

Arctic 3-D Seismic across the Transition Zone from the Beaufort Sea onto the Mackenzie Delta, Northwest Territories, Canada

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A transition zone 3D seismic program was executed during the winter of 2007/2008 in the Mackenzie Delta Region, NWT including portions of the Ellice and Langley islands, Mackenzie River channels and the shallow Beaufort Sea.

MGM Energy Corp. has operated several Exploration Licenses in the area and contracted Aguila Exploration Consultants Ltd (Aguila) to project-manage the North Ellice 3D geophysical operations. Veri-Illuq Geophysical (a CGGVeritas Company) was the principal acquisition contractor. The survey was acquired during a 111 day period between December 10, 2007 – March 29, 2008. Field operations related to the survey had to begin in September 2007 to pre-position the equipment and camp prior to freeze up of the Mackenzie River.

The 3D survey was located on the northwest edge of the Mackenzie Delta with the transition between onshore and offshore frozen during acquisition. The survey had 59 receiver lines and 31 source lines laid out in an orthogonal pattern. The program covered 144 sq km and required 4505 Dynamite (on ice) and 2125 Vibroseis (on land) source points to be occupied. The survey was executed using Best Practice environmental guidelines for a Canadian northern seismic operation.

The seismic data processing was contracted to WesternGeco who processed the data to prestack time migration. Processing into a 3D bin grid consisting of 583 inlines (oriented NNE-SSW) and 654 crosslines (oriented NNW-SSE) overcame the significantly different seismic responses recorded on the ice compared to data collected over the islands. About 65 % of the source points were drilled dynamite shotholes through floating sea ice. Examples of the data illustrate the challenges of processing and interpreting the variable seismic data quality throughout the data cube.

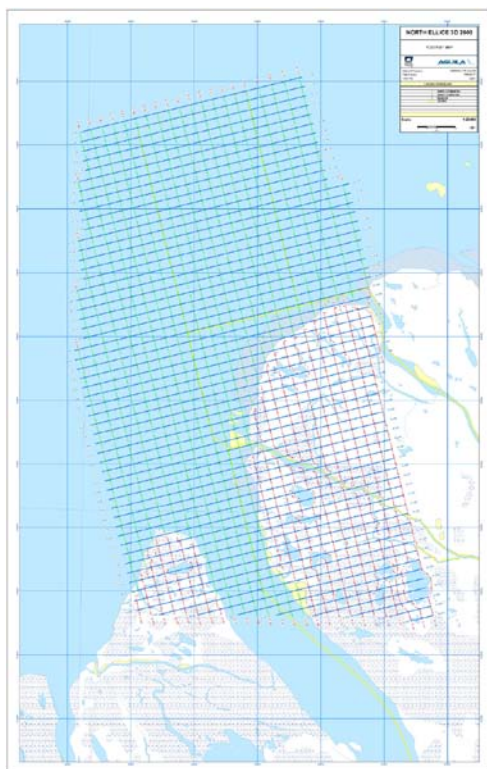


Figure 1. Final Survey Station Location Map, Mackenzie Delta, NWT, Canadian Arctic



