

ABROLHOS BANKS

3D Earth Model Integrating Marine Gravity, Magnetic & Seismic Data



ABROLHOS BANKS 3D MODELING

Gravity, Magnetic and Seismic Data

The gravity, magnetic and seismic data were acquired concurrently. A regional grid was shot, after which a more detailed infill was acquired over some of the 3rd round license blocks.

Geological Setting

The Abrolhos Bank is a frontier exploration area with the distinction of having near surface volcanics. The Bank is a wide platform with shallow water. A steep eastern shelf-break which extends into waters of greater than 3 km depth. The Abrolhos Bank is the northern end of the Espirito Santo Basin.

The Upper Neocomian continental to lagoonal shale and the Aptian restricted marine shale are two major source rocks in the Espirito Santo Basin. It is also likely that organic rich marine shales (upper Cretaceous to lower Tertiary) can be source rocks in the deep sedimentary basins on the Abrolhos Bank area. Turbiditic sand flows of upper Cretaceous and lower Tertiary age are expected to be found below the Abrolhos Volcanics and contribute as good reservoir rocks. There are structural trends on the bank that indicate good trap possibilities.

Integrated 3D Earth Model Area

The model, covering approximately 18,500 square kilometers of the Abrolhos and Besnard Banks, includes geologic constraints provided by the combination of seismic, gravity and magnetic data.

