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Near offsets effects on Rayleigh-wave dispersion measurements inferred from laser-Doppler physical modelling

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Laboratory experiments using laser-Doppler vibrometry proved to be an efficient tool in physical modelling of wave propagation. It can provide useful realistic data, bridging the gap between numerical simulations and field studies. Both numerical and such physical experiments are used here to address issues in near offsets effects on Rayleigh-wave dispersion measurements.
Surface-wave profiling techniques using active sources and linear arrays are often performed with short source-receivers distances compared to involved wavelengths. Dispersion measurements may then be corrupted by near field effects. Numerical modelling helped here to identify these effects as a systematic underestimation of measured phase velocity at low frequency. Laboratory experiments confirmed the results of our numerical findings and allowed to propose a lower cut-off frequency based on the seismic spread length : using active sources and purely linear arrays, the maximum measurable wavelength should not exceed 50% of spread length.