

## **NASA/JPL AIRSAR Single Pass Polarimetric Interferometry: Data Processing and Calibration**

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The NASA/JPL AIRSAR system was modified to collect the polarimetric interferometry data at C-band in 1998. S. R. Cloude and K. P. Papathanassiou first published the basic formulation of polarimetric interferometry. Polarimetric interferometry provides interferometric cross correlation information at various polarization states. Unlike repeat pass interferometric data, these single pass data do not suffer temporal decorrelation. In this paper, we discuss the data processing and calibration issues associated with polarimetric interferometry by using the AIRSAR data. Since the polarimetric interferometry data are collected in the polarimetric mode using the double baseline sequence, all data combinations must be co-registered precisely in the along track direction. Usual polarimetric SAR data have been recorded in the compressed Stokes matrix form; however, the polarimetric interferometric data must be recorded in the special form due to the complex correlation relationship. The final DEM (Digital Elevation Model) pixels must be carefully associated with the polarimetric interferometric images since various DEMs can be derived using different combinations of polarization states.

We calibrated the polarimetric interferometric data in two steps. The first step is similar to the usual interferometric calibration process combined with the polarimetric radiometric calibration. Then, we perform the precise relative interferometric calibration in the phase domain. Using this two step calibration process, we derive the precise baseline information. This is particularly important since the phase center of each polarization is slightly different even though a single antenna is used for both horizontal and vertical polarization. This calibration process will be illustrated by using several examples of polarimetric interferometry data.

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