USING OF HYPERSPECTRAL DATA ANALYSIS AND FIELD PORTABLE XRF TECHNOLOGIES IN EVALUATION OF HEAVY METAL DISTRIBUTION

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Abstract

Characterization of heavy metal polluted abandoned mining sites is complicated as the spatial distribution of pollutants often changes dramatically, so complex integrated methods shall be applied to evaluate environmental risks. In our study, the integration of FPXRF (Field Portable X-ray Fluorescence spectrometry) and hyperspectral data analysis of the Gyöngyösoroszi abandoned Pb-Zn mine located in Northern Hungary where ZÁRAY (1991) reported serious heavy metal contamination was carried out.

The results showed that the integration of hyperspectral remote sensing and FPXRF is an effective tool for the characterization of Pb, Zn and Cu polluted sites and modeling the distribution and migration of heavy metals in extensive areas. The method can be used primarily to support the potentially applicable phytostabilization technique and to isolate hot spots where only ex-situ remediation techniques can be applied. This integrated method is a basis of further detailed investigations to map the heavy metal distribution of the studied area and quantify environmental risks caused by erosion, which include DEM (digital elevation model) and climatic and hydrological data sources.

Key words: *Hyperspectral data analysis, xrf technologies, heavy metal.*