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Ice elevation change from Swath Processing of CryoSat SARIn Mode Data

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Reference and repeat-observations of Glacier and Ice Sheet Margin (GISM) topography are critical to identify changes in ice elevation, provide estimates of mass gain or loss and thus quantify the contribution of the cryosphere to sea level rise (e.g. McMillan et al., 2014). The Synthetic Interferometric Radar Altimeter (SIRAL) onboard the ESA radar altimetry CryoSat (CS) mission has collected ice elevation measurements since 2010. The corresponding SARIn mode of operation, activated over GISM areas, provides high spatial resolution in the along-track direction while resolving the angular origin of echoes (i.e. across-track). The current ESA SARIn processor calculates the elevation of the Point Of Closest Approach (POCA) within each waveform and maps of elevation change in Antarctica and Greenland have been produced using the regular CS height product (McMillan et al., 2014; Helm et al., 2014).
Data from the CS-SARIn mode has also been used to produce measurements of ice elevation beyond the POCA, also known as swath elevation (Hawley et al. 2009; Gray et al., 2013; ESA-STSE CryoTop project). Here we use the swath processing approach to generate maps of ice elevation change from selected regions around the margins of the Greenland and Antarctic Ice Sheets. We discuss the impact of the swath processing on the spatial resolution and precision of the resulting ice elevation field and compare our results to current dh/dt estimates.

References:
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