

Volcanic eruptions records in the Late Jurassic-Early Cretaceous Bazhenov Formation of Western Siberia

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The Bazhenov Formation (BF) in Western Siberia was deposited in the epicontinental sea during the Late Jurassic-Early Cretaceous. The BF is commonly 20–30 m thick and consists mostly of black organic-rich siliceous shales in a depth range from 2400 to 3500 m. Beige or grey thin (< 1 cm) tuff beds were discovered within the BF [1, 2]. The primary glassy matrix of the tuff beds has been altered to clay minerals as a result of deposition in the marine environment.

The major and trace element composition of the tuff beds is typical of the andesites and basaltic andesites. The values of Na₂O+K₂O in ranges of 2.20–6.10 wt.%, SiO₂=48.15–58.52 wt.%, Zr/TiO₂=0.02–0.03 and Nb/Y=0.03–0.26. According to discrimination diagrams, the tuffs predominantly correspond to basalts of arc volcanism (Figure 1). Our new zircon U-Pb dating of the five tuffs showed concordia age of 141.26±0.32 Ma (MSWD=0.23, n=86) indicating isochronous deposition in the Bazhenov paleosea. According to the chemical composition and geographical distribution of the tuffs, the most suitable source of pyroclastic materials may be the Caucasian volcanoes.

The large areal extent (~0.5 million km²) of the tuff beds in the Bazhenov black shales and long distances from the potential source volcanoes suggest an extremely intensive eruption during the Volgian-Ryazanian. As an independent precise marker horizon, the tuff beds may be used in the stratigraphic correlation of the Bazhenov sequences of Western Siberia.

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[1] Panchenko I.V., et al. (2021) Volcanic tuffs and tuffites in Jurassic–Cretaceous (Volgian–Ryazanian) boundary rocks of Western Siberia. *Lithol. Miner. Resour.* 56, pp. 152–188. DOI:10.1134/S002449022102005X.

[2] Bulatov T.D., et al. (2021) Alginite-rich layers in the Bazhenov deposits of Western Siberia, *Geosciences*, Vol. 11, No. 6. DOI:10.3390/geosciences11060252.

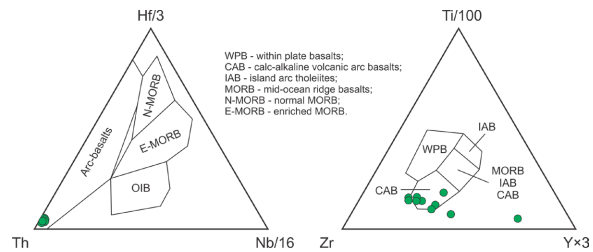


Figure 1. Discrimination diagrams for distinguishing tectonic settings