DecisionSpace® Geosciences: Getting Started

HALLIBURTON | Landmark

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Preface **P**

DecisionSpace Geosciences Getting Started

The DecisionSpace® Geosciences software provides an elegant approach to integrated prospect evaluation and development. The goal of DecisionSpace Geosciences is to help interpreters quickly and accurately map oil and gas plays, prospects, and fields. The software accomplishes this by integrating a wide range of data types with a narrow range of probable solutions, constrained by geology, geophysics, petrophysics, and reservoir models. Integrating geological and geophysical interpretations allows you to map and analyze your projects accurately, build sealed structural frameworks and reservoir models, and plan wells in both traditional and unconventional scenarios.

Overview of DecisionSpace Geosciences Modules

This Getting Started course is the first of a suite of DecisionSpace Geosciences modules. Others include:

- DecisionSpace Geosciences: Fundamentals of Geophysics (two days)
- DecisionSpace Geosciences: Fundamentals of Geology (two days)
- DecisionSpace Geosciences: Integrated Interpretation and Mapping using Dynamic Frameworks to Fill (three days)
- DecisionSpace Geosciences: Well Tie Workflow (one day)
- DecisionSpace Geosciences: Practical Velocity Modeling (three days)
- DecisionSpace Offshore Well Planning (three days)
- DecisionSpace Onshore Well Planning (three days)
- Stochastic Modeling and Geostatistics for Reservoirs, Principles and Methods (three days)
- DecisionSpace Geosciences: Stimulation (one day)

This manual accompanies the instruction provided in the standard *DecisionSpace Geosciences Getting Started* course, revision 5000.10.0. The Getting Started manual is both a teaching tool and a practical, hands-on reference. Because DecisionSpace Geosciences is very extensive and flexible, it is not possible to cover all features, functions, and modules in a single manual. Therefore, we provide key examples and descriptions, with exercises that are directed toward common geoscience work flows.

After you have worked your way through the course, you will find the manual is a quick and easy-to-use reference for investigating topics of interest.

Objectives of the Getting Started Module

This one-day course will give you a practical introduction to DecisionSpace Geosciences workflows. You will become familiar with the DecisionSpace platform in terms of program control, data access, and data visualization. By the end of this session you will be able to:

- Initialize the DecisionSpace Geosciences software.
- Select data and control the scene.
- Load data and perform a reconnaissance workflow.
- Generate an ISet.
- Embed Notes to aid interpretation.
- Display GIS data.
- Use Vertical (section) Images.
- Interpret with GeoShapers.
- Record your interpretation activities in Project Designer.

Retain this manual as a reference for functionalities and workflows that you can apply to examine and evaluate your data.

Summarizing the Chapters

This section provides a high-level summary of the chapters and exercises that compose the course.

Chapter 1: Exploring DecisionSpace Geosciences

Chapter 1 is an introduction to DecisionSpace Geosciences, a unified workspace. The basics of data access and manipulation are described. The exercises in this chapter will show you how to use *Cube*, *Map*, and *Section* views, the primary views of DecisionSpace Geosciences modules.

Chapter 2: Getting Organized

Chapter 2 describes ways to organize your interpretation activities to get the maximum benefit from the DecisionSpace Geosciences software

suite. The suite includes tools that enable you to organize your work and to give you the ability to generate subsets of your data for improved efficiency. With DecisionSpace Geoscience software you can also use non-traditional data objects, vertical-section images, and GeoShapers in your analysis; and with Dynamic Frameworks to Fill (DFF) you can generate surfaces. Chapter 2 also touches on the DecisionSpace Geographical Information System (GIS) application.

Chapter 3: Geographical Information System Integration

In Chapter 3, you will bring more GIS data to your project evaluation and you will learn about the integration of ESRI data in an OpenWorks® context.

Appendix A: Project Designer

DecisionSpace software's Project Designer enables you to systematically record your interpretation activity while you work. By using this valuable tool you and other team members will be able to create and access a common record of the processes used by team members to develop interpretations.

Appendix B: Hardcopy with Print Preview

The Print Preview functionality enables you to create and save templates with information you want to plot, import templates into a project, edit plot shapes, set frame dimensions, customize paper sizes, integrate the CGM Montage Tool into your work, and determine the kind of plotter to be used for your job.

Organization and Conventions

The chapters that compose this manual examine key workflows within DecisionSpace Geosciences.

General Organization of this Manual

Where the content permits it, the chapters in this book conform to the following organizational structure. You will find that topic introductions are useful quick references.

- **Introduction:** The focus and learning goals of the course are defined and exercise topics are introduced. Sometimes a diagram is presented that pictures the workflow you will encounter; at other times a few sentences of description suffice.

- **Overview:** Overview sections are intended to call attention to the theory and functionality related to the chapter topic. Though some dialogs are displayed, these overview sections are not written as step-by-step exercises. Your instructor may demonstrate the overview material or may simply ask you to use DecisionSpace to explore the overview topics.

- **Exercises:** The exercises are the core of the manual. Most of the manual comprises the detailed steps that are necessary to achieve learning goals. To guide your learning, you will find diagrams and screen captures in abundance. The exercises may include current topic descriptions of varying length, with accompanying notes.

- **Review:** Each chapter concludes with a short list of the main learning goals.

Exercises that contain **bold** font require your interaction (with keyboard and mouse). Overviews are for reading.

Note on Exercises

Each exercise comprises a series of steps that build a workflow, helps you select parameters, executes the flow, or analyzes the results. Many of the steps provide detailed explanations of how to correctly select parameters and make good use of the functionality of interactive processes.

The numbered paragraphs are steps that will guide you through the command path. As you proceed through the exercises, note the options that you find on the dialogs, but stay near the prescribed path. This will enable you to complete the exercise in the allotted time and produce results similar to those shown in the accompanying figures.

DecisionSpace Geosciences is a sophisticated application with a user-friendly interface. When you work with DecisionSpace Geosciences you will often note that it provides multiple interpretation paths. For the sake of clarity and to keep you moving through the course, only one path, or method, is described in each exercise. The authors hope that after this class you will return to your workplace and explore the solution paths that are easiest and most intuitive for you. To enable you to effectively cover course material we ask that you follow the instructions in the manual and use the solution paths described herein.

As you progress through the exercises, familiar parameters and obvious instructions may not be shown in workflow steps. For instance, in many workflows the instruction to click the OK button after parameter selection is sometimes implied by the context. In these cases we often omit that instruction, to avoid monotony.

The screen captures you will see throughout this manual are chosen to best illustrate the point at hand. Because of variations in path and session state that occurred during the writing of the exercises, screen captures may not always match the image on your monitor. Window size, display scale, colorbar content and limits, interpretation display characteristics, and so forth, can easily be changed. Header text in the main viewer can vary, as the manual was created using a few incremental releases of the application.

Personalized Outputs

In this course you may need to personalize and identify your work. You will save certain data with your initials as part of the output name. The data could be a horizon you interpreted, an attribute volume you generated, or a session file. For example, if your name is Aaron Buster Chapman, you might save some of your data by naming it ABC. The creators of this manual don’t know your name, so herein we use the letters “YOU” to refer to your initials. Thus, when you see the expression “YOU,” substitute your initials.

Interpretation ID automatically generates data versions in OpenWorks. The use of five alpha-numeric characters in data-version nomenclature is mandatory at the start of your session. For this manual, it is 01STA. Do not assume that by adding your initials, or interpretation ID, to the

name of an entity you define the data as yours. Including your initials in the data name only assists you in the selection of data, not in defining ownership. Ownership is defined through the interpretation, also known as interpreter.

By using your initials you make your saved sessions easy to identify. In addition, your horizons and other interpretations will be easy to find among the other files that are saved in this project.

The session (saved-state) files are very helpful if you go astray in one of the exercises or encounter a hardware or software problem. If either of those circumstances occurs you can restart your session at your previous saved point.

The Conventions of this Manual

The manual uses the following common conventions in describing how to access and use various features of DecisionSpace Geosciences. You are probably familiar with most of them.

Windows, dialogs, and boxes	DecisionSpace Geosciences has user interfaces that appear as windows. The terms ‘window’ and ‘dialog’ are used interchangeably, but the term dialog is usually reserved for windows that require user interaction in the form of parameter selection or information input. ‘Box’ is usually a smaller window, such as a warning or message box. ‘Box’ can also be an area inside a window that is defined by a rectangular line.
Dialog Names	The titles of windows, dialogs, some tabs, and occasional boxes are *italicized* when they appear in text. Typically, dialog names appear in a bar at the top of a window (this is also known as the window title).
Mouse Buttons **MB1**, **MB2**, **MB3**	The manual does not instruct you to press mouse buttons. Instead, you will see instructions to press or use MB1, MB2, or MB3, where MB1 is mouse button 1, and so forth. Mouse buttons are numbered from left to right. **MB1** means click the left mouse button, **MB2** means click the middle mouse button, **MB3** means click the right mouse button. If your computer is set up for a left-handed mouse, the mouse buttons are reversed in direction. Mouse buttons may not work properly if Caps Lock or Num Lock are on. **MB1** is used for most selections.
Menu Options	Menu options and push-button names are bolded when they appear in a text (an instruction for an action). For example, when you see the instruction “**Close** the dialog,” it is an instruction to click the Close button.

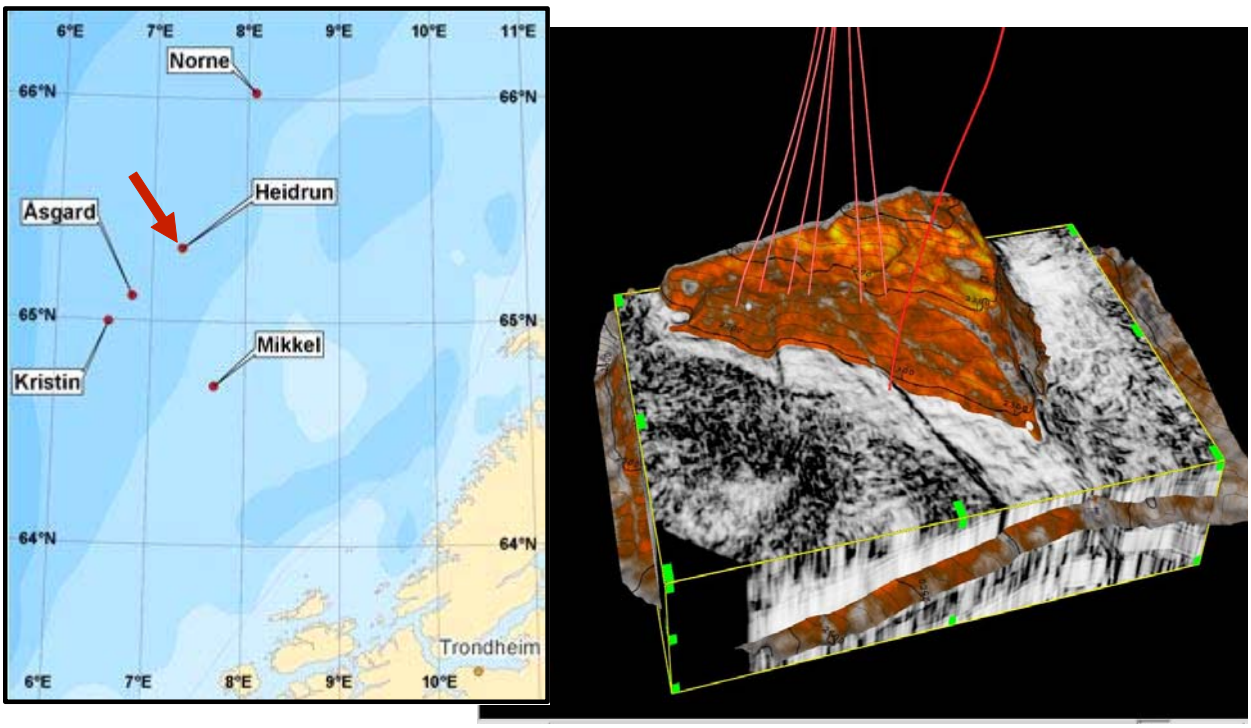
Type or enter	Type all terms that appear in quotes and bolded. For example, when you see the expression, *Enter "**2300**" in XYZ field,* you should type 2300 in the prescribed place. Context will often suggest that you need to change an instruction. For example, when you read "**YOURINITIALS**" or "**YOU**", type your initials.
<**key**>	Press the indicated key on the keyboard. For example, <**Enter**> is an instruction to press the Enter key.
Select, Click, Choose, or Highlight	Move the cursor to the specified option or object and press, then release, the mouse button. Unless otherwise specified, use **MB1**.
Click and drag	Press the mouse button and hold it down while moving the cursor. Then release the button. This is also called press and drag, or **MB1-drag**.
Shift and drag	Hold the shift key while pressing the MB1. Hold the mouse button down while moving the cursor around the option you want, then release the button.
Double-click	Click the button twice, rapidly, without moving the mouse. The first click highlights the option or object beneath the cursor; the second click is equivalent to pressing the **OK** button to accept the selection. Normally double click action is performed by MB1.
Conditions for bold font	We use bold font to make the exercises easier to follow. Bolded text means the text is an instruction that require user action, such as an instruction to click a button or an icon, enter text, highlight list items, and so forth. Often the instruction has the subject-verb-object structure, such as "You can click the **Open** button to display the dialog." In this situation *You* is the subject, *click* is the verb, and ***Open*** is the object. Sometimes the sentence has an imperative structure, such as "Click **Open**." In this case, the subject is implied. In general, we bold the ***object*** in these action sentences both to draw attention to the need for student action and to provide a quick visual aid in clearly distinguishing what the action should be directed to. On a few occasions an instruction requires that the verb be bolded, though we do this reluctantly, because excessive use of bolding creates visual confusion.

Note:

This manual follows the popular usage of "data" as singular or plural. You will see both "data is" and "data are".

The Dataset for this Class: Heidrun Field

Heidrun in the Norwegian Sea (map below) has been producing oil and gas since October 1995.



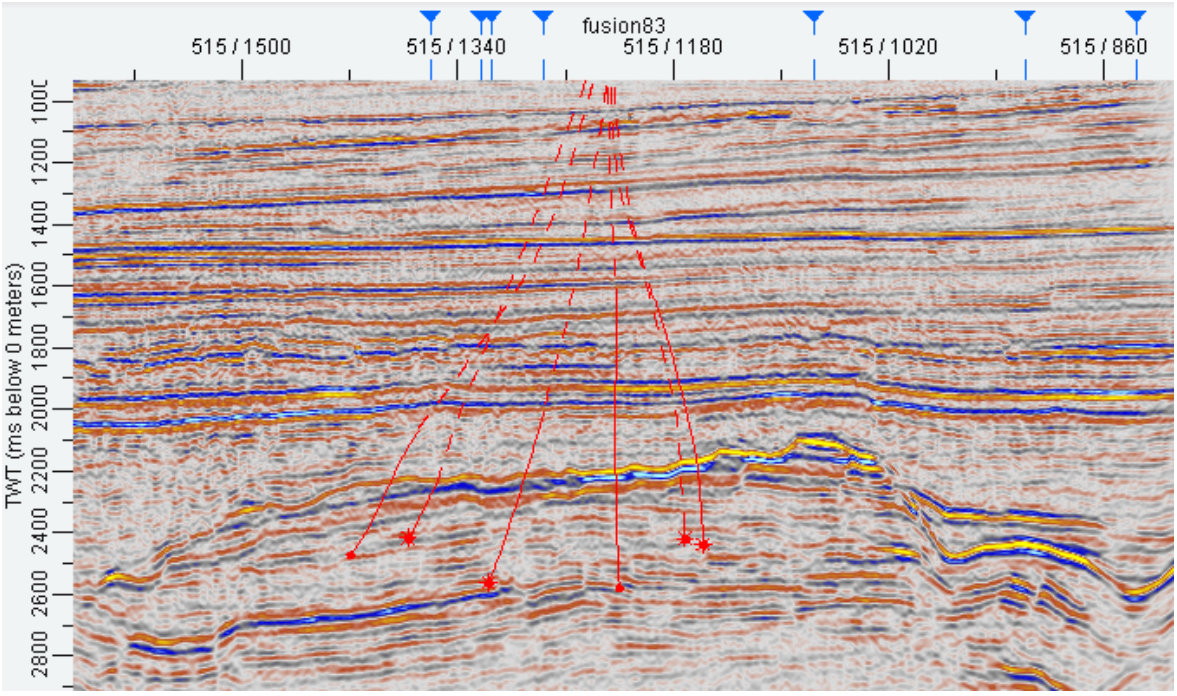
The Heidrun field is located on Haltenbanken in the Norwegian Sea in water depth of about 350 meters. The field was developed with a floating concrete tension-leg platform, installed over a subsea template with 56 well slots. The northern part of the field is developed with subsea facilities. This heavily faulted reservoir comprises Lower and Middle Jurassic sandstones. The recovery strategy for the field is pressure maintenance using water injection and injection of excess gas.

The Heidrun field has yielded some 660 million barrels of oil since it came on stream, with a current flow of about 150,000 barrels per day. At its peak it produced over 300,000 barrels per day from the Fangst group.

Its annual gas output totals roughly 1.3 billion cubic meters. Purposeful efforts to improve oil recovery have boosted estimated oil reserves in the field to about 1,130 million (1.13 billion) barrels.

Original discovery was on a high-amplitude-gas bright spot, but most of the production is from non-bright seismic signatures of the oil leg, which makes up about 80% of the total production.

Seismic-stack signature does not change much from oil pay to non-pay, as seen in the amplitude map on the pay horizon (below).



Chapter 1
Exploring DecisionSpace Geosciences

This chapter details some of the principles that you must understand to properly run DecisionSpace Geosciences. You will perform a manual reconnaissance of some of the basic data types in your survey. Many interpreters refer to this workflow as data mining.

Topics Covered in this Chapter

The following topics are in this introductory chapter:

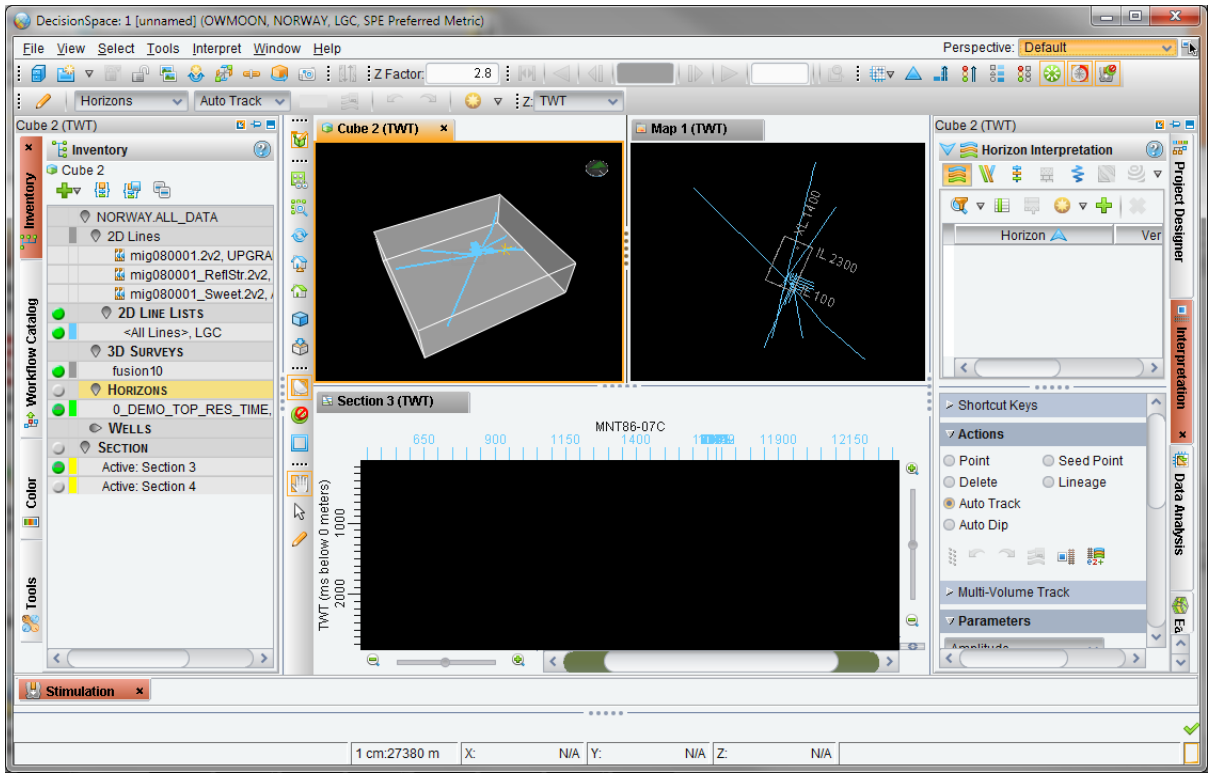
- Launching DecisionSpace Geosciences
- Selecting data and loading it into DecisionSpace Geosciences
- Manipulating data displays, including *Map*, *Section* and *Cube* views
- Using DecisionSpace Geosciences to assess a project (reconnaissance workflow), using seismic, well, and other data

Overview: Displaying Tabs, Tiles, and Windows

The DecisionSpace Geosciences suite lets you simultaneously display *Cube*, *Map*, *Section*, and *Well Correlation* views, each with different data and color bars. DecisionSpace Geosciences does this through a structure of windows, tiles, and tabs.

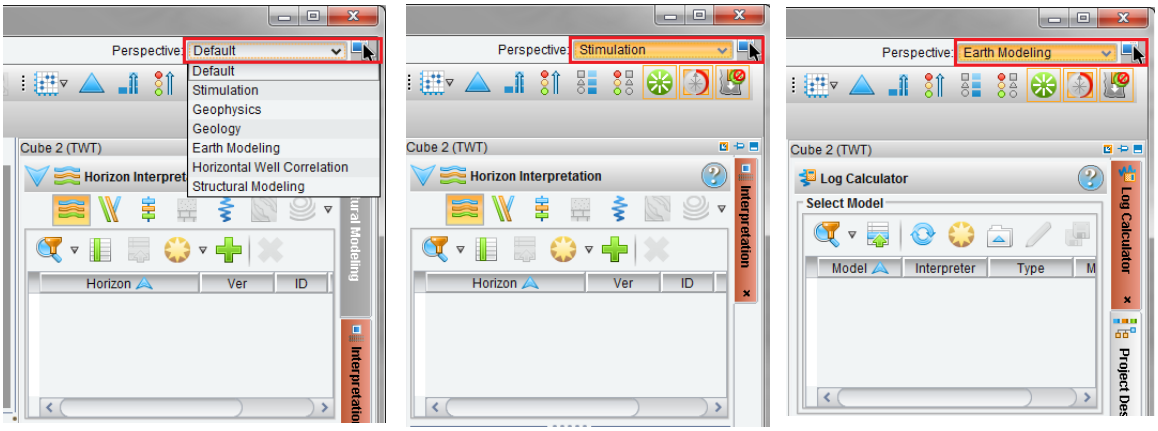
A window (also called a dialog) is the frame that appears when you start DecisionSpace. The first window to appear is *DecisionSpace: 1*. Subsequently-opened windows will be numbered consecutively.

Each window contains at least one tile that holds at least one primary tab. Some primary tabs may also contain additional interior tabs, depending upon functionality. How primary tabs and tiles appear depends on your choice of window layouts, called templates. A primary tab shows a Map, Section, Cube, Well Correlation, or Project Designer task pane.



Using the Perspective Pull-down Menu

The distinctions between windows, tabs, tiles, task bars, and panes can be confusing at first. To alleviate confusion, DecisionSpace provides interpretation-specific layout configurations. The Perspective pull-down menu in the upper right corner of the *DecisionSpace 1* window allows you to select Default, Stimulation, Geophysics, Geology, or various other layouts. These layouts display task bar tabs that geologists, geophysicists, or geomodelers typically use most often. This allows you to display more of the data and views that are appropriate for your work. More importantly, these configurations hide those tasks not directly related to that perspective work flow.

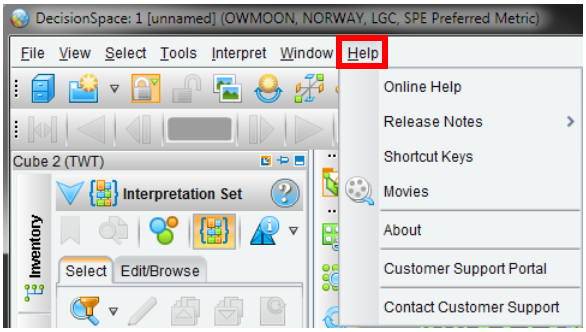


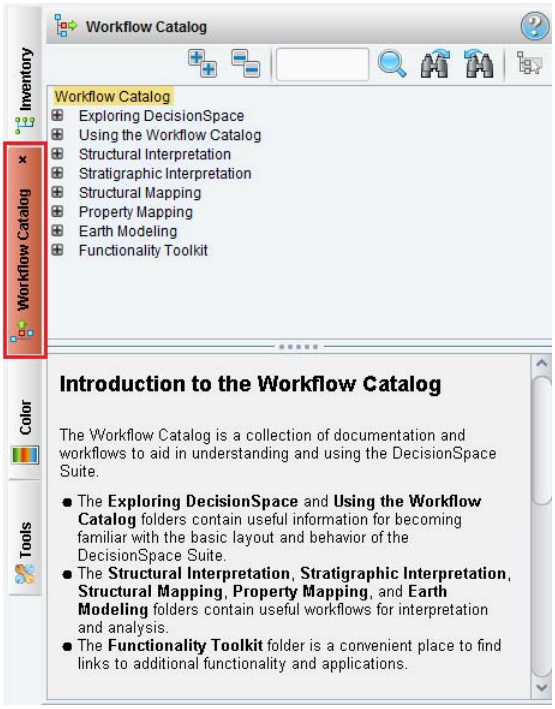
Using DecisionSpace Geosciences Help

Landmark has provided many ways to help you work with DecisionSpace Geosciences and to find answers to your questions.

- **Online Help** includes a variety of information, from a high-level introduction to DecisionSpace to detailed descriptions of dialogs and parameters.
- **Release Notes** describes changes in the latest release.
- **Shortcut keys** is a list of shortcuts for performing some action.
- **Movies**, Step-by-step demonstrations of features are available in movies.
- **About** displays the version of the program that is running.
- **Workflow Catalog** supplies workflows that progress from Seismic Interpretation through Geocellular Modeling. The Workflow Catalog also provides another interface to the application, taking you straight to the functionality that is being reviewed.

You can access Help through a pull-down menu at the top of the window.





Landmark has many classes to guide and train you, as well as consultants that offer one-on-one mentoring to help you solve problems and increase your productivity.

Exercise 1.1: Starting DecisionSpace Geosciences

This exercise covers how to start DecisionSpace Geosciences, and how to change interpreter (interpretation ID) and source priority lists.

> **Note:**
>
> This document is not the definitive guide to DecisionSpace. Further details about using the DecisionSpace software are covered in online DecisionSpace documentation.

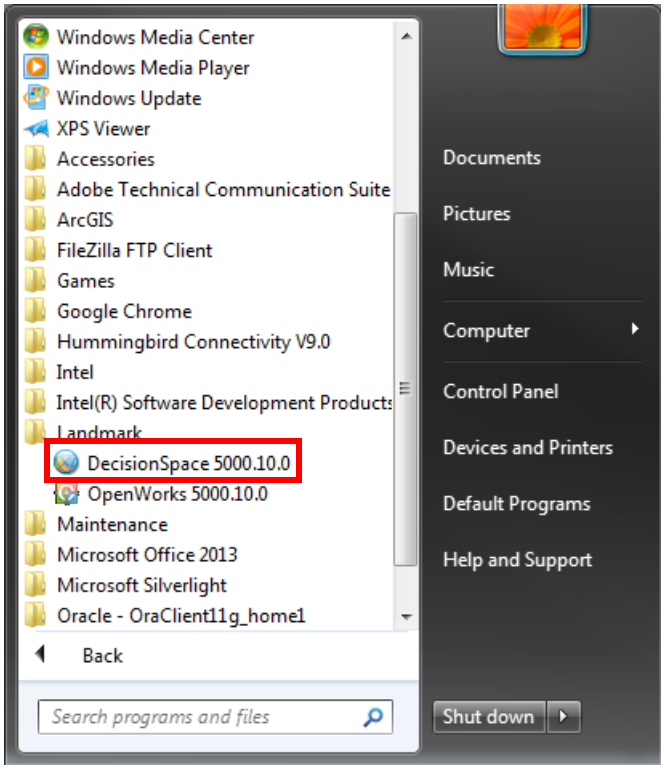
Before running the DecisionSpace Geosciences suite, you should have formulated some general ideas about the geologic terrain of your project and your exploration prospect types. These ideas can come from typical geological plays. Depending on the lithology and fluid content, your prospects may or may not show up as seismic anomalies of the stacked seismic data. For example, in the Preface overview of the Heidrun Field, you learned that the gas cap is visible as an amplitude anomaly, but the oil is not. Keep this variability in mind as you examine this data.

Opening a New DecisionSpace Session

Depending on the operating system of your computer and the state of configurable interfaces, follow these instructions to open a new DecisionSpace Geosciences session.

Starting DecisionSpace in Windows

1. Click the **Start** icon and select **All Programs > Landmark > DecisionSpace 5000.10.0**.



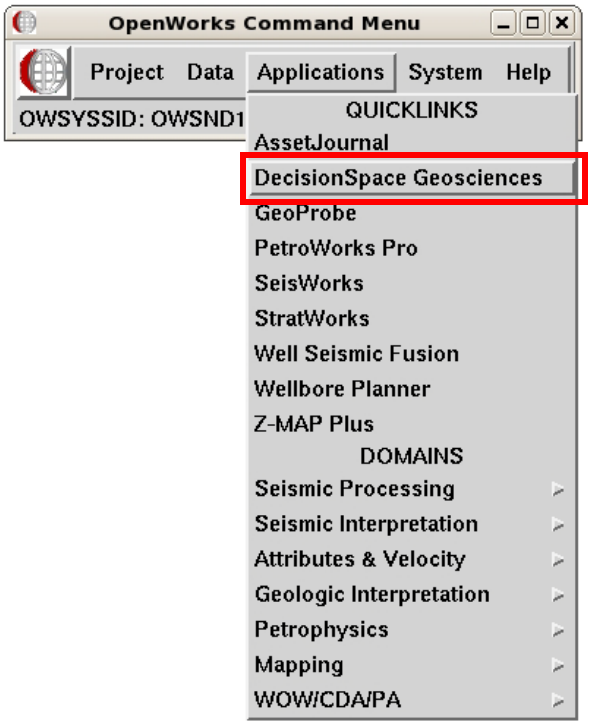
When the DecisionSpace application starts, skip to step 4 below and select the Modules and Templates for the session.

Starting DecisionSpace in Linux

1. **MB3** anywhere on the desktop and select **Open Terminal**. Type "**startow**" in the *Terminal* window to start the OpenWorks launcher.

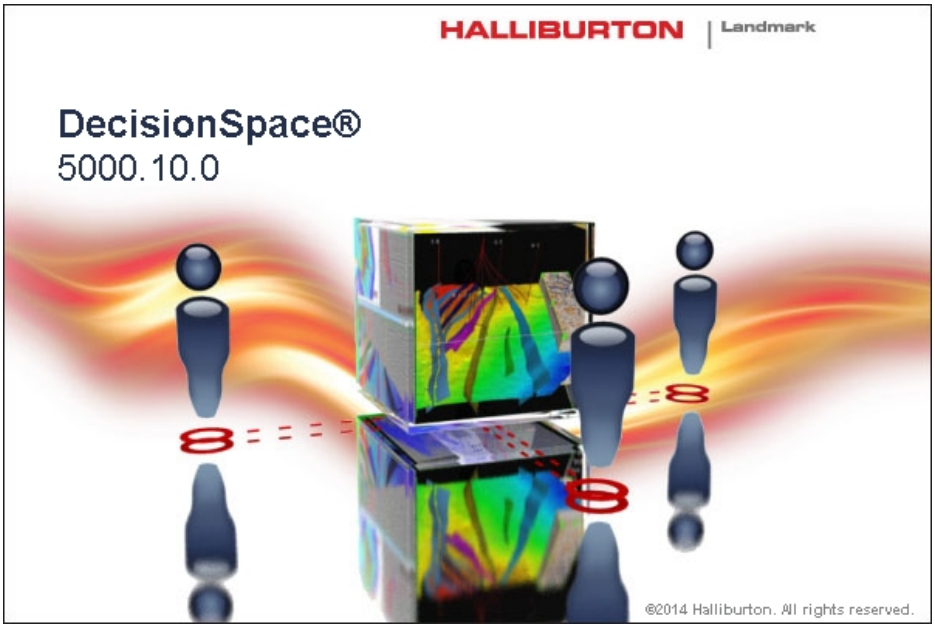
Because OpenWorks Command Menus are configurable, your Application pull-down menu may differ slightly from the image below.

2. On the *OpenWorks Command Menu*, select **Applications > DecisionSpace Geosciences** to launch DecisionSpace.

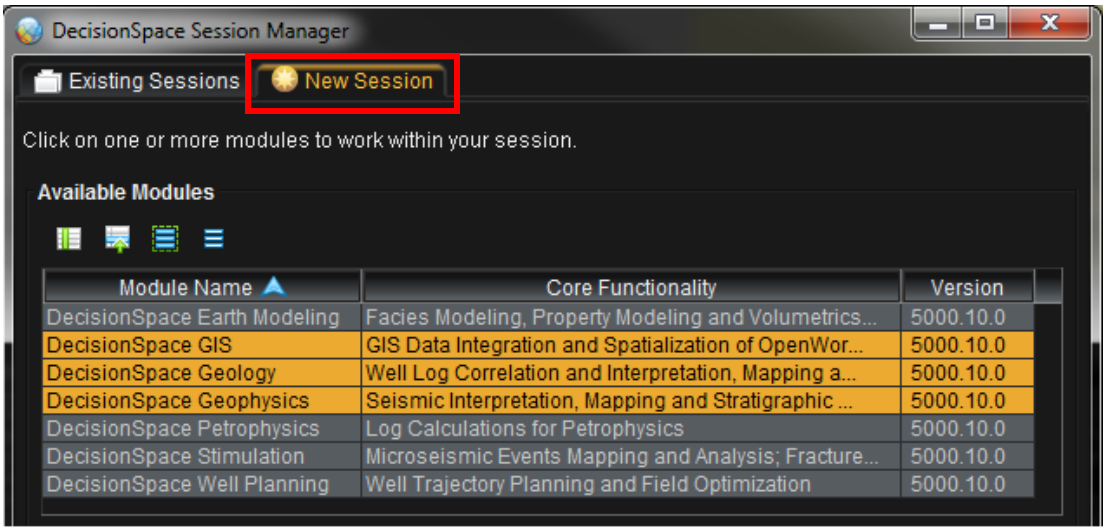


Session Manager

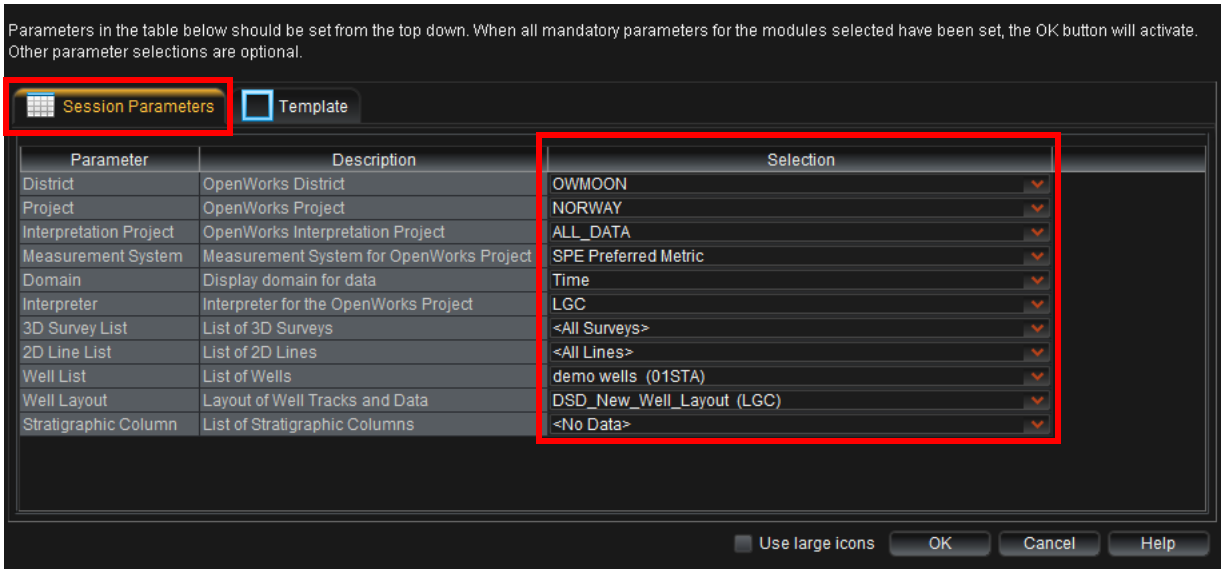
Note the temporary image (splash screen) identifying the DecisionSpace revision.



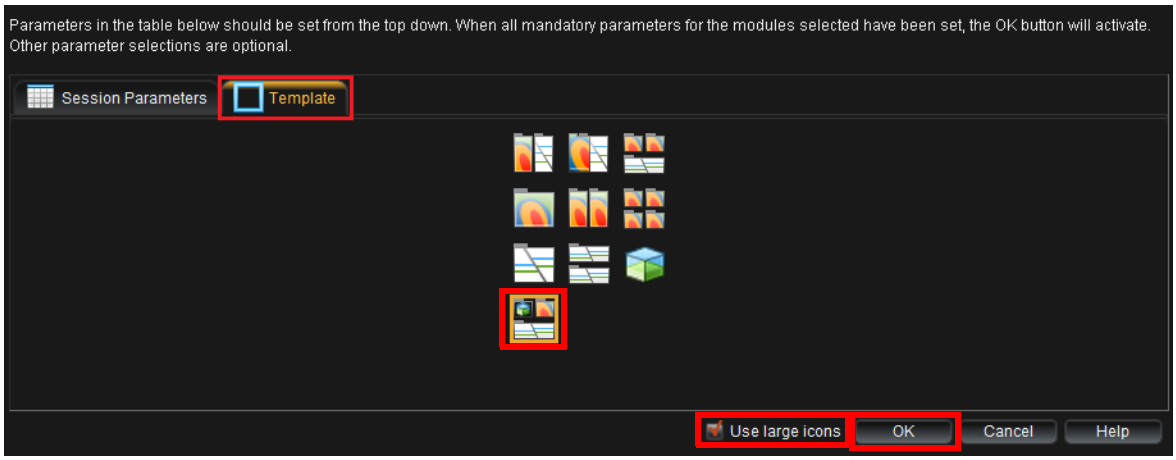
3. In the *DecisionSpace Session Manager* dialog, click the ***New Session*** tab and select the **GIS**, **Geology**, and **Geophysics** modules.



4. In the *Session Parameters* tab, select the **parameters** shown below. Check with your instructor regarding the District, Project, and Interpretation Project, which may differ from those shown.



5. In the *Template* tab, toggle on the **Map/Section/Cube - Triple Tile** icon if it is not already on. Click **OK** to launch DecisionSpace.



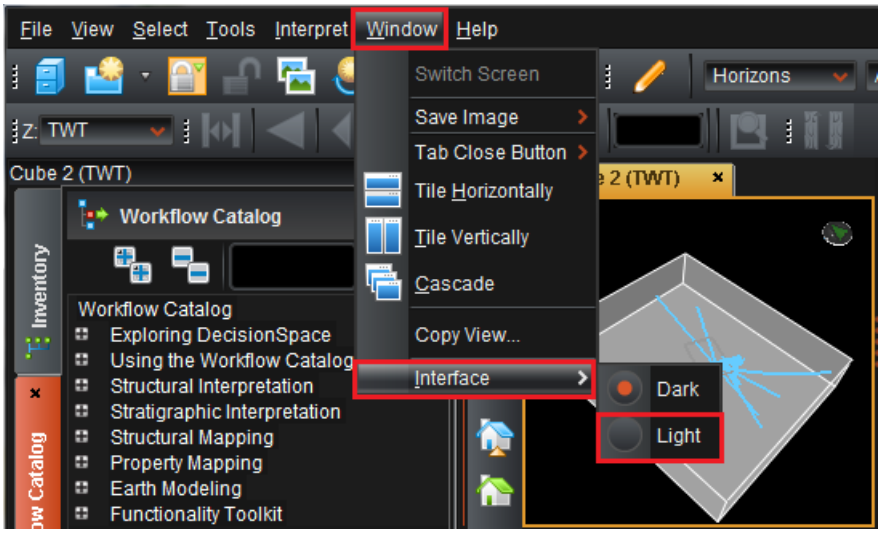
NOTE

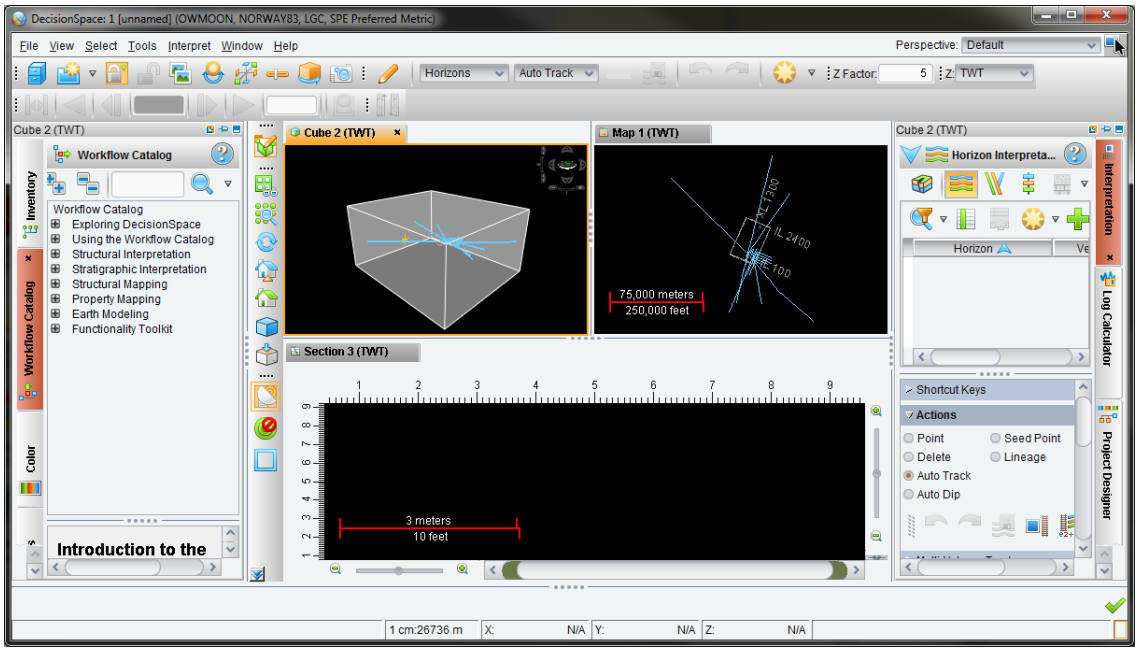
You can choose to use larger icons at the initiation of your session. The benefit of using a set of larger icons comes at the expense of reducing your working window area.

Choosing Optional Window Layouts

At startup, you have the option of opening other windows with various tab configurations, called Template Layouts. After the *DecisionSpace* window appears, you can add *Map*, *Cube*, *Section*, or *Well Correlation* tabs in any of the tiles you are displaying. To start with a layout other than the default, visit the *Template* tab in the *DecisionSpace Session Manager*, where ten different templates are available.The selected template is outlined in yellow.

6. If you want to change the interface colors from Dark (default) to Light, select **Window > Interface > Light** from main menu bar.





This manual will use the Light interface because it produces a better printed image. The Dark interface is the default because it may be easier on your eyes in a room with low ambient light. The Light interface is better when ambient light is high.

Later, the manual will switch to a grey background for all views, also to improve the printed image. You can retain your black view backgrounds.

Changing Interpreters and Source Priority Lists

An interpreter (Interpretation ID) identifies the creator of certain data items. You can display and use other interpreters' (Interpretation ID) data, depending on how you set up your interpreter source priority.

Four parameters are associated with the interpretation ID when you are working with DecisionSpace Interpreter Source Priority lists:

- **Name** is the name of the interpreter, user, or entity (external source) that owns the data tagged with this Interpretation ID.
- **User Access** displays the ability of the current user (userid) to use the Interpretation ID. NO_ACCESS indicates the current user cannot create, edit, or delete data associated with this Interpreter ID. MANAGE indicates that the current user has create, edit, and delete permissions on any of its associated data.
- **Public** indicates whether the Interpreter ID access is open (Y = yes) to any user (userid) creating, editing, or deleting its associated data, as opposed to closed (N = no), which indicates that the Interpreter ID is private or shared.
- **Remark** displays any Interpreter ID comments or additional defining information (comments).

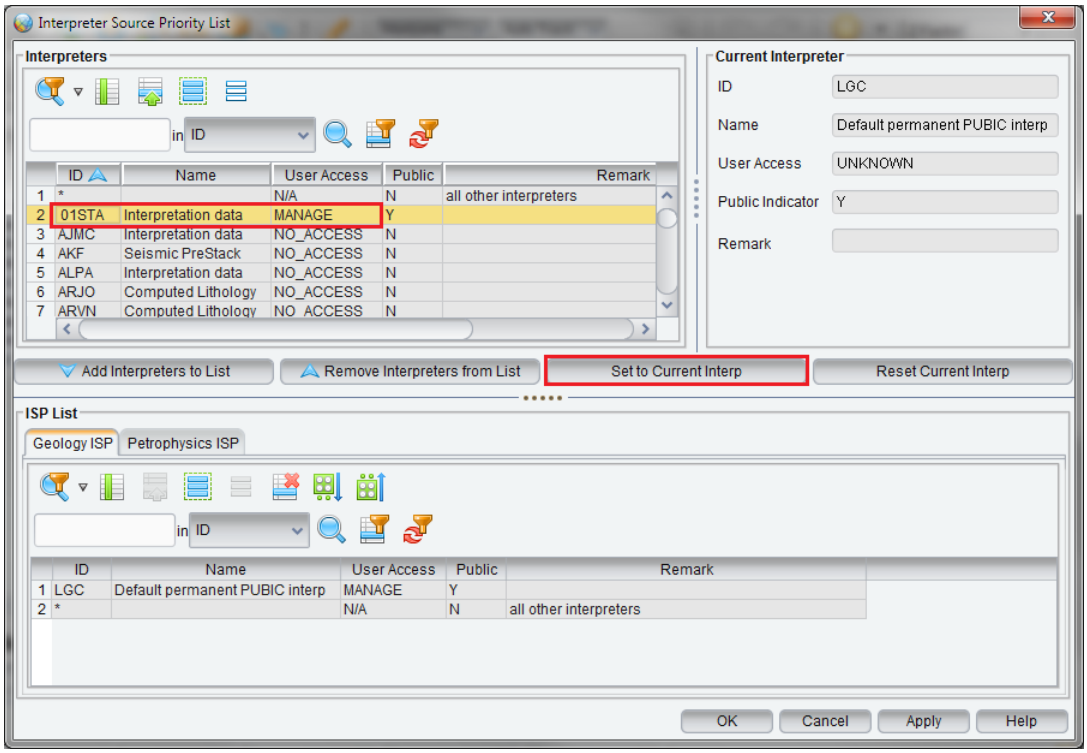
You will change Interpreter ID and edit the source priority list.

7. From the main *DecisionSpace* dialog, select **File > Interpreter Source Priority List...**.

The *Interpreter Source Priority List* dialog appears. The top left panel shows a list of all Interpreter IDs in the project database and four columns of details about each, as described above. The panel on the top right of the dialog shows details for the current interpreter.

The bottom of the dialog contains the interpreter entries that make up an Interpreter Source Priority (ISP) list. The list could contain LGC, the interpreter specified when starting this session.

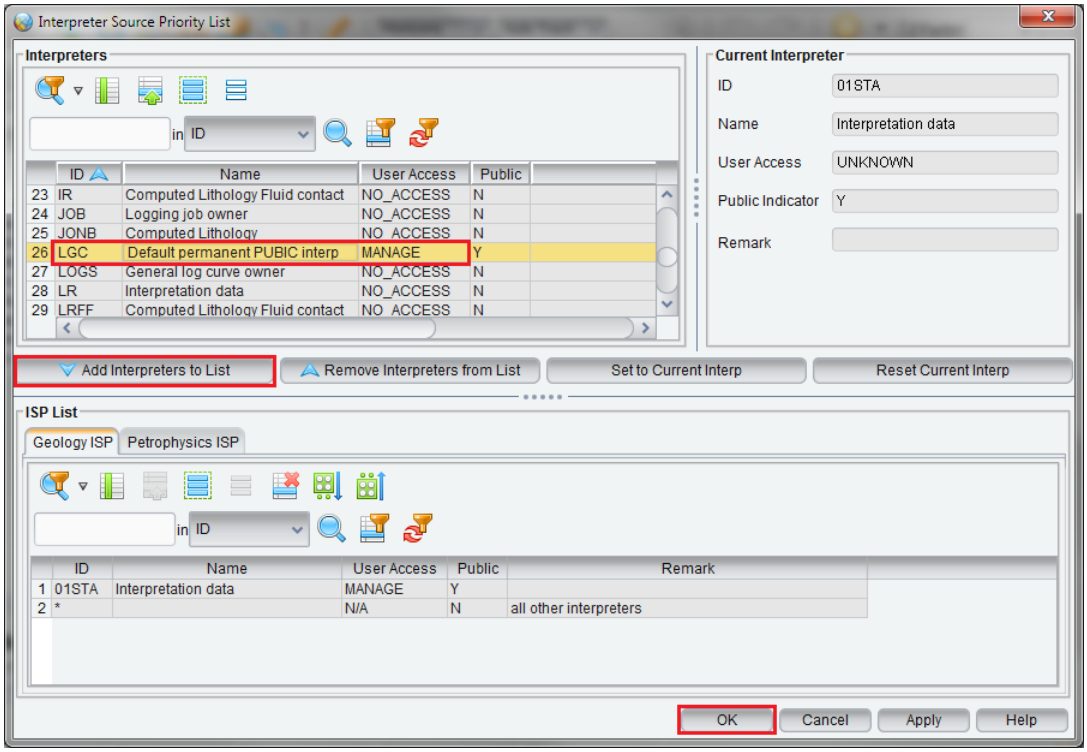
8. To set 01STA as the interpreter, highlight the **01STA** row in the Interpreters panel and click **Set to Current Interp**.



The 01STA ID appears in the Current Interpreter panel.

The ISP list is updated at the bottom of the dialog. By default, the current interpreter is the first entry. The previous Interpreter ID (LGC) may be second or it may be omitted; the last entry is *. The asterisk designation means that if no selected data are found for the priority listed Interpreters ID, the next data owned by any Interpreter ID will be used.

9. If Interpreter LGC is not on the ISP list, you can add it. Scroll down the Interpreters list and select **LGC**, then click **Add Interpreters to List**. Click **OK** to save the ISP list changes and close the dialog.



How Interpreter Priority Affects the View of Data

Interpreter source priority affects the faults and well data selected for display and use.

Assigning Fault Colors

Because fault colors are assigned by Interpreter ID, they are changed to the colors assigned by any new interpreter.

For example, when changing Interpreter ID, any new segments added to an existing fault are assigned to and owned by the newly selected interpreter. The existing fault segments assigned to that fault retain the original Interpreter ID.

Displaying Well Data

The DecisionSpace Geosciences suite uses the ISP list to display data owned by different interpreters. When you choose another session interpreter, DecisionSpace (OpenWorks) automatically selects data per the new interpreter source priority list. If required, it also uses the time-depth models per the new interpreter source priority list. Well surface picks are displayed in the colors assigned to the newly selected interpreter.

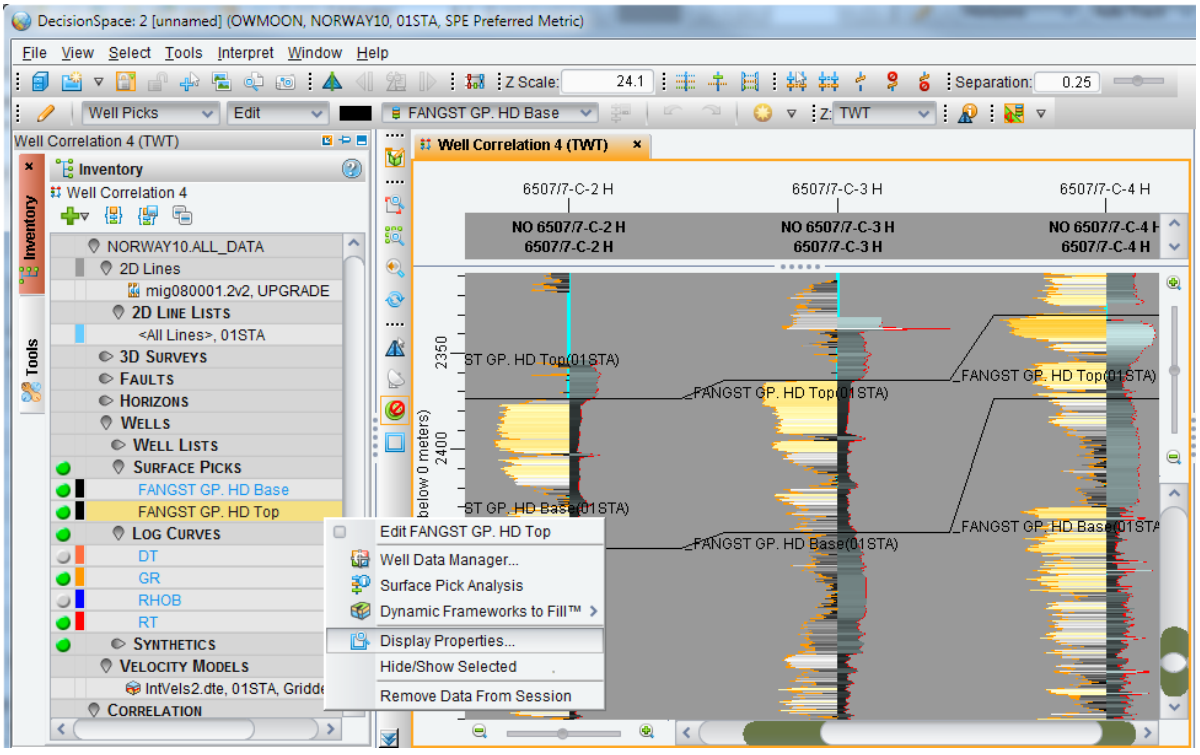
ISP Override

By design, the system will register the hierarchy of interpreters from the ISP list and display only the top most listed interpreter's surface picks. The ability to view each interpreter's surface pick marker simultaneously is a new feature in version 5000.10.0 and can be accessed through the *Display Properties* dialog.

You will not use this multiple interpreter pick display in an exercise. However, shown below are examples of the single and multiple pick displays in *Correlation* view.

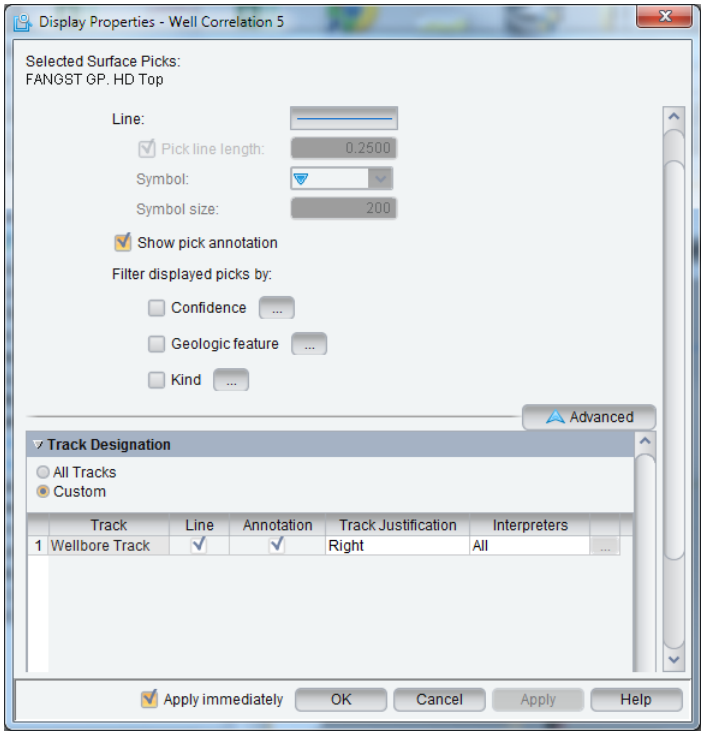
Access Display Properties... for a Surface Pick.

Single pick displayed for well 6507/7-C-3 H honors ISP hierarchy.



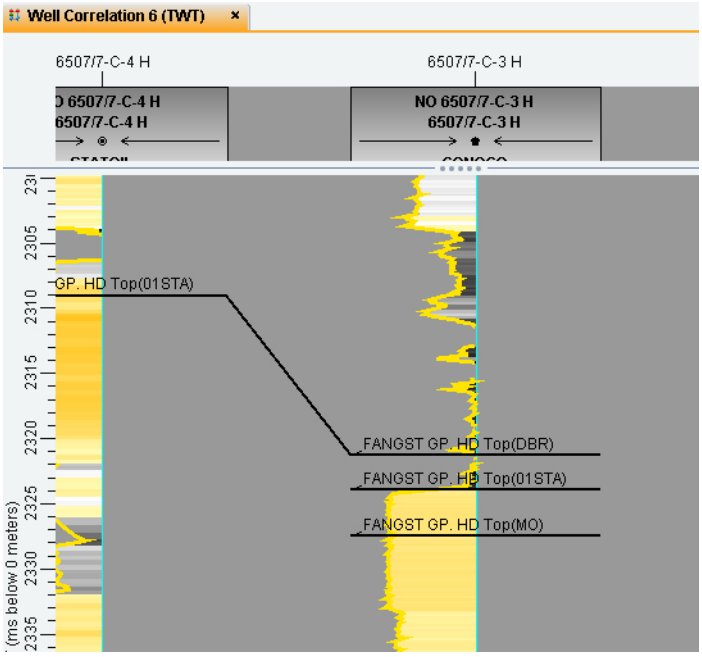
Additional ISP control resides under the Advanced sub-panel of the *Display Properties* dialog.

Customize Track Designation parameters to include <u>All</u> Interpreters.



An ISP override is applied to the *Correlation* view shown below.

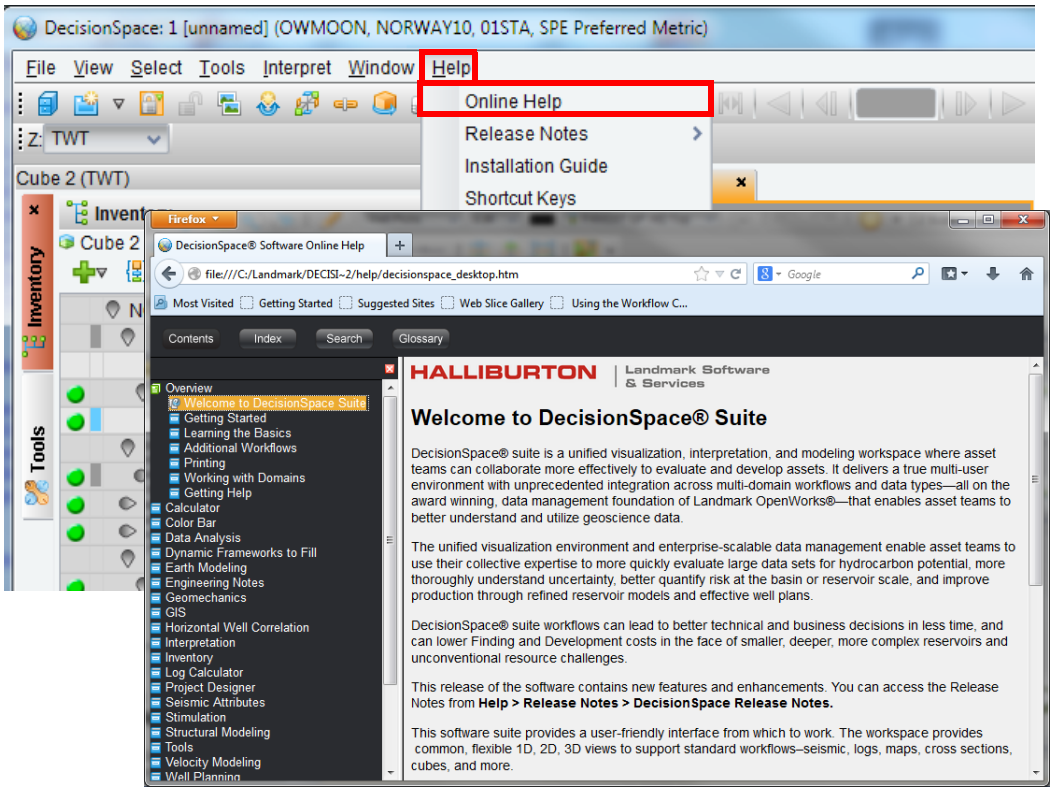
One Surface Pick, from each interpreter, is displayed as an example of ISP override.



Getting DecisionSpace Help

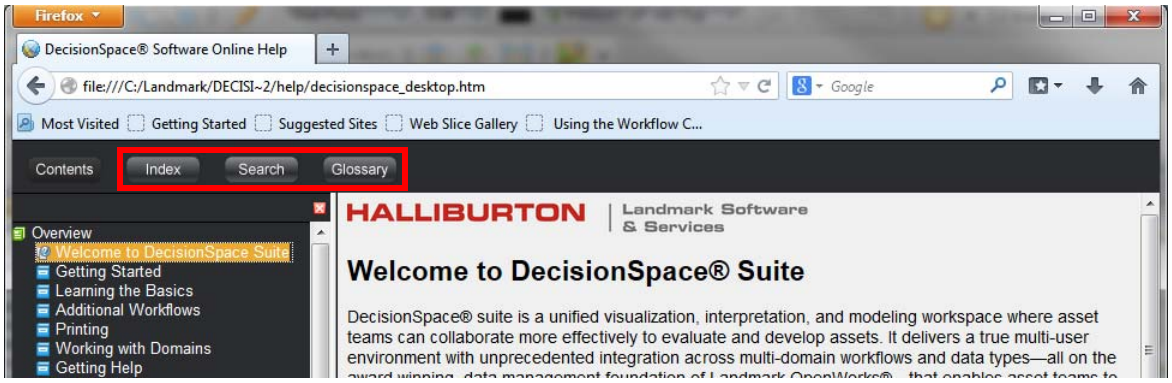
The final steps in this exercise show ways of getting help when you have questions.

10. In the menu bar at the top of the main window click **Help > Online Help**.

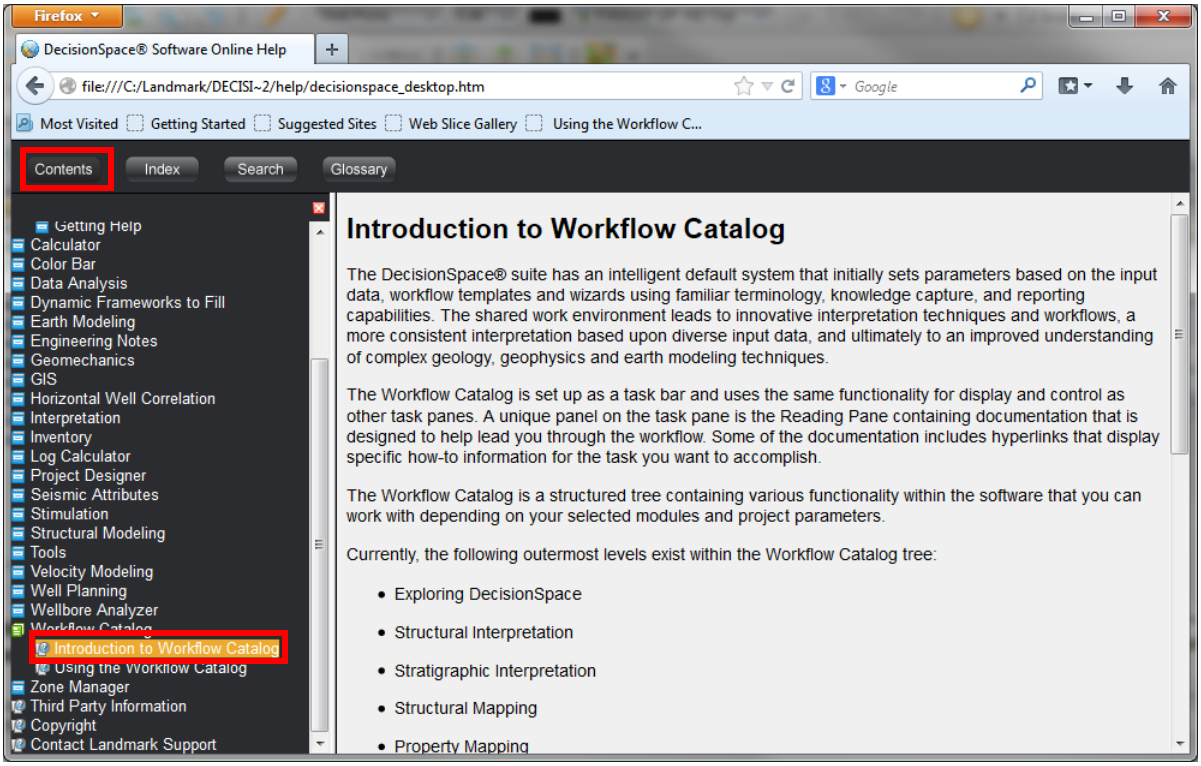


An internet browser containing documentation about the DecisionSpace Geosciences suite will open. You can explore the document in four ways: Index, Search, Glossary, and Contents.

11. In succession, click the **Index**, **Search**, and **Glossary** buttons to see how the left panel changes to allow you to find the topic that you need.

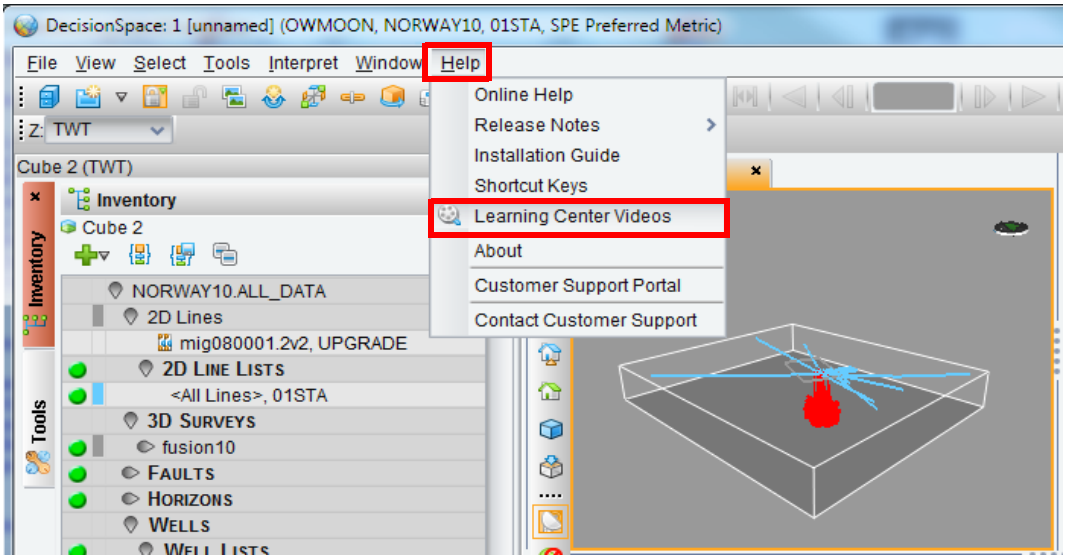


12. Click the **Contents** button, then near the bottom of the list click **Workflow Catalog > Introduction to Workflow Catalog**.



You can read about the intelligent default system that uses familiar terminology, knowledge capture, and reporting capabilities to initially set parameters based on input data, workflow templates, and wizards. You will investigate some of these functions in this class.

13. In the *DecisionSpace* dialog, click **Help > Learning Center Videos**. If you have time to watch a few minutes of the movie, do so.



14. **Close** the browser displaying the help content.

In the next exercise you will learn to load data and manipulate the display of loaded data.

Exercise 1.2: Selecting Data and Controlling the Scene

The DecisionSpace Geoscience suite allows you to quickly and easily view seismic and well data around a geologic or seismic feature.

Before beginning the exercise, spend a moment looking at the windows, tabs, and tiles. Throughout the class, you will visit most of these in more detail. Refer to the diagram on page 1-2 if you need to refresh your memory about the parts of DecisionSpace.

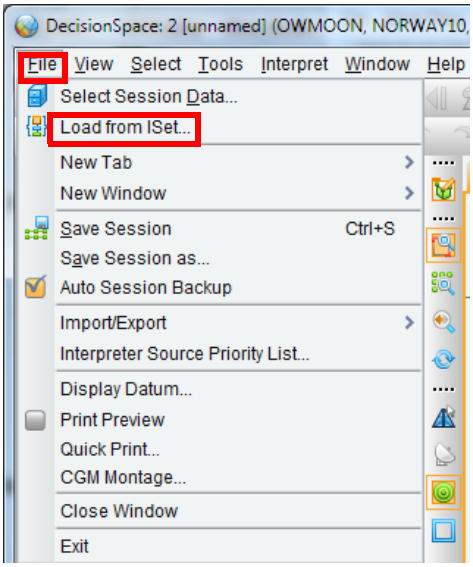
In this exercise, you will load data into your DecisionSpace session. You will first load data from an interpretation set (ISet) that includes 2D and 3D seismic data, horizons, faults, and well data. ISets, which are stored in the OpenWorks database, flag, or group, important session data. ISets are accessible to all interpreters who have OpenWorks access.

In the next chapter you will learn how to create ISets.

