

Hot news

dGB 10 years!

This year, dGB celebrates its 10th anniversary. We thank all our past and present clients for their custom and for the confidence put in us. We enjoyed developing GDI and OpendTect and applying new techniques to case studies around the world. We look forward to many more years of innovation and conducting projects on your behalf. Please visit us at the coming SEG annual conference where we will celebrate this latest milestone!

Conferences



SEG International Exposition and 75th Annual Meeting

Booth #2758

In this issue

Integrated exploration project 2	
Chimney classification and seal risk assement	2
New Faces	3
Publications	3
OpendTect Hot news	4
Gaz de France OUF	4
Sponsors sought	4

Released: OpendTect tracker!

Version 2.2 (Oct. 2005) boasts a completely re-engineered seismic event tracker that is expected to elevate OpendTect from a special attribute processing / pattern recognition / visualization system to a general-purpose seismic interpretation system. The new tracker is released as part of OpendTect Base, the open source part of the system, hence benefits all users. The initial release supports horizon tracking in two modes:

- plane-by-plane mode
- auto-track mode

In plane-by-plane mode the tracked surface is extended by moving a tracking plane manually or semi-automatically in a user-driven direction. In auto-track mode the surface grows automatically. Two algorithms are supported initially:

- amplitudes only
- amplitudes steered by similarity

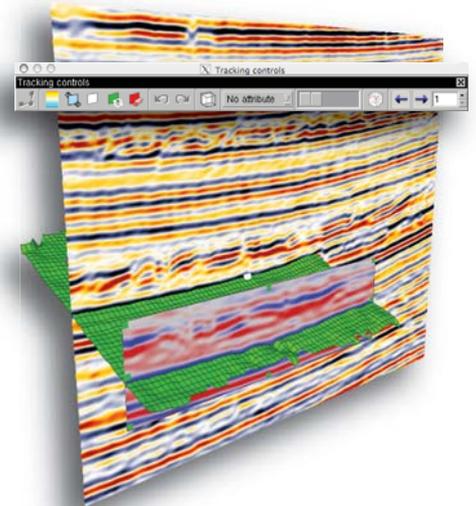
The tracking software supports various features for editing tracked surfaces. Areas can be removed from the surface and re-tracked after picking new seed points, or changing tracking parameters. Holes in the data can be filled automatically with an inverse distance interpolation algorithm.

Creating fault planes is not supported in the initial version, but it is planned to have fault interpretation capabilities

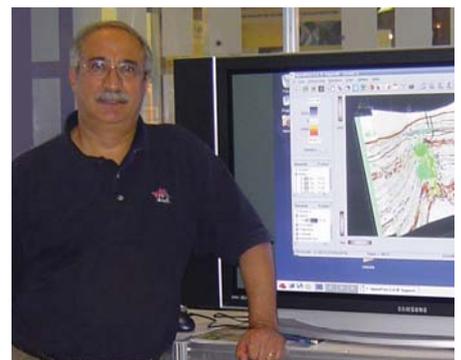
'Innovative thinker'

At a reception in Houston, on September 15 2005, World Oil announced the finalists for its annual awards. Fred Aminzadeh was one of the four finalists for the "Innovative Thinker" award. He was recognized for his contributions to the oil industry in pattern recognition, neural networks, fuzzy logic, and artificial intelligence applications.

before year-end. At first we will support manual interpretation of fault planes only. Data-driven fault tracking, which we have learned to be only feasible under excellent data quality conditions, will be supported soon thereafter. The new tracking system deviates from our original plans to track multiple horizons and faults simultaneously in a geometrically consistent manner. We learned that this workflow is too complicated for both user and software developer. In the new workflow users first track horizons, then they create fault planes and finally they will have the option to make horizons and faults



geometrically consistent (i.e. to create watertight segments). In the last operation horizons are automatically re-tracked in a corridor around the mapped fault planes until they stop at the fault intersection. We expect to support this functionality in 1Q06.



