



Optimizing OBS data using shielding and by removing ocean wave loading noise with Pressure and Horizontal Pressure Gradient Sensor Data

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Ocean bottom seismometer (OBS) data, particularly from sites in shallow water are notoriously noisy. Ocean currents generate forces on an unshielded OBS sensor causing time varying tilt that greatly raises noise levels. Shallow burial can mitigate this source of noise, but is expensive and difficult to accomplish, particularly for large fleets of instruments. Large shields can provide significant reduction in noise levels as demonstrated with Cascadia Array OBS data. A recent test deployment investigated the relative motion of the shield and the sensor within the shield, providing guidance on the effectiveness of shielding. Even with shielding or burial, deformation of the seafloor caused by loading by the ocean waves raises seismic noise levels. We have previously shown the vertical component noise can be reduced using data from pressure sensors to predict the vertical deformation and remove it from the vertical record. We recently deployed a new OBS instrument in shallow water (80m) that measured two horizontal components of pressure gradient and show these data can be used to reduce wave induced deformation noise from horizontal component seismic data.