Open Source Advances

From strength to strength in seismic interpretation software.

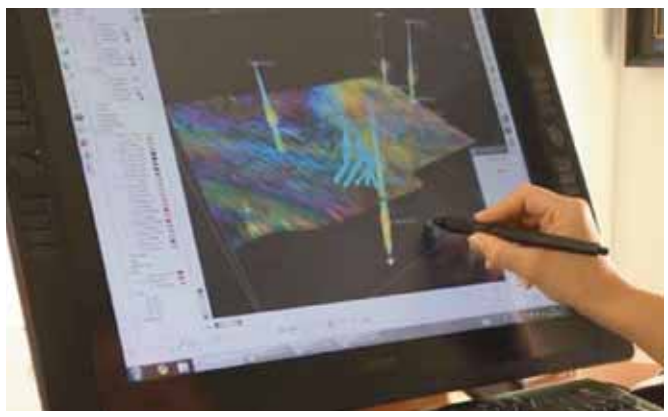
Whatever sector you work in and whatever business applications you have on your laptop and web site, it is likely that much of your software is open source. The International Data Corporation (IDC) predicts the market and related products will reach US$8 billion by 2013. Yet, for all the growth in open source software over the last few years, few would readily identify the oil and gas industry as a leader this field -until now that is, according to dGB Earth Sciences, a provider of open source seismic interpretation software. dGB is showcasing the latest version of its OpendTect software - OpendTect 4.2 at Vienna 2011. The company says that its OpendTect software has been downloaded more than 52,500 times from www.opendtect.com, providing operators with a vital tool in interpreting and generating maximum value from their geological data.

While seismic interpretation software has advanced considerably over the last few years, dGB believes that, all too often, there has remained a lack of integration between different applications and a lack of input from users. Technology advances seemed to be dominated by just a few players, with any new company wanting to bring their software to market having to spend the majority of their time building a complete interpretation system rather than focusing on the software itself.

OpendTect, which was first made available in 2003 and which came under the General Public License (GPL) in 2009, is free and provides users with a truly open platform for seismic interpretation. While supplemented by a variety of commercial plugins related to specialist areas such as sequence stratigraphy, fluid migration, and rock property predictions, OpendTect contains all the features and tools the majority of geophysicists and seismic interpreters require for carrying out highly sophisticated interpretations. This includes a powerful attribute engine providing sophisticated multi-volume, interactive analysis, the latest in seismic filtering and processing capabilities, and the ability to connect with other open source seismic processing packages, such as Madagascar.

At EAGE this year, dGB and ARK CLS will also be announcing a direct data link with the Petrel seismic to simulation software using the Ocean software development framework, ensuring that seismic interpretation and the creation of accurate reservoir models is brought even closer together. Furthermore, the adoption of open source software is the ideal platform for other oilfield services companies to develop their own interpretation tools. For example, ARK CLS has developed a seismic spectral blueing and seismic coloured inversion plugins for the OpendTect software which supports direct import and export from Landmark's SeisWorks/OpenWorks and Schlumberger's GeoFrame-IESX data stores.

The gap between the academic and commercial worlds can also be narrowed through open source with universities and students providing an unrivalled peer review process for OpendTect as well as encouraging the geoscientists of the future to deploy their ideas within a professional environment. To date, dGB has established relationships with over 220 universities worldwide dispensing well over 1,750 free licenses of its commercial plugins which link into OpendTect.



OpendTect: a truly open platform for seismic interpretation

OpendTect continues to progress. The latest version, being demonstrated here, includes a new HorizonCube technology that increases the number and density of mapped horizons and analyzes data along correlated stratigraphic events.

The result is more accurate inversion results, geologically sound rock-property predictions, a realistic geologic history and well correlations, and more geological information from seismic than ever before.

Collaboration and open source are the keys to advancing technology. Through the sharing of ideas - and source code - people can be inspired and better interpretation technologies generated. The result is a win-win solution for all sides and, most importantly of all, a win-win solution for the geophysics and seismic interpretation industry as a whole. To find out more about dGB, visit booth 1614.