Displaying Data by ISets

1. Open DecisionSpace if it is not already open. See initial steps in Exercise 1.1 for details.

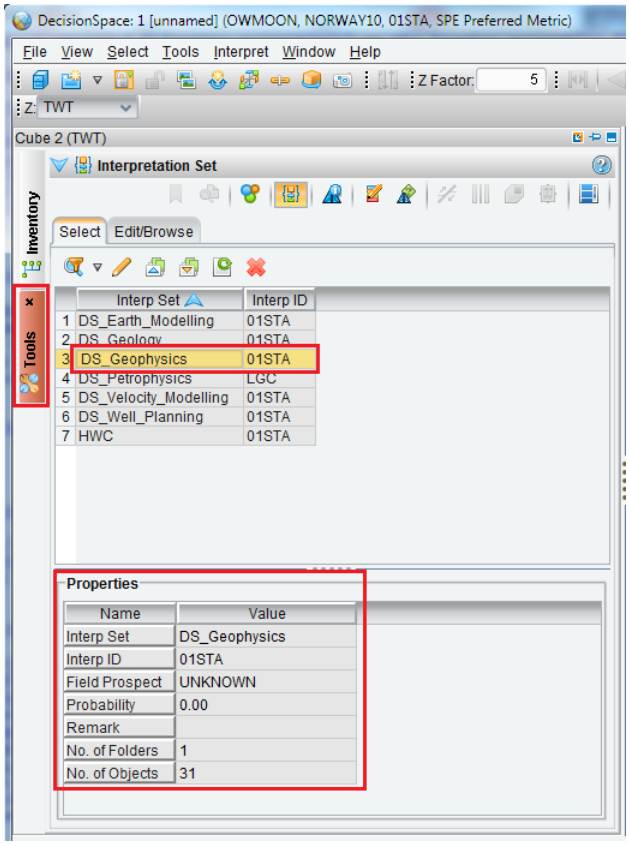
2. From the *DecisionSpace* window, select **File > Load from ISet...**.



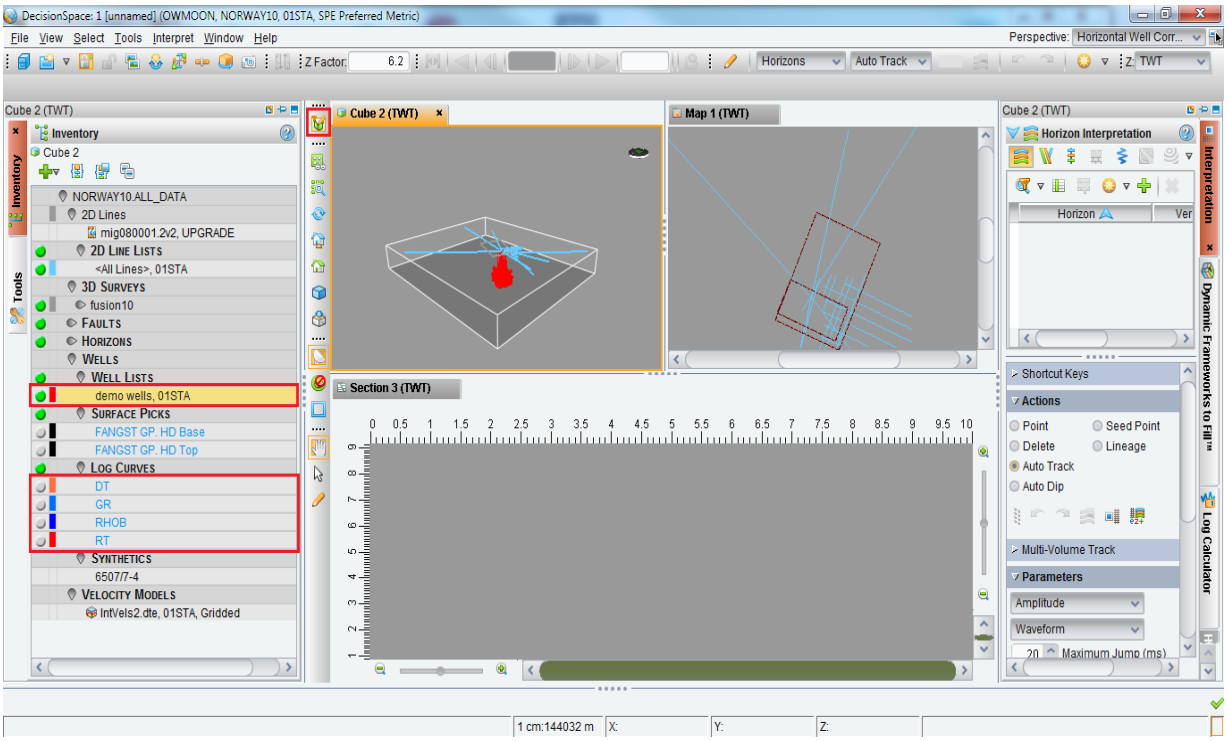
Note:

You can also access this by clicking the *Tools* task pane and selecting the **Interpretation Set** icon( ).

3. In the (left or right) task pane on the **Tools** tab, select the **DS_Geophysics** Interpretation Set. Summary information for the ISet will appear in the Properties area in the lower part of the pane. Click the **Load Data To Session** icon ( ).



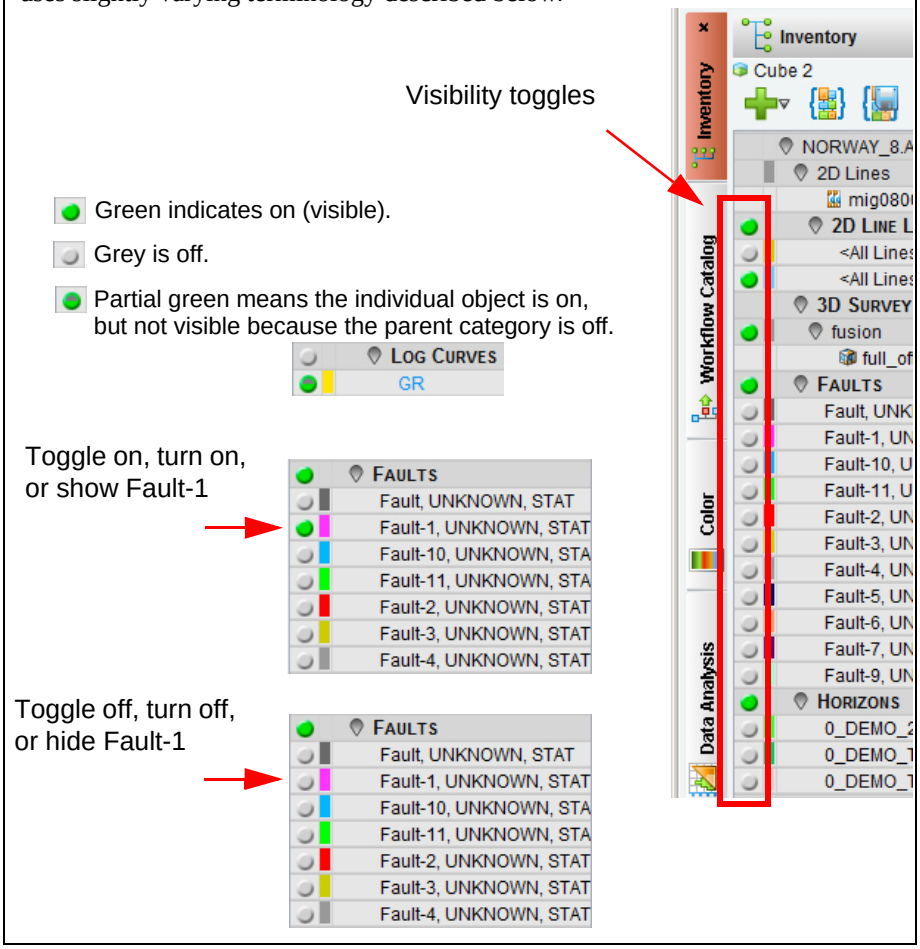
4. Click the **Cube** tab to make the *Cube* view active. Click the **Inventory** tab (usually left task pane) and toggle on **Well Lists** and the **demo wells**, **01STA** object. Toggle off the **Log Curves** for now.



In this and subsequent figures, your inventory may differ slightly from the one shown.

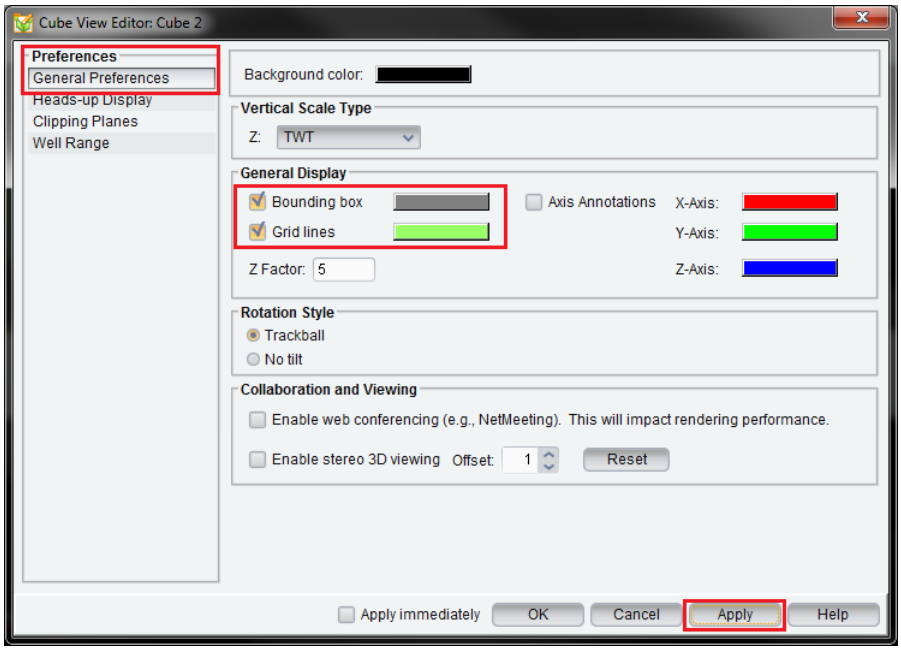
Note:

Toggles in the *Inventory* control data visibility in all views. You can hide or show entire data categories (types) and individual objects within a category. This manual uses slightly varying terminology described below.

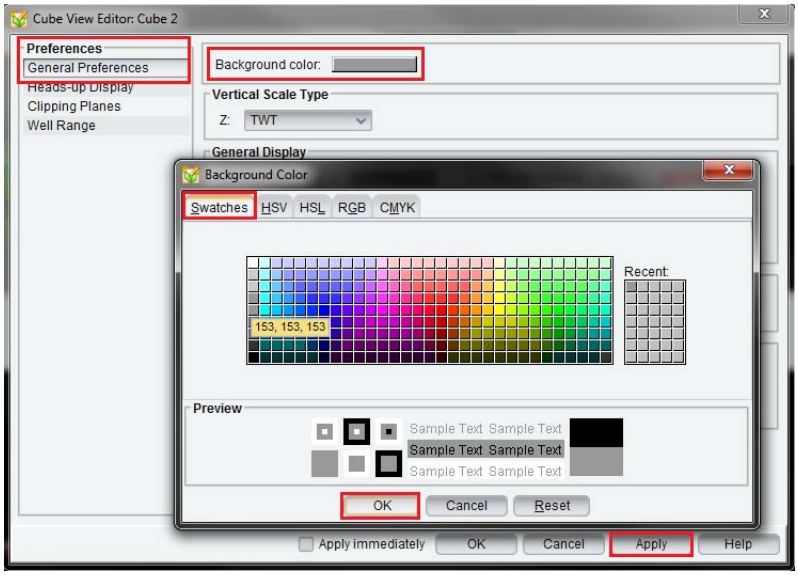


5. Click the **View Editor** icon ( ).The *View Editor* dialog appears. Click ***General Preferences*** under *Preferences*.

6. In the *General Display* section, select the **Bounding box** and **Grid lines** check boxes and see how your *Cube* view changes. Experiment with toggling on/off the bounding box and bounding grid. You can also change the color of the bounding box and grid by clicking the colored box to the right of the toggle box.



7. Click the colored bar adjacent to the **Background color** option. The *Background Color* window displays. On the *Swatches* tab, select **Grey** (153,153,153) and press **OK**.



Note:

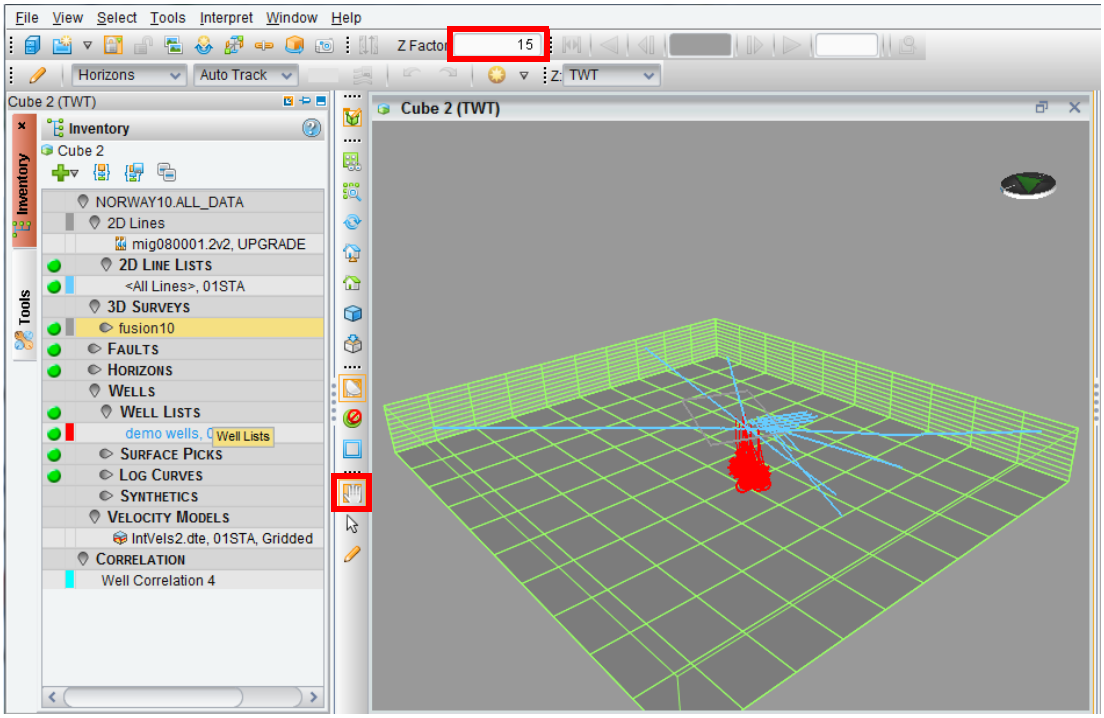
From this point forward, the manual uses a gray background for all views to improve the printed image. You may continue with your preferred background color. Color discrepancies between the manual pages and your monitor are not important.

8. In the main *DecisionSpace* window, with *Cube* view active, make sure the **Pan/Zoom/Rotate** mode is on. If necessary, click the ( ) **icon** (see image below). **MB1-drag** to rotate the scene.

9. **MB2-drag** to pan (move horizontally or vertically) the scene.

10. Zoom the display by simultaneously **MB1 + MB2-drag** up and down (vertical motion on your monitor). Move the mouse down to zoom in and up to zoom out. You can also zoom by turning the scroll wheel (if you have one on your mouse).

11. Use the **vertical scroll bar** in the heads up display (compass) to change the vertical exaggeration. Note update to the **Z Factor:** readout in the horizontal tool bar near the top of the window.

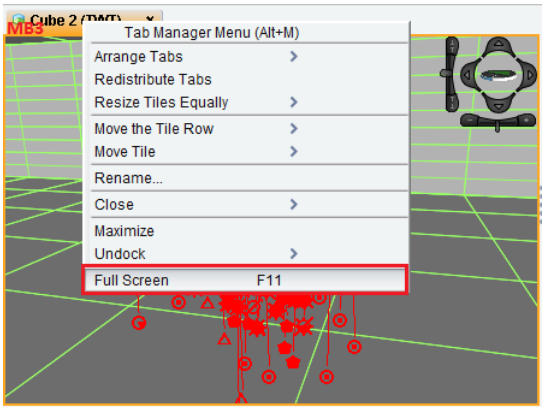


You can also navigate the *Cube* view with the heads up display. The small arrows around the compass translate the image. The horizontal scroll bar zooms.

Note:

If you prefer to not allow your cube view to tilt off of the main x, y, and z axes, you can select the option to have **No tilt** in the *Rotation Style* of the *General Preference* section of the *Cube View Editor*.

12. On the *Cube* tab, **MB3 > Full Screen** to display in Full Screen mode. Alternatively, press the **F11** hot key.

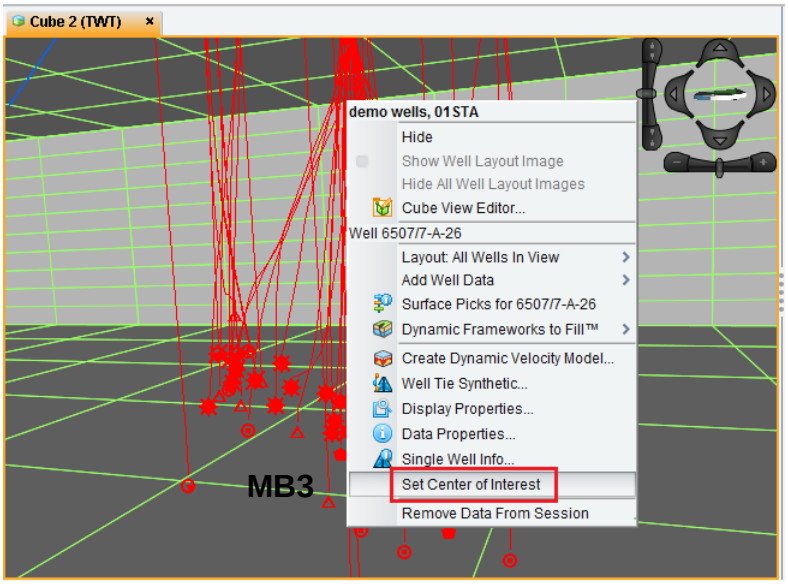


13. Press **F11** to exit Full Screen mode.

    All the same scene manipulation controls exist in Full Screen mode.

14. **MB3** one of the **wells** near the middle of the display and select **Set Center of Interest**. The display will now rotate around the

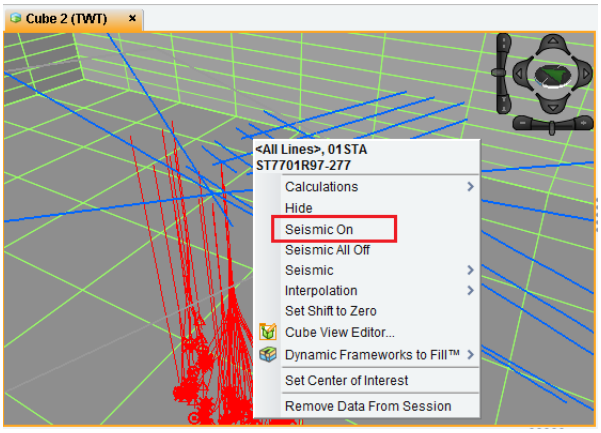
designated point, not the middle of the entire display. **MB1-drag** to confirm this change in center of rotation.

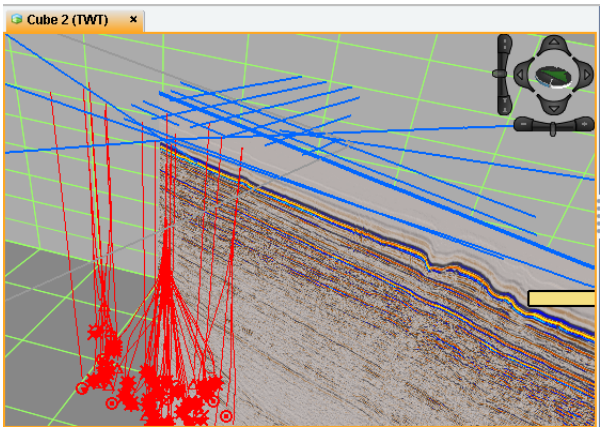


Note:

You may also hit the hot key <m> to set the Center of Interest.

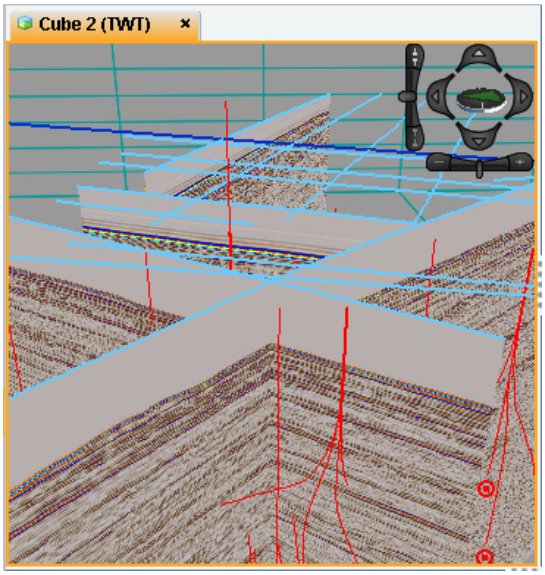
15. To display 2D seismic in the *Cube* view, hover over a **2D line** and **MB3 > Seismic On**. Alternatively, you can **MB2** the **line** you want displayed.





Most of the regional 2D lines in this project are many kilometers long.

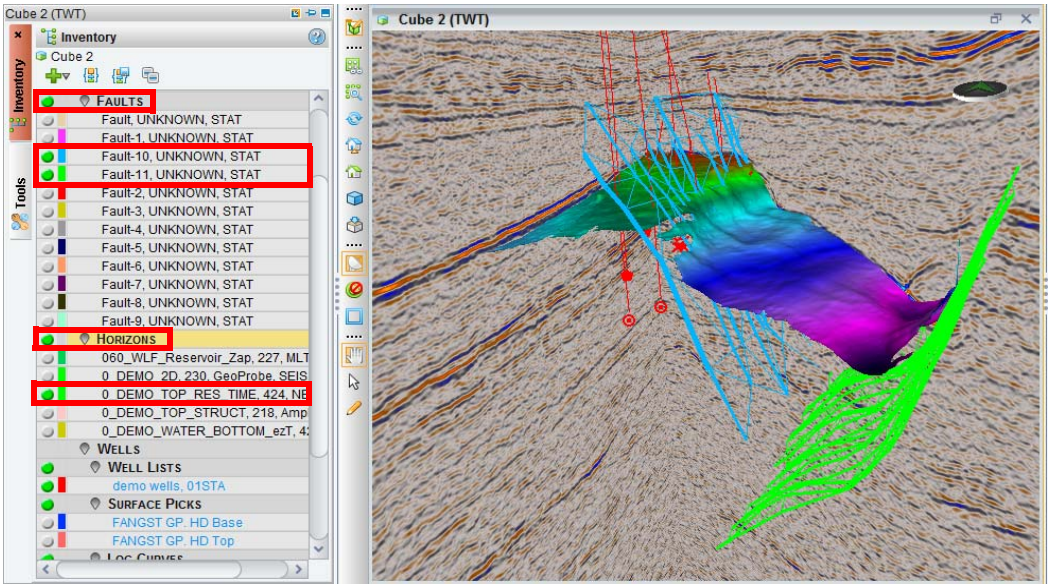
16. **MB2** on a few more 2D lines to toggle them on.



You may need to see an existing interpretation during your data reconnaissance. This can provide insight into the structure and potential plays in the area, and you can build on this existing interpretation instead of duplicating previous efforts. You will display (toggle on) a previously interpreted horizon and two faults.

17. Make sure the ***Cube*** view is active. In the *Inventory*, expand (if needed) the **FAULTS** data type and toggle on **Fault-10** and **Fault-11**. In the same way open the **HORIZONS** data type and toggle on the **0_DEMO_TOP_RES_TIME** horizon.These objects will

appear in the cube display. Using mouse buttons and heads-up display, adjust the display so you can see them better.



In the next exercise you will load more data.

Overview: Select Session Data

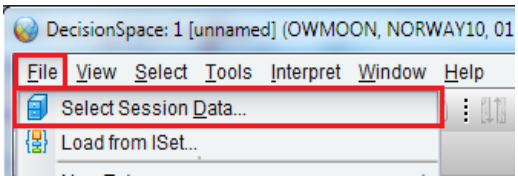
In the previous exercise, you worked from an existing ISet. In the next exercise you will select and load data from the project database. This overview summarizes how you can select data, including query of the database, sorting, and selection of the data that you need for your interpretation session.

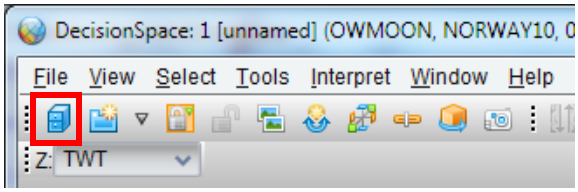
Selecting Data

You can add data to your session by two main methods.

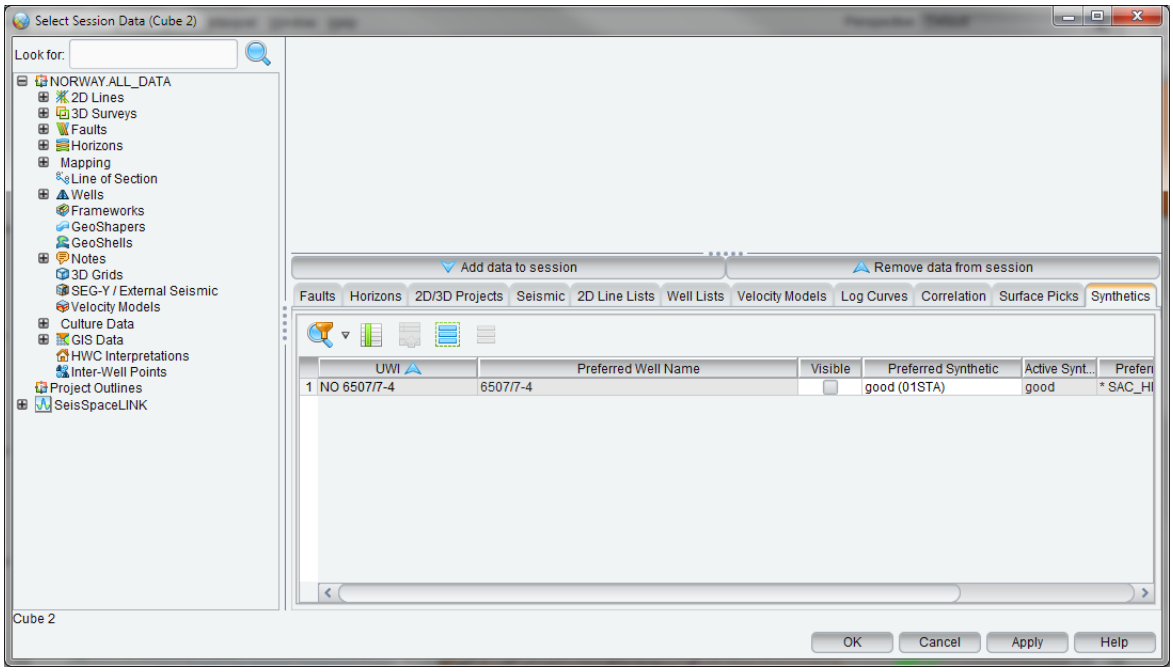
Data Selection - Method 1

This method allows you to add data to any active view. You initiate data selection by **File > Select Session Data**... or by clicking the **Select Session Data** icon ( ) on the main tool bar.





This will launch the *Select Session Data* dialog (shown below).



When you open the *Select Session Data* dialog in a new session, the top right panel is blank. A list of available data items appear at the left of the dialog. When you click a data type in the left panel, it populates the list of all data at the top right of dialog. When you select data from here and click the **Add data to session** button, the items move to the bottom of the list in the Select *Session Data* dialog, and tabs appear for each data category. Additional tabs are added at the bottom each time you choose or create another kind of data.

You can move data items from the top available list to the bottom selected list by several ways:

- Select one or more data items in the top right of the *Select Session Data* dialog and click the Add data to session button.

  The data items appear in the bottom list, and the ones that are checked Visible will appear in the view. Most items are automatically checked Visible when you are viewing a map or section. You must then click Apply or OK.

- Double-click a data item.

  The double-clicked item moves into the list at the bottom of the *Select Session Data* dialog. You can toggle Visible, if necessary, then click Apply or OK to finish.

- Drag one or more data objects.

  — To move a single selection, select a data item at the top of the *Select Session Data* dialog, and MB1-drag-and-drop it to map or section view.

  — To move multiple objects in the upper area of the *Select Session Data* dialog, MB2-drag-and-drop the items to map or section view. MB1 to make the items visible.

Note:

Drag-and-drop is the fastest way to add session data, but you cannot use this method for ZGF files.

To select multiple data items, do one of the following:

- To select several items, click the number to the left of an object name and drag the cursor up or down.

- To select contiguous items, press and hold the Shift key and click the items for display. Alternatively, press and hold the Ctrl key and MB1 the items.

- To select all items, click the **Select All** icon ( ) at the top of the *Select Session Data* dialog.

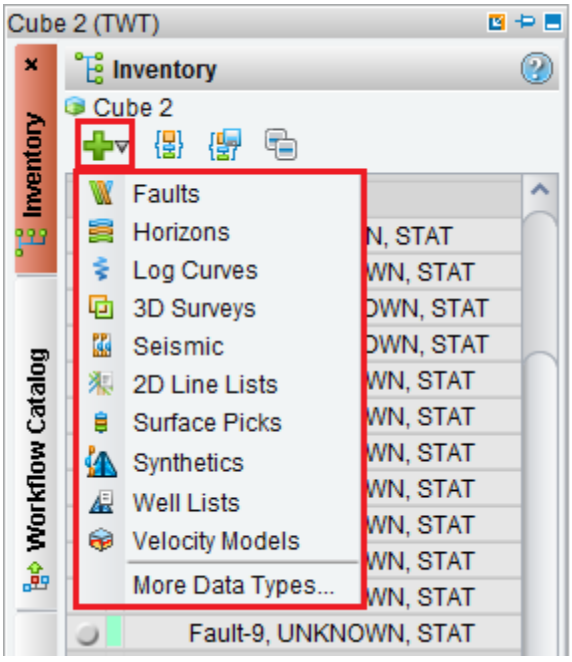
The data is added only when you click the Apply or OK button.

To remove data from the session, select the object in the bottom part of the *Select Session Data* dialog and click Remove data from session. If you do not also click Apply, a dialog will appear asking you to confirm you want the data removed.

To reiterate, additions to, or subtractions from, session data occurs when you click Apply or OK. In other words, updates to the session data population requires confirmation on the *Select Session Data* dialog.

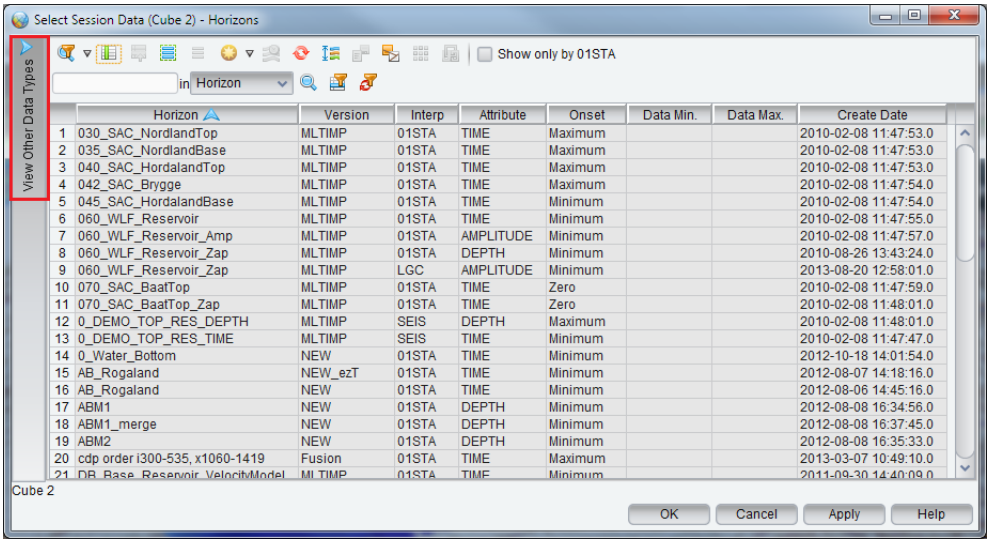
Data Selection - Method 2

Another important data selection method is available in the active Inventory tab. Click the **Add more data** icon ( ) to present a pull-down menu that shows the types of data available.

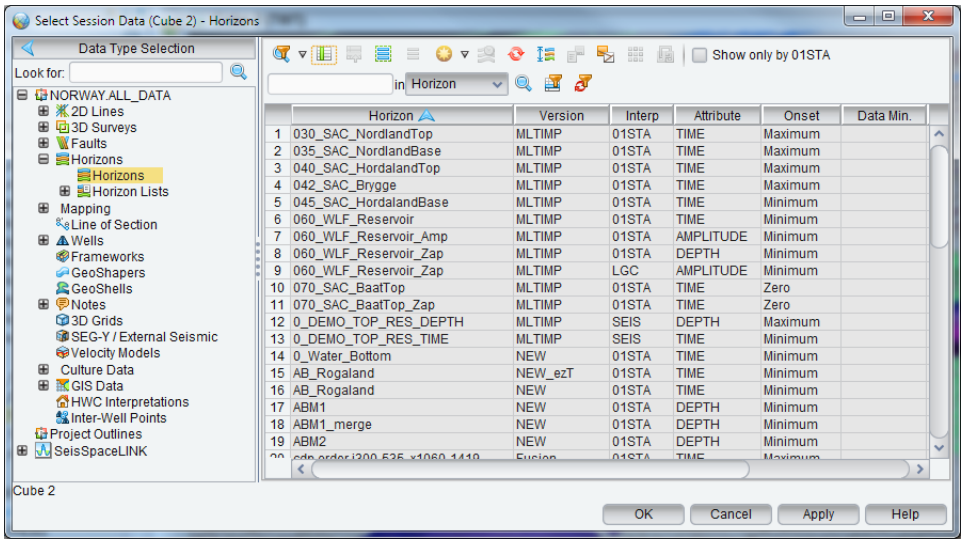


The drop-down list is dynamic and displays the last ten loaded data types.

When you select a data type, the *Select Session Data* dialog opens. The *Select Session Data* dialog associated with Method 1 (above), is much more complex than the relatively simple dialog associated with Method 2, which shows only one type of data. For example, the figure below shows only a list of available horizons.



You can click the View Other Data Types button on the *Select Session Data* dialog to expand access to different data types.



Simply select data in the list and click **Apply** or **OK** to add the data to the *Inventory* and make it available in any of the views. Alternatively, you can drag and drop the data into the session.

Selecting 2D and 3D Projects in the Session Manager

Selecting and Display 2D Line Lists

If you are starting a new session the quickest way to display 2D lines is to select them in the *Session Manager*. You can do this on the *Select Session Data* dialog. Simply select 2D Lines and 2D Line Lists, then drag-and-drop the data into the desired screen.

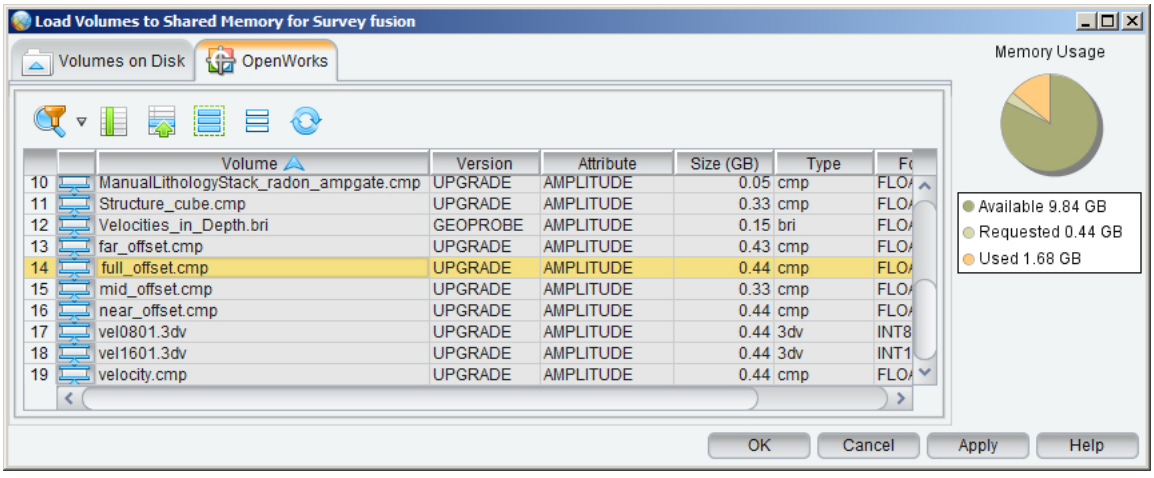
Selecting 3D Surveys

The DecisionSpace Geosciences suite allows you to work with multiple seismic surveys. When you start a new session, the *DecisionSpace Session Manager* dialog requires that you select an OpenWorks project. All valid seismic surveys associated with the current OpenWorks project are available in the data tree. Using the nodes, you can expand each survey to reveal icons for Seismic. Faults and horizons are stored under the OpenWorks project name for the R5000 data model.

Displaying Shared Memory

Disk file access is the default. This is good for a single display or occasional changes in views, but for high-speed access to seismic data volumes during rapid display changes, you can load the data into computer memory (RAM).

The amount of seismic in DecisionSpace-defined shared memory is limited by the amount of memory on your computer. DecisionSpace keeps track of the amount of memory used and the amount available on your computer, and displays this as a pie chart in the *Load Volumes to Shared Memory* dialog (shown below).



	Volume	Version	Attribute	Size (GB)	Type	Fc
10	ManualLithologyStack_radon_ampgate.cmp	UPGRADE	AMPLITUDE	0.05	cmp	FLO
11	Structure_cube.cmp	UPGRADE	AMPLITUDE	0.33	cmp	FLO
12	Velocities_in_Depth.bri	GEOPROBE	AMPLITUDE	0.15	bri	FLO
13	far_offset.cmp	UPGRADE	AMPLITUDE	0.43	cmp	FLO
14	full_offset.cmp	UPGRADE	AMPLITUDE	0.44	cmp	FLO
15	mid_offset.cmp	UPGRADE	AMPLITUDE	0.33	cmp	FLO
16	near_offset.cmp	UPGRADE	AMPLITUDE	0.44	cmp	FLO
17	vel0801.3dv	UPGRADE	AMPLITUDE	0.44	3dv	INT8
18	vel1601.3dv	UPGRADE	AMPLITUDE	0.44	3dv	INT1
19	velocity.cmp	UPGRADE	AMPLITUDE	0.44	cmp	FLO

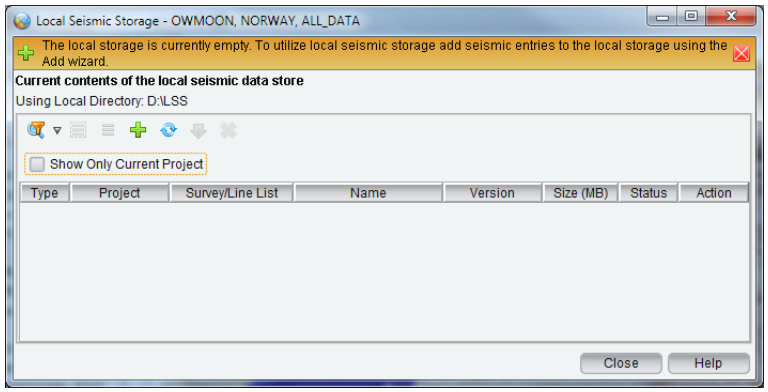
In the next exercise you will experiment with increasing the display speed of seismic data when you have the seismic loaded into shared memory.

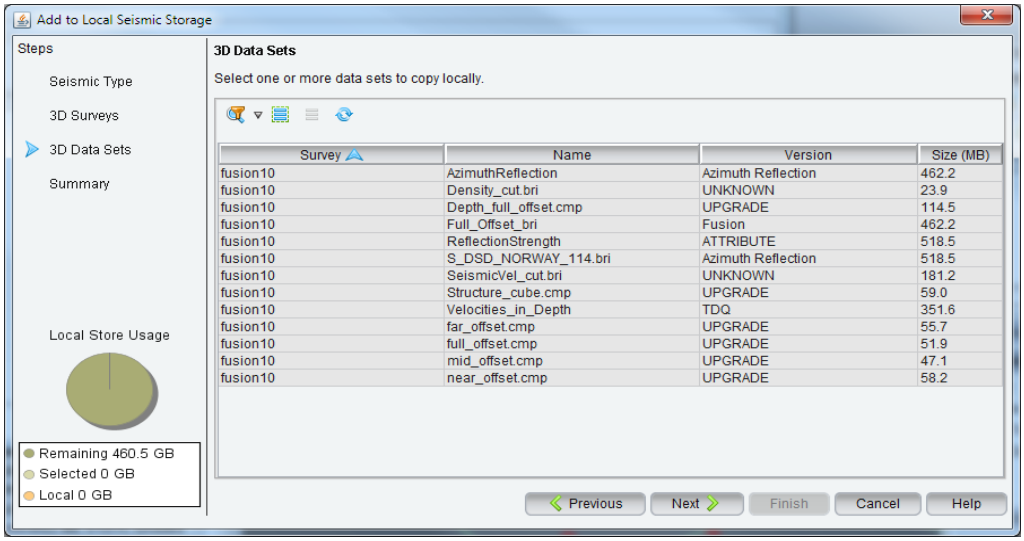
Storing Seismic on Local Directories

If you are working on a system with seismic data stored on a centralized filer (server), you may experience slow display speeds because of the time needed for network access to the filer. Accessing seismic data will likely be faster when the data is read from a local directory, as opposed to a server.

With the *Local Seismic Storage* tool, you can specify that the data sets you frequent more often are copied to a local disk. Both 2D and 3D seismic data can be thus localized. After the data has been copied to a local disk, the software automatically references the local version when you access the data set, and you have control over when the data set is updated or removed.

To use local seismic storage, create a directory on your computer and a system environmental variable set. From the main menu you can access Tools > Local Seismic Storage to control the local files, as shown below.





For more information and detailed instructions on how to use local seismic storage, search for that topic in the online help.

In this class you will not work with local seismic storage because your computers are not accessing a centralized filer.

Exercise 1.3: Loading Data for Reconnaissance

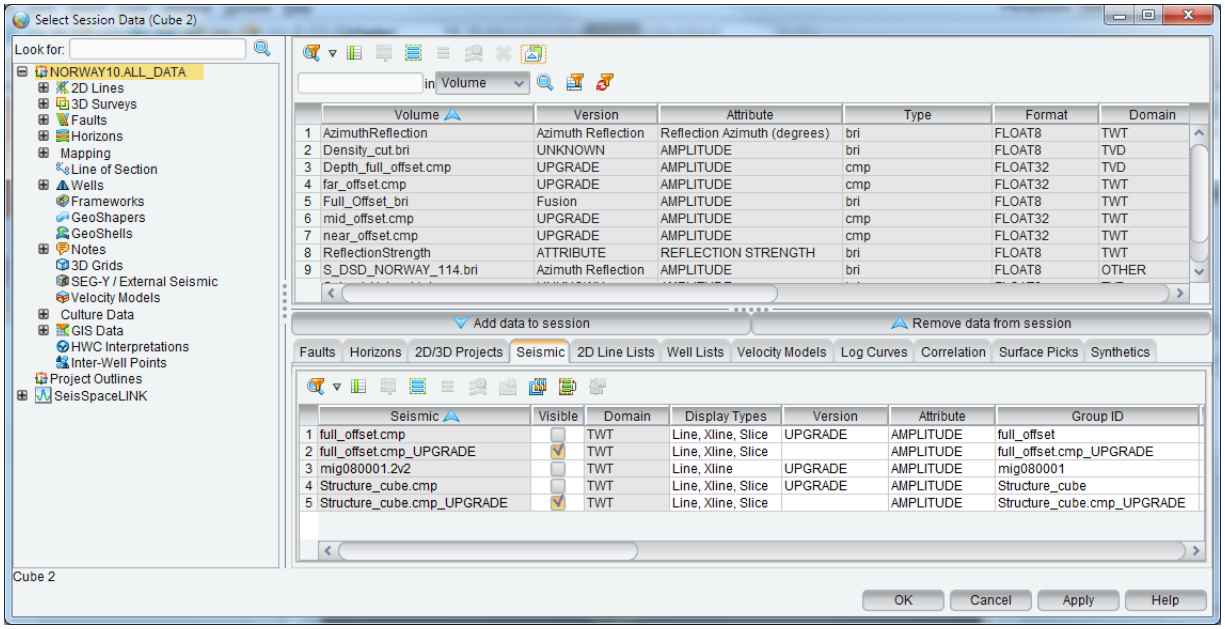
The linked *Map*, *Section*, and *Cube* views of DecisionSpace enable rapid regional QC of *Inventory* and session data. This section will describe a few different seismic QC display techniques.

You select data from a single place – the *Select Session Data* dialog. As noted in the overview (above), you can access and configure it in two ways. You will use both methods to add multiple data types to the session and set parameters for the display of that data.

Displaying Cultural Data and 3D Seismic

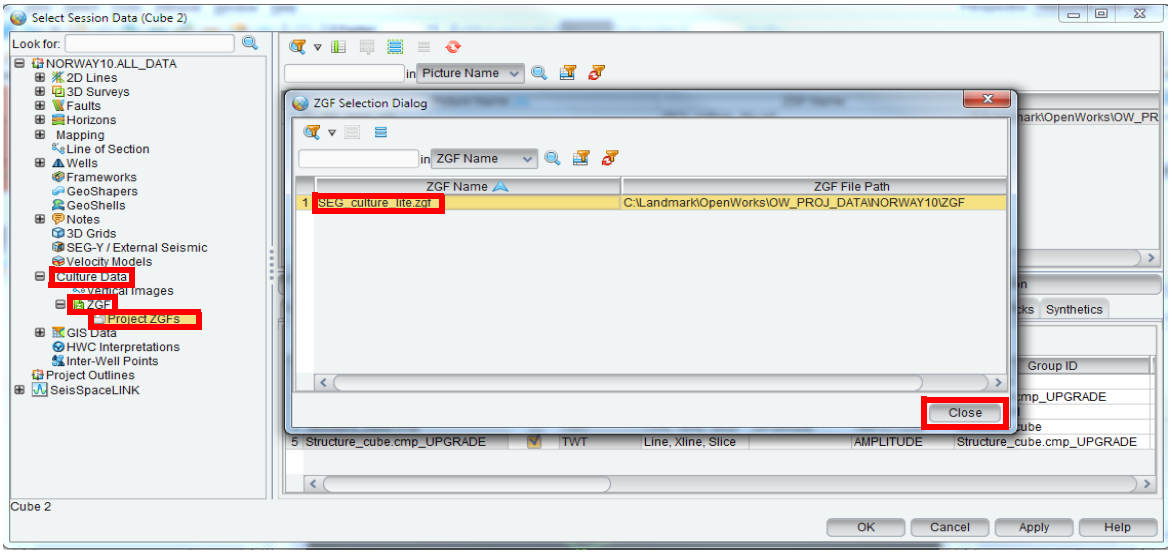
1. In the *DecisionSpace* window, click the *Map 1* tab to activate *Map* view. Note that the *Inventory* designation in the task pane changes to the name of the active *Map* view. Click the **Select Session Data** icon ( ) on the main tool bar.

The *Select Session Data* dialog also displays the name of the active tab. The left side of the window displays a tree of all data objects. Some categories, such as Wells, are expandable. Use the node ( ) beside the folder to expand or collapse the tree.

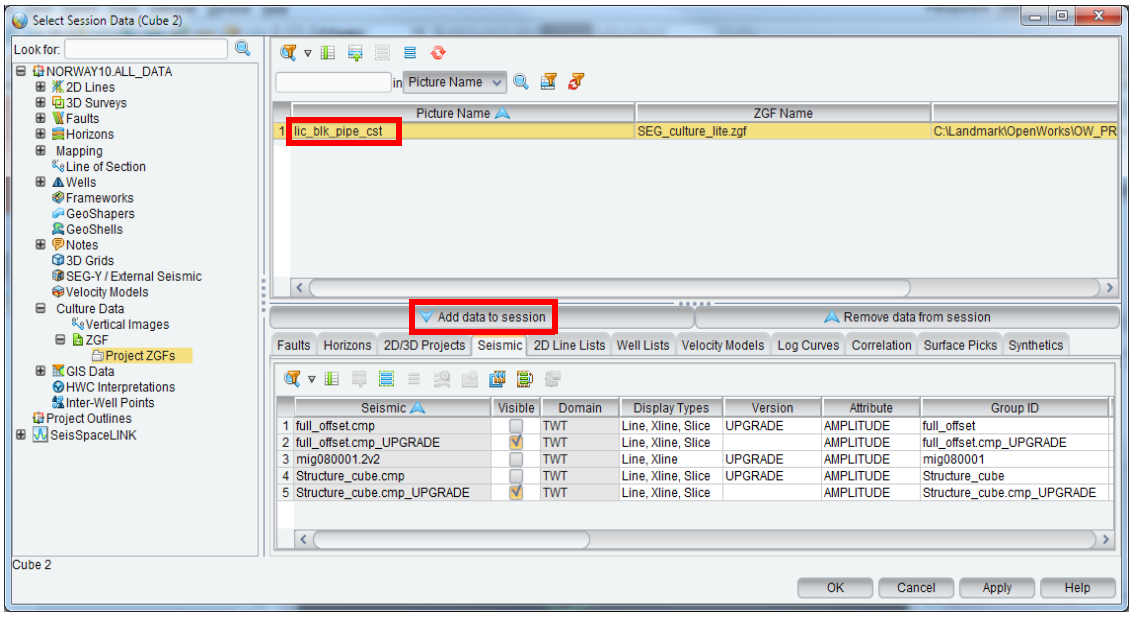


You will now load cultural data.

2. Select (expand) **Culture Data > ZGF > Project ZGFs**. Click the **Project ZGFs** folder. The *ZGF Selection* dialog appears. Select **SEG_Culture_lite.zgf**. It appears in the upper-right list of the *Select Session Data* dialog. Click **Close**.

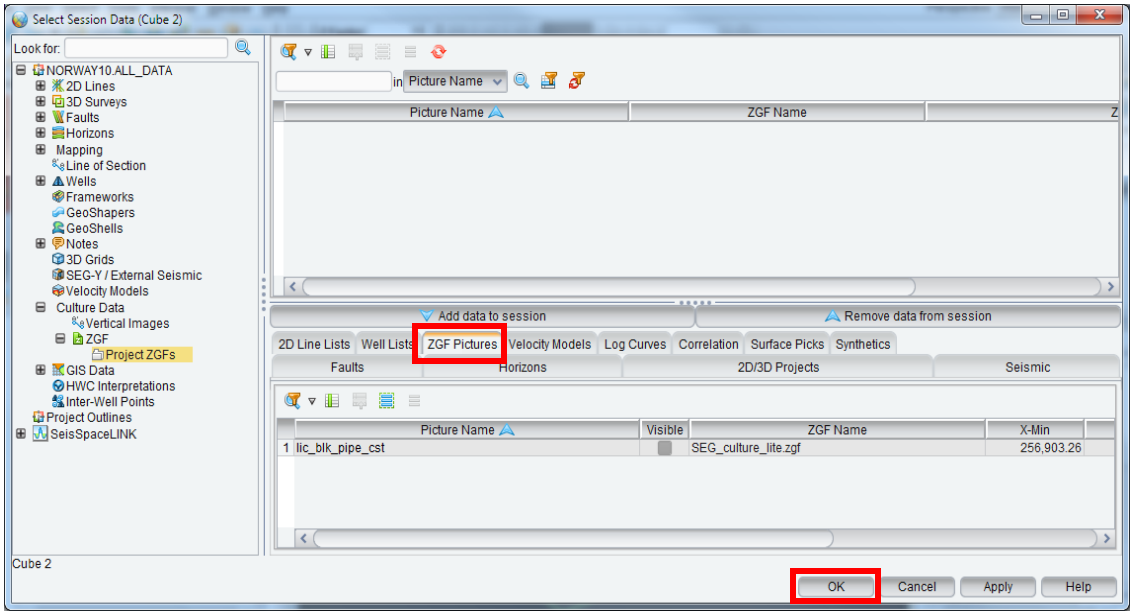


3. In the *Select Session Data* dialog, select **SEG_Culture_lite.zgf** and **Add data to session**.



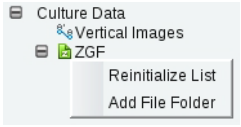
A new tab, ZGF Pictures, is created in the lower right area of the *Select Session Data* dialog. The zgf file moves to this list.

4. Click **OK** to load this file to the session inventory.



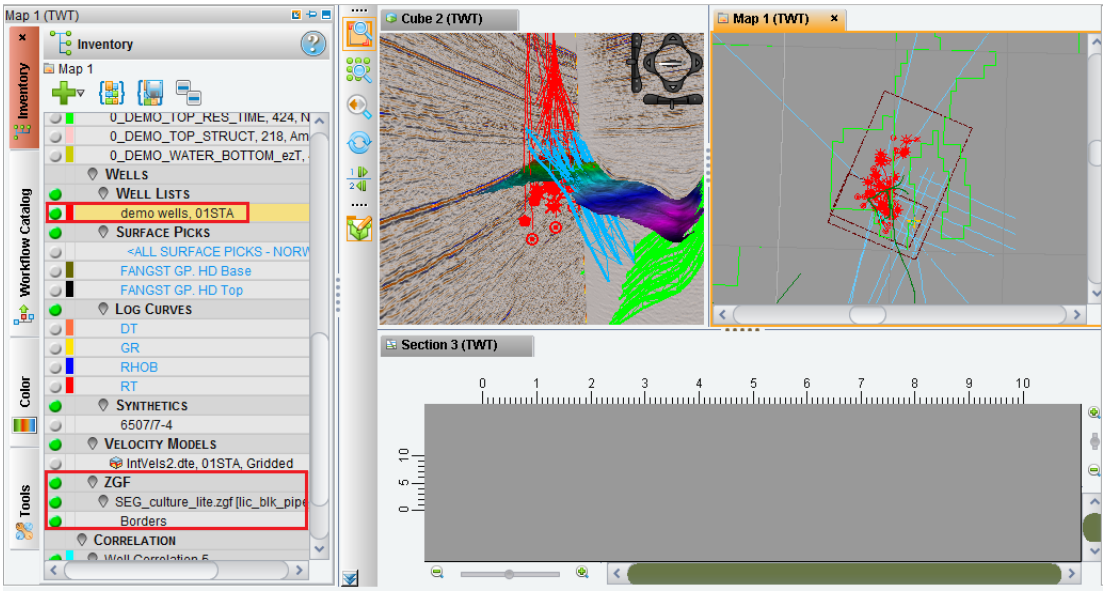
Note:

ZGF data may not always reside under your OW_PROJ_DATA structure. These files can be located anywhere on your file system. If you require ZGF data in your session, you can direct DecisionSpace to look in other directory locations. In the *Select Session Data* dialog on the ZGF node, **MB3 > Add File Folder**. When you select the ZGF data folder, the files therein are made available to your session.

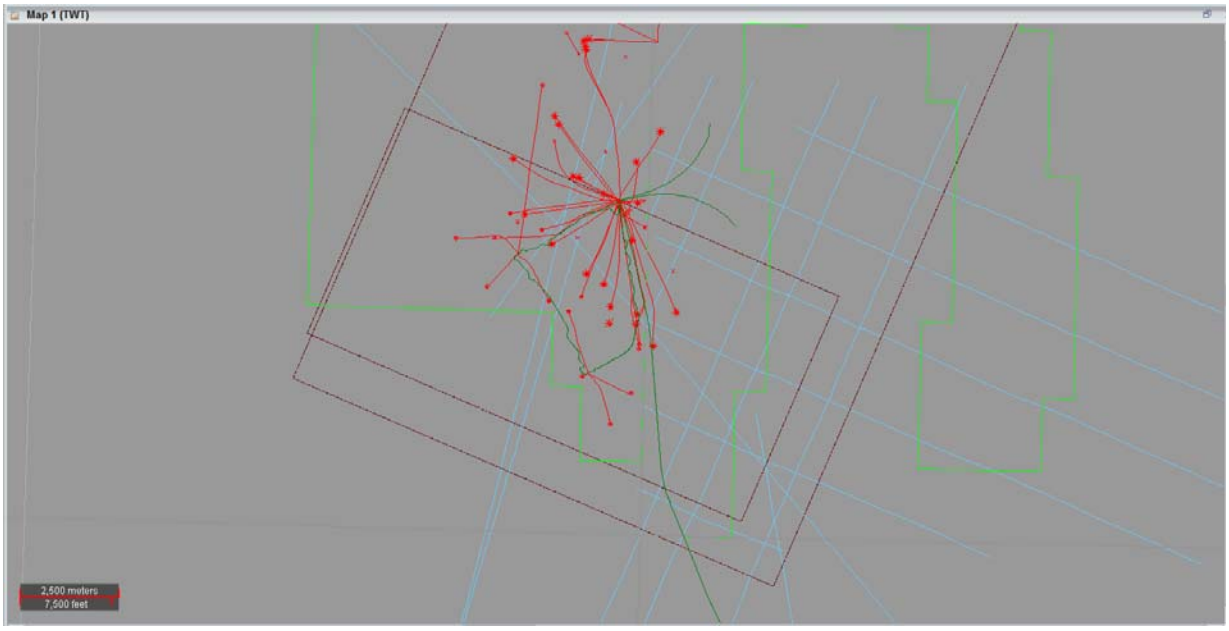


Because the *Map* view tab was active, the SEG_Culture_lite.zgf was automatically added to that view.

5. Toggle on the well list named **demo wells, 01STA**.

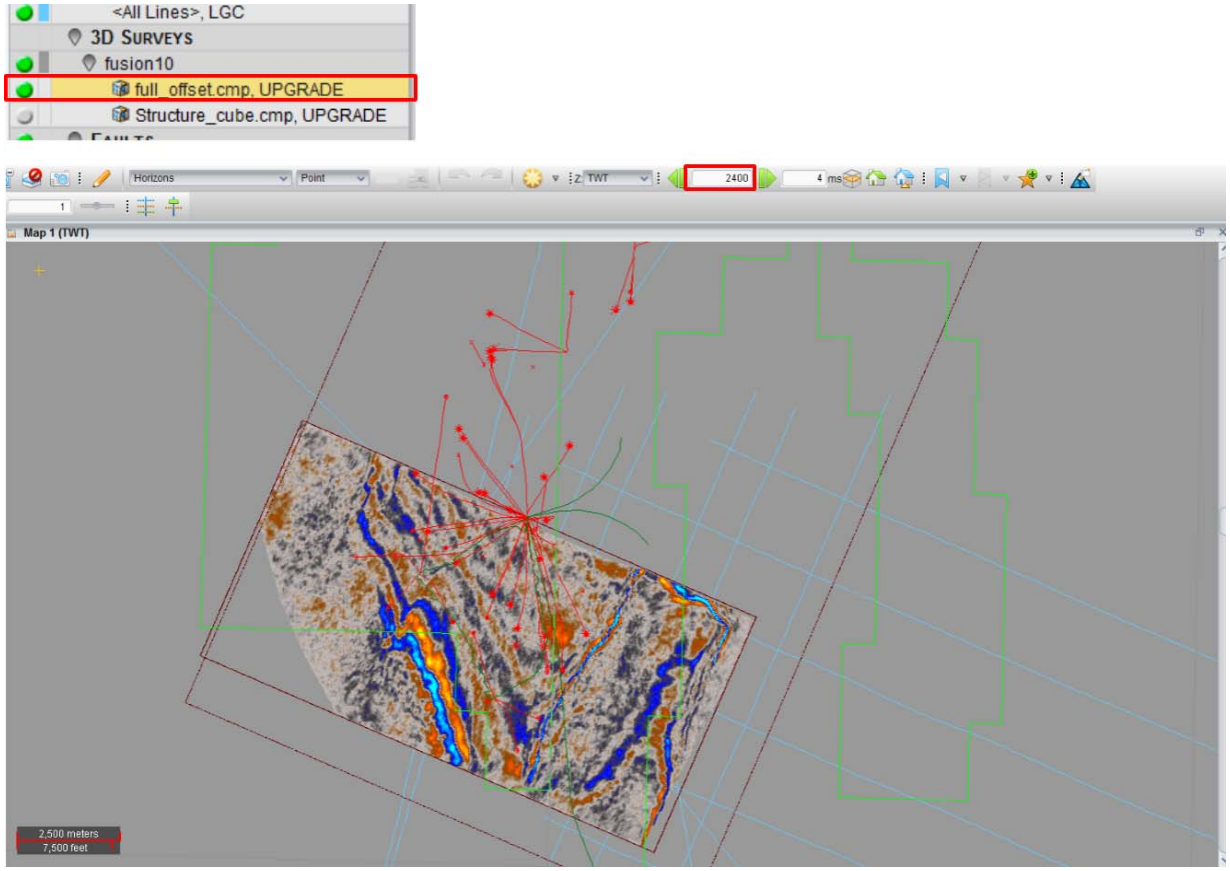


6. Double-click the ***Map*** tab to maximize the view. **MB2** the **Show All** icon ( ) to zoom out and view the entire map. Click the **Area Zoom In** icon ( ) and adjust your view (**MB1-drag** stretchy box zoom) to the approximate size of the one below to the right. You can also zoom with **MB1-MB2-drag** vertically.



7. In the *Inventory* task pane, toggle on **full_offset.cmp** under **3D Surveys > fusion10**. At the top of the *DecisionSpace* window, type "**2400"** (ms) in the Navigation tool bar, then press <**Enter**>.

A time slice at that value will appear on the map.



8. Double-click the **Map top border** or click the **Restore** icon ( ) at the top right to restore your tile arrangement.

Working in Section View

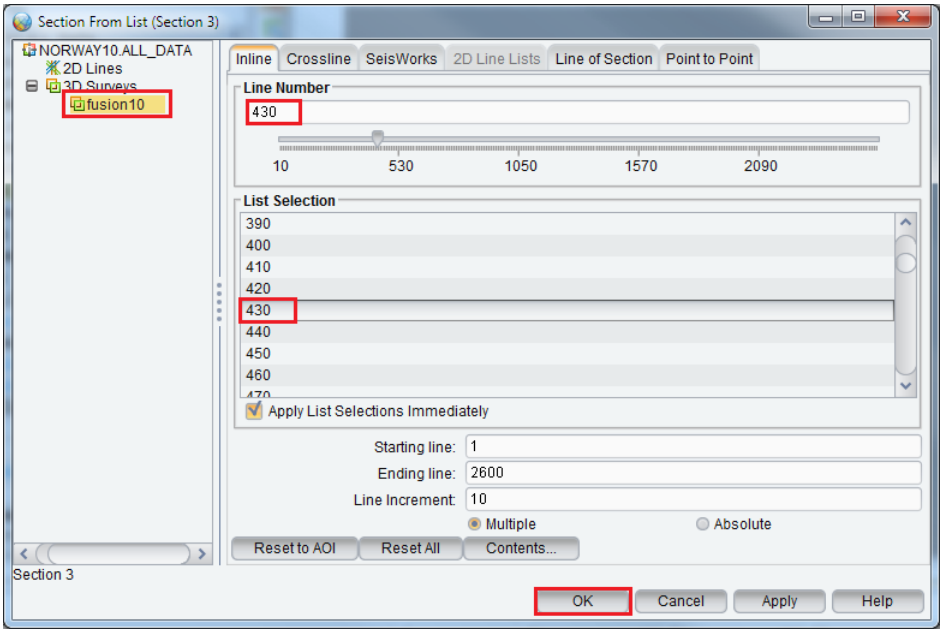
You will now work with the *Section* view.

9. Click the ***Section*** tab to make it active. The *Inventory* updates to show items that are available to the section. Under **3D Surveys > fusion10**, toggle on **full_offset.cmp**.

10. Using one of the following methods, display line 430:

    - From a list:
      — At the top of the *DecisionSpace* window, click **Select** > **Section from List...**. In the *Section From List* dialog,

navigate to **3D Surveys** > **fusion10**, then click the ***Inline*** tab. Scroll to and select **430** in the List Selection box or, in the Line Number area, type "**430**". Click **OK**. The line appears in the *Section* view.



- From the map:
  - Click the **Select Inline** icon ( ) in the vertical tool bar.
  - Move to the *Map* view and look at the readout in the lower left of your window to find inline **430**. **MB1** to select it, then **MB2** to display it. Alternatively, you can forgo MB1. Simply position your cursor on the map and **MB2**.
- From the Navigation tool bar, with *Section* view active:
  - If an inline is already displayed, type "**430**" and press **<Enter>**.

Note:

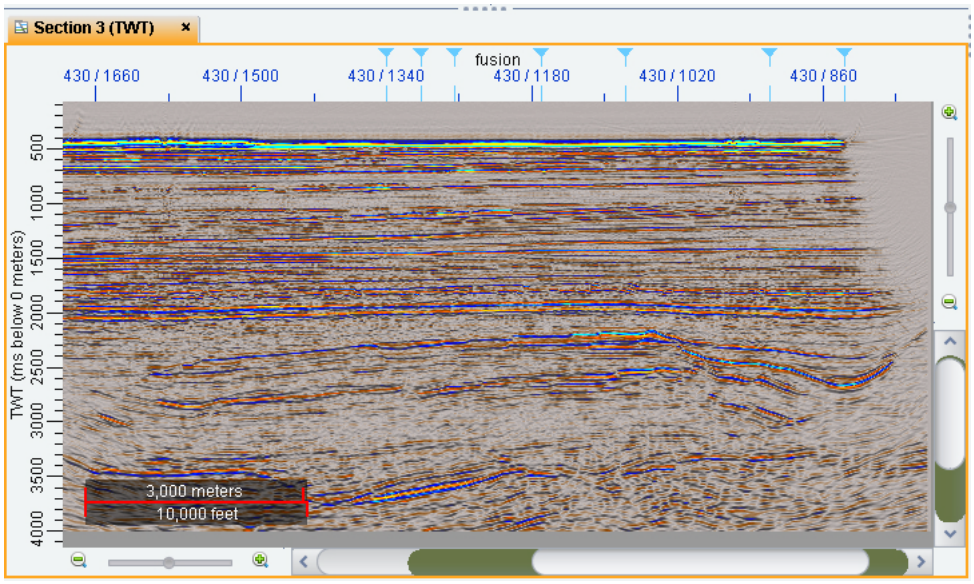
Another method exists for rapidly bringing seismic volumes into a *Section* view. You can drag-and-drop seismic files from the *Inventory* tree to *Section* view. When you drag-and-drop an enabled seismic volume onto a new section, the center inline of the volume will display by default. This allows very fast display of the seismic while minimizing the line selection effort.

Seismic volume drag-and-drop also facilitates fast seismic exchange within a given section

Note:

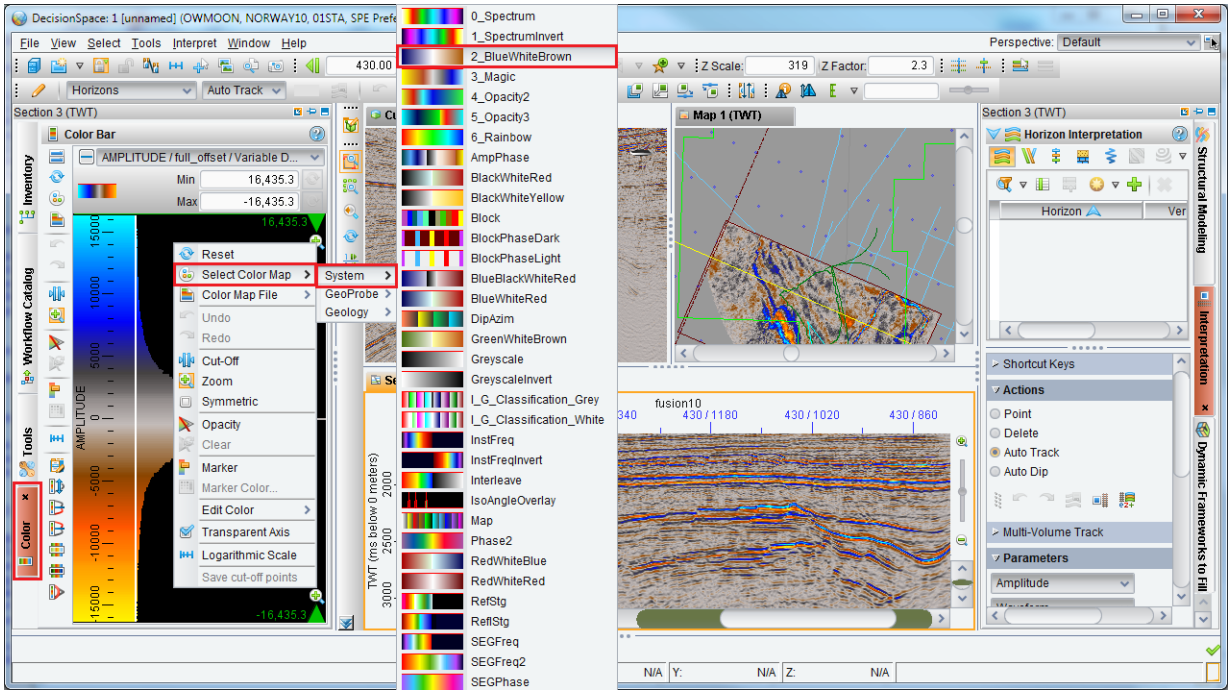
When you select an inline from the *Map*, the behavior you see will differ, depending on whether the icon was selected from the active *Map* or *Section*.
- If the *Section* was active, the line selected will be displayed in that *Section* view.
- If the *Map* was active, the line selected will be broadcast to all available *Section* views.

11. Adjust the amount of data displayed in the section using one of the following methods:
    - Click the **Area Zoom In** icon ( ) and draw a stretchy box.
    - Manipulate vertical and horizontal zoom **scroll bars** at edge of section.
    - **MB1+MB2-drag** up and down on the section.



