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IGC Tools

IGC Tools include features of:

- **Database Record**: Of input parameters is saved and dated for a successful run of an application if the save option is selected. Any past data record can be restored into application for rerun or for editing.

- **Exporting Graphics/Maps automatically** to a PowerPoint Presentation/Word Document/Image Files

**GSCM** – is a 3D Ray Tracing for each structure contour for estimating the areal extent for 3D seismic survey.

- **Methods**: (1) Structure Data as (x, y, z) in Excel Worksheet  
  (2) Parametric modeling 3D Structure.

- **Options**: Linear/Non-Linear ray tracing depending on the velocity gradient in the subsurface. Ray trace multiple structures (limit 4) sequentially when structure(s) are modeled. No limits when Structure (x, y, z) data are used.

- **Produces**: ■ 3D structure plot, ■ ray traces from contours to surface, ■ areal extent, ■ structure map (x, y, z),  
  ■ structure map of unmigrated data, ■ structure map with (x, y, z) for contours, ■ structure map with gridded structure (x, y, z), ■ 3D dip map structure (x, y, z), ■ 3D dip direction map structure (x, y, z), ■ 3D Strike map structure (x, y, z), ■ 3D curvature map structure (x, y, z)

**Benefits:**

Areal extent of a 3D seismic survey is critical for successfully imaging a geologic structure. This method provides a systematic calculation and assessment of areal extent required for a 3D survey,

- Delivers areal extent for design and QC of existing surveys,
- Shows contours crossing in unmigrated data, which helps in QC of Processing (before and after migration) and for QC of interpretation to avoid pitfalls of unmigrated or incorrectly migrated data due to artifacts generated by crossing contours
- Using dip, strike, and direction maps for QC structure data for consistency and for understanding the migrated and unmigrated contour maps.
- Quickly model a 3D structure and produce above results in minutes, and costing a fraction of cost of 3D seismic modeling software
- Special feature of contour imaging provides insight into migrated and unmigrated contours which is not available in most geophysical software packages.

Pre-Requisite Software: **Surfer** (Golden Software), **MS Excel, Word, PowerPoint**, and **Access Licenses**
AFPAVO – is a seismic data acquisition modeling tool that offers a systematic technique to estimate acquisition footprints, apply footprint correction, and extract AVO for the target seismic reflection. The user can model data or user data for analysis. Acquisition footprints are an inherent part of all seismic surveys. These footprints are controlled by the seismic data recording geometry, surface conditions, source and receiver coupling variations throughout the survey. The major steps in methods used in this tool are depicted here. Footprints are displayed, source receiver response variations are calculated and corrected, wave propagation decay factors are calculated and corrected, and the remaining AVO response is displayed.

Methods: (1) Modeling source-receiver response, AVO response, and wave propagation factors to simulate recorded seismic data. (2) Extract source-receiver response, AVO response, and wave propagation factors with three different procedures using real seismic data or simulated data from (1).

Benefits:
(1) Three techniques of systematically analyzing, estimating and correcting source, receiver, wave propagation effects for extracting AVO response from seismic data.
(2) Method of modeling seismic response, source and receiver responses, wave propagation effect, and AVO response. Using the known modeled responses, AVO response is extracted for confirmation of each of the three methods.
(3) User seismic data AVO response is extracted with each of the three methods for cross checking.

Pre-Requisite Software: MS Excel, Word, PowerPoint, and Access Licenses

Export MapsCharts: Is a utility to export Maps in all Surfer (.srf) files from a directory to a Powerpoint presentation and Word Document. Excel Charts from all Excel files are exported to a Powerpoint presentation and Word Document.
**StrucMap** – includes modeling and mapping of fault polygon, Pinch-outs, Unconformity, effect of statics and mis-ties structure maps based on seismic interpretation. Includes a tool for testing and analyzing mapping parameters, options, variograms, and algorithms. Also, included is a restore-top method for contouring and mapping faulted structure and performing volumetric calculations.

**Benefits:**

1. Modeling a fault polygon gives the interpreter an insight into contouring through the polygon. Interpretation, location of a fault polygon can drive the estimate of resources upward or downward.
2. Restore top method allows the interpreter to place the faults in corrected locations, account for and match displacements across faults. Volumetric Calculation for estimation of resources in the presence of faults.
Pre-Requisite Software: **Surfer** and **Grapher** (Golden Software), MS **Excel**, **Word**, **PowerPoint**, and **Access** Licenses

**GravMod**— is a tool for Modeling and Mapping gravity anomaly of geometric shapes. Modeled data is calculated in 3D to generate line profiles and gravity anomaly map for the selected model.

**Benefits:**

1. Gravity maps (2D and 3D) calculated and displayed covering several variations of selected model parameters
2. Profiles are displayed as Excel Charts.

Pre-Requisite Software: **Surfer** (Golden Software), MS **Excel**, **Word**, **PowerPoint**, and **Access** Licenses
**MagMod** is a tool for Modeling and Mapping magnetic anomaly of geometric shapes. Modeled data is calculated in 3D to generate line profiles and magnetic anomaly map for the selected model.

**Benefits:**
1. Magnetic 3-Component calculated and displayed as maps variations of selected model parameters
2. Profiles are displayed as Excel Charts.

**Pre-Requisite Software:** Surfer (Golden Software), MS Excel, Word, PowerPoint, and Access Licenses
GPHToolBox – includes 170 workbooks – Mathcad (72) & Excel (98) tools in Seismic Survey Design, Processing, Modeling, Interpretation and analysis. This tool is offered for organizing workbooks generated in-house exploration projects and tools for convenient access. Users can add their own workbooks to this ToolBox. Examples:

Benefits:
1. ToolBox comes with Excel and Mathcad workbooks related to Seismic Survey Design, Seismic Processing, Seismic Modeling, Seismic Interpretation and analysis.
2. The users can easily include their own workbooks for accessing them conveniently.

Pre-Requisite Software: Mathcad (PTC), MS Excel, and Access Licenses
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