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Rhenium bearing sands of Moscow lignite basin

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Briketno-Zheltukhiskoye rhenium deposit in alluvial sands of Early Visean Moscow Lignite Basin (MLB) is located near south-east closure of the paleo depression (fig. 1). Ore bearing sands are enriched in coal detritus and contain thin lignite layers. Extension area of these sands is confined to south-west edge of MLB. Many branchy paleo watercourses were documented in the area. Numerous non-commercial U-Mo sandstone type (basal and tabular subtypes) occurrences are known there. Rhenium content in these sands was determined for Briketno-Zheltuhiskoye and Bel'skoye U-Mo ore sites (fig. 1).

We have hypothesis in terms of these facts about deltaic nature of ore-bearing sands. Early Visean paleorivers fall into swamped MLB area from south. Their riverheads are reconstructed on north-east shoulder of middle Paleozoic Dnieper-Donets rift where real and potential carriers (granites, black shales, magmatic and hydrothermal complexes) of Re, U and Mo excessive content exist. Primary ore segregations of these elements were formed when oxygenic river waters fall to peat swamps of MLB area where sharp change of redox conditions took place.

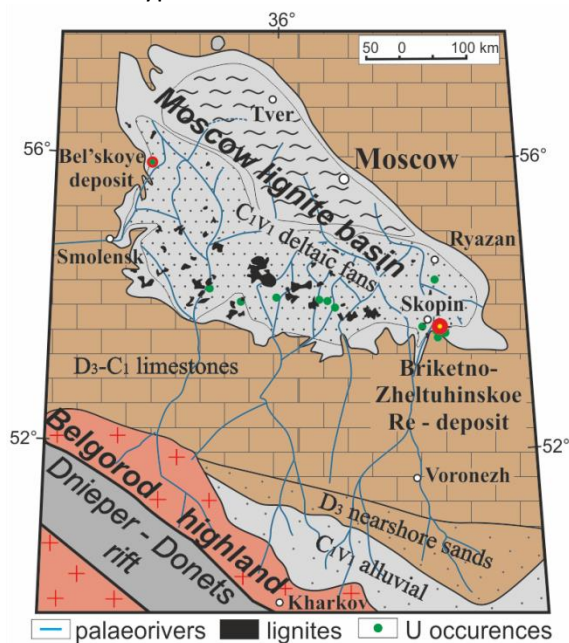
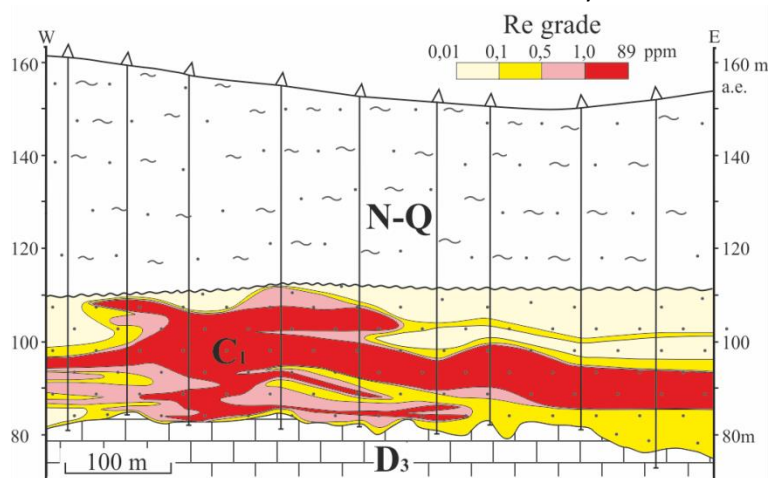


Figure 1: Early Visean paleo reconstruction and localization of Re bearing sands of MLB

Rhenium ore mineralization of Briketno-Zheltuhinskoye deposit is located in alluvial sandy sediments of 20-30 m thickness (fig. 2). Ore bearing Visean sands overlie Upper Devonian "limestone basement" and are covered by neogen-quaternary strata of clays, silts and sands interbedding of 40-50 m thickness.

Ore bearing strata consist of fine-medium grained sands enriched by organic detritus and sulfides. All cross-sections of alluvial sandy sediments are characterized by Re grade ≥ 0.01 ppm.



Maximal Re grades were fixed in clay and coal seams (10 - 609 ppm). In sands Re grade attains a 10-30 ppm.

Sand layers of Re grade ≥ 0.1 ppm were outlined as ore bodies. Ore sand thickness of mean grade Re 1.5 ppm is 5-33 m. Existence of these layers in permeable rocks permit to realize mining of the deposit by ISL (in-situ leach) technology on the ground of layer water and hydric dioxide. 80 % of

Re extraction was attained during approbation of ISL. Subsequently Re was sorbing from pregnant solution and ammonium perrhenate was obtained as finished product.

Figure 2: Cross-section of Re-bearing sands of Briketno-Zheltuhinskoye deposit.

