



Space-borne Observations of Ice Freeboard: Past Present and Future

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Sea ice represents one of key uncertainties in the future temperature rise predicted by Global Climate Models (GCM's). However GCM's simulations of future changes sea ice thickness vary widely. Satellite altimeters have the potential to provide wide area, continuous measurements of sea ice freeboard from which sea ice thickness can be obtained. Data from ERS already provide a ten year time-series of ice thickness in the Arctic and reveal a highly variable thickness field controlled by both thermodynamic and dynamic forcing. More recently satellite laser altimeter data from the IceSat GLAS mission has shown the potential to provide sea ice elevation estimates at higher latitude. Considerable potential exists in combining these two data to reduce key uncertainties in thickness retrieval related to water level and snow depth. Finally we describe current plans for launch and validation of the ESA CryoSat satellite which will provide radar altimeter measurements up to 88 °N for the first time.