

## 2013 WORK PLANS FOR THE VISÉAN-SERPUKHOVIAN BOUNDARY TASK GROUP

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### Introduction

The Viséan-Serpukhovian boundary task group has determined that the FAD of the conodont *Lochriea zieglerei* Nemirovskaya, Perret & Meischner, 1994 in the lineage *Lochriea nodosa* (Bischoff, 1957)-*Lochriea zieglerei* is the best index for boundary definition and plans to draft a proposal advocating the use of that index. During the November 1<sup>st</sup>, 2012 - October 31<sup>st</sup>, 2013 fiscal year, the team plans to 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 China is an excellent candidate for the GSSP at the base of the Serpukhovian because the *L. nodosa*-*L. zieglerei* lineage is well defined and the FAD of *L. zieglerei* has been precisely located. The conodont studies for the locality are essentially complete and the FAD of *L. zieglerei* is located at 60.10m (Qi *et al.*, 2010) above the base of the section. In addition, John Groves and his colleagues (Groves *et al.*, 2012) have completed their study of the foraminifers in the section, thereby finishing most of the work needed for that 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 the 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. zieglerei* transition in south China, the investigation of three reference sections - the Yashui, Dianzishang, and the Luokun sections - will continue.

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; Groves *et al.*, 2012) and is dominated by shallow-marine, neritic- to peritidal-ramp facies. In 2010 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. 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 2013 and 2014.

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. zieglerei* 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. zieglerei* transition. John Groves completed his study of the foraminifers in the section during the 2012 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 an important aspect of the 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 but dominated by slope carbonates of that are more proximal aspect than those at Nashui. 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 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-carbonate 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. Conodonts, foraminifers and ammonoids in section have been studied in detail (Nikolaeva *et al.*, 2009; Pazukhin *et al.*, 2010) but additional work is required. 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 may be 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 2013. The team is currently preparing a preliminary paper on the lithostratigraphy and sedimentology of the lower part of the section including the boundary interval for publication in the proceedings volume arising from The Carboniferous-Permian Transition Conference being held in Albuquerque New Mexico from May 20-22, 2013. The Kardailovka section 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.

#### **Activities in Cantabrian Mountains, northern Spain**

Several well-exposed sections span the Viséan-Serpukhovian boundary in the Cantabrian Mountains of northwestern Spain. 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. During 2013 to 2014, 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 in the final stages of 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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