



ABSTRACT BOOK



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Anthropogenic soil contamination connected with active mines, smelting and plants in the Republic of Macedonia

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Abstract

A few anthropogenic pollutants at the territory of the Republic of Macedonia, were studied, three Pb-Zn mines with three mills, one copper mine with mill and copper leaching facility, one Pb-Zn smelting and several mines and factories for raw minerals such is the Usje in our capital Skopje. At the Usje factory were measured values in ranges of $1.46 \div 2.23\%$ Fe, $440 \div 940\%$ Mn, $93.4 \div 104.71$ mg Ni kg⁻¹, $58.57 \div 83.1$ mg Zn kg⁻¹, $23.1 \div 34.9\%$ Pb, $42.30 \div 60.3$ mg Cu kg⁻¹ and $0.59 \div 1.61$ mg Cd kg⁻¹. The concentrations of heavy metals at Veles former smelting Pb-Zn plant were in the range: $20 \div 1823$ mg Pb kg⁻¹, $29 \div 2395$ mg Zn kg⁻¹, $28 \div 65$ mg Cd kg⁻¹, $27 \div 81$ mg Cu kg⁻¹, $39 \div 164$ mg Ni kg⁻¹, $508 \div 938$ mg Mn kg⁻¹ and $1.6 \div 3.8\%$ Fe, all of them above reference values. Around the Feni smelting plant concentrations of particular pollution elements were in the range: $16 \div 31$ mg Pb kg⁻¹, $117 \div 286$ mg Zn kg⁻¹, $13 \div 30$ mg Co kg⁻¹, $43 \div 119$ mg Cu kg⁻¹, $158 \div 292$ mg Ni kg⁻¹, $519 \div 903$ mg Mn kg⁻¹, $119 \div 236$ mg Cr kg⁻¹ and $2.24 \div 3.79\%$ Fe. At the Toranica Pb-Zn mine all the measured values multiplexed above the standard values. Enrichment factors ranged from, low 3.75 for nickel up to 362.5 for zinc and extreme 1587.5 for lead. The Zletovo Pb-Zn mine has been characterized by all the measured values multiplexed above the standard values with an exception of nickel. Enrichment factors ranged from mediate ones such were those for copper of 20.8, cadmium of 28.7, arsenic of 32.5 up to high ones for zinc with 341.7 and lead 925. In regards to Sasa Pb-Zn mine all the measured values multiplexed above the standard values with an exception of nickel. Enrichment factors ranged from low for manganese of 12.14 and arsenic of 15.72, median for copper of 59.15, high for cadmium of 126 and extremely high for zinc with 892.7 and lead 1201.9. In regards to the Bucim copper mine the median values for Cu in samples were 396 mg kg⁻¹ and the ranges from 94.8 to 1171 mg kg⁻¹, for the Topolnica village the median values in samples were 150 mg kg⁻¹ with ranges from 52.5 to 1183 mg kg⁻¹ and for the Bučim village the median values were 145 mg kg⁻¹ and the ranges from 85.3 to 317 mg kg⁻¹.

Key words: Heavy metals, contamination, anthropogenic, R. Macedonia.

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