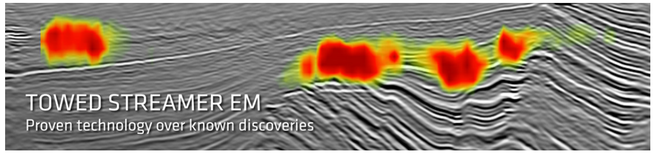
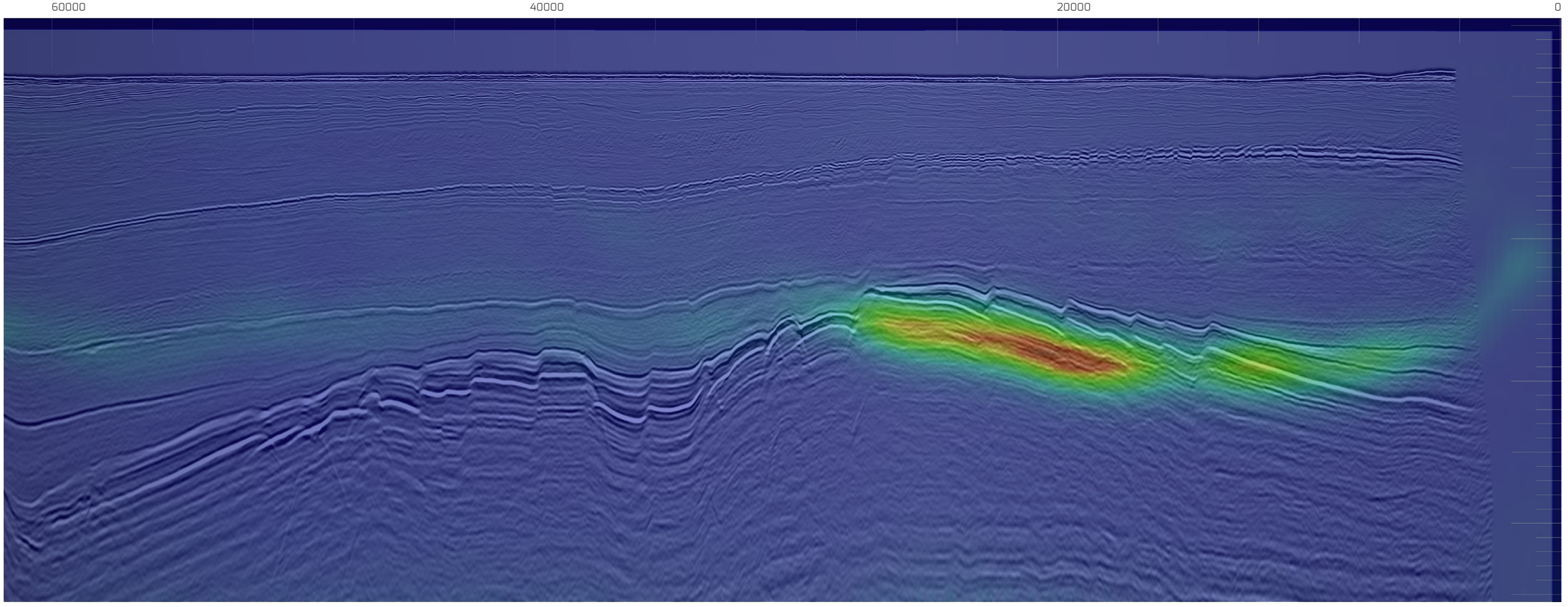
23rd ROUND:

De-risking the Barents Sea Southeast – using Towed Streamer EM

PGS has covered all areas of interest in the Barents Sea Southeast with densely sampled Towed Streamer EM data, and there is now a unique opportunity to evaluate blocks using seismic in combination with resistivity anomalies.

