AVO attribute calculation and comparison with real seismic data in the Scotian margin

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Abstract

In order to improve the success rate of future exploration on the Scotian slope, it is important to investigate if seismic reflection data can be used in this region to determine rock properties and select productive drill targets. Our approach is to re-analyze seismic data at existing borehole locations, using well logs for ground truth of the seismic results. In this poster, we will present preliminary results for the Torbrook C-15 well, drilled by EnCana Corp. adjacent to the Mohican Channel in a water depth of 1675 m and logged over the interval 2657-3600 m. The drilling target was a strong seismic bright spot that was imaged on a 3-D seismic data cube at a target depth of ~3.5 s two-way traveltime in Tertiary sediment. Siltstone layers with velocities reduced by ~100-200 m/s were encountered within the uniform shale over depths of 2865-2895 m, which correspond to the high amplitude reflection horizon; but no significant fluid or gas was found.

Using available long offset (9 km) GXT NovaSpan Line5300 2D seismic data and EnCana_C15 well logs, we calculate AVO (amplitude variation with offset) response of the seismic data at the well location to investigate the observed anomaly in detail. The calculated attributes consist of AVO gradient and intercept followed by cross plotting and estimating fluid factor attributes. Reflection seismic data was processed in an amplitude preserving mode prior to the AVO analysis. These processes include amplitude recovery, surface consistent deconvolution and normal moveout correction of common midpoint gathers. Using the calculated attributes we aim to identify AVO signature characteristic of sediment formations in the Nova Scotia region.

We also plan to estimate the probability for the measured AVO responses in terms of the presence (or absence) of different fluids.