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The Cryosphere Discussions

Interactive comment on "What's in an elevation difference? Accuracy and corrections of satellite elevation data sets for quantification of glacier changes" *by* C. Nuth and A. Kääb

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Author Reply to comments by S. Khalsa

Reviewer comments in bold
Author reply in normal text

2015:27 It is incorrect to state that the conversion procedures for deriving elevations from GLAS return waveforms are not available. The original waveforms are available in GLA01 and the waveform fitting parameters are in GLA05.

We have weakened the statement. However, granted the waveforms and fitting parameters are provided, it is practically not feasible to develop personal waveform fitting algorithms.

Also, determining elevations from the large footprints requires an assumption of Gaussian return-echo waveforms and thus Gaussian histograms of the terrain within each footprint. This inherent assumption may not be valid for all waveforms and therefore induces a non-controllable uncertainty within these types of elevation acquisitions. This type of error can not be modelled unless one has a very precise DEM, such as from airborne laser scanning where the histogram of elevation within an ICESat footprint can be properly described.

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2021:9 Explanation should be provided for why GLA06 and GLA14 elevations can differ by so much (number of peaks used in fitting waveform, corrections applied, etc.)

Agreed

2048:21 Unfortunately, because of wide ICESat track spacing the data are not everywhere available for use in DEM registration.

Of course, if ICESat is not within the scene, then it would be impossible to use. However, as few as 600 points can provide a reasonable registration in our study. For a 60 km long ASTER scene, a single ICESat track may contain 350 elevation points, and thus 6 repeat tracks could potentially provide 2100 elevation points, enough to significantly co-register parameters for a scene with a single ICESat track. We therefore do not know the practicalities of using ICESat to co-register all ASTER DEMs, however we do believe it is worthwhile to suggest as a conclusion of this study.

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