Managing systematic residual errors in multibeam backscatter data

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Interpretation issues with Grazing-Angle Invariant Backscatter Maps

As-observed backscatter variability — with strong artifact

Three data sets in the class: range, circular, normal. The data are not normally distributed, with line-averaged angular response being significantly better.

Bottom Backscatter Strength

Angular Dependence

An opportunity to assess relative importance of different scattering mechanisms

Additional Discrimination using Angular Response

Beam-Averaged Data: Resolution Loss and Feature Distortion

Alternate Methods for deriving Grazing-Angle Invariant Backscatter Maps

METHOD 1: Estimating the Line-Averaged Variability in the Vertebrally Referenced Angle

METHOD 2: Estimating the Line-Averaged Variability in the Vertically Referenced Angle

METHOD 3: Estimating the Line-Averaged Variability in the Vertebrally Referenced Angle

METHOD 4: Estimating the Line-Averaged Variability in the Vertically Referenced Angle

Beams pattern reduction using line-averaged statistics

Larger beams are less effective statistically. This data set includes four beam patterns, with each beam pattern being analyzed individually. The results are then combined to provide a single beam pattern.

Beams pattern reduction using rolling 250 ping statistics

Rolling statistics are used to improve the robustness of the results. The rolling statistic is calculated by taking the average of the last 250 pings. The results are then combined to provide a single beam pattern.

Backscatter data collected in a number of systems has shown significant improvement in the accuracy of the angular response.

The results of the rolling statistic are shown to be more robust than the line-averaged statistic. The rolling statistic is shown to be more effective in reducing the noise in the data.

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