

APPLYING RS AND GIS TO THE MONITORING OF SOIL EROSION IN DEEP COAL MINES

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Abstract. Soil erosion has been a problem in Chinese agriculture since cultivation began, which absolutely poses a threat to the sustainability of Chinese agriculture today. Meanwhile, China is one of the few countries that have a vast amount of coal mineral resource and a wide range of coal mining industries. The extraction and utilization of coal mineral resource inevitably causes a series of serious environmental damages, which worsens soil erosion problem in coal mines. This study intends to combine soil erosion monitoring and deep coal mining impact, in accordance with the technique support from Remote Sensing (RS) and Geographic Information System (GIS), for the purpose of providing fundamental information for environment evaluation and ecological restoration projects in deep coal mines, through spatial data analysis of erosion controlling factors, and eventually conducts the generation of soil erosion risk map. On the basis of RS and GIS techniques, the monitoring of soil erosion affected by deep coal mining is conducted based on empirical relations among erosion controlling factors. Four types of data resource are involved in this study, namely remote sensing (RS) data, digital elevation model (DEM) data, mining surveying data and soil surveying data. RS data is mainly used to extract vegetation information and land use information, while DEM data is applied in topography analysis to obtain slope information. Furthermore, based on mining surveying data, mining subsidence analysis is carried on, where subsidence map is derived. Similarly, soil information is obtained from soil surveying, where soil property is analyzed and generated. As a result, soil erosion risk map is obtained, which serves as the basic but essential information for further environment evaluation and ecological restoration. The overall objective of this study is to operate qualitative soil erosion monitoring in deep coal mining area. Although this approach might be fundamental in nature, the ultimate goal is to create a tool that is useful for deep coal mining soil erosion monitoring.

Key words: soil erosion monitoring, deep coal mine, remote sensing, geographic information system

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