Advanced Mapping Techniques
Petra 2016
Petra Advanced Mapping Techniques

Course Description

Welcome to the IHS Petra® Advanced Mapping Techniques course. This two-day, hands-on computer training class is designed for participants who completed the Petra Overview Training Course and want to advance further with mapping features and gridding. A basic or intermediate skill level is required for this course.

Map Module is a powerful visualization tool that enables you to apply your knowledge and intuition to guide the development of conceptual models, to test and modify these models, and to create maps for use in exploration and development, acquisition evaluation, and decision-making. This class emphasizes the use of Petra, its database and computational functions, and its gridding and contouring algorithms to facilitate and amplify your creative process.

Course Objectives

In the Advanced Mapping Techniques course, you will do the following:

- Learn about the organization and functionality of the Map Module.
- Develop a better understanding of map projections, gridding and contouring algorithms, as well as working with various types of spatial data.
- Develop skills, through hands-on training in the following areas:
  - Manipulating map display options and data extents.
  - Importing spatial data with a different reference datum.
  - Manipulating well display options, such as symbol location and data posting, for vertical and directional wells.
  - Managing and organizing overlay layers.
  - Selecting and comparing gridding parameters for different data types.
  - Computing and analyzing data via grid calculations.
  - Viewing maps and grids in 3D, among others.

Course Content

The following is the course content for the Advanced Mapping Techniques course.

Projections and Locations

Project Overview
- Opening the Project
- Carter Knox Field Area
- Structure and Stratigraphy
Project Data
  Project Summary Report
  Formation Tops and Zone Data

Map Projection
  Project Map Projection
    Petra Coordinate Systems
    Viewing Map Projection Settings

Datum-Shifting Project Data
  Convert Coordinates Utility
    Checking the Datum Shift
    Changing the Project Area

Project Locations
  Displaying Coordinate Ticks

Displaying WMS Imagery
  WMS and Map Projection
  Using WMS in Petra

Datum Shift a Shapefile
  Viewing Shapefile Information
  Activating the Datum Shift Utility
  Viewing Results

Datum for Data Imports
  Project Settings
  Importing Well Data
    Verifying the Location
  Importing Cartographic Data
    Reference Datum and Import Options
    Importing Shapefiles

Well Display Options

Well Symbols
  Symbol Codes
    Identifying Project Symbol Codes
    Identifying Unknown Symbol Codes on the Map
  Modifying Symbol Codes
    Changing a Symbol Code
    Creating a Symbol for Unknown Code
    Modifying the Symbol Translation File
  Well Symbol Display Options

Deviated and Directional Wells
  About Survey Data
    Viewing Survey Data
    Calculating Bottom Hole Location from Survey Data
  Surveys and Well Symbol Locations
    Viewing the Default Locations and Settings
    Plotting the Symbol at Depth
  Convergence Angle and Directional Surveys
    True North vs. Grid North
    Viewing the Convergence Angle
   Convergence Angle Correction
Identifying Survey Flag Setting
Applying the Convergence Correction on the Map
Posting Well Data
  Posting Depth Ticks and Tops on the Well Path
  Posting Zone Data on the Well Path
  Posting DSTs and IPs
    Posting DSTs
    Manually Shifting Text

Gridding and Contouring

Contours versus Grids
  Basic Grid Parameters
    Grid Nodes versus Data Points
Creating a Rectangular Grid
  Preliminary Setup
  Grid Parameter Selection
  Viewing Grid Nodes and Results
Contouring Grids
  Normal Colorbars
    Changing Colors
  Enhanced Colorbars
    Changing Colors
  Displaying Two Contour Sets
General Gridding Options
  Grid Size
    Grid Size Options
  Grid Flexing
Gridding vs. Map Extents
  Data Limits
    Changing Map Extents
    Creating a Prospect
Changing Grid Limits
  Gridding Prospect Limits
  Viewing Grid Limits

Structure Mapping and Analysis Methods

Formation Top Options
  Handling Problem Data Points
    Dropping versus Disabling Wells
Sample Grid to Wells
Adding Interpretation with Overlay Data
  Contour Lines
    Using Hand-Drawn Contours
    Capturing Contours to the Overlay
Faults
  Fault Strength
  Fault Symbol and Direction
  Gridding with Faults
Adding Faults to the Sycamore Grid
Adjusting Grid for Fault Artifacts
Contour Clipping Polygons
Trend-Residual Mapping
  Trend Map
    Creating a Trend Map
  Residual Map
    Creating a Residual Map
Curvature Analysis
  Overview
    Grids and Curvature Analysis
  Curvature Calculation Types
    Computing Maximum Curvature
      Creating the Curvature Grid
      Applying a Scale Factor to Grid
Lineament Analysis
  Identifying the Lineaments
  Analyzing the Lineaments

Specialized Gridding Techniques

Comparing Grid Parameters
  Extrapolation and Blanking Methods
    Blanking Methods
  Octant Search
    Smaller Search Radius
    Changing Max Points per Octant
    Related Search Parameters
Surface Styles
  Comparing Surface Styles
Triangulation
  Triangle Refinement
    Parameter Options
  Creating a Triangular Grid
Gridding Production Data
  Reviewing the Data
Gridding Options
  Simple Weighting without Slopes
  Creating the Grid
  Applying Log 10 Transform
Gridding External Control Points
  Loading the External Control Points File
  Gridding External Control Points as a Fault Plane
  Control Point Pseudo-grids
    Advantages
    Disadvantages
Grid Management
  Grids Folder
    Standard Grid Naming Conventions
    Creating Grids Subfolders
Isopach Mapping Options

Mapping Zone Data
- Isopach Gridging Parameters
- Isopach Zero Thickness Options
  - Adjusting Zero Contour During Gridding
  - Adding Hand-Drawn Zero Contour in Overlay
  - Using Internal Control Points

Grid Subtraction
- Creating Upper Grid
- Creating Lower Grid to Match
- Performing Grid Subtraction

Grid User Model
- Reviewing the Model
- Executing an Isopach Grid Model
- Viewing the Results

Isopach and True Stratigraphic Thickness
- Creating a TST Isopach Grid
- Sampling Grids to Zone

Map Data in 3D

Formatting Maps for 3DVIZ
- Opening and Navigating 3DViz
  - Opening the 3DVIZ Module
    - Mouse and Keyboard Functions
Well Data and Borehole Display Options
- Borehole Display Options
- Displaying Formation Tops
- Displaying Perfs

Map and Overlay Data
- Displaying the Overlay
- Displaying a Map
- Changing Display Extents

Displaying Surfaces
- Displaying Structure Grids
- Displaying Additional Structure Grids
- Displaying Isopach Grids
- Displaying a Depth Plane

Other Mapping and Analysis Techniques

Overlay Display Options
- Adding Images
  - Geo-Referenced Images
  - General Images
- Adding a Legend
- Boundary Limits Polygon
Creating a 9-Section Plat
Managing Overlay Layers
  Associated Layer Files
    Functionality Overview
    Saving a Layer File
    Loading a Layer File
    Associated Layer Options
Organizing Overlay Layers
  Layers View
  Group View
Other Layer Options
Analyzing Isopach Data
  Finding Wells with Isopach Data
  Computing Dip from Averaged Surfaces
    Using the Compute Function
  Comparing Results with Z Data Cross Plot
    Using Z Data Cross Plot
Analyzing Cross Plot Data
Viewing Wells on the Map