Figure 2. View of Camp looking towards the East before freeze up



Figure 3. Line Crew Tracked Vehicle



Figure 4. Dynamite Shothole Tracked Drilling Rig

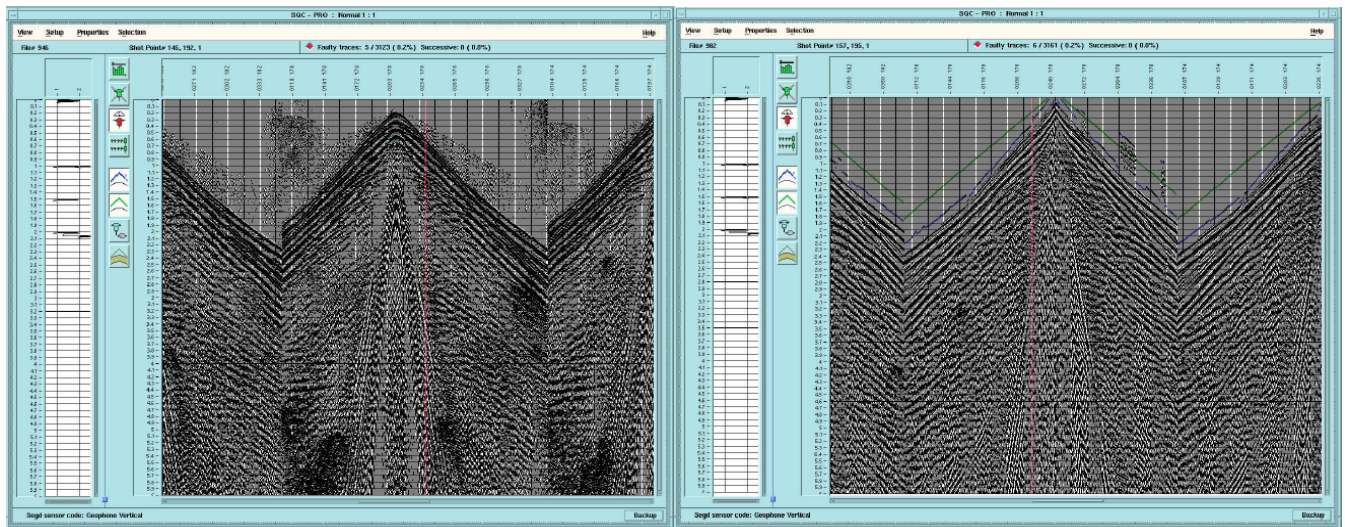


Figure 5. Dynamite Source below floating sea ice showing ice cracking noise bursts