**Integrated exploration Project
Repsol, Iran**

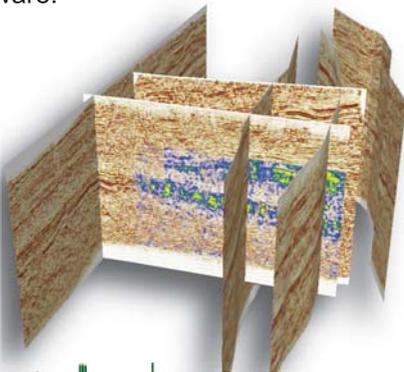


**Repsol-YPF
Oriente Medio S.A.** awarded dGB a major 2D seismic inversion and characterization project in the Persian Gulf, off-shore Iran. The objectives are to find new exploration targets in two

blocks and reduce associated risks by applying various qualitative and quantitative seismic interpretation techniques. For the quantitative work dGB's GDI software is used to predict seismic properties such as porosity, Volume of Clay and Volume of Dolomite from Acoustic Impedance and AVO attributes. Pseudo-wells are employed to enlarge the database of the existing real wells and to train neural networks. The



derivation of AVO attributes is sub-contracted to REXIMseis, dGB's strategic partner for seismic processing services. The qualitative work is done in OpendTect and comprises waveform segmentation (to visualize seismic patterns), hydrocarbon Indicator detection, and fluid migration path and fault seal analysis, using the Chimney-Cube. Before inversion and interpretation the data are Spectral Blued using ARK CLS' software.

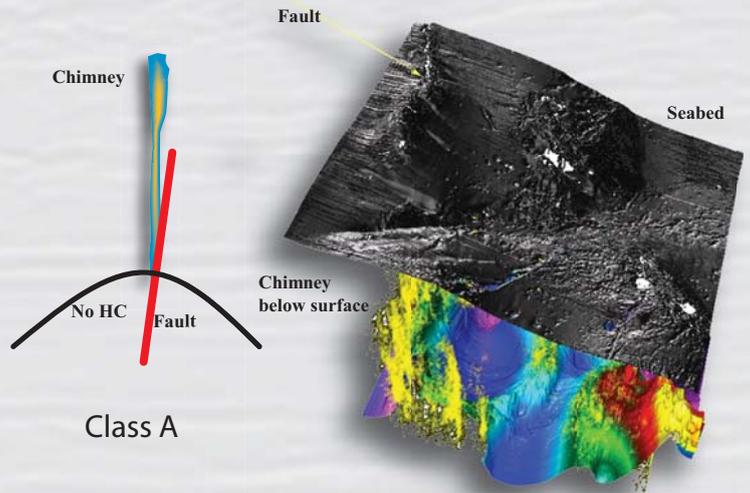


Chimney classification & seals

by Roar Heggland of Statoil

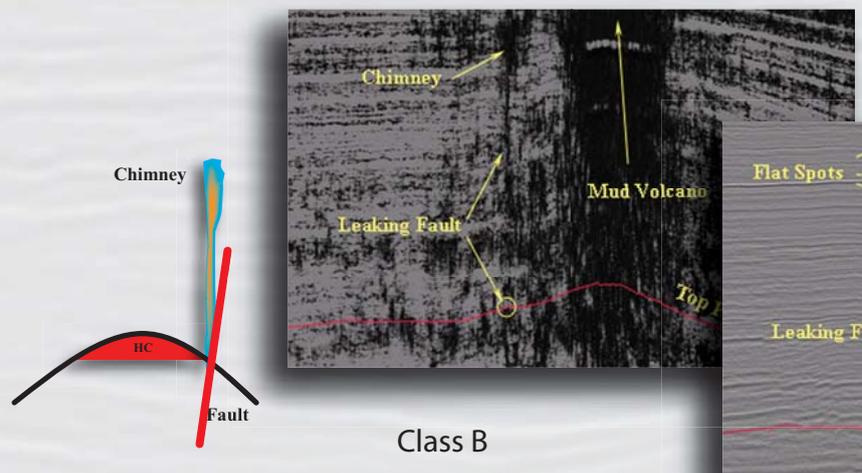
Since the introduction of Chimney Cube technology some 7 years ago, Statoil has processed and interpreted many data sets covering a wide variety of geological settings and geographic locations. Chimney Cubes are nowadays routinely used by Statoil interpreters to gain better understanding of the petroleum system, to identify

In Class A, the crest of the structure is cut by a fault. The presence of one or more gas chimneys at the position of the fault is assumed to indicate that the fault is non sealing and the structure may have a low probability of containing commercial amounts of hydrocarbons. Class B is similar to A, but faults and gas chimneys are located at the flank of the structure, and a column of hydrocarbons may be



