EGU21-15636
https://doi.org/10.5194/egusphere-egu21-15636
EGU General Assembly 2021

A comparison between coincident laser and Ku radar versus S- to C-band 'snow radar' data for airborne retrievals of snow depth on sea ice

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Snow depth estimates remain a large uncertainty for constraining the accuracy of sea ice thickness retrievals from polar altimetry. There have been several recent investigations into methods for estimating snow depth from airborne observations over sea ice; this poster outlines a comparison between two different methods applied to Operation IceBridge data from the Spring 2016 campaign. The first co-locates visible-band laser scanner data from the Airborne Topographic Mapper with Ku-band data from the CReSIS radar, using a fixed threshold first-maximum retracker algorithm for retracking radar waveforms and applying a calibration step to remove the vertical offset between sensors at leads. This method represents an airborne proxy for the newly-aligned ICESat-2 and CryoSat-2 orbits of the Cryo2Ice campaign. The second method uses the conventional CReSIS ultrawide-band frequency□modulated continuous□wave ‘snow radar’ system, that ranges between S- and C-band, applying the retracker algorithm described by Newman et al 2014. We evaluate properties of the estimated snow depth distribution, and alignment of air-snow and snow-ice interfaces, along the aircraft track and the scale of correlation between sensors.