DEGHOST + DENOISE + DEMULTIPLE + VELOCITY & Q INVERSION + DEPROPAGATE = SEISMIC IMAGING

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The recent advances in seismic acquisition and processing have made it possible to obtain more accurate representations of subsurface geology than ever before. More accurate and advanced implementations of deghosting, denoise, demultiple and anisotropic velocity inversion and Q-attenuation-factor determination techniques are the fundamentals of high resolution seismic imaging.

Receiver-side deghosting through dual-sensor streamer (PGS), over/under single-sensor streamer (WesternGeco), single-streamer Broadseis (CGGV) or 2C/4C OBC acquisition & processing has become common practice whereby extending usable frequency bandwidth of seismic data. Denoising through filtering in a variety of data domains (shot, receiver, offset, cdp) through XT, FK, TauP, FX, Wavelet-Transform based techniques are very successful and available from all vendors. Effective demultipling through short-period and long-period 2D/3D surface & interbed multiple attenuation techniques are essential for the success of the next steps namely: (1) Velocity & Q inversion and (2) Depropagation (Backpropagation) + Imaging Condition = Seismic Imaging (Migration).

The best subsurface imaging approach PreStack Depth Migration method has to rely on high-frequency accurate background models as compared to earlier approaches which use smooth background models with some hard-boundaries as needed i.e. salt or carbonates. Otherwise, it is unlikely that reservoir imaging below challenging overburden settings will be resolved. To realize the goal of high-frequency accurate background model building, direct-arrival tomography and reflection travel-time tomography, acoustic/elastic inversion, Q-tomography, full-waveform inversion techniques are being utilized to set up the appropriate background model for final imaging.

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