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## **Synthetic aperture radar interferometry in a subregional scale as a source for the monitoring of contemporary surface movements in the areas of Poland**

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Measuring how the Earth's surface deforms in response to natural and anthropogenic processes allows scientists to better understand them and the risks associated with them. Synthetic aperture radar interferometry (InSAR) enables monitoring the land surface in order to detect and trace changes of altitude which result from such phenomena as volcanic, seismic, landslides, or glacier movements (natural) and mining and post-mining, water pumping, or gas storage (anthropogenic). Simultaneously trace changes of land surfaces having an area up to approx. 48,000 km<sup>2</sup> (in the case of Sentinel 1A/1B satellites for one scene) with an interval of between 6 and 12 days (due to the time required for SAR data acquisition) allows to monitor surface displacements in regional or national scale.

We present results of measurements covering the entire Poland for the period 6 years, from 2015 to the end of 2020. The time series were developed based on the SBAS algorithm. Due to shifts of scenes in the azimuth direction in a given path, we developed an algorithm to crop and merge the raw imagery to predefined ranges. This allowed to formulate a series of interferometers with the same ranges, uniformly covering the entire area. Finally, we performed calculations of 32 frames (14 from ascending and 18 descending orbits). Based on time series, identified numerous areas where significant, anthropogenic or natural nature, surface displacement appears. The collected displacement observations allow not only to monitor areas where displacement occurs continuously, e.g. as a result of direct effects of mining operations, but also to identify regions of new, previously unidentified displacement, displacements occurring temporarily, or very slow movements of large areas.