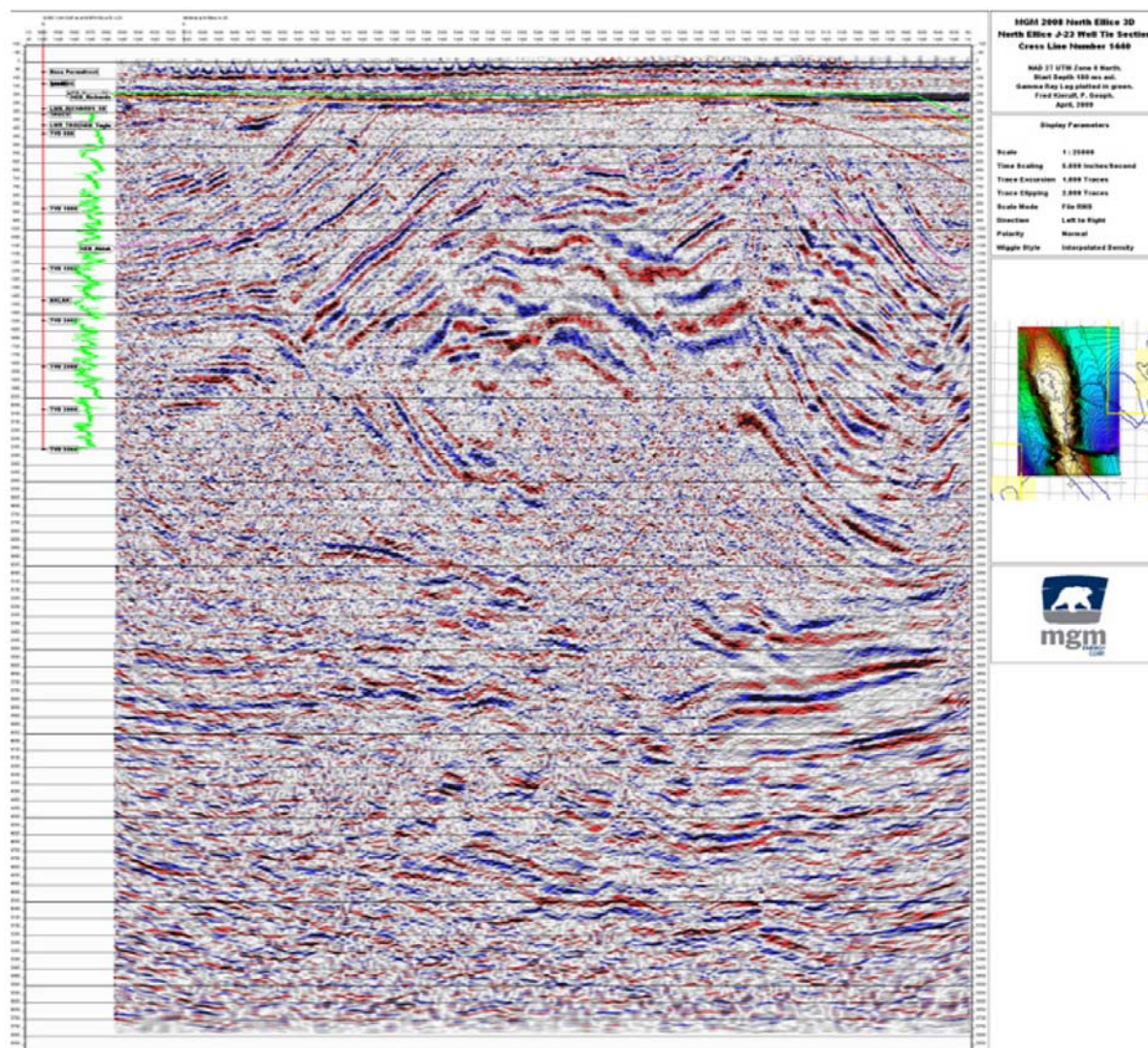


Figure 6. Brute Stack cross line from South to North through center of survey grid

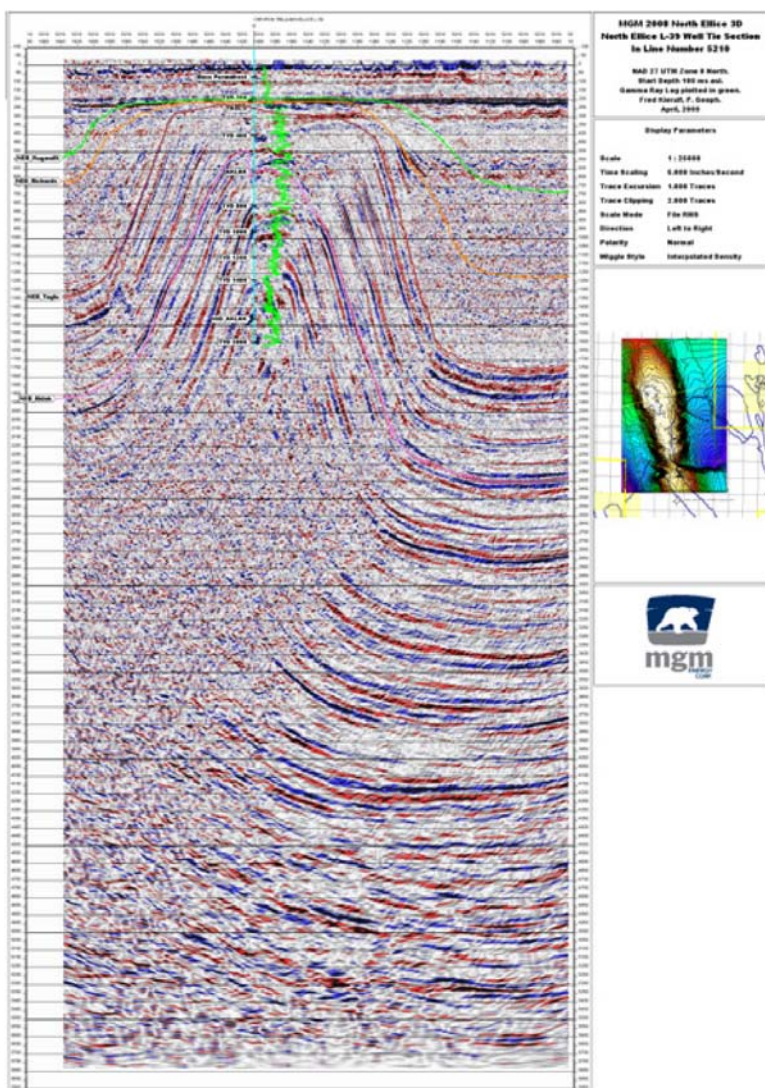


Figure 7. Brute Stack Line from West to East through center of survey grid