



Sea Ice Properties from Submarine Multi Beam Sonar

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A Kongsberg EM 3002 Multibeam (MB) sonar was installed on Royal Navy submarine 'HMS Tireless' in collaboration with the DAMOCLES project to measure properties of Arctic sea ice in Spring 2007. MB sonar makes successive, parallel, along-track narrow beam soundings comprised of 254 individual 'pings' spread out perpendicular to the direction of motion of the parent vessel. Reconstructed multiple soundings provide high-resolution descriptions and locations of physical features of interest to mariners, i.e. submerged vessels, bathymetry of continental shelves and navigation hazards. HMS Tireless looked upward with the MB sonar, gathering data on the highly variable Arctic sea ice underside. We present 200 km of MB data, in a region located 350 km off the northern coast of Greenland, where the submarine performed a gridded overlapping survey between 12 and 13 March 2007. This ice topography data includes pressure ridge spacing, frequency and orientation, draft, and we demonstrate its ability to demarcate regions of first-year and multi-year ice.