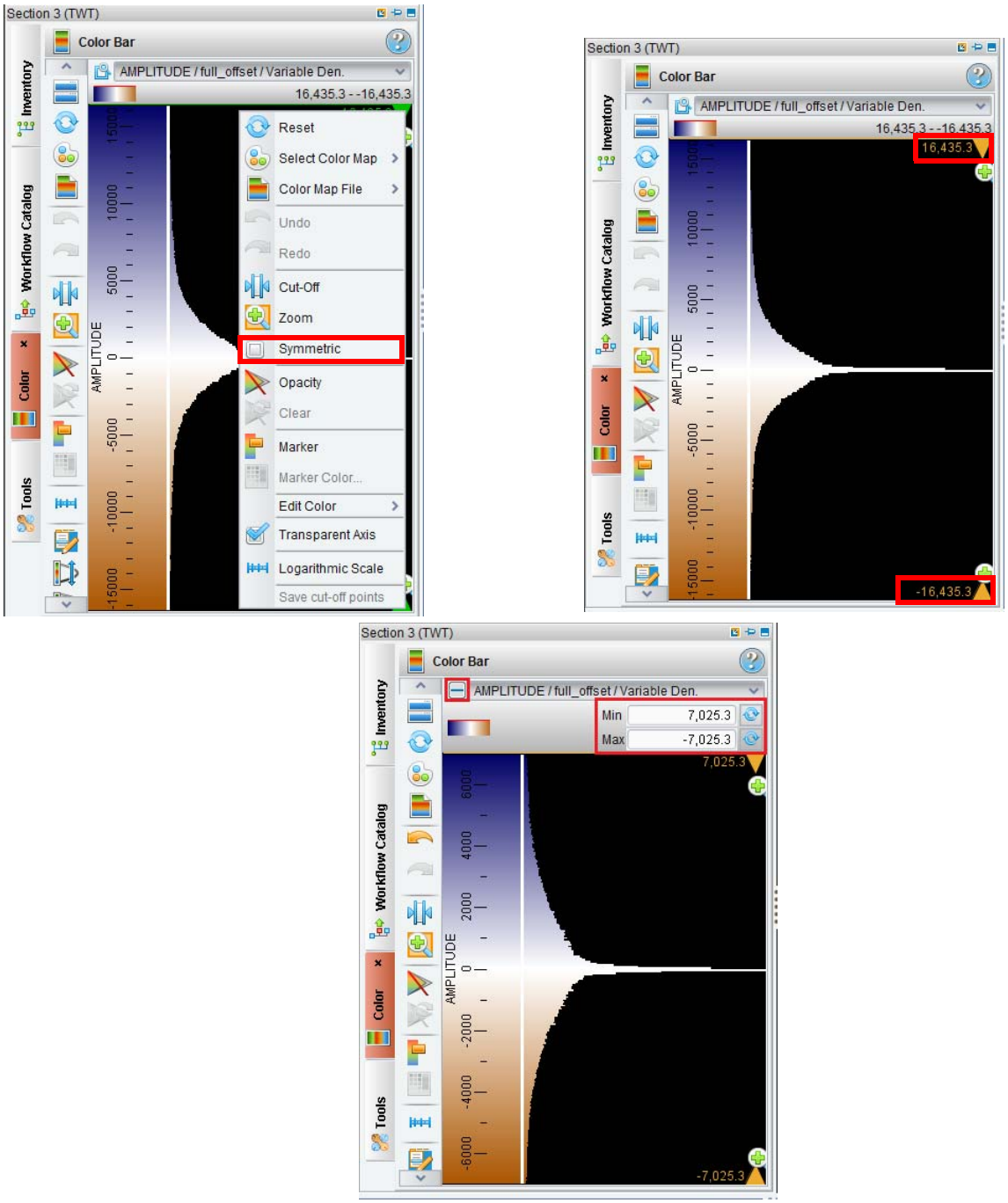
Change the colors of the seismic data in the *Section* display.

12. With the *Section* view active, activate the *Color* task pane. The Color Bar with a histogram is displayed. In the color bar area, **MB3 > Select Color Map > System > 2_BlueWhiteBrown**.



The seismic colors appear washed out. To remedy this, you can adjust dynamic scaling of the mapped color scale only.

13. With your cursor in the color bar, **MB3** > **Symmetric**. Drag the **orange arrow** down to an amplitude around **7000**. Alternatively, you can click the **Expand Color Bar Editor** icon ( ) and type in the Min and Max amplitudes.



14. Experiment with some of the icons in the color bar, such as opacity, color bar orientation, flip color, and so forth.

15. If time permits, you can display other seismic sections by selecting methods such as Inline, Crossline, Point to Point, ZigZag, Loop, Line of Section or Intersection on the vertical tool bar.

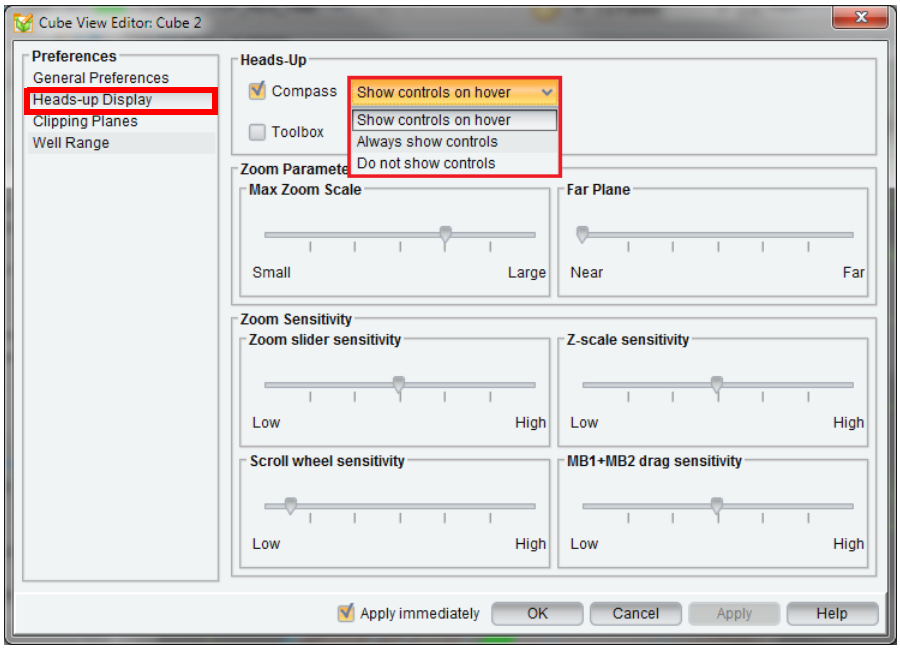
Working in Cube view

Now you will work in the *Cube* view to investigate the area covered by the 3D seismic volume.

16. Click the ***Cube*** tab to activate it and **double-click** the tab again to enlarge it to full size. Be careful to click the title of the tab; avoid clicking near the X, as this will close the tab.

You can use the area to the right of each view tab to activate the view (a single click) and to maximize the view (a double click).

17. Click the **View Editor** icon on the side of the *Cube* view then click on **Heads-up Display** under *Preferences*. Select the **Show controls on hover** option from the **Compass** pull down menu located under the *Heads-up* section.

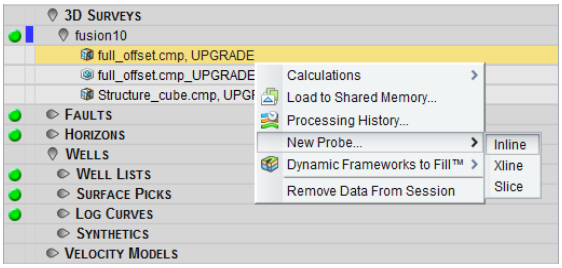


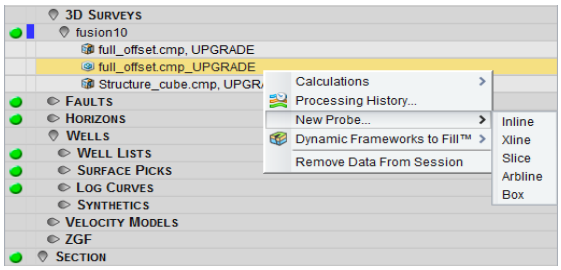
18. In the *Cube* view, move your cursor around the scene and into the compass area, noting behavior of the HUD. You can use this feature at your discretion. In the *View Editor* dialog, configure the Heads-Up Display area to suit your preference, and click **OK**.

19. **MB2** the **2D seismic lines** to turn them off.
    You can also **MB3 > Seismic Off**.

You can display the 3D seismic volume in two ways in the *Cube* view:

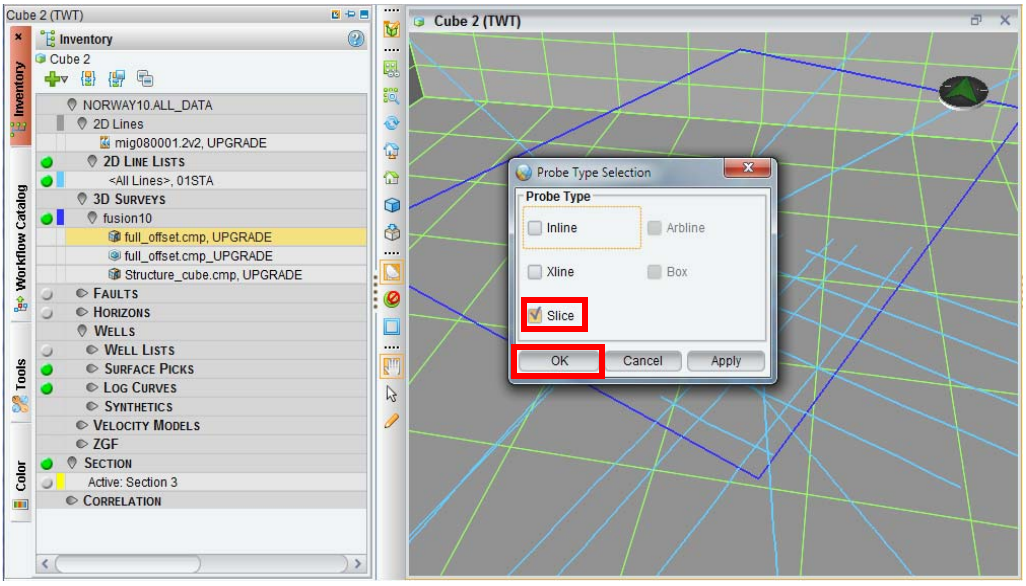
- Drag-and-drop the volume onto the *Cube* view.
- From the *Inventory* tab you can put your cursor over a volume and **MB3 > New Probe... > Inline** (or **Xline** or **Slice**). The Shared memory volumes have additional probe options.

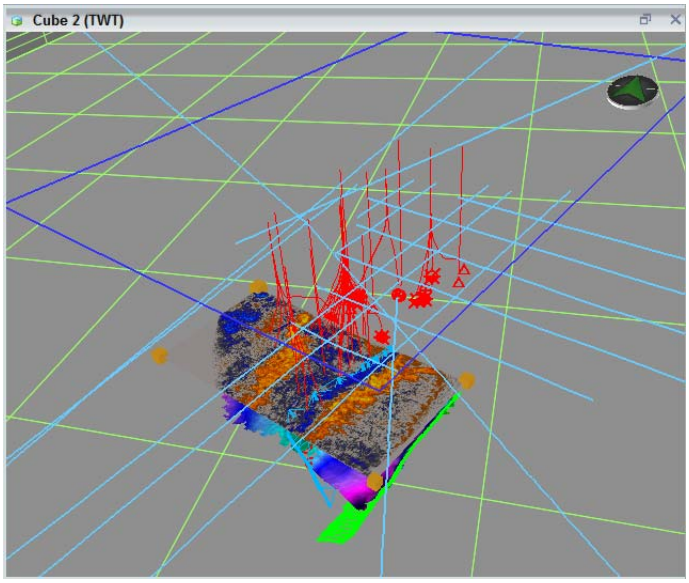




You will use the first method in the next step.

20. In the *Inventory*, locate the seismic volume **3D Surveys > fusion10 > full_offset.cmp**. Drag-and-drop it on the ***Cube*** view. The *Probe Type Selection* dialog appears. In that dialog, select **Slice** (only) and click **OK**.

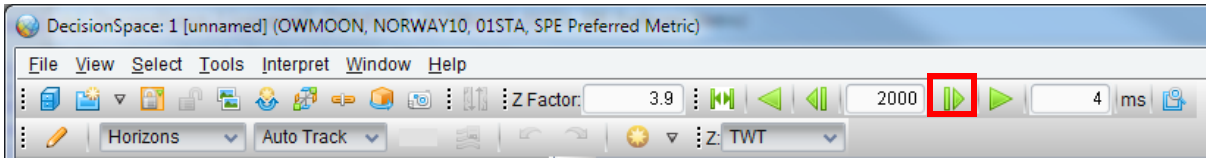




21. Adjust the *Cube* view display scale (zoom), orientation, and center of interest as necessary.

The time-slice animation of a 3D seismic volume is a valuable interpretation tool.

22. In the tool bar near the top of the *DecisionSpace* window, click the **Step Right** icon ( ) several times. The slice probe moves down through the volume.

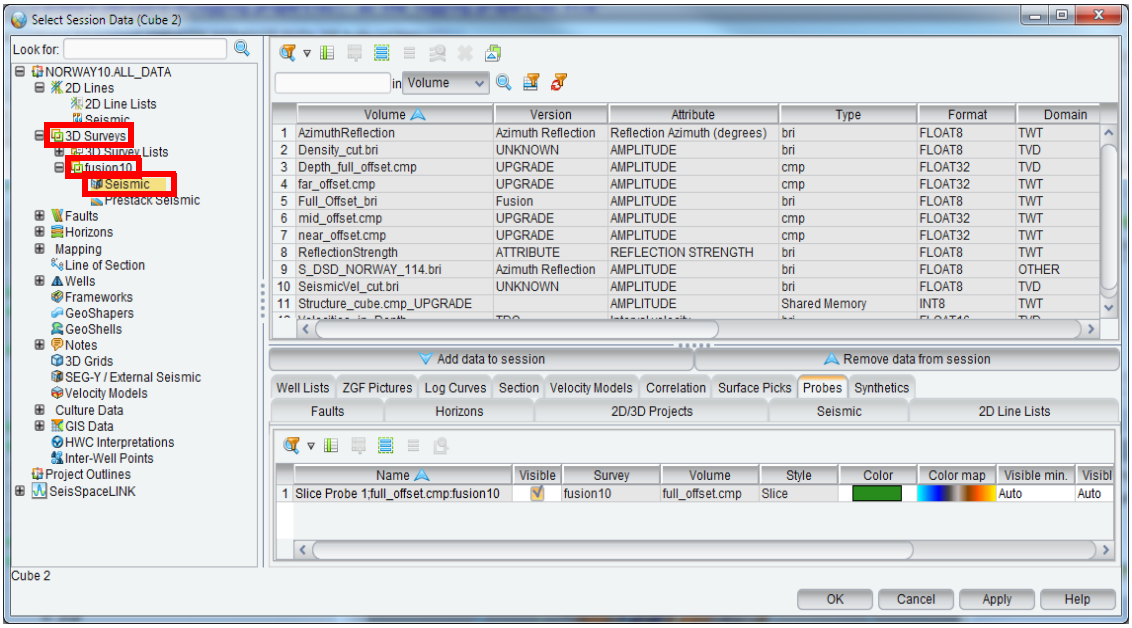


23. Click the **Play Right** icon ( ). The slice is now animated and moves down through the volume automatically. Click the same icon again to stop.

Some graphics systems may show a grayed-out animated slice. Depending on the capabilities of your computer and the size of the seismic data file on disk, the animation may slow or even pause for a moment. The more efficient way to handle volume data is to load it into shared memory. You will now load the volume into shared memory.

24. At the top left of the *DecisionSpace* window, click the **Select Session Data** icon ( ).

25. In the *Select Session Data* dialog on the data tree (left), select **3D Surveys > fusion10 > Seismic**.

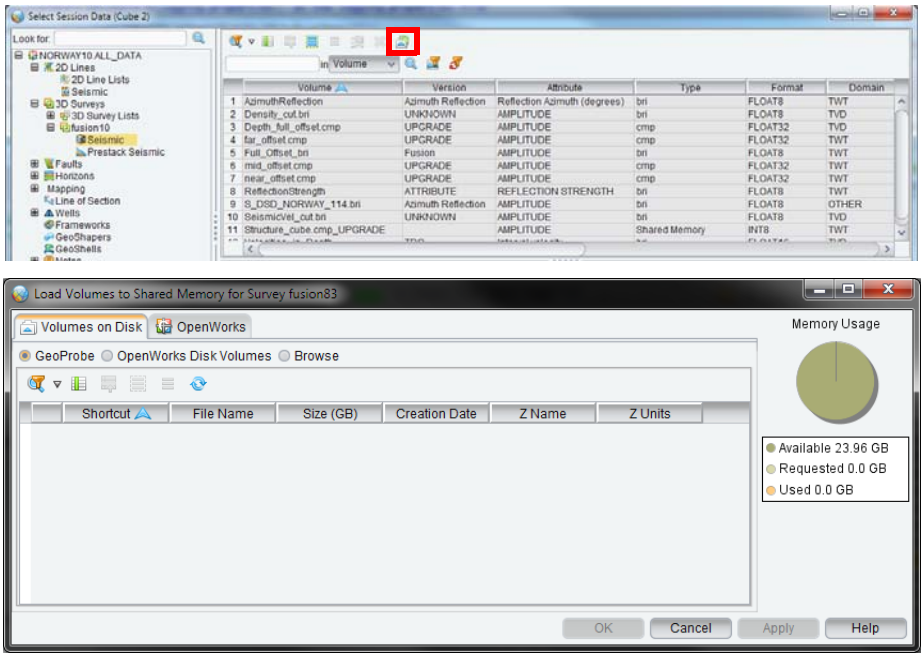


The *Select Session Data* dialog now lists the seismic volumes that are associated with the survey and are available to your session. Any seismic already in shared memory will be listed as *Shared Memory* in the *Type* field.

Seismic Volumes to Shared Memory

26. Near the top middle of the dialog, click the **Load volumes to shared memory** icon ( ).

    The *Load Volumes to Shared Memory* dialog shows the Memory Usage Pie Chart on the right. Available, Requested, and Used system memory are noted.

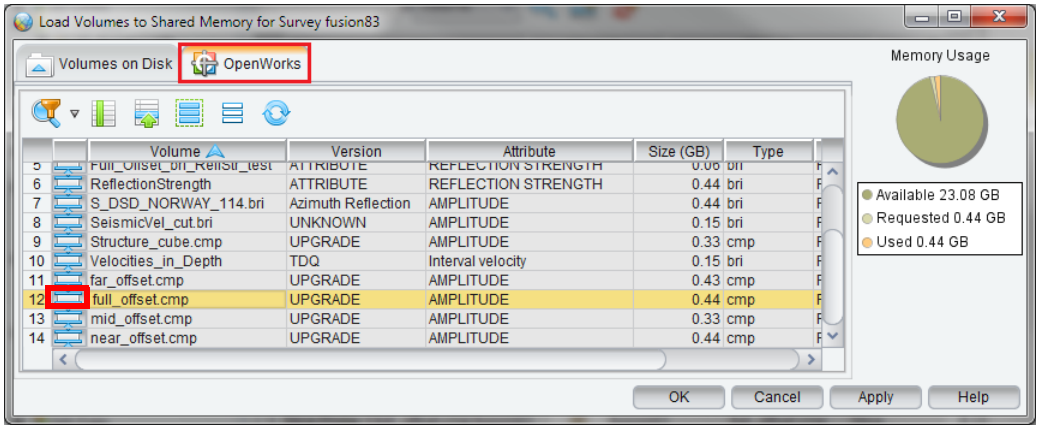


    The *Volumes on Disk* tab allows access to Landmark .vol seismic format. These files can be located in a GeoProbe® project, OpenWorks seismic directory, or anywhere on your file system.

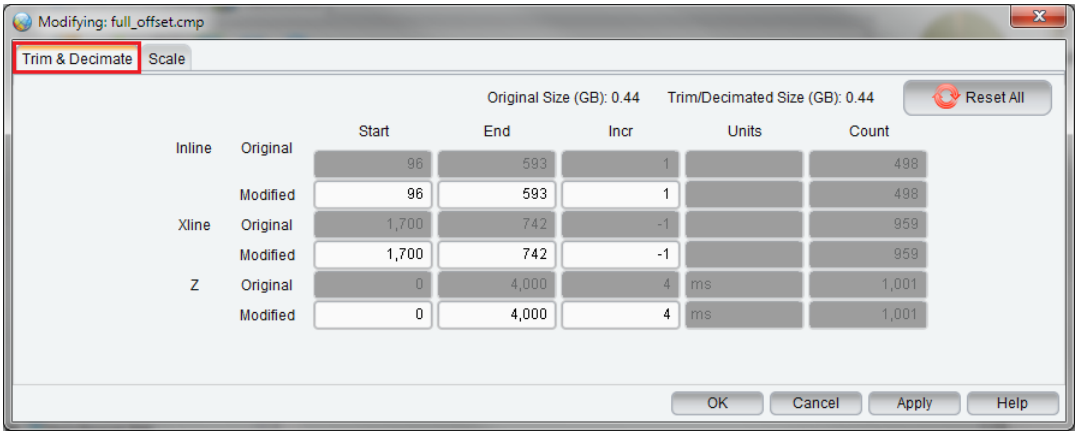
> **Note:**
>
> A .vol file is the format that GeoProbe software uses. It is loaded to shared memory, which makes moving through data quicker than accessing data from disk.

27. Click the ***OpenWorks*** tab. Select the **full_offset.cmp** volume. Note update to Available and Requested allocations in the Memory

Usage pie chart. Click the **Trim, Decimate & Scale** icon ( ) on the full_offset.cmp row.

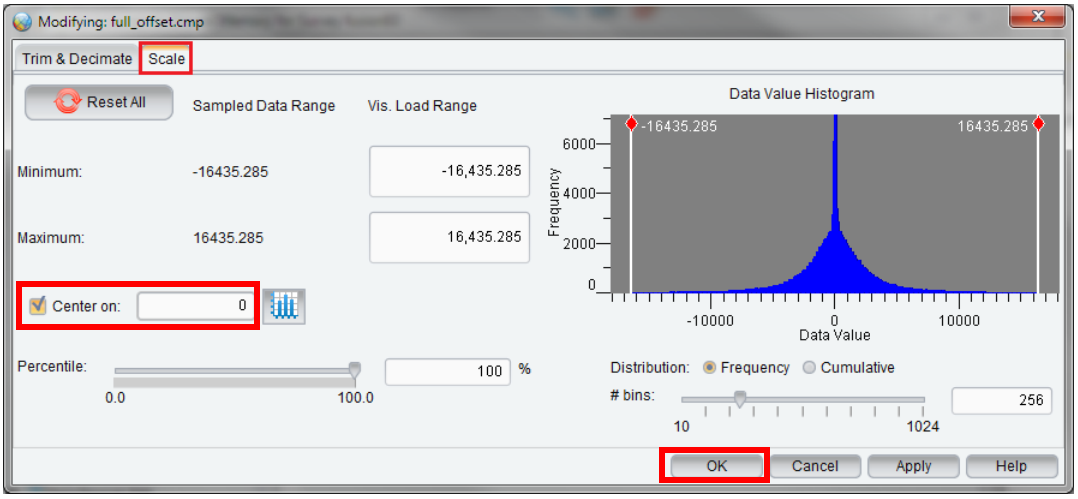


The *Modifying: <seismic file>* dialog opens, with the *Trim & Decimate* tab active. Here, you can change the *Start*, *End*, and *Increment* values of the Inline, Xline, and Z when generating the shared memory volume.

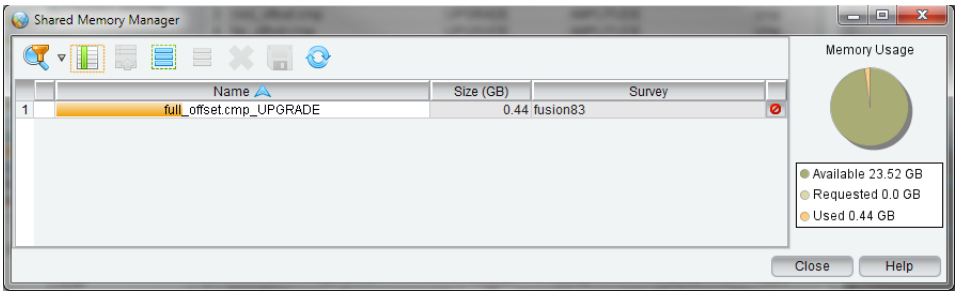


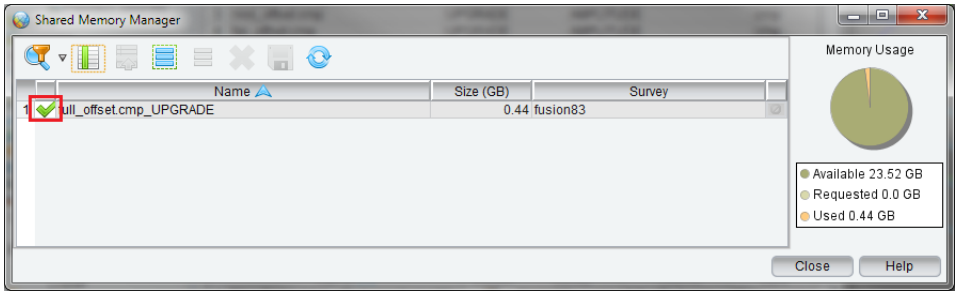
28. Click the ***Scale*** tab. Do not change the Minimum and Maximum values. Toggle on **Center on:** and enter **"0"** (zero) in the text box. This will preserve a symmetric scale. Click **OK**.

29. In the *Load Volumes to Shared Memory* dialog, click **OK** to start the load and close that window.



A new *Shared Memory Manager* window will open and show loading progress. A green check mark will appear next to the name of the volume when loading is complete.





At this point you can save the shared memory volume to a physical file on disk in two ways:

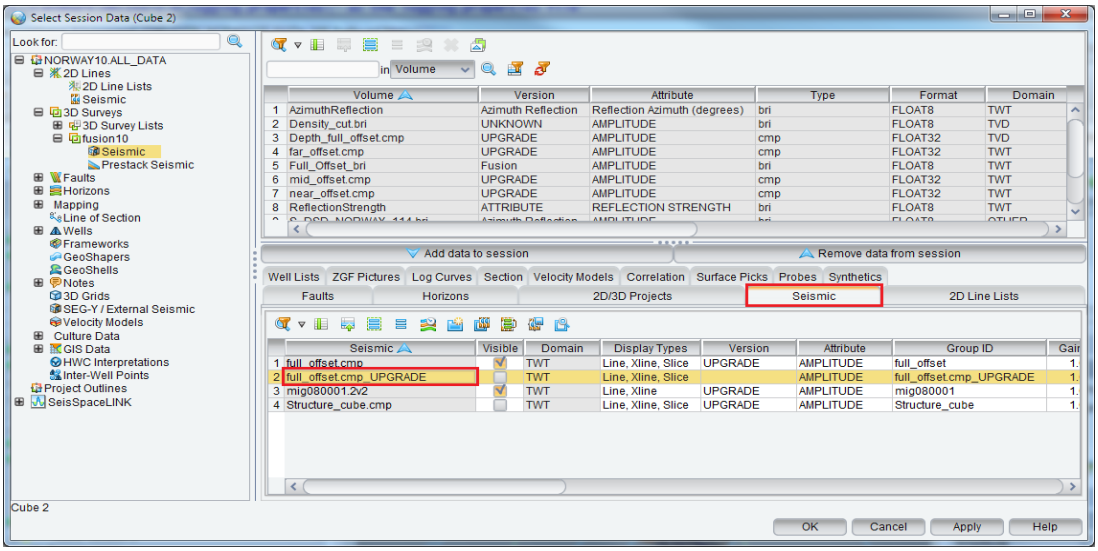
- OpenWorks Project (rename the volume if necessary)
- GeoProbe Project (rename the volume if necessary)

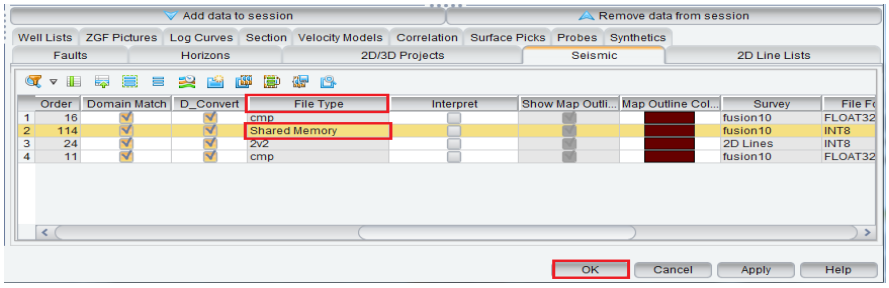
There is no need to save a file now, but the steps are straightforward and described below to serve as an example.

30. On the *Shared Memory Manager* dialog, highlight the **full_offset.cmp** volume, then click the **Save selected...** icon ( ).

31. Toggle **Browse** on the *Select Save Location* dialog and observe that the default location is your home directory. To change this location, click **Browse...**. If you have an associated GeoProbe project, you can save the volume there. In this example, click **Cancel** (you do not want to save the volume).

32. The new Shared Memory volume will appear in the lower right list of the of the *Select Session Data* window in the *Seismic* tab. Scroll to the right in this list to confirm that this is a shared memory volume in the *File Type* column. Click **OK** to apply any changes and close this window. You can also **Close** the *Shared Memory Manager* dialog.

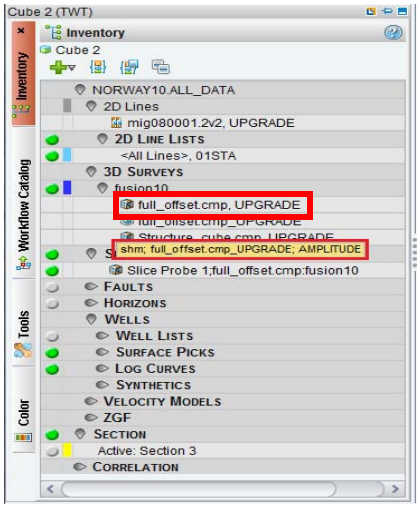


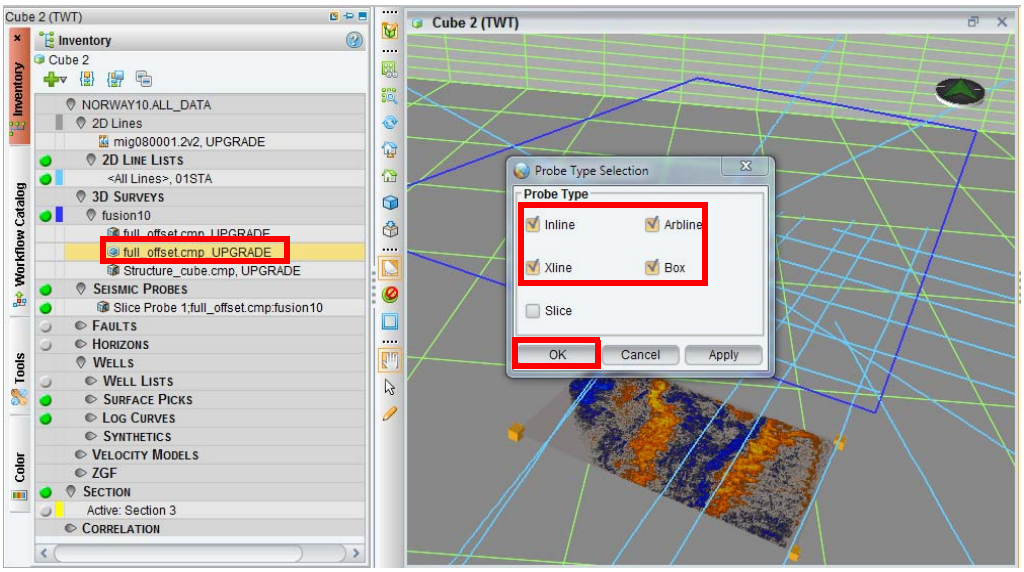


You will now display the shared memory volume in *Cube* view. Note improved display response of the memory volume compared to the (parent) seismic file on disk.

Back on the main window in the *Inventory* tree, notice under 3D Surveys > fusion10 that there are two versions of full_offset.cmp UPGRADE, but that their icons are not the same. The **Shared Memory Volume** icon ( ) differs from a **Regular Volume** icon ( ).

33. In the *Inventory*, **place** your cursor over the volume (hover) and note that the tool tip starts with shm, for shared memory. Click that shared memory **full_offset.cmp** object in the *Inventory*, then drag-and-drop it into the *Cube* view. In the *Probe Type Selection* pop-up, select **Inline**, **Xline**, **Arbline**, and **Box**. Click **OK**.





The Probes will appear.

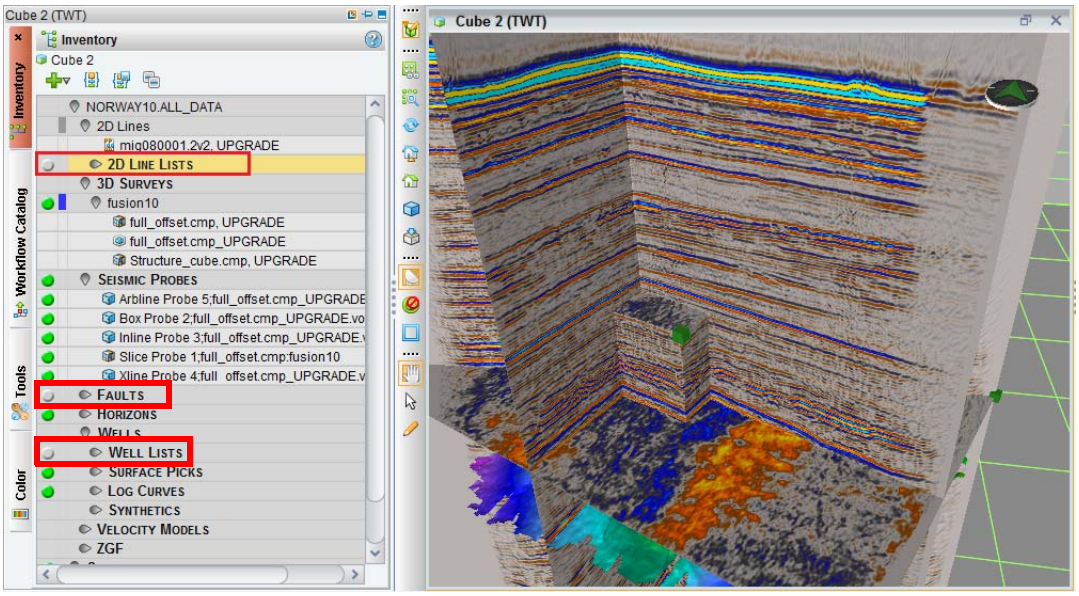
Note:

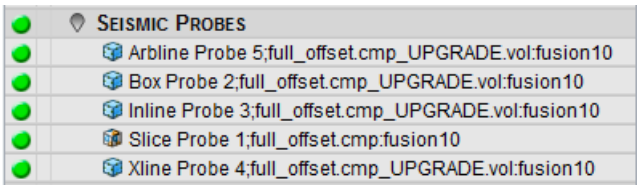
A probe is a portion of your seismic volume that can be moved or re-sized. Probes can be any one of the following types: Box, Arbline, Inline, Xline, or Slice.

Only .vol files can display Box or Arbline probes.

Gaining Field Familiarity Through Reconnaissance

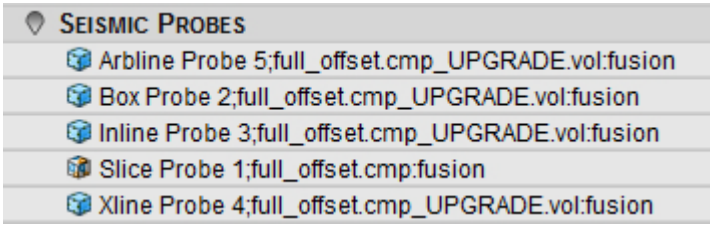
34. To get a better look at the probes, in the *Inventory*, hide **2D Line Lists**, **Faults**, and **Well Lists**. Click the **View All** icon ( ).





The scene will be re-scaled to show all objects toggled for display in the *Cube* view. The center of interest (the point about which the display rotates) will be updated to the center of all of the displayed items to make it easier to pan and rotate.

Note the five Seismic Probes in the *Inventory* list. The slice you loaded previously from disk file and the box, inline, xline, and arbline probes you just defined from the shared memory volume are listed.



35. Toggle off the **Slice**, **Inline**, and **Xline** probes.

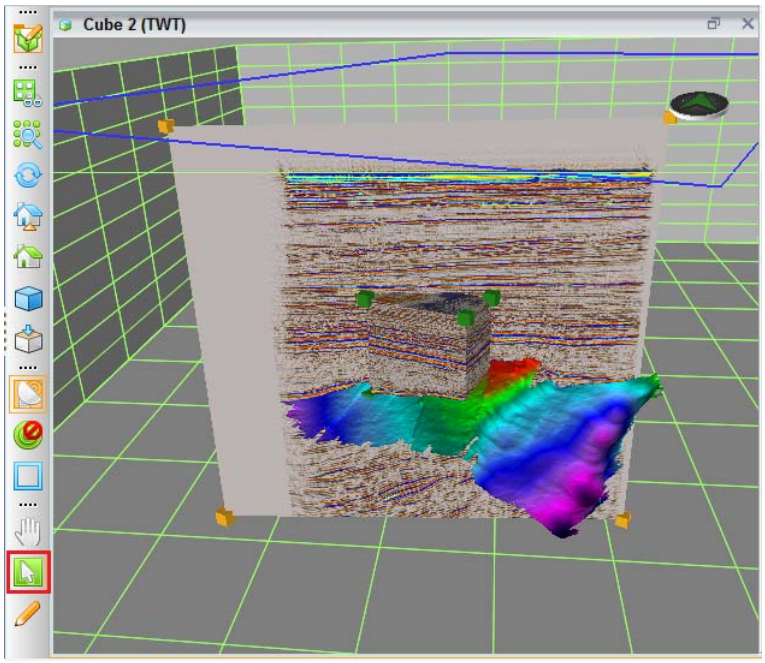
You will concentrate on the box probe to explore the seismic, but first you need to understand the three cursor modes in *Cube* view.

Select the modes from the vertical tool bar to the left of the display tiles:

Mode	Mouse	Action
Pan/Zoom/Rotate 	**MB1-drag** **MB2-drag** **Shift-MB1-drag**	Rotates the view Translates the view Animates a probe face
Select/Drag 	**MB1-drag** **Shift-MB1-drag**	Moves the probe Animates the probe
Interpretation 	**MB1**	Primary picking method for certain objects

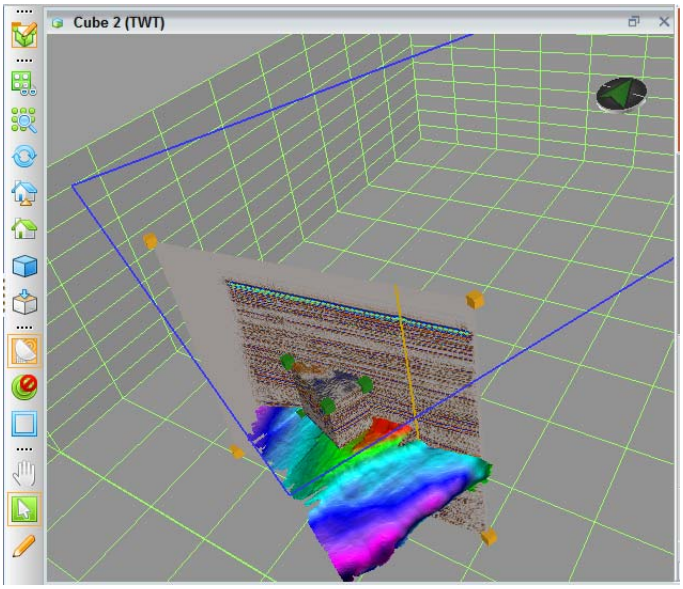
36. If not already set, maximize the *Cube* view and apply your preferred color map to the seismic data. (Hint: Double-click the ***Cube*** tab. On a probe, **MB3 > Display Properties....**)

37. In the vertical tool bar to the left of the display tiles, click the **Select/Drag Mode** icon (). Click the **Arbline probe** to make it active. The green corner handles will turn orange. In the middle of the probe, **Shift-MB1-drag** (up and down) to drive (push and pull) the Arbline probe through the seismic parallel to current orientation.



Now rotate the Arbline probe to a different orientation.

38. Place your cursor within the probe. **Shift-MB2 and hold**. A vertical line appears where you clicked. You will rotate the arbitrary section about this line while holding **Shift-MB2**. Release at new orientation.

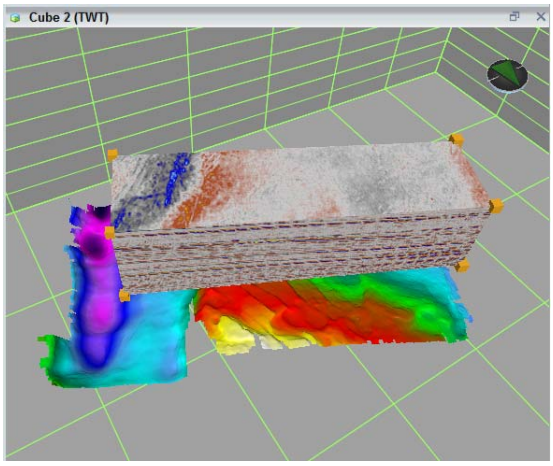


39. Toggle off the **Arbline** probe.

40. To make rotation easier, put your cursor on a point on the **Box** probe and **MB3 > Set Center of Interest**. The view will now rotate about that point.

41. Confirm **Select/Drag Mode** ( ). Click the **Box probe** to make it active (green handles become orange).

42. **MB1-drag** one of the orange **corner handles** and expand the probe to cover a larger part of the seismic volume, as shown below:



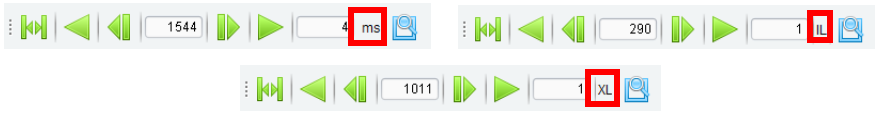
43. Then **MB1-drag** a face to move the probe around, as shown above in figure 2 with the result in Figure 3.

The probe moves only in the plane of the face selected. Because the probe is using the shared memory volume it responds instantaneously to your movements.

44. **Shift+MB1+drag** on any of the faces of the box probe to move the face through the volume.

> **Note:**
>
> With a *Cube* view full of data, the corner (grab) handles of a seismic probe may be obscured. Enter hot key x to expand the active seismic probe to its fullest extent.

The VCR buttons control the animation of your active probe. Animation direction for a box probe depends on the probe face you select. You can move a box probe incrementally in ms, IL, and XL directions.

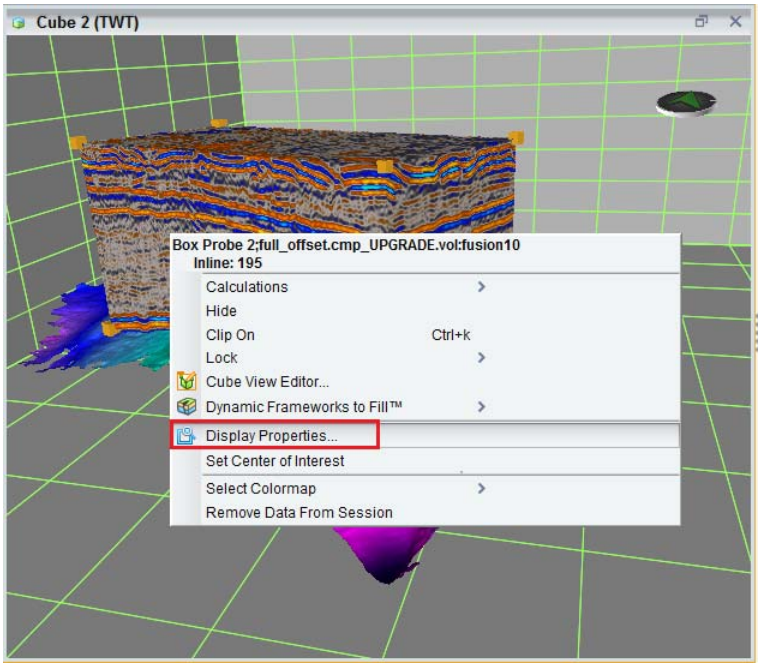


45. Use all of these probe controls, including the VCR buttons, to examine the seismic volume. Remember Select/Drag Mode. Enter hot key **x** to expand the active box probe to the full extent of its loaded volume. Toggle the horizon display for a better view of how it relates to the structure.

What geologic structures do you see in the area?

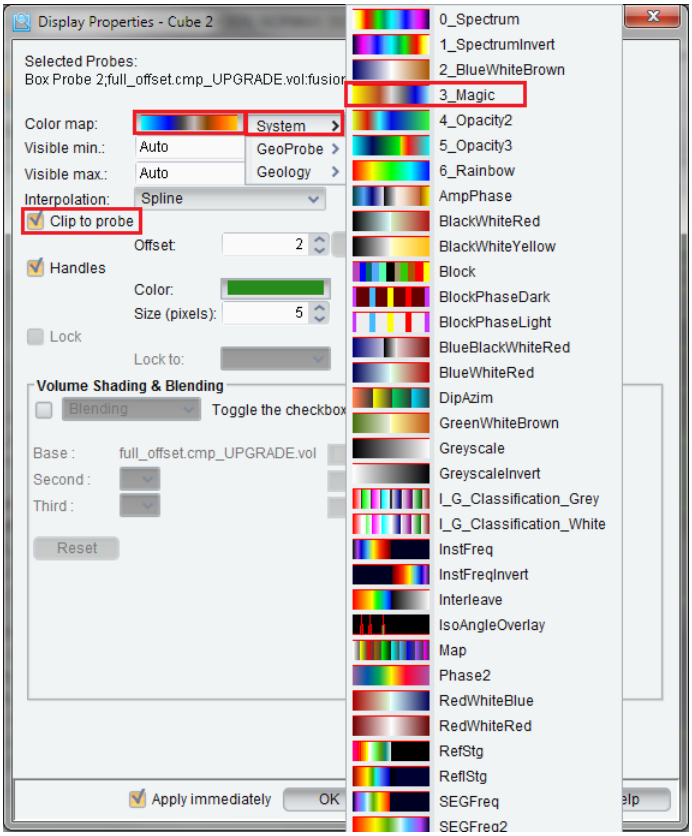
As you probably noticed, the horizon can get in the way when you are moving probes around. Clipping the horizons to the probe can solve that, as you will see in the next steps.

46. On the box probe, **MB3 > Display Properties...**.



The *Display Properties* dialog will appear.

47. In the *Display Properties* dialog, select **Color map > System > 3_Magic**. Check the **Clip to probe** box and click **OK**.

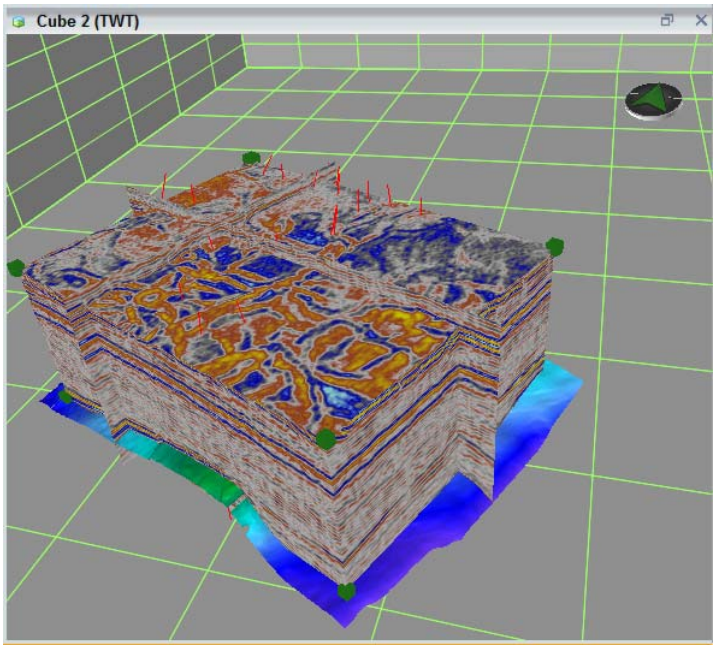


Observe how the horizon and faults are now clipped to the probe, so it is easily observable, but doesn't get in the way. You can increase or decrease the clipping offset (the amount of horizon visible outside the probe) with hot keys.

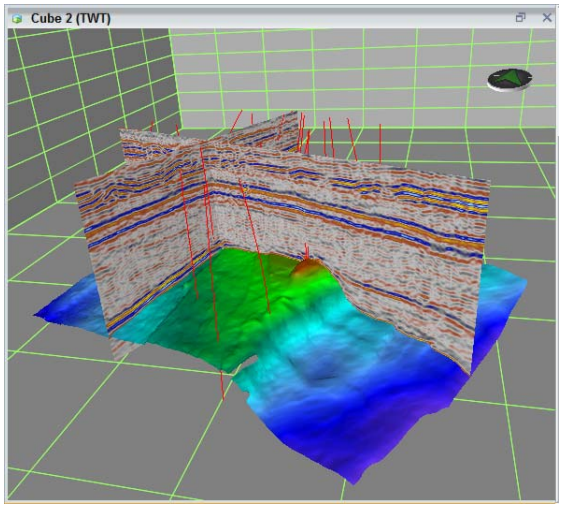
48. To increase the clipping offset in the *Cube* view, press the equal key < = > a few times. To decrease the offset, press the minus key < - > a few times.

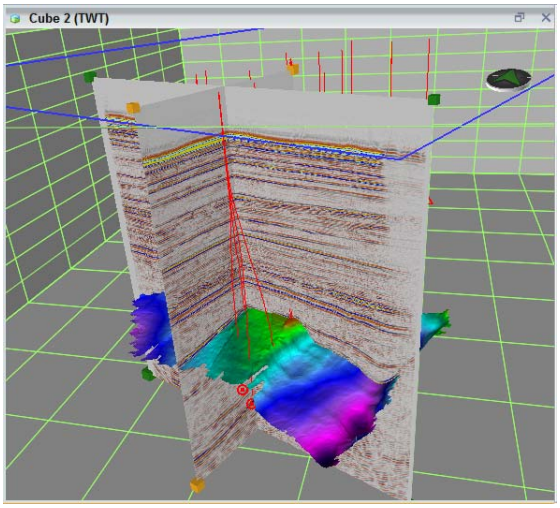
49. In the *Inventory* under **Seismic Probes**, toggle on **Inline** and **Xline**. Toggle on **Well Lists > demo wells, 01STA**.

Note how these other probes and the wells are clipped to the box probe. Continue to explore the data. Visualizing your data in this way is a great way to familiarize yourself with the project area.



50. In the *Cube* view, turn off the **Box Probe**. Note that the wells and other probes are still clipped to the now invisible probe. You can turn off the clipping in the *Display Properties* dialog for the box probe. An easier path is **MB3 > Display Properties...** on any of the remaining probes, and the unclipped state of all objects is restored.



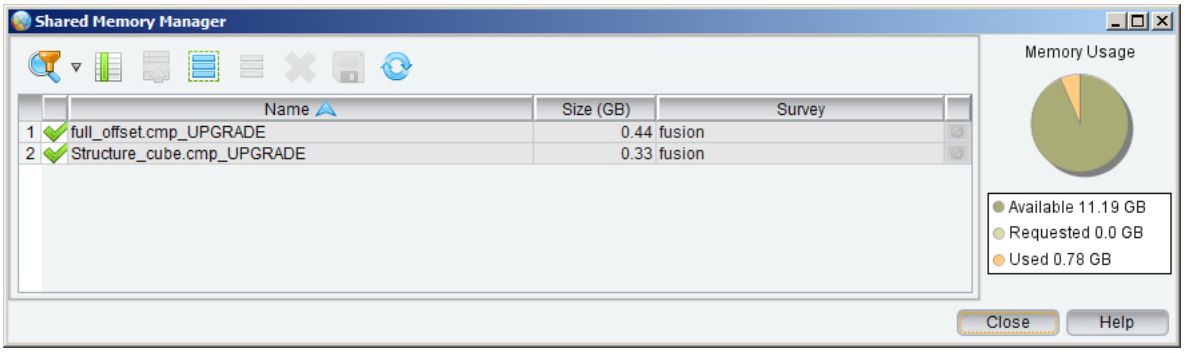


Now you will use another data volume to provide a different view of the survey area.

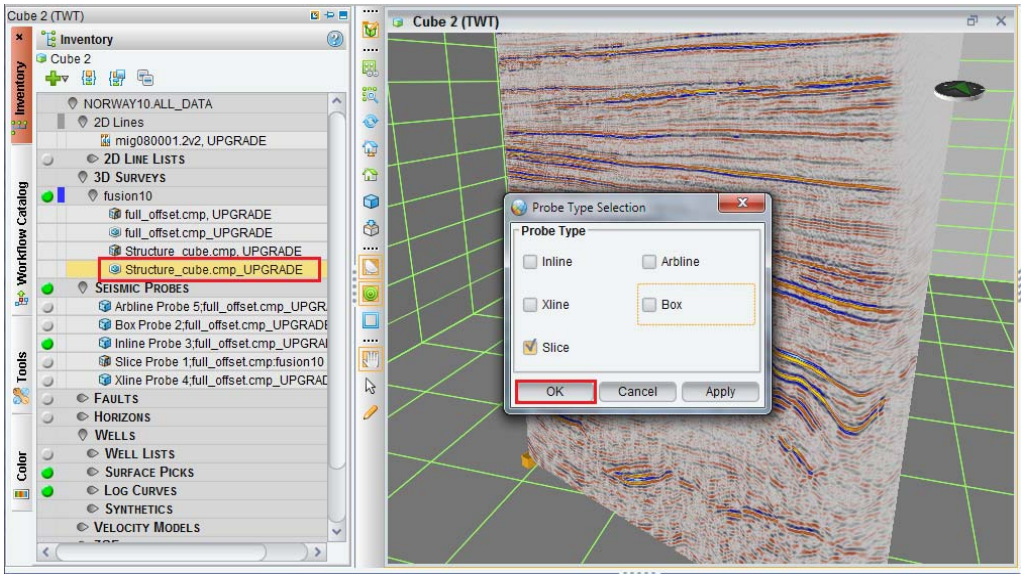
51. In the *Cube* view, turn off the **horizon faults**, **well lists**, and **all probes** except the **Inline** probe. Double-click the *Cube* tab to maximize its view.

The 3D Survey named Structure_cube.cmp was loaded when you loaded the ISet. You will now load it into shared memory.

52. In the *Inventory* task pane, put your cursor on **3D Surveys > fusion10 > Structure_cube.cmp**, then **MB3 > Load to Shared Memory...**. Accept the defaults in the *Modifying* dialog and click **OK**. After the volume is loaded (note the green check in the *Shared Memory Manager*), **Close** the *Shared Memory Manager.*

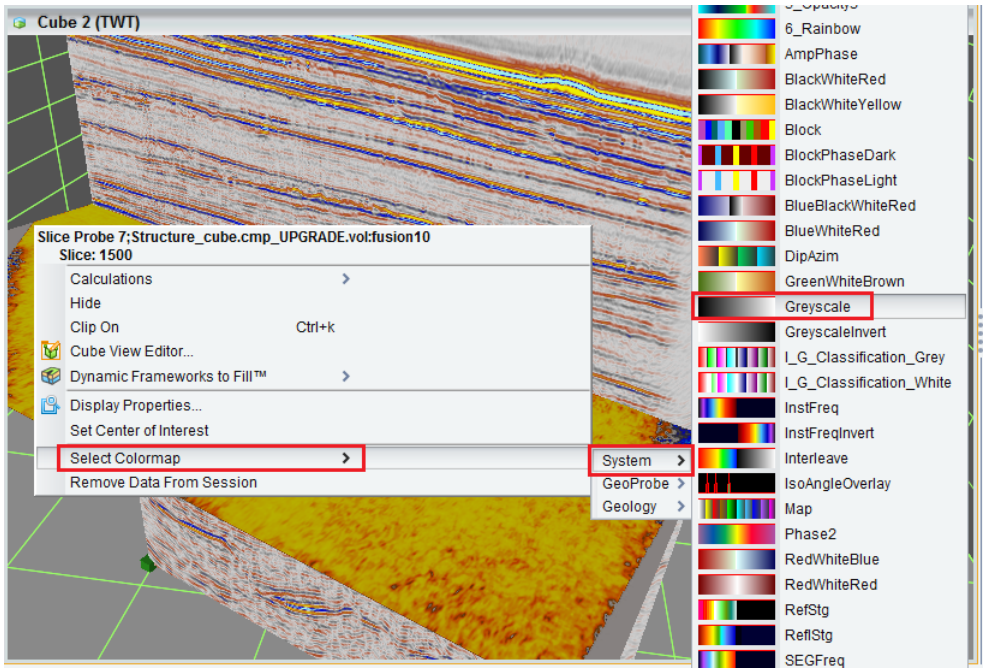


53. In the *Inventory*, drag-and-drop **Structure_ cube.cmp** (Shared Memory) into the *Cube* view. Select only a **Slice** Probe Type and click **OK**.



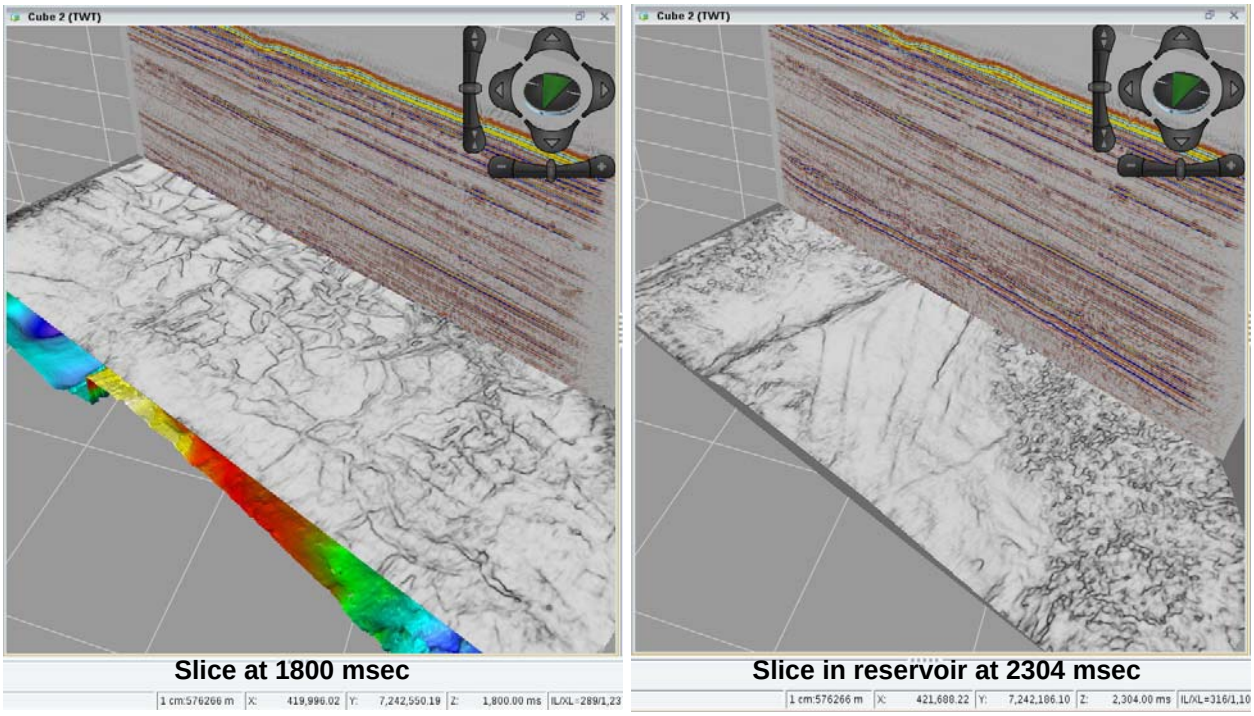
This structure cube shows the continuity or correlation between traces. In a greyscale color bar, faults show up black (low continuity) in this volume because there is a break in correlation between traces across the fault. Continuous reflectors show up white. You may be able to detect indications of sinuous stream channels or other depositional variations.

54. In the *Cube* view on the Structure_cube.cmp probe, **MB3 > Select Colormap > System > Greyscale**.



55. **Shift-MB1** grab the slice probe and move slowly up and down through the volume. If necessary, toggle the horizon display to remind yourself of the depth of the reservoir. Keep an eye on the Z: (time) readout at the bottom of the main window. You may need to switch between Pan/Zoom/Rotate ( ) and Select/Drag ( ) modes to get the best views of the data.

You are looking for changes in fault patterns and structural style. At very shallow depth (~440 ms) you can see channels or groves in the current and paleo water bottoms. At about 1800 ms the fault pattern looks almost like shattered glass. However, when you get into the reservoir the fault pattern changes with a large N-S trending fault in the east and smaller faults trending NE-SW, cutting the continuous reservoir reflector.



Remember these are time slices, not the reflections on a horizon, so some of the structure is influencing the patterns that you observe. Later you will learn to display the attributes on a reflector.

56. Toggle off all the probes in the *Inventory* except the box probe for **full_offset.cmp** (shared memory) and toggle on your **Well Lists**.

Using Section View with Wells

You will now look at more data types in different views to help you understand the details of the Heidrun field. You will find additional ways of representing seismic and well data in cross section.

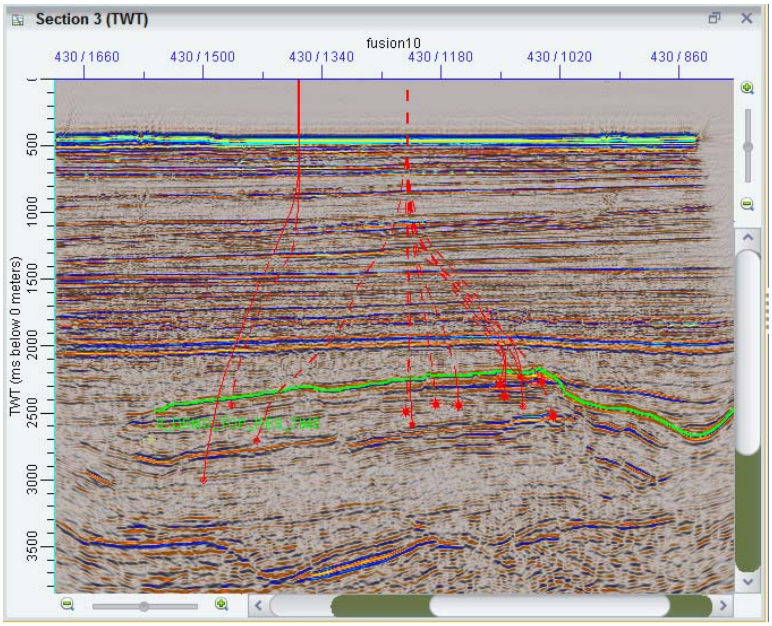
57. **Restore**, or un-maximize, the *Cube* view. Activate your ***Section*** view (click the tab) and double-click the **tab** to maximize it.

58. In the *Inventory,* toggle off all seismic volumes except **full_offset.cmp** (shared memory). In the *Section* view, display line

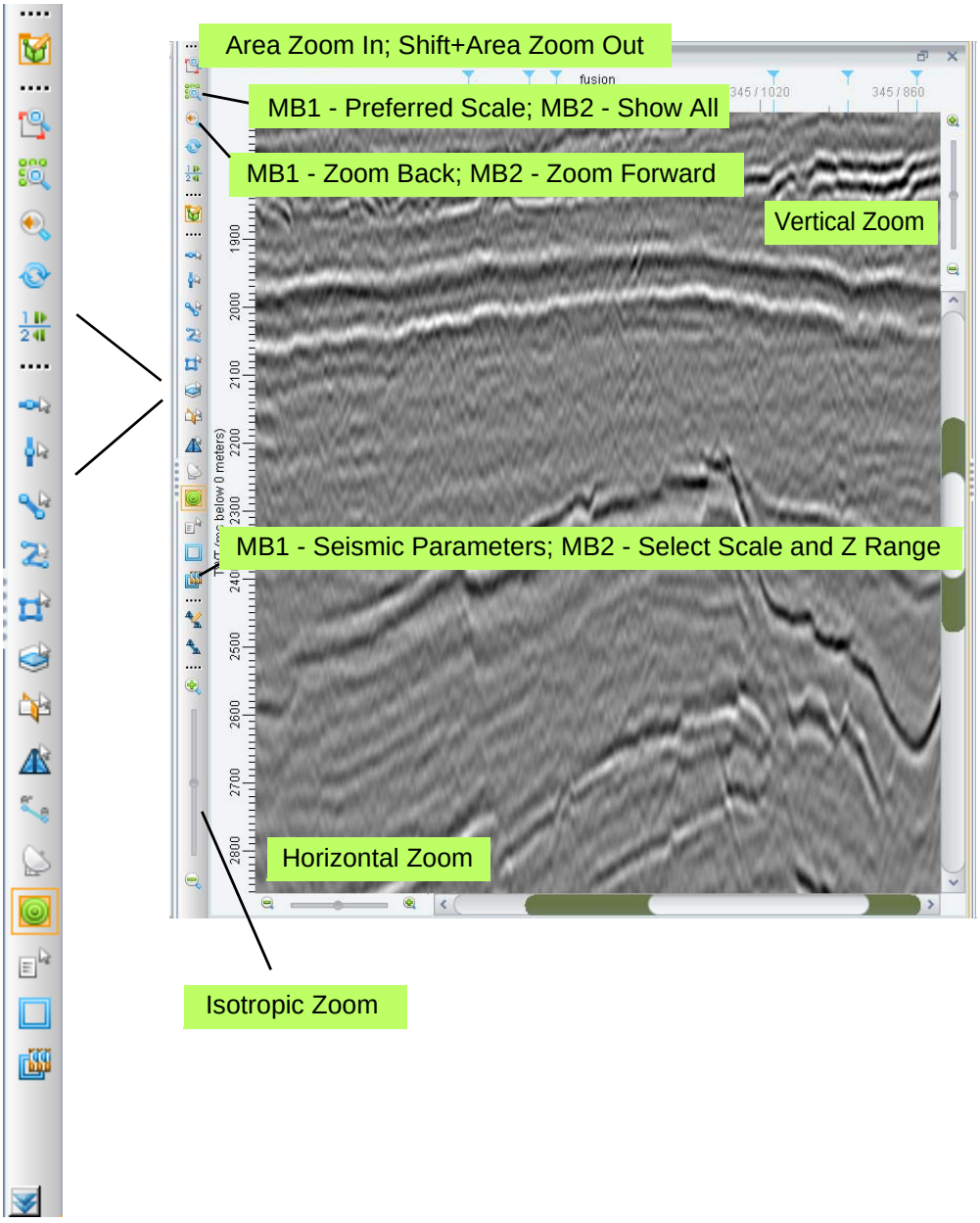
430, if it is not already displayed, and zoom to see the full line. (Hint: **Select > Section from List...** and click on **fusion10** under **3D Survey**.)

59. Toggle on **Horizons > DEMO_TOP_RES_TIME** and **Well Lists > demo wells, 01STA**. Turn off **Log Curves** for now.

The *Section* view should look something like this:



In the next step you will zoom in on the display.The tool tips for zoom-related operations in *Section* view are shown below.

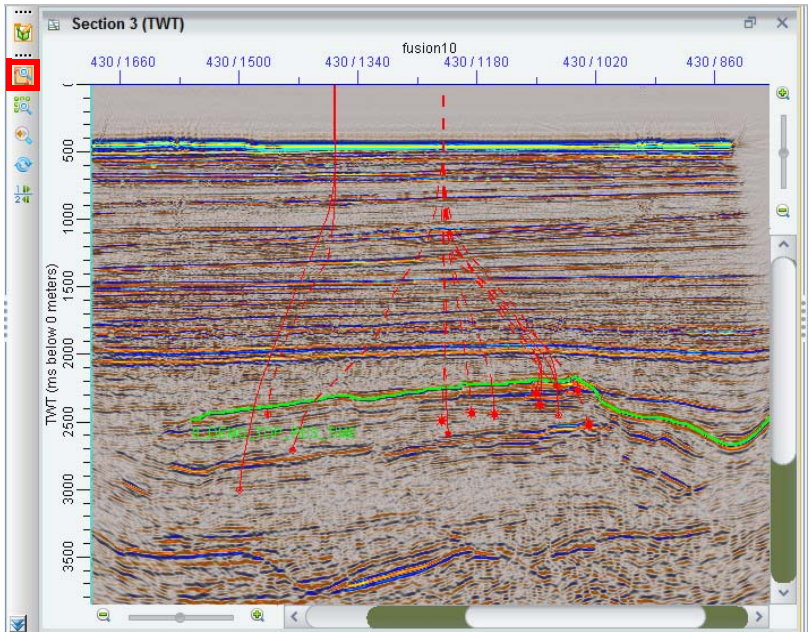


The isotropic zoom slider operates on both axes of the section display equally. MB1-MB2-drag (vertical motion) in the section also invokes isotropic zoom. The horizontal and vertical zoom sliders operate on only one axis of the display. The Online Help resource includes the following table:

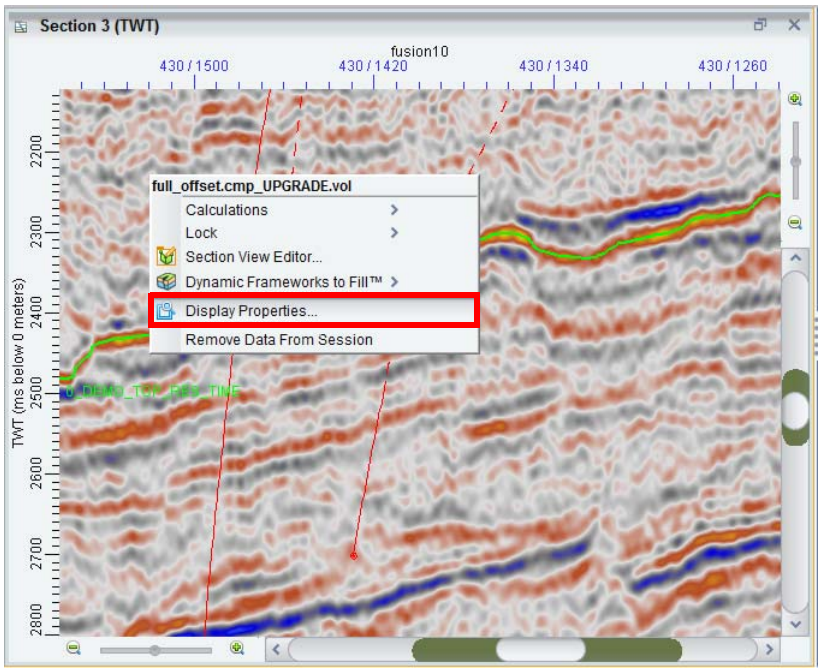
Area Zoom Fit AOI

Icon	Tooltip	Function
	Area Zoom In Shift + Area Zoom Out	Click this icon and draw a zoom rectangle by dragging your cursor over the object. When you release the mouse button, you effect the zoom. To zoom out leave this icon depressed and press **Shift+MB1** drawing another rectangle to zoom out.
	MB1 - Preferred Scale MB2 - Show All	Click MB1 to set the display to your preferred scale, which is set in the Scale and Z Range dialog box. Click MB2 to set the display all the objects in the view.
	MB1 - Zoom Back; MB2 -Zoom Forward	MB1 - Zoom Back changes the display back to your last zoomed view. MB2 - Zoom Forward changes the display forward to your previous zoomed view.

60. Experiment with some of the zoom options described above. Use the time scale or the survey scale to zoom. Click (activate) the **Area Zoom In** icon ( ). In the time scale next to the seismic traces, **MB1-drag** over a time window to zoom. The same idea applies to the spatial scale at the top of the seismic traces.

