

# **Monitoring of iron distribution in mine districts using multispectral and thermal data**

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Predicting the iron distribution in open pit mines and the neighboring regions is a key issue for the ecological state assessment of land cover. This problem is very cute for Kremikovtsi site since it is located closely to a large number of populated zones. As a data source multispectral data (Landsat ETM+) in combination with field and laboratory based data were utilized in the assessment the environmental impact from the mining activities. The unmixing method was chosen in the process of classification of land cover. Large number of mineral, rock and soil samples was collected during a field campaign in the study area to obtain correct statistics. The laboratory measurements performed on those samples were separated as follows: 1) conventional chemical and mineralogical analysis and 2) non-destructive spectroscopy in VNIR (using TOMS, 0.45-0.9 um) and thermal (using TIRES, 8-12 um ) ranges with different spectrometric systems. All laboratory data together with the field-acquired multispectral data were used to develop a model for the iron content in the samples. Next we developed a model for validation of Landsat ETM+ data, selecting representative pixels from the study area where the vegetation cover is less then 40 percent, with those achieved by other means. The results exhibited a good correlation between the model and the real multispectral data. For the thermal bands a practical method was developed for converting the emissivity data to temperature.

We consider that these results will be used in the process of supervised classification especially on the training stage when the endmembers are defined. We plan to extend this methodology for other regions polluted by mining activities mostly by cooper plants.

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