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STUDYING THE IMPACT OF SURFACE MINING ON THE ENVIRONMENT, USING REMOTE SENSING

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It is a fact that mining significantly affects the surrounding environment. An ever-developing technology based on satellite data can be helpful in assessing the degree of this impact. The purpose of this work was to use remote sensing techniques to study the impact of surface mining on the surrounding environment. Specifically, the focus was on attempting a preliminary assessment of the extent of the cone of depression, using satellite spectral data.

For this purpose, the remote sensing Temperature-Vegetation Dryness Index (TVDI) was used, based on the triangulation method of determining values (dependence of surface temperature on vegetation index). The obtained values were spatially compared with the extent of the cone of depression. The study area was two surface coal mines: Belchatow in Poland and Carmichael in Australia, where Landsat mission data for selected years between 2013 and 2023 were subjected to calculations. The obtained results were subjected to statistical analyses such as zonal statistics and heatmaps.

The observations showed a correlation between the extent of the cone of depression and the increased values of the TVDI index in the study area (Belchatow), in contrast to the area outside the extent of the cone of depression. This allows to claim that the methodology used is a good way to make a preliminary assessment of the approximate extent of groundwater lowering caused by mining operations within an surface mine.