

Monitoring of Soils and Geochemical Development in Lignite Open-Cut Areas

Cornelia GLÄBER¹, Walter GLÄBER²

1. Martin-Luther University, Institute of Geography, Domstr. 5, D-06108 Halle, Germany.

2. Centre of Environmental Research, Department of Hydrogeology, Hallesch Str. 44, D-06246 Bad Lauchstädt, Germany.

Abstract

The intensive mining of Tertiary lignite deposits in open-cut mining in the last 70 years in Middle German led to radical and deep changes and destruction of the natural environment, formed by the continental glaciation. The whole surface sedimentary cover (ca. 60-80 m) was mined and as a result changed the natural, geomorphological, hydrological and hydrogeological conditions as well as the structure of the geological underground and the soil cover.

Up to 1989, the recultivation has had only the goal to regain agricultural acreage. Ecological aspects to a great extent were not taken into account. Today the output of rough lignite goes back to ca. 10%. Very large open dumps have to be recultivated, based on a detailed actual state analysis to draw up development conceptions.

By analysing multitemporal, multispectral and multisensoral remote sensing data, important information will be extracted for these terms; they are often the only source of information for these questions.

Aerial photographs (pan, CIR), Landsat TM data, KFA-1000 photos and ERS-1 data will be used. The following topics will be worked on:

- Monitoring recultivated areas within narrow bounds succession of dumped substrates and moisture content, combined with vegetation damages; control and assessment;
- Monitoring of biotic succession at the dumps as an indicator for oligotrophic sites;
- Classification of substratum types, moisture contents and headwaters in the open dumps;
- Localisation of industrial waste sites on the dumps and investigation of their influence on the substratum and water;
- Characterization of the hydrochemical conditions of open-pit residual lakes and dump virgin soils;
- Derivation of digital terrain models using stereo images;
- Integration of all the data in a GIS.

The investigations show the possibilities of needing different remote sensing data for soil-classification and geochemical development in an intensive anthropogenic altered region.