Rediscovering an Offshore Treasure Trove: Reprocessing Old 2D Data Offshore East Coast of Canada

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The practically unexplored Laurentian Basin, located between the provinces of Nova Scotia and the island of Newfoundland and which includes a strip of French marine territory, is presently an active area of exploration in which 2D regional geophysical mapping plays a decisive role for basin research, government resource evaluation and ultimately – for the selection of industry leads, prospects and exploratory wells.

Over 400,000 bopd (from the Jeanne d'Arc Basin) and 400 Mmcfd (from the Sable Sub-basin) are presently being produced from the Atlantic Canada offshore. With ongoing exploration in basins along Scotian Shelf and Slope, Laurentian as well as the Maritimes, Jeanne d'Arc, East Orphan, Hopedale and Saglek basins, the potential for large new discoveries remains high. Given the vastness of the area and the low well density, the East Coast of Canada will be a frontier for petroleum exploration for long time to come. However, modern regional studies based on dense 2D basinal grids are still largely missing in some of the most prospective Atlantic basins.

More than half million km of older 2D seismic data are stored on tapes within the vaults of oil companies, geophysical contractors, data brokers and government agencies. With new data acquisition becoming increasingly expensive and seismic vessels more difficult to mobilize for smaller 2D surveys, reprocessing of older, good quality seismic grids is an attractive economic solution for companies or consortia aiming to re-evaluate the regional geology and petroleum systems of the large, underexplored Atlantic Mesozoic and Paleozoic basins.

Here we present one example of successful data rejuvenation through application of modern processing to 3,135 km of 1985 vintage seismic data acquired by the Geological Survey of Canada (GSC) in the Laurentian Basin. The survey extended from the 100 metres water depths of the continental shelf to depths of about 3,000 metres on the continental slope and along the way crossed major submarine canyons and slump features. The reprocessing stream, which included several multiple elimination routines, processing to maximum recorded time, prestack and depth migration, showed considerable improvement in the imaging of steeply dipping complex features. Especially good results were noted at the shelf break and the deep water areas. With modern reprocessing this once obsolete data set can be used as the primary grid for novel regional studies.

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