of the Upper Oxfordian. The overlying cherty limestones (unit C) yielded the Kimmeridgian ammonites found in their uppermost part; the deposits of the unit are rich in rests of planktonic crinoids *Saccocoma*. The younger ammonite assemblage coming from the lower part of the upper *Ammonitico Rosso* unit (unit D) is indicative of the Acanthicum Zone of the Upper Kimmeridgian. These deposits are characterized by *Saccocoma-Globochaete* microfacies, and yielded calcareous dinocysts indicative of the Moluccana Zone of the Kimmeridgian.

The Kimmeridgian/Tithonian boundary runs in the middle of the discussed *Ammonitico Rosso* unit (unit D) as evidenced by occurrence of calcareous dinocyst *Carpistomiosphaera tithonica*. The upper part of the unit yielded calpionellids and calcareous dinocysts indicative of the Praetintinnopsella Zone located at the turn of the Middle and Upper Tithonian. The topmost part of the unit, as well as the lower part of overlying partly nodular micritic limestones (unit E/D) yielded already calpionellids and calcareous dinocysts indicative of the Crassicolaria Zone of the Upper Tithonian. The deposits are dominated by the *Crassicolaria-Globochaete* microfacies.

The Jurassic/Cretacous boundary runs in the middle of the partly nodular micritic limestone unit (D/E). Here appears assemblage dominated by spherical forms of *Calpionella alpina* indicating the lowermost part of the Calpionella Zone of the Lower Berriasian. This zone ranges up at least to the upper part of massive micritic limestones (unit E) where the calpionellids of the Ferasini Subzone have been recognized. The microfacies of the *Globochaete-Calpionella* type, locally enriched in radiolarians prevail.

The carbonates of the topmost part of the succession covering the basalt lava flows, as well as limestones alternating with pyroclastic layers yielded calpionellids of the Calpionellopsis Zone of the Upper Berriasian indicating both the Simplex Subzone, and the Oblonga Subzone. The breccias contain i.a. the clasts of the Upper Tithonian micritic limestones with calpionellids of the Crassicolaria Zone and of volcanic rocks. The carbonates correspond to the Łysa Limestone Fm., including the Walentowa Breccia Member of this formation (see Birkenmajer 1977).

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A multi-proxy study of the Kimmeridgian/Volgian boundary beds in the Gorodischi section (Middle Volga area, Russia), the lectostratotype of the Volgian Stage

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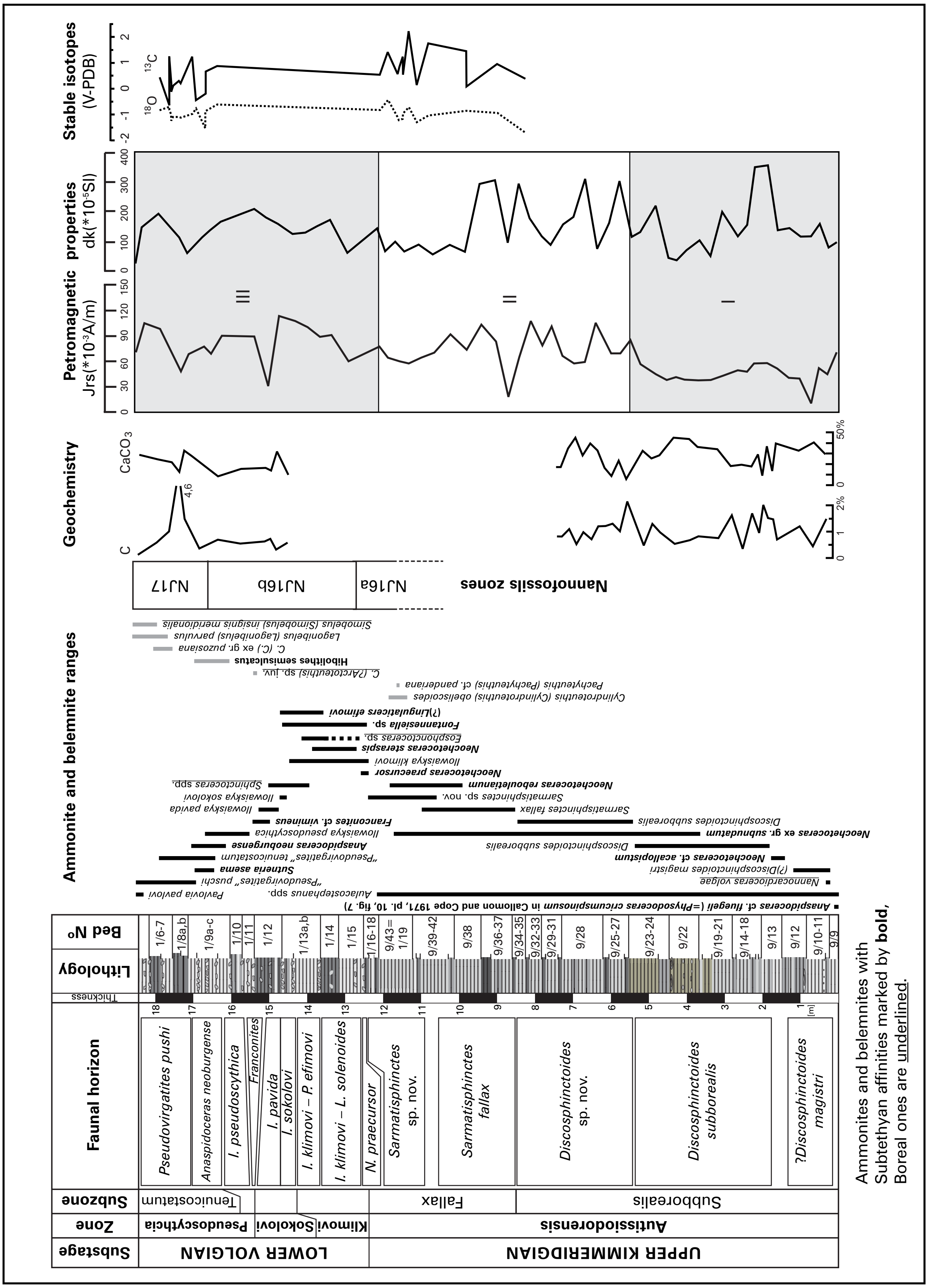

