



## Phase unwrapping issue in DInSAR measurements in the aspect of surface displacements on the mining areas

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InSAR become more and more popular technique for monitoring mining excavation influence on terrain surface. Nowadays, research on the accuracy of InSAR measurements focuses on impact of external factors on SAR signal and process of phase unwrapping. SAR interferogram include information about a displacement in wrapped form – modulo  $2\pi$ . Demodulation of phase (phase unwrapping) enable to restore true phase values and then correct interpretation of acquired information. Poor quality of data (low coherency) and large surface deformations cause phase discontinuities that make unwrapping process difficult and may generate incorrect results. Underground mining excavation, especially shallow or inducing seismic activity, may lead to large and abrupt surface displacements. Majority of unwrapping algorithms assume that the difference between any two adjacent samples in the continuous phase signal should not exceed a value of  $\pi$ . However, this assumption may be incorrect for large and abrupt surface displacements and lead to errors in the phase unwrapping and then to determination of incorrect values of surface displacements. Studies were conducted for areas where both natural and mining-induced seismic shocks occurred. DInSAR technique was used to create interferograms. Phase unwrapping processes were performed using Statistical-Cost, Network-Flow Algorithm for Phase Unwrapping (SNAPHU) for conventional parameters, modified discontinuity parameters and taking into account theoretical shock models (Mogi model). Research allowed to determine the impact of abrupt, large displacements on the phase unwrapping process.