

Advantages to Geoscience and Disaster Response from the QuakeSim Implementation of Interferometric Radar Maps in the GeoServer GIS System.

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Repeat-pass interferometry from air or space produces high resolution maps of surface deformation, a rich source of precision measurements that can distinguish models of underground sources including volcanic inflation and earthquake processes. But with typical data archives of hundreds to thousands of files, describing maps that exceed 100 megapixels and contain multiple gigabytes of data, systems must be developed that enable visual browsing of available images and preliminary detailed examination of subsets of images without full-file downloads, even from mobile platforms in times of crisis. Such a system should also support Geographical Information Systems (GIS) operations so that for example InSAR data cross sections can be compared to local infrastructure locations. QuakeSim has implemented an archive of UAVSAR data in a web service and browser system based on GeoServer (<http://geoserver.org>). This supports a variety of services that supply consistent maps, raster image data, and GIS objects including standard earthquake faults. Browsing the database is supported by initially displaying GIS-referenced thumbnail images of the radar displacement maps. Access is also provided to image metadata and links for full file downloads, when desired. One of the most widely used features is the QuakeSim Line-Of-Sight profile tool, which calculates the radar-observed displacement (from an unwrapped interferogram product) along a line specified through a web browser. Displacement values along a cross section are updated to a plot on the screen as the user interactively redefines the endpoints of the line and the sampling density. The profile and also a plot of the ground height are available as ascii text files for further examination, without any need to download the full radar file. Additional tools allow the user to select a polygon overlapping the radar displacement image, specify a downsampling rate, and extract a modest sized grid of observations for display or for inversion, for example with the QuakeSim Simplex inversion tool which estimates a consistent fault geometry and slip model.