

# Successful 3-D Seismic Exploration Offshore West Greenland using Dual-sensor Streamer Technology

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Seismic exploration in Arctic waters offshore West Greenland face a multitude of challenges. The ice-free season is short, weather conditions are rough causing bad quality seismic data and last but not least, the sub-surface conditions are far from ideal for good seismic imaging. The latter constitutes a very hard, rocky sea floor, full of dropstones and thick volcanic rocks almost impenetrable to seismic energy. Husky partnered up with PGS in the summer of 2009 and set out on an exploration campaign to cover more than 2200 square kilometers of high quality 3D seismic data in Blocks 5 and 7 offshore West Greenland.

## Method

Dual-sensor streamers (Carlson et al., 2007) can, without compromising the higher frequencies, be towed at greater depths than conventional seismic cables, due to its ability to eliminate the receiver side ghost. With all 6 seismic streamers down at 15 meters tow depth, the surface noise is minimal and the operational window can be extended to allow acquisition in inclement weather conditions. The two surveys, Block 7 and Block 5 were completed on time with only 3 % and 12 % weather downtime respectively. The deep towed streamers also enhance the natural frequency response below 20Hz which is important for sub-basalt imaging. 2D vintage data from the area was used to analyze and optimize acquisition parameters. Special attention was put on source optimization for increased low frequency penetration. Full 3D ray tracing studies were performed to confirm survey outlines in order to properly image the steep dips in the area. Initial results from fast track data confirm the uplift of improved low frequency sub-basalt penetration.

## Conclusions

Dual-sensor technology has proven to be very valuable in these challenging conditions, addressing both weather and the seismic imaging challenges. Along with this technology, the success was also achieved through excellent project management and novel seismic survey planning.

## References

Carlson, D., Long, A., Söllner, W., Tabti, H., Tenghamn, R., and Lunde, N. [2007] Increased resolution and penetration from a towed dual-sensor streamer. *First Break*, 25(12), 71-77.