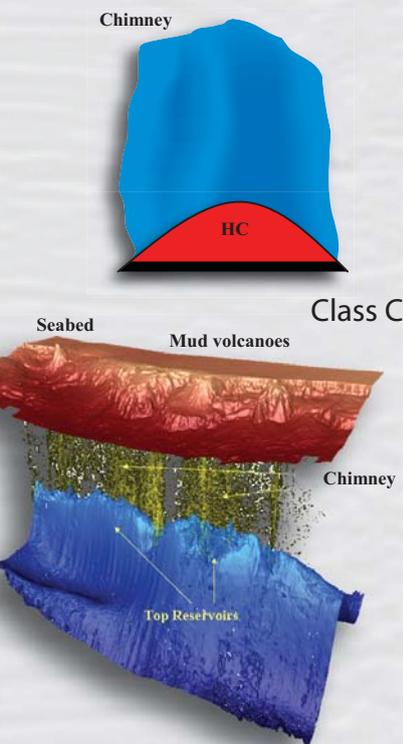
source rock expulsion, distinguish between leaking and sealing faults and for geohazard detection purposes. Recently we established a prospect risking procedure that is based on the presence or absence of chimneys, their shape, extent and origination point. The chimney classification scheme into 3 trap integrity classes, A, B and C, has been calibrated against some 50+ cases studied to date.

preserved up-dip of the fault. In Class C a large part of the structure is covered by a gas chimney that is not associated with faults. Reservoirs covered by class C chimneys have non-perfect seals but the structures may still retain hydrocarbons in commercial quantities as confirmed by many cases we studied. In classes A and B high flux rates are possible, whereas in

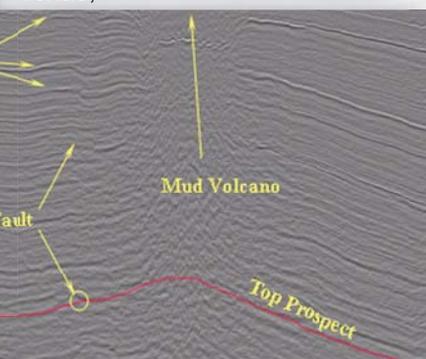


Risk assessment

the case of class C gas chimneys are considered to have no, or a very slow upward movement (zero to low flux rate).



For details, please see: Heggland, R., 2004, "Hydrocarbon Migration and Accumulation Above Salt Domes-Risking of Prospects by the Use of Gas Chimneys", Proceedings of 24th Annual GCSSEPM Foundation Bob F. Perkins Research Conference, "Salt-Sediment Interactions and Hydrocarbon Prospectivity: Concepts, Applications, and Case Studies for the 21st Century", December 5-8, 2004, Houston, Texas,



New Faces



Amanda Pouwel started in September 2005 as a Geoscientist at dGB. She is involved in seismic object detection and interpretation studies. Amanda holds a MSc degree in Structural Geology from Utrecht University where she specialized in salt deformation. During her graduation internship she worked on risk assessments and geohazard detection, focusing on the implications of presence of shallow gas for the offshore industry.



Israel Rivera Rabelo will join dGB in December 2005. He is completing his PhD at Delft University of Technology. He has more than 10 year experience in geoscience research projects. He worked from 1990 - 2000 at Cuban Geological and Mining enterprise. Israel started his PhD in object recognition in high resolution seismic data in 2001. He has skills in 3D seismic interpretation, image processing, GIS, wireline interpretation, numerical modelling, and computer application programming. He holds master level degrees in geoinformatics from ITC Enschede, applied computer science from UCLV Santa Clara (Cuba), and nuclear physics engineering from CUT in Prague.

Vacancies

We are expanding and are currently looking for two **software developers** for our office in Enschede (NL). Your main task will be to develop, maintain and support innovative seismic interpretation tools in the OpendTect system. You will be part of a dedicated team of geophysicists and IT specialists and report directly to the head of R&D. Your work will be judged on quality, innovation and development cycle time. Please check our website for further information. Applications and questions can be addressed to the head of R&D: Bert.Bril@dgb-group.com

Publications

The following is a selection of recent publications and forthcoming talks by dGB staff.

Articles:

Huck, A., de Rooij, M., de Groot, P., Henke, C. and Rauer, S., 2005. Populating a PSDM created Earth Model with PSTM predicted seismic properties. *First Break*, Oct. 2005, p 87-91.

Tingdahl, K. M. and de Rooij, M., 2005. Semi-automated detection of faults in 3D seismic data. *Geophysical prospecting*, volume 53, p. 533-542.

Presentations:

de Groot, P. and Bril, A.H., 2005. The Open Source model in GeoSciences and OpendTect in particular. 75th SEG Annual Meeting, Houston.

Aminzadeh, F. and de Groot, P. A neural networks based seismic object detection technique. 75th SEG Annual Meeting, Houston.

