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Initial results of the deep reflection seismic imaging in SE Poland using extended correlation method

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In the effort to provide constraints on the deep crustal structure we have applied extended correlation technique to the ION GXTechnology PolandSPAN seismic reflection data. It allows to extend nominal record length of the survey (12 s in this case) to much longer times (18 s and 22 s tested here), given that raw uncorrelated data are stored and the up-sweep is used. The technique is not novel and has been successfully used, e.g. in Canada, during the LITHOPROBE project to save the time spend on single VP. For the times greater than the nominal record length, data are correlated using self-truncating sweep resulting in the original sweep spectrum kept for the nominal record length and the higher frequencies cut off for the greater times. Given the broad sweep spectrum (2-140 Hz) used in the survey, the high-end frequency at 22 s is 55 Hz (88 Hz at 18 s), which is way below the expected frequency of deep crustal arrivals (usually below 30 Hz). The correlation was performed both using the pilot sweep signal and the mean of the measured ground force recorded for each separate vibrator and VP. Processing of the ground-force correlated data produced clearer reflectivity in the deeper section, which can be attributed to the lower-frequency characteristics of the ground-force signal. Initial results of processing applied to one of the PolandSPAN lines in SE Poland (line 5100) revealed highly reflective lower crust and clear Moho discontinuity signature at around 15-16 s, being in agreement with coincident deep-refraction profile and the recently acquired deep reflection line.