

**Katarzyna MIREK**

AGH University of Science and Technology, Department of Geoinformatics and Applied Computer Science, al.

Mickiewicza 30, 30-059 Kraków, Poland

phone: +48 126174758, e-mail: [kmirek@agh.edu.pl](mailto:kmirek@agh.edu.pl)

## **New possibilities of mining area subsidence monitoring using sentinel-1 sar interferometry, uscb poland**

### **Abstract**

In the article the InSAR (Interferometric Synthetic Aperture Radar) technique was used, which has proven itself in many practical applications: starting from the development of digital terrain models, through the monitoring of glaciers and landslides, as well as terrain subsidence. The input data were radar images taken by the new European Space Agency satellite Sentinel-1. The aim of the study was the preliminary evaluation of the possibility to monitor subsidence in mining areas with the use of radar imagery provided by the Sentinel-1 satellite in combination with the analysis of seismic activity. InSAR technique was used to analyze subsidence in the area of the Upper Silesian Coal Basin (USCB). For analysis the area of Ruda Śląska, Ormontowice and Gierałtowice commune was chosen. The selected radar images and the catalogue of seismic events encompasses the period from 31 March to 6 May 2015. The interferograms were obtained from three interferometric pairs. On the obtained interferograms, there were areas observed which present the image of elliptical fringes which indicate the subsiding trough. The analysis of individual interferograms shows the gradual development of troughs, and next the slowdown of the subsidence, until its complete fading. When analyzing the location of the tremors epicenters, it can be noticed that the events are concentrated at perimeters of the troughs.