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ASSESSMENT OF RADARSAT-2 HR STEREO DATA OVER CANADIAN NORTHERN AND ARCTIC STUDY SITES

T. Toutin¹, K. Omari¹, E. Blondel², D. Clavet³, and C. V. Schmitt¹

¹Canada Centre for Remote Sensing, 588 Booth Street, Ottawa, K1A 0Y7, Canada

²Gismatix Inc., 1475 Cumberland Ridge Drive, Cumberland, K4C 1E1, Canada

³Centre for Topographic Information, 2144 King Street West, Sherbrooke, J1J 2E8, Canada

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Abstract. Digital surface models (DSMs) extracted from high-resolution Radarsat-2 (R2) stereo images using a new hybrid radargrammetric modeling developed at the Canada Centre for Remote Sensing are evaluated over two Canadian northern and arctic study sites. Because the new hybrid model uses the full metadata of R2, it does not require any ground control point. The first study site in the north of Quebec is used for the scientific validation where accurate checked data (dGPS, lidas) is available. The second study site in the Arctic (steep relief and glaciated surfaces) is challenging for the operational evaluation of topographic mapping capabilities of R2. For the first study site, the bias and elevation linear errors with 68 percent confidence level (LE68) of R2 stereo-extracted DSM compared to lidar data were computed over bare surfaces: LE90 of 3.9 m and no bias were achieved. For the second study site the comparison was performed between the R2 DEM and ICESat data. A negative 18-m bias was computed and certainly results suggests a bias in the stereo-model of R2 and thus in the metadata used in the model computation because there is few temporal variation in the data acquisition (R2 and ICESat)/ LE68 of 28 m was obtained. However, the differential melting and thinning depending of the glaciers elevations and planimetric surging of glacier tongues with less accumulation of debris and moraines, a lower LE68 of around 20 m could be expected. In addition to evaluate the potential of R2 over ice bodies, which generally have low slope relief and because the errors are strongly correlated with slopes, other statistical results of elevation differences were also computed: LE68 of 15 m was obtained over ice fields with 0– 5° slopes while a little more than 20-m over less than 30° slopes was achieved.

[Conference Paper](#) (PDF, 8739 KB)

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