



Wavefield divergence via hydrophone measurement on land

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Seismic and seismology communities typically use geophones to measure particle velocity on land and hydrophones to measure the pressure fluctuations in marine environments. Here we explore the concept of pressure measurements in a land acquisition setting. We first review the theory for pressure measurements near the surface of the earth and show the significance of the S-to-P conversion which results in the pressure being proportional to sum of the slowness-scaled horizontal velocity fields. This implies that fast apparent waves are attenuated, in contrast to the slower shear and surface waves which are amplified in comparison. Then we test a land hydrophone prototype using a small-scale field experiment to validate the pseudo-divergence measurement and its omni-directional nature. This study suggests that such a land hydrophone can potentially allow single-station surface wave attenuation using local adaptive subtraction using the new data type as noise model. This can potentially allow sparser acquisition geometries with associated logistic and cost reduction.