

703974 Acquisition and Processing of 3-D Dual-Sensor Towed Marine Streamer Data

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Traditionally, towed marine cables measure the seismic wavefield using only pressure sensors (hydrophones). By contrast, in a dual-sensor streamer, independent measurements of the total pressure and particle velocity wavefields are obtained using collocated sensors. These two measurements of the seismic wavefield can be combined in processing to separate the wavefield into up- and down-going components. 2-D case examples have demonstrated that this procedure is both robust and accurate. This concept has now been extended to 3-D acquisition geometries. It has been shown that 3-D dual-sensor streamer acquisition avoids exposure to weather, sea-state and streamer spread control downtime by efficiently towing the entire 3-D streamer spread deep and at one common depth. Removal of the receiver ghost effects simultaneously boosts both low and high frequencies beyond any result achievable with conventional hydrophone-only streamers, and maximizes low frequency signal-to-noise content required for accurate seismic inversion and reservoir description. These applications are illustrated using data examples from a number of 3-D dual-sensor streamer surveys.

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