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USE OF SMALL PROGRESSIVELY EXPANDING SEISMIC ARRAYS FOR COMPREHENSIVE MONITORING OF MICROSEISMS

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ABSTRACT

Microseismic ground motion produced, as Rayleigh-type surface waves in a wide frequency range, by either natural or artificial (man-made cultural) sources can be gainfully employed, for determining the sedimentary structure of layered crust from phase velocity dispersion data acquired, at seismometric arrays. The properties of a large aperture array to resolve long wavelengths, and with station density adequate to suppress wave number aliasing, can be synthesized using smaller arrays in expanding mode. Using synthetic data, it is shown that a 3, 4 or 5-station linear-cross array of orthogonal arms can be progressively expanded successfully, employing suitable procedures to minimize number of station relocations and maintaining the basic array geometry. Assuming plane wave propagation from single as well as multiple sources in different azimuths, we have demonstrated that a 5-station expanding array is comparatively more efficient, in fact just optimum in terms of response, in resolving phase velocities and wave numbers of microseisms, with least bias.

KEYWORDS: Expanding Seismic Arrays, Microseisms, Phase Velocity, Response, Wave Number