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Detection of surface subsidence using SAR SENTINEL 1A imagery and the short baseline InSAR method – a case study of the Belchatow open pit mine, Central Poland.

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The work focuses on time series analysis application through the high temporary resolution imagery from the SENTINEL 1A/1B mission. The analysis of surface subsidence in open pit mining area was performed by the selected InSAR approach - small baseline InSAR. This methodology allows for continuous monitoring of the mining area. The study was performed in the 700 km² mining area of the PGE GiEK KWB Belchatow mine in Central Europe (Area Of Interest, AOI). The SAR imageries acquired by the SENTINEL 1A/1B satellite for the 124-descending track in two years period - 10.2015 and 01.2017 have been used in the analysis. The post-proceed satellite LOS (Line of Sight) displacement indicates vertical changes of the surface within the dumping and excavation area. The analyzed AOI shows total subsidence of ca. -500 mm, whereas the excavation area shows a trend of terrain uplift ca. +250 mm during the analyzed periods. The presented processing pathway allows for the early detection of landslides in near real-time. Future work will focus on the accuracy assessment of analyzed data and detection of horizontal displacements of the AOI.