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Performance of light vibroseis sources on polar firn

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Small vibrator sources have been succesfully operated on cold Alpine firn in the last years. Here we present results from first operations on the Antarctic plateau, near Kohnen station, Dronning Maud Land with the electrodynamic vibrator system ELVIS. Because of its light weight, such vibrator sources are especially suitable for air transport, a considerable logistic advantage for operation in remote polar regions. As its peak force is lower than 1000 N, it has also been possible to excite shear waves at the surfaces. The complementation of shear waves with pressure waves allows for the deduction of elastic moduli within the firn and ice column. We provide an overall assessment of the results of recordings made with three-component geophones, including estimates of penetrating depth, capability to image shallow internal layering and comparison with stratigraphy detected with ground-penetrating radars.