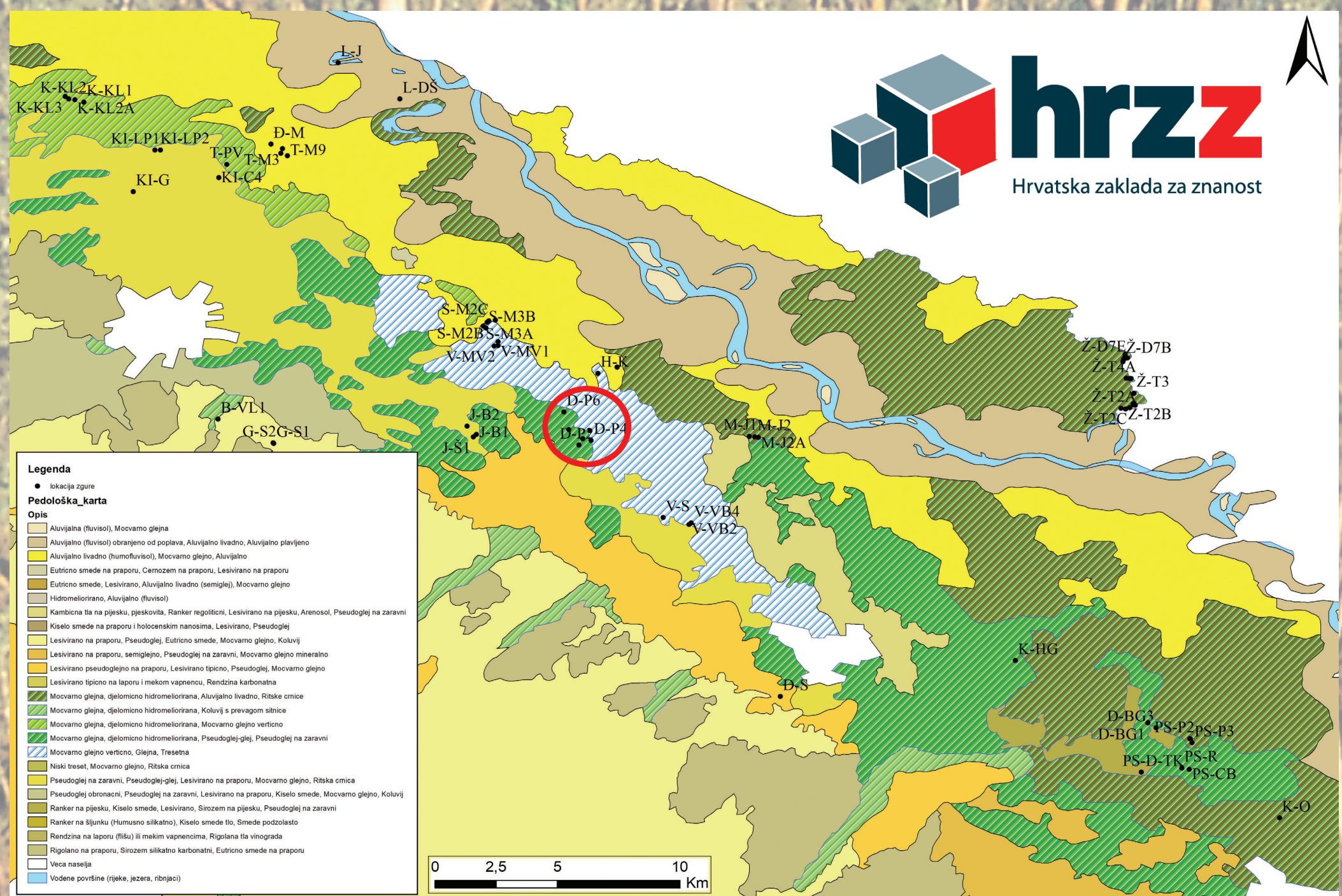




Map 1: Position of Podravina (seed processing by I. Valent)



Map 2: Pedology map of Podravina with archaeological sites with recorded smelting characteristics (the red circle presents the position of sites in the vicinity of Delovi (made by T. Brenko, 2017., seed processing by I. Valent)



Map 3: Archaeological sites in the vicinity of Delovi with traces of smelting activities: Banovice 1-3 (B 1-3), Grede 1 (G-1), Poljane 2, 4-8 (P 2, 4-8) (background: geoportal.dgu.hr; made by I. Valent)

**IVAN VALENT**



## Contribution to the topography of the iron smelting furnaces in Podravina a case study of the Delovi – Grede / Poljane / Banovice archaeological zone

During the first two years of the TransFER research project “Iron production along the Drava River in the Roman period and Middle Ages: Creation and transfer of knowledge, technologies and goods”, funded by the Croatian Science Foundation, over 80 archaeological sites with traces of smelting activities (pieces of smelting slag, blowers or furnace wall) were recognised on the territory of Podravina (Map 1). The majority of sites is placed on lower Holocene Drava terraces that have an alluvial-swamp substratum, next to a water source (Valent et al. 2017:9, Map 3, 21). These sites are most frequently grouped within a smaller archaeological zone within which one can define several positions on which smelting remains can be recognised (Map 2). One of these areas is the Delovi-Grede / Poljane / Banovice archaeological zone, situated to the north of the village Delovi in Podravina (Map 3).

The position of this plain zone (alt. 120 - 121 meter) is characterised by creeks Brzava and Bistra, their numerous meanders and several low sand mounds on which, or in the foot of which, archaeological positions Grede 1-7, Beljevine 1-2 (Marković 1984: 297, Map 6), Poljane 1-8 (Valent et al: 2017, 15-16) and Banovice 1-3 (Valent et al. 2019) were recognised. The datation of these sites spreads from Eneolithic to Late Medieval Period. On the other hand the datation of the positions containing smelting remains (Grede 1, Poljane 1, 4-8, Banovice 1-3), based on the ceramic material collected alongside during field surveys and one preventive excavation (Grede 1), can be dated to Late Iron Age (Poljane 4, 8), Roman Period (Poljane 4), Early Medieval Period (Poljane 1) (Valent et al. 2017: 16), High and Late Medieval Period (Grede 1, Banovice 1-3) (Valent et al. 2019.). These datations correspond to the period in which smelting is presumed on the entire territory of Podravina, which is currently, based on the conducted archaeological excavations, proven for the period of Late Antiquity and Early Medieval Period (Valent et al. 2017: 22).

Additional examination of several pieces of slag collected from the 1982 preventive excavation of the site Delovi - Grede 1 revealed that the slag, which was found in abundance, was not created as a product of forging, as it was previously presumed, but in fact of smelting. The context in which the pieces were found was dated between 12th and early 14th century (Marković 1984: 301, Pl. 11: 1-4), but in fact, the ceramic material should be dated to late 15th / early 16th century. These information therefore indirectly prove the existence of a smelting workshop on the site within that period, which might have a secondary location on positions Banovice 1-3 situated approximately 1 km to the north, where smelting remains was discovered in the context of 13th -16th century ceramic (Valent et al. 2019).

Analysing the presented information, it is clear that the territory around Delovi has a long-term history of occupation which, during the period between Late Iron Age and Late Medieval Period, might have been collocated with the existence of bog iron ore in the soil which was continuously forming through centuries and thereby enabled the production of iron in Podravina.

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