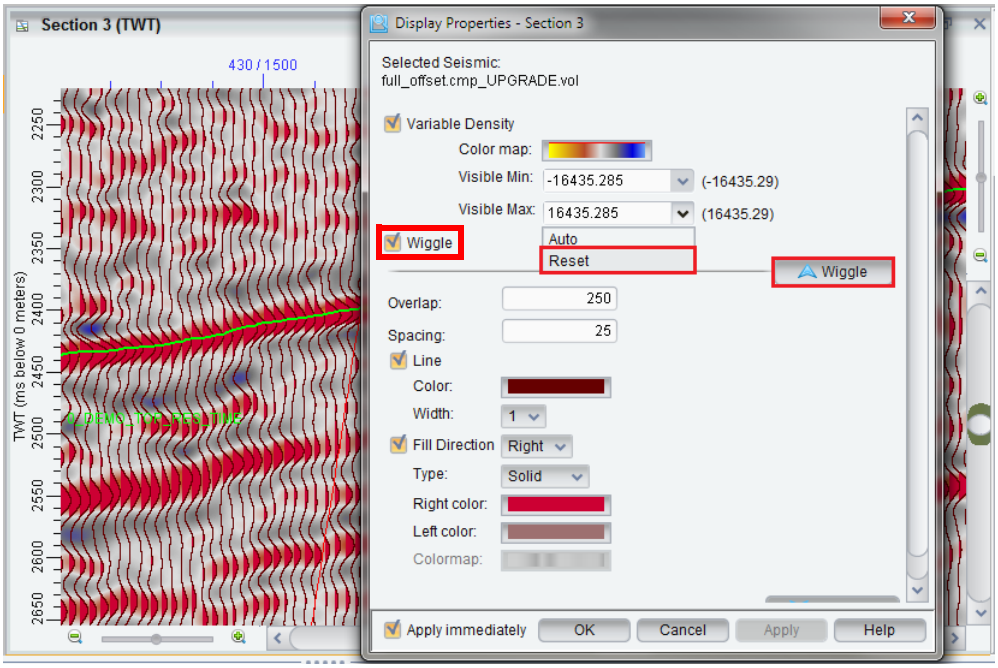


61. Zoom In on the **three wells** on the left. On the section, **MB3 > Display Properties...**.



From the *Display Properties* dialog you can change the seismic color and turn on wiggle traces.

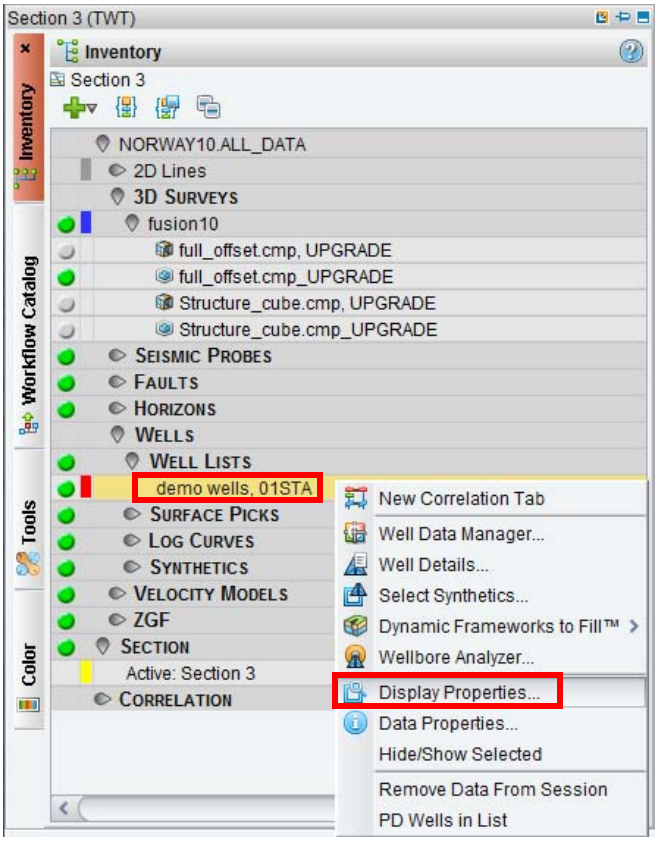
62. In the *Display Properties* dialog click the pull-down arrow for **Visible Max: > Auto** to reset the maximum and minimum for the color scale. Toggle on the **Wiggle** check box, and on the lower right of the *Display Properties* dialog, click the **Wiggle** button to reveal more options. If the Apply immediately box is checked, the wiggles will appear without requiring that you click **Apply** or **OK**. If you have time, experiment with wiggle trace line color, fill direction, fill type, color, and overlap.



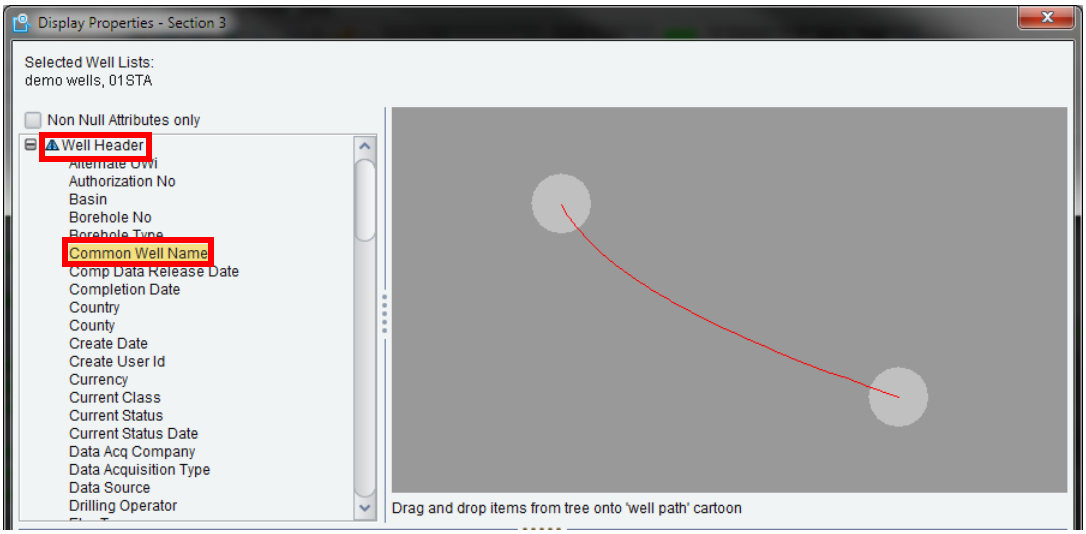
63. When you are finished, toggle off **Wiggle** traces. Click **Color map > System > Greyscale**, and click **OK**.

You may use your preferred color map, perhaps 3_Magic, but greyscale produces the best printed images for this manual.

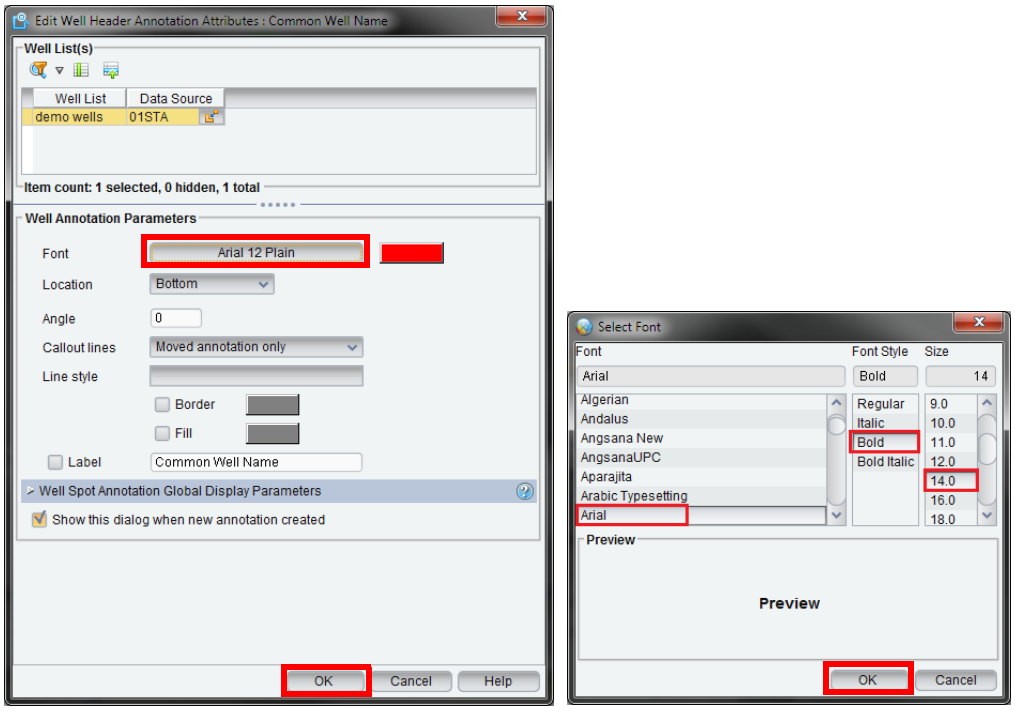
64. Either directly over a well in the *Section view* or over the **Demo Wells > demo wells, 01STA** list in the *Inventory*, **MB3 > Display Properties...**.



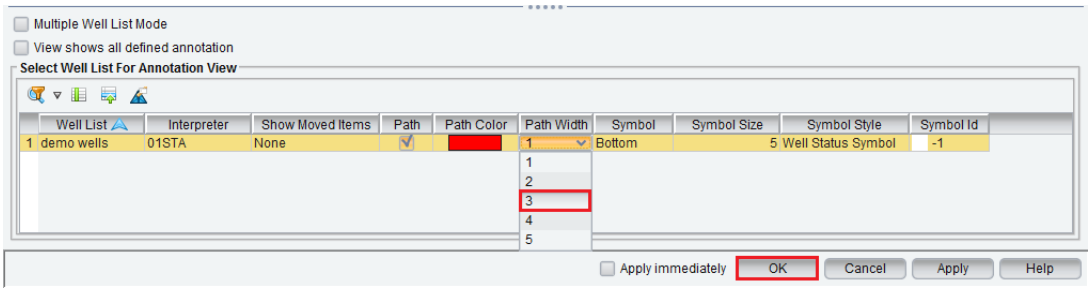
65. Click the plus sign (Well Header) to expand the *Well Header* tree. Drag-and-drop **Common Well Name** to the bottom hole location.



66. The *Edit Well Header Annotation Attributes* dialog will appear. Click the **Font** button and in the *Select Font* dialog, change the font type to **Arial** font style to **Bold** and font size to **14.0** point, then click **OK** in the *Select Font* dialog to close it. Then click **OK** in the *Edit Well Header Annotation Attributes* dialog.



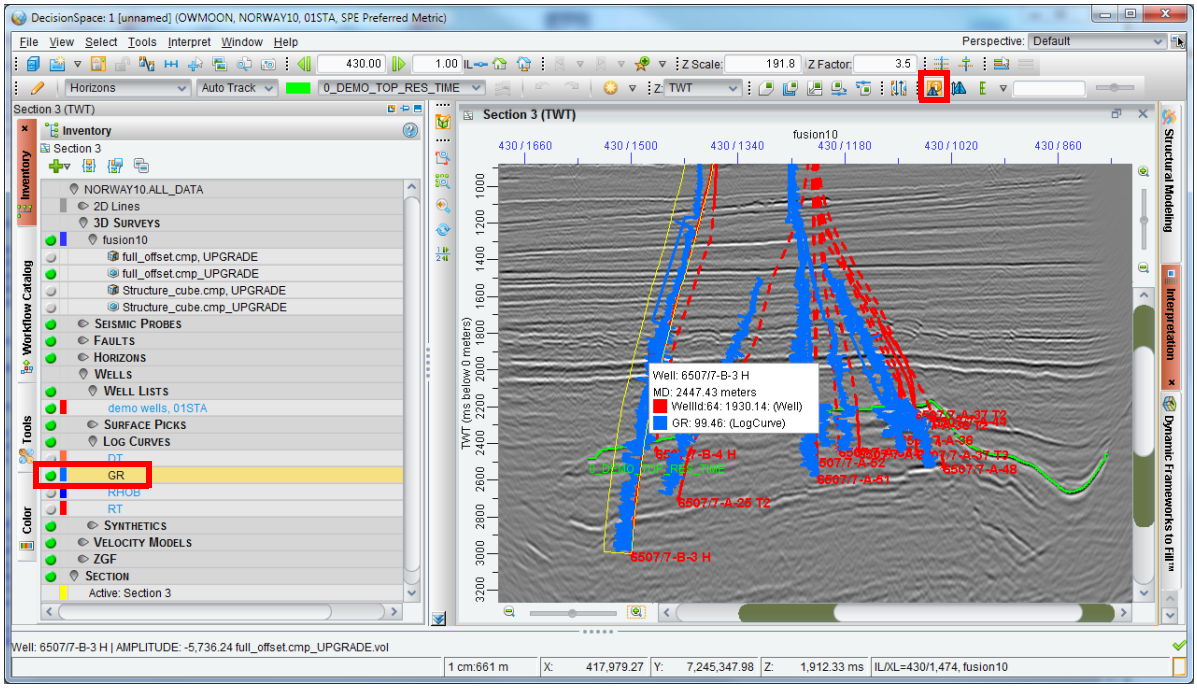
67. Back in the lower part of the *Display Properties* dialog, on the demo wells line, change the *Well Path* to **3**, and click **OK**.



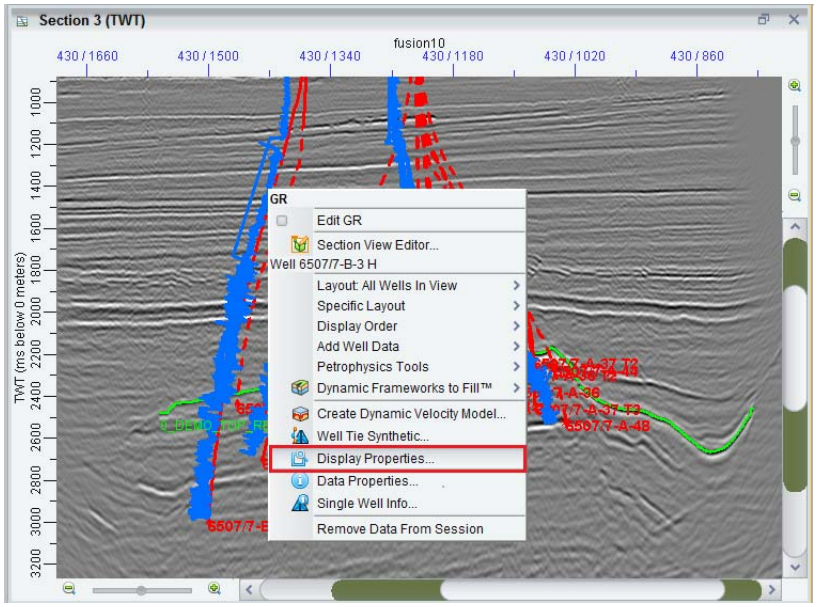
The wells in the section should now be labeled at the bottom and have a thicker well bore.

68. In the *Inventory*, under **Log Curves,** toggle on **GR**. Click the **Well Info** icon ( )in the top icon bar. Then place (hover) your cursor on

the well and log curve at a location of interest. After observing several wells, click the **Well Info** off.



69. Still in the *Section* view, put your cursor on a **GR log** and **MB3 > Display Properties...**.



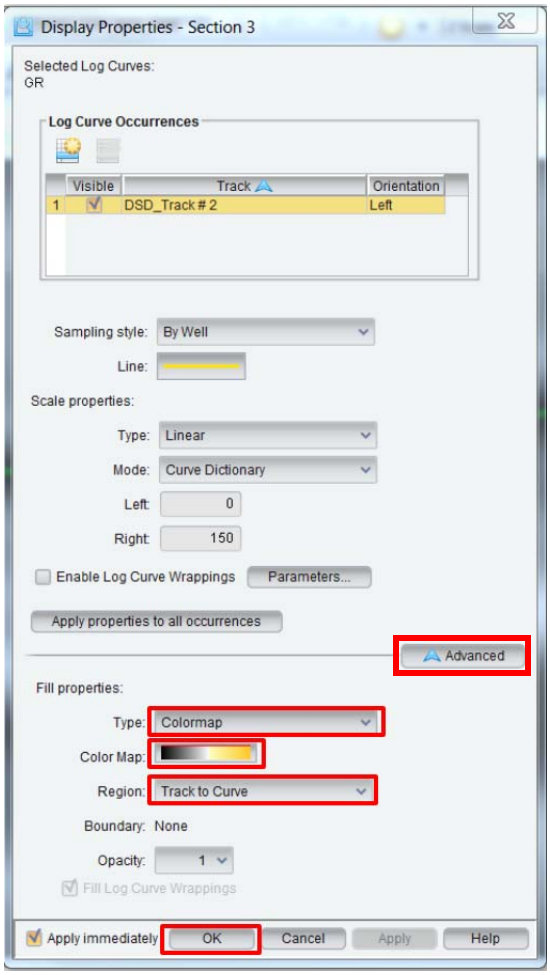
Note:

In some areas with dense data it may be difficult to select a specific item to ensure that you have selected the right data, the name will be at the top of the menu.

You can examine many parameters over time. For now you will continue by making a few changes to enhance the view of the log data.

In clastic sediments, the Gamma Ray (GR) curve is often an indicator of sand and shale, with lower values indicating a more sandy lithology and higher values indicating a more shaley lithology. You can display the curve filled with a color scale of yellow (sandy) to white and on to black (shaley), as you will set in the next step.

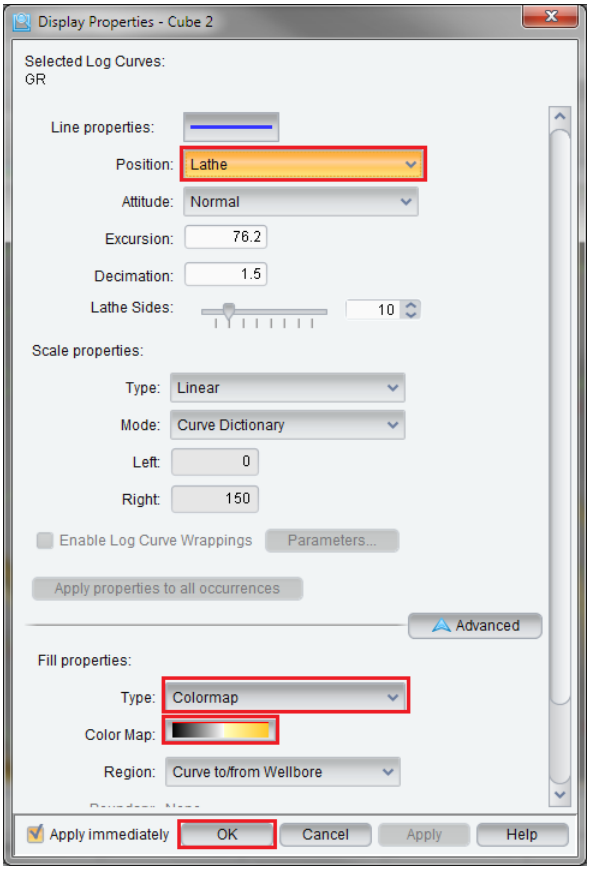
70. On the *Display Properties* dialog, click the **Advanced** button to provide the log with some fill properties. In the *Type* pull-down, select **Colormap**. Click the displayed **color bar** and select **System > BlackWhiteYellow**. In the *Region* pull-down, select **Curve to/ from Wellbore** or **Track to Curve**. Click OK to close the *Display Properties* dialog.



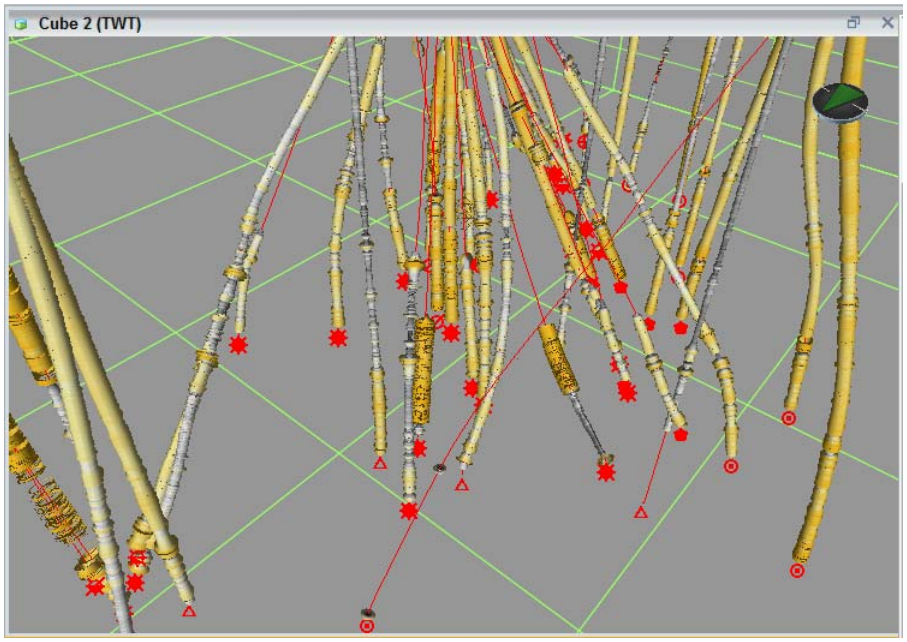
71. Double-click the ***Section*** tab to restore original tile size; select and double-click the ***Cube*** tab to maximize that view. Turn **off** all

probes, horizons, and faults. If not already displayed, toggle on **Well Lists > demo wells, O1STA**. Also turn on **Log Curves > GR.**

72. In the *Cube* view on a log curve, **MB3 > Display Properties....** Set the properties as shown below, including setting Position to **Lathe**. Note that the color scale is now **BlackWhiteYellow**. Click **OK**.

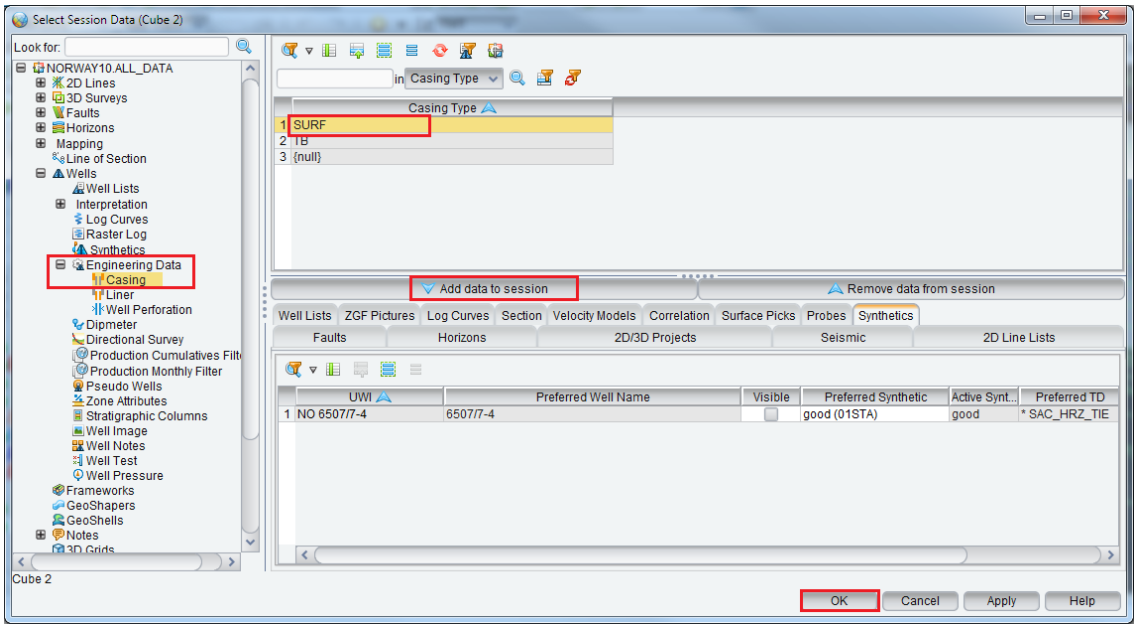


The wells in *Cube* view now graphically portray the sand and shale variations.



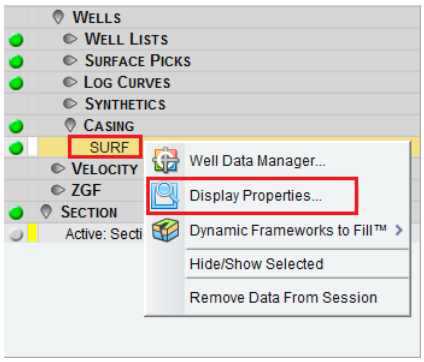
You can display casing information in *Cube* view, if it is stored in the OpenWorks database.

73. Click **Select Session Data** ( ). In the data tree on the left of the *Select Session Data* window, expand **Wells > Engineering Data** and select **Casing**. Highlight the Casing Type **SURF** and click the **Add data to session** button. Click **OK**.

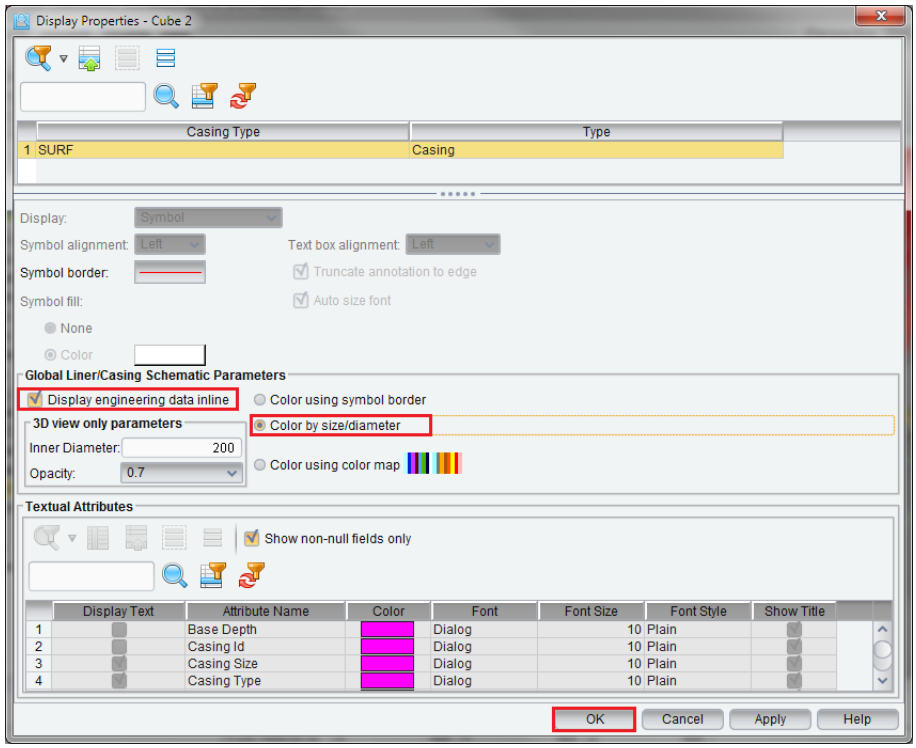


The casing information is added to your session.

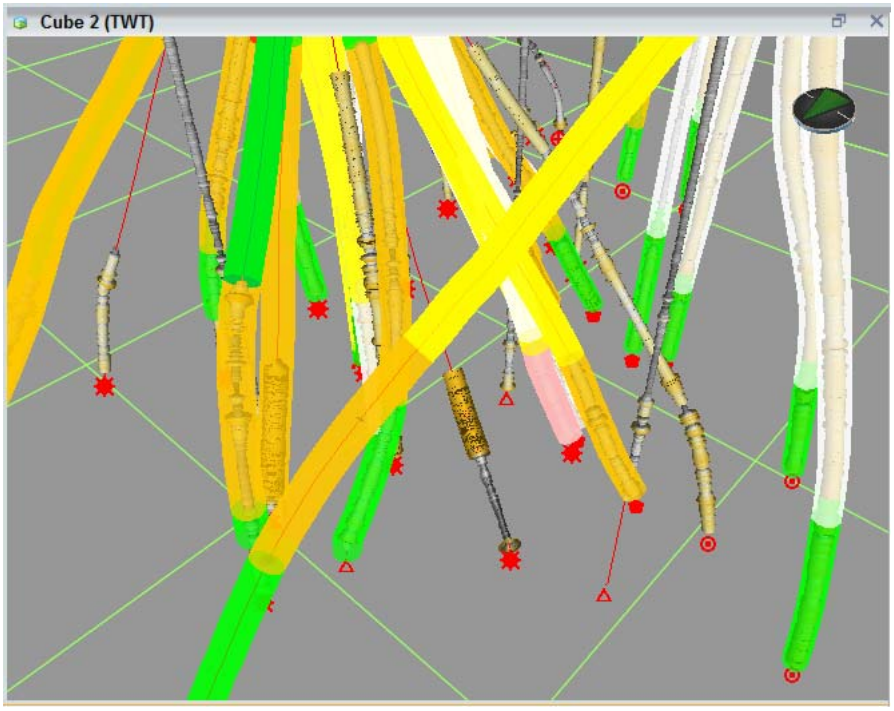
74. In the *Inventory*, toggle on **Casing** and **SURF**. With your cursor over **SURF**, **MB3 > Display Properties...**.



75. In the *Display Properties* dialog, toggle on **Display engineering data inline** and **Color by size/diameter**. Click **OK**.



Your display should look something like the figure below.

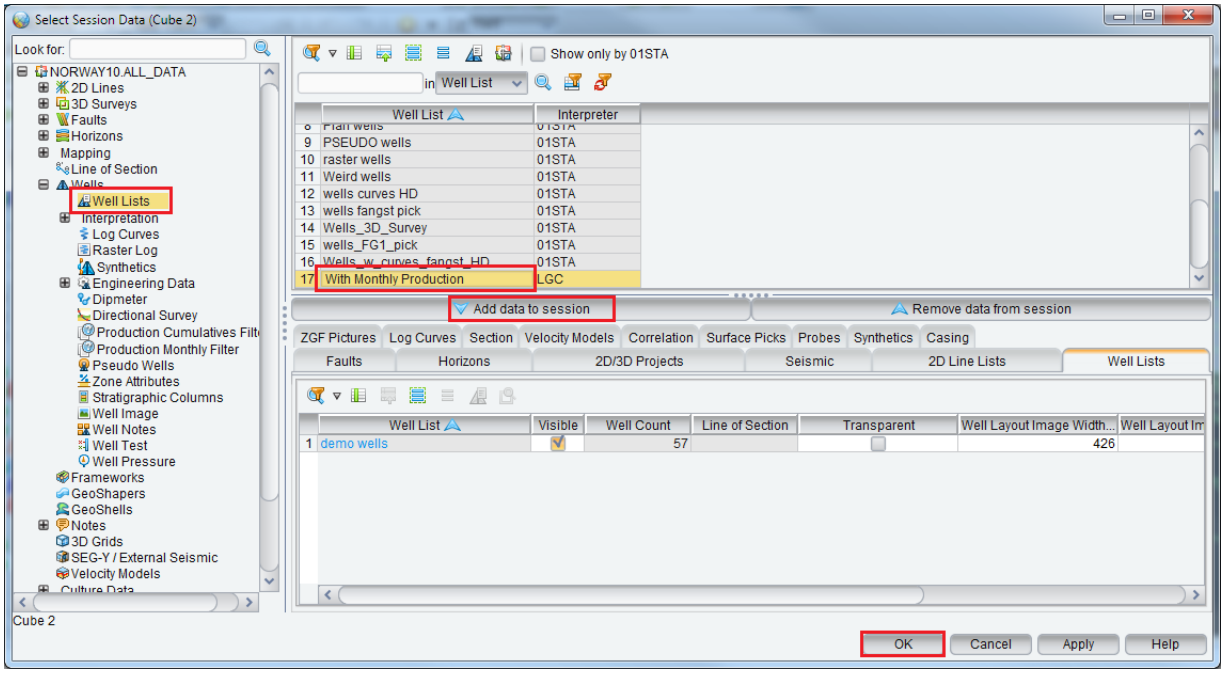


Displaying Well Layouts with Log Signature Maps

Log signatures are a way to display well layouts and their corresponding data: log curves, raster logs, well notes, casing, perforations, well images, and so forth, in *Map* view. You can use log signature displays for specific presentation maps.

You will work with a well list containing fewer wells to keep the *Map* view uncluttered. Add Well List With Monthly Production to your session data.

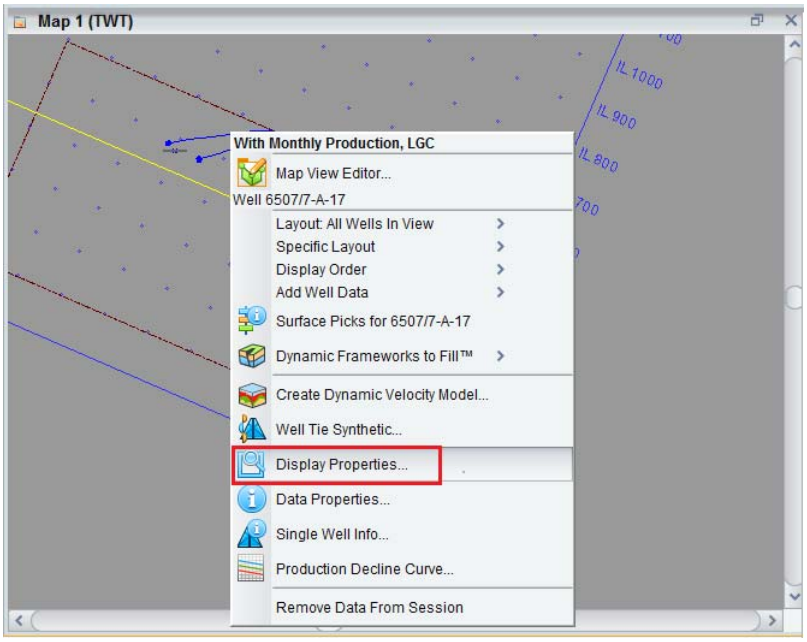
76. Click **Select Session Data** ( ). In the data tree on the left of the *Select Session Data* window, expand **Wells > Well Lists**, make the selection of **With Monthly Production**, and click the **Add data to session** button. Click **OK**.



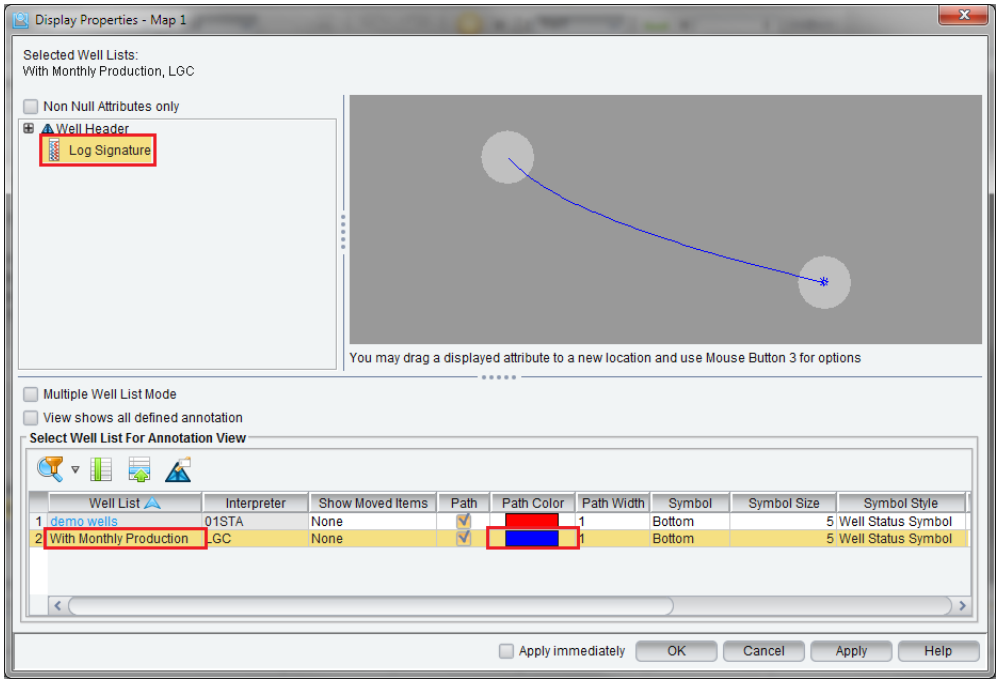
Log signature display is controlled by the *Edit Log Signature Annotation Attributes* dialog.

77. Double-click the ***Cube*** tab to restore original tile size; select and double-click the ***Map*** tab to maximize that view. Toggle off all **3D Survey > fusion10 volumes**. If not already displayed, toggle on **With Monthly Production** and toggle off **demo wells** and **O1STA** under **Well Lists**. Toggle off all other data.

78. Either directly on a well in the map or on the **With Monthly Production, LGC** item in the *Inventory*, **MB3 > Display Properties...**.

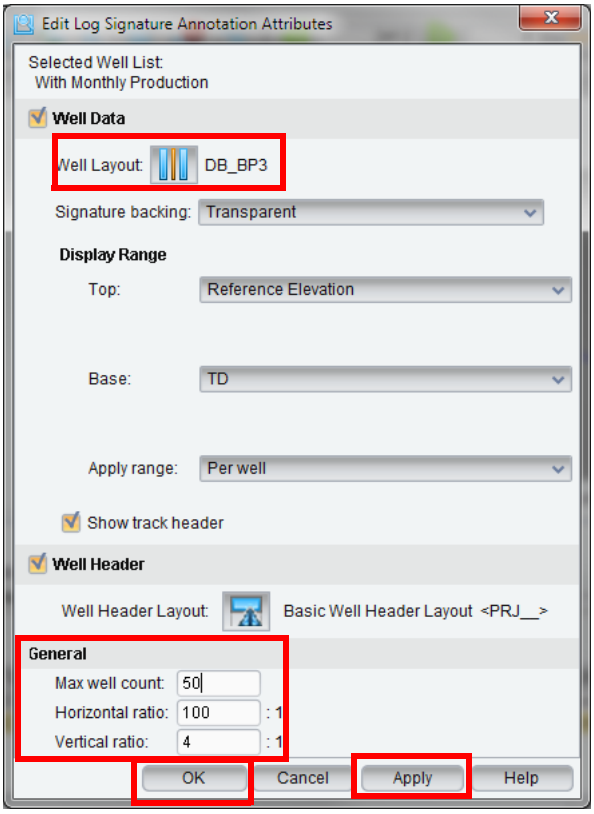


79. On the *Display Properties* dialog, change the **Color** of the well bores for this well list, if you wish. Drag-and-drop the **Log Signature** heading to the bottom hole location.

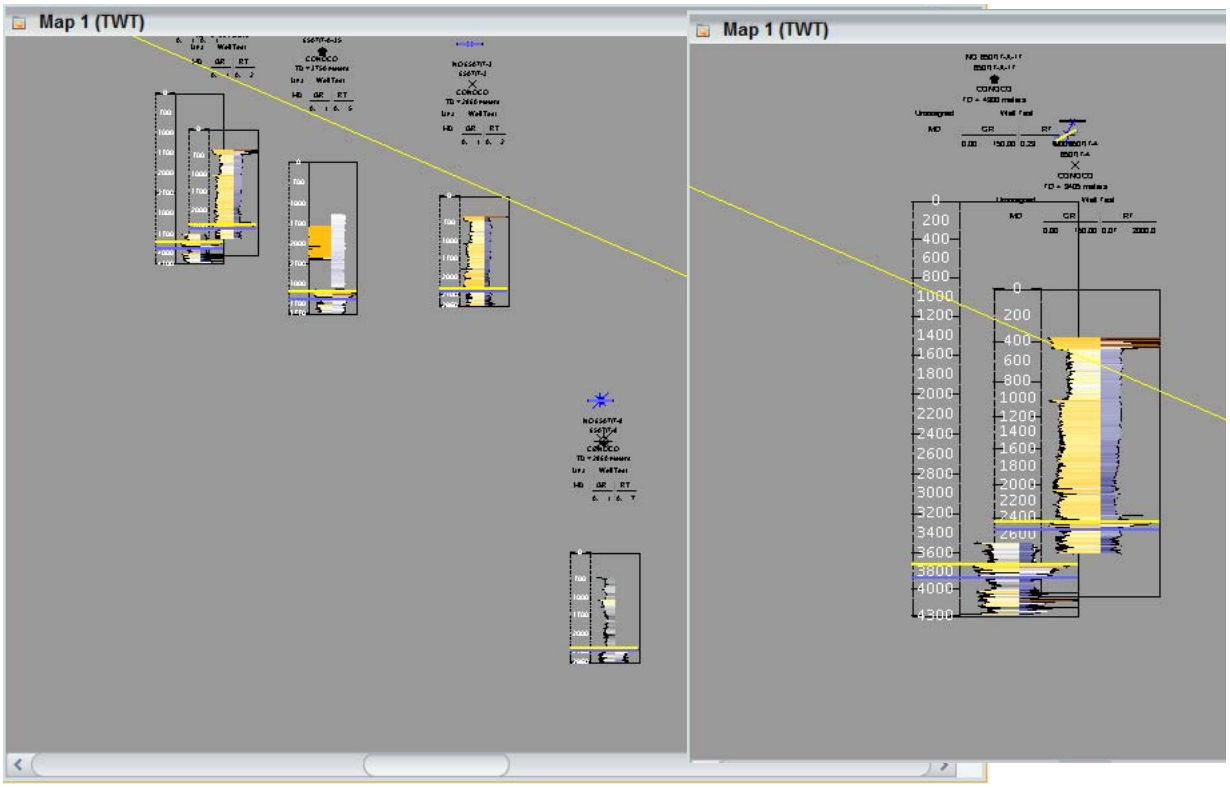


The *Edit Log Signature Annotation Attributes* dialog will appear.

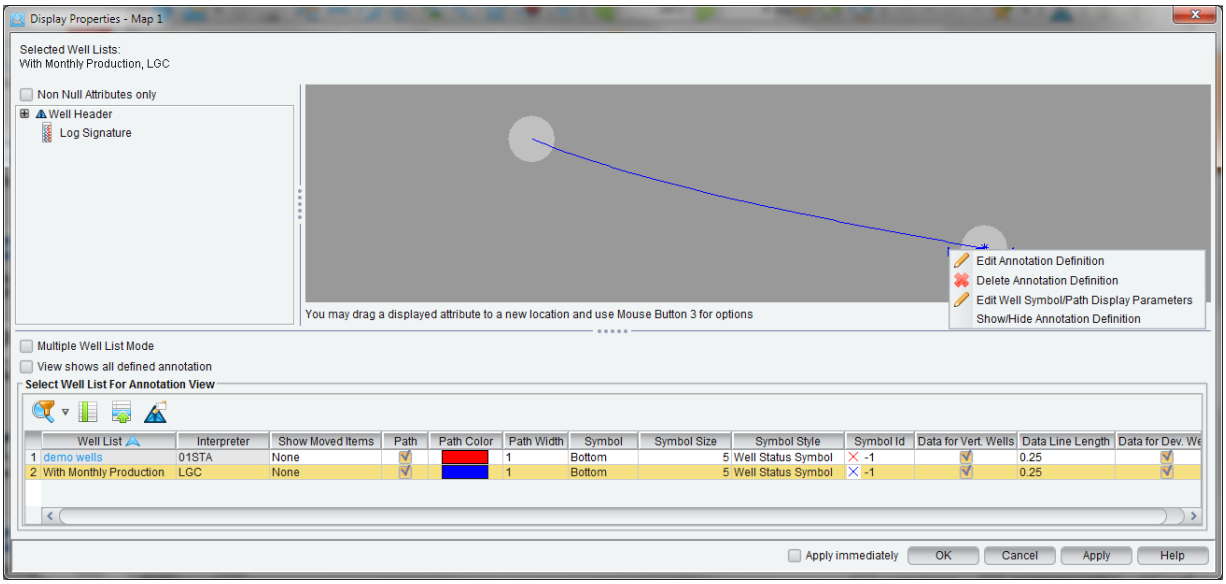
80. Configure the *Edit Log Signature Annotation Attributes* dialog as shown. Click the **Well Layout** icon to display the *Open Well Layout* dialog. Select **DB_BP3** and press **OK**. Now in *Edit Log Signature Annotation Attributes* dialog in General sub-panel Set the *Max well count* to "**50**" *Horizontal ratio* to "**100**" and *Vertical ratio* to "**4**" press **OK** on this dialog, then **Apply** in the *Display Properties* dialog.



81. Inspect the *Map* view. **Zoom in** to a few wells to understand the Log Signature display.

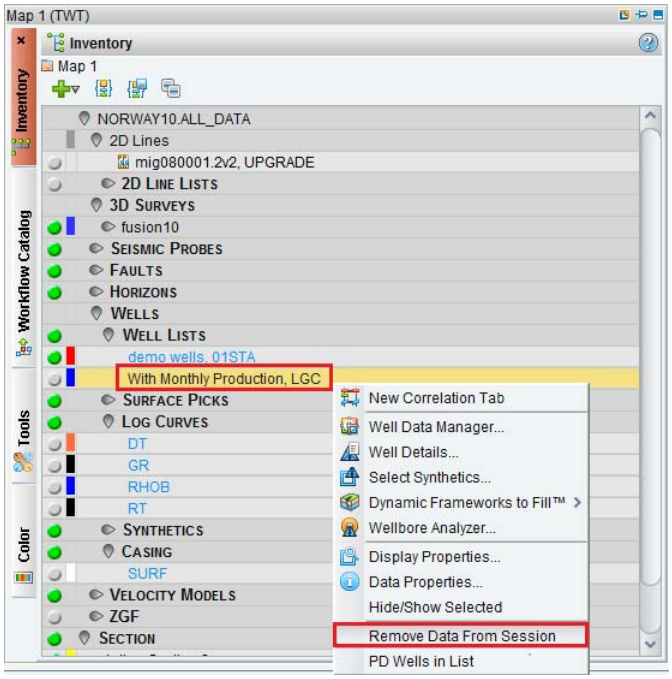


82. Experiment with some of the controls on the *Edit Log Signature Annotation Attributes* dialog. In the *Display Properties* dialog on the Log Signature text at the bottom hole location, **MB3 > Edit Annotation Definition** to restore the *Edit Log Signature Annotation Attributes* dialog. Make changes to parameters, then click **OK** and **Apply** and note updates to the *Map* view.

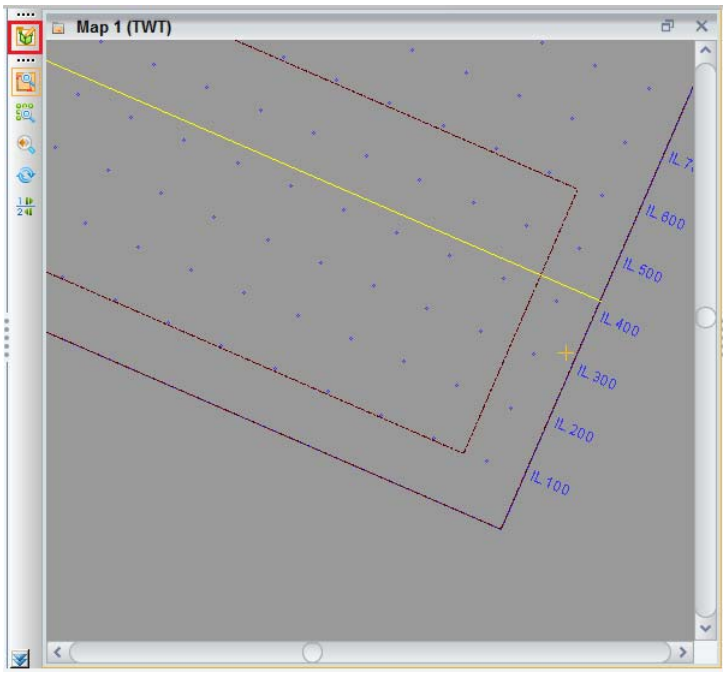


83. When you are finished with parameter adjustments, **cancel** the *Edit Log Signature Annotation Attributes.* In the *Display Properties* dialog, put your cursor on the Log Signature and **MB3** > **Delete Annotation Definition** (as shown above). Click **OK** to close the *Display Properties* dialog.

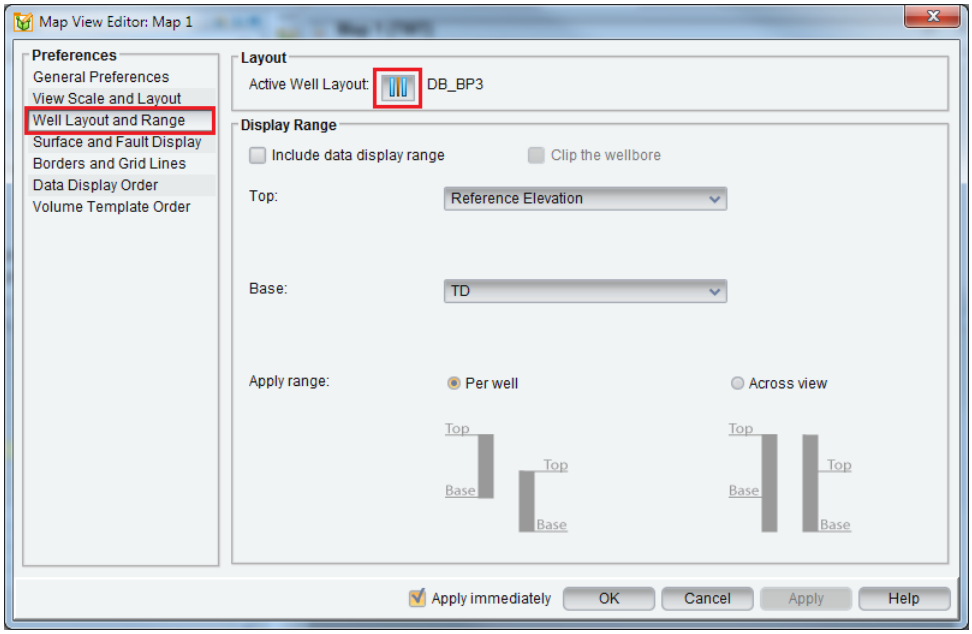
84. In the Inventory, put your cursor on **Well Lists > With Monthly Production** and **MB3 > Remove Data From Session**.



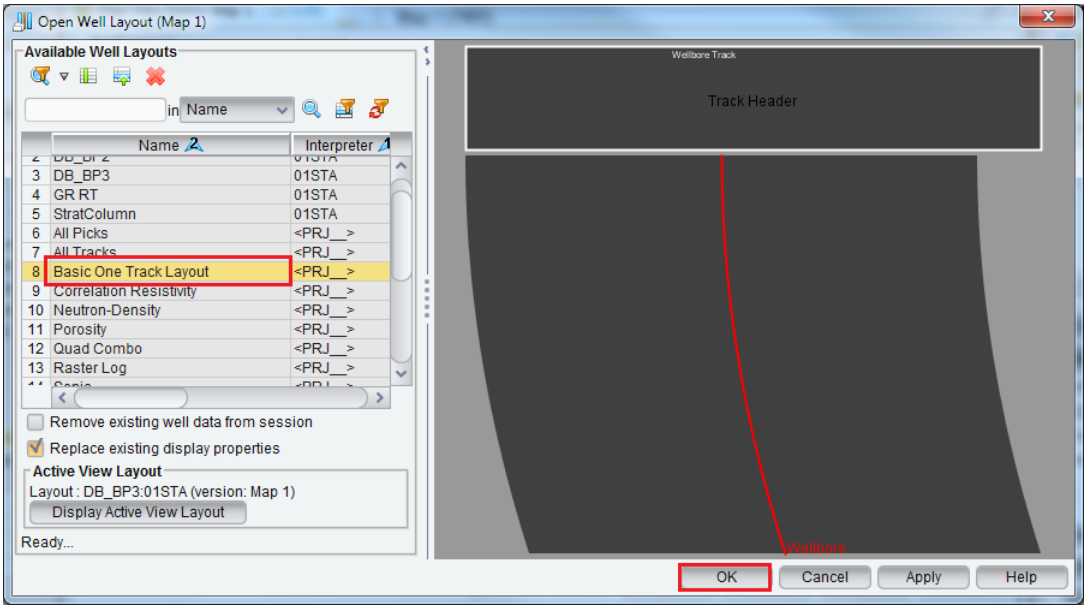
85. In Map View, click the **View Editor** icon. The *Map View Editor* dialog will open.



86. Select **Well Layout and Range** under **Preferences**. Then click the **Active well layout** icon. The *Well Layout* dialog will open.



87. Select **Basic One Track Layout** from the available well layout and click **OK**. Then click **OK** in the *Map View Editor* dialog.



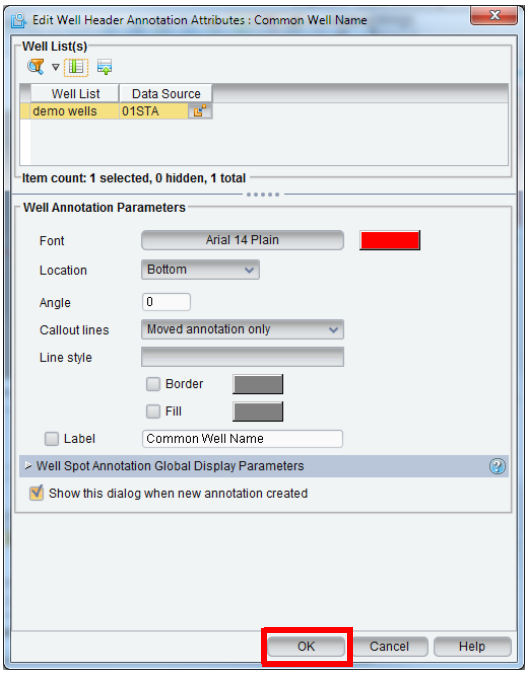
Displaying Single-Well Information

You should know the production history of the wells in the area that you are studying. With DecisionSpace you can check production data in table or graphical form. The following steps will introduce you to these capabilities.

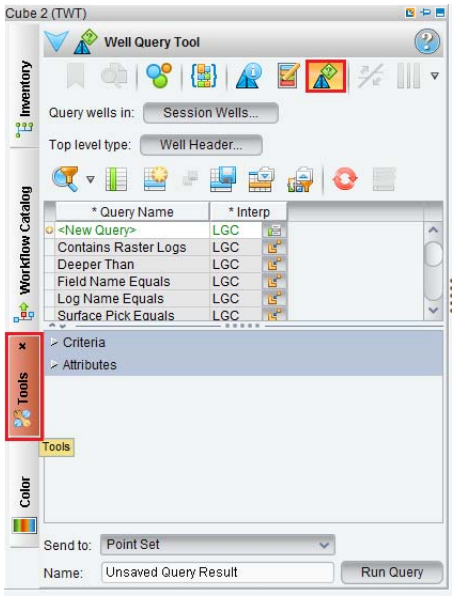
First you will query the database to see which wells contain production histories. Then you will display this data in a decline curve view.

88. Restore the main window configuration to three tiles (*Cube*, *Map*, and *Section*). In all three views, show Well List **demo wells**, **01STA**. Hide all other data.

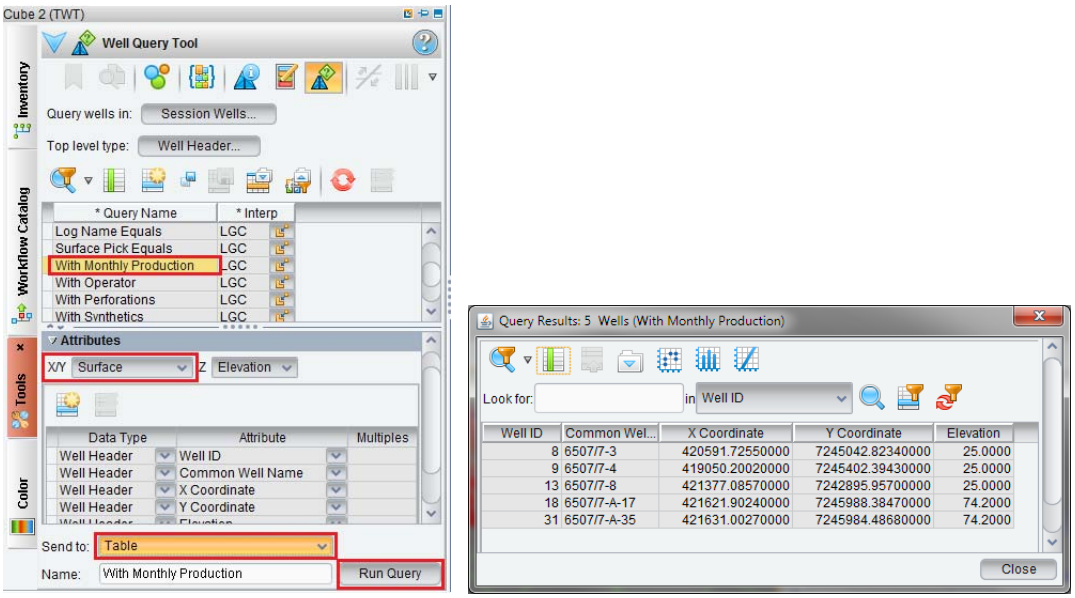
89. *The Edit Well Header Annotation Attribute* dialog will open. Press **OK** and also press **OK** in the *Display Properties* dialog.



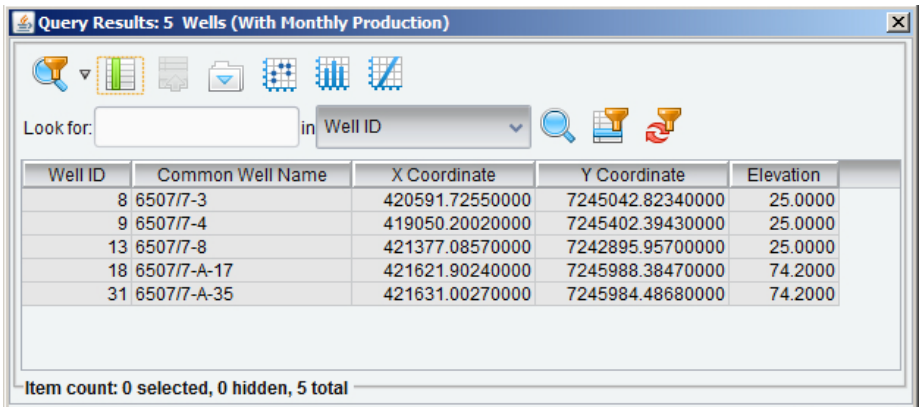
90. Activate the *Tools* task pane. Click the **Well Query Tool** icon ( ) at the top of the task pane.



91. From the list of Query names, select the **With Monthly Production**. Expand the **Attributes** sub-panel. Select **Surface** from the *X/Y* drop-down menu. At the bottom of the pane in the Send to field, select **Table** and click **Run Query**.



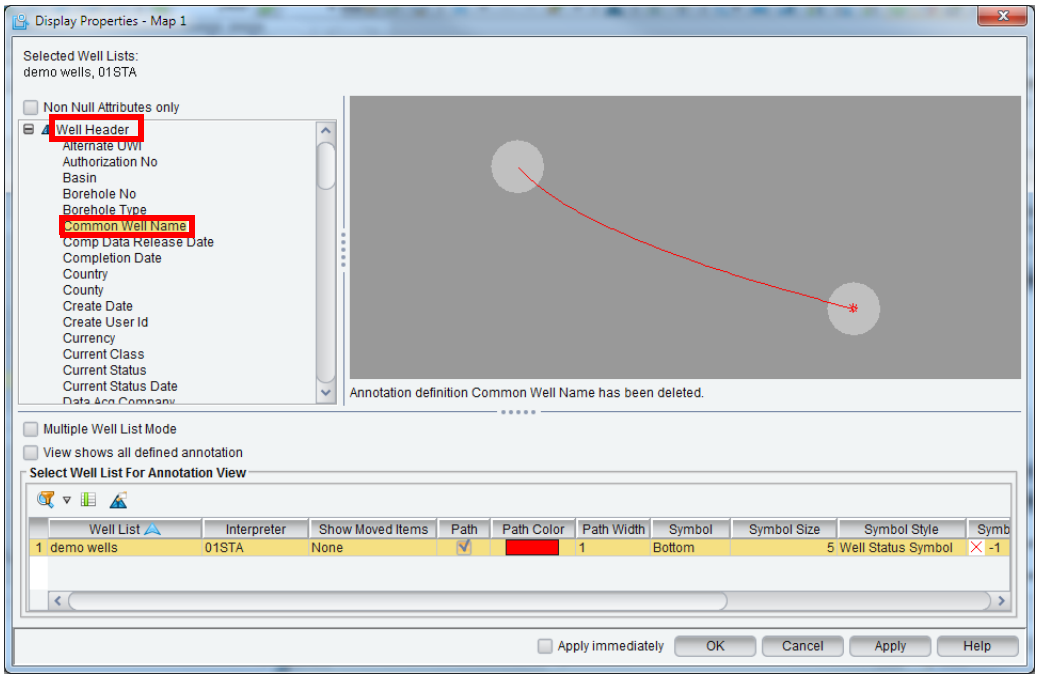
The *Query Results* table shows five wells with monthly production information. Now that you know which wells contain production data, you can select and view the information.



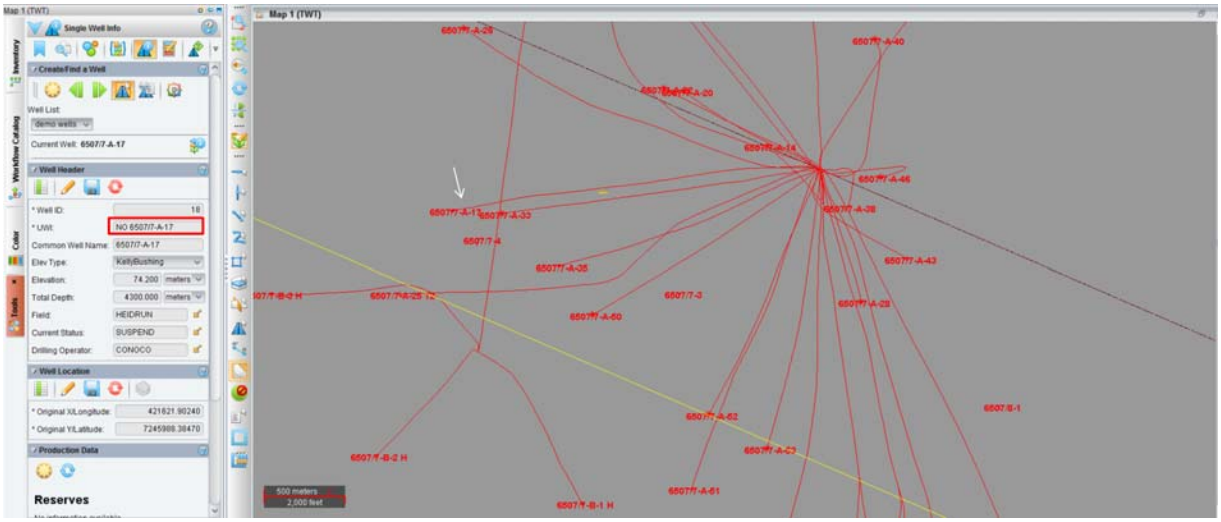
92. Double click the ***Map*** tab to maximize its tile. In the ***Tools*** task pane (Well Query Tool), click the **Single Well Info** icon ( ).

The task pane changes to Single Well Info configuration, showing a well and its header information. Your next step is to use the Find a Well sub-panel to select one of the wells with production information.

93. From the *Inventory* task pane **MB3** on well list **demo wells** > **Display Properties**. In the *Display Properties* dialog, open the **Well Header** tree and drag and drop **Common Well Name** to the Bottom hole location.



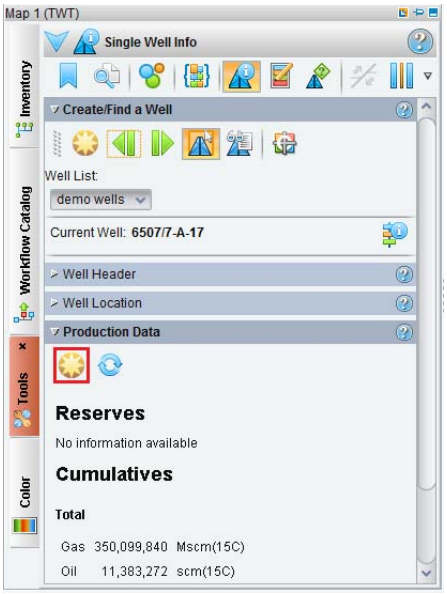
94. In the task pane, click the **Select Well From View** icon ( ). Then, in the *Map* view, click the TD location of well **6407/7-A-17**. The location of the well is shown by the white arrow in the figure below.



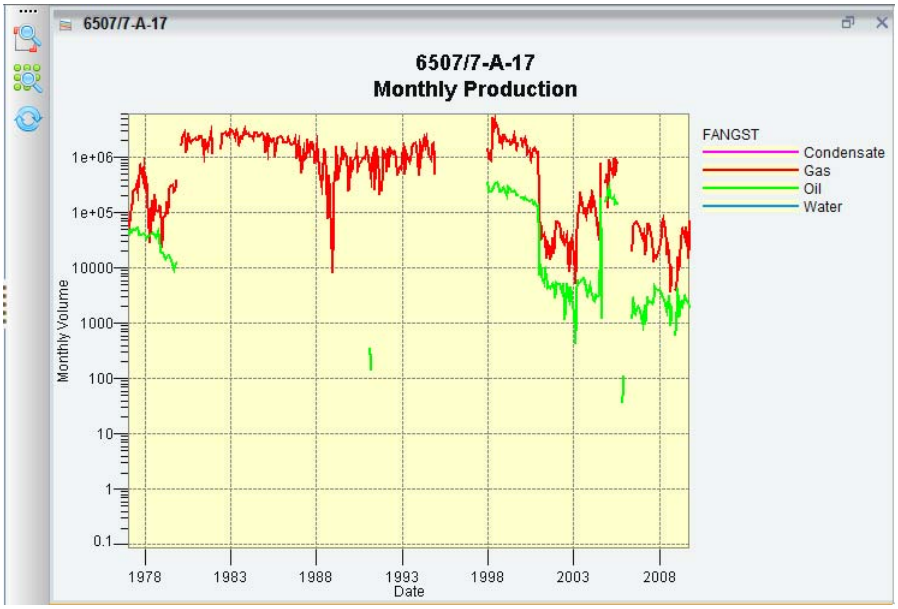
Note the updates to the Well Header and Production Data sub-panels.

You can choose wells using the **Select well (from list)** icon ( ), the **Select Previous Well in List** ( ), or **Select Next Well in List** ( ) button pair.

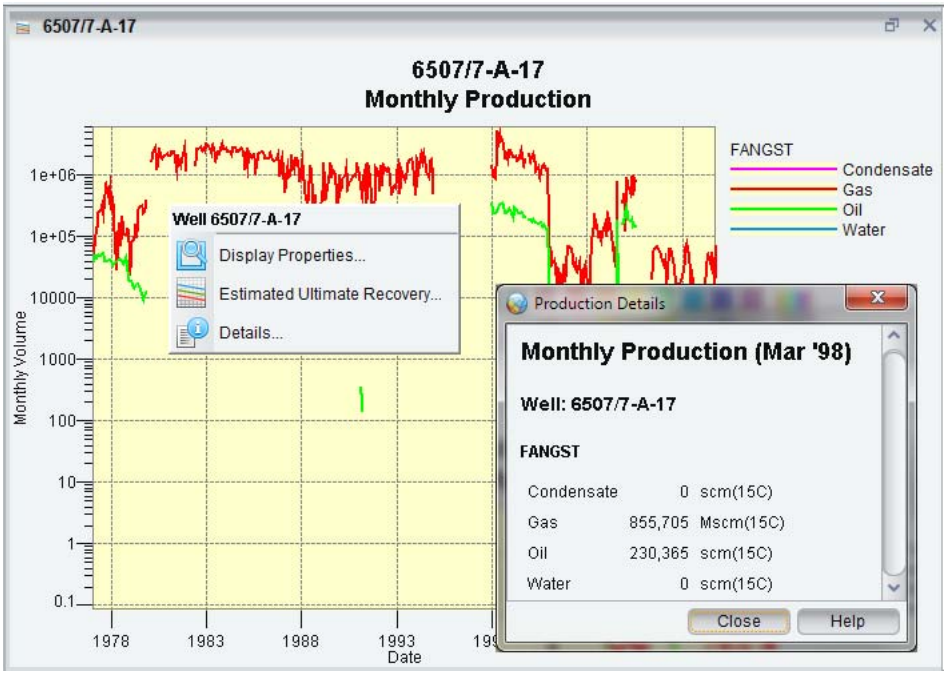
95. In the Production Data sub-panel, click the **Create decline curve view for current well** icon ( ).



The view changes to a Monthly Production plot where you can examine monthly production details.

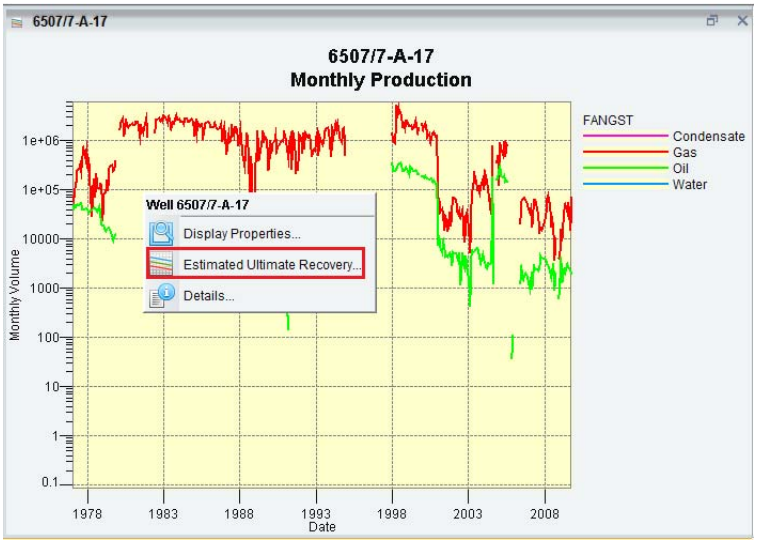


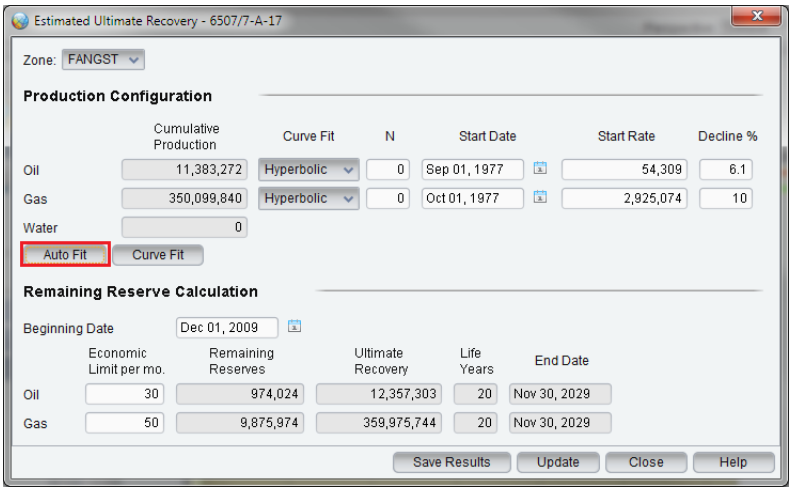
96. On the plot, **MB3 > Details...**. Then MB1-drag the **red icon** at the bottom of the plot to the month of interest and observe updates to the *Production Details* window. Click **Close** when you are satisfied.



