

# Mapping Internal Layers Using a 12-18 GHz Plane Wave Radar

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Understanding trends in accumulation is necessary when determining the mass balance of both the Greenland and Antarctica ice sheets. In the past, a 500-2000 MHz FMCW radar has been employed in order to efficiently and accurately measure annual accumulation over a distance. Recently a higher frequency plane wave radar of 12-18 GHz was developed with the aim of detecting subannual layers as fine as three centimeters formed by individual accumulation events. Data obtained from the 12-18 GHz radar used at the Summit Greenland camp in 2005 and WAIS Divide camp in 2006 was processed to create images depicting layers present within the top five meters of the ice sheet. A comparison to other accumulation data gathered from snow pits and stake measurements was made to confirm the accuracy of the radar. Several layers were traced from images created from the 12-18 GHz radar data in order to obtain measurements of their depth. The measurements were analyzed to examine the continuity of the layers as well as the variability in accumulation between two layers. By analyzing the continuity and variability of subannual layers, a better understanding of the accumulation processes present on the ice sheets can be gained.