Book:

Fred Aminzadeh and Paul de Groot are working on a book entitled: "Neural Networks and Other Soft Computing Techniques with applications in the oil industry". This monograph is an extension of the series of articles on AI that were published in *First Break* (2004). A DVD with OpendTect + plugins with a 3D seismic data set + wells will be included for hands-on experimentation with neural networks. The book will be published by EAGE and is scheduled for release in Jan. 2006.



OpendTect

Hot news

OpendTect Version 2.2

The latest version of **OpendTect** contains a sophisticated and user-friendly **horizon tracker**. Tracking is now possible in an autotrack- or plain-by-plain mode, and it supports two algorithms: amplitude and similarity. Furthermore, interactive stopping criteria and editing tools are implemented

The **Attribute Engine** in OpendTect is renewed. It is faster, easier to program user-defined attributes, and it supports "Extraction between horizons"

A new version of **Qt** is adopted. This enables -amongst others- the ability to set icons to user-defined size.

dGB plugins:

The **Neural Network** plugin has an extended functionality for balancing input data for supervised prediction (i.e. well properties from seismic data + attributes). Furthermore, 'classification' and confidence outputs can be generated for all supervised classifications.

Colophon

dGB Earth Sciences
Nijverheidstraat 11-2
7511 JM Enschede
The Netherlands
Phone: +31 53 4315155
Fax: +31 53 4315104

dGB-USA
1 Sugar Creek Center Blvd.
Suite 935
Sugar Land, TX 77478, USA
Phone: +1 281 240 3939
Fax: +1 281 240 3944

info@dgb-group.com



Gaz de France sponsors OUF

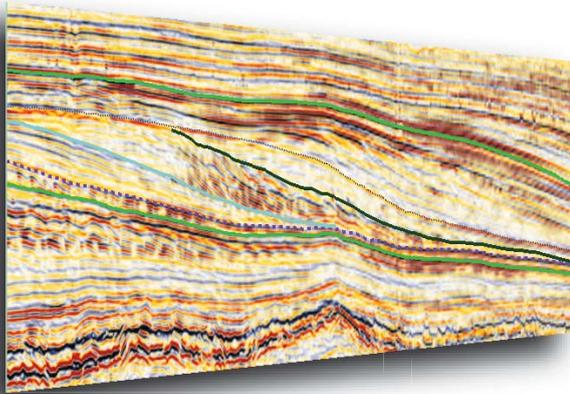
Gaz de France

Gaz de France recently approached dGB to develop a random line through selected (deviated) well tracks. Such displays are very useful for studying lateral continuity between wells. GdF also proposed a few improvements to make life easier for the OpendTect end-user. Thereupon we defined an OpendTect User Friendliness (OUF) project that also included elements from dGB's own wish list. The 3-month project is on its way and the first deliverables are already

included in the new v2.2 release. Amongst others OUF will deliver functionality to:

- Create random lines through deviated wells.
- Draw well tracks.
- Display horizons on sections only.
- Lock display elements.
- Support "Solo" vs. "View all" modes (for toggling between displays at the same position).

All functionality developed under this project will end up in OpendTect Base, the open source part of OpendTect, hence will benefit all users. On behalf of the OpendTect user community we like to thank GdF for sponsoring this project.



Sponsors sought

Sponsoring is the way to let OpendTect grow in a user-driven direction (see dGB++, May 2005). We are actively looking for sponsors to start the following projects: PSDM-VMB, BM and OSC.

PSDM-VMB (Pre-stack Depth Migration – Velocity Model Building) project is proposed in collaboration with GDC, the Houston-based processing specialists. The deliverables are:

- Pre-stack enabled OpendTect Base.
- VMB plugin.
- Kirchoff PSDM plugin.
- Tomography plugin.

The one-year project will be started when we have financial commitment from two sponsors.

BM (Basin Modeling) is proposed with IES, the developers of PetroMod. The aim is to improve basin models by increasing the input from seismic data. One can think of updating basin models with chimney cube fluid migration path interpretation results, populating basin models with seismic predictions of porosity and lithology and facilitating time-depth conversions. BM project is offered as a sequence of single- or multi-client development projects that are optionally integrated in proprietary Basin Modeling case studies.

OSC (OpenSpirit Connection Project) aims to make OpendTect an OpenSpirit compliant product primarily to facilitate data IO. The OSC plugin will be developed by ARK CLS in collaboration with dGB. This relatively small-scale project has already attracted two sponsors. We need one more sponsor to start the project.