

SIR-C/X-SAR Interferometry: The Next Step Toward Digital Global Topography

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During the second flight of the Spaceborne imaging Radar-C and X-Band Synthetic Aperture Radar (SIR-C/X-SAR) in October 1994, the shuttle was flown in a 57° inclination orbit with a nominal altitude of 215 kilometers. This resulted in a slightly drifting orbit for the first 6 days, almost exactly duplicating the flight 1 (April, 1994) orbit, at times to within 10 meters. During day 5, the team was extremely successful in acquiring flight 1 to flight 2 interferometry cm specific datatakes, with not only L- band, but also C- and X-band. For days 7-11 of flight 2, the orbit was lowered to a 1-day exact-repeat orbit. This orbit was so accurate that virtually all orbit-to-orbit attempted interferometry datatakes were successful. Twenty-three hours of interferometry data were acquired in this mode. Swaths of interferometric data were acquired over central North America, the Amazon forests of central Brazil, and the volcanoes of the Kamchatka Peninsula in Russia. Digital elevation models (DEMs) have been generated at all three radar frequencies over a variety of terrain types. In addition, it has been possible to detect topographic changes that occurred between SAR overpasses in April and October. This unique data set will not only make it possible to generate DEMs over areas that have not previously been mapped, but will also make it possible to improve data handling and processing required for the Global Topography Mission (1 OPSAT).

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