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New Late Viséan and Early Serpukhovian Ammonoids in the Verkhnyaya Kardailovka Section (Eastern Slope of the South Urals)

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Abstract—New Late Viséan and Early Serpukhovian ammonoids are described from the Verkhnyaya Kardailovka section (South Urals, Bashkortostan). The ammonoid assemblages allow the recognition of the *Hypergoniatites–Ferganoceras* Genozone and a correlation with the synchronous zonations of North Africa, Spain, and China. The new species *Ferganoceras constrictum* sp. nov., *Dombarites clemens* sp. nov., and *Hypergoniatites kardailovkensis* sp. nov. are described.

Keywords: ammonoids, Carboniferous, Viséan, Serpukhovian, *Hypergoniatites–Ferganoceras*, Verkhnyaya Kardailovka, South Urals

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INTRODUCTION

The Late Viséan–Early Serpukhovian ammonoids of the Urals have recently been a focus of attention in connection with the definition of the base of the Serpukhovian stage and the search for the stratotype of this boundary (GSSP). Previous publications have included several taxonomic papers (Ruzhencev, 1966; Bogoslovskaya, 1966; Ruzhencev and Bogoslovskaya, 1971; Nikolaeva and Konovalova, 2011; Nikolaeva, 2013). On the eastern slope of the South Urals, ammonoids of this age were found only recently, in condensed deep-water limestones (mudstones and wakestones) opened in trenches in the Verkhnyaya Kardailovka Section (Baimak District, Bashkortostan) (Fig. 1), studied in an uninterrupted section of the Viséan–Serpukhovian boundary beds with conodonts, foraminifers, corals, phyllocarids, and holothurian skeletons (Nikolaeva et al., 2009b, 2014; Kulagina et al., 2009; Pazukhin et al., 2010; Nikolaeva and Konovalova, 2015). In this section, the Viséan–Serpukhovian boundary is drawn at the level of the first appearance datum (FAD) of the conodont *Lochriea ziegleri* (Nikolaeva et al., 2009b; Pazukhin et al., 2010). The studied boundary interval contains, in the Viséan portion, the *Goniatites* Genozone (interval 16.30–18.00 m from the base of the section) and the lower part of the *Hypergoniatites–Ferganoceras* Genozone (interval 18.00–21.56 m from the base of the section), and in the Serpukhovian portion—the upper part of the *Hypergoniatites–Ferganoceras* Genozone and part of the *Uralopronorites–Cravenoceras* Genozone (interval above 21.56 m from the base of the section). This section is one of the few sections in the world where the *Hypergoniatites–Ferganoceras* Genozone is found in an uninterrupted succession of several ammonoid genozones and the only known section, in which ammonoids, conodonts, and foraminifers are studied at many levels near the boundary interval.

MATERIAL

The ammonoids studied were collected from the levels 18.50–20.80 m above the base of the Verkhnyaya Kardailovka Section (Bed 21, see Nikolaeva et al., 2009b, Nikolaeva, 2013, text-fig. 1). Ammonoids from Sample 015/5 (17.2–17.3 m), 015/2 (17.7–18.0 m), 015 (18.4–18.52 m), Sample 19.0, 19.20, 19.44, 19.50, 19.55–19.65, 19.72–19.83, 20.30 were mentioned in previous publications on this section (Nikolaeva et al., 2009b, Pazukhin et al., 2010, Nikolaeva, 2013; Nikolaeva et al., 2014). Other occurrences (Samples 18.75, 19.88, 20.20, 20.80, 21.10) are new. The state of preservation of the ammonoid remains is satisfactory, but the external layer of the shells on the last whorls is dissolved. Usually, one flank of a shell is preserved better than the other, because of carbonate dissolution in a deep water environment in a starved basin. Conodont samples from this interval and lithological