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Abstract:
Sea ice is strongly affecting the global climate, and the sea ice extent has been monitored by satellites since 1979. To estimate the Arctic sea ice volume, ice thickness must be determined. The measurements of sea ice thickness are however more difficult to achieve, and encounter limitations due to spatial and temporal variability. The measurements of sea ice freeboard may be used to estimate sea ice thickness, when combined with examination of leads between ice floes to determine the local sea surface height. With CryoSat-2 (CS), we have the opportunity to measure much more of the Arctic Ocean due to its high sampling rate and geographical coverage to 88 oN/S. Validation of the CS retrievals are very important to verify the derived sea ice thickness and understand the associated error sources. We present a comparative analysis of CryoSat-2 elevations with the Operation IceBridge Airborne Topographic Mapper (ATM) laser altimeter data gathered on April 2, 2012, where the NASA P-3 completed an underflight of CS orbit number 10520, north of Alert, Nunavut, Canada. We present a new lead detecting algorithm which was developed using the CS Level1b (L1b) waveforms, and we analyze its capabilities via comparisons with IceBridge imagery and ATM elevations. In addition,using CS L1b waveforms we have developed a method to find misplaced CS Level 2 elevations and correct them to remove any elevation bias.