HR: 0830h
AN: U21A-13
TI: Joint Model and Phase Parameter Estimation in Sparse Synthetic Aperture Radar Interferometric Measurements
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AB: One of the difficulties in using Synthetic Aperture Radar (SAR) differential interferometric data for geophysical modeling is errors in the phase unwrapping procedure. In extreme cases where deformation is measured over long periods of time or in regions of rapid change in ground characteristics, the interferometric phase signature of deformation can consist of disjoint, isolated regions or points. In these cases, interferometric SAR images can be considered as equivalent to dense geodetic measurements such as from GPS arrays, but with the limitation that the unwrapping is impossible without further assumptions about the nature of the deformation.

In this work, we explore the idea of combining phase unwrapping with model parameter estimation. The phase of an interferometric measurement lies in the interval $[-\pi,\pi]$.
Phase unwrapping in differential interferometry involves finding the unique multiple of 2π for each point in the image that matches the physical measurement of deformation. Most methods of unwrapping assume connectivity of the phase image. This work relaxes that assumption by assuming the phase is simply connected in several disjoint regions. We invert for the parameters of simple Okada and Mogi models of deformation along with the absolute phase numbers of each of these disconnected region, and explore the sensitivity of the estimation space.

More advanced models of interpreting truly isolated interferometric geodetic measurements are also explored.
DE: 1243 Space geodetic surveys
DE: 1294 Instruments and techniques
SC: U
MN: 1998 Fall Meeting