Updated Repeat Orbit Interferometry Package Released

ROI_PAC V2.3, a Repeat Orbit Interferometry package that allows topographic and surface change researchers to apply Interferometric Synthetic Aperture Radar (InSAR) methods, is now freely available to the community. InSAR is the synthesis of conventional SAR and interferometry techniques that have been developed over several decades in radio astronomy and radar remote sensing. In recent years, it has opened entirely new application areas for radar in the Earth system sciences, including topographic mapping and geodesy.

ROI_PAC, developed primarily to work with European Remote Sensing (ERS) satellite radar data, currently supports ERS-1, ERS-2, and Japanese Earth Resources Satellite (JERS) radar data, and is configurable to work with "strip-mode" data from all existing satellite radar instruments. The first release of ROI_PAC (V1.0) was made quietly in 2000, and roughly 30 groups in the academic and research community currently use it.

ROI_PAC uses raw radar data, ancillary information from telemetry and navigation solutions, and digital elevation models (DEM; externally provided or interferometrically derived) to produce a variety of derived data products, including full resolution images, interferograms, phase images measured as principal value and continuously "unwrapped" DEMs, and error estimates. Each of the products is available in its natural radar coordinate system and is geo-referenced to a DEM. The software computes the interferometric baseline—that is, the orbital separation of the satellite at the observation times—from the navigation solutions provided, and then refines the estimate to the millimeter level of precision using the DEM provided and the optional deformation model for reference. To remove the topographic signature from an interferogram, ROI_PAC simulates an interferogram from the orbit data and the DEM, and subtracts the phase from the measured interferogram, leaving just the deformation phase. ROI_PAC implements its fundamental algorithms in C and Fortran 90, and drives each executable module with a Perl control script, running on Silicon Graphics Incorporated (SGI), Sun, Linux and Mac OS X platforms.

ROI_PAC source code is available to the international community for research purposes at no charge from the NASA Open Channel software distribution system (http://www.openchannelfoundation.org). Caltech retains intellectual property rights to the software and licenses the source code and executable software for external use. Other uses and restrictions can be found in the supplement. ROI_PAC source and object code have received an official classification of EAR99 from the U.S. Department of Commerce, allowing export without any government licensing requirement to foreign nationals of all but a few selected countries.

The developers are heavy users of ROI_PAC and attempt to fix software bugs as they arise. A ROI_PAC Web page at the Open Channel Foundation Web site hosts documentation and links to other pages and newsgroups for discussing bugs. ROI_PAC is not a commercial package. It is hoped that the user community will work actively with the developers to report and repair bugs.

The developers intend to improve efficiency, modularity, and user-interactivity needed for solving big geophysical problems with large quantities of data provided by an array of international SAR systems. In the immediate future, ROI_PAC will be fitted with data conditioners for Europe's EnviSAT, Japan's Advanced Land Observing System (ALOS), and Canada's Radarsat-2 systems in anticipation of the exciting interferometric data they will provide.

More extensive information about ROI_PAC V2.3 can be found on the *Eos* Electronic Supplement at http://www.agu.org/eos_elec/000487e.html.

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