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Comparison of multi-beam and single-beam seabed backscatter
and sampling resolution near normal incidence

Rudy Kloser
GPO Box 1538, 7001 Hobart, Australia

The seabed backscatter difference near normal incidence ($<30^\circ$) is compared between two multibeam (EM300 and EM1002) and two on-axis calibrated single beam EK60 (38 and 120 kHz) echo sounders and found to differ by 7 to 10 dB. A seabed backscatter model supported the calibration of the single beam backscatter near normal incidence. Potential errors due to incorrectly applied equivalent area compensation were found to contribute to this difference but not significantly. Estimating the equivalent area of sampling from multibeam and single beam echosounders highlights the complexities of sampling resolutions as a function of incidence angle and pulse length. These variable sample sizes influence the measured backscatter due to the patchy nature of seabed substrate and fauna. The current backscattering processing method for a national upper slope mapping program relies on producing metrics at the highest spatial resolution. Calibration errors on these metrics for seabed classification for a national mapping program are discussed.