Remote Sensing of Sea Ice Cover Using SuperDARN HF Radars

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In addition to returns from field-aligned plasma irregularities in the ionosphere, SuperDARN radars also observe backscatter from Earth's surface on a daily basis. These ground scatter echoes have been used to characterize the ionosphere in variety of ways, such as monitoring atmospheric gravity waves, *E* and *F* layer critical frequencies, and ultra-low frequency (ULF) wave propagation. We have calculated monthly ground scatter occurrence rates for four high-latitude SuperDARN radars and compared them to Arctic sea ice boundaries derived from satellite observations courtesy of the National Snow and Ice Data Center (NSIDC). Regions covered by sea ice are shown to be weak scatterers for the HF signals, while sea surfaces not covered by ice produce more easily detectable backscatter than land regions in Canada and Greenland at comparable ranges. The spatial resolution and coverage of these results are influenced by several factors: seasonal ionospheric propagation conditions, relatively large range cell resolution (45 km), and the need for a thick daytime ionosphere to reflect radar signals down to the Earth's surface. In this talk, besides statistical analysis of historical high-latitude SuperDARN observations, we will present first results from a new radar control program designed to improve detection of sea ice boundaries.