

Shallow vertical seismic profiling experiments with a surface impact source and a cemented 3-C geophone string; Perth Basin, Western Australia.

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Analysis of first arrivals recorded by a total of 24 cemented geophone from a surface source provides insight into the propagation of acoustic waves. A set of surface to hole experiments have been carried out to measure variations of transit times, frequency content and amplitudes of the downgoing (transmitted) compressional waves. The geology of the test site is tightly constrained by wire-line and geological logs from more than 20 close spaced drill holes. One experiment consisted of 274 repeat blows from a surface impact source 25 m away from a vertical string of 3-C geophones cemented in a drill hole. The geophones spanned a depth range from 74 to 284 m. A detailed comparison of total travel time and interval travel times demonstrate a surprisingly high level of repeatability across 274 repeated shots at the same position. Experiments with repeat radially symmetric source positions located around the cemented 3-C geophone string were also carried out. These experiments indicated that even a slight change in source location or condition can significantly change the shape of the waveform generated at the surface. This was likely the result on slight variations at the source ground interface.