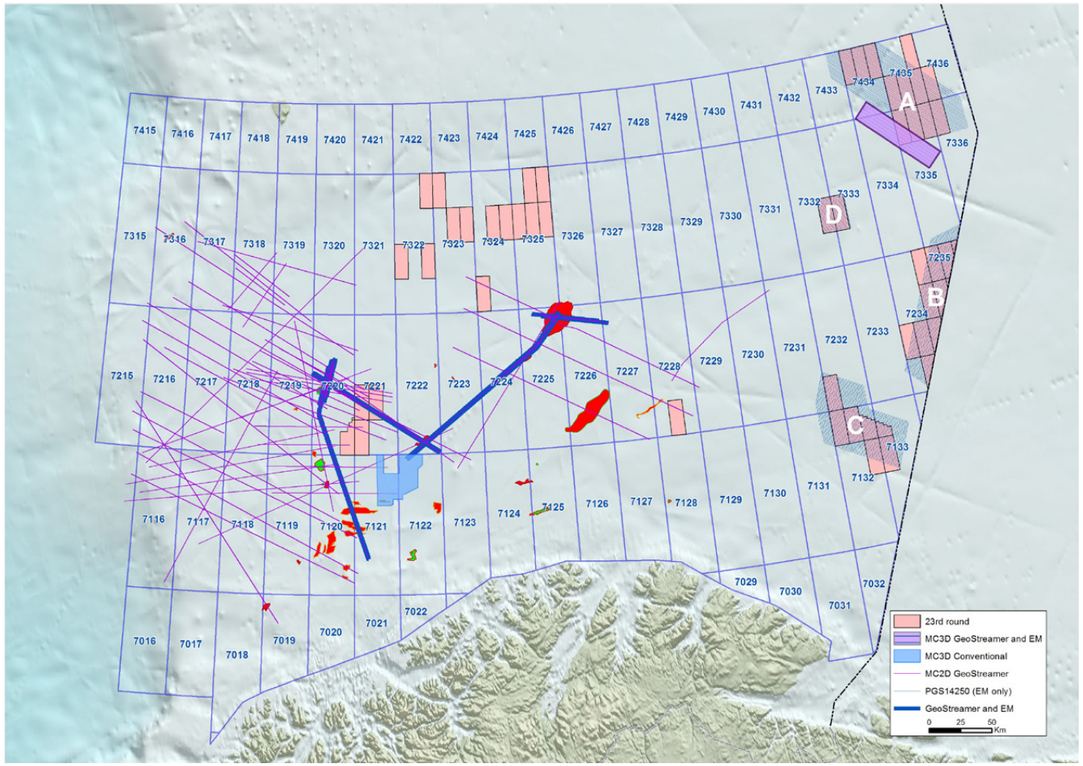




An illustrative resistivity section determined using unconstrained inversion of Towed Streamer EM data in the Barents Sea. There is an obvious resistivity anomaly at about 2.3 km depth that is robust, structurally conformant, and coincides with a known hydrocarbon accumulation. The colour bar highlights the highest resistivity values only – there are additional variations of resistivity that are not shown by this choice of display. The vertical axis is depth [m]; the horizontal axis is profile distance [m]. The seismic data in the background is full stack broadband dual sensor seismic.

Towed Streamer EM and GeoStreamer® – The ultimate de-risking technology

Technological improvements now make it possible to use resistivity information in combination with seismic data to evaluate blocks that possess a combination of structural seismic information and anomalously resistive features.



Towed Streamer EM data in the Barents Sea Southeast in relation to blocks nominated for inclusion in the 23rd licensing round.

Resistivity information together with seismic data has the potential to improve block evaluation ahead of the upcoming 23rd round licensing deadline.

Marine Controlled Source EM (CSEM) data has been used extensively to improve the chance of success in the search for hydrocarbons.

Historically, CSEM data have been used primarily to de-risk prospects. After acquiring ~11,700 km² of high-density Towed Streamer Electromagnetic data in the Barents Sea Southeast in 2014, the inversion of this regional scale, high-density 3D data is progressing well.

By using a Towed Streamer EM system it is possible to acquire CSEM data in a cost effective manner to determine the sub-surface resistivity at both the regional and prospect scale. Indeed, there is now Towed Streamer EM data covering all the main areas of interest in the Barents Sea Southeast.