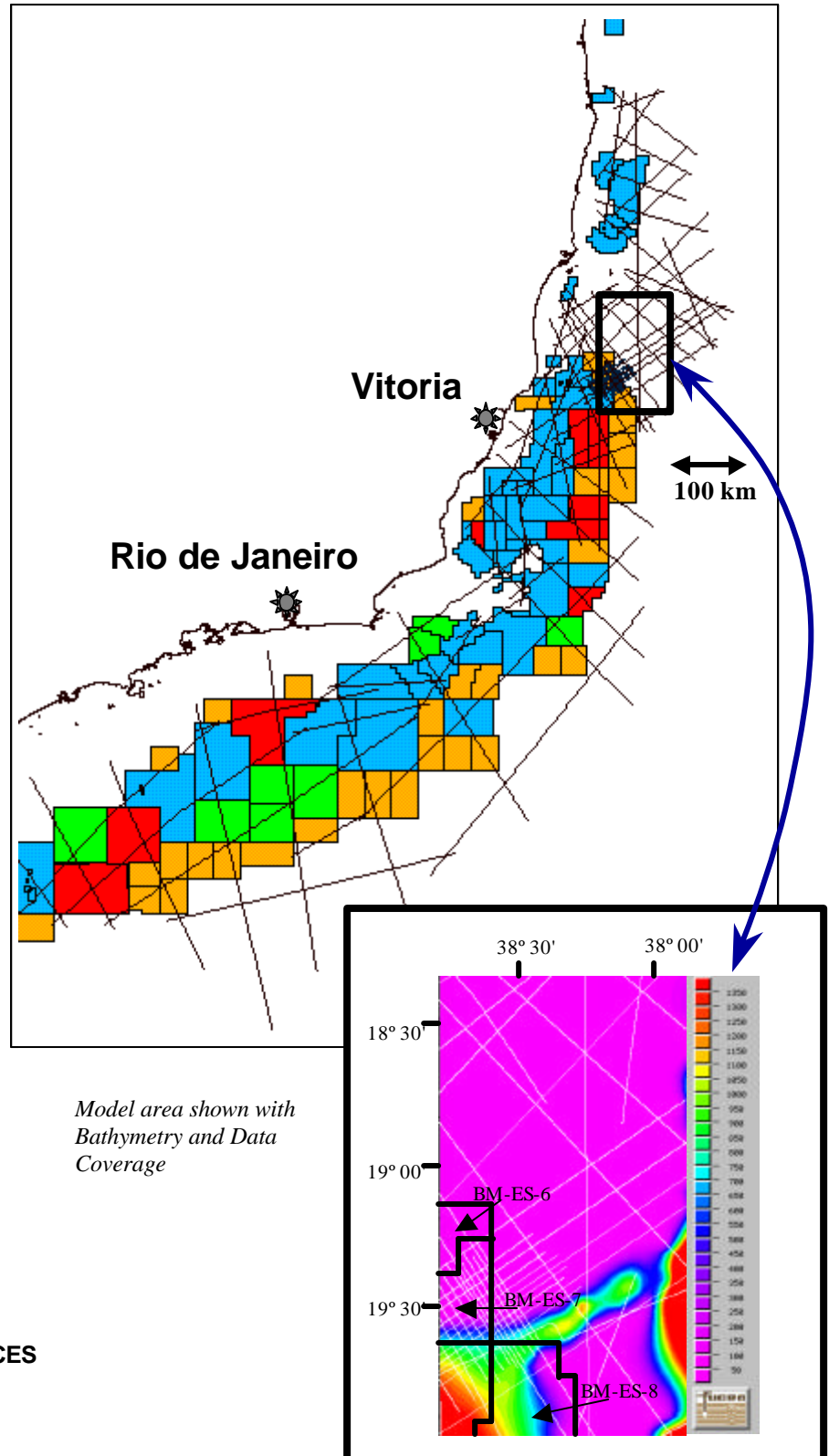
FUGRO-LCT & FUGRO MULTICLIENT SERVICES

6100 Hillcroft, 5th Floor (77081)

P.O. Box 740010

Houston, TX 77274

Tel: (713) 369-6100 Fax: (713) 369-6110



ABROLHOS BANKS



3D Earth Model Integrating Marine Gravity, Magnetic & Seismic Data

Modeling Methodology

Three types of independently measured geophysical data sets (seismic/gravity/magnetics) were used to create a integrated 3D earth model.

A following horizons were used to create a 3D earth model using Fugro-LCT's industry leading 3MOD™ software:

- Bathymetry
- Oligocene unconformity
- Volcanics
- Unconformity of the late Cretaceous/Early Tertiary
- Albian carbonates/limestone
- Syn-rift sediments (possible source rock)
- Basement

These horizons were chosen for their density properties, their geological importance, and their continuity in the seismic sections.

Bathymetry and each horizon other than basement was derived from interpretation of the seismic data.

The basement was interpreted by integrating magnetic depth estimates generated from MAGPROBE™ with an interpretation of the seismic data.

The initial 3D earth model was modified by way of gravity constrained structural inversion of the volcanics layer. During this inversion the volcanics, which were the least constrained geologic feature in the initial earth model, were allowed to move (change isopach) within the model until a good fit was achieved between the calculated model gravity and the gravity data measured during the seismic survey.

Interpretation Benefits

The integrated 3D earth model provides a subsurface image of the volcanics including the interpreted aerial extent, isopach, and most probable geologic source.

The results of the 3D earth model can provide great value to an exploration program including:

- Cross sections from the final 3D earth model can be extracted and re-projected along selected lines to constrain seismic interpretations
- Heat flow and migration studies
- Evaluation of potential reservoir thickness, including sediments below the volcanics
- Understanding of the volcanic's role as a possible trap or cap rock on the bank and what impact that has on the exploration prospectivity.

Deliverables

The products include:

3MOD™ 3D earth model

Geologic horizons and isopachs, in the following formats:

*Fugro-LCT "load and go" grids
Industry standard grid formats
ASCII*

MAGPROBE™ depth to magnetic source solutions

3 months free usage of the Fugro-LCT Software

Marine Bouguer gravity and magnetic grids in the following formats:

*Fugro-LCT "load and go" grids
Industry standard grid formats
ASCII*

Data interpretation report

PowerPoint presentation from 2001 SEG Case Studies Paper – A tale of three methods: Volcanics in the Abrolhos Banks, Brazil

Customization

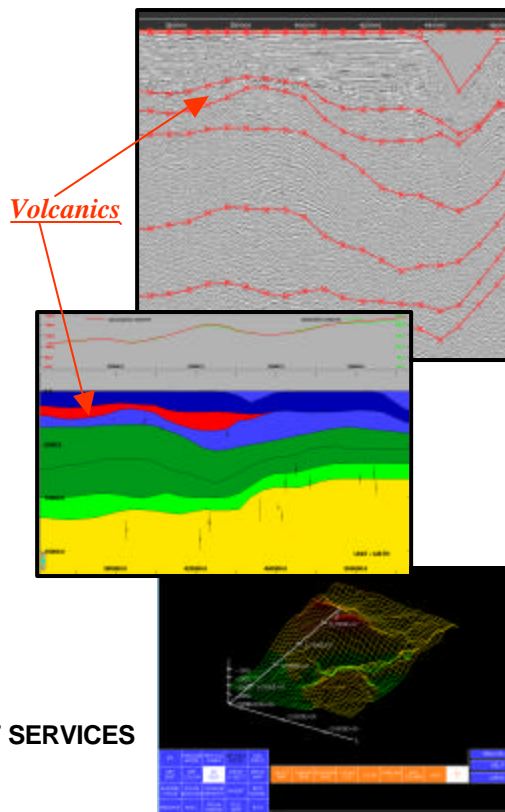
The 3D earth model can be customized, at additional cost, to include additional data provided by the licensee.

Prerequisite Data License

License to use the seismic, gravity and magnetic data used for the model is a prerequisite for licensing of the 3D earth model interpretation.

Availability

Available for immediate delivery. Data review and interpretation costs available upon request.



FUGRO-LCT & FUGRO MULTICLIENT SERVICES

6100 Hillcroft, 5th Floor (77081)

P.O. Box 740010

Houston, TX 77274

Tel: (713) 369-6100 Fax: (713) 369-6110

www.lct.com • E-mail: info@lct.com