A Comparison of L-band and P-band Interferometry at La Selva, Costa Rica for Tree Height Estimation

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The NASA/JPL AIRSAR system was deployed to Central America, South America and Antarctica in March 2004 for science collections ranging from archeological investigations of the Maya, Aztec and Olmec civilizations, land use studies, vegetations studies and ice sheet and glacier investigations in Patagonia and Antarctica. Among the data collected was a series of 39 repeat lines collected at C, L and P-band at the La Selva Biological Research Station in Costa Rica. Data was collected at this site since this a well studied region with vegetation ranging from 1-2 year regrowth to pristine natural tropical forests. Ground truth consisting of field observations and LVIS lidar data was previously collected for a portion of this site that is well suited for vegetation studies. Several techniques have been developed for estimating tree height in vegetated regions using the volumetric correlation signature in radar interferometry. These techniques have been applied to vegetation using frequencies ranging from X-band to P-band and employed purely interferometric as well as polarimetric interferometric data for estimating vegetation parameters. We compare the interferometric and polarimetric interferometric vegetation height estimation algorithms in tropical vegetation using both single pass and airborne repeat pass data collected over the La Selva Ecological Reserve in Costa Rica by the NASA/JPL AIRSAR system during a campaign to Central and South America in March 2004. The effect of short term temporal decorrelation at even at these low frequencies is seen to degrade the vegetation height estimation.

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