



Final mine surface slope deformation monitoring using InSAR analysis

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Our previous research showed that Interferometric Synthetic Aperture Radar (InSAR) technology is effective in studies of land subsidence and for monitoring landslide areas. However, InSAR irradiation radar angles are changed by various slope angles, for example in mountainous areas. Therefore, the aim of this study is to evaluate the capability of using InSAR analysis to monitor the final slope deformation of a mine in a mountainous area. We performed differential InSAR and InSAR time-series analyses to precisely estimate vertical and horizontal displacement using the vector composition method from the observation data of upward and downward orbits. We applied the method to a limestone mine on Mt. Buko in the Chichibu region of Japan using images from the Advanced Land Observation Satellite/Phased Array Synthetic Aperture Radar (ALOS/PALSAR) obtained in 2006–2011. The results of the InSAR analysis using 31 PALSAR images showed similar trends to previous Automated Polar System monitoring results at this mine. According to previous studies, rainfall is connected to the amount of deformation of the final slope, but not with the trends. Therefore, our results capture the essential behavior of this mine, indicating the effectiveness of monitoring of the final slope using InSAR analysis.