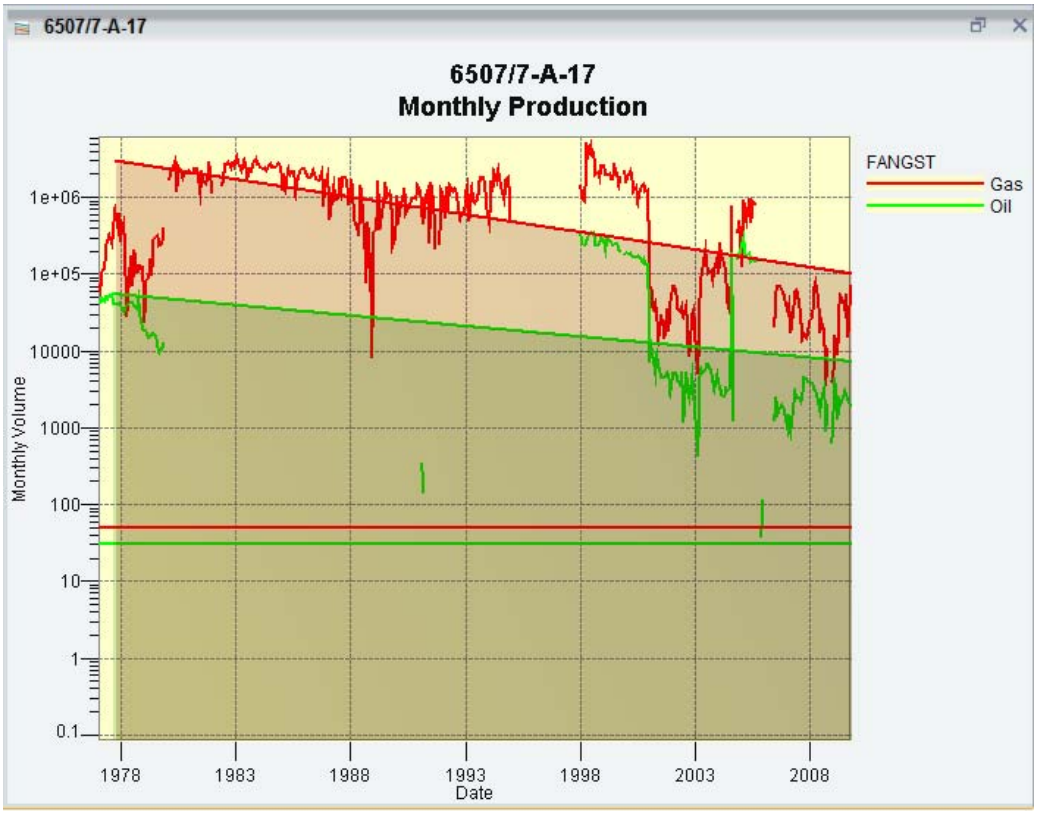
DecisionSpace also contains a calculator for estimating ultimate recovery. There are many parameter options, but for this introduction you will take the default settings.

97. On the chart, **MB3 > Estimated Ultimate Recovery...**. On the *Estimated Ultimate Recovery* dialog, in the Production Configuration section, click **Auto Fit**.





The remaining reserves are calculated and the decline curves are plotted on the graph.

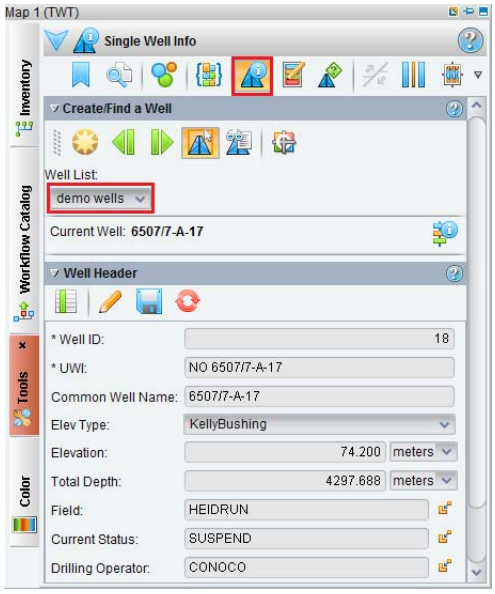


98. **Close** the *Estimated Ultimate Recovery* calculator. **Close** the Monthly Production plot and the *Query Results* table.

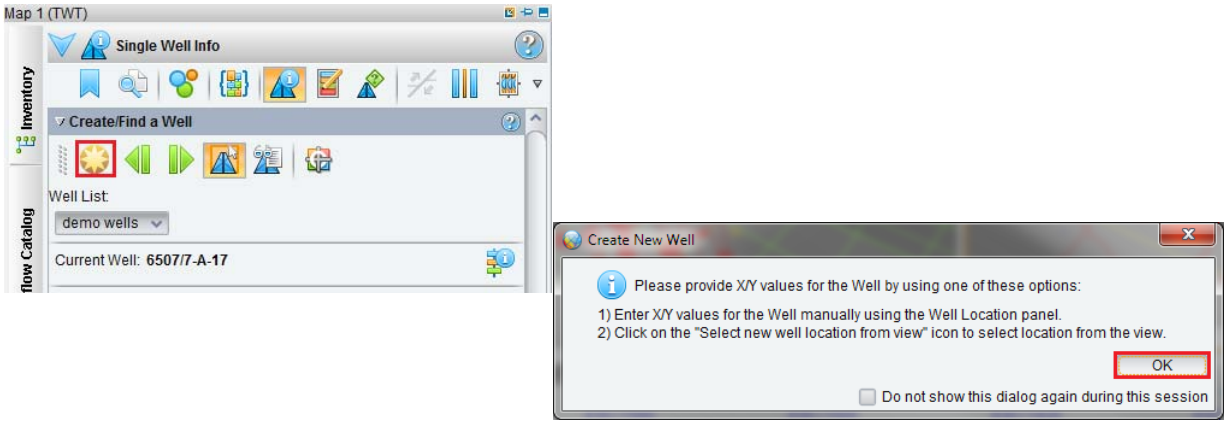
Easy Create Well Utility

DecisionSpace 5000.10.0 includes a simple method to create wells in the project database. New wells are added to a designated Well List.

99. Confirm that the ***Tools*** tab is configured for Single Well Info. For Well List, select **demo wells**.

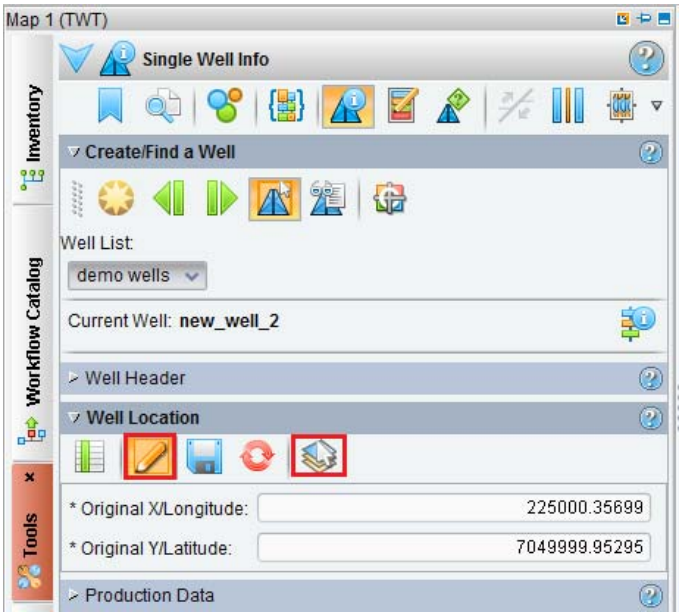


100. Click the **Create new well in list** icon to open the *Create New Well* dialog. Read about your options, then click **OK**.

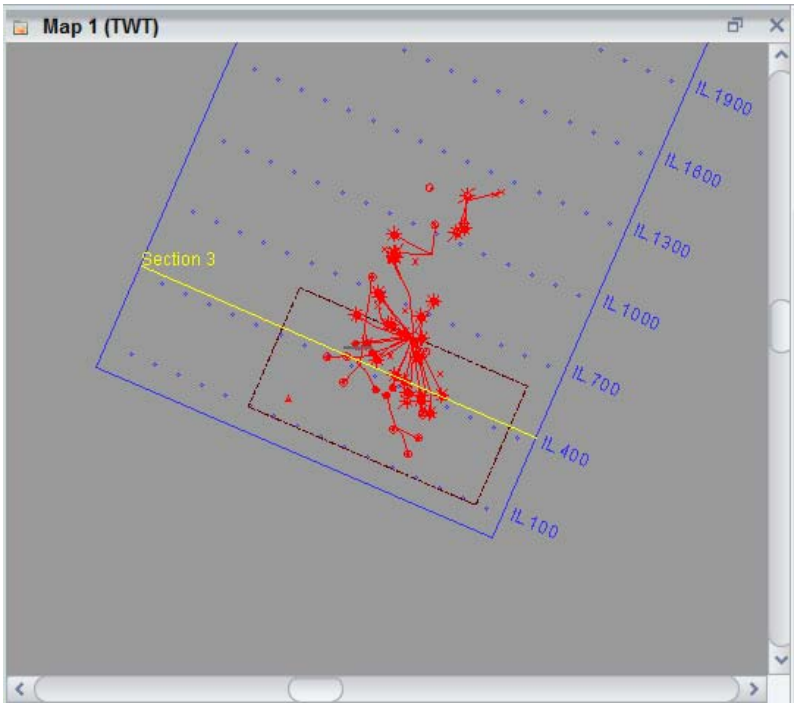


Location information is needed for the new well, as the dialog suggests.

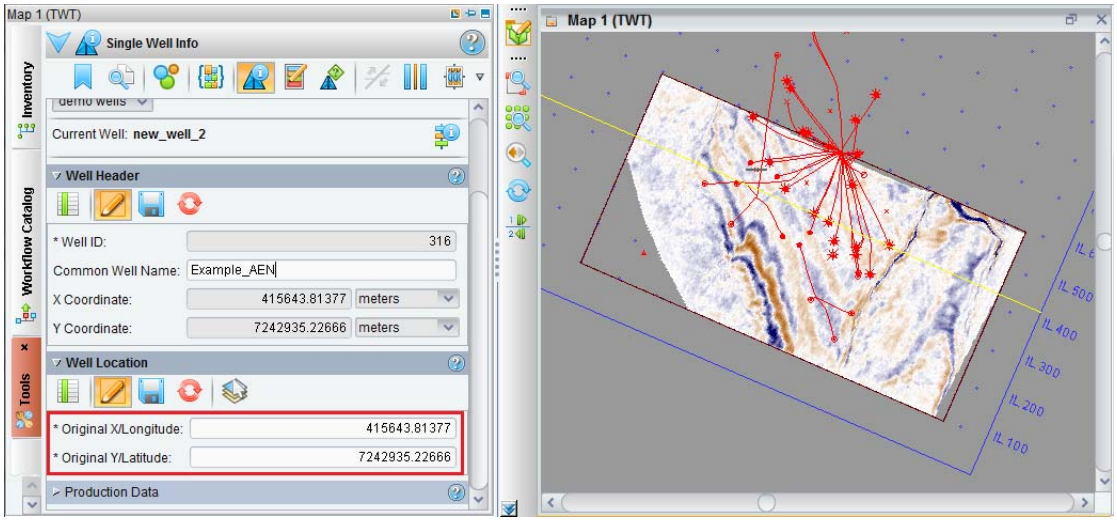
101. With ***Map*** view active, click the **Edit data item** icon in the Well Location sub-panel, if it does not activate automatically. Then click the **Select new well location from view** icon.



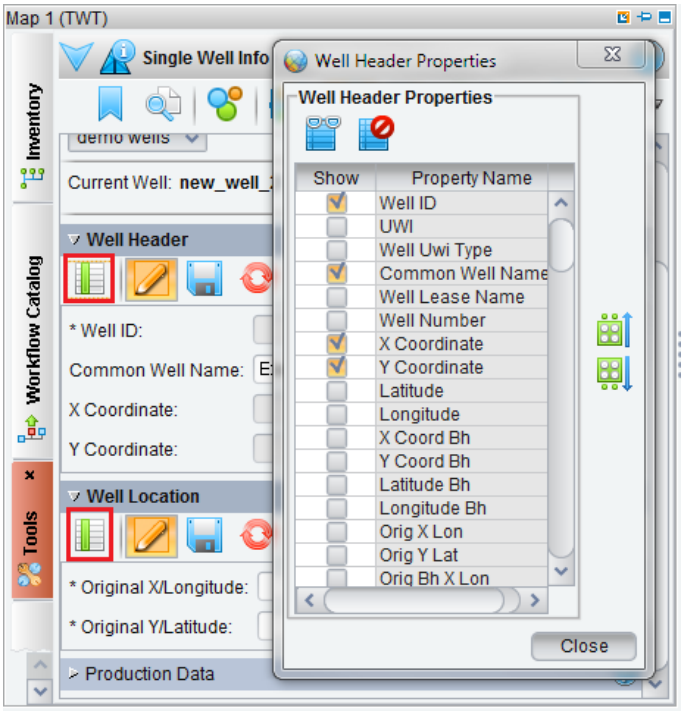
102. In the *Map* view, click **a location** for the new well.



In the Well Location sub-panel, coordinate text fields are updated based on your click. Note well symbol on the *Map* view. You can also specify coordinates and well name with a keyboard entry.



You can also increase the number of editable header fields in the Well Header and Well Location sub-panels.



If prompted, do not save your example new well.

Saving the Session

If you develop the good habit of saving your session periodically, you can readily recover from many computer problems. DecisionSpace offers a fallback in this regard by backing up sessions automatically every 15 minutes. You may see some of these time-stamped session names in the *DecisionSpace Session Manager* dialog when you launch the application.

103. In the *DecisionSpace* menu bar select **File > Save Session as...**. In the middle of the *Save Session As* dialog, enter a session name such as **YOU_DSG_Ch1**, then click **Save**.

That concludes your first look at the layout and functionality of the DecisionSpace Geosciences suite. In the next two chapters you will build upon this introduction, learn how to document your work, and dig down further into your project data.

From this reconnaissance exercise, you should have some concept of the setting, structure, lithology, well position, and even a little well engineering of this field.

Review

This chapter introduced you to some of the structure and features of the DecisionSpace Geosciences suite. You made a reconnaissance pass through the data in this North Sea field and you brought many data types into various displays. You scanned through the seismic volume, viewed wells, and looked at previous interpretations.

In this chapter you:

- Started DecisionSpace Geosciences
- Discovered the abundance of information in the online help
- Learned about the DecisionSpace interface with tabs, views, tiles, task panes, tool bars, and more
- Explored three main types of display: *Map*, *Section*, and *Cube;* and how they interrelate
- Changed the display parameters in each of these views to best visualize the data
- Selected and loaded data into DecisionSpace
- Loaded seismic volumes to memory to improve performance
- Learned that the Inventory Tree is a powerful method of controlling display content
- Discovered that while there are sometimes several ways of accomplishing a task, the DecisionSpace Geosciences suite provides a friendly and intuitive user interface
- Learned how to manipulate probes and other objects in Cube view
- Used DecisionSpace Geosciences to assess a project (reconnaissance workflow) using seismic, well, and other data

Chapter 2
Getting Organized

Before you begin your geological and geophysical interpretation, you need to get organized. This chapter shows some new techniques that will prepare you for upcoming workflows in the DecisionSpace Geoscience suite.

In addition to the organizing methods and tools discussed in this chapter, DecisionSpace also possesses the valuable capabilities of Project Designer for organizing and recording your interpretation work. For a thorough discussion of Project Designer, refer to Appendix A of this manual.

Topics Covered in this Chapter

The following topics are described in exercises and overviews:

- Generating an Interpretation Set (ISet)
- Applying Interpreter Notes
- Displaying GIS data
- Showing Vertical Images
- Interpreting with GeoShaper information
- Gridding in Dynamic Frameworks to Fill
- Using GeoShaper with Geometry Projection

Exercise 2.1: Organizing within DecisionSpace

Generating an ISet

Interpretation Sets allow you to organize and quickly load the project data for a particular workflow or scenario. Any changes you make to data within an ISet are automatically saved in the project database. An ISet may hold any data type that can be displayed in the *Inventory* task pane, except for active sections and .vol files stored in shared memory.

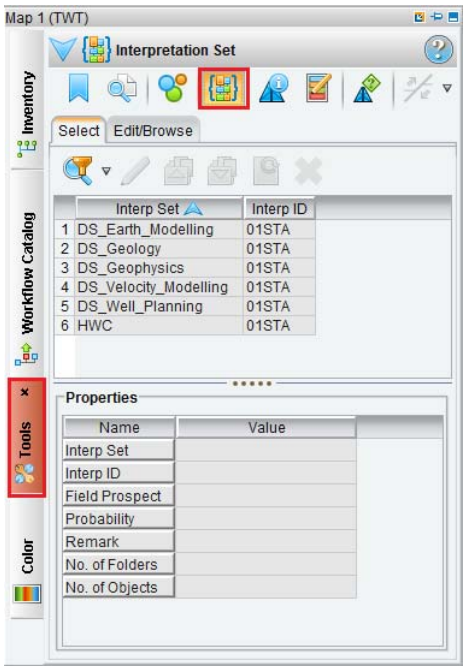
In Chapter 1, you loaded data from an ISet. Therefore, there was no need to load all the wells, faults, horizons, and seismic data individually. In this exercise, you will learn how to build your own ISet. Interpreters with access to the OpenWorks project can use these ISets later.

1. If DecisionSpace is running from the end of Chapter 1, proceed with Step 3 below.

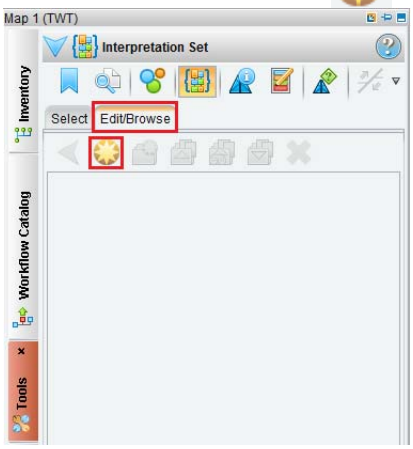
2. If not, start DecisionSpace. When the *DecisionSpace Session Manager* opens, select the ***Existing Sessions*** tab, if it is not already active. In the upper list, select the session you saved at the end of Chapter 1 (it was named **YOU_DSG_Ch1**, or something similar). Click **OK**.

3. Make sure you are in an active *Map*, *Cube*, or *Section* view and select the **Tools** tab. (This tab may either be in the left task pane or

the right task pane, as shown below). Click the **Interpretation Set** icon ( ) at the top of the task pane.

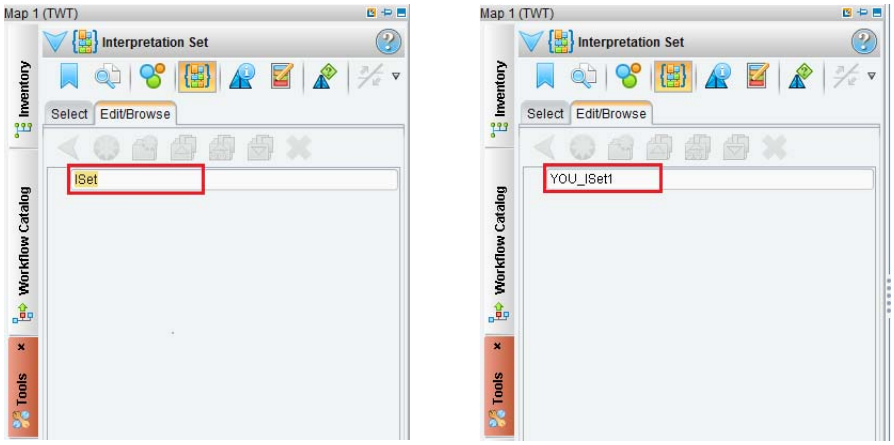


4. Select the **Edit/Browse** tab, and then click the **Create Interpretation Set** icon ( ).



A default folder entitled ISet is created in the task pane. It is highlighted and ready for you to rename it.

5. Enter **YOU _ISet1** as the folder name, and press <**Enter**>.

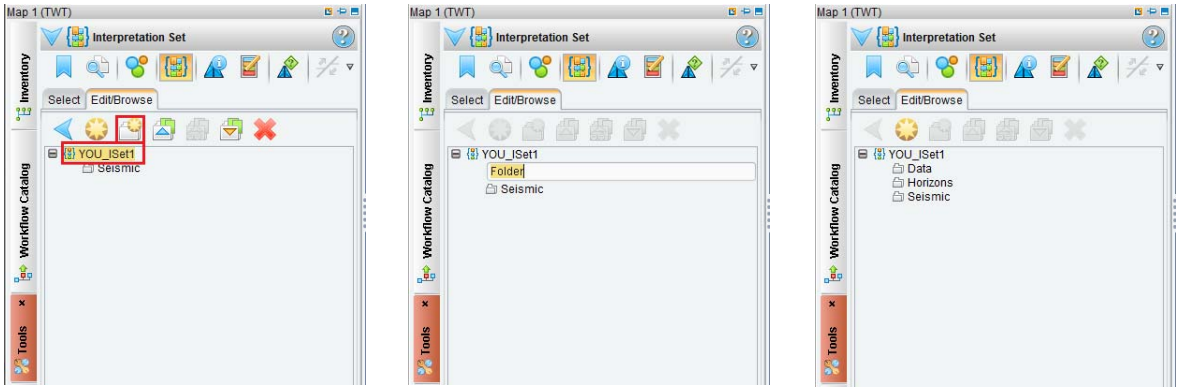


The ISet folder has the highest rank on the tree and has a subfolder named Folder, ready to be renamed.

6. Rename the subfolder to **Seismic** and press <**Enter>.** To rename a folder, **MB3 > Rename**.

Make two additional folders.

7. Highlight the parent folder **YOU_ISet1**. Click the **Create Folder** icon ( ) and enter **Horizons** as the subfolder name. Repeat this process to create another subfolder named **Data**.



You may create as many subfolders as you like. These folders will hold links to the data, not the actual data.

You will add data to the ISet by dragging and dropping from the *Inventory*. Therefore, you will need to see both the *Interpretation Set* (*Tools* task pane) and the *Inventory* (*Inventory* task pane).

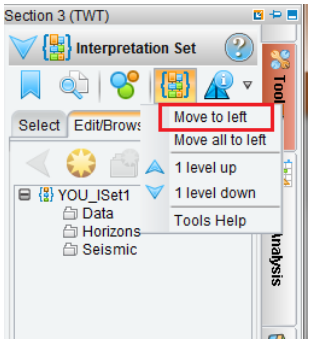
Configuring Task Panes

There are two task panes, one each on the left and right sides of the workspace window. Task bars are configurable, as you learned in Chapter 1 discussion of the Perspective pull-down menu. You can further customize taskbar appearance and content by manually positioning task pane tabs to either the left or right pane. Additionally, you can adjust the order (vertical position) of these tabs. You can learn more in the Working with Task Panes topic in the Online Help.

The next few steps illustrate a few task bar configuration options. However, as task bars in the *DecisionSpace* main window are adjustable, your current on-screen configuration may not exactly match the step sequences below.

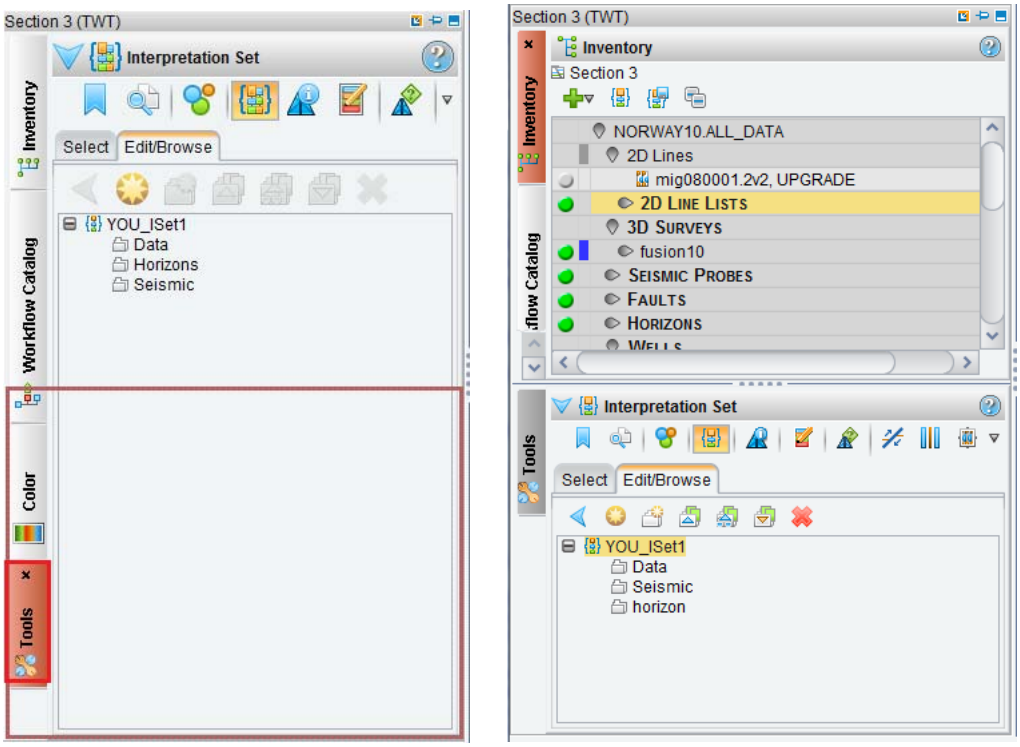
Thus far in this manual, *DecisionSpace* workspace images show the *Inventory* on the left task pane and the *Tools* tab on the right . In this configuration both tabs are visible and ready for data object drag-and-drop to populate the ISet. However, your current on-screen configuration may show both those tabs within the same task bar. In the following steps, you will work with both tabs in the same task bar.

8. If necessary, ensure that both the *Inventory* and *Tools* tabs reside in the left task bar. On the *Tools* tab, **MB3 > Move to left**.



In this exercise you will drag-and-drop from the *Inventory* to the ISet (in the *Tools* tab). But now, one is superimposed on the other in the left task pane, so you can see only one of them. To make both visible, you will divide the left task pane into two panels.

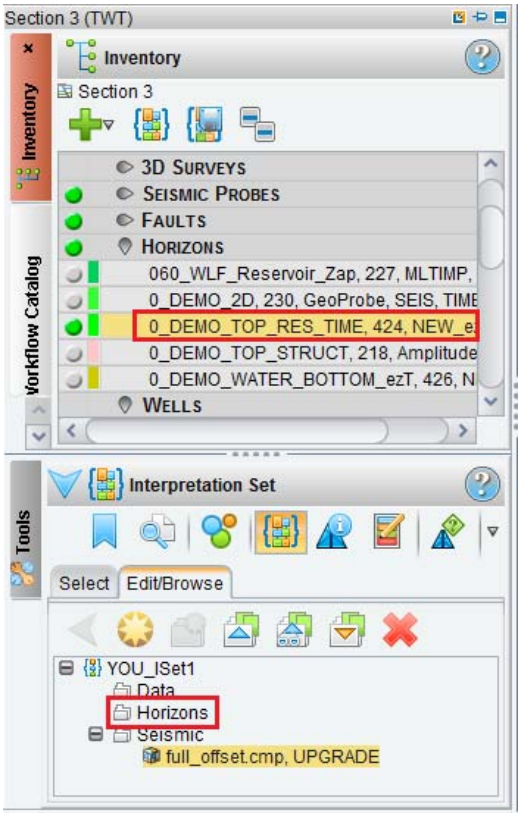
9. **MB1**-drag the ***Tools*** tab to the lower center of the task pane. A red rectangle appears, showing where the new task pane panel will be located. Release **MB1**.



The ISet pane (*Tools* tab) appears lower in the task bar, while other tabs are above.

10. Select the ***Inventory*** tab to make it visible in the upper panel. Adjust the **sash** between the panes to make the *Inventory* larger.

11. Drag **full_offset.cmp** (cmp file type, not the shared memory version) from the *Inventory* to the ISet tree and drop it on the **Seismic** subfolder. You can tell if it is over an acceptable drop point when the cursor changes to a white arrow with a folder and a plus sign. Drag-and-drop horizon **0_DEMO_TOP_RES_TIME** to the Horizons subfolder in the ISet.

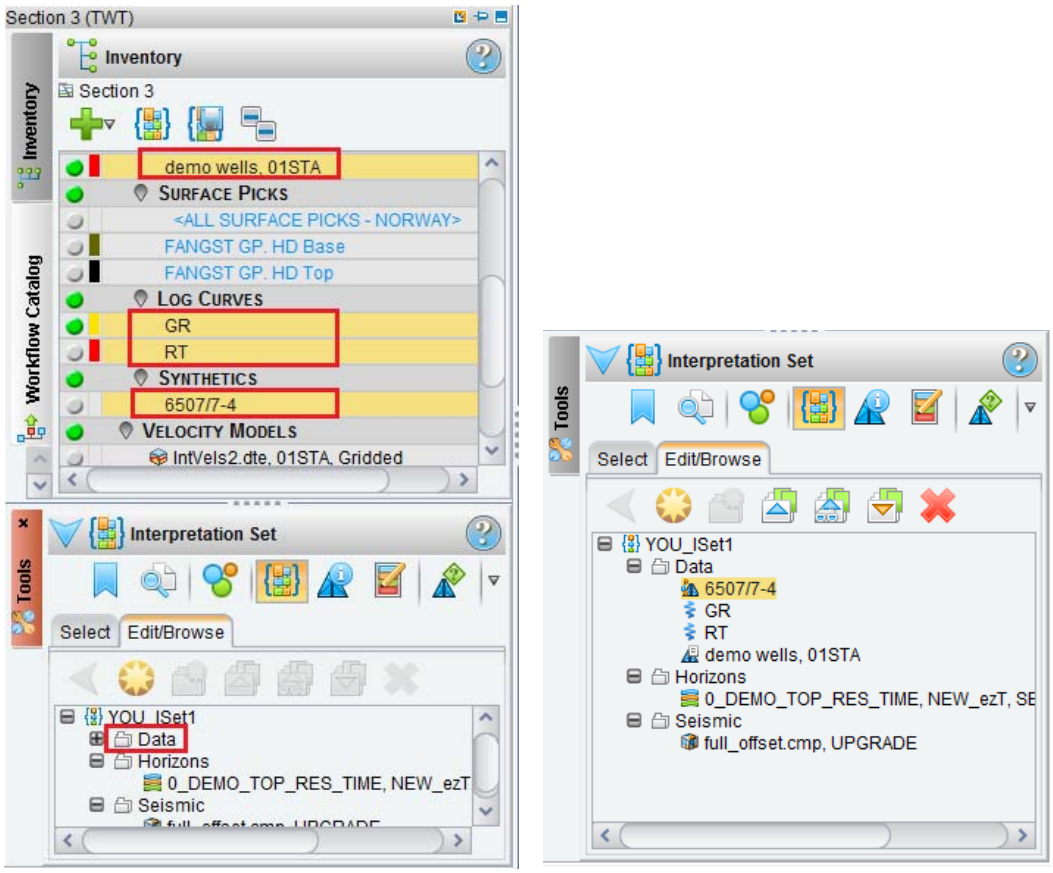


Note:

- You do not actually move data into an ISet, you merely associate the object with the ISet.
- Data must be present in the session before you can drag it into an ISet. Add data to the session by the *Select Session Data* window before populating your ISet.
- Shared Memory seismic volumes cannot currently be placed in an ISet.

Multiple data objects can be moved at the same time.

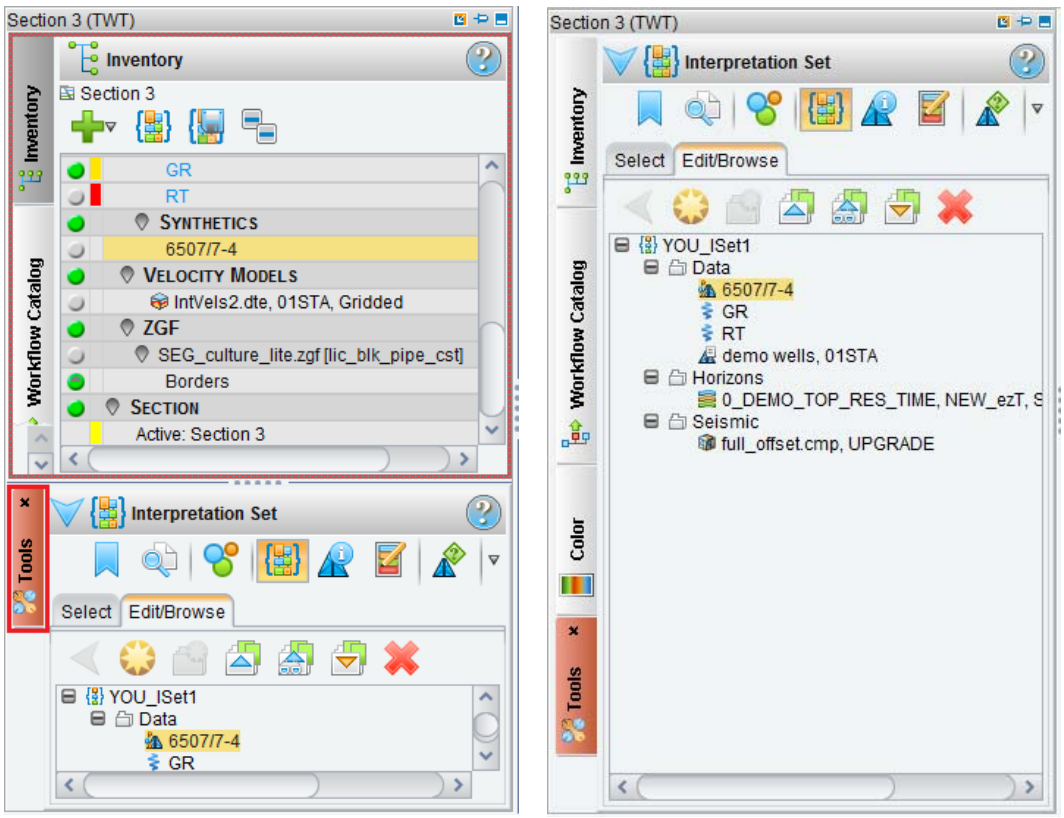
12. From the *Inventory*, employ the standard Microsoft multi-select method to select **multiple items** (e.g., different well data or faults). Ctrl-MB1 for discontinuous rows, and Shift-MB1 for contiguous rows. After the items are selected, **MB2-drag** to transfer them simultaneously to the ISet subfolder, **Data**.



You must have the levers open and the data items selected in the *Inventory* tree for the drag-and-drop to work. You cannot drag a header, such as Faults.

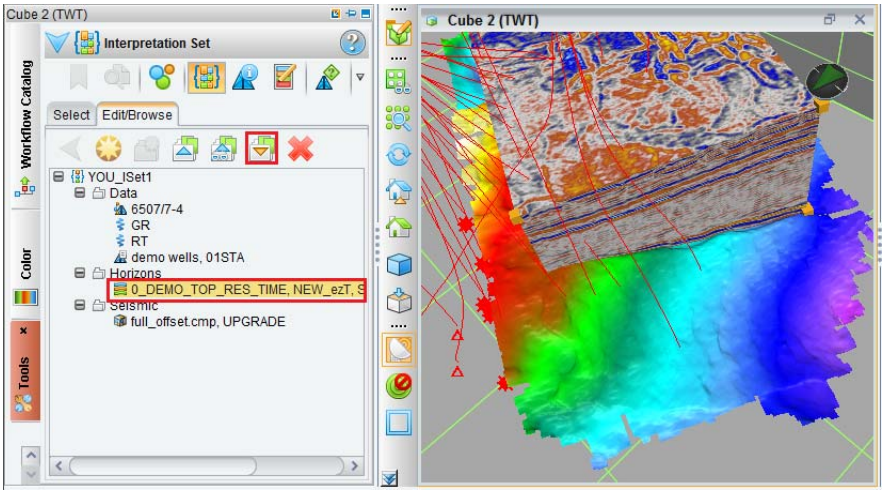
For the next several steps, you will need more room in the ISet. You will configure the left task pane to be a single panel, like you had at the start of this exercise.

13. MB1-drag the ***Tools*** tab to the top of the task bar, until a red outline appears around the full upper panel. After you drop the *Tools* tab, only a single panel will remain.

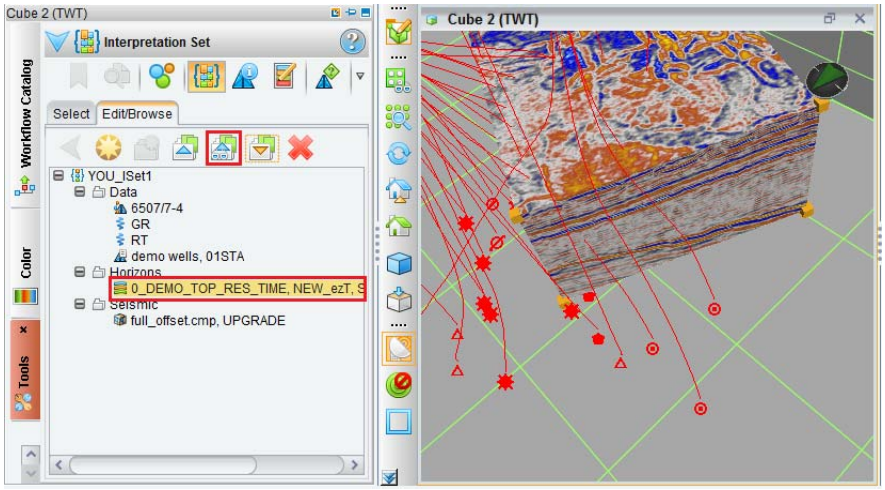


From the ISet, you can use the icons at the top of the task pane to Load Data To Session ( ), Load and Display ( ), and Unload Data From Session ( ). You may remember that in Exercise 1.2 you loaded data from an ISet. Next, you will see how you can unload and reload a horizon from the ISet you just created.

14. In the ISet you just created, highlight the horizon **0_DEMO_TOP_RES_TIME** and click the **Unload Data From Session** icon ( ). Though the Horizon is removed from the *Inventory* and disappears from the displays, it remains in the ISet.

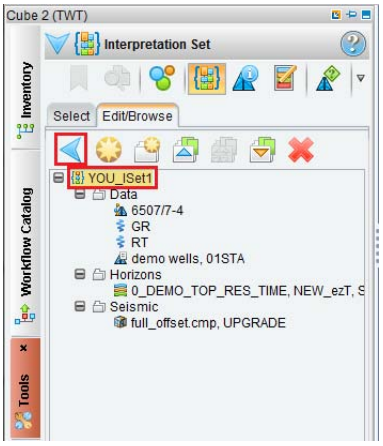


15. To restore the horizon to the *Inventory* and displays, select the **horizon** in the ISet and click the **Load and Display** icon ( ). The horizon is restored.



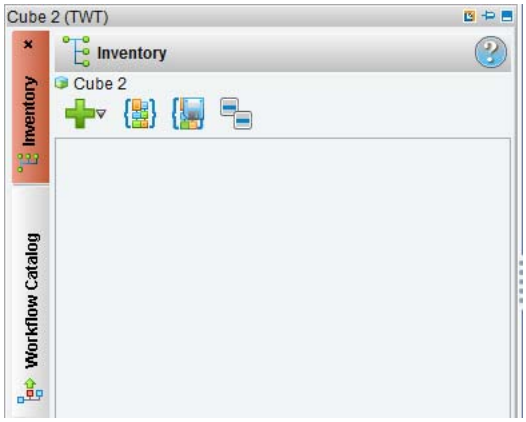
To work with other ISets you must deactivate the current ISet. The following steps show how to deactivate an ISet and then open another ISet. In this process, you will close the ISet you just created, and then reopen it.

16. In the Interpretation Set task pane, highlight the **ISet** that you just created, then click the **Deactivate ISet** icon ( ). The Select tab becomes active (forward) in the pane and your ISet is listed.

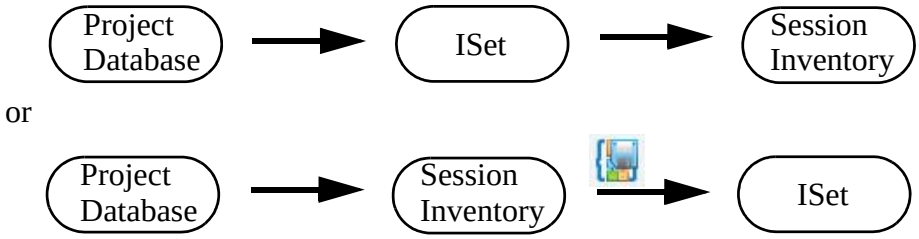


Inventory Control and ISets

You learned about task pane manipulation in the previous steps. We retained that sequence because configuring task panes is useful beyond the context of ISet generation. DecisionSpace 5000.10.0 includes functionality represented by the three rightmost icons at the top of the *Inventory* pane.

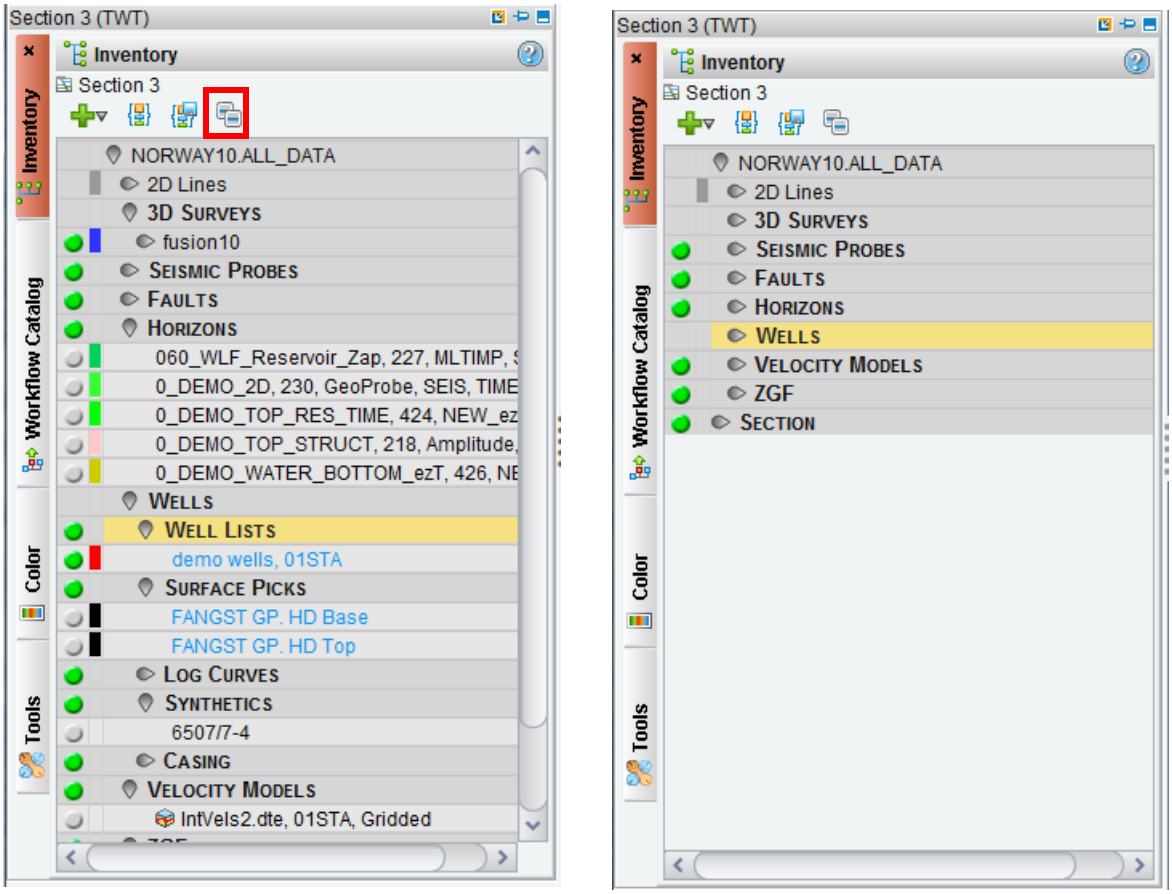


You can generate an ISet from the contents of the *Inventory* with the Save ISet from Inventory icon. This is a very nice alternative method depending on your situation and workflow preferences.



or some combination of both.

Multi-disciplinary sessions, or any DecisionSpace interpretation workflow, can require large amounts of data. The *Inventory* can grow to quite a large listing. You might struggle occasionally looking for a particular visibility toggle. You can unclutter the *Inventory* appearance by clicking the **Collapse all inventory tree nodes** icon ( ).



Your ISet is a work in progress. As you add more data to your session, remember to add it to your ISet if there is a chance you will use it later.

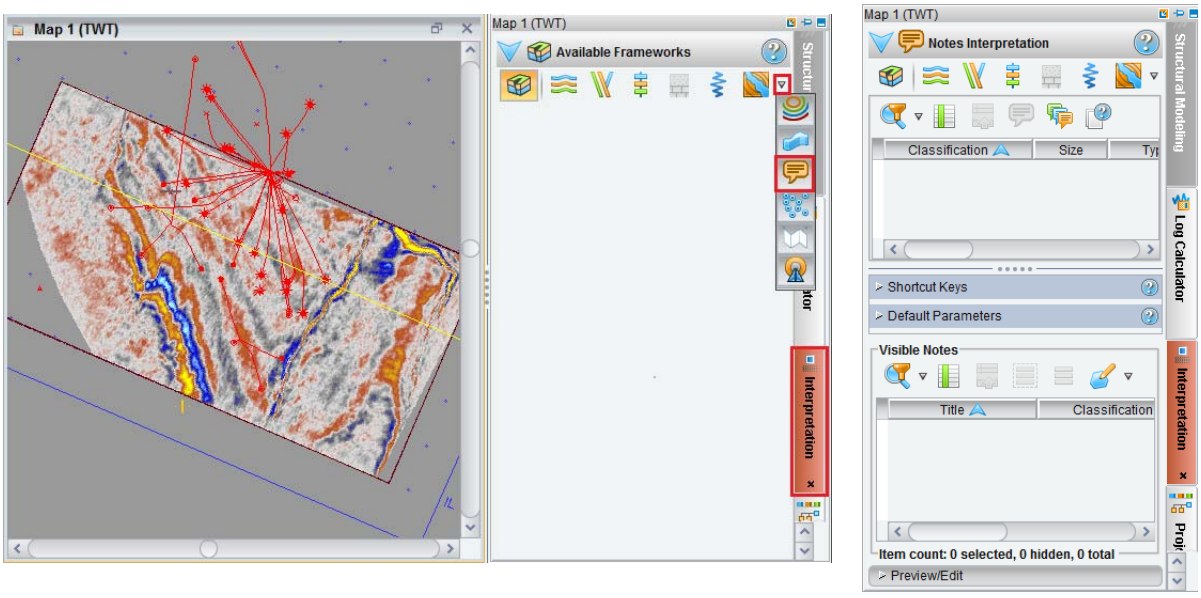
Creating Interpretation Notes

The DecisionSpace Geoscience suite provides accountability and traceability for your interpretations. In this exercise, you will learn how to add, remove, and edit Interpretation Notes and then classify them in the database. Once this information is in the database, it is forever stored and associated with the project. Interpretation Notes allow you to add documents or simple sticky notes.

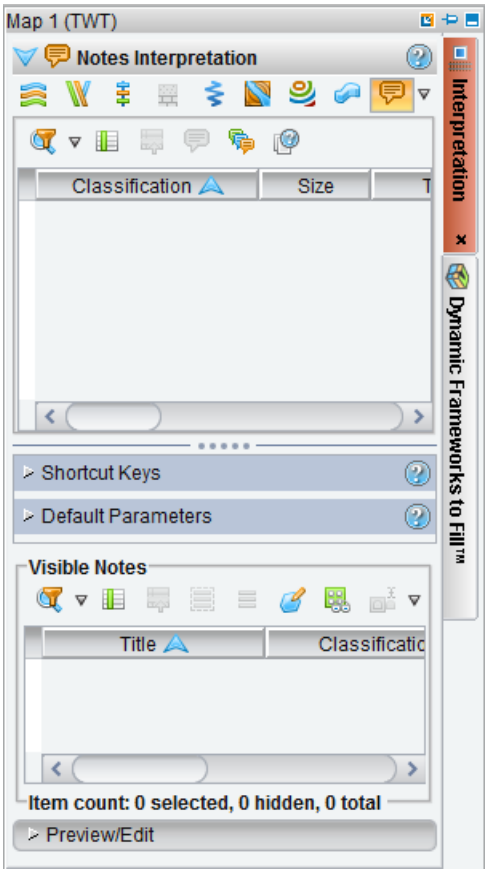
You can use Interpretation Notes in *Section* view or *Map* view only. If Notes are enabled, they will appear as icons in *Cube* view, but will not display their text. Notes are not available in *Correlation* view at this time because of coordinate incompatibilities.

You will find Interpretation Notes extremely useful for capturing knowledge as you interpret your data.

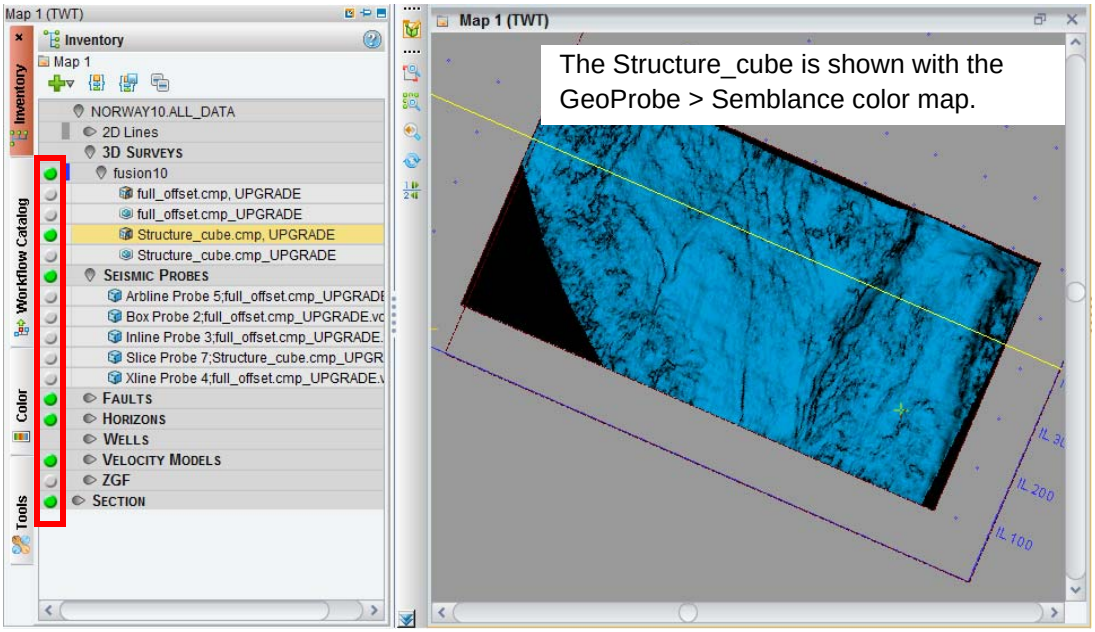
17. Click the ***Map*** tab to make that view active. Select the ***Interpretation*** tab in the task bar. Click the **Notes Interpretation** icon ( ) at the top (you may have to expand the icon bar to see it).



The Visible Notes sub-panel becomes active in the task pane.



18. Maximize your ***Map*** view. **Hide** the horizon and **show** the Structure_cube seismic volume at 2400 ms. (Hint: Double-click the *Map* tab. In the *Inventory*, use the visibility toggles to show or hide objects. Use the VCR controls to display the volume at a specific time value.)



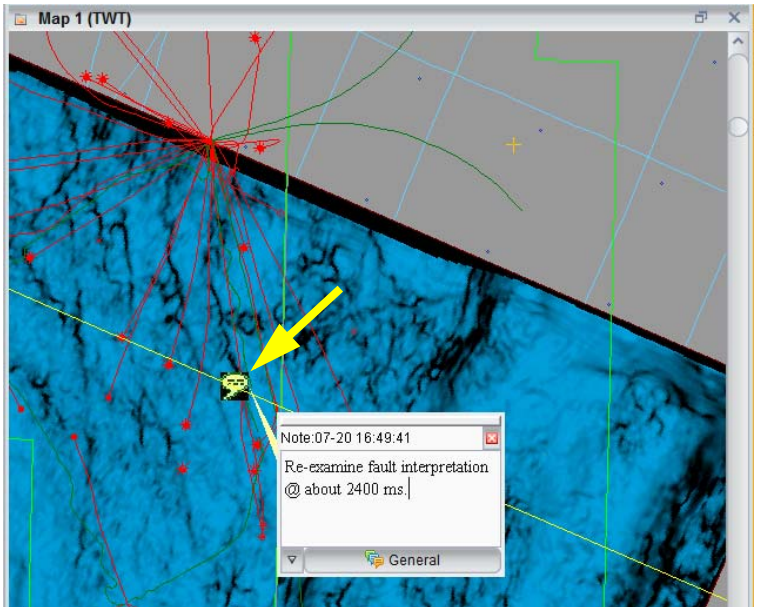
Creating notes is different from other interpretation data types because there is no starburst icon (typically used to create a new object). Instead, you go into interpretation mode, where you can add a note with a click on a map or section.

19. At the top of the main window, toggle on **Interpretation Mode**. The **Interpretation Mode** icon ( ) changes to ( ).

20. Find a spot in the scene worthy of a note and **MB1** at that point. Type a message in the time-stamped **Note** box. When you are finished with the text, click outside the **Note** box. This will collapse the note to the bubble icon.

Your initial click will create a note bubble and a note box. The note box is by default in edit mode. This means you can type directly into the note. The note is time stamped and associated with your interpreter ID. The note is automatically saved to the OpenWorks database.

The example below shows a note placed at a fault on timeslice 2400 ms of the Structure_cube. The note reminds the interpreter to come back at a later date for fuller scrutiny.

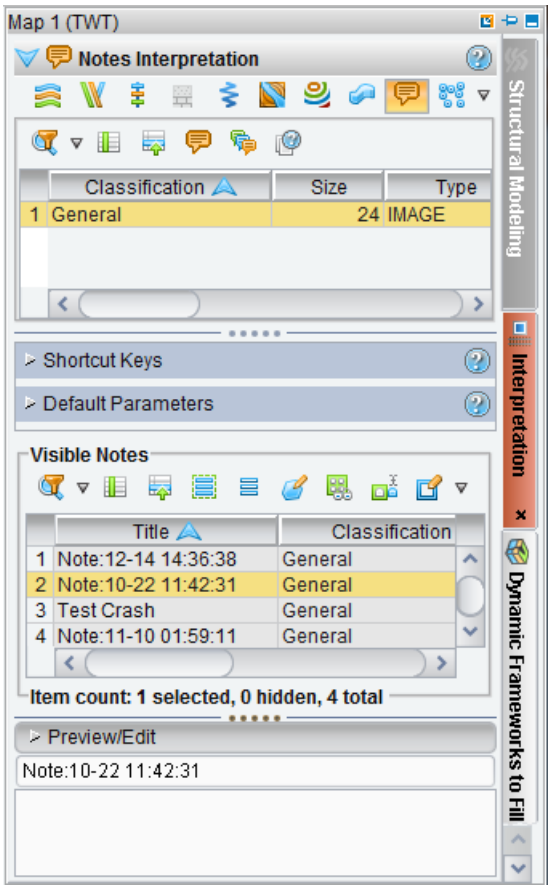


Notice the content of the *Notes* task pane.

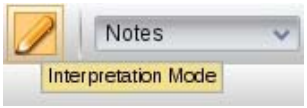
Your note was saved to the General classification in the upper table.

Your note is listed in the Visible Notes section, since it is toggled on in the *Inventory*.

Your note is shown in the Preview/Edit sub-panel. You can edit the content here.

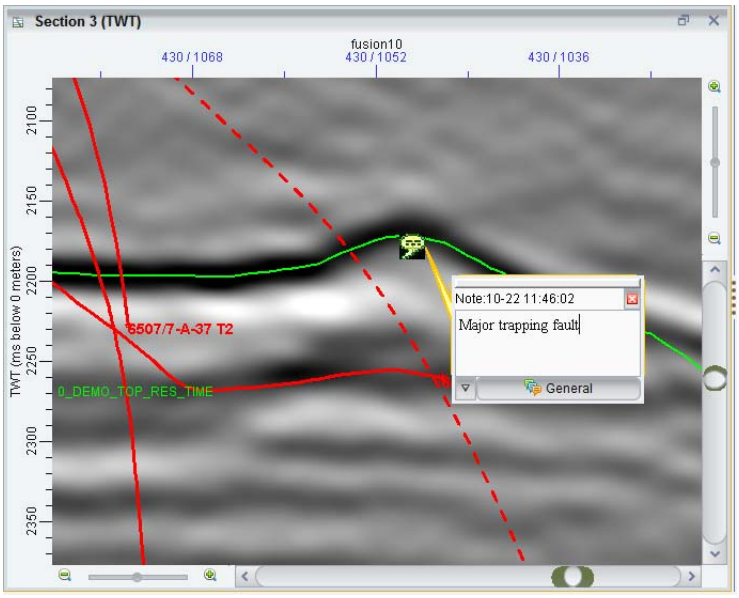


Add a note to the *Section* view. You can work in your active views with maximized or normal tile size, as you prefer.

21. Activate the ***Section*** view and confirm that **Interpretation Mode** applies to Notes in the main toolbar. (

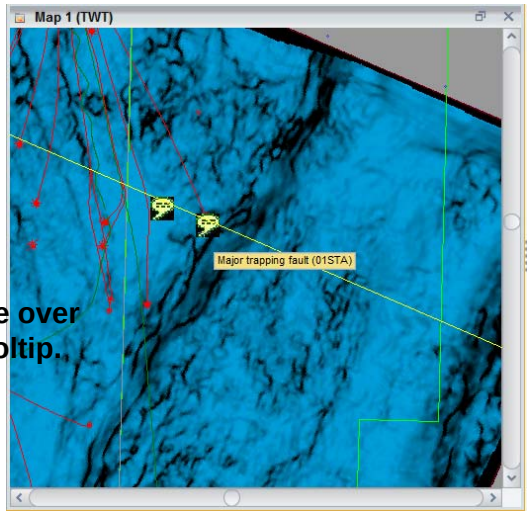
)

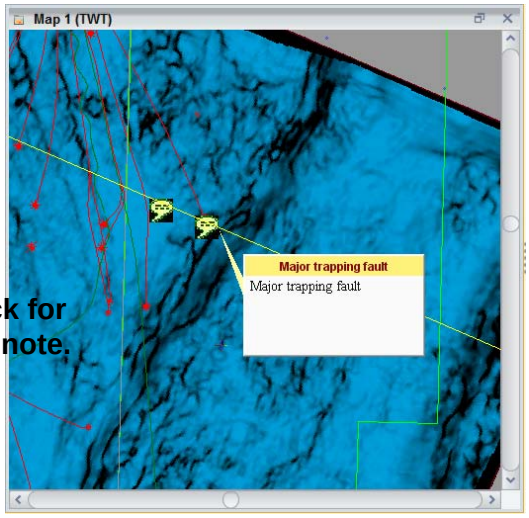
    Type a message into the *Note* box and click outside the box to close it.



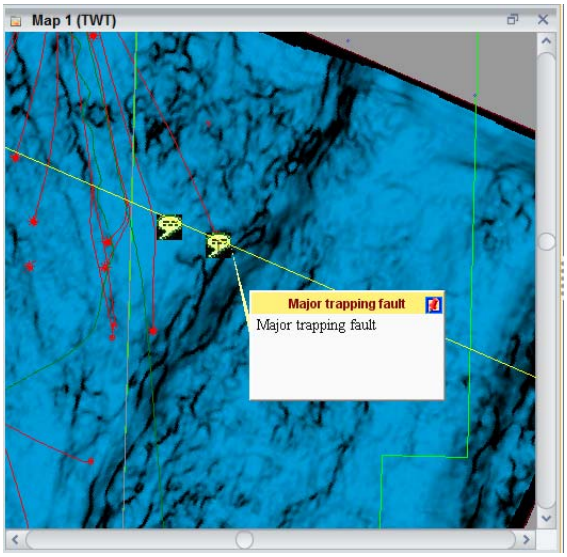
The note icon is also displayed in the *Map* view (assuming you placed the note in a visible area of the map).

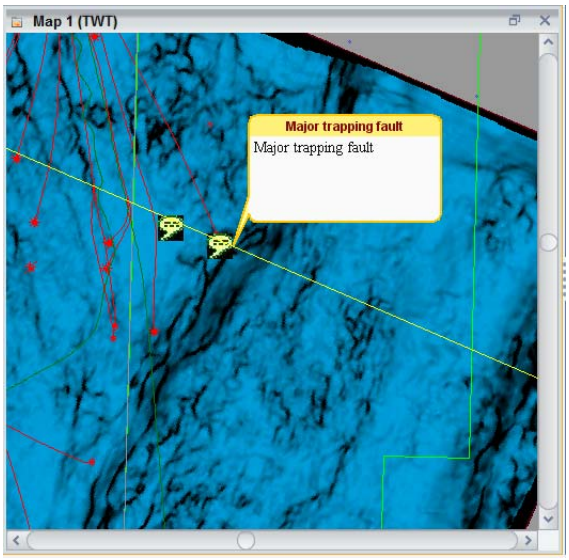
22. To view the notes, go back to the ***Map*** view and place your cursor over the **Note** bubble. A tooltip will show the first line of the note. Click the **Note** bubble and the *Note* box will reappear.





23. Move your cursor over the *Note* box and a red "push pin" appears. Click this **pin** to temporarily affix the note to the view. **MB1-drag** the *Note* box to a different location.



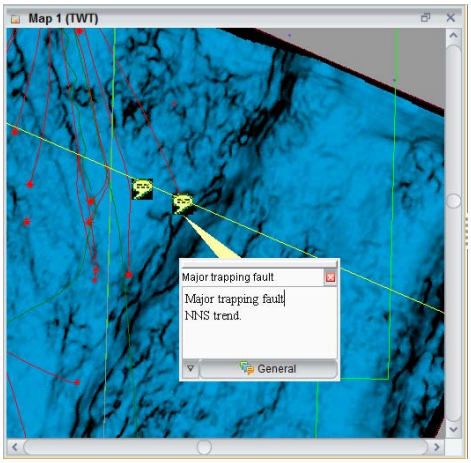


In this pinned mode, the note will not collapse to the bubble icon. It will stay visible. The pinned note can be moved around.

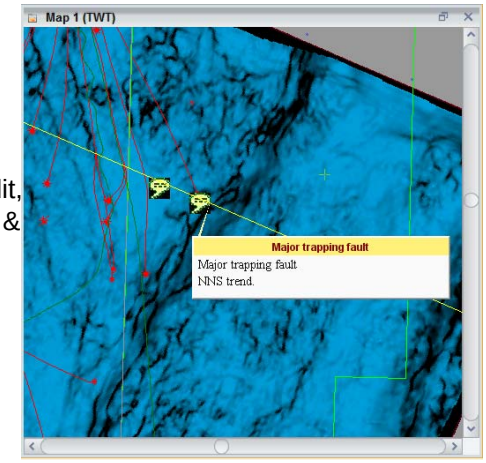
24. Click the *Note* box (no drag). The appearance will change to show you can edit the message. Edit the message, if you wish. Drag the corners to **resize** the note (you will see a resize cursor when you are

over the edge). Drag the top bar to the **changed position** of the *Note* box. Click **outside** the Note.

Edit & Resize Mode



After Edit, Resize, & Move



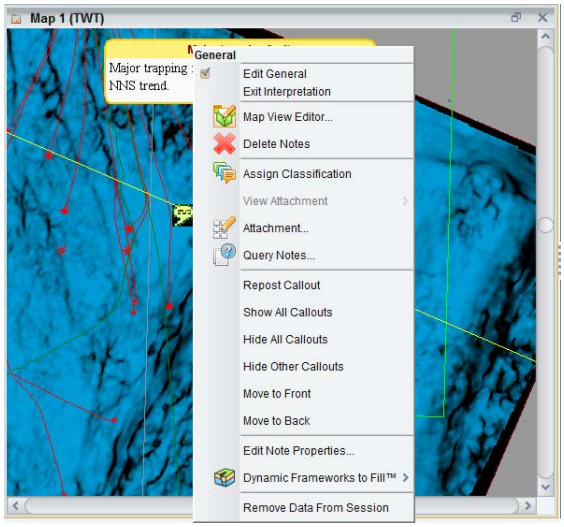
Note:

As you use Notes, you may inadvertently add Notes where you did not intend. In *Map* or *Section* view, you can **MB2** the notes you don't want and delete them. Use the task pane table to delete multiple notes in a list form.

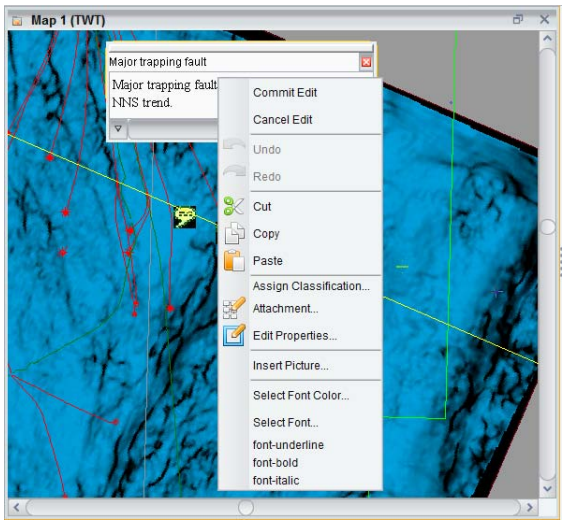
Notes have extensive capabilities. You can attach documents and links to share ideas (for example, best practice documents) and you can paste images into the text. You can also add your own icon images, change the color, text, opacity, and so forth.

25. Put your cursor on a *Note* box and **MB3** to see a list of options. The options differ, depending on whether the Note is in Edit mode.

MB3 menu, Note Box (pinned)



MB3 menu, Note Box (Edit mode)

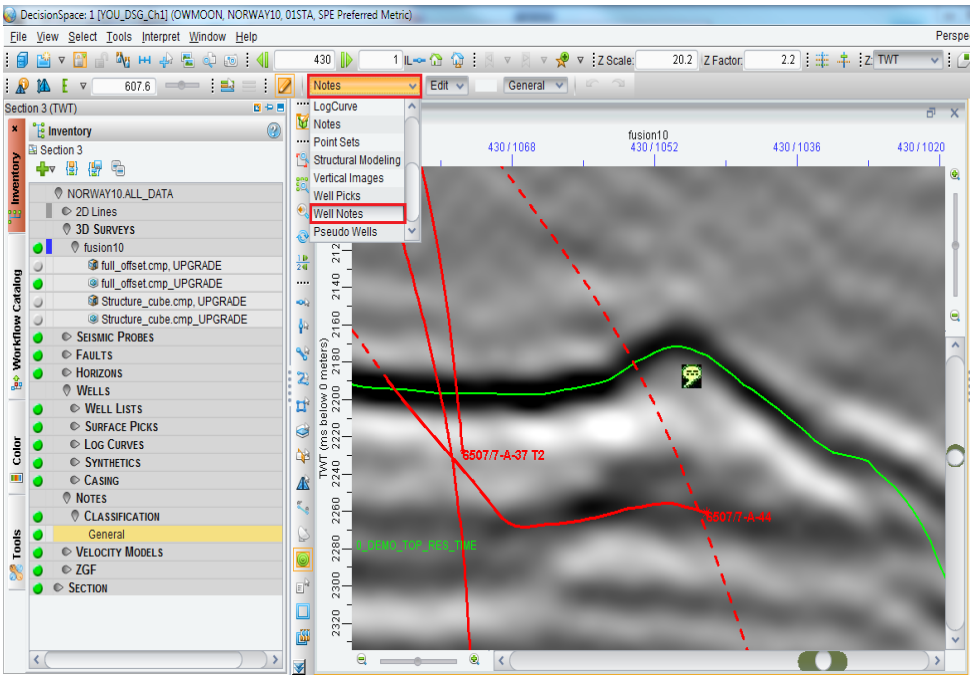


Creating Well Notes

DecisionSpace 5000.10.0 provides a note type specifically for wells.

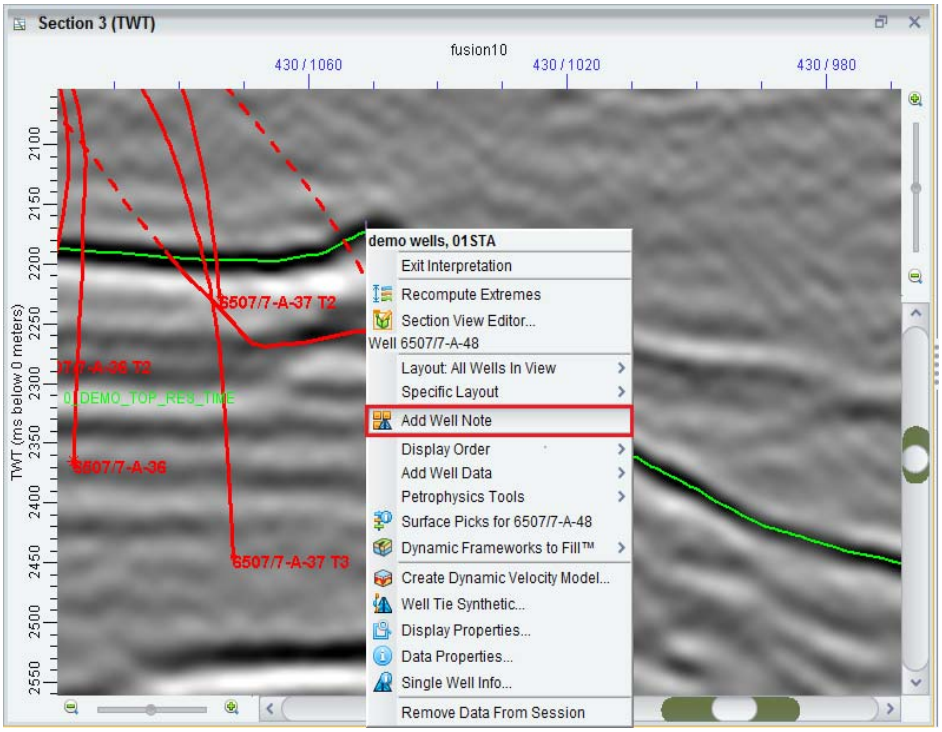
Well Notes are notations that are assigned along a wellbore. Well Notes may contain various kinds of information — key dates, information about completions, mud logging data, production shows, or any other item you might want to capture in a note. Well Notes are specific to individual wells in a well list and to an interpreter. They are depth-specific, and are automatically stored in the project database when you make changes to them.

