**Analysis of Long-term Ground Subsidence Displacement of a Transmission Facilities using Multi-temporal SAR Imagery and PSInSAR**

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***ABSTRACT***

The stability and integrity of transmission facilities, such as transmission towers, are crucial for the uninterrupted supply of electricity. Ground displacement around these structures can lead to significant issues, including tower instability and potential service disruptions. Therefore, effective monitoring of ground displacement near transmission towers is of paramount importance. Synthetic aperture radar (SAR) imagery provides high-resolution, all-weather, and day-and-night capabilities, making it an ideal tool for continuous observation of transmission infrastructure. Unlike traditional ground survey methods, SAR can cover large areas with high temporal frequency, allowing for the detection of ground displacement over time. In this study, we applied SAR interferometry (InSAR) to extract ground displacement information near transmission towers. Persistent Scatterer InSAR (PSInSAR) is a technique that detects time-series displacement over long periods by using stable persistent scatterer (PS) that exhibit consistent backscatter signals. Artificial structures such as transmission towers typically have high backscatter signals in SAR imagery. They are expected to serve as suitable stable sactterers. PSInSAR enable the measurement of ground deformation with milimeter-level accuracy by comparing phase differences between SAR images taken at different times. This approach not only enhances the safety of critical transmission infrastructure but also contributes to the broader field of geospatial monitoring and analysis.

**Keywords:** SAR, PSInSAR, transmission facility, ground displacement