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CHIRP SUB-BOTTOM PROFILER SOURCE SIGNATURE DESIGN AND FIELD TESTING

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Chirp sub-bottom profilers are widely used to collect very high resolution 2D marine seismic data. They produce high signal-to-noise ratio data using highly repeatable source signatures. A 3D chirp system is currently developed at the Southampton Oceanography Centre. We developed and tested a number of alternative source sweeps to optimise the vertical resolution and penetration capability of the system. The source sweeps use the same frequency range of 1.5 Ű 13 kHz but vary in their instantaneous frequency as well as their envelope function. Non-gaussian envelope functions and non-linear instantaneous frequency function are used. In field trials in the West Solent (UK) the same seismic line was repeatedly recorded using different source sweeps. The data sections were analysed for resolution and attenuation, and the results were compared to model results. We show that the newly developed sweeps offer advantages over the signatures originally used and we demonstrate that the source sweep should be chosen depending on the survey task.