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Studies on soils condition on the area of the closed Babina mine in 2009-2019 using multispectral satellite images

Anna Buczyńska

Wrocław University of Science and Technology, Faculty of Geoengineering, Mining and Geology, Department of Mining and Geodesy, Poland (anna.buczynska@pwr.edu.pl)

Mining activity on the area of the former open-pit and underground brown coal mine called Friendship of Nations - Shaft Babina, which is at this moment part of the UNESCO Geopark - the Muskau Arch, was finished in 1973 and reclamation works were started with a special dedication to the forestation. As a part of the reclamation works, a number of technical and biological operations were performed, the subjects were: adjustment of water conditions, relevant land forming, development of the former mine area by plantings and improvement of soil condition. The last of mentioned factor is extremely significant element whose condition determines the proper growth of vegetation. Considering the mining-industrial history and current development of this area, it seems necessary to constantly monitor the components of the natural environment, in particular soils. Adequate and timely used remedies can limit the negative effects and degradation of flora. The purpose of this research was an analysis of the soils condition in 2009-2019 on the area of Babina mine on the basis of geological indices determined using multispectral images of Sentinel-2 and Landsat 5/8 satellite missions. The subjects of analysis were the following soil properties: humidity, overall condition, salinity, texture and chemical composition. It should be emphasized that the research was the first on this area in which remote sensing data was used. Obtained results allowed determining of the current condition of soils, describing their changes in the last 10 years and indicating spatial and temporal trends of changes in the future. In addition, the results of the analysis made it possible to identify areas that may still be under the influence of former mining activities that adversely affect the condition of soils.