



## **Physical properties of meteoric and marine ice in Larsen C Ice Shelf, Antarctic Peninsula, from Q and AVA analyses of reflection seismic data**

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We present initial estimates of the physical properties of meteoric and marine ice in Larsen C ice shelf, Antarctic Peninsula, as derived from quality factor (Q) and amplitude-versus-angle (AVA) analysis of reflection-seismic datasets. The data were acquired during the 2008-09 austral summer in the south-eastern sector of the ice shelf, using explosive sources deployed in shallow shot holes, and 48 vertical-component 100 Hz geophones. 24 of these phones were installed horizontally and transverse to the acquisition line, such that compressional (P), vertically-polarised shear (SV) and horizontally-polarised shear (SH) could be recorded. The recorded data are rich in reflection events, with different phases identifiable as primary and multiple P-waves, SV- and SH-waves, and also P to SV mode conversions. The AVA character of these reflections is applied in a joint inversion, with a Bayesian statistical analysis used to obtain best-fit densities and wavelet velocities for the meteoric and marine ice, which allows estimates of the ices' Young's moduli and Poisson's ratios. We further use prestack Q inversion (PSQI) to determine P- and S-wave quality factors for the two ice types, and consider these in terms of ice temperature and permeability. Our estimates of the physical properties of the meteoric and marine ices will ultimately be used to inform predictive models of the flow and fracture mechanics of Larsen C Ice Shelf.