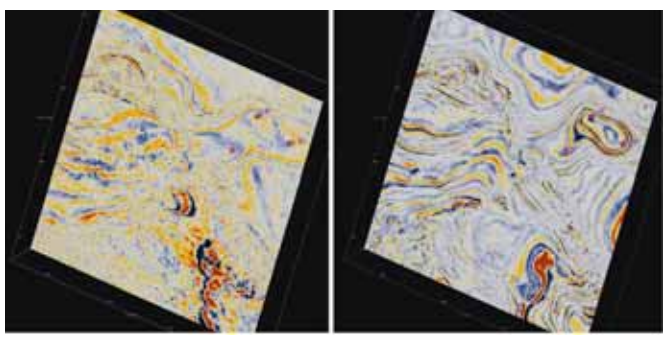
Multifocusing from Geomage

Geomage says that its new approach to seismic image enhancement - known as Multifocusing (MF) - is providing remarkable improvement to data that has otherwise been viewed as poor, if not useless. The technique is giving new life to legacy data with outstanding results, and, by making a small adjustment to the patented algorithm that forms the basis for the technique, the results can yield direct indications of fractures, which can be used in many unconventional gas environments.

Even with the advent of prestack depth imaging, time domain imaging techniques remain important for many reasons. High-quality time imaging can provide a basis for interpretation in the processing sequence - and often a useful one - even in cases of poor data quality or strong structural complexity. In the process of constructing a time image, useful additional information required for velocity model building can be obtained. For these reasons, improving the quality of time-domain stacked sections remains the focus of intensive research.

MF technology, based on multiparameter stacking, has been applied to enhance time imaging sections by dramatically increasing the fold of coherent summation of seismic signals. The MF correction formula is accurate, even for heterogeneous subsurface and strongly curved reflectors. One of the important products of MF technology is so-called “diffraction imaging”, which utilizes diffraction/scattering energy of the total wavefield. The diffractive component of the wavefield should be considered as a direct indicator of small scale, subsurface heterogeneities such as faults, karsts and fractures. In this sense, the MF diffraction imaging can be considered as a tool for detection and characterization of unconventional reservoirs such as shale gas, oil shale, heavy oil and tight gas.

MF is a new, patented, method of moveout correction and seismic data stacking. Unlike conventional imaging techniques, it does not require varying degrees of accuracy with the section's velocity model. It uses time imaging of, what can be, low-fold, conventionally acquired, data to greatly improve signal-to-noise ratio, increase coherence and increase resolution. The Geomage system uses multi-parameter approximation for actual traveltime surfaces: three parameters in the 2D case and eight parameters in the 3D case. These parameters are connected to emergence angles for the normal waves and radii of curvature for fundamental wavefronts, namely normal incident point and normal waves. Stacking reflection events in a larger gather of seismic traces (superbase) that spans many CMP gathers might be expected to enhance random noise, but the simultaneous search of the parameters avoids negative effects and minimizes artifacts. Considerable computer power is required to implement such a search, and Geomage utilizes a very large array to perform MF processing.



Pre-SDM (left) and MultiFocusing Post-SDM (right).

MF is especially beneficial to low fold data and highly suitable for foothills areas. The method delivers around 20-30% higher frequency content in comparison to other processing techniques, and can reduce footprints in 3D surveys. Moveout corrected signals are stretch-free, and the technique is applicable to a wide class of subsurface models. Velocities derived in the process may be used for time and depth migration and MF parameters can be estimated automatically. For more information, go to www.geomage.com or visit Geomage at booth 1664.

Polarcus Arctic operating procedures qualified by DNV

The Arctic poses demanding challenges to marine seismic operations. Environmental conditions stress the ship, equipment and crew, limit the window for seismic operations, and pose dangers to in-water seismic equipment. To mitigate these risks in order to safeguard life, property and the environment, Polarcus, with assistance from Det Norske Veritas (DNV), has developed a wide-ranging set of Arctic-specific operating procedures. Last month Polarcus received Qualification from DNV of its Arctic Procedures. The Statement of Qualification was presented at the 7th Annual Arctic Shipping Summit in Helsinki.

Commenting on the achievement, Rolf Rønningen, CEO Polarcus, said: "We believe that the environmental, health and safety concerns associated with working in the Arctic demand the very highest level of commitment from companies operating in this pristine and often challenging frontier. Consequently we have collaborated with DNV over the past year to develop a comprehensive set of Arctic procedures to cater for the unique hazards associated with operating a seismic vessel in these waters. We are very proud therefore to receive this Statement of Qualification today from such a prestigious organization as DNV."

Christian Fjell, DNV Project Manager said: "Polarcus' active cooperation and input provided early in the project was extremely helpful in aligning our thoughts and objectives. Our team of experts assessed the completeness and quality of Polarcus' Arctic operating procedures, internally designed by their team, and DNV proposed areas of improvement based on applicable conventions, regulations and standards. This project has certainly been mutually rewarding as Polarcus was able to provide significant input and reflections on our own suggestions based on their existing in-house competence in this field." Polarcus is on booth 1570.