26. Activate the ***Section*** view. Confirm that **Interpretation Mode** applies to **Well Notes** in the main toolbar.

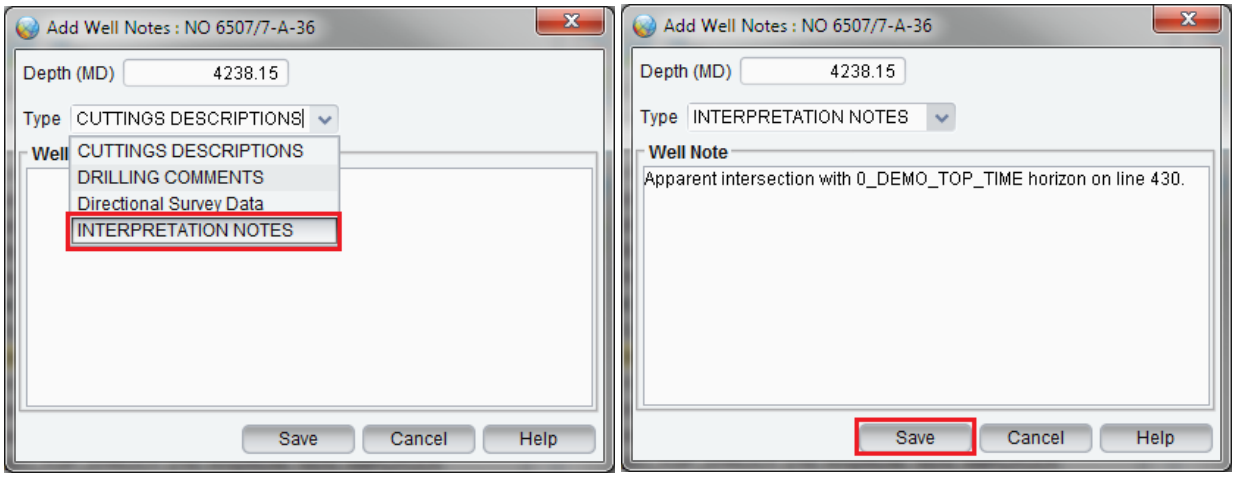


Well Notes can be interpreted (added, edited, or deleted) and displayed in *Correlation* and *Section* views. When present in your session, they are listed in the *Inventory*.

27. On any well, where the well intersects the **0_DEMO_TOP_RES_TIME** horizon, **MB3 > Add Well Note**.



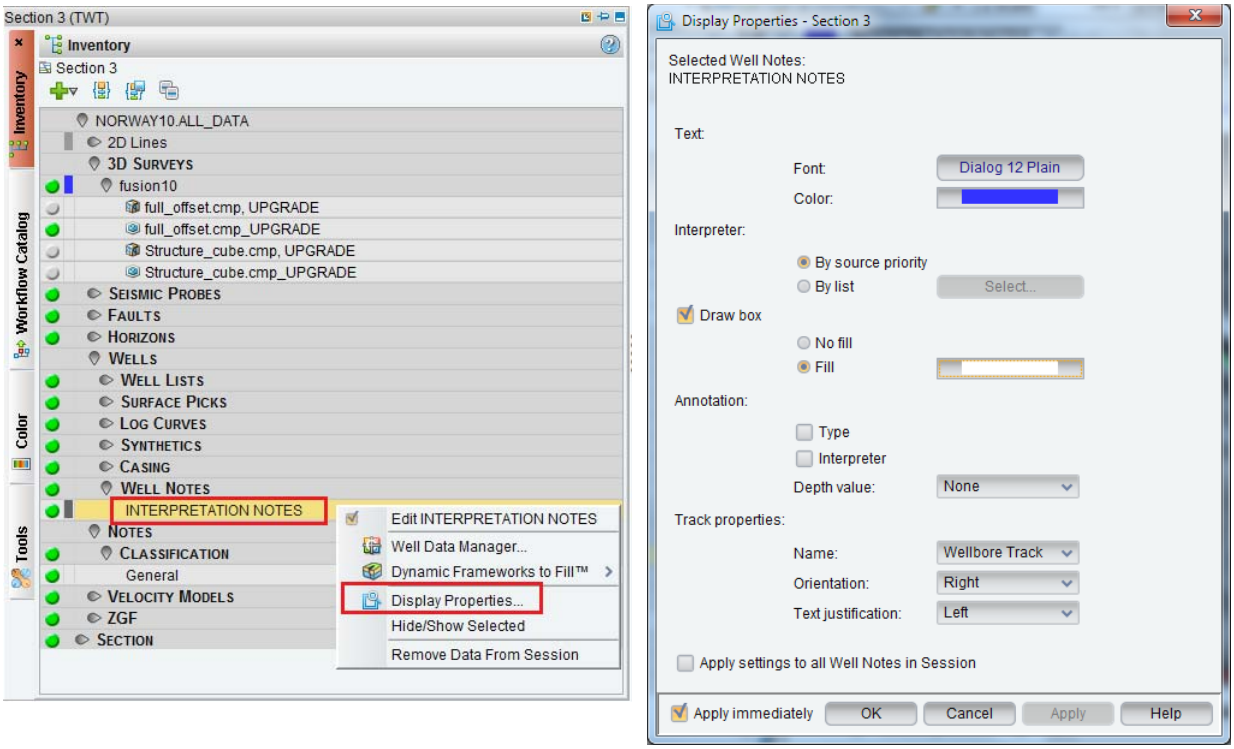
28. On the *Add Well Notes <UWI>* dialog, note the Depth (MD). For **Type**, select **INTERPRETATION NOTES**. In the *Well Note* text box, add some comment and click **Save**.



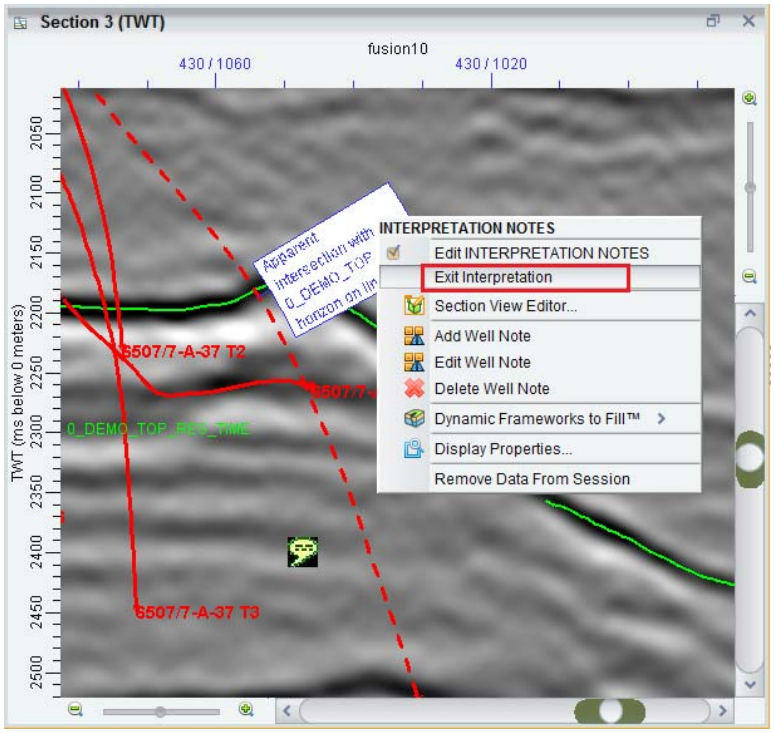
Your *Section* view will contain the new note as will your *Inventory* listing. Try to improve the appearance of the note in the *Section* view.

29. In the *Inventory* on INTERPRETATION NOTES, **MB3 > Display Properties...** to experiment with Text Color, Track properties, and

other parameters on the *Display Properties* dialog. Click **OK** when you are finished.

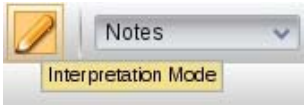


30. In the *Section* view, **MB3** your Well Note to see the options available in the pop-up menu. **MB3 > Exit Interpretation**.



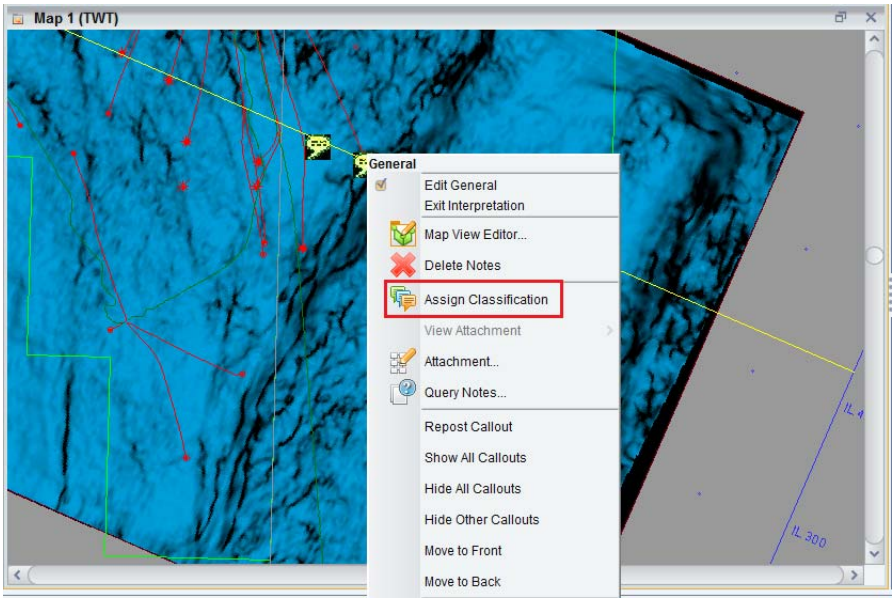
You will return to the previous (note related) data object you worked with to investigate one of the additional features of Notes Interpretation. This is distinct from Well Notes. In the following steps you will set up a classification of Notes.

Assigning Note Classification

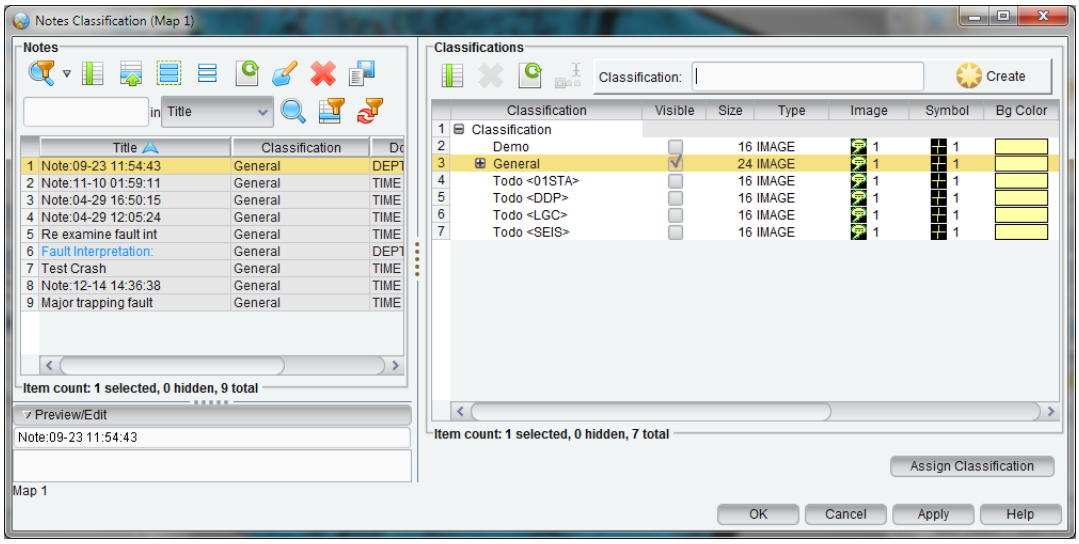
31. Activate the ***Map*** view and confirm that **Interpretation Mode** applies to Notes in the main toolbar. (

)

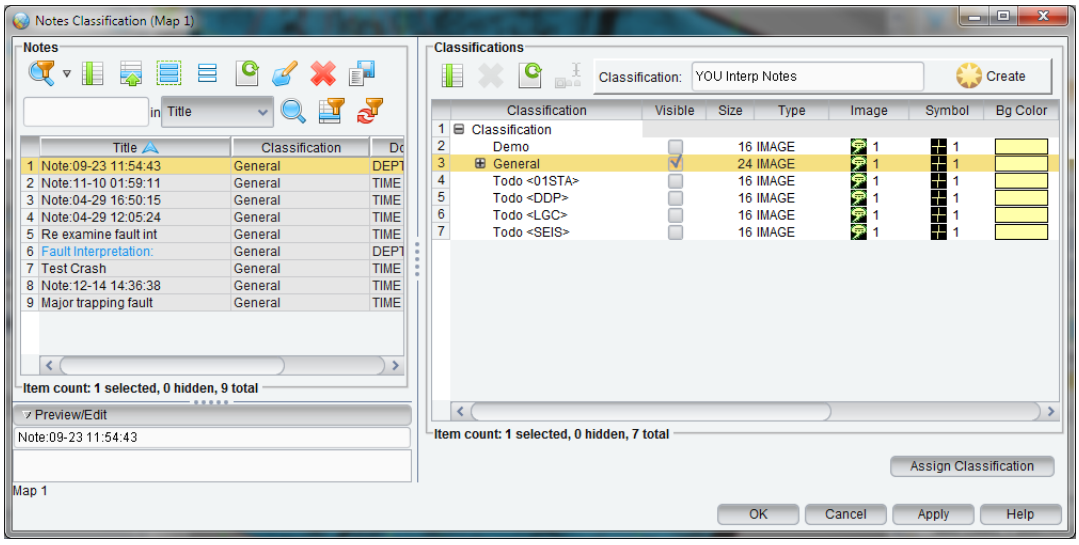
    MB3 a **Note** and then select **Assign Classification**.



The *Notes Classification* dialog will appear. On the left side, all Notes are listed. By default, new notes are placed in the General Classification. On the right side is the Classifications structure currently available in your project. You will create a new sub-category under General.

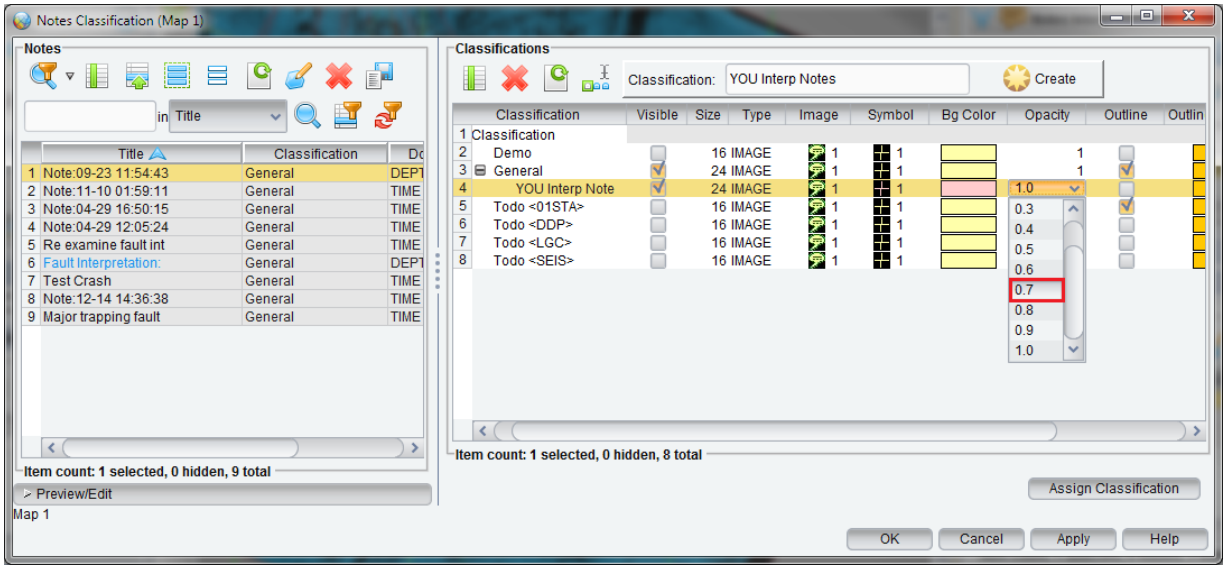


32. In the Classification text box at the top, type a **new name**, including your initials, then click **Create**.



You will see that your new classification is added to the table. Defaulted display characteristics are shown.

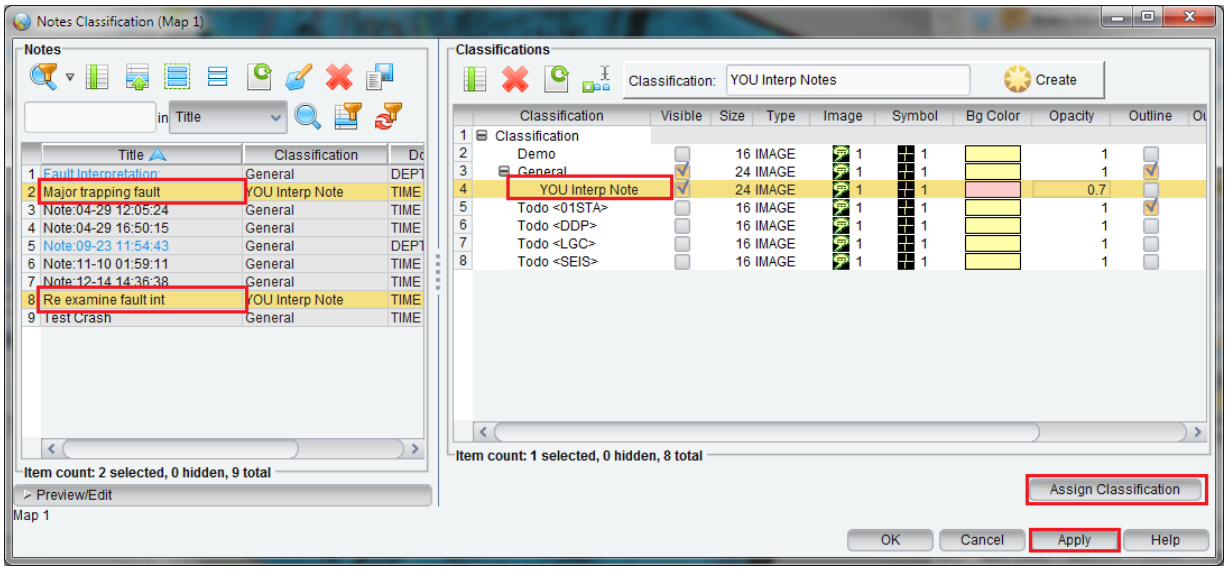
33. Select **your entry**; change the background to a **color** of your choice and the opacity to **0.7**.



Now that you have created the new classification, you are ready to reassign your notes from General to the new classification.

34. Highlight your **Notes** in the table to the left. Use multi-select, if necessary. Select your new **Classification** in the tree on the right. Click **Assign Classification** at the bottom right of the *Notes*

Classification dialog, then click **Apply**.



This concludes the Interpretation Notes section. You can explore more of the Notes capabilities at your leisure using the online help as your guide.

Hide the notes to simplify displays for the next exercises.

35. With the *Map* view active, toggle off **CLASSIFICATION** (under NOTES) in the *Inventory.*

The notes are no longer plotted on the map.

Remember to save your sessions.

36. In the *DecisionSpace* menu bar, select **File > Save Session as...**. In the middle of the *Save Session As* dialog, enter a session name such as **You_GS_Ch2**. Then click the **Save** button at the bottom of the dialog.

In the next exercise you will add GIS data to your overview of the project.

Exercise 2.2: Accessing GIS and Other Culture Data

The DecisionSpace GIS module allows you to add valuable geographical images and their associated data to the project environment. This includes topographical and cultural data such as rivers, pipelines, elevations, satellite images, leases, and so forth, to set the spatial context of all other project data.

GIS data is used in many geological, geophysical, well planning, and stimulation workflows, including QC of well locations, interpretation in the context of digital geospatial images, and assessment of the environmental impact of proposed wells.

You can import spatial data in ESRI-supported formats (shape files, SDE databases, tiff, geotiff, and others) into the DecisionSpace Geoscience suite as well as OpenWorks data and view the data in the same cartographic system.

A structural basemap of your subject area is available as a georeferenced .tif file. You can use highly flexible connectivity to import this into your session. To access this capability, you must select the GIS module when you start your session.

More details about the GIS module are presented in Chapter 3, GIS Integration.

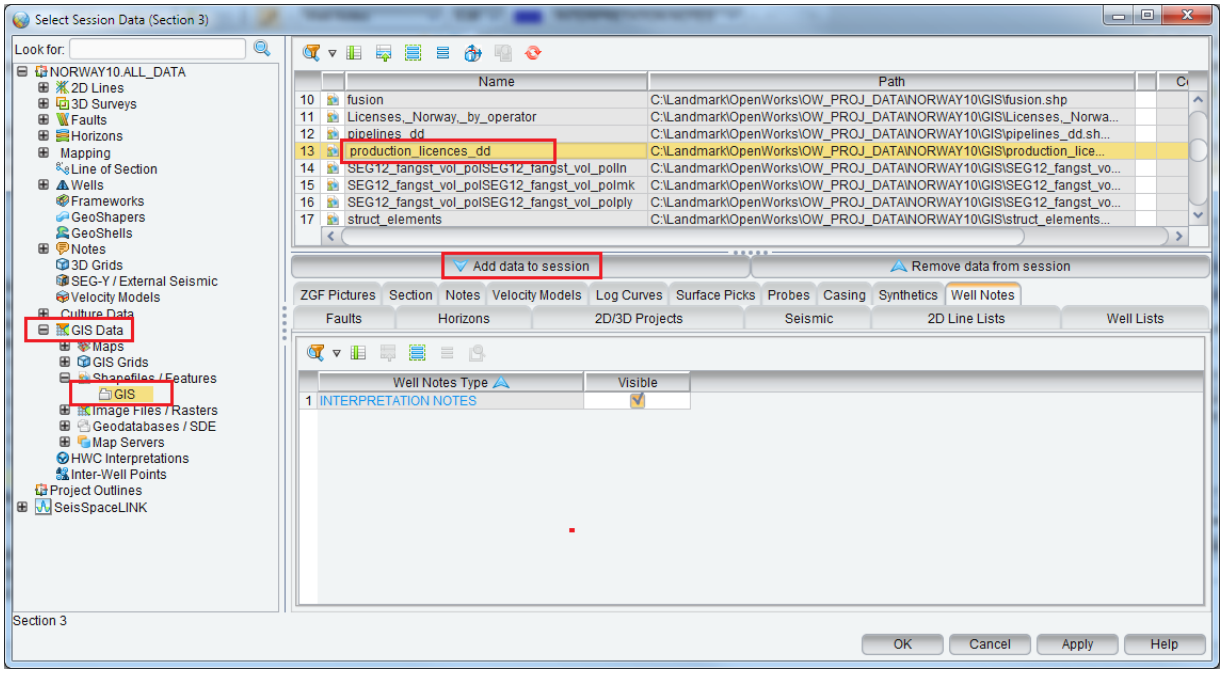
Browsing and Interpreting GIS Files

The DecisionSpace GIS module allows you to browse for layers, shape files, and raster files that have been previously created or that are accessible through the ArcGIS server (SDE data).

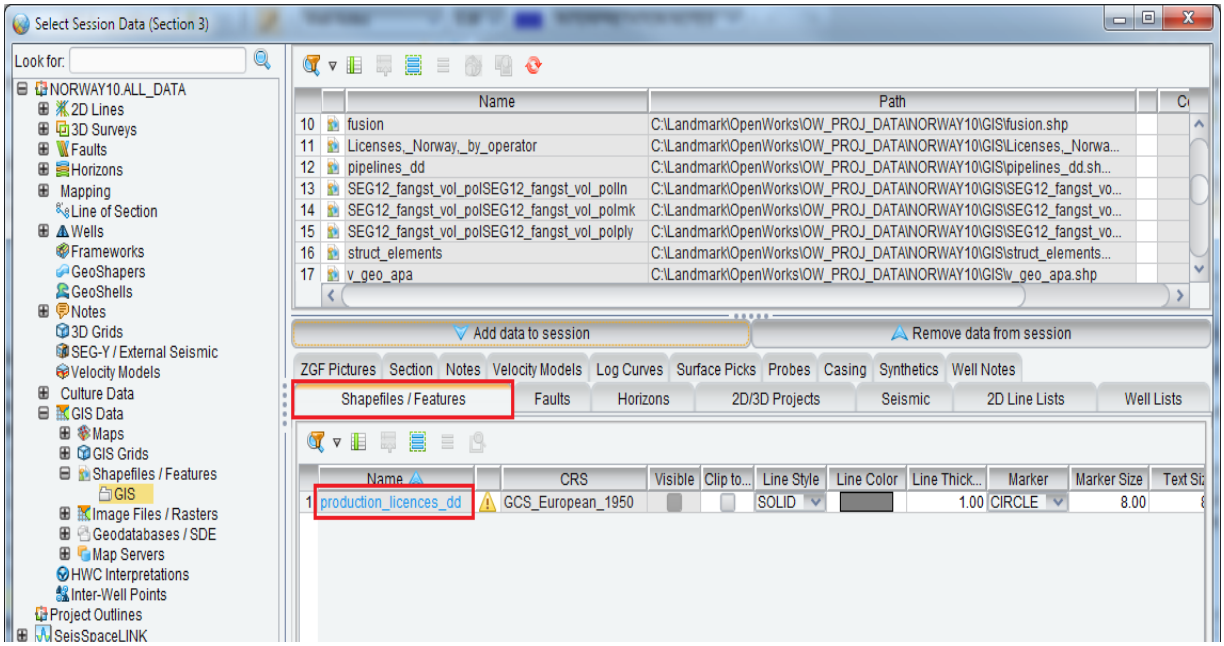
Recall that you selected the GIS module when you created your session. This will enable you to browse and import shape and raster files. It will also enable the use of the GIS tool.

1. Click the ***Map*** tab to make it active. Open **Select Session Data** ( ).

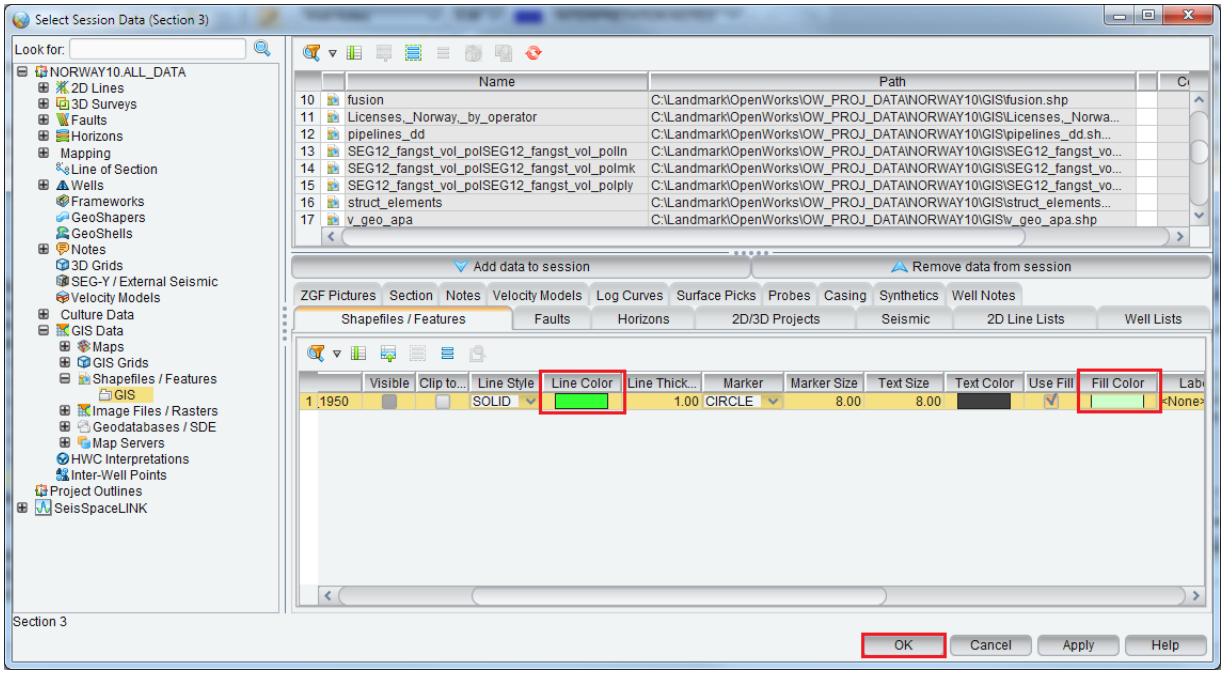
2. In the data tree in the *Select Session Data* dialog, click the **plus sign** to expand **GIS Data**. Expand the **Shapefiles/Features** folder and select the **GIS** folder. The upper right panel should update. Select the **production_licenses_dd** shape file and click **Add data to session**.



A new tab will be created in the lower right panel, which contains information about the Shapefile object.

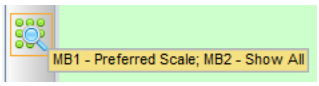


3. If you wish, edit any of the **display parameter**s such as Line Style, Line Color, and Line Thickness. In the figures below, Line Color is a medium green and Fill Color is the lightest green. To change a color, double-click the **color cell** to bring up the *Choose Color* palette. Select your color and click **OK**. After you have made changes, click **OK** to display the GIS data on the map.

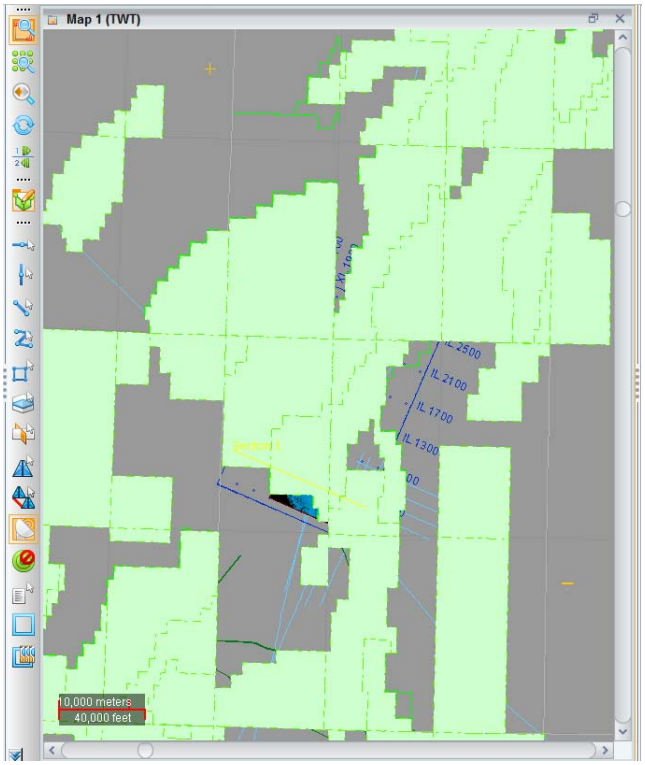


Because the *Map* tab was active when you selected the GIS data, the **production_licences_dd** object is automatically available and displayed on the map. The object is also available for display in the *Cube* view.

4. Select the ***Map*** tab and **MB2** the **Show All** icon ( ). The map, including the production licenses, will be rerendered. Click the **Area Zoom In** icon ( ) and define a better view.



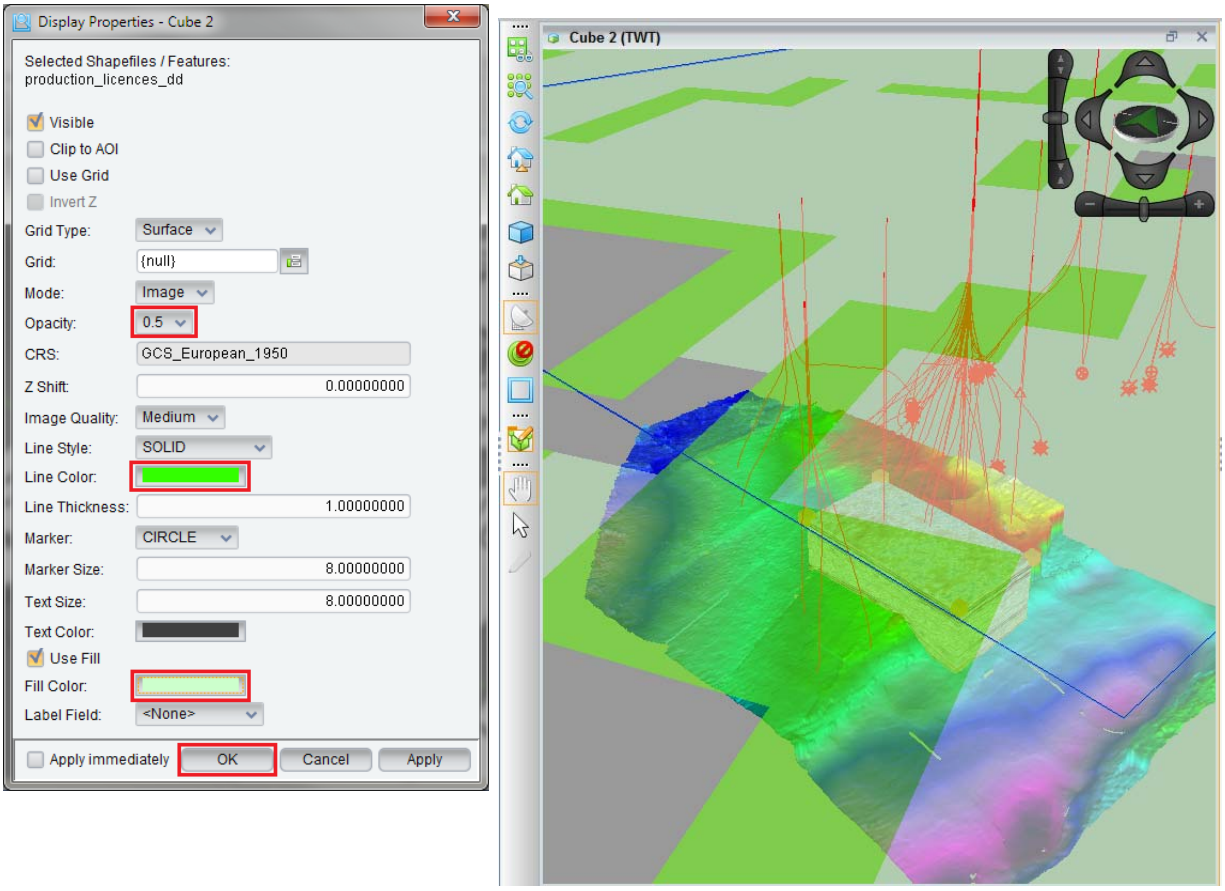
Note tool tip in *Map* view.
Check tool tip in *Cube* view.



5. Select the ***Cube*** view. In the *Inventory* tree, toggle on (show) **Shapefiles / Features** and **production_licenses_dd**. You may need to click the **View All** icon ( ) or **Refresh** the scene ( ). It may take a moment to recalculate the view. **Zoom in** on the displayed wells (MB1+MB2-drag works well).

You will change the shapefile colors in the *Cube* view to match your *Map* view, then move the plane of the production_licenses_dd object to different Z values.

6. In the *Cube* view on the production_licenses_dd object, **MB3 > Display Properties...**. In the *Display Properties* dialog, change the **Opacity** to **0.5**, the **Line Color** to **medium green**, and the **Fill Color** to the **lightest green**. Click **OK**.



7. **<Z>+MB1-drag** the production_license_dd data to move it up and down in time.

This allows you to bring the boundaries down to the TD level of the wells and note which are in each of the license blocks.

In the next steps you will be adding more information to your *Cube* and *Map* views; to avoid confusion you will hide the production license map.

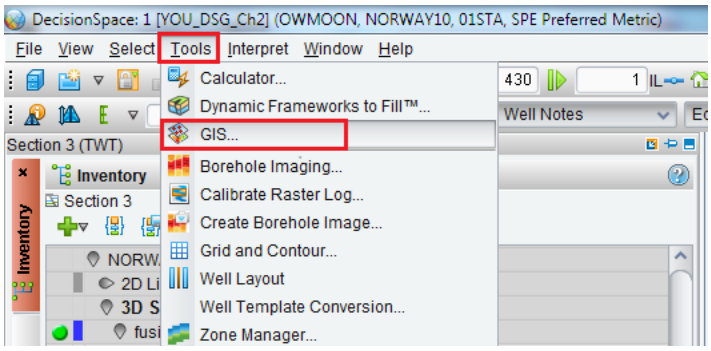
8. In the *Inventory* for both *Cube* and *Map* views, use the visibility toggles to turn **off** the **production_licenses_dd** under Shapefiles / Features.

Displaying ESRI Shape Files in DecisionSpace Geosciences

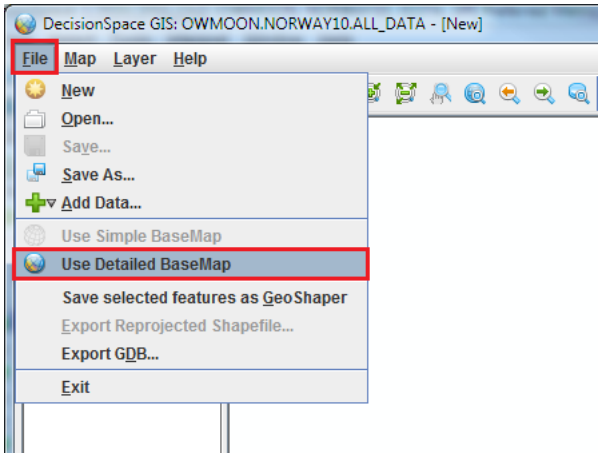
DecisionSpace Geosciences allows you to examine GIS maps in an overlay on your *Map* and *Cube* views. This greatly enhances your investigation of a broader view of the project area.

In this exercise you will use the GIS tool to load and edit multiple raster images and send them to your session. First you will load a map of the structural elements of the Norwegian continental shelf.

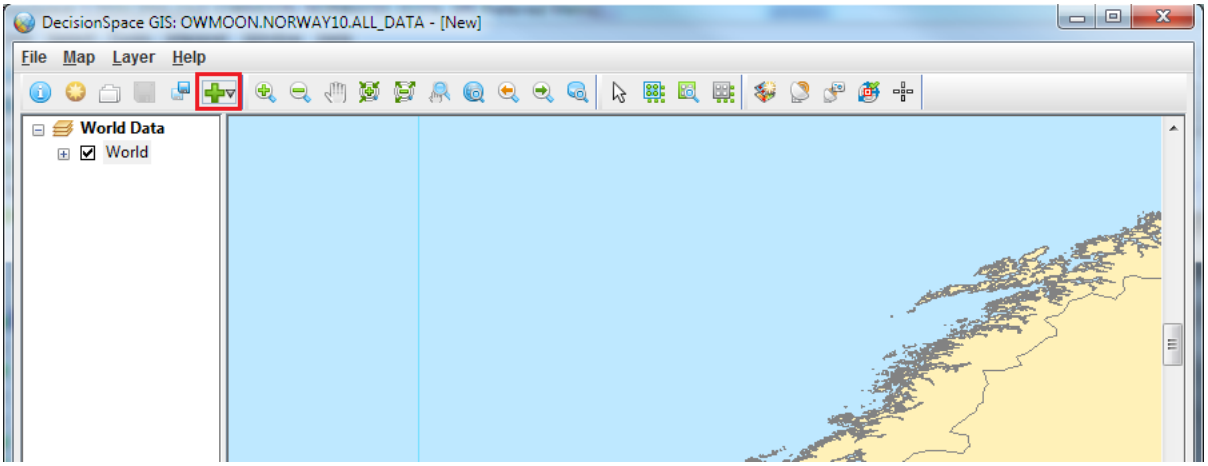
9. Select **Tools > GIS...** to access the application.



10. On the *DecisionSpace GIS* window, select **File > Use Detailed BaseMap**.

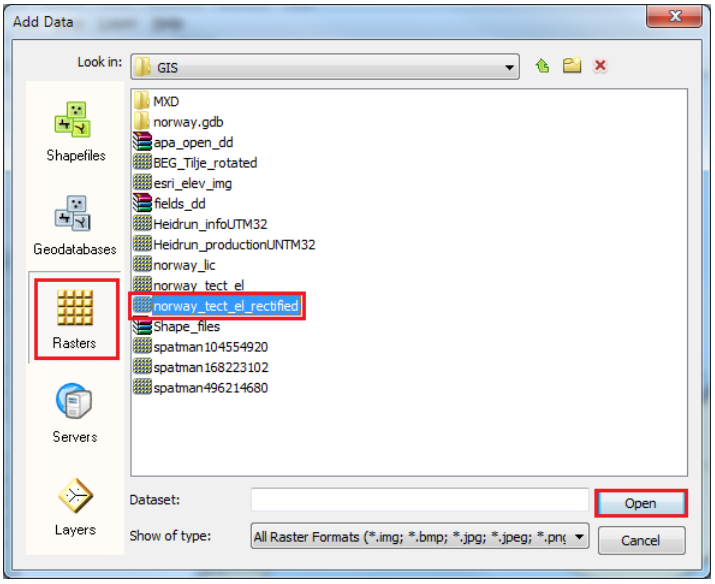


11. From the *DecisionSpace GIS* window, click the **Add Data** icon ( ).



12. In the *Add Data* dialog, click **Rasters**. Select the **norway_tect_el_rectified.tif** file and click **Open**.

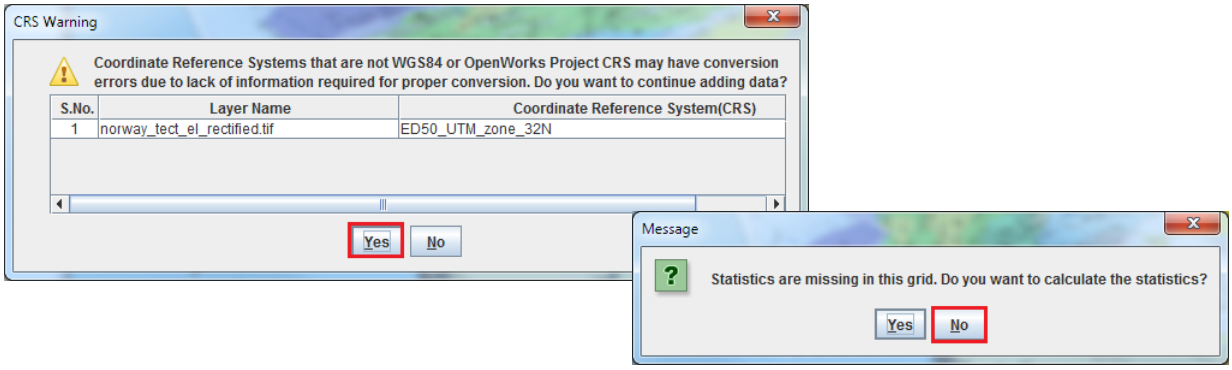
If necessary, navigate to the `/data/OW_PROJ_DATA_DSG_NORWAY10/GIS` directory, or an alternative provided by your instructor.



A slight projection mismatch is inconsequential for this class. You will not require statistics for the added layer.

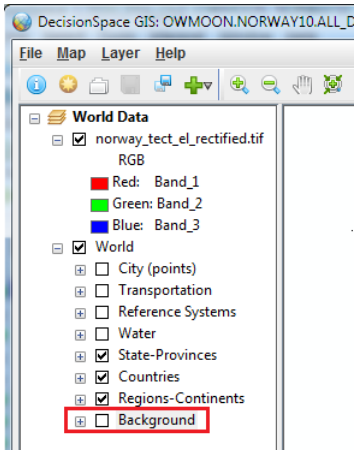
13. In the *CRS Warning* dialog, click **Yes**. If a message appears

regarding calculation of statistics click **No**.



You will configure the GIS display with a few adjustments to layer content and hierarchy.

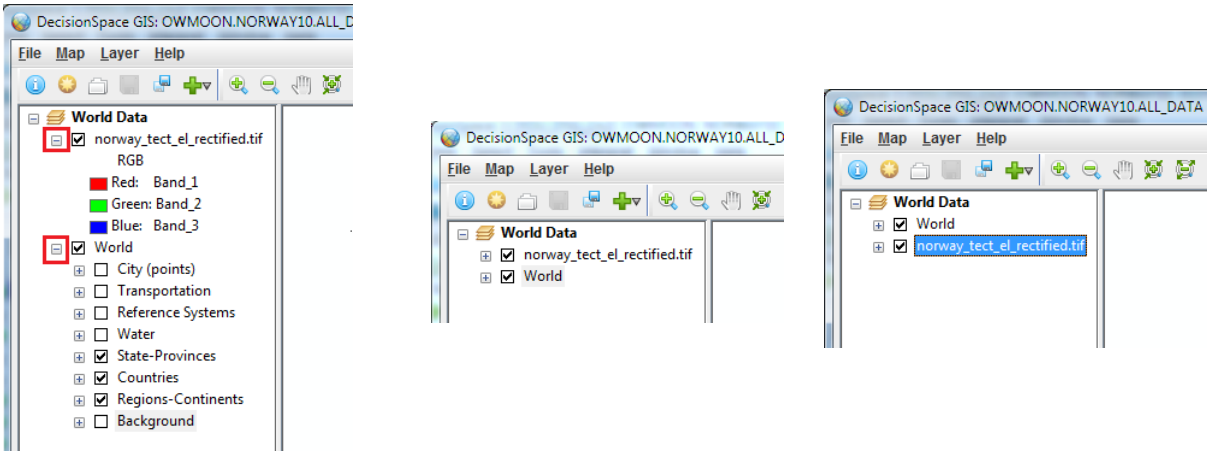
14. In the left data tree of the *DecisionSpace GIS* window, expand the **World** layer and toggle **off** Background.



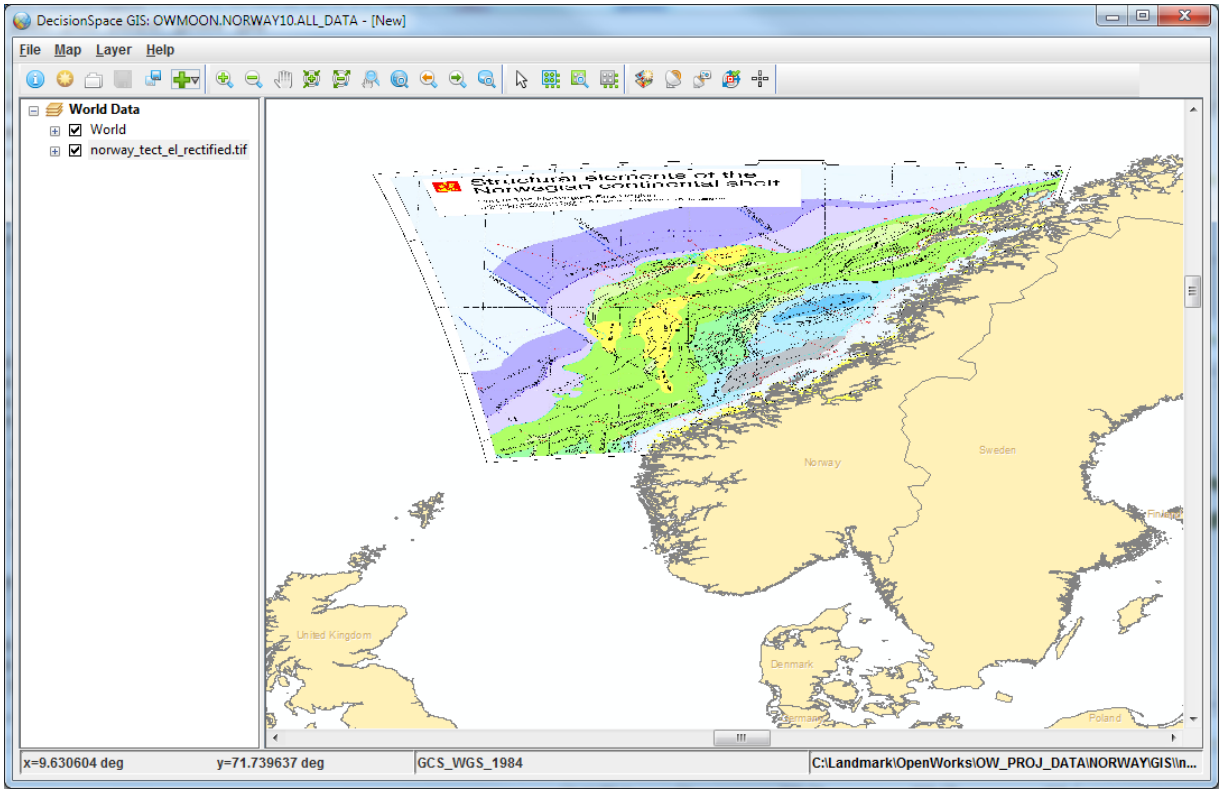
If the GIS map is first in the list, it will plot over the world map. If so, you will change the plotting order.

15. Collapse the nodes for **norway_tect_el_ rectified.tif** and **World**. Drag and drop the **norway_tect_el_ rectified.tif** layer to a position

below the World layer.



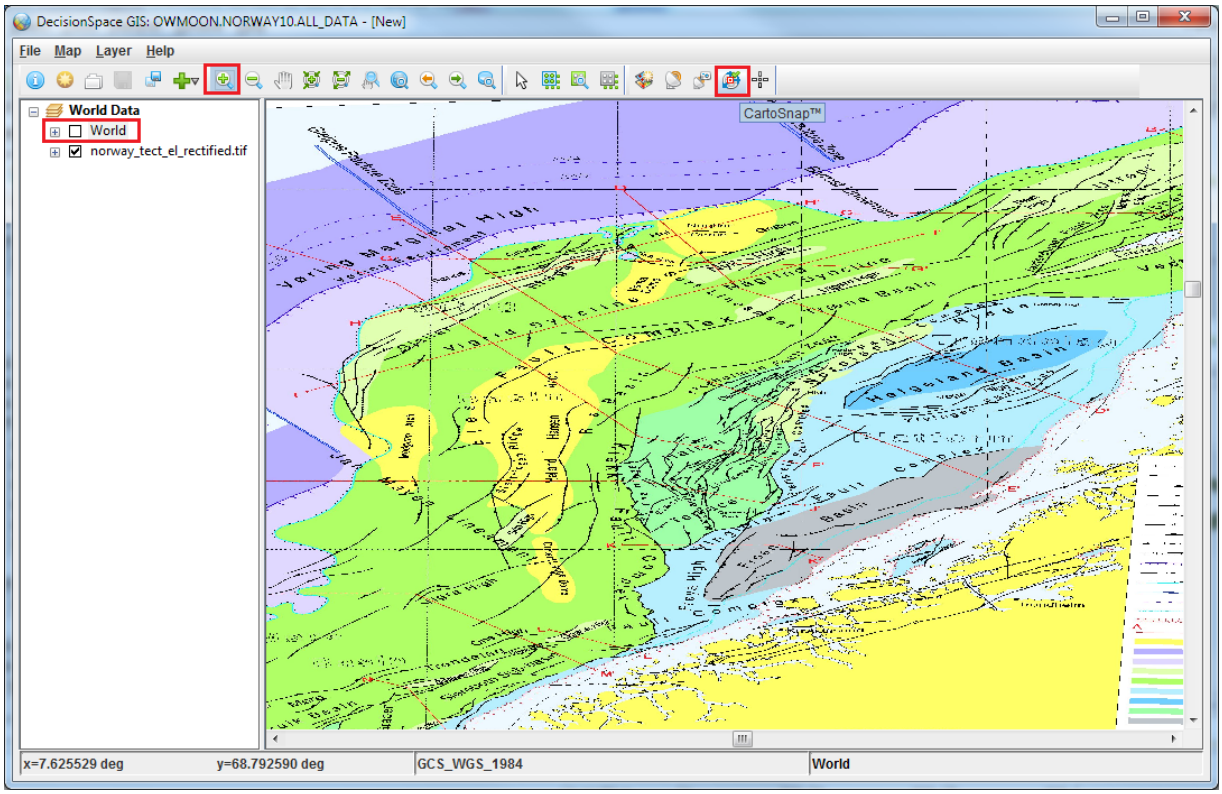
The added layer image is projected onto the world map in the *DecisionSpace GIS* main display.



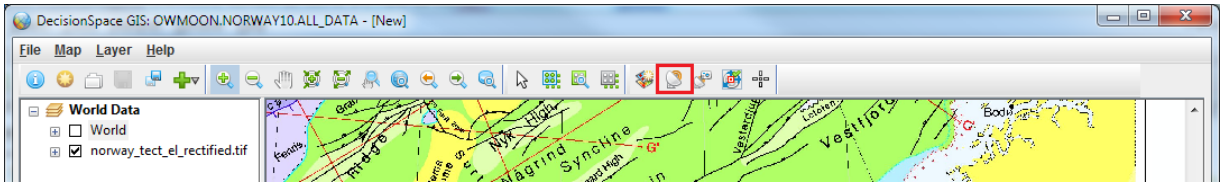
You will turn off the world map and change the projection of the GIS image (tif file) to the current OpenWorks project coordinate system. Then you can export the GIS image to the DecisionSpace Geoscience suite and overlay it on other data in your project.

16. Toggle **off** the World layer in the left side inventory panel. Click the

CartoSnap icon ( ) in the upper menu bar to change the coordinate system. Finally, click the **Zoom** icon ( ) and enlarge the image to cover the display area.



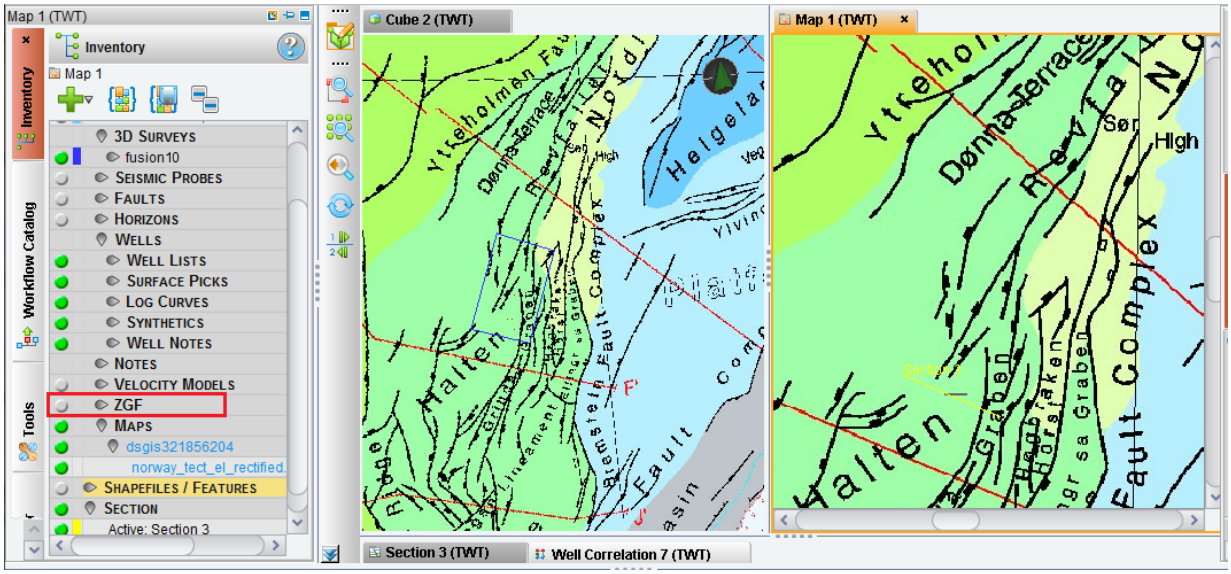
17. Click the **Broadcast Map Document** icon ( ).



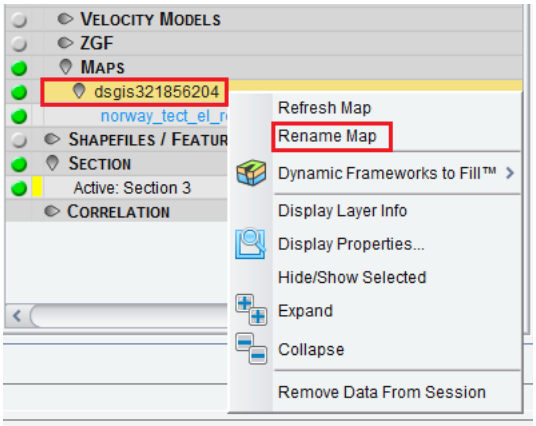
As the document is broadcast to your session you should see cross-hairs on the displays. It will take a few seconds to complete the display in the *Cube* and *Map* views. The *Inventory* will list the layer under the MAPS heading with a default name.

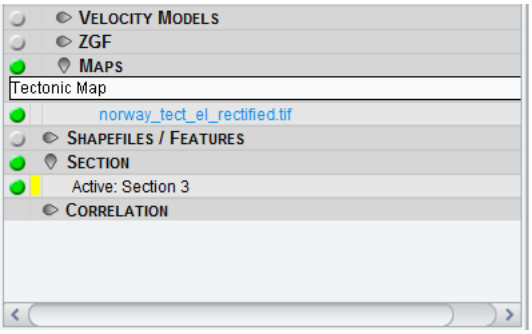
18. **Hide** the ZGF data in *Map* and *Cube* views. Adjust those views to be larger and zoom as needed to explore the map and its relation to

the wells and seismic data in your project.



19. To rename the map in the *Inventory* tree, put your cursor on the default file name and **MB3** > **Rename Map**. Type "**Tectonic Map**" and press <**Enter**>. If an *Error Renaming MXD File* warning message appears, click Yes to overwrite the file.

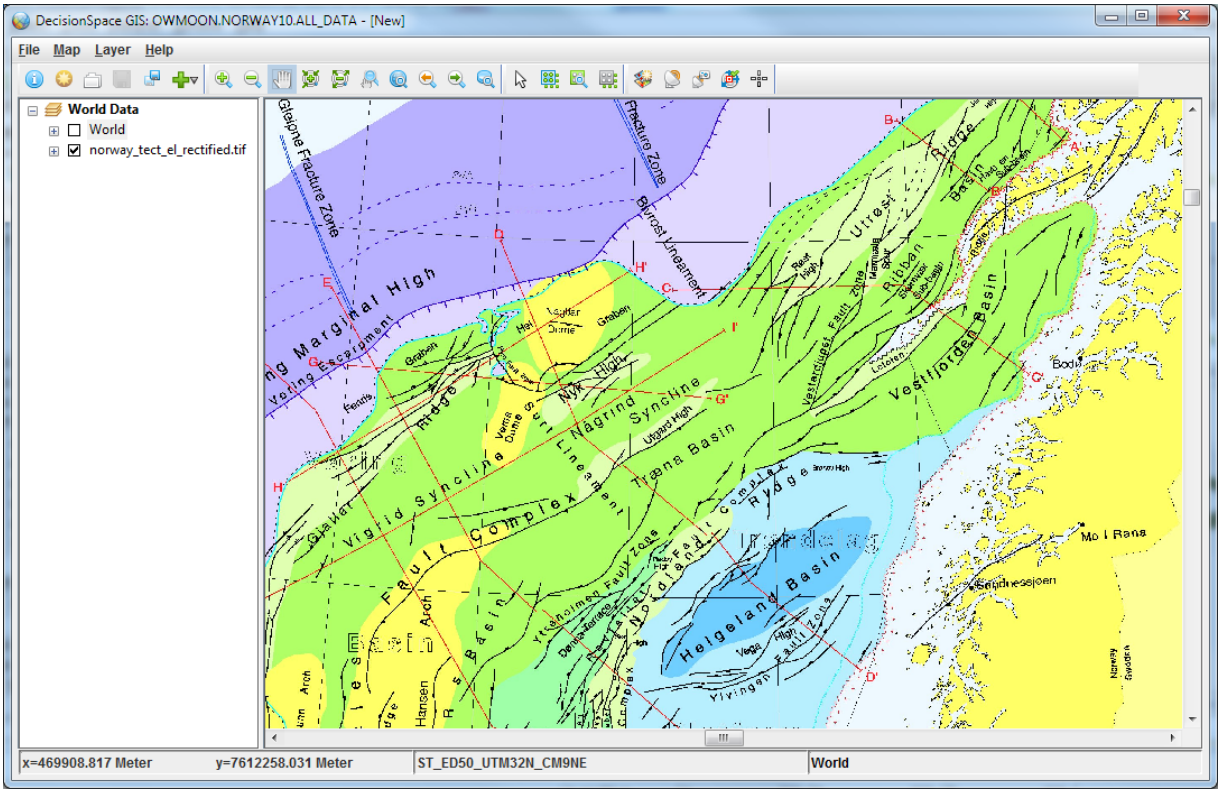




Note:

You can attach GIS data directly to your session. Open the *Select Session Data* dialog ( ). Expand the GIS Data node, then MB3 one of the sub-categories to Add File Folder. Navigate to and select a relevant data directory; from that point forward, the associated files will appear in the *Select Session Data* dialog.

20. Double-click the ***Map*** tab to maximize the display. **Zoom** and **pan** to approximate the image shown below,



21. In the *DecisionSpace GIS* window select **File > Exit** and click **Yes** in the *Exit* prompt.

You will learn more about GIS in Chapter 3.

Creating and Using Vertical Images

In this exercise, you have loaded a structural basemap from a shape file. Now you will view some vertical cross sections in the DecisionSpace Geoscience suite. DecisionSpace allows for these types of geologic analogies through the use of vertical images.

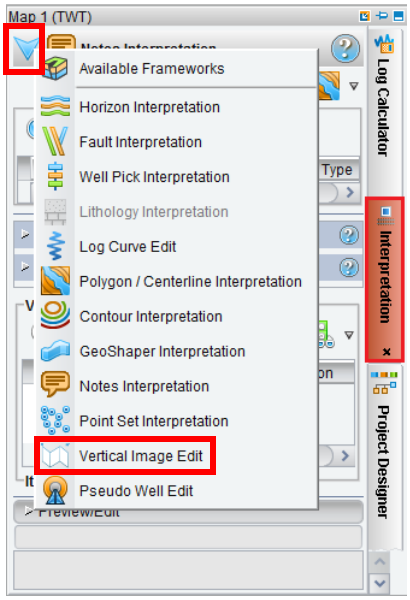
If you have a section displayed when you load a vertical image, the vertical image will snap to the section. This assumes the section and the vertical image have the same location. This assumption is sometimes incorrect, so you may need to use vertical image edit to enter the correct location.

If a vertical image already has the correct location information loaded into the database, you can find it by selecting Culture Data >Vertical Images in the *Select Session Data* dialog. Add vertical images to your session as you would any other data type.

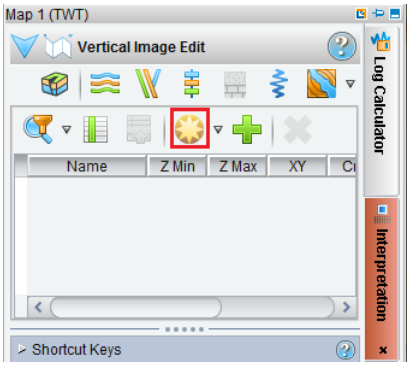
You will add a new vertical image to your session and position that image by digitizing its location. You will also load vertical images with pre-specified locations.

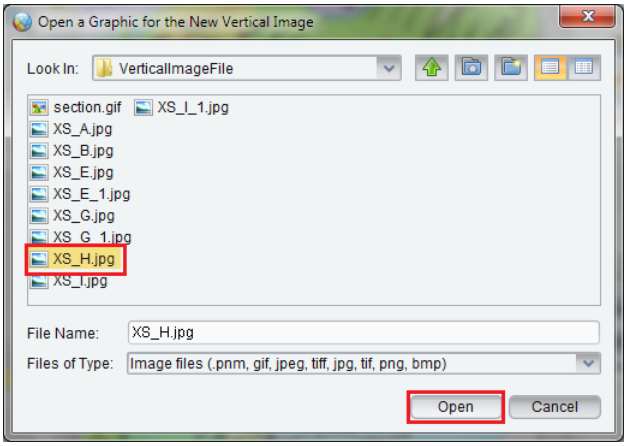
22. Click (activate) the ***Map*** tab.

23. Click the ***Interpretation*** tab in the task pane, then click the **Select A Task** icon ( ) for more interpretation options. Select the **Vertical Image Edit** icon ( ).



24. In the *Vertical Image Edit* task pane, click the **Create new Vertical Images** icon ( ). On the *Open a Graphic for the New Vertical Image* dialog, select **XS_H.jpg** and click **Open**.





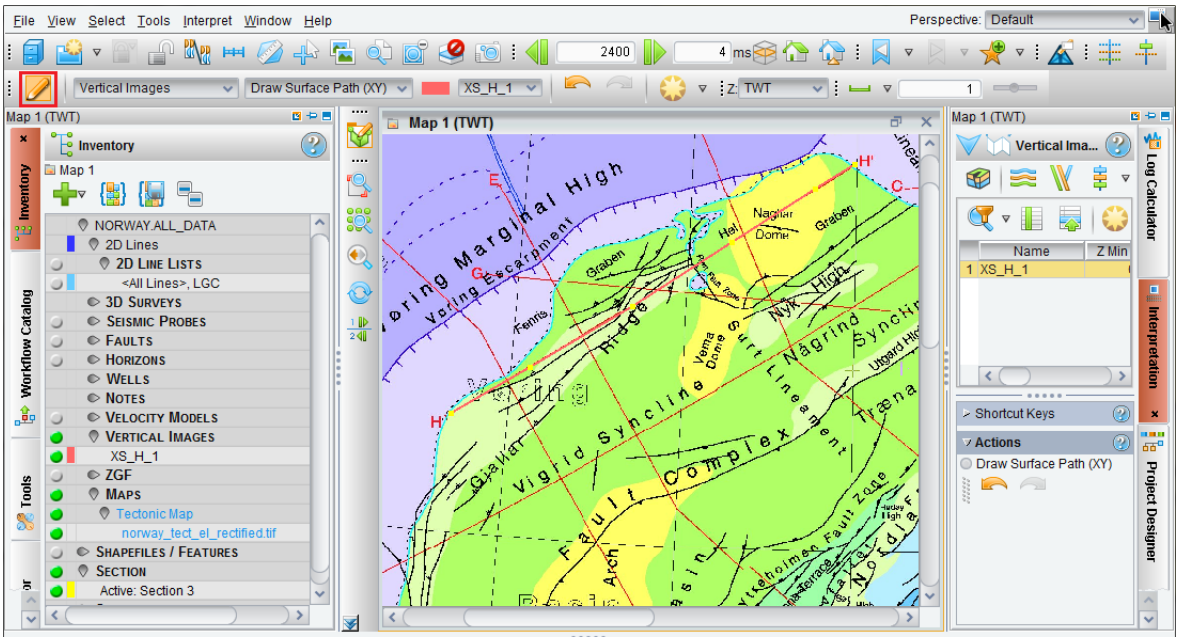
Note:

The file selector defaults to the disk location where the OpenWorks software stores external files for the project.

The vertical image is automatically displayed in the *Section* view. Because there is no location data, it assumes it is co-located with the displayed section (probably an inline from your seismic data). The next step is to define a line of section where you would like the image to be displayed. You will use the structural map that you imported with the GIS functionality to locate and digitize coordinates for this vertical image.

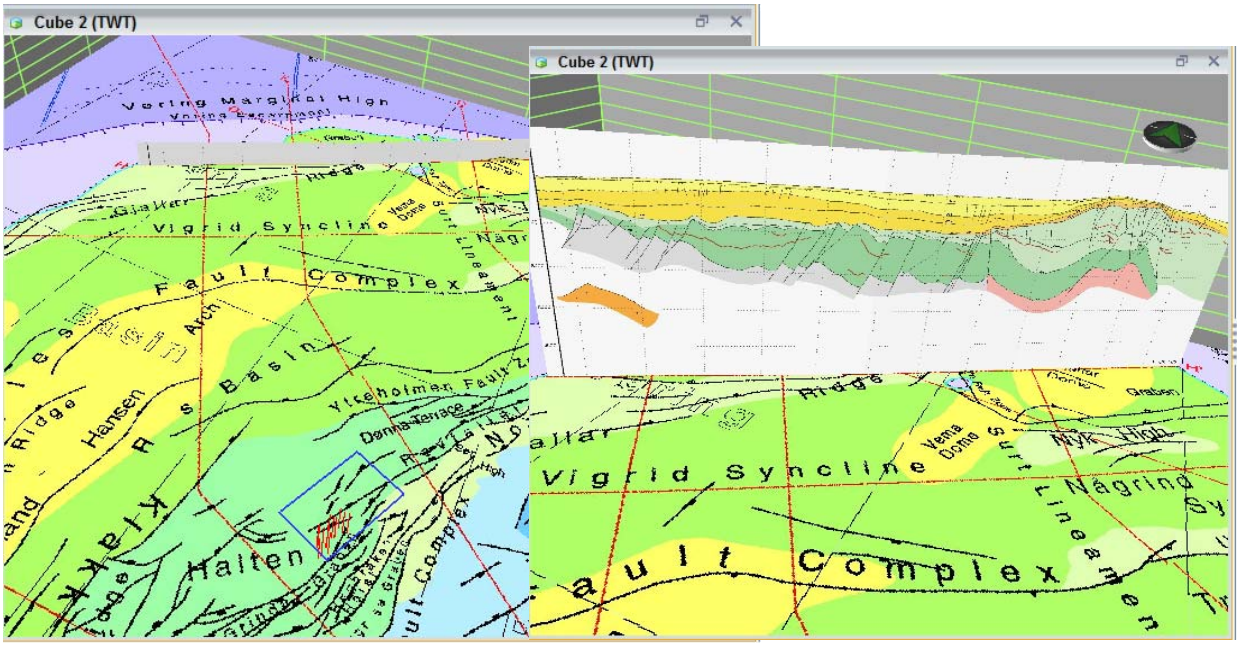
25. Confirm that **Interpretation Mode** ( ) is off (exit interpretation mode, if necessary). This will help you adjust the *Map* view. Double-click the ***Map*** tab to maximize the view and **zoom** so the full extent of the red H to H' line is visible in the northern area of the GIS image.

26. Confirm that **Interpretation Mode** ( ) is on (enter interpretation mode). On the map, click a sequence of **MB1-MB1-MB1...** to draw the line of section H to H'. Click **MB2** to finish digitizing the line.



When you **MB2** to finish digitizing the section the vertical image will snap to it and be displayed in the *Cube* view. It will be removed from the *Section* view because the application now knows that it does not lie on the existing section location.

27. Select the ***Cube*** view and **<Z> MB1-drag** (move the tectonic map down in time) to reveal the vertical section. Manipulate the view to better see the section, as shown below.