Therefore, a unique opportunity to exploit the added information offered by resistivity models derived from Towed Streamer EM measurements early in the exploration workflow, where the ranking is at the block rather than prospect level, has opened up. Thus, there is the potential to use the resistivity information, together with an interpretation of the seismic data to evaluate blocks e.g. by identifying blocks which possess a combination of structural seismic information and anomalously resistive features.

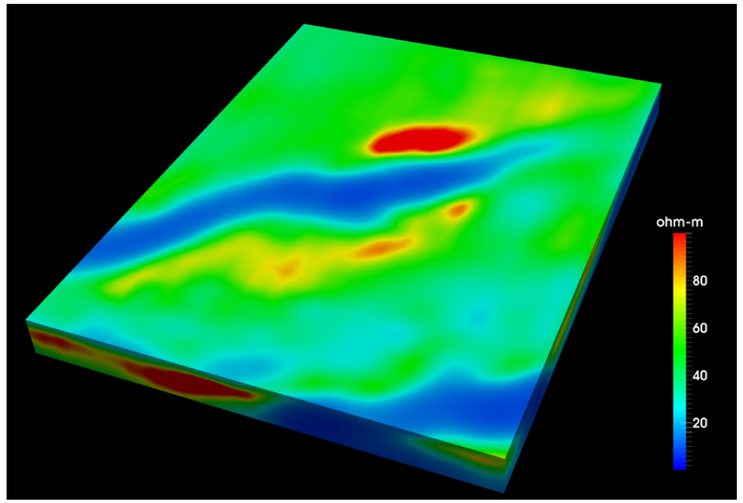
A quick turnaround is required to ensure that both the seismic data and resistivity models are ready to be used by interpreters, ultimately to enable them to extract value in time for the 23rd round application deadline in December 2015.

By performing unconstrained inversion of the Towed Streamer EM data to determine the sub-surface resistivity we aim to extract the maximum possible amount of information from the data before considering any constraints on the solution.

In addition, the results may be further enhanced when structural constraints are employed. In the Barents Sea Southeast, these constraints could be derived from the Group Shoot seismic data acquired over areas A, B, C and D. Thus, valuable and independent information can be gained in a timely fashion at the block evaluation stage, with the possibility that more value can be extracted from a combination of seismic and Towed Streamer EM data to mature leads into prospects.

As the inversion process is entirely data driven PGS ensures the accuracy of the results by delivering 2.5D inversion sections from our own dedicated EM Processing and Interpretation group as well as 3D inversion volumes produced independently by a third party.

PGS is on track to complete the inversion processes by the end of Q1 2015 for delivery to clients, the Frequency Responses (delivered off the vessel, the input to the inversion process) are available for licencing now.



Example of 3D anisotropic unconstrained resistivity volume from the Barents Sea Southeast Towed Streamer EM data.

FOR FURTHER INFORMATION PLEASE CONTACT:

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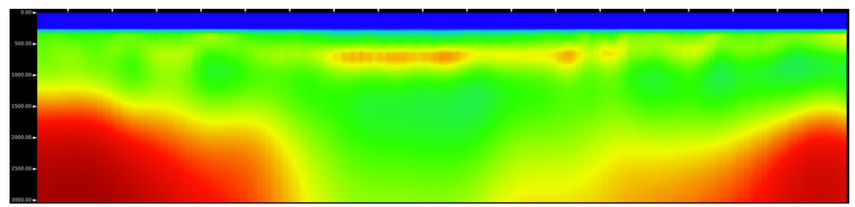
TOWED STREAMER EM

Towed Streamer EM is based on standard 2D seismic system:

1. Acquisition speed is the same as Towed Streamer Seismic
2. Streamer has dense receiver spacing resulting in superior data density and accurate inversions
3. Enables simultaneous acquisition of EM and 2D GeoStreamer®
4. Can be deployed from virtually any seismic vessel
5. Does not require an EM dedicated crew
6. Real-time QC and onboard processing of data
7. Receivers are towed through a homogenous water layer so less sensitive to localized anomalies on the seabed



Resistivity determined from unconstrained anisotropic inversion of data in the Barents Sea Southeast as a 2.5D section.