



Imaging the Underground Coal Gasification Zone with Microgravity Surveys

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Abstract

The paper describes results of microgravity measurements made on the surface over an underground geo reactor where experimental coal gasification was performed in a shallow seam of coal. The aim of the research was to determine whether, and to what extent, the microgravity method can be used to detect and image a coal gasification zone, especially caverns where the coal was burnt out. In theory, the effects of coal gasification process create caverns and cracks, *e.g.*, zones of altered bulk density. Before the measurements, theoretical density models of completely and partially gasified coal were analysed. Results of the calculations of gravity field response showed that in both cases on the surface over the gasification zone there should be local gravimetric anomalies. Over the geo reactor, two series of gravimetric measurements prior to and after gasification were conducted. Comparison of the results of two measurement series revealed the presence of gravimetric anomalies that could be related to the cavern formation process. Data from these measurements were used to verify theoretical models. After the experiment, a small cavern was detected at the depth of the coal seam by the test borehole drilled in one of the anomalous areas.

Key words: microgravity, time lapse data, coal, gasification, control.