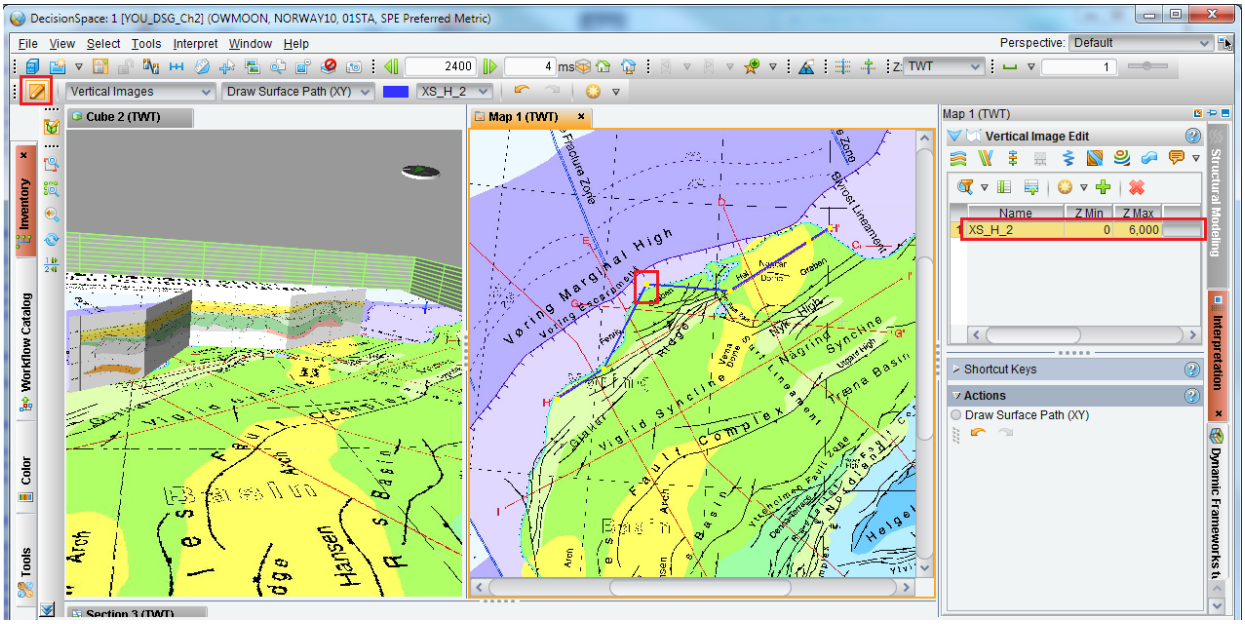
If the position of the vertical image needs adjustment, you can move it in two ways:

- You can MB1-drag to move nodes in the *Map* view or delete points by MB2. Then you can click the straight line segments and drag. A new node will be created at the drag point and the line becomes kinked.
- You can precisely adjust the x,y locations of any point in a table.

You will use both methods in the following steps.

28. Make the ***Map*** view active and select the *Vertical Image Edit* in the task pane. Highlight the line **XS_H_n** in the list (_n is assigned by the program). Click the **Interpretation Mode** icon ( ). On the map you should see blue line segments between the yellow picked points. Click the mid-point of a **straight line segment** and **drag-**

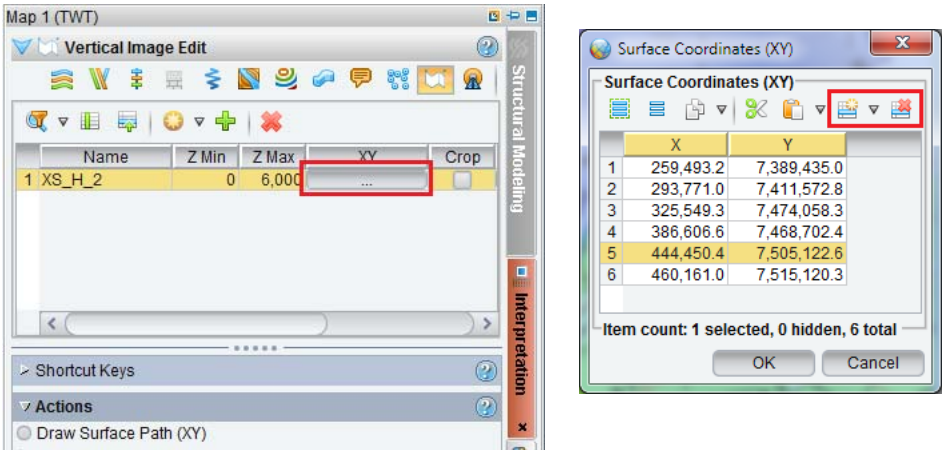
and-drop to create a new point and kink the line. Notice that the *Cube* view updates the display (location) of the vertical image.



29. **MB2** to remove the point you just created, as well as any other incorrect points. MB1-drag a **point** to experiment with changing the position of an existing point.

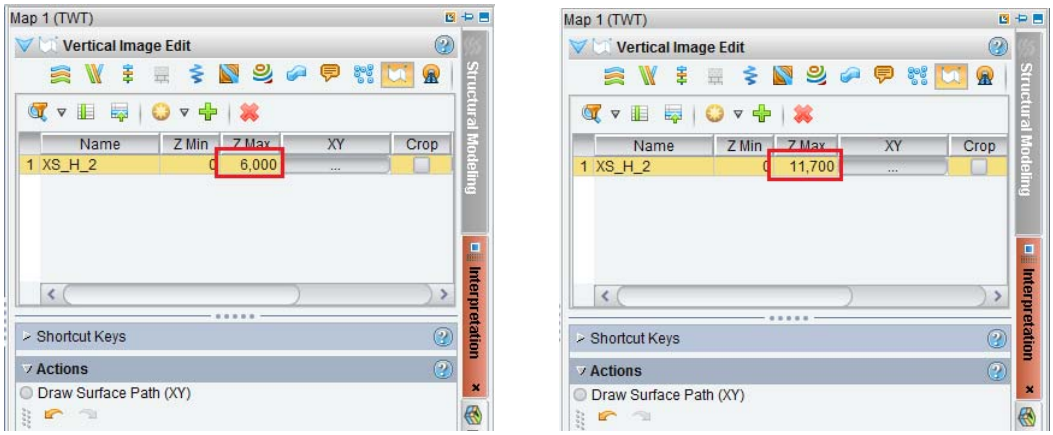
If you have x and y coordinates for the line of section, you can add these in a spreadsheet format.

30. Make the ***Map*** view active, and in the task pane click the (**…**) button under the XY column heading for the selected vertical image (you may need to scroll to the right). The *Surface Coordinates (XY)* dialog appears. In the dialog you can edit the X,Y location of any point. Double-click **any cell** to make it active and enter the modified value. Create and delete rows by using the icons circled below. Click **OK** to exit.



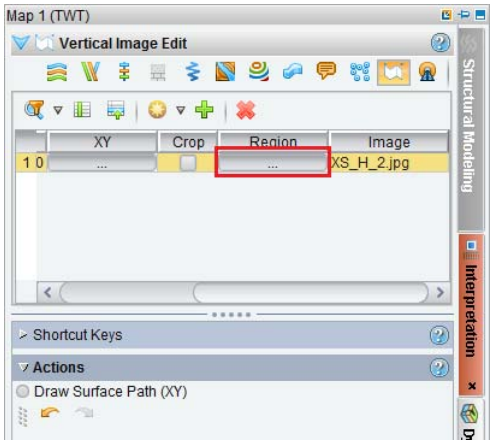
A close examination of the scale on the left side of the XS_H_n vertical image indicates that the maximum time is 11,700 ms. The default Z Max of 6000 ms is incorrect.

31. To change the Z Max, double-click the **6000** cell value to make it active, then type "**11700**" and press <**Enter**>.

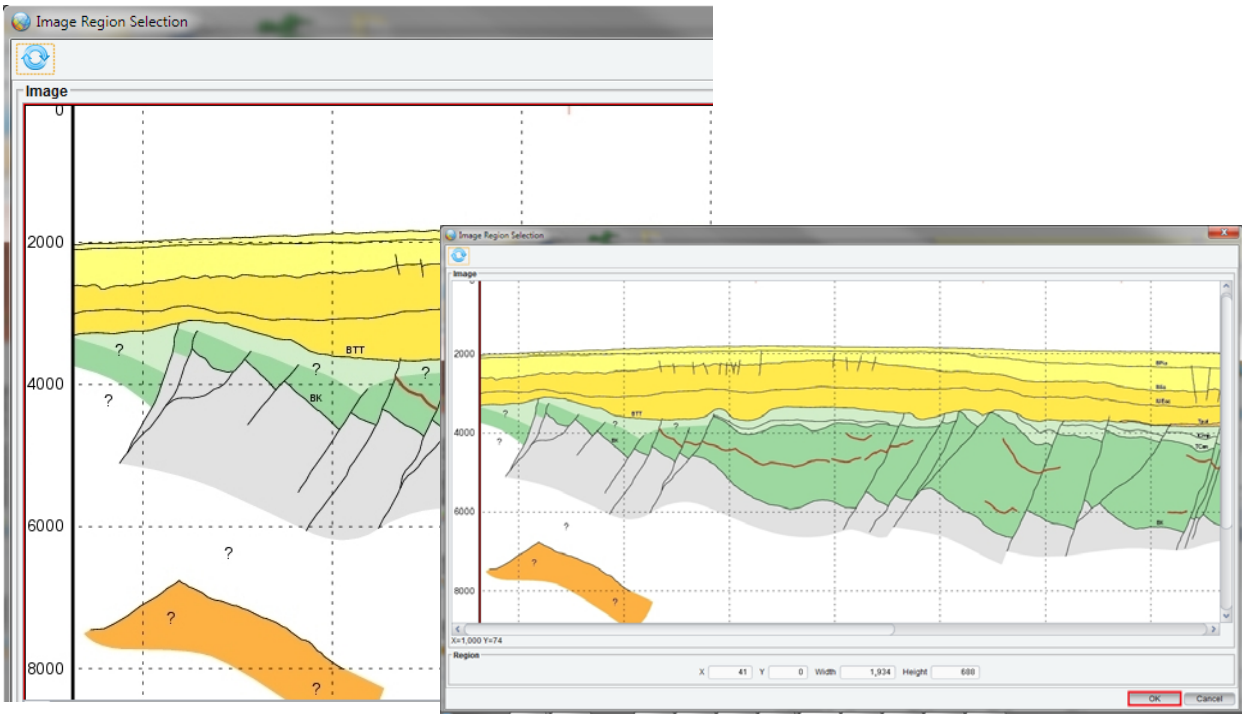


Note that the scale should not be included in the projection of the image on the map going from H to H'. Next, you will crop the image so the scale will be removed and the vertical image correctly positioned.

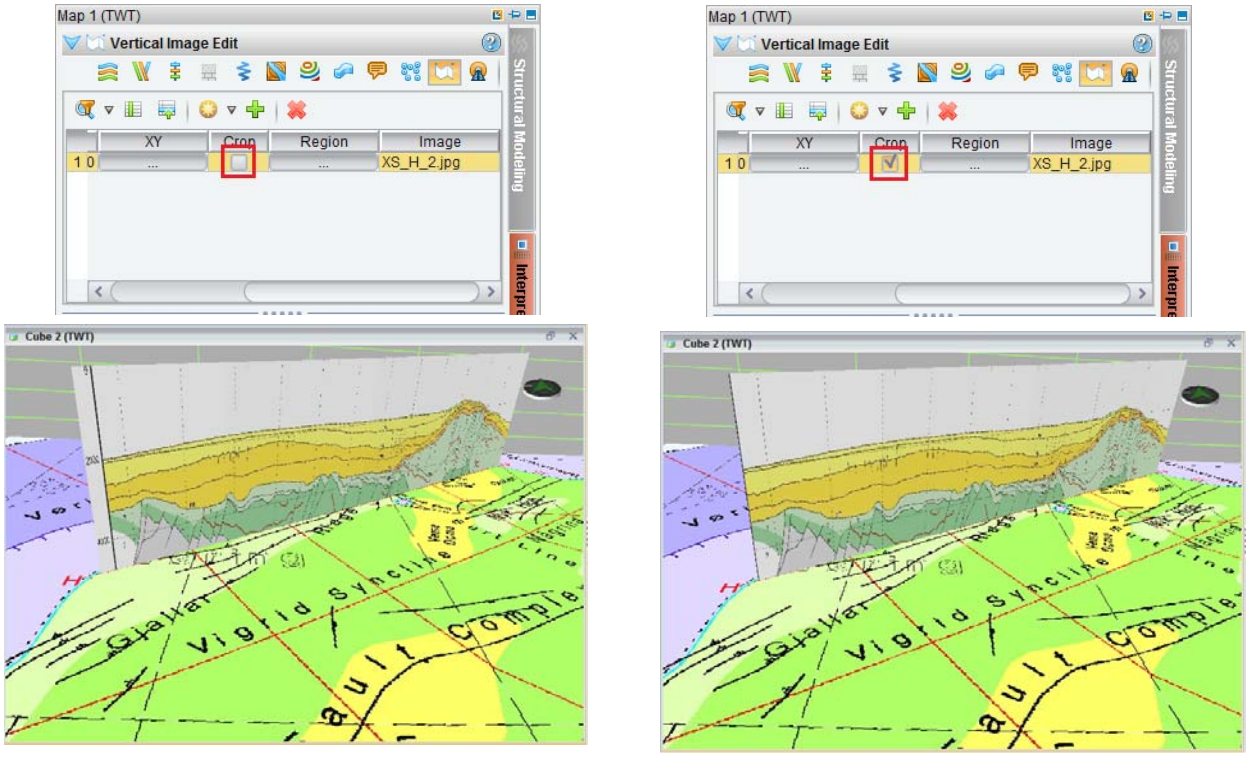
32. While still in the *Vertical Image Edit* panel on the XS_H_n line, move the scroll bar to the right to locate the Region column. Click the (**...**) button.



33. The *Image Region Selection* window appears. In it you will see a red box surrounding the whole image. MB1-drag the left edge of this **box** to move the red boundary to exclude the vertical scale. (If necessary, you can MB1-drag a stretchy box to define a new crop area.) Click **OK**.



34. In ***Cube*** view, **zoom in** on the left (western) end of the vertical image. Note that the scale is included in the display. Activate the ***Map*** view and in the V*ertical Image Edit* task pane, toggle on the **Crop** check box and note that the scale is removed and the position of the western end of the line is now correct.

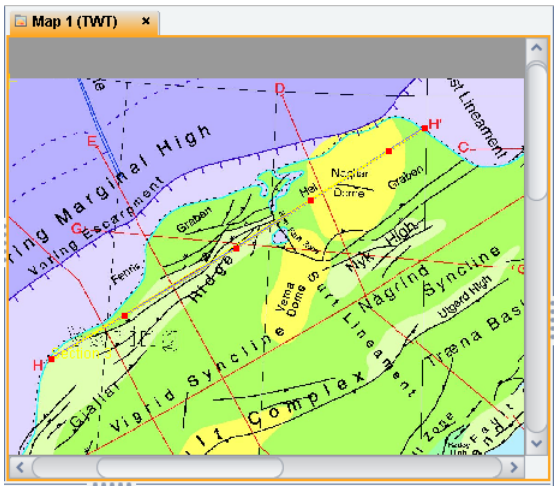


You will now display the vertical image in the *Section* view.

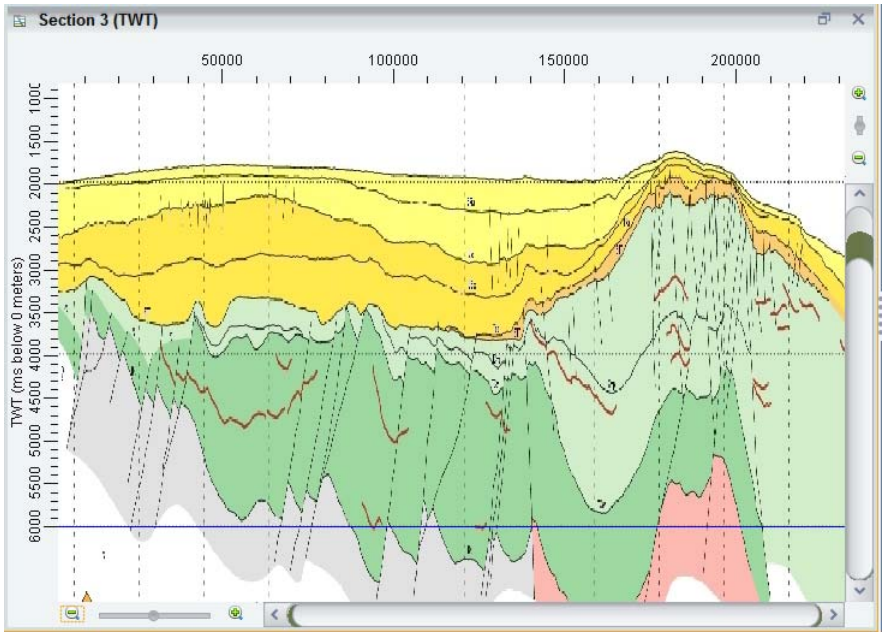
35. Click the ***Section*** tab to activate it. Click the **Select Point to Point** icon ( ).

The program is now waiting for you to select a line in the *Map* view.

36. In the *Map* view, hold down the **Ctrl** key and place your cursor over the vertical image line near the western end of the line. You will see it highlight as you hover over it. When it becomes highlighted, **MB1** to select it. The line will turn red. **MB2** to complete the section selection.



You should see the vertical image appear in the *Section* view. You will probably need to zoom out to see the entire line.



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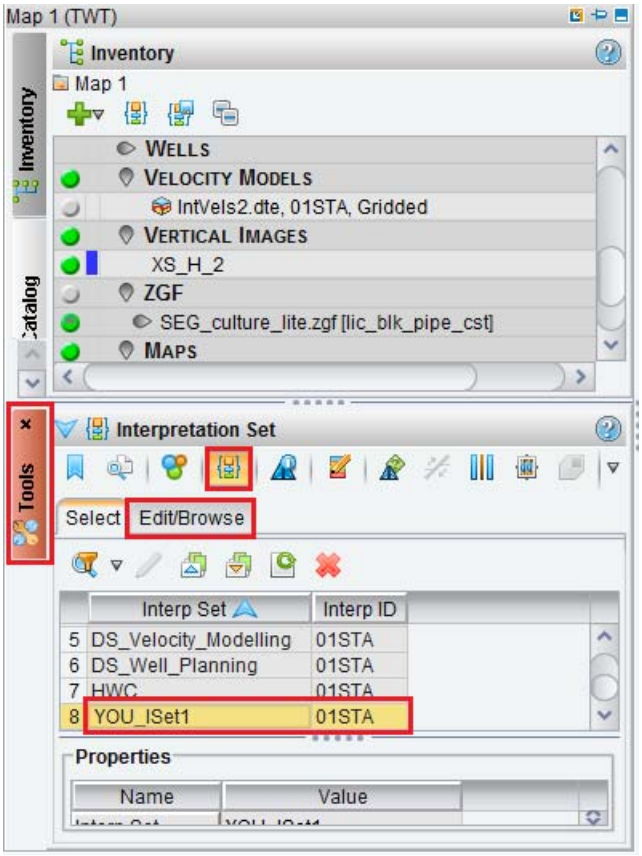
Note:

If your image appears flipped in the *Section* view, use the **Select Point to Point** icon to choose it again. Pay close attention to the end of the line from which the rubber band starts after you select **Ctrl-MB1**. The end where the rubber band is anchored will be posted on the left side of the *Section* view.

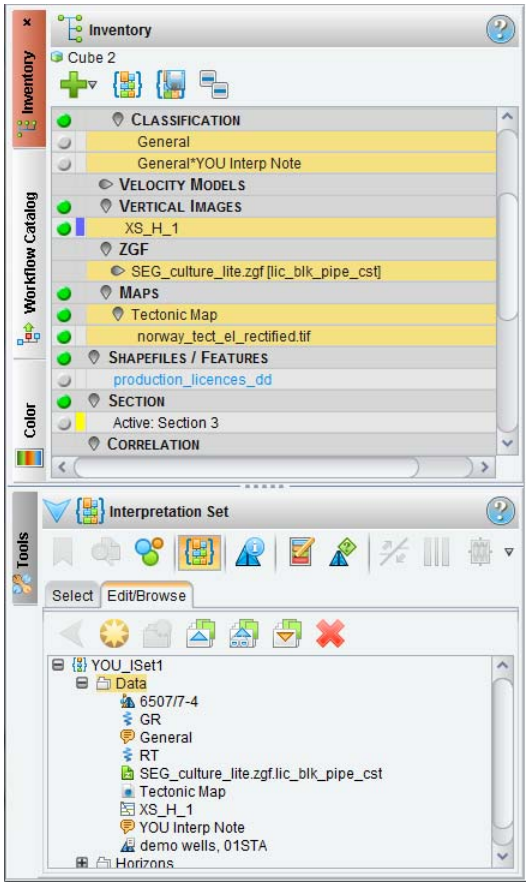
Return to your ISet and update it with your notes and images. You must have the task bars configured so you can see the *Inventory* pane and the *Tools* pane simultaneously.

37. Make the ***Cube*** view active. Then, as you have done before, drag the ***Tools*** tab to the lower section of the left task pane to create two panels. Click the ***Inventory*** tab in the upper panel; click the **Interpretation Set** icon({}) in the lower panel. Select **You_ISet1**, then the **Edit/Browse** tab.



38. Highlight, then drag-and-drop the **new data types** shown below from your *Inventory* into the Data folder of your ISet.

*** Notes**
***Vertical Images**
***ZGF Objects**
***Maps**
***Shapefiles**



Remember, you drag individual objects, not categories.

ISets are a great way of organizing data, allowing easy access by you and your colleagues.

Leave DecisionSpace open for the next exercise.

Overview: Using Dynamic Frameworks to Fill (DFF)

Background to the Design of DFF

The direct tie between data, interpretations, and mapping is the key theme in the design of DecisionSpace and DFF. Dynamic Frameworks to Fill was designed as an integrated interpretation and mapping system tied directly to a next generation, framework-based mapping system. As a result, DFF workflows tie directly back to raw interpretive data such as horizons, tops, and well logs. The DecisionSpace Geosciences environment facilitated this concept and design.

By contrast, competitive framework-building or earth-modeling systems emphasize the use of static data objects (grids and point sets) as their starting point. This assumes that interpretation is the realm of interpreters and framework building is the realm of (earth) model builders. When framework building tools rely on static grids and static point sets, the ability to tie back to the original data that the interpretation was based upon, is lost.

Dynamic Frameworks to Fill supports the proposition that the industry would prefer that edits to a framework model are based on changes to the original interpretation. The key point is that DFF takes a data centered approach to the framework construction process that fully involves the professional interpreter. The benefit of this approach is that the DFF QC process can compare framework surface geometries directly to original seismic, horizon, and top data.

DFF Capabilities

Dynamic Frameworks to Fill has many advantages and benefits, based on the following components.

1. Integrated geologic and geophysical interpretation tools leverage framework surfaces in workflows. For example, pick and edit well faults from predicted seismic faults in Correlation view triggers an update of DFF.

2. The best-in-class topology engine properly grids surface data in the context of fault blocks (introducing a paradigm shift in interpretation with automatic construction of fault polygons) and unconformity-bounded regions.

3. Conformance technology models well surface picks, guided by seismic horizons, thereby eliminating horizon shifting to well surface picks and preserving your seismic interpretation.

4. A best-in-class topology engine properly extracts zone properties for wells with incomplete penetrations and multiple traversals of the same zone for horizontal wells.

5. Multi-surface framework and property map updates tied to changes in data or edits to existing interpretation. This is enabled by the ability to:

    - Associate or blend multiple data sources (e.g., tops, seismic horizons, point sets for structural surfaces, raw and calculated log curve data for property maps) with a given surface or property map.

    - Update all surfaces and property maps when input data are changed by data import (i.e., new wells are drilled and additional top and well log data are available) or interpretations are changed (e.g., horizon or top data for surfaces, and raw or calculated log curves for log-derived property maps).

    - Update all dependent surfaces when primary surfaces (e.g., parent surfaces in conformance relationships, or fault planes cutting multiple surfaces) are altered in a multi-surface framework.

In the next exercise you will create a Geoshaper surface using Dynamic Frameworks to Fill.

Exercise 2.3: Interpreting GeoShapers Plus Framework

You can create simple drawing objects with GeoShaper Interpretation. GeoShapers can be lines, points, or polygons. Use these objects to highlight or locate an area of interest. Although they are not intended to be a seismic interpretation tool, GeoShapers can be connected to create a 3D surface or they can be output as an OpenWorks point set. GeoShapers were not envisioned to be quantitative or modeling objects, but rather to provide rapid insights into the form and structure of the geology in an area.

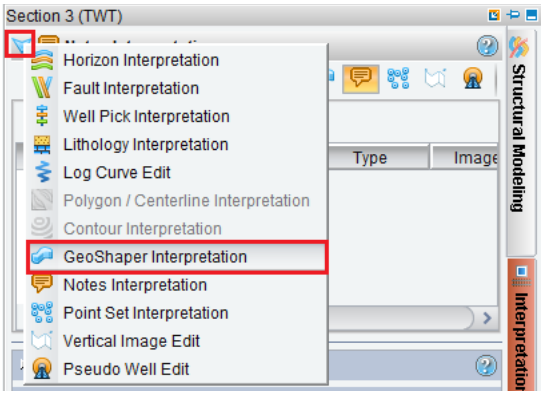
In this section you will create and edit GeoShapers. You will interpret the water bottom on vertical images using a GeoShaper object. Your interpretation will form a surface in a Dynamic Framework. You will be able to interpret some of the features you may have noticed during the earlier exercises.

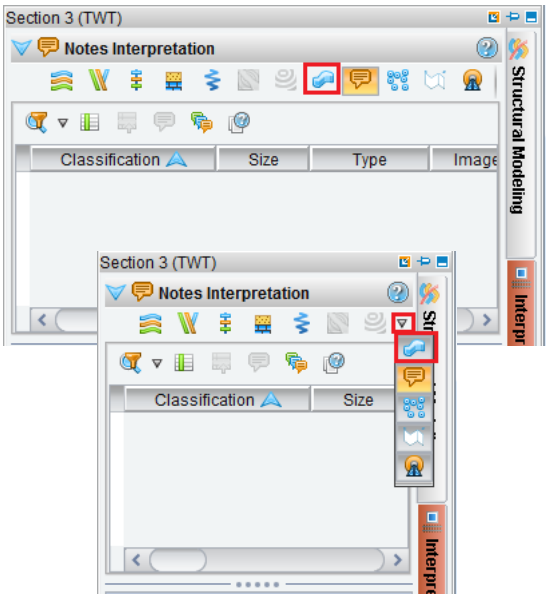
GeoShapers are created and modified in the *Map* and *Section* views only. GeoShapers can be displayed in the *Cube* view, but cannot be created there.

GeoShaper to Dynamic Surface

From the previous exercise you should still have your vertical image displayed in the *Section* view. You will create a GeoShaper line on this image.

1. Click the ***Section*** view containing the vertical image, to make it active. In the task bar click the ***Interpretation*** tab and select the **GeoShaper** icon ( ).

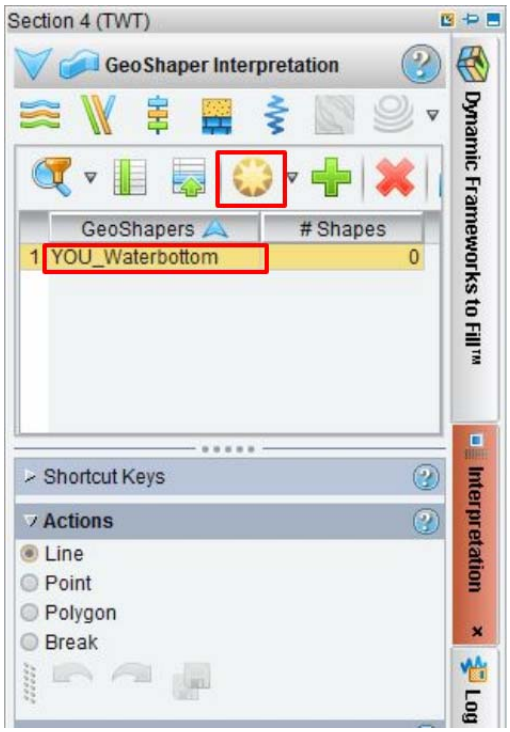




You can access the GeoShaper icon several ways.

The Interpretation task pane now shows the GeoShaper Interpretation controls.

2. Click the **Create new GeoShaper** icon ( ). To rename the new GeoShaper set, double-click the **cell** and enter **YOU_WaterBottom**.



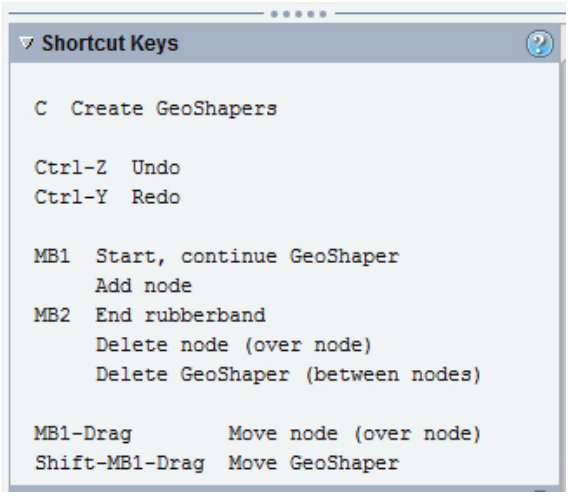
As you can see in the figure above, GeoShapers have three main drawing shapes:

- **Line** is a linear drawing that is used to enhance your interpretation. For example, you could use this shape to interpret a horizon in the *Section* view that is beyond your current seismic data. This is one way to extend a surface grid.
- **Point** is a single-point drawing that creates a data control point to help guide the interpretation.
- **Polygon** must have three or more sides. You can fill polygons with color or lithology from the GeoShaper Shape Info panel.

In a *Section* view or *Map* view, you can draw GeoShaper objects anywhere by a sequence of MB1-MB1-MB1... and then MB2 to close the object.

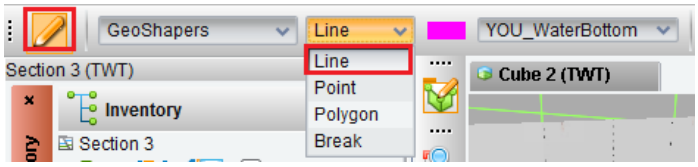
All GeoShaper interpretation is supported by Undo and Redo through icons ( ) or shortcut Keys **Ctrl-Z** and **Ctrl-Y**.

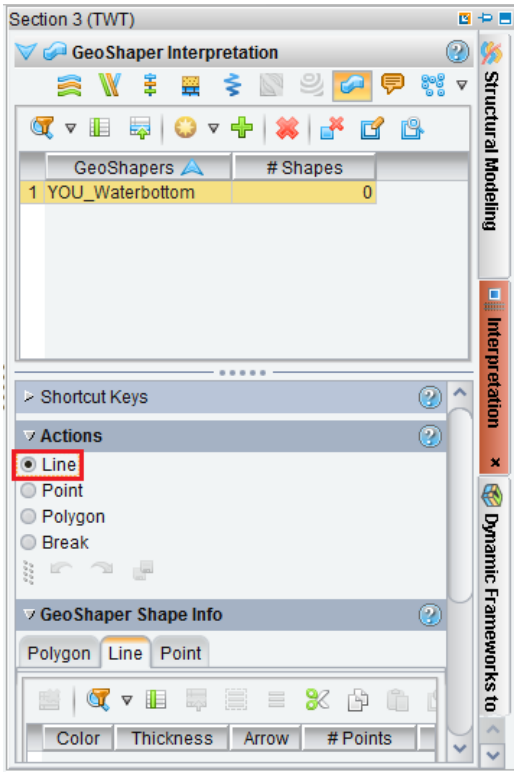
The task pane lists the GeoShapers shortcut keys.



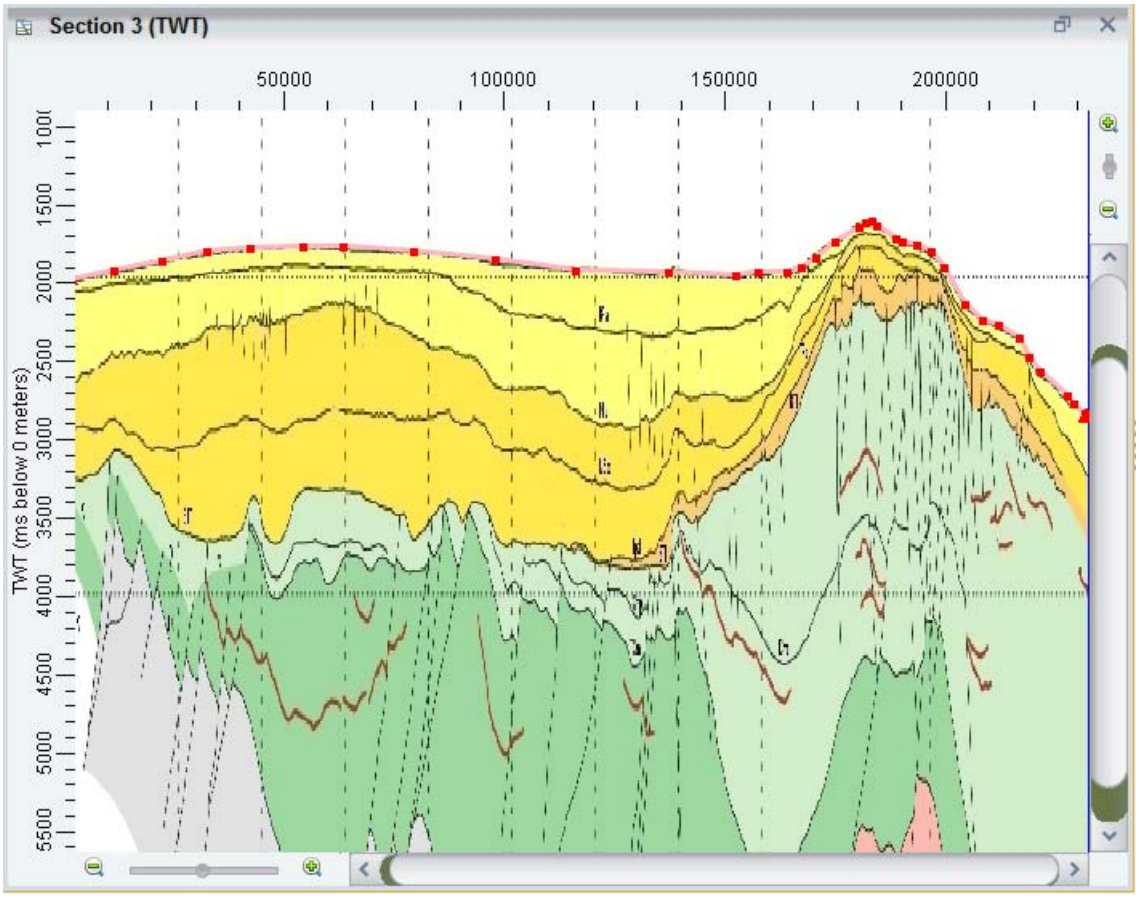
You must enable Interpretation mode to digitize the GeoShaper.

3. Click the **Interpretation Mode** icon ( ) in the main tool bar. The background becomes orange ( ) when it is active. Ensure that GeoShapers is your object and Line is the action. Select **Line** in the Actions panel of the task pane or in the pull-down menu in the main toolbar.



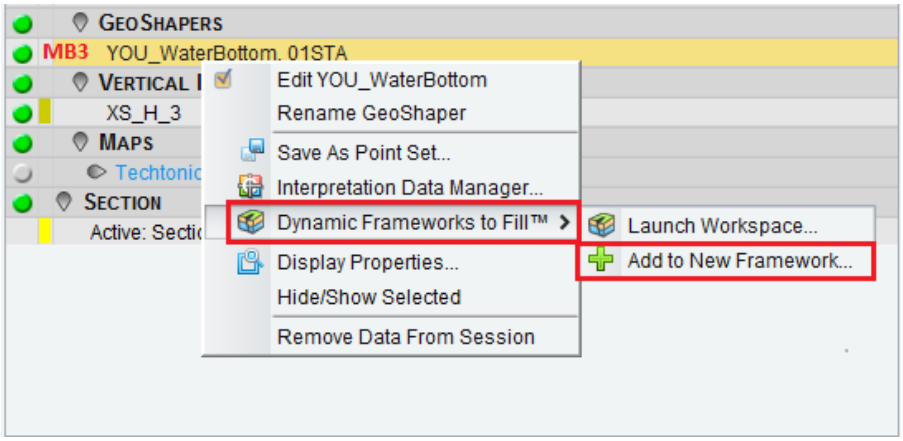


4. Perform a sequence of **MB1**, **MB1**, **MB1...** along the water bottom to interpret a GeoShaper Line that defines the sea floor on the vertical image. **MB2** to close the line.



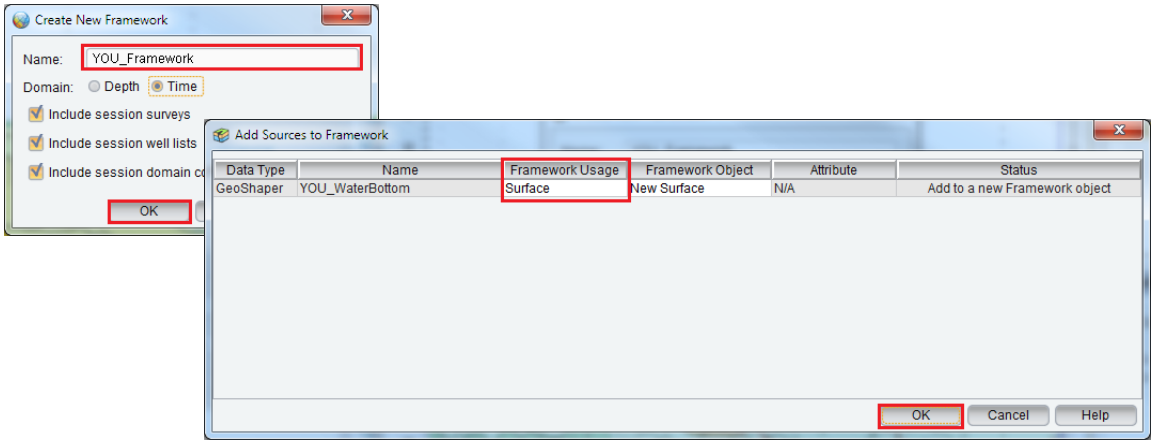
Send this first line of interpretation to a Dynamic Framework to initiate a new gridded surface (and Framework).

5. In the *Inventory* tree, on the GeoShaper object you just picked, **MB3 > Dynamic Framework to Fill > Add to new Framework**.

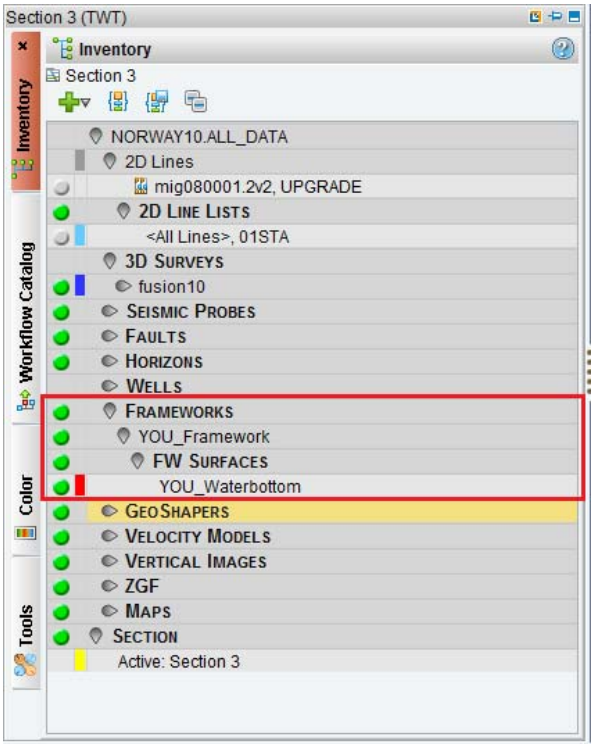


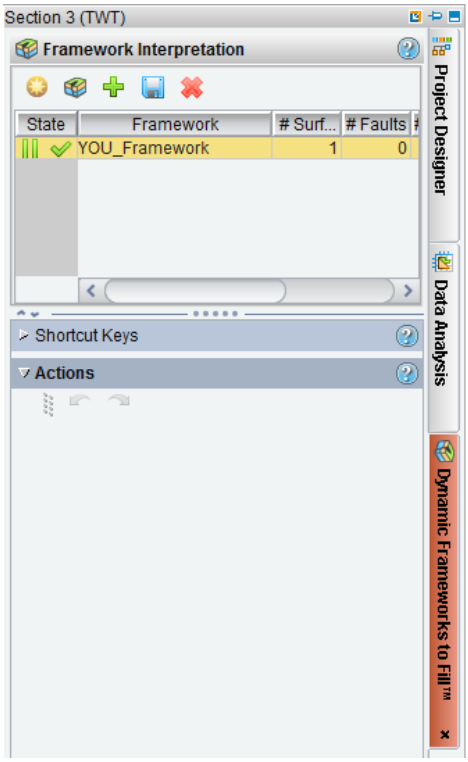
The GeoShaper will contribute to a surface within the Framework.

6. On the *Create New Framework* dialog, enter **YOU_Framework** in the Name text field and click **OK**.
   This opens the *Add Sources to Framework* dialog. Select **Surface** under **Framework Surface** if it is already not selected.

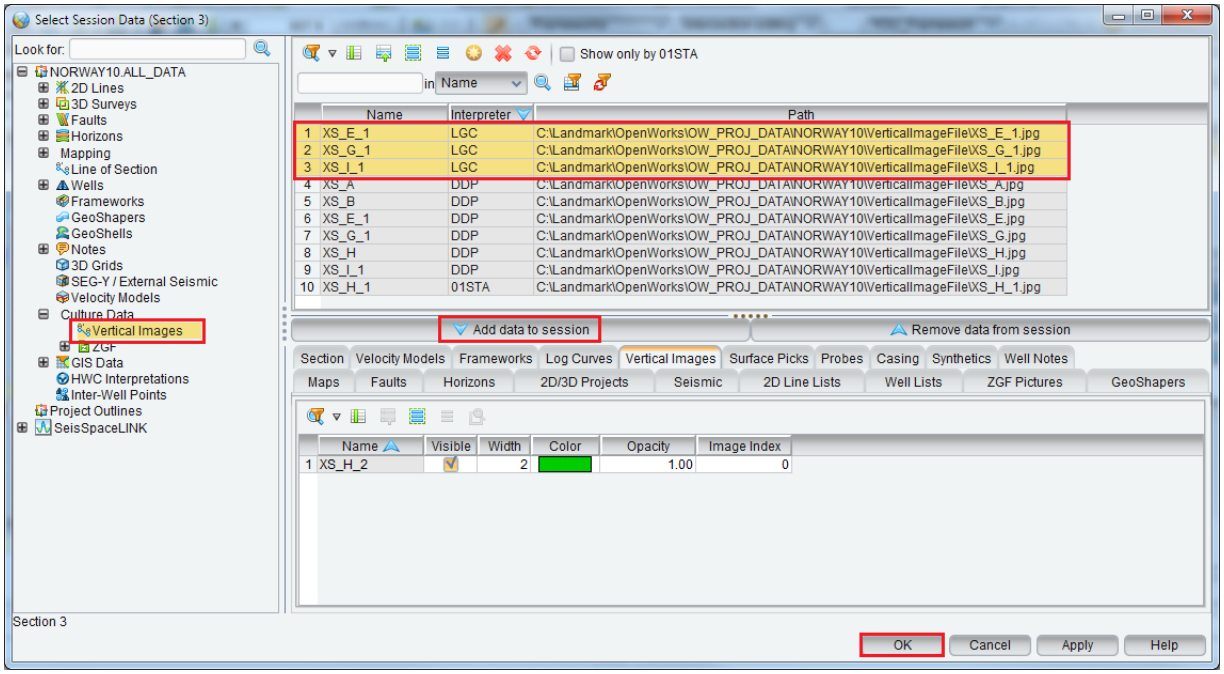


Your session data now includes a new Framework with an assigned name. You can see this object in the *Inventory* tree under FRAMEWORKS; the Framework and its constituent surface are listed. The *Frameworks to Fill* task pane may be activated.





7. From the top toolbar, click the **Select Session Data** icon ( ), then **Culture Data > Vertical Images**. Click the **Interpreter** column heading to sort the rows by Interpreter. Highlight the **XS_E_1**, **XS_I_1**, and **XS_G_1** vertical images for Interpreter LGC. Click **Add data to session,** then click **OK**.



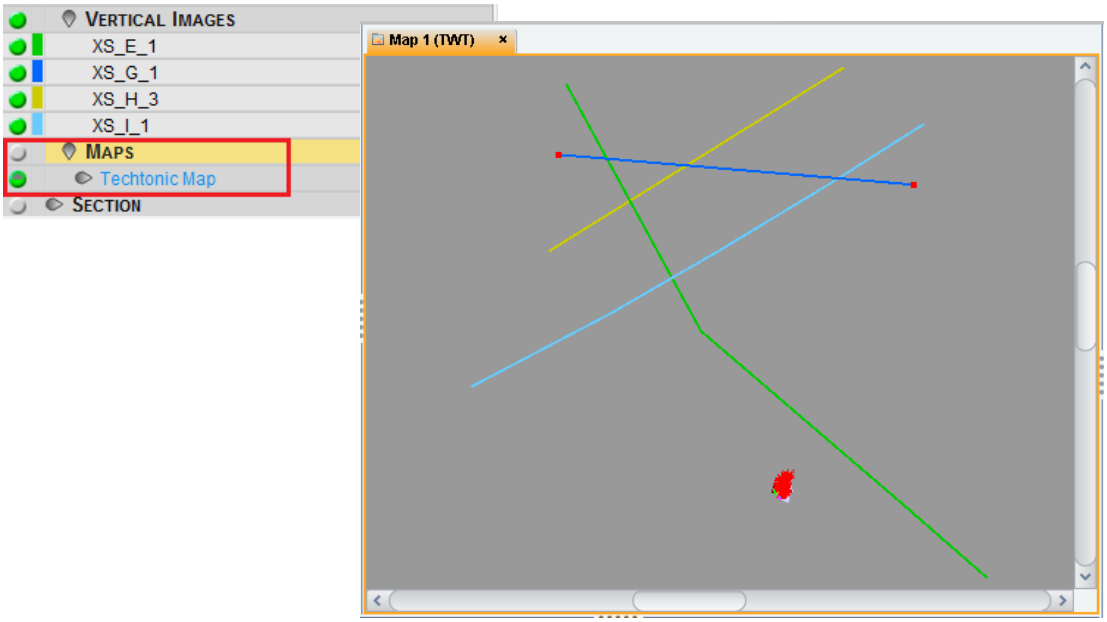
You will:

- Display each of these vertical images in *Section* view.
- Extend your GeoShaper interpretation.

When you complete the interpretation on a section, the Framework surface will update automatically (dynamic).

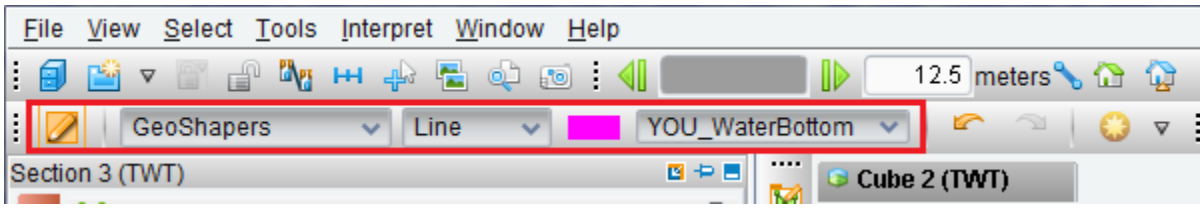
As with the first vertical image displayed in *Section* view, you must select the line from the *Map* view.

8. Activate ***Map*** view. **Hide** MAPS and **Zoom** appropriately.



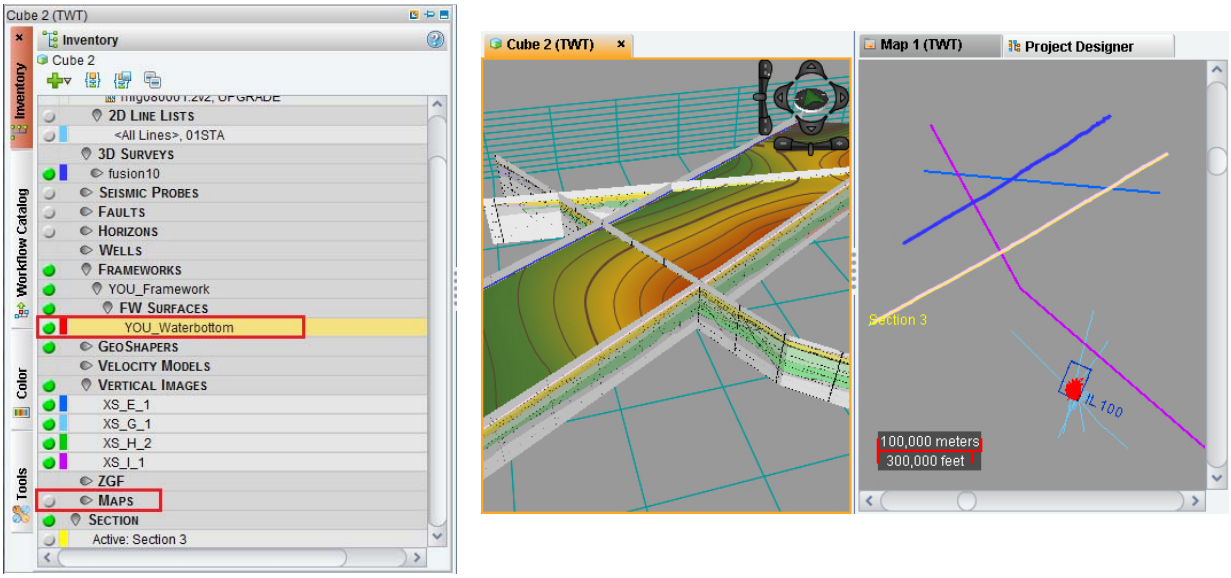
9. From the active ***Section*** tab, click the **Select Point to Point** icon ( ). In the *Map* view, hold down the **Ctrl** key and place your cursor over one of the other vertical image lines. When it becomes highlighted put your cursor over it and **MB1**; the line will turn red (or change color). **MB2** to complete the selection.

10. Reactivate your ***Section*** view and confirm that GeoShapers is your object and Line is the action. YourInitials_WaterBottom should be highlighted in the Interpretation task pane. Interpret your water bottom GeoShaper on this line; **MB1**, and complete with **MB2**.



11. Activate ***Cube*** view. In the *Inventory* tree, **hide** MAPS and **show** the FRAMEWORKS SURFACES_FW object, Y**OU_WaterBottom** (confirm the visibility toggle is on).

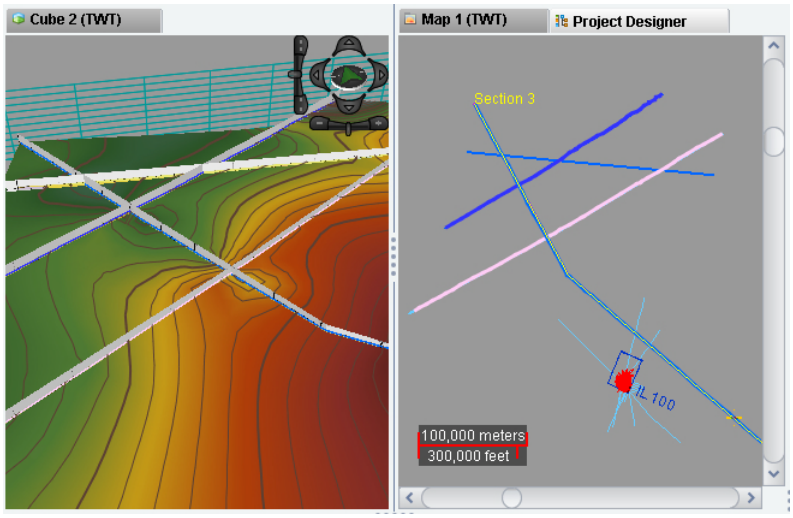
Your *Cube* view should show the gridded and contoured Framework surface between two interpreted vertical sections.



The extent of your Framework surface may differ from the image above because of the order of vertical section selection.

12. Repeat the steps necessary (see above) to display another vertical image in *Section* view; extend your GeoShaper interpretation on that line.

13. Confirm that the *Cube* view shows the dynamically updated Framework surface.

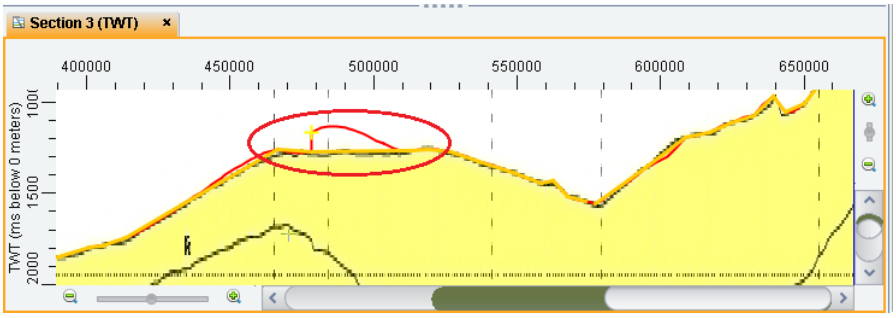


That should complete three of the four vertical sections.

14. Display the final vertical image in *Section* view, and extend your GeoShaper interpretation on that line.

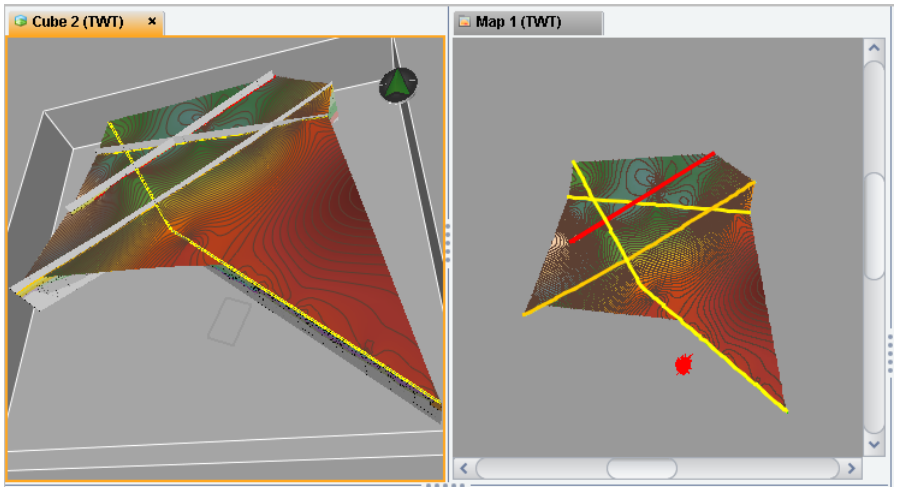
Notice that the Framework surface is displayed in *Section* view.

The gridded Framework surface shown here is plotted on one of the vertical sections prior to GeoShaper interpretation.



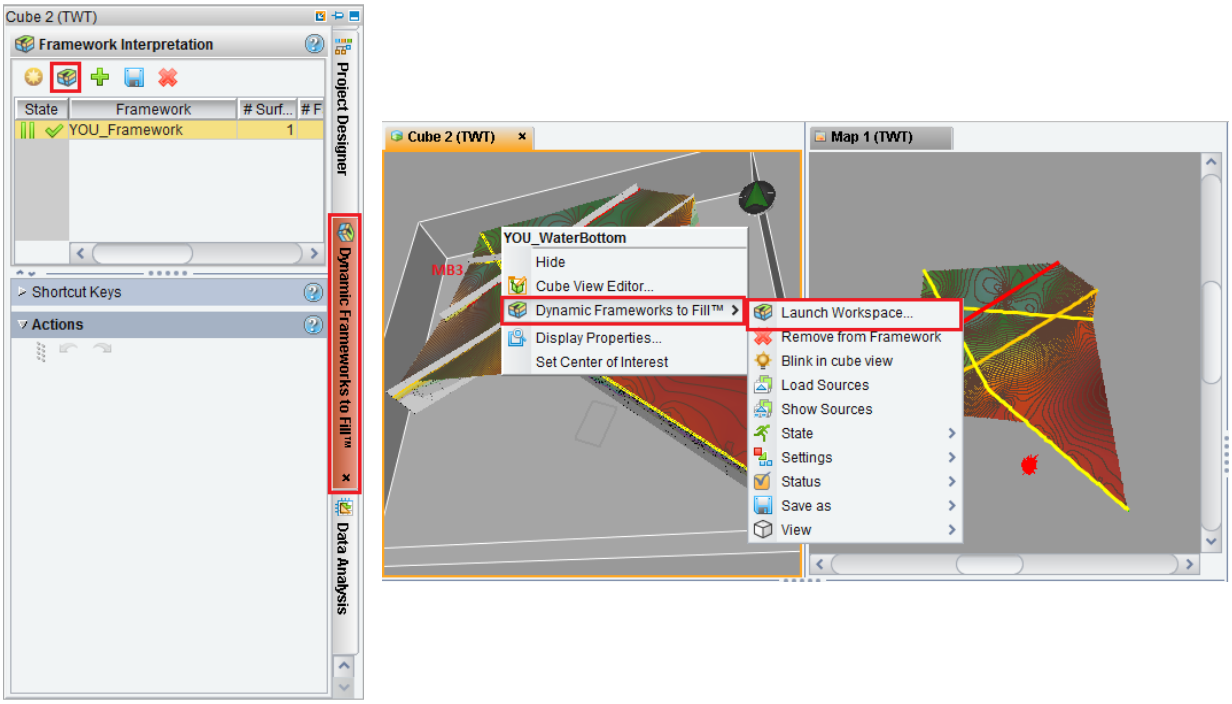
While picking you may notice that there are misties between lines. We will discuss that problem later.

15. Inspect the gridded Framework surface in *Cube*, *Section*, and *Map* views. Activate a **view**, check **visibility toggle**.



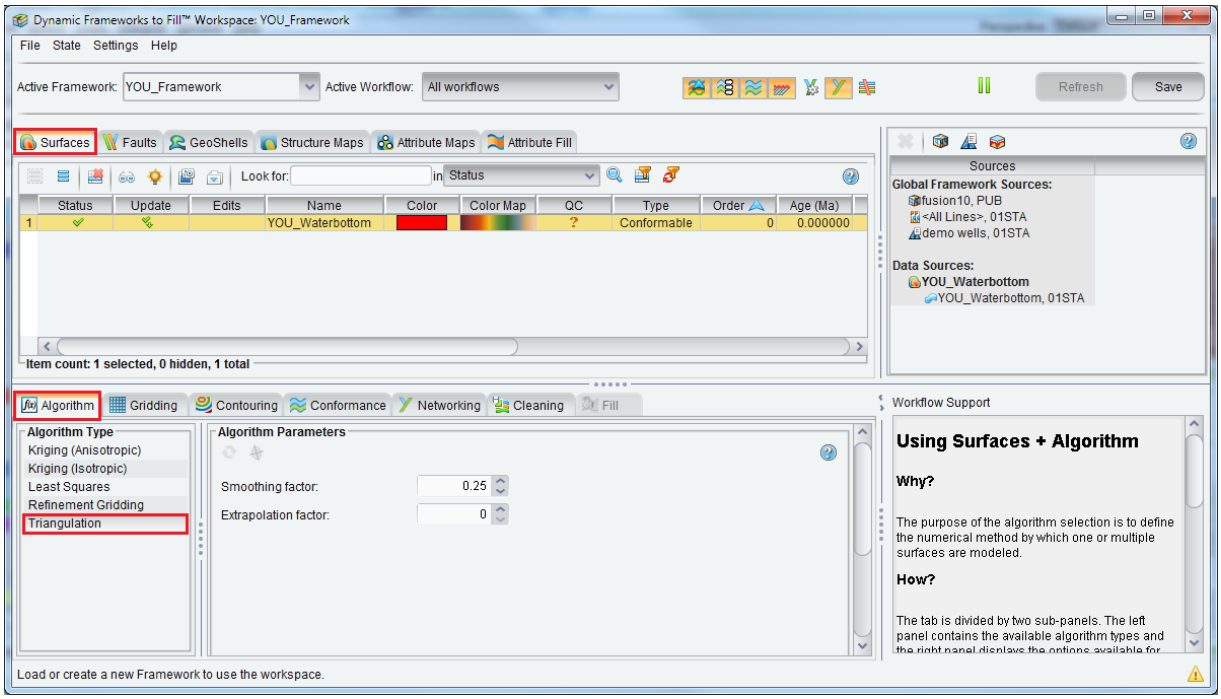
Your gridded and contoured DFF surface should look similar to the image above. This relied on sending the input object (a GeoShaper interpretation in this case) to Dynamic Frameworks to Fill one time. After that, updates to the interpretation dynamically update the Framework. Your first DFF gridded and contoured surface relied on default settings. You will use another gridding algorithm next.

16. In the active ***Frameworks to Fill*** task pane, click the icon indicated in the figure below to launch the *Dynamic Frameworks to Fill Workspace*.



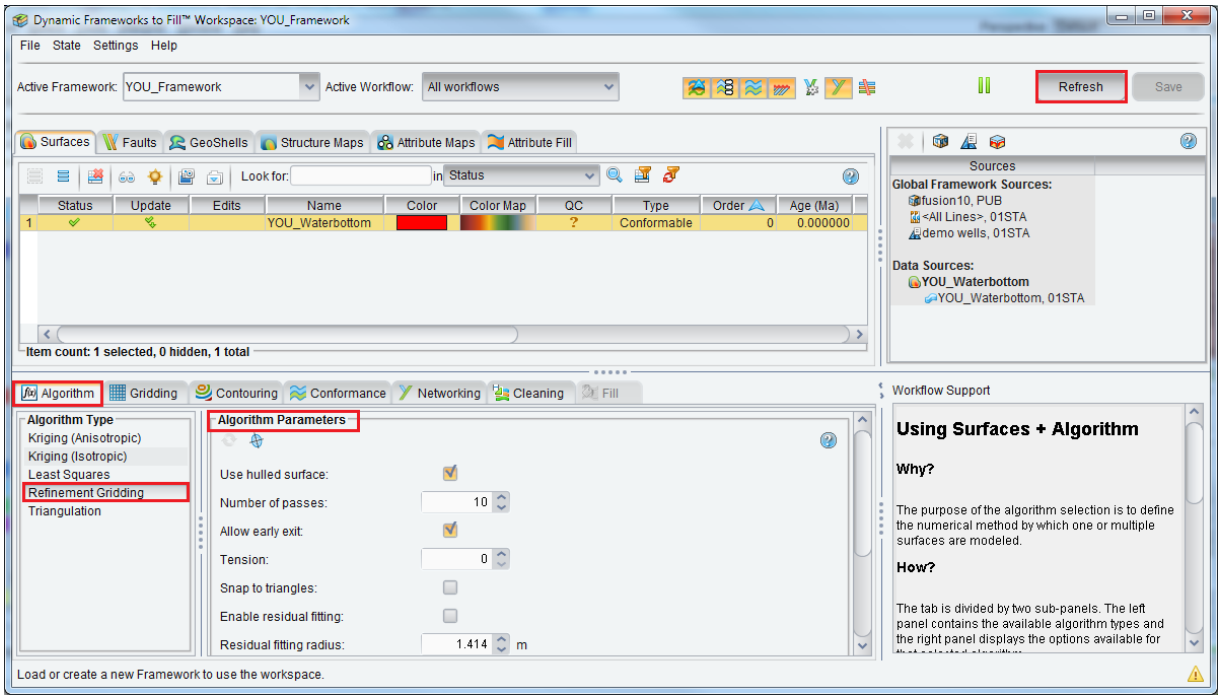
The *Dynamic Frameworks to Fill Workspace* dialog indicates that the active surface relied on a triangulation method to derive a fit (grid) of the input points.

17. On the *Dynamic Frameworks to Fill Workspace* dialog, confirm that the **Surface** tab is active on the upper part of the dialog. In the lower part, select the **Algorithm** tab. You will see that the **Triangulation** option is selected under **Algorithm Type**.

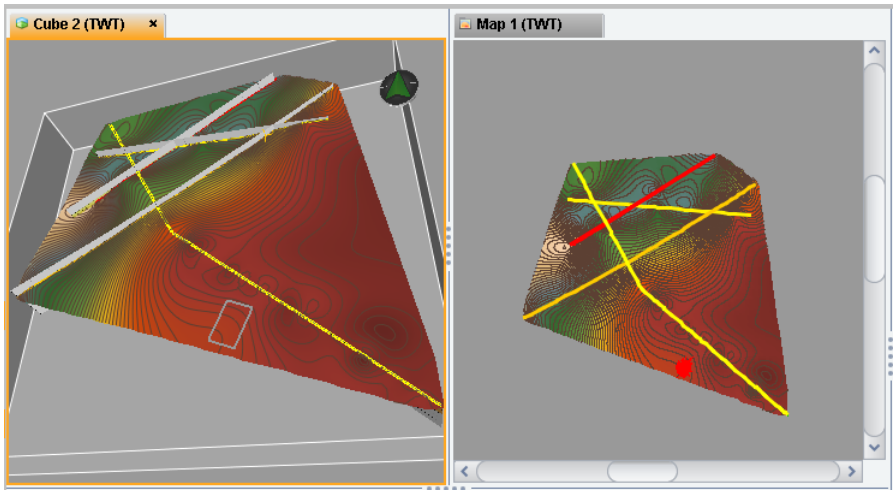


18. For Algorithm type, select **Refinement Gridding** in the lower part of the *Dynamic Framework to Fill Workspace* dialog. The *Algorithm Parameters* panel reconfigures for the selected

algorithm, with gridding parameter controls available. Accept the default settings and click **Refresh** to see the changes.



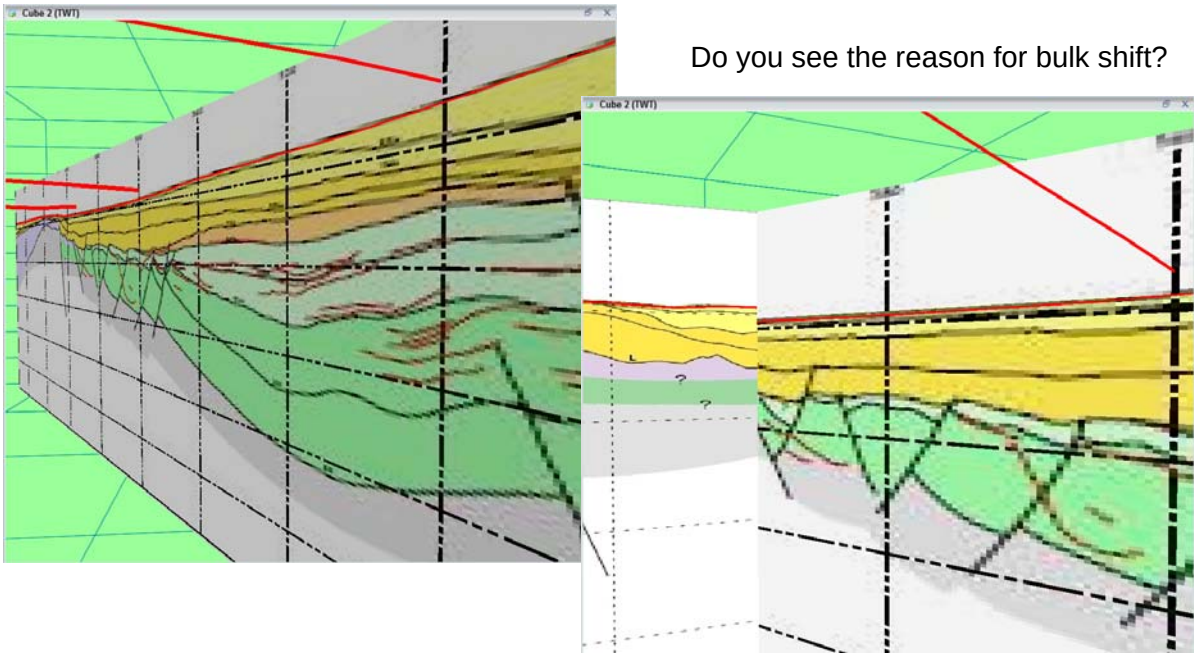
Your recomputed surface should resemble the following image.



More lines (additional control) and some QC are needed to improve this grid.

As noted on the above, misties are apparent at some of the intersections of the vertical images. Is the GeoShaper from the NW-SE trending vertical image section bulk shifted relative to the others? This suggests checking the vertical axis (Z range and crop) of the imported vertical

sections. If you have time, you can correct and re-pick the problem line.



You have just seen how GeoShapers serve as input to Frameworks to Fill. You will continue with GeoShapers in another context.