Fig. 1. Kimmeridgian-Volgian transition in the Gordodischi section, lectostratotype of Volgian Stage.

Key-words: Kimmeridgian/Volgian boundary, integrated stratigraphy, Boreal-Tethyan correlation, Volgian SSSP.

The Gorodischi section is one of the most famous and well-studied sections among the Russian Jurassic. This section was chosen as lectostratotype of the Volgian Stage by Gerasimov & Mikhailov (1966). Following by the proposals of Cope (1996) regarding the acceptance of secondary standards, Zakharov (2003) suggested Gorodischi as Secondary Stratotype Section and Point for the Volgian Stage. In spite of the small thickness of Volgian rocks, recent studies show an absence of biostratigraphically significant gaps within the whole Volgian Stage (Kiselev & Rogov 2005).

The ammonite succession consists of a mixture of Subboreal, Boreal and Submediterranean taxa, with an alternation of the dominant groups through the section, providing a highly accurate correlation of the Lower Volgian with the Tithonian Stage and Arctic Volgian. The succession of *Neochetoceras* has particular significance for the correlation of the Kimmeridgian/Volgian and Kimmeridgian/Tithonian boundaries, which is also marked by disappearance of aulacostephanids. Among the belemnites Boreal and Subboreal taxa are predominate with exception of the neoburgense horizon, rich in small *Hibolithes*. Nannofossil samples were collected from only part of the section, but changes in calcareous nannofossils permit the identification of the Boreal Zones N16-N17 (Fig. 1).

Both sedimentologic, isotopic and petromagnetic data reflect rapid sea level fluctuation during the Kimmeridgian-Volgian transition. The character of the oscillations of the saturation remanent magnetization (Jrs) and growth of magnetic susceptibility after heating the rocks up to 500°C in air (dk) allows the recognition of three successive zones (I-III). The alternation of the light and dark clays reflects irregularities in the nannofossil versus organic matter abundance. Numerous features of the short gaps could be traced by the ammonite accumulations, sometimes associated with zonal phosphate nodules and in few cases by numerous belemnites. The frequency of condensed levels increases significantly from Kimmeridgian into the Volgian, simultaneously with a gradual coarsening of the terrigenous matter. The character of sedimentation as a whole reflects slow input of terrigenous rocks and oscillations in productivity of calcareous nannoplankton, controlled by climate change and eustasy. The changes in lithology testify to progressive shallowing of the sea basin and increasing of the sensitivity of sedimentation against sea level changes.

This study has been supported by RFBR grant 06-05-64284, 06-05-64439, 06-05-64282 and Russian Science Support Foundation.

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