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Understanding the vibrator-earth response is a pivotal part in addressing problems that decrease the fidelity of vibroseis data. If the vibrator output (ground force) is known, raw vibroseis data can be optimized for resolution and signal-to-noise ratio of the seismic waveform. The source signature, however, is non-unique and varies from shotpoint to shotpoint and from sweep to sweep. Nonlinear complexities within the vibrator's hydraulic system, tower structure, baseplate flexure, and the ground response to force exerted by the vibrator baseplate increase irregularities in the vibroseis signal. Measuring and analyzing the response of the vibrator baseplate to a specific drive signal can help determine optimal recording positions on the baseplate to recover the ground force signal. When used to correlate or deconvolve raw data, an accurate approximation of the vibrator output will increase data resolution. Two experimental seismic datasets were collected to allow analysis of the IVI MinivibI's source performance for high frequency data. The first experiment was developed to examine the motion and modes of the baseplate throughout the sweep when coupled to variable near surface ground conditions. The second experiment was designed to determine the optimum weighted sum approximation of ground force, and to compare approximate and true ground force calculations to a downhole geophone response. Initial results indicate that the MinivibI baseplate motion becomes asymmetric as the frequency of the sweep increases beyond 225 Hz. The vibrator, therefore, cannot be considered a point source of propagation for all frequencies. In addition, the vibrator does not provide measurable energy above 300 Hz because the vibrator baseplate and reaction mass become 180 degrees out of phase beyond 300 Hz. This study indicates that high frequency vibratory sources input a variable signal to the ground that is frequency dependent necessitating the recording and retaining of raw, uncorrelated data for each sweep.