

2014 PROGRESS REPORT OF THE TASK GROUP TO ESTABLISH A GSSP CLOSE TO THE EXISTING VISÉAN-SERPUKHOVIAN BOUNDARY

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Introduction and general activities

An index for boundary definition has been selected, but not voted on by the task group and SCCS for final approval, and work is well advanced at the two prime GSSP candidate sections: the Verkhnyaya Kardailovka in the southern Ural Mountains of Russia and the Naqing (Nashui) section in southern Guizhou Province, China. In the Cantabrian Mountains of northwest Spain, work continued on the Millaró and Vegas de Sotres sections, two other potential candidate sections for the GSSP. For boundary definition, the group is using the first evolutionary occurrence of the conodont *Lochriea zieglerei* Nemirovskaya, Perret & Meischner, 1994 in the lineage *Lochriea nodosa* (Bischoff, 1957)–*Lochriea zieglerei*. *L. zieglerei* appears in the Brigantian Substage of NW Europe somewhat below the current base of the Serpukhovian as defined by its lectostratotype section in the Zaborie quarry near the city of Serpukhov in the Moscow Basin, Russia (Kabanov *et al.*, 2009, 2012, 2013).

The most important accomplishments in 2014 were: 1) the completion of a manuscript by Nemirovska *et al.* (in progress) titled “Conodonts of the genus *Lochriea* near the Viséan/Serpukhovian boundary (Mississippian) at the Naqing section, Guizhou Province, South China”. That study enables confirmation and refinement of known lineages within the genus, and two lineages are proposed: a) the noded *Lochriea* species *L. mononodosa*–*L. nodosa*–*L. zieglerei*, *L. senckenbergica* and *L. multinodosa*, and b) the ridged *Lochriea* species *L. monocostata*–*L. costata*–*L. cruciformis*. 2) the publication of a paper about the conodonts of the genus *Lochriea* in Ireland and recognition of the Viséan-Serpukhovian boundary (Barham *et al.*, 2014), and 3) the publication of two papers about the upper Viséan and Serpukhovian in the Moscow Basin of Russia: a) one about the sequences, disconformities and biostratigraphy (Kabanov *et al.*, 2014a) and b) a second about the geochemistry and magnetic susceptibility in the type area of the Serpukhovian Stage in the Moscow Basin, Russia (Kabanov *et al.*, 2014b).

Additional progress in southern Guizhou province, China

A comprehensive study on the biostratigraphy, sedimentology and geochemistry of the upper Viséan to Serpukhovian succession in South China is being undertaken in order to obtain a detailed understanding about the evolutionary change of the biota and global correlations across the Viséan/Serpukhovian boundary. The studied sections include the limestone-dominated, shallow-marine Yashui section and deep-water (slope) Naqing, Narao, Luokun, and Dianzishang sections. Detailed conodont and foraminiferal biostratigraphy across the Viséan/Serpukhovian boundary intervals in the Luokun and Narao sections is being done at a bed-by-bed level of detail. Foraminiferal stratigraphy across the Viséan/Serpukhovian boundary intervals in the sections is being studied intensively by Qingyi Sheng and Paul Brenckle. Preliminary stable carbon isotope work reveals a prominent negative carbon isotope excursion shortly above the FAD of *Lochriea zieglerei* in the Naqing (Buggish *et al.*, 2011), Narao and Luokun sections.

An important discovery made at the Naqing, Narao and Luokun sections was the discovery of several volcanic ash beds in the upper Viséan and another in the lower Serpukhovian. Numerous

zircons have been extracted from the ash samples and are being processed in the U.S.A. by Jitao Chen and Isabel Montanez with the ID-TIMS U-Pb age dating method.

Additional progress in Russia,

Moscow Basin

The conodont record in the upper Viséan and Serpukhovian of the Moscow Basin was revised. In the Novogurovsky quarry section (Tula Region near Moscow), *Lochriea* aff. *ziegleri* Nemirovskaya, Perret & Meischner, 1994 was documented from the lower Venevian Substage and *Lochriea ziegleri* was recorded in the upper Venevian (Kabanov *et al.*, 2014a). These results are compatible with those of Skompski *et al.* (1995), who recorded *L. ziegleri* from a correlative stratigraphic position in the middle Brigantian (upper Viséan) at several localities in Western Europe.

South Urals

Biostratigraphic, sedimentologic and geochemical studies continued at the Verkhnyaya Kardailovka section in the southern Urals. The conodont work resulted in the placing the FAD of *Lochriea ziegleri* at 19.63 m above the base of the section, which is 7 cm lower than previously reported by Nikolaeva *et al.* (2014). Studies of conodont biofacies using a quantitative analysis of the relative abundance of *Gnathodus bilineatus* (Roundy) (a relatively deep-water species), *G. girtyi* Hass (a relatively shallow water species), and *Vogelgnathus* (unknown ecology) suggest maximum water depths across the boundary interval were attained during deposition of the 19.00 – 19.20 m interval in the section. Sedimentologic considerations place it somewhat lower (16.45 m) at the transition from dark-grey, laminated pelagic limestone to the overlying light-grey, nodular, pelagic limestone. Michael Joachimski has completed the preliminary phase of his stable oxygen isotope study using elements of the conodont *Gnathodus bilineatus* (Roundy) in 14 samples spanning the upper Viséan/Serpukhovian boundary interval. The $\delta^{18}\text{O}$ show an upward shift to heavier values through the boundary interval with a more rapid upward rate of increase at the level 19.43 – 19.53 m, close to the transition from the thin-bedded to nodular pelagic limestones.

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