IAF SYMPOSIUM ON INTEGRATED APPLICATIONS (B5)
Satellite Applications for Sustainability and Climate (3)

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CHINESE HIGH-RESOLUTION COMMERCIAL INTERFEROMETRIC SAR FUCHENG-1: DINSAR RESULT FOR LANDSLIDES MONITORING

Abstract

The proliferation of commercial Synthetic Aperture Radar (SAR) satellites in Earth's orbit is poised for exponential growth in the coming years, propelled by SAR's remarkable capability to acquire accurate measurements even under adverse weather conditions. This surge in satellite deployment is reshaping the landscape of remote sensing technologies, especially in the field of Interferometric Synthetic Aperture Radar (InSAR). While InSAR faces limitations related to the frequency and spatial resolution of SAR datasets, recent advancements have demonstrated its potential for achieving high spatial and temporal resolution in monitoring small areas and micro-deformations.Our focus in this study is on Fucheng-1, a C-band commercial SAR satellite launched by China. We aim to explore the interferometric capabilities of Fucheng-1 and its potential in detecting landslides. Employing a pair of Fucheng-1 Interferograms, we conducted a comprehensive analysis to map landslides over Mao County. The assessment of interferometric performance revealed the significant impact of tropospheric delay on interferogram quality in this region. In high-altitude mountainous areas, atmospheric artifacts introduced substantial phase ramps in the interferograms.To address these challenges, we implemented the a new method to refine tropospheric artifacts with topography, thereby improving the interferogram quality and the precision of landslides detection. For a thorough evaluation of Fucheng-1's performance, we introduced the Sentinel-1 SAR dataset for comparison. The results unequivocally demonstrated Fucheng-1's pronounced advantages in the detection and measurement of small-scale and micro-deformation landslides over rugged mountainous terrains. This underscores the significant potential of Fucheng-1 in advancing InSAR applications.