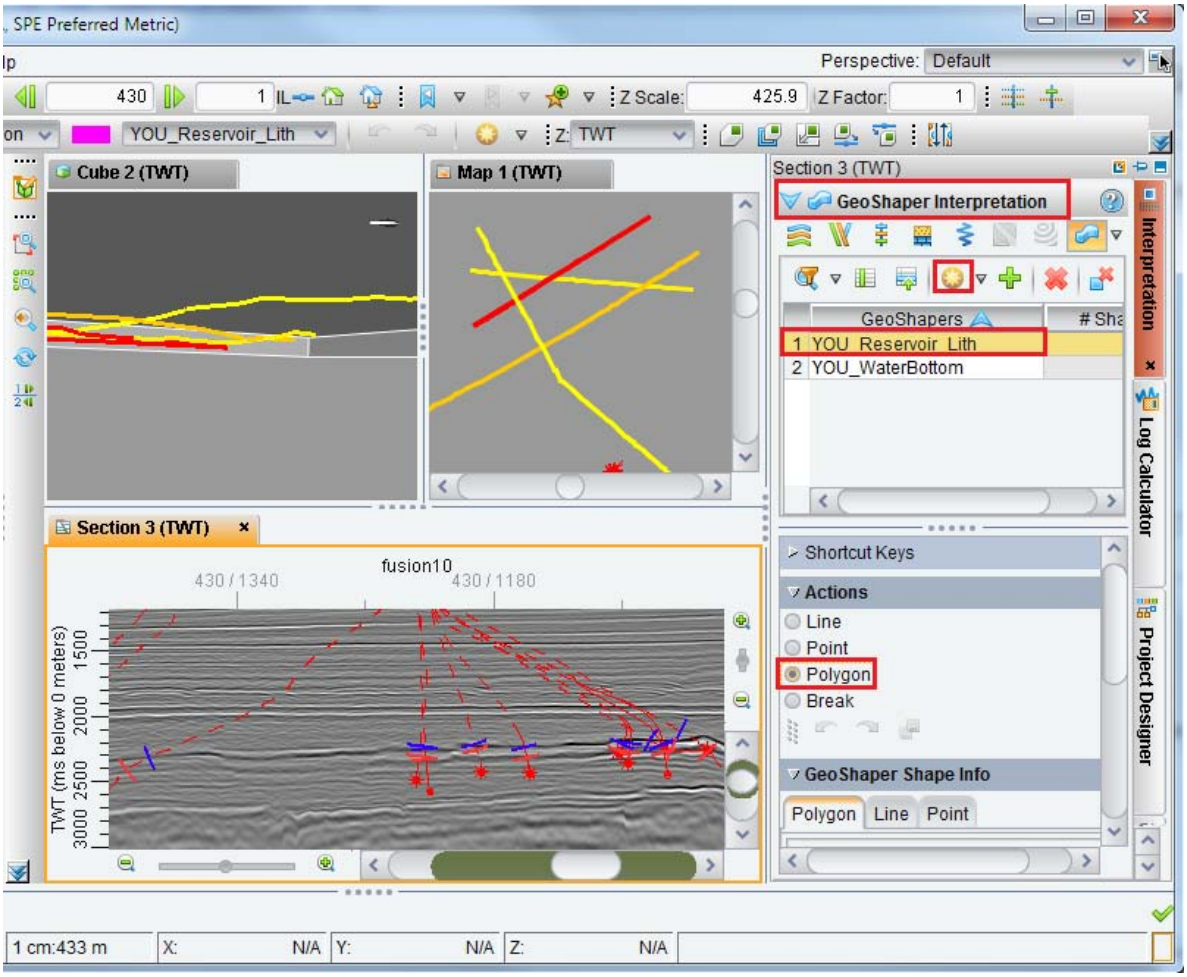
Using GeoShaper Polygons

The water-bottom interpretation used line action to construct the GeoShaper. You will use polygons for GeoShapers in the next example.

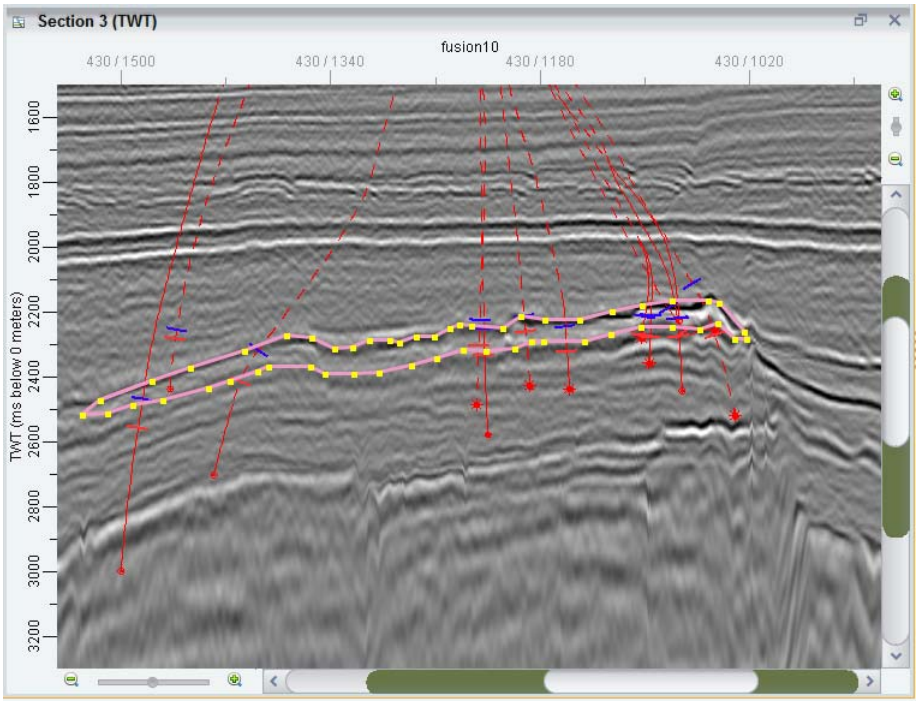
19. Toggle off the **FRAMEWORKS** display for both the *Cube* and *Map* views. Toggle off the **VERTICAL IMAGES** in *Section* view.

20. Display **inline 430** (shm; full_offset.cmp) in your *Section* view and make sure it is active. Zoom in on the area near the wells.

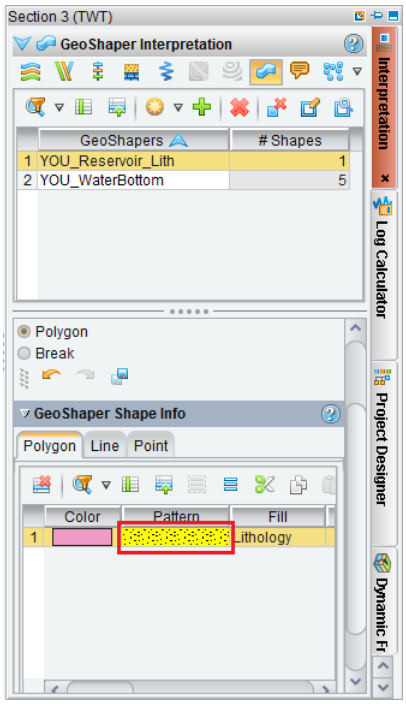
21. In the GeoShaper Interpretation task pane, create a new **GeoShaper** ( ) and name it **YOU_Reservoir_Lith**. In the Actions panel select **Polygon**.

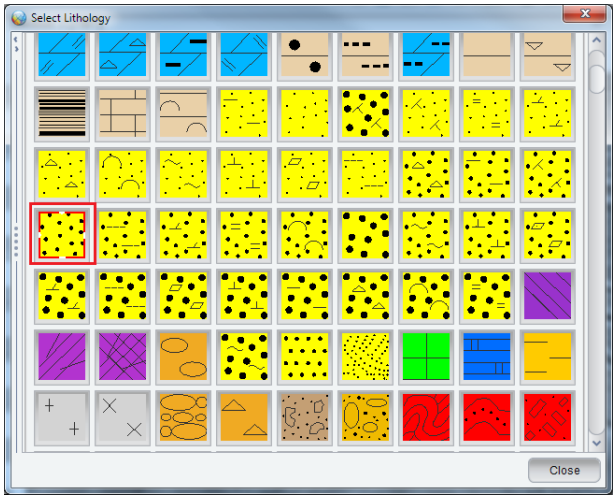

SPE Preferred Metric)
Perspective: Default
Z Scale: 425.9
Z Factor: 1
YOU_Reservoir_Lith
Z: TWT
Cube 2 (TWT)
Map 1 (TWT)
Section 3 (TWT)
GeoShaper Interpretation
GeoShapers
Sha
1 YOU_Reservoir_Lith
2 YOU_WaterBottom
Interpretation
Log Calculator
Project Designer
Section 3 (TWT)
fusion10
430 / 1340
430 / 1180
TWT (ms below 0 meters)
1500
2000
2500
3000
Shortcut Keys
Actions
Line
Point
Polygon
Break
GeoShaper Shape Info
Polygon
Line
Point
1 cm:433 m
X: N/A
Y: N/A
Z: N/A

22. With a sequence of MB1, create a **polygon** that characterizes the geology that you see in the line. **MB2** to close the polygon.



23. Experiment with some of the controls in the GeoShaper Shape Info sub-panel. In the polygon example below, the Fill is **Lithology** and the Pattern is **MEDIUM SAND**.



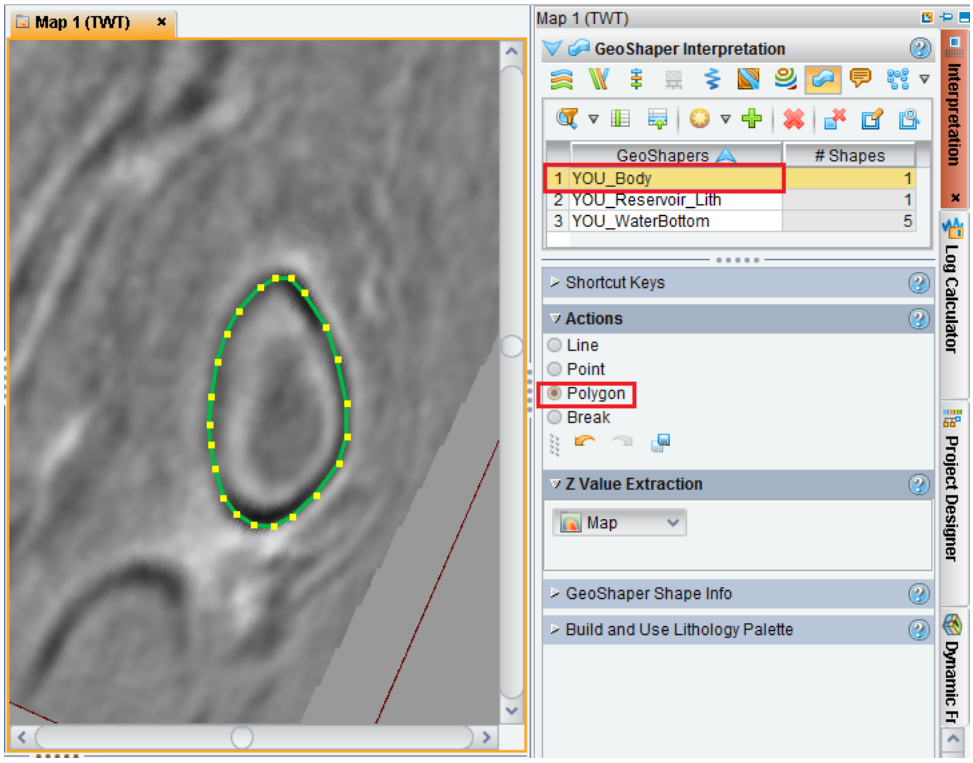


24. With the Interpretation Notes tool, add a description of your GeoShaper Polygon feature. (Hint: Notes is an Interpretation object.)

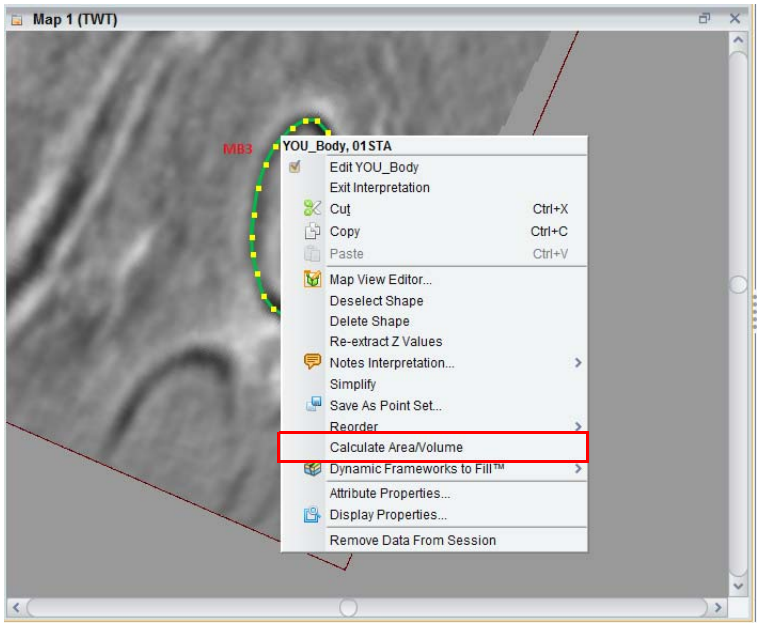
Now you will pick a shape on a time slice in *Map* view.

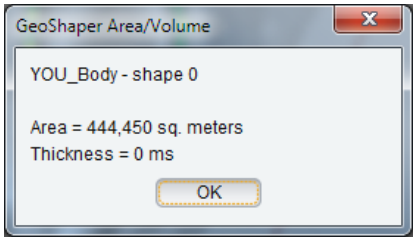
25. In your ***Map*** view, display the **full_offset.cmp** volume at **2720** ms. **Zoom in** to the southeast edge of the survey. Notice an oblong event.

26. Create a new GeoShaper and name it **YOU_Body**. MB1 numerous points around the feature and then **MB2** to finish. You should have completed a GeoShaper **polygon**, as shown below.



27. **MB3** the edge of this GeoShaper polygon and select **Calculate Area/Volume**.

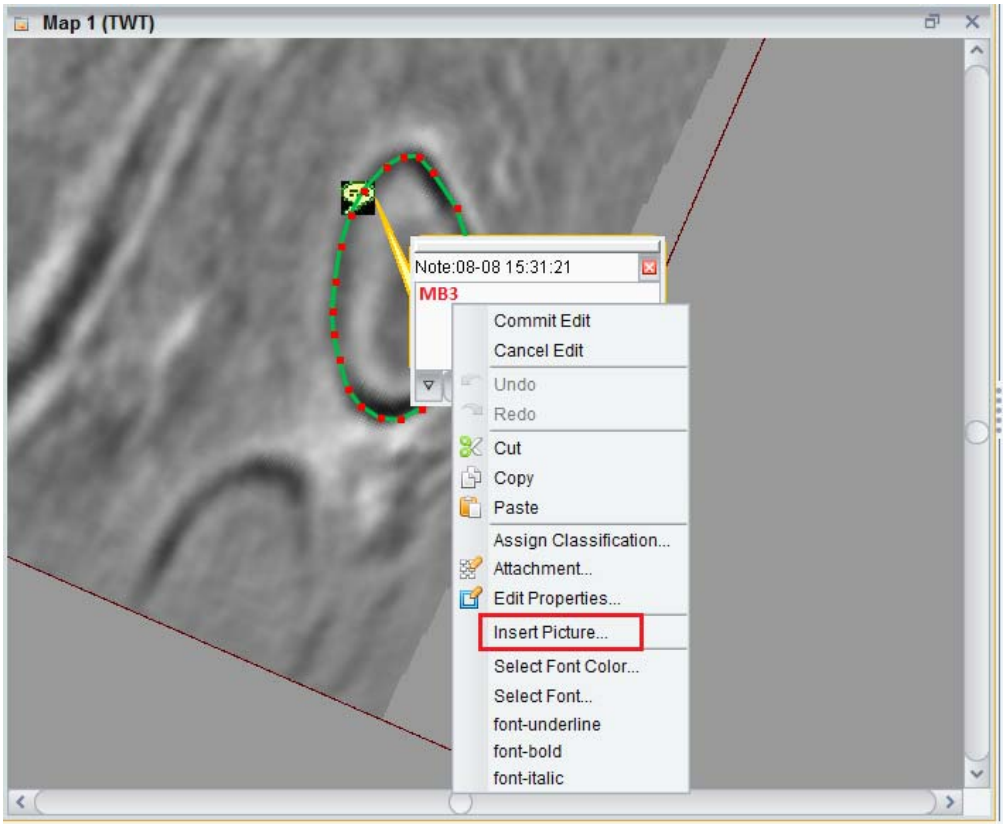




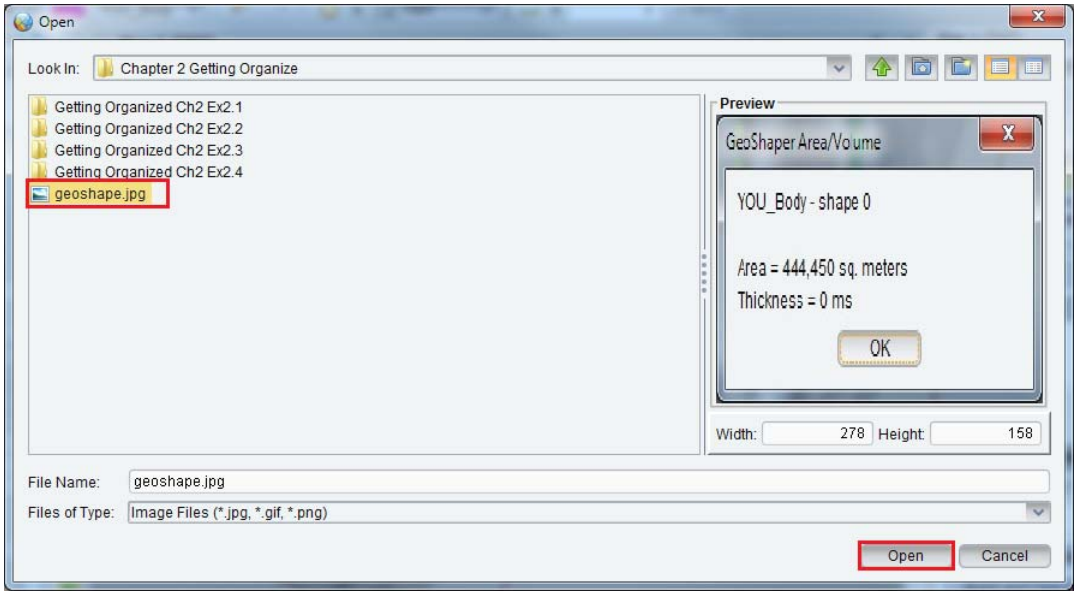
28. Use Print Screen or the Snipping Tool in Windows, SnagIt or Gimp in Linux to take a **screenshot** of this message window. If necessary, your instructor can provide details on this procedure. **Save** the picture as **geoshape.jpg**.

You will now apply a Note to this GeoShaper, with the image of the *GeoShape Area/Volume* window attached.

29. On the GeoShaper polygon, **MB3 > Notes Interpretation... > Attach...**. Enter a **comment**. Within the Note, **MB3 > Insert Picture...**.

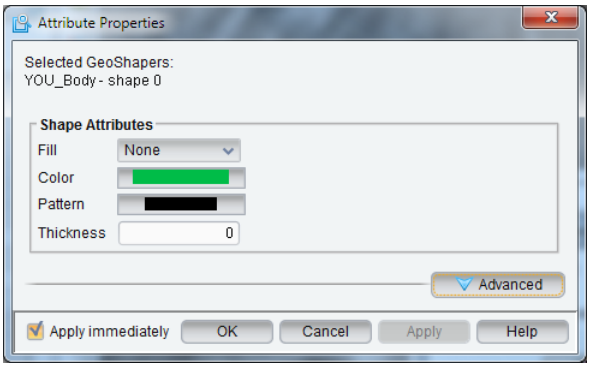


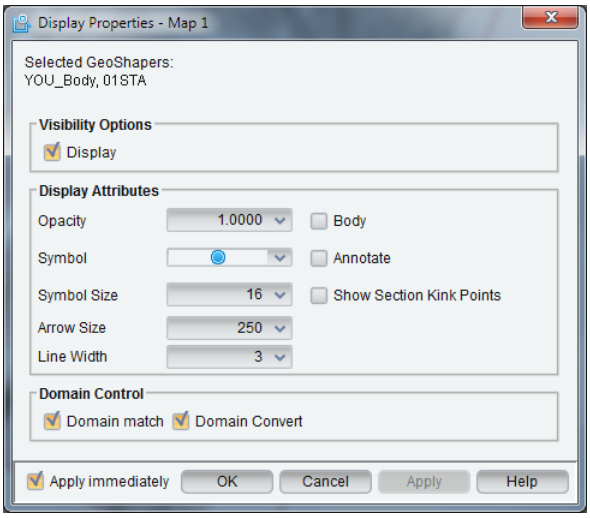
30. In the *Open* dialog, navigate to select and **Open** the image file, **geoshape.jpg** (which you just created).



31. Resize the Note to accommodate the image.

32. In the *Map* view on the polygon (in GeoShapers Interpretation mode), **MB3 > Attribute Properties...** then **MB3 > Display Properties...** to adjust GeoShaper characteristics.





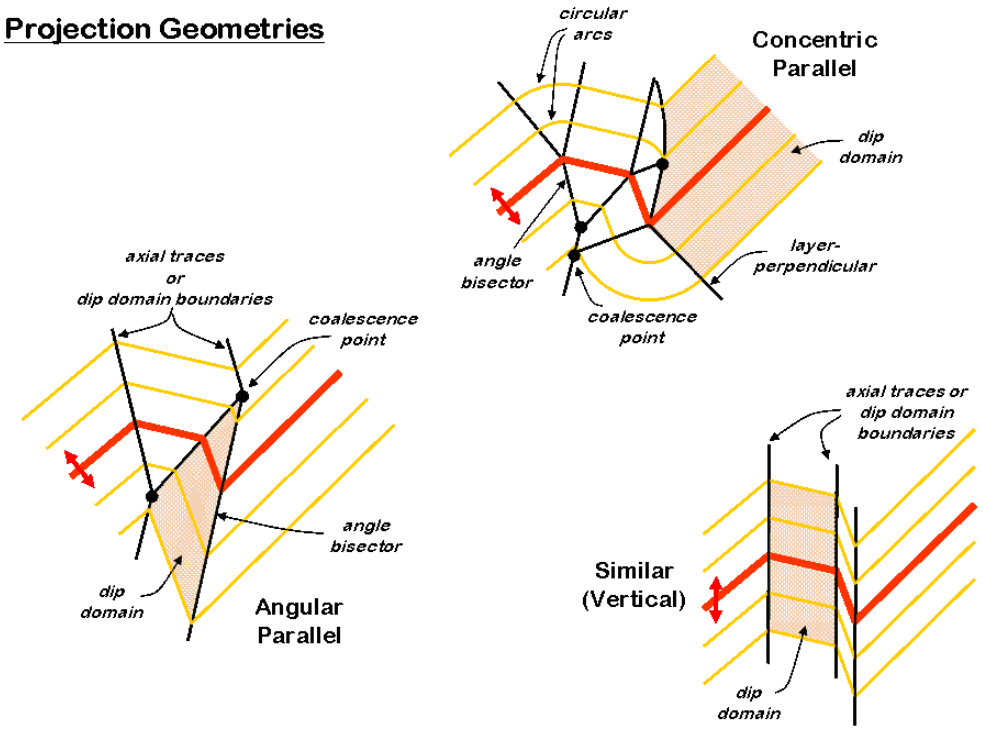
This exercise is just a brief introduction to GeoShapers and Dynamic Frameworks to Fill. You can learn more about these tools in other DecisionSpace courses.

Overview: Making Geometry Projections

The Geometry Projection tool provides controls for projecting two different fold styles within a *Section* view:

- Parallel (concentric parallel and angular parallel), with constant bedding thickness (perpendicular or isopach thickness)
- Similar, with constant bedding thickness parallel to the axial trace

The relationship of tightly constrained layers within a section through a fold can help determine which of the geometry projection methods should be applied to create additional layers in areas with poor data constraints.



Alternatively, knowledge of the kind of rocks being folded (competent/strong versus incompetent/weak) or the tectonic setting of the deformation (extensional or compressional) can guide the choice of a projection geometry in regions with limited seismic and well control. If a similar geometry with vertical axial traces (isochore thickness) proves a reasonable method in the area of interest, the Framework Interpretation tools can quickly create single and multi-surface structure maps using conformance parameters and based on this geometry.

Exercise 2.4: Making a Geometry Projection Plus GeoShaper

This is an optional exercise. Your instructor will inform you if the limited class time permits your completing this exercise. In the future you can use this exercise as an explanation of geometry projection and a template for the needed workflow.

You will configure a *Section* view in the depth domain (TVD). You may need to add depth domain data to your session.

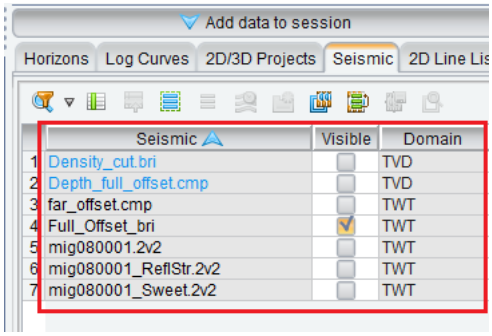
Working in Z Domain

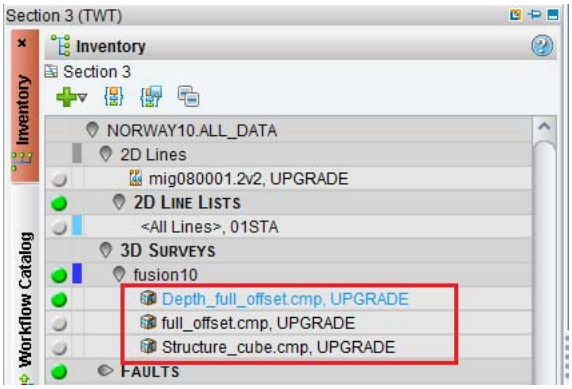
DecisionSpace sessions are time-domain-specific or depth-domain-specific, yet you can work in a session accessing multiple domain data. When you define a session, you elect to interpret in either a time domain or a depth domain in the *Session Manager*. Views opened in the session will initially launch in that domain.

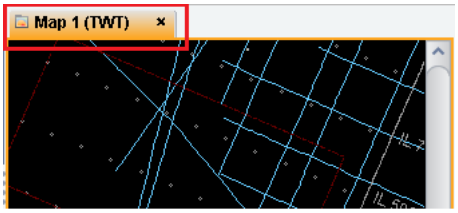
In any session:

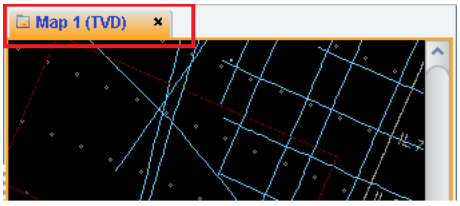
- Time is indicated as TWT (two-way time). In the Dark interface, time domains are indicated in the *Inventory* tree by white text. In the Light interface, time domains use black text.

- Depth is indicated as TVD (true vertical depth) or TVDSS (true vertical depth subsea). All depth domains are indicated in the *Inventory* tree by blue text in the Dark and Light interfaces.

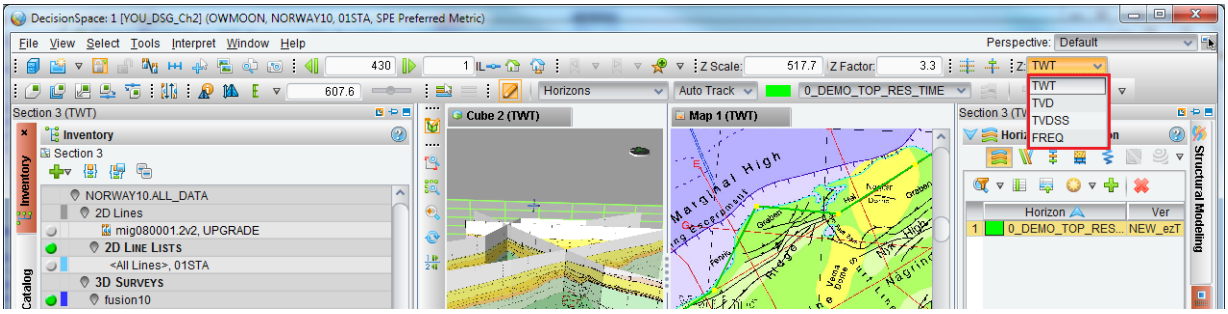








At any time in a session you can use the Select Domain pull-down menu in the main toolbar to choose among TWT, TVD, TVDSS, and FREQ. You can use this functionality to choose which domain is active as you step through seismic volumes in *Map* or *Section* Frame Control.



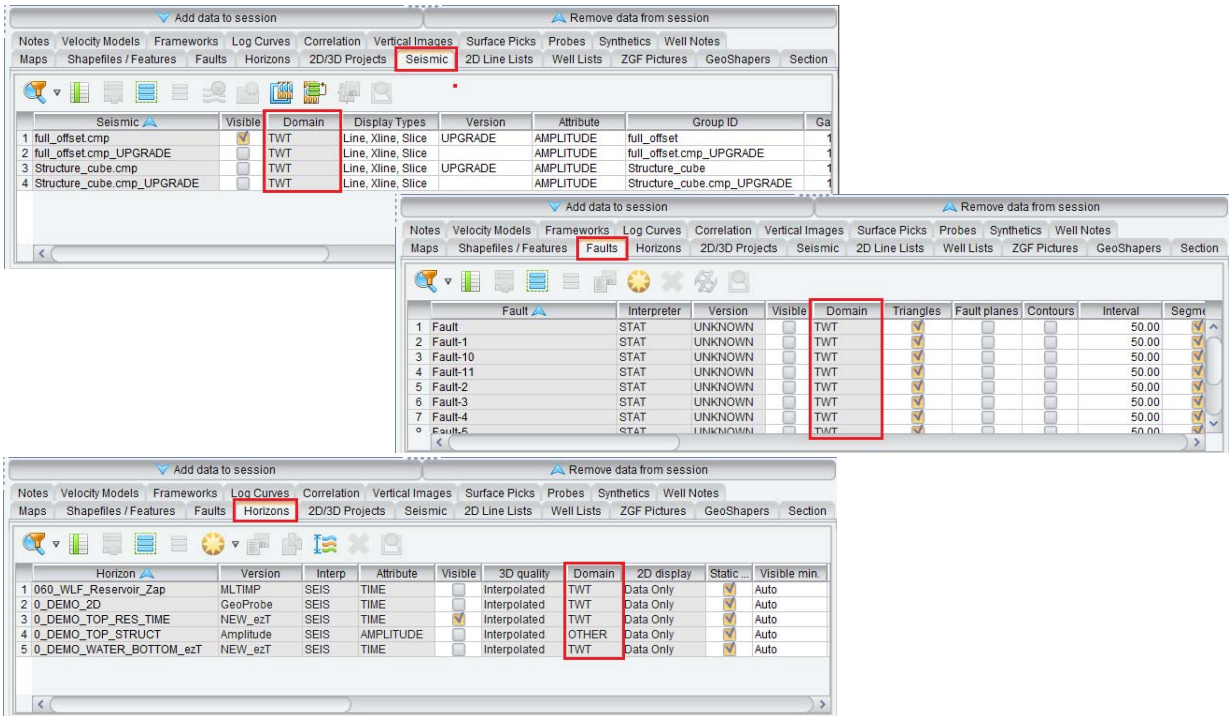
If you select a domain different from that of your displayed data, that data may no longer display in the view. You may attempt to drag-and-drop depth seismic into a time domain *Section* view and fail to generate a display.

With specific DecisionSpace settings, time depth domain conversions can be made on the fly and the data will be displayed in its non-native domain. Those settings reside on the *Select Domain Conversion* dialog (Select > Domain Conversion... from the main menu bar). If you activate a velocity model for time-depth conversion you can use dynamic domain conversion. This allows a seamless integration between geology and geophysics. You can control how data items stored in one domain, such as Depth, are displayed in views of a different domain, such as Time. Domain Match and D_Convert check boxes are provided in the *Select Session Data* and *Display Properties* dialog boxes for most data types.

Online Help is required reading on the topic of domains and domain match. Please see Contents > Overview > Working with Domains.

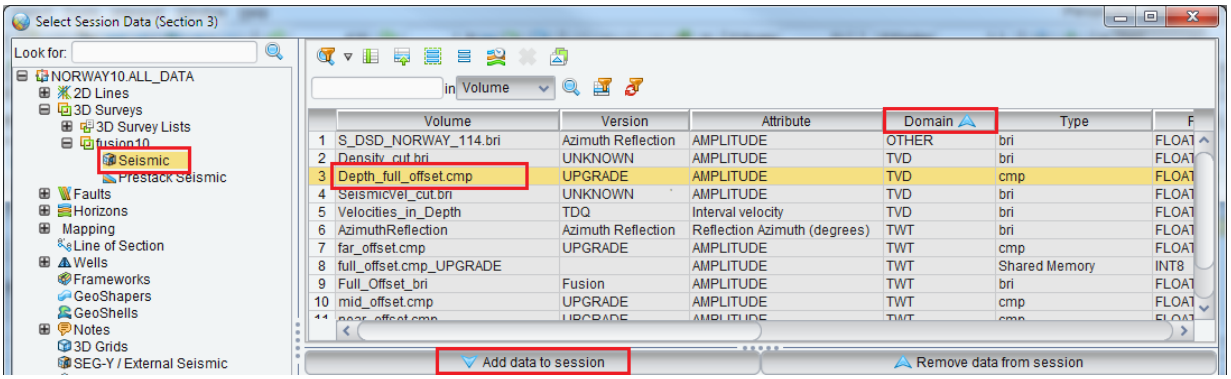
Selecting Depth Seismic

1. Open the *Select Session Data* dialog ( ). Inspect the lower right panel for depth domain **Seismic**, **Faults**, and **Horizons**.

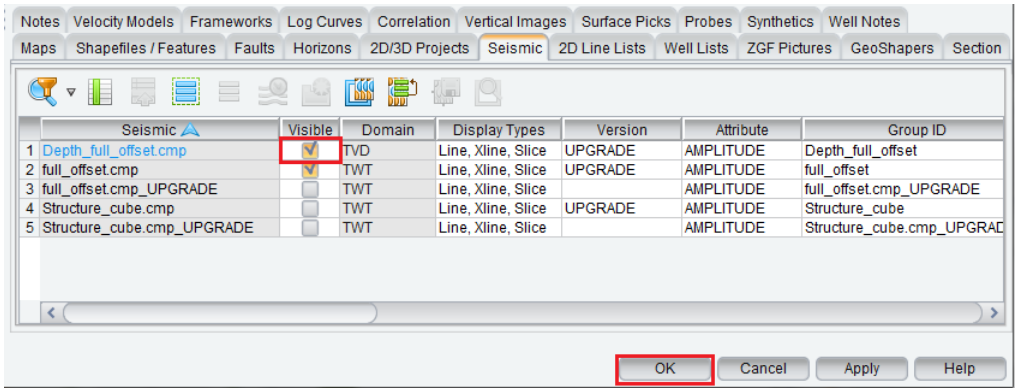


If your session has no depth data, as in the case above, you will need to add data.

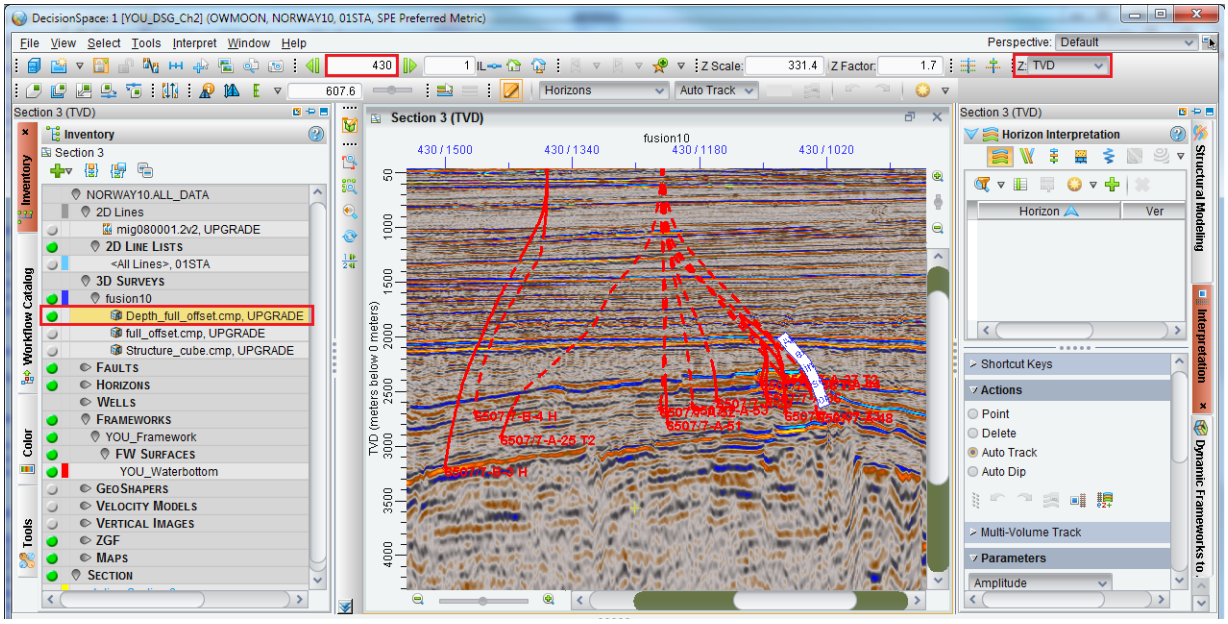
2. In the data tree on the left of the *Select Session Data* dialog, navigate to **3D Surveys > fusion10 > Seismic**. Sort the list of seismic files by **Domain**. Select **Depth_full_offset.cmp** and **Add data to session**.



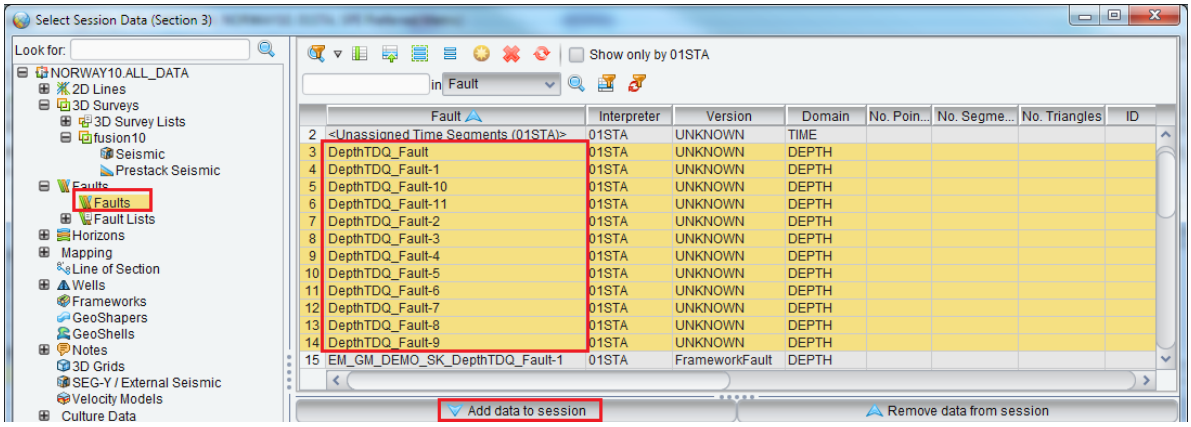
3. Toggle on **Visible** for the depth seismic and click **Apply** on the *Select Session Data* dialog.

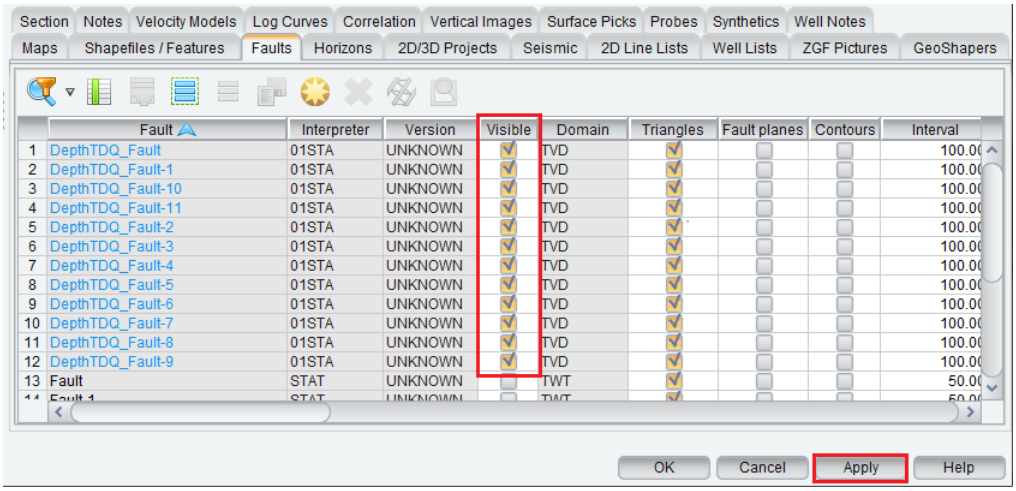


4. In the *DecisionSpace* main window, click the ***Section*** tab to make it active. Change the domain to **Z: TVD**. Display line **430** from the depth volume.



5. Back on the *Select Session Data* dialog, Select all DEPTH domain **Faults** with names starting with DepthTDQ and click **Add data to session**. Confirm that the depth faults are toggled **Visible** in the lower list and click **Apply**.

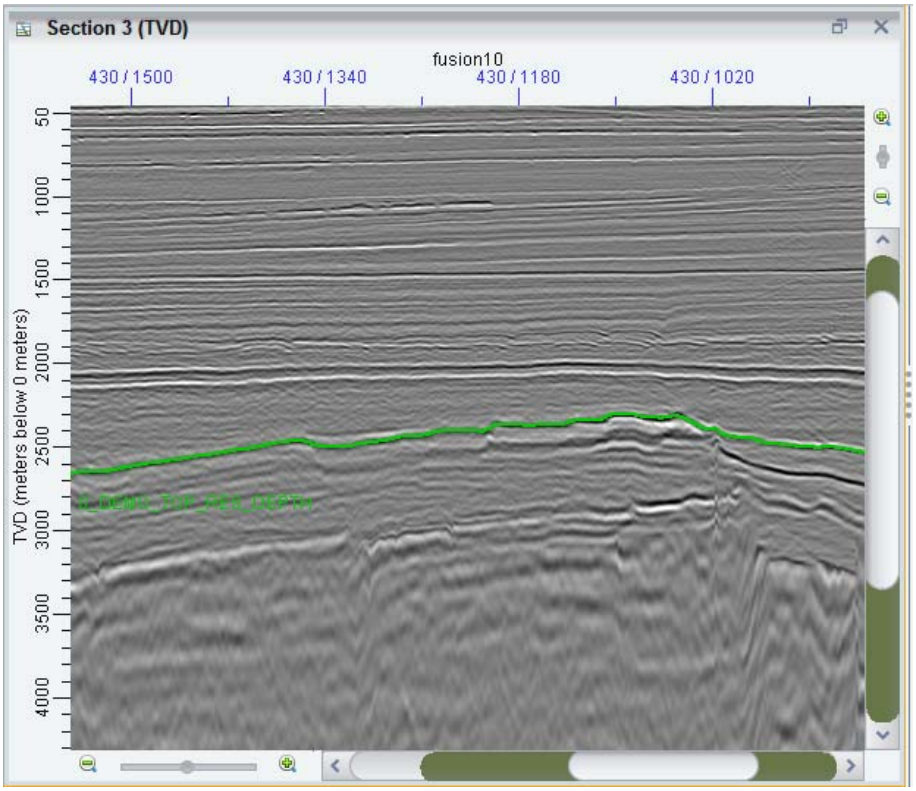




6. Still on the *Select Session Data* dialog, select depth horizon **0_DEMO_TOP_RES_DEPTH**, **Add data to session** and confirm visibility. Click **OK**.

7. In Section View on seismic, **MB3 > Display Properties**, in *Display Properties* dialog change the color map to Greyscale.

8. Maximize your *Section* view and configure it to resemble the image below. For now, toggle off all **Faults**.



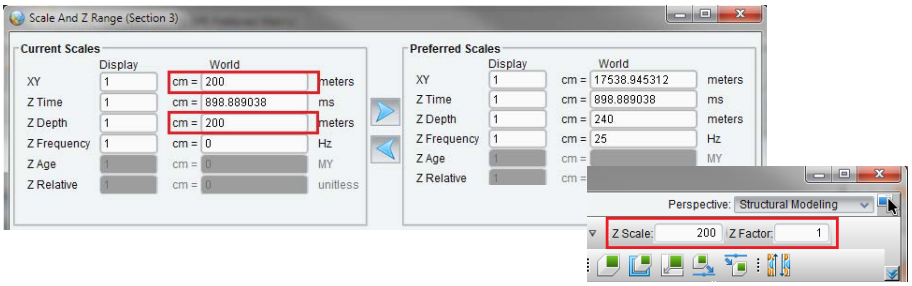
Vertical zoom control

You can adjust the vertical and horizontal scales with the zoom sliders on the edges of the section.

Note:

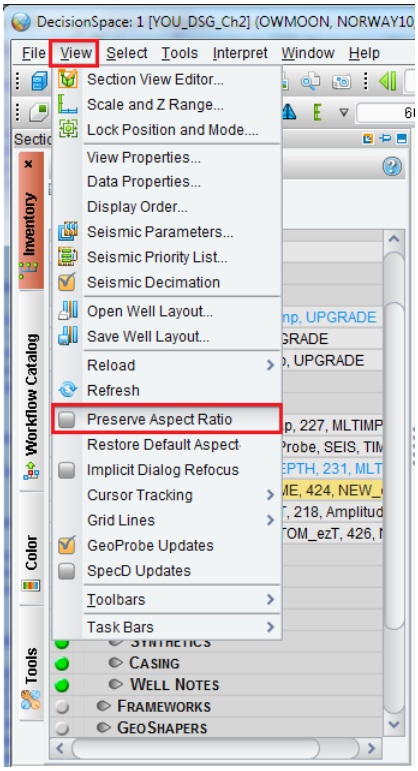
Although geometry projection results in a depth section that is not dependent on the vertical exaggeration, it is best practice to set the vertical and horizontal scales to identical values (that is, the vertical exaggeration of vertical/horizontal = 1.0). Deciding on the viability of a projection method is much more difficult in extremely exaggerated sections—the expression of geometry in seismic data is your best guide to understanding the evolution and internal character of structures. If the display is too exaggerated, it will often lead to incorrect interpretation decisions (mistakenly interpreting a similar or isochore geometry rather than parallel or isopach geometry is a classic example). It is possible to use Geometry Projection in time interpretations, but angle and distance measurements are always performed assuming the current vertical exaggeration is 1:1. An implied constant velocity depth conversion is thus assumed for these tasks, where the implied velocity is dependent on the vertical exaggeration (VE): implied velocity = 2*VE.

9. For more exact zoom and scale control, select **View > Scale and Z Range...** from the menu bar. In the *Scale and Z Range* dialog, set the **XY** and the **Z Depth values** the same, then click **Apply**. This makes the vertical exaggeration (Z Factor) 1 as reported in the main tool bar. Dismiss (**Cancel**) the dialog when complete.



Retain this relationship upon subsequent zooming.

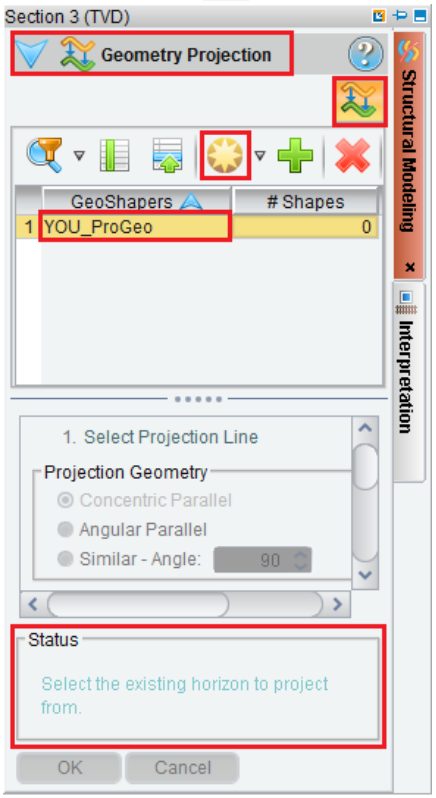
10. Select **View > Preserve Aspect Ratio**.



Generated projection geometries will be captured in a new GeoShaper object. The workflow for producing the projected layers is contained in the *Structural Modeling* task pane.

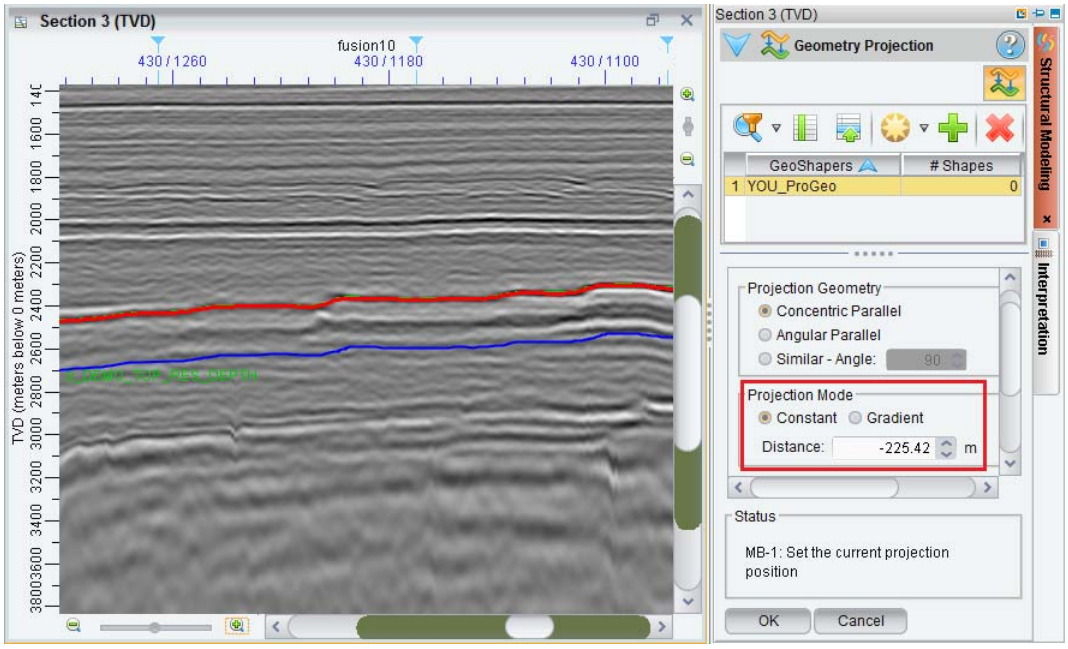
11. In the menu bar, click **Interpret > Structural Modeling**. The *Structural Modeling* tab becomes active. If necessary, **scroll down** ( ) in the task pane to access it.

12. Click the **Geometry Projection** icon so the *Structural Modeling* task pane is entitled Geometry Projection. Click the **Create new GeoShaper** icon ( ) and rename it **YOU_ProGeo**.



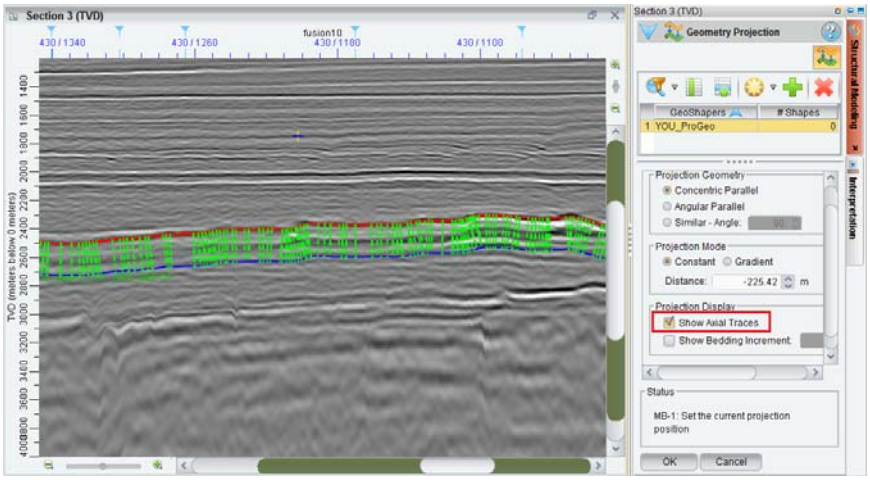
The Status box near the bottom of the *Geometry Projection* pane prompts you to your next action: “Select an existing horizon to project from.”

13. In your active *Section* (TVD) view, click the **0_DEMO_TOP_RES_DEPTH** horizon. It will turn red. Then click some distance below the horizon where you want to position a deeper layer.



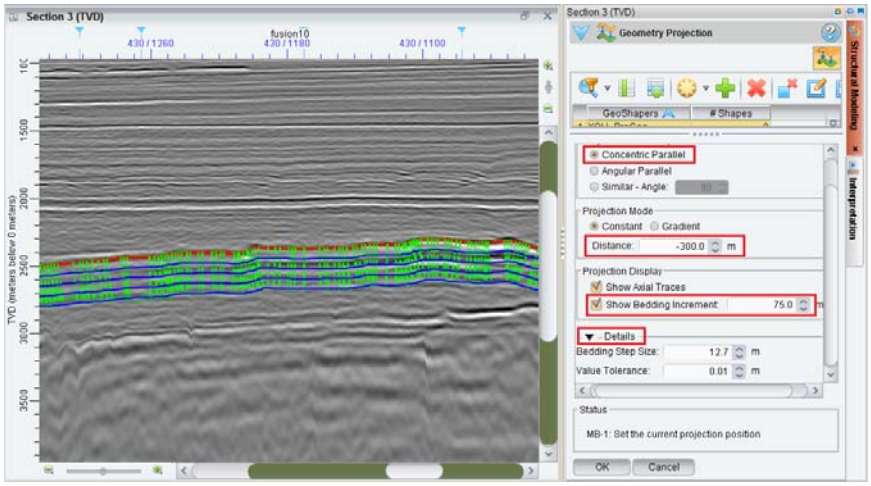
The distance between the horizon and your pick will be the Projection Mode constant distance as shown in the middle panel of the task pane. The resulting projected geometry is constrained by the selected horizon and a stratigraphic thickness or isopach projection. Note that the default projection geometry is concentric parallel.

14. To understand how the projected layer was created, toggle on **Show Axial Traces** in the Projection Display area.

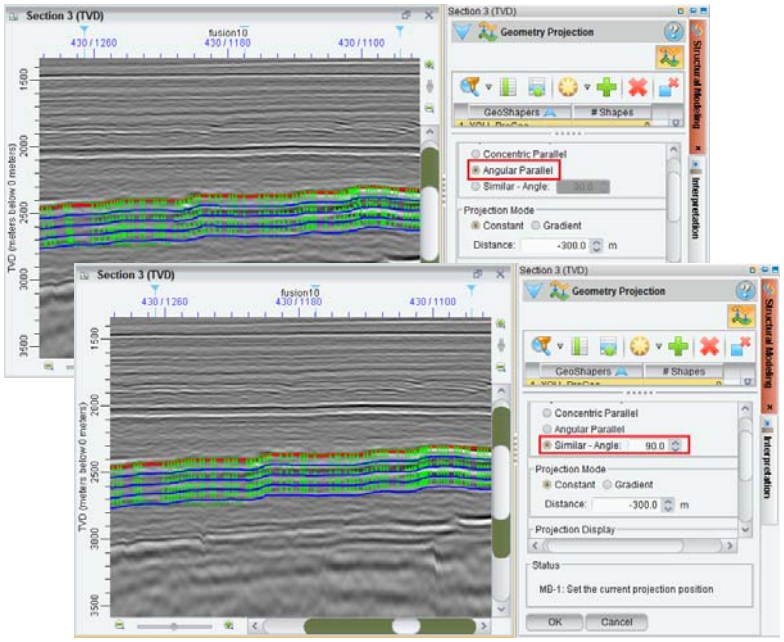


For more details about the projection methods, refer to the Geometry Projection overview preceding this exercise.

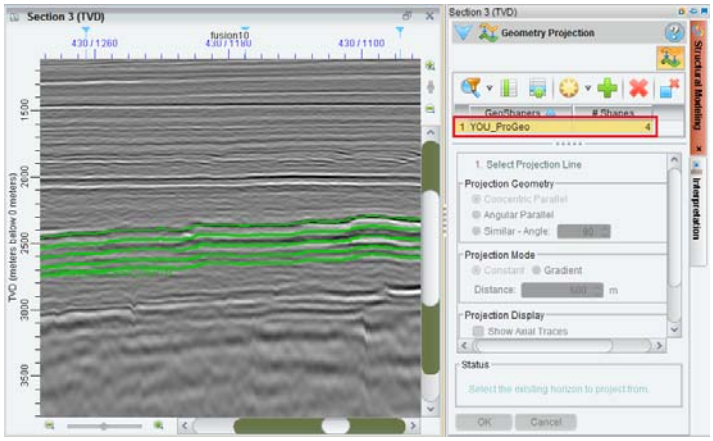
15. Experiment with the controls on the *Geometry Projection* task pane. Toggle on the default, **Concentric Parallel**, set Projection Mode Distance to **-300**, toggle on **Show Bedding Increment**, and set that increment value to **75** m. Click the **Details lever** to show several parameters that can be modified if necessary.



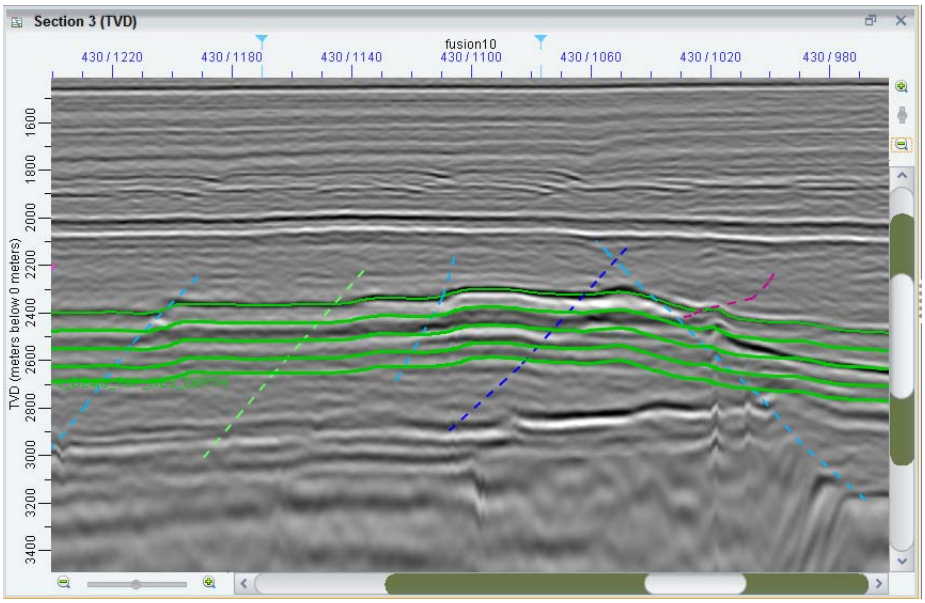
16. Select Projection Geometry **Angular Parallel**, then **Similar - Angle**. Show Axial Traces with all three Projection Geometries. Give the display a few moments to update between selections.



17. On the *Geometry Projection* dialog, toggle off **Show Axial Traces**. Select the best-fit-to-seismic projection to generate a set of GeoShapers. Click **OK** to confirm the new projected geometry. Note that four shapes are now saved in your GeoShaper.



18. Toggle on the **Faults** and **zoom in** to observe that the projected GeoShapers depend on the horizons, not the faults.



19. In the *DecisionSpace* menu bar select **File > Save Session as...**. In the middle of the *Save Session As* dialog, enter a session name such as **YOU_DSG_Ch2end**, or something similar, then click **Save**.

20. In Chapter 3 you will start a new session. Select **File > Exit**. Do not save any Frameworks; answer **No** to saving the session (you just saved) and **Yes** in the *Clear Active Shared Memory* box.

Review

Chapter 2 helped you get organized. Part of being organized is having items grouped and labeled. You can think of ISets as groups, and Notes as labels. In addition you may benefit from exploring the organizational capabilities of the DecisionSpace Project Designer, which is discussed in Appendix A.

In this chapter you were also introduced to several important DecisionSpace Geosciences tools that will become part of your interpretation regimen.

In Chapter 2 you:

- Reduced data loading concerns by gathering data specific to your area of interest into an ISet
- Applied Interpreter Notes directly to data in *Map* and *Section* views
- Applied GIS data and Vertical Images as an interpretation aid
- Used GeoShapers as an interpretation aid, including geometric projection of various types
- Generated a map grid from interpreted water bottom (GeoShaper object) in Dynamic Frameworks to Fill

Chapter 3
GIS Integration

The DecisionSpace Geoscience suite can display and manipulate Geographic Information System (GIS) data through the DecisionSpace GIS tool. The DecisionSpace GIS tool gives you access to OpenWorks software data, such as wells and seismic navigation, to create layers or to select data to send to DecisionSpace Geosciences. The GIS tool also provides access to shape files, raster images, and graphic databases to generate MXD layers in DecisionSpace and allows correlation and interpretation of these data.

Files with MXD extension can contain map descriptions, map layouts, and embedded objects saved as maps. MXD files are used by the ESRI company's ArcMap, as well as other GIS software. The file format indicates how the map should be displayed in a Coordinate Reference System (CRS).

In Chapter 2 you used GIS data to load a tectonic map, then used that map to position vertical sections. In this chapter you will explore other GIS data capabilities, which are integral to the DecisionSpace Geoscience suite.

Topics Covered in this Chapter

This chapter covers these topics.

- Importing OpenWorks and GIS map (MXD) data
- Generating and editing GIS layers
- Displaying GIS map data
- Creating OpenWorks layers
- Displaying wells and seismic navigation data
- Producing OpenWorks layers displayed as GIS map files
- Overlaying GIS map data on OpenWorks grids

Exercise 3.1: Integrating GIS

Loading and Displaying OpenWorks Data by the GIS Module

You can access OpenWorks data through the GIS module to send selected project data to the DecisionSpace *Inventory*. For example, you can send subsets of wells to the suite as a unique selection. You can access many data types from other OpenWorks projects to use as a base reference dataset to generate lists of data identified as missing in the current interpretation project (IP). You can then send the missing data lists to the *Session Data Manager*, to facilitate data loading.

In the same way, you can select 2D and 3D navigation data for an interpretation project as a subset to be sent to the DecisionSpace *Inventory* as active session navigation.

You can also access other types of OpenWorks data and generate graphic layers to send to the DecisionSpace Geoscience suite.

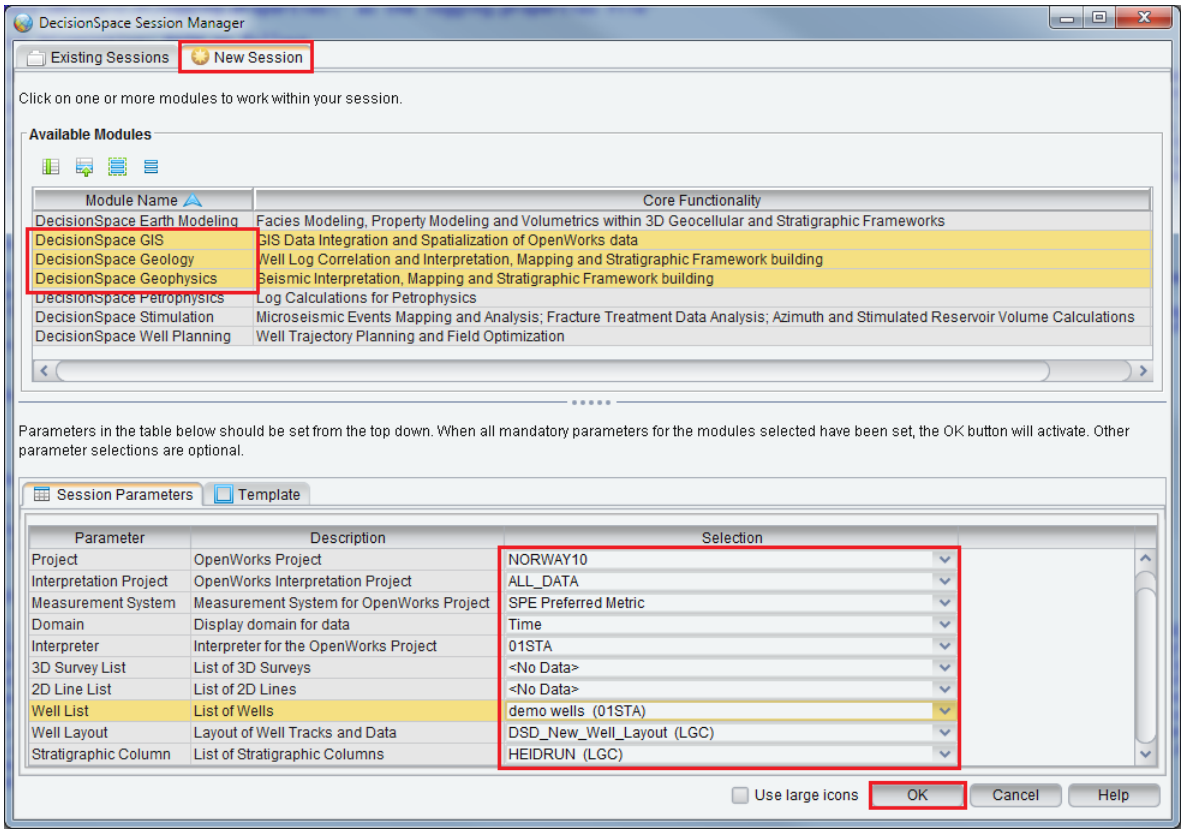
Initializing DecisionSpace GIS

You must enable the DecisionSpace GIS module when you initialize a new session. If you do not select the module when opening DecisionSpace, you must exit and start again.

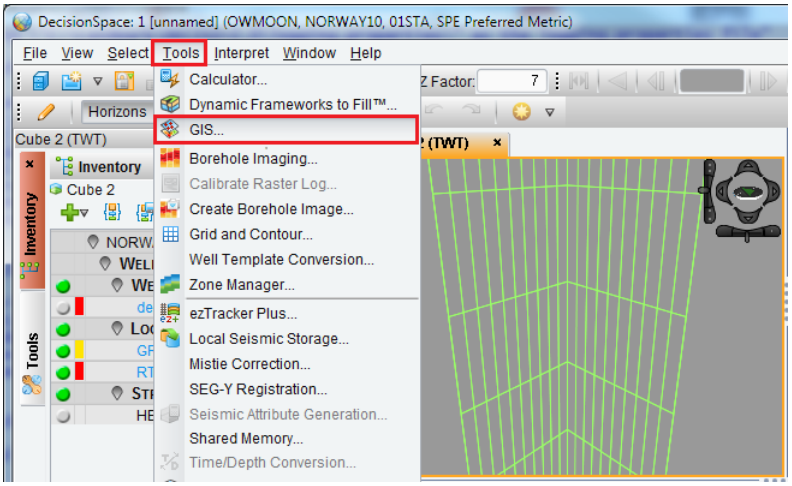
1. Launch DecisionSpace, then click the ***New Session*** tab.

2. In the top panel of the *DecisionSpace Session Manager*, select the following three modules: **DecisionSpace GIS**, **DecisionSpace Geology**, and **DecisionSpace Geophysics**.

3. Select **Session Parameters** (as shown below). Check with your instructor regarding the District, Project and IP, which may differ from those shown. Click **OK**.



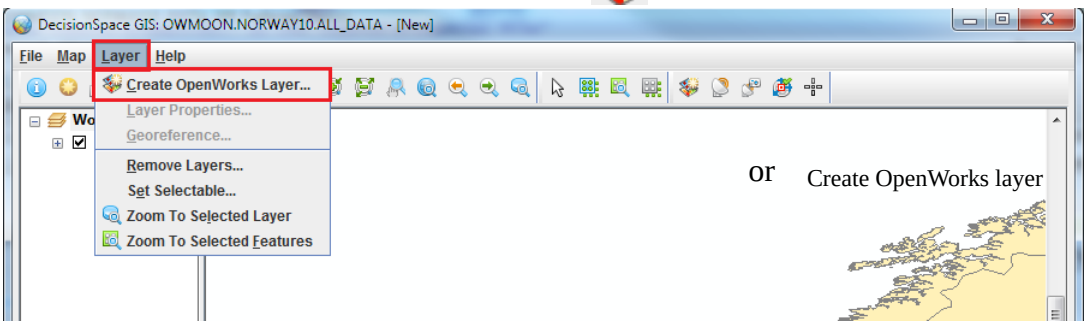
4. When the *DecisionSpace* window appears, select **Tools > GIS…**.



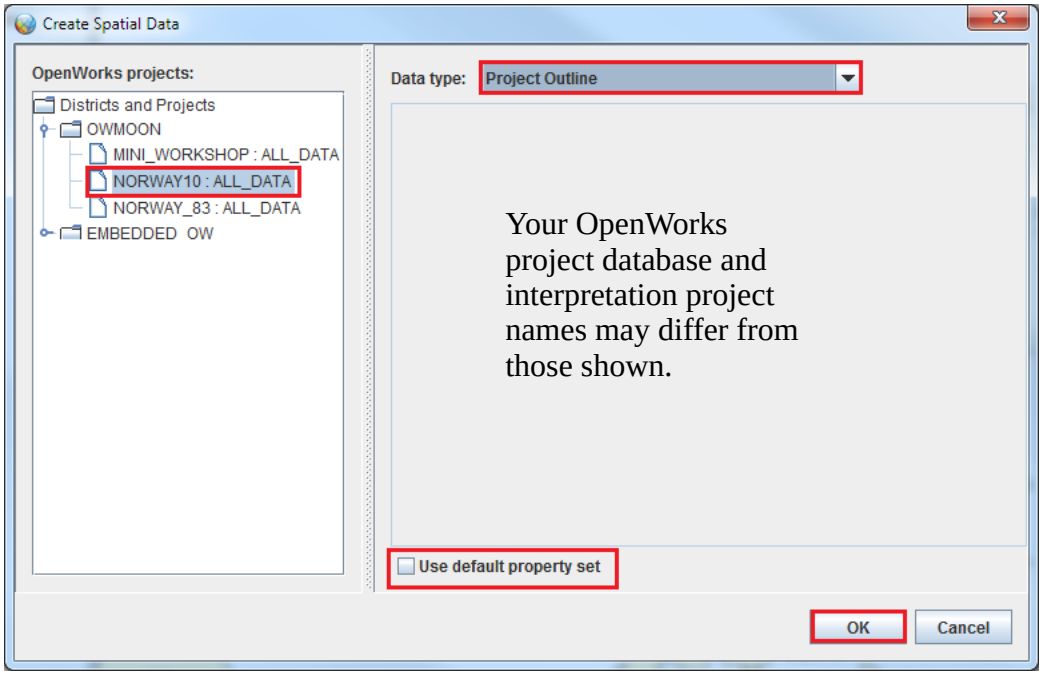
The *DecisionSpace GIS* window opens.

Creating an OpenWorks Layer – Project Outline

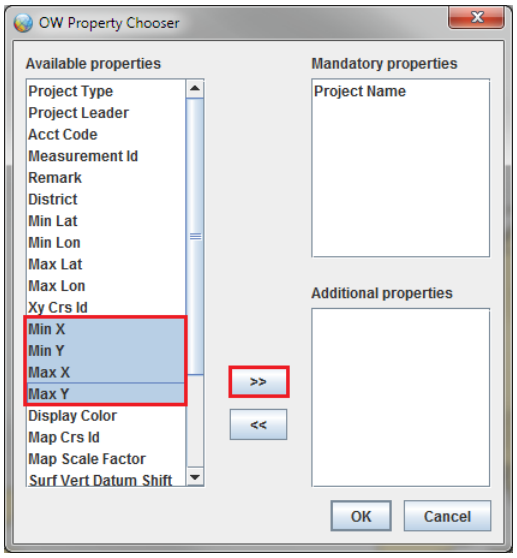
5. Select **Layer > Create OpenWorks Layer…** or click the **Create