

# **Pre-Stack Depth Imaging Offshore Nova Scotia Over Rugged Water Bottom: A Case Study**

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## **ABSTRACT**

In the summers of 1999 and 2000, Veritas acquired a 4500 km<sup>2</sup> 3D seismic survey offshore Nova Scotia. This survey covers an area with extremely rugged water bottom, whose topography resembles the Rocky Mountains. The survey was originally processed with a MOVES processing flow (DMO followed by zero-offset  $v(z)$  phase-shift time migration applied to each common-offset volume). Time migration (poststack and prestack) assumes hyperbolic moveout. When seismic events recorded at near and far offsets encounter different velocities, as happens when the water depth varies rapidly, their moveout becomes non-hyperbolic. This non-hyperbolic moveout presents a major challenge to time migration, especially one that assumes a laterally invariant velocity. Part of the survey has recently been reprocessed with Kirchhoff pre-stack migration, both time and depth. We demonstrate with synthetic and real data that the problem of imaging beneath a rugged water bottom can be solved by using prestack depth migration.