



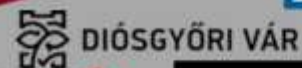
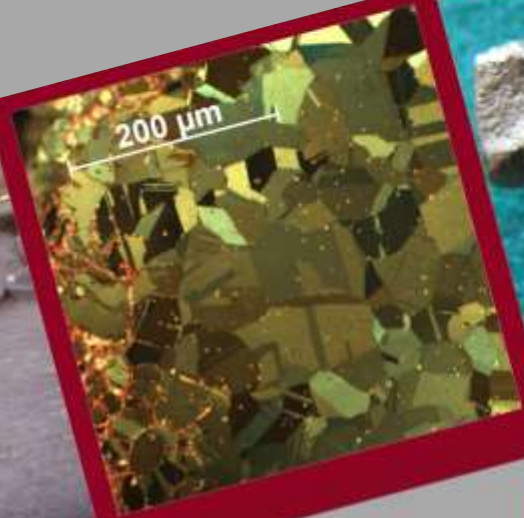
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Abstracts



IRON ORE MINING IN VOLGA-SVIYAGA INTERFLUVE IN THE EARLY MIDDLE AGES: IMPACTS ON SETTLEMENT PATTERN AND LANDSCAPE CHANGE

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The role of iron as one of the most important resources for the economy since the Early Iron Age cannot be doubted. The invention and spread of the iron making highly influenced different spheres of ancient society as well as human-nature interaction. We studied these aspects in the Volga-Sviyaga interfluve (Middle Volga region, Russia), a region comparatively rich with siderite iron ore. We used both archaeometric studies and paleo-landscape analysis methods as well as archaeological surveys and excavations. We examined the chemical and mineralogical composition using emission spectroscopy, petrography, and X-ray structure analysis of iron ore and slags to understand the possible provenance of raw materials for metallurgical production.

Our investigations reveal that the earliest specialized iron mining sites appeared between Volga and Sviyaga as early as in the 3rd - 5th c. CE. The excavations and surveys reveal that the regional population of that period used to mine siderite ore in the wet areas on the plateau of Volga upland. Plenty open pits dug from the surface and associated with the metallurgical kilns reveal the picture of massive extensive seasonal iron ore mining.

Another mining technology was used in the 5th-7th c. A site complex at Komarovka which comprises several hillforts and occupation sites together with a burial ground is a well-investigated example of the land use and settlement pattern of that time. Massive deposits of iron slags on the banks of gullies over about 2 km around the sites mark the impressive metallurgical activity in this area. We suppose that digging the ore deposits in the sources of gullies resulted in stream incision, slope erosion and deposition of colluvial fans. Off-site excavations revealed dramatic landscape changes due to ore mining. Permanent smelting activity was also recorded in the section of gully banks while the agricultural influence on the territory seems to be not that significant.

After a period of depopulation in the 8th c., in the 9th-10th c. iron sources in the region were developed by small groups of semi-sedentary newcomers in the flat wetlands of floodplains and uplands once again. The localities of iron making seem to be the first occupation sites after repopulation and many of them subsequently become medieval cities. The ore mining continued by Volga Bulgaria craftsmen and the region became a resource base of local Bulgarian urban centers, exporting iron across the Volga River.