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Location of Targets and Scatterers with Ambient Noise

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By placing a vertical array in an ambient noise field and forming an upward and downward beam one obtains two time series which can be cross-correlated to reveal a sub-bottom profile of the seabed [Siderius, et al., *J. Acoust. Soc. Am.*, 120, 1315-1323, (2006)]. Here the cross-correlation approach is extended to the location in range and bearing of a point target. An experiment was designed using floats and weights mounted (and dismounted) on the same cable as the vertical array. Careful measurements were made of the location of all likely floats, ballast weights, array terminations, and so on. After suitable coherent averaging, peaks were seen at delays (correlation offsets) agreeing with the reflector positions and were shown to be absent when reflectors were removed. An implication for geoacoustic inversion is that, in principle, the technique can be used to explore scattering as well as reflection properties of layers. A simple extension of the theory developed in [Harrison and Siderius, *J. Acoust. Soc. Am.*, (2007), accepted] is used to explain the amplitudes of the reflections. The approach differs from "acoustic daylight" principally in determining a target range.