Public Abstract
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Graduation Term:FS 2010
Department:Electrical Engineering
Degree:MS
Title:Investigation of Polarimetric Coherence Optimization in Persistent Scatterer Interferometry

Interferometric Synthetic Aperture Radar (InSAR) provides a means of imaging small deformations of the Earth's surface (millimeter scale). Furthermore, interferometric point target analysis (IPTA) and time-series analyses can be enhanced using polarimetric and interferometric synthetic aperture radar (PolInSAR) processing techniques to improve detection of point targets or coherent scatterers (CS) that are characterized by a point-like scattering behavior. A mixture of single or multiple scattering mechanisms with a high range of backscattering amplitudes characterize many SAR images over a number of areas. However, the fact that a number of scatterers are characterized by a strongly polarized behavior and are located at different heights even within the same resolution cell make the combination of polarimetric and interferometric information a promising one.

For the study site of Socorro, New Mexico, full polarization techniques provided a significant increase (i.e. more than doubled) in CSs compared to a non full polarization. Scattering mechanism and temporal behavior of the CSs were investigated. The CS scattering mechanism behavior was found consistent amongst the CS lists. Full polarization processing was found to increase the CS quantity significantly compared to single polarizations while maintaining high temporal coherence. Thus, this significant increase in full polarization CSs has the potential to increase the overall InSAR processing quality. For sites that challenge (e.g. vegetated areas and other low coherence environments) the single polarization InSAR processing, the full polarization increase in CSs may be essential for processing