of the better-known Afanasievo section (Goreva *et al.*, 2009) in the Moscow Basin, demonstrates a wider distribution of the marker conodont species for identifying the base of the Kasimovian. The section is better than the Afanasievo section (neostatotype of Kasimovian and a potential candidate for the GSSP), because it was deposited in somewhat deeper water and elements of the *I. sagittalis*-*I. turbatus* group are more abundant.

Activities in Spain

Spanish members of the task group plan to continue with investigations in most of the regions reported on in the progress report for the last fiscal year. Elisa Villa reported that the University of Oviedo is devoted to the study of the Moscovian-Kasimovian boundary in the Cantabrian Mountains and will continue with intensive research of the Carboniferous limestones outcropping in the Ándara Massif of the Picos de Europa Mountains.

The Spanish team will continue investigating the Vegas de Ándara section (also in the Ándara Massif), where late Moscovian to middle Kasimovian strata are present. Sampling of Podolskian (middle Moscovian) to Khamovnikian beds in the Vegas de Ándara and the Castillo de Grajal sections are being undertaken to analyze the succession of the conodont faunas (J. Sanz and S. Blanco, in progress). These studies include the systematics of *I. sagittalis* collected from the base of the Khamovnikian Substage and their relationship with much scarcer *I. turbatus* and *I. swadei*.

Idiognathodus sagittalis, one of the two best potential indices for the lower Kasimovian boundary, occurs within other sections in the Cantabrian Mountains such as the Las Llacierias (Méndez, 2006). To confirm the potential of *I. sagittalis* for global correlation, the study of its variability (preferably in the type bed in Ukraine) and more illustrations documenting its characteristics at various occurrences are necessary.

Kasimovian-Gzhelian boundary

Introduction

Since 2007, when the task group voted in favor of using the first appearance of the conodont *Idiognathodus simulator* (Ellison, 1941) in the lineage *Idiognathodus eudoraensis* - *I. simulator* as the boundary-defining event (Heckel *et al.*, 2008), the search for a suitable section for the GSSP has been the task-group's main objective. The event level is consistent with both the working ammonoid definition of the boundary and with the first appearance of a cotype of the fusulinid *Rauserites rossicus* in the Moscow region. The recent selection of the lectotype of the fusulinid *R. rossicus* at the first appearance of *I. simulator* in Russia will expedite the recognition of this boundary in Eurasia.

So far, only the Usolka section in the southern Ural Mountains of Russia has been proposed as a candidate section for the GSSP at the base of the Gzhelian (Chernykh *et al.*, 2006; Davydov *et al.*, 2008). We strongly encourage all task-group members and other interested teams to complete high-quality studies across the Kasimovian-Gzhelian boundary in their respective areas of study in the search for additional candidate sections.

Activities in Russia

The Usolka section requires substantial new lithostratigraphic, sedimentologic and biostratigraphic work. On August 14 2009, a team of SCCS representatives visited the Usolka section during a Field Meeting and observed that only fragments of the section were exposed and they were in narrow, partly filled to overgrown trenches. In response to that observation, the task group needs to extensively excavate the site during its re-assessment.

In the summer of 2010, Russian colleagues briefly visited the Kholodny Log section on the western slope of the Middle Urals. The upper part of the section is a famous shallow-water Asselian (Lower Permian) succession containing abundant fusulinids but the lower part of the section spans the Kasimovian-Gzhelian boundary interval, which contains abundant fusulinids and the conodont *Streptognathodus pawhuskaensis*. The task group plans to visit the locality to collect more samples for conodonts.

Task-group member Alexander Alekseev and colleague are working in the Yablonevy Ovrage Quarry, Zhiguli Mountains, by Samarskaya Luka National Park in the Volga River region, Russia. The section contains abundant *Idiognathodus simulator*, the index conodont for the boundary and it is anticipated the group will develop a GSSP proposal based on studies at the locality.

Activities in China

Yuping Qi and colleagues will continue detailed sampling and analysis across the proposed Kasimovian-Gzhelian boundary level in the Nashui section (Wang and Qi, 2003) in Guizhou Province, south China for conodonts and fusulinids. Conodont recovery across the boundary level has not been as good as expected and large samples are required to obtain an adequate understanding of evolutionary trends. A sedimentologic, geophysical and geochemical analysis of that section at the appropriate level is required. During 2013 to 2014, the task group plans to complete the measurement and sampling of the upper Kasimovian to Lower Permian component of the Nashui section (for lithology, stable-isotope geochemistry, and geophysics). In conjunction with the latter work, the task group plans to complete a bed-by-bed study through 10 metres of strata on either side of the proposed Kasimovian-Gzhelian boundary level. That work will include taking a continuous sample through about 1.5 m of strata on each side of boundary to determine the location of all principal sedimentary events and the characteristics and origins of the beds.

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