Clari-Fi™ is a broadband processing package which includes denoising, deghosting, designature and inverse-Q. A multi-domain denoising process attenuates various types of noise before the deghosting algorithm accounts for the local variations of source and receiver depths and the sea state. A global statistical approach is then used to address the source signature in different directions, before Q compensation with respect to the ray-paths. The resulting high quality broadband data improves visual and quantitative interpretation.

Recently, TGS delivered more than 120,000 km regional broadband data offshore Portugal and in the North Sea.

Clari-Fi broadband reprocessed east-west seismic section through expected bidding areas west of the Porto Basin offshore Portugal. Clari-Fi reprocessing reveals rotated Mesozoic fault blocks creating huge closures with sharp imaging of faults.
North Sea Renaissance: Exploring the Mid-North Sea High

Offshore exploration in the North Sea dates back to 1964 when the UK Continental Shelf Act came into force. Several gas discoveries were made, but exploration interest quickly declined towards 1968 due to low gas prices and therefore little commercial value. In 1969, Phillips Petroleum discovered Ekofisk with 4 Bcf in place. This triggered a string of discoveries which up until now has made the North Sea has one of the most prolific oil provinces in the world.

Clari-Fi Broadband Reprocessing

During the exploration history of the North Sea, a huge variety of seismic surveys have been acquired. However, by 2000, very little dataset existed which had been shot using long-offset streamers for deeper imaging, and no regionally consistent dataset had been acquired. In 2003 TGS therefore decided to start acquiring a multi-year super-regional south-west to north-east grid using long-offset streamers. The project was named North Sea Renaissance (NSR). By end of 2011, this huge NSR multi-year project had resulted in a super-regional grid with ~100,000 km of long-offset 2D seismic covering the entire North Sea. One of the main objectives while acquiring the NSR grid was to ensure a regionally consistent long-offset 2D dataset. This was partially achieved by maintaining an east-west grid using long-offset streamers for deeper imaging, and no regionally consistent dataset had been acquired. In 2003 TGS therefore decided to start acquiring a multi-year super-regional south-west to north-east grid using long-offset streamers.

Preparing for the Next UK Licensing Rounds

Exploration through the last decade in the expected 25th round area has focused on pre-Jurassic targets. Leads and prospects have suffered significant uncertainties due to the poor imaging of the vintage data available. The Clari-Fi broadband dataset allows better definition both regionally and at prospect level, significantly reducing the uncertainty within a wider regional structural and stratigraphic framework. Utilization of gravity and magnetic data during processing highlighted the areas in the 25th Round that required more focussed processing effort in order to provide better imaging of deeper basins and sub-basins. For the integration of seismic, gravity and magnetics data will yield both previously identified and new leads in the future areas to be more confidently evaluated.

Portugal: New Clari-Fi Broadband Reprocessed Data Available

Initial offshore exploration in Portugal was restricted to shallow waters close to shore. In 2002, 27 offshore wells were drilled from the mid-seventies up to the early nineties with water depths ranging from <200m up to 540m. Most of the well locations were based on old vintage 2D data compromised by shallow high velocity carbonates causing strong multiples. Despite the uncertainties regarding the structural interpretation, six of the wells in the Lusitanian and Porto Basin yielded hydrocarbon shows with cores covering oil on DST.

The northernmost well in the Porto Basin, Lula-1, is positioned at the break from a shallow carbonate platform into the deep water basin. Based on the good results obtained from the Lula-1 well, it was planned to drill another well targeting the same reservoir in the known source in the Porto Basin, indicating that this oil was probably originated from the west. TGS acquired a small seismic program into deep waters in 2004. The results were encouraging and confirmed the presence of basins with relatively continuous, sedimentary sequences and interesting structural/faults. In 2004–2012 TGS therefore acquired a total over 22,000 km of multicycle conventional 2D seismic offshore Portugal.

Conjugate Margin

Continental plate reconstruction at the Early Mesozoic era indicates that the north-west margin of Portugal was positioned at the break from a shallow carbonate platform into the deep water basin. Based on the good results obtained from the Lula-1 well, it was planned to drill another well targeting the same reservoir in the known source in the Porto Basin, indicating that this oil was probably originated from the west. TGS acquired a small seismic program into deep waters in 2004. The results were encouraging and confirmed the presence of basins with relatively continuous, sedimentary sequences and interesting structural/faults. In 2004–2012 TGS therefore acquired a total over 22,000 km of multicycle conventional 2D seismic offshore Portugal.

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Midland Valley, 2 West Regent Street Glasgow G2 1RW, UK
t: +44 (0)141 332 2681
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