

# Utilizing acoustic noise

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## I. ABSTRACT

The random nature of noise tends to suggest its limited utility. Nevertheless, it is possible to extract information about the kinds of structures associated with coherent processes from an assortment of noise fields. Thus, coherent wavefronts, for example, can be extracted by cross-correlating noise fields between a point receiver and a vertical array that are equivalent to those propagating from a source at the point receiver to the array. We examine the background physics of extracting these coherent structures and present experimental results confirming these theoretical arguments. Further, we present experimental results of some uses for random noise fields such as using noise for time synchronization between unconnected acoustic receivers for performing array element localization, for constructing passive stacked acousto-seismograms, and for seismic inversion. We conclude with a discussion of some broader applications.

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