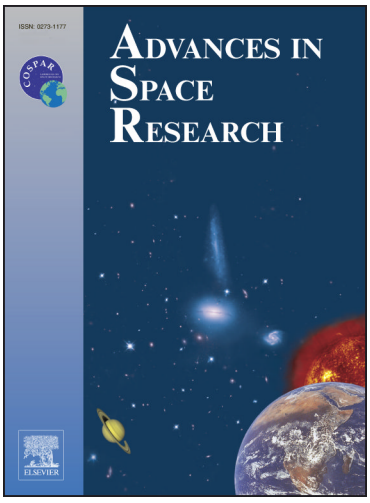

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Uncertainty Reduction of Arctic Sea Ice Freeboard from CryoSat-2 Interferometric Mode

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Abstract

A study by Armitage and Davidson (2014) has shown that the extra information from the CryoSat-2 (CS2) SARIn mode increases the number of valid sea surface height estimates which are usually discarded in the SAR mode due to snagging of the radar signal. As the number of valid detected leads increases, the uncertainty of the freeboard heights decreases.
In this study, the freeboard heights estimated by processing CS2 SARIn level 1b waveforms are validated using the information from airborne laser and radar altimetry as well as snow radar measurements acquired during the CryoVEx 2012 and Operation IceBridge 2012 campaigns, respectively. The possible reduction in the random freeboard uncertainty is investigated comparing two scenarios, i.e. a SAR-like and a SARIn acquisition.
A very good agreement is found between average airborne and satellite radar freeboards although, at the CS2 footprint scale, they do not show along-track spatial correlation. It is observed that using the extra phase information, CS2 is able to detect leads up to 2300 m off-nadir. A reduction in the the total

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