

2012 WORK PLANS FOR VISÉAN-SERPUKHOVIAN BOUNDARY TASK GROUP

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Introduction

The work plans for the Viséan-Serpukhovian Boundary task group during the November 1st, 2011 - October 31st, 2012 fiscal year are a continuation of last years plans. Since determining that the first appearance datum (FAD) of the conodont *Lochriea ziegleri* Nemirovskaya, Perret & Meischner, 1994 in the lineage *Lochriea nodosa* (Bischoff, 1957) -*Lochriea ziegleri* is the best index for boundary definition, the task group will draft a proposal advocating the use of that index and direct its attention toward selecting the best candidate section for the GSSP. The best two candidate sections are the Nashui section by the village of Naqing in southern Guizhou Province, China and the Verkhnyaya Kardailovka section on the Ural River in southern Russia. A third section by the village of Millaró in the Cantabrian Mountains of northern Spain may have potential rivaling that of the others.

Activities in South China

The deep-water (slope), carbonate-dominant Nashui section in southern Guizhou Province, China is an excellent candidate for the GSSP at the base of the Serpukhovian because the *L. nodosa*-*L. ziegleri* lineage is well defined and the FAD of *L. ziegleri* precisely located. The conodont studies for the locality are essentially complete and the FAD of *L. ziegleri* is located at 60.10 m (Qi *et al.*, 2010) above the base of the section. Some additional work is required including the slicing the bed (parallel to bedding) containing the FO and the immediately underlying bed to see if boundary can be more precisely located. John Groves plans to complete his study of the foraminifers in the section, thereby finishing most of the work needed for this important fossil group. Work on the sedimentology, stable-isotope geochemistry, and geophysical characteristics of the boundary interval are less advanced than the paleontological investigations and will be the focus of the team's work in next two fiscal years. To place the Nashui section into its sedimentologic and paleoenvironmental context and to determine the relationship of shallow-water coral zones to the deeper-water *L. nodosa* - *L. ziegleri* transition in south China, the investigation of three reference sections - the Yashui, Dianzishang, and the Luokun sections - will continue during the new fiscal year.

The most important reference section for Nashui is the Yashui section, near the city of Huishui in Guizhou province. It is an important section because it contains abundant well-preserved rugose corals and foraminifers (Wu *et al.*, 2009) and is dominated by shallow-marine, neritic- to peritidal-ramp facies. In 2010 and the Yashui section was measured and described by at a bed-by-bed level of detail and sampled by team members for lithology, conodonts, foraminifers, and rugose corals. John Groves plans to complete his study of the foraminifers in the lower part of the section prior to the end of the fiscal year. Investigations on the sedimentology, stable-isotope geochemistry and geophysical characteristics of the section are less advanced than the paleontological work and will be the focus of the team's work in 2012.

Strata in the Dianzishang section, situated by Dianzishang village along the Zin Zai River 1 km upstream from the Red Flag Bridge, are intermediate between the lower-slope to basin deposits at Nashui and the shallow-marine ramp deposits at Yashui. The Dianzishang section includes spectacular syndepositional slump deposits formed in slope settings and provides another opportunity to see conodonts and foraminifers spanning the *L. nodosa*- *L. ziegleri* transition in the region. In February 2010, task-group members measured 72.7 m of strata extending from the uppermost Viséan into lowermost Bashkirian. Conodont work at the locality has been completed to the extent that the Viséan-Serpukhovian boundary has been located using the *L. nodosa* - *L. ziegleri* transition. John Groves plans to complete his study of the foraminifers

in the section by the end of the fiscal year. Work on the sedimentology, stable-isotope geochemistry and geophysical characteristics of the boundary interval and section are not as advanced as the paleontological studies and will be the focus of the teams work at the locality in the next two fiscal years.

During 2010, the task group commenced measuring and sampling of the Luokun section, situated by the village of Luokun several kilometres from Naqing and the Nashui section. Like the Nashui section, the exposure at Luokun is essentially 100% complete and dominated by slope carbonates of turbiditic and hemipelagic aspect. At Luokun, the deposits are of more proximal aspect than those at Nashui but not as shallow as those at Yashui. Study of the section will provide another opportunity to see conodonts and foraminifers spanning the *L. nodosa*-*L. zieglerei* 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. Study of all aspects of the section is at a preliminary level but sufficient biostratigraphic work has been completed to locate the approximate positions of the Viséan-Serpukhovian and Serpukhovian-Bashkirian stage boundaries. During 2012 - 2013, the task group plans to complete the measurement and sampling of the section at a bed-by-bed level.

Activities in Southern Urals, Russia

With its conodonts characteristic of the *L. nodosa*-*L. zieglerei* transition, abundant ammonoids, and moderately common foraminifers, the Kardailovka section, a deep-water basinal succession on the Ural River near the village of Verkhnyaya Kardailovka in the Urals remains the other strong candidate for the Viséan-Serpukhovian boundary GSSP. During the summer of 2010, the lower part of section was completely exposed using a tractor with back hoe and aluminum marker pins were placed at one-metre intervals. Conodonts, foraminifers and ammonoids in the section have been studied in detail (Nikolaeva *et al.*, 2009; Pazukhin *et al.*, 2010) but additional collections will be required when the section is measured and sampled at a bed-by-bed level in August 2012. Sufficient conodont work been done to locate the approximate position of the FAD of the conodont *L. zieglerei* in the lineage *L. nodosa*-*L. zieglerei* but additional collecting of closely-spaced samples is required to more completely document the transition and precisely locate the FAD of *L. zieglerei*. Work on the sedimentology, stable-isotope geochemistry and geophysical characteristics of the section is less advanced than the paleontological work and will be a focus of the team's investigations in 2012 and 2013 when the team plans to complete the detailed sampling and analysis of the boundary level over a five- to ten-metre thick interval on either side of the Viséan-Serpukhovian boundary. The sections contains numerous volcanic ash layers near the boundary level and the task group will have the most important ashes dated using the U-Pb isotope dilution thermal ionization mass spectrometry (ID-TIMS) methodology. A couple of relatively shallow-water but poorly-exposed sections such as the Bolshoi Kizil River section (Kulagina *et al.*, 2009) occur in the region. The task group plans to start measuring the best of them in 2012 to place the important Kardailovka section into its sedimentological and paleoenvironmental context and to determine the relationship of shallow-water coral and foraminiferal zones to the deeper-water *L. nodosa* - *L. zieglerei* transition at Kardailovka.

Activities in Cantabrian Mountains, northern Spain

In June 2010, Javier Sanz-López and Silvia Blanco-Ferrera introduced task-group members to several sections spanning the Viséan-Serpukhovian boundary in the Cantabrian Mountains of northwestern Spain. One of the sections, the Millaró section by the village of Millaró in the fold and Nappe province of the Cantabrian zone, is excellent rivaling the better known Kardailovka and Nashui exposures. Conodonts within the *L. nodosa* - *L. zieglerei* lineage are well preserved and abundant; in addition, the first occurrence of *L. zieglerei* has been located with moderate precision. A major biostratigraphic advantage of the section is the common occurrence of abundant, well-preserved ammonoids being studied by team-member Svetlana Nikolaeva.

Deposits within the *L. nodosa* - *L. zieglerei* transition are dominated by nodular, deep-water, basin carbonates of the Alba Formation. The conodont biostratigraphy has been moderately well established (Sanz-López *et al.*, 2007) but the FAD of *L. zieglerei* may need to be more precisely located and sedimentological, geophysical and geochemical analyses are required. A problem with the section is that the interval containing the *L. nodosa* - *L. zieglerei* transition may be too condensed for a good GSSP candidate. During 2012 to 2013, the team plans to systematically sample the section for ammonoids and commence sedimentological, geophysical and geochemical analyses.

Activities in Rocky Mountains, Canada

The task group chairman along with corresponding members Sergio Rodriguez and Wayne Bamber will continue to study carbonate-dominant sections across the Viséan-Serpukhovian boundary interval in the upper Viséan to Serpukhovian Etherington Formation in the southern Canadian Rocky Mountains. They are preparing a monograph on the taxonomically diverse rugose coral faunas that span the boundary within the Etherington. Although none of the Etherington sections are likely to be candidates for the GSSP, the investigation will provide valuable biostratigraphic and sedimentologic data that will assist correlations between Western North America and the low-latitude tropical-marine successions of Europe and Asia.

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