ABSTRACT: ORAL PRESENTATION
ISSUE: SAR CALIBRATION

ASSESSMENT OF POLARIMETRIC RADARSAT-2 DATA QUALITY

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ABSTRACT

RADARSAT-2 is equipped with polarimetric capability at multiple incidence angles and resolutions of 9 m and 24 m. Even though the original requirement on the H-V antenna isolation was too low (-20 dB), the actual RADARSAT-2 antenna isolation is better than -32 dB [1]. As such, single- or dual-polarization are not significantly contaminated with polarization cross-talk [2], and this makes RADARSAT-2 calibration much easier.

In this study, an independent assessment of polarimetric RADARSAT-2 data quality is conducted using data collected over the CCRS calibration site in Ottawa. A transponder conceived by CSA in collaboration with CCRS [3] is used for the measurement of the impulse response characteristics, and for the assessment of the accuracy of polarimetric data collected at 25 degree and 40 degree incidence angle. Data collected over the Amazonian forest at various incidence angles between 20 and 40 degree are also considered in this investigation.

The Freeman-Van Zyl calibration technique [4], which symmetrises the system prior to the estimation of the distortion matrix elements, is adapted for this work. Van-Zyl's technique [5] for determination of system distortion matrix elements is reconsidered, and additional equations are used to optimize the estimation of the calibration system unknowns even when the azimuthally symmetric reference target is of very low HV return in comparison with HH, VV, and the HH-VV cross-correlation. This new calibration method was validated for PALSAR calibration, and permit demonstrating that PALSAR antenna isolation is higher than -35 dB [6], in contrast to the -25 dB isolation obtained by many studies [7] using the conventional Van-Zyl algorithm or the Quegan calibration method.

The results obtained with the new calibration method confirm the high-isolation of phased array RADARSAT-2 antenna. The effect of Look-up Tables applied to provide the data in 16 bits (in stead of 32 bits) is also discussed. .

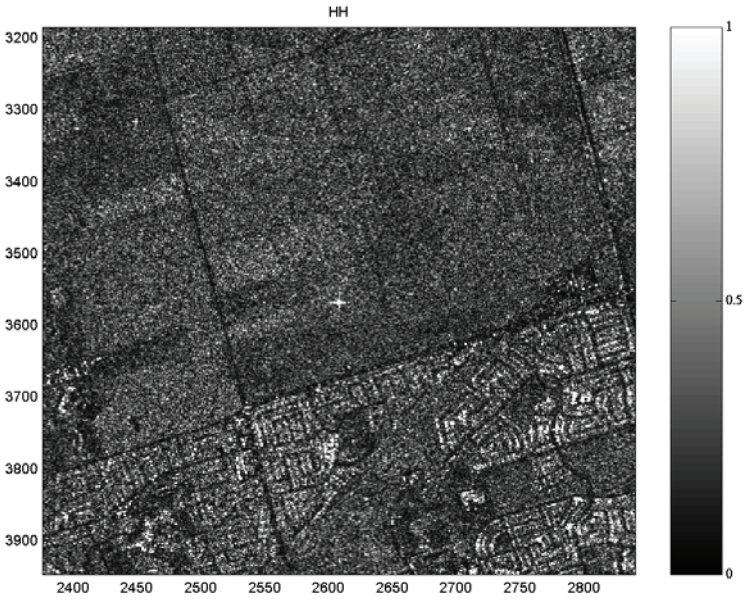

Fig.1 RADARSAT-2 image with the CSA Transponder

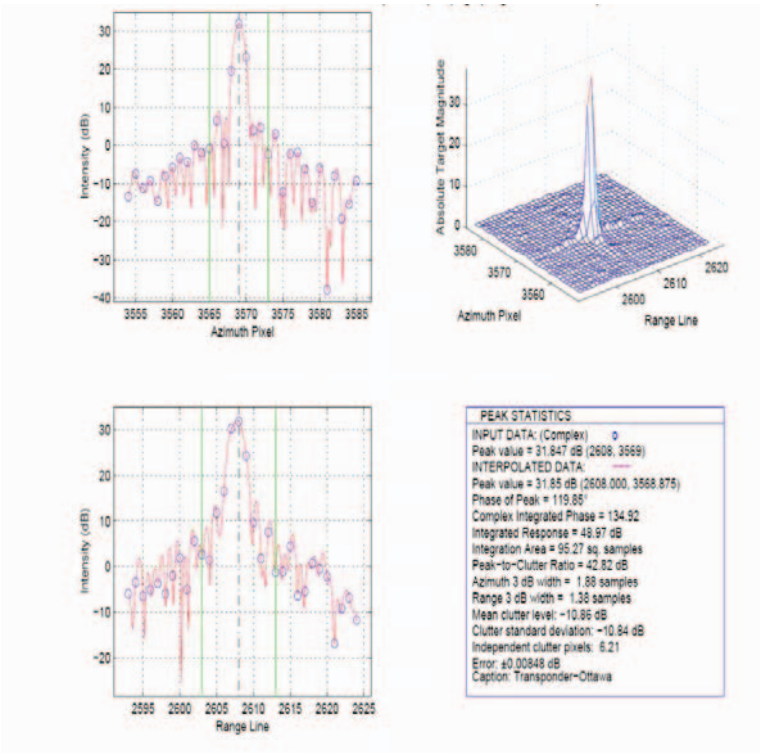

Fig.2 Transponder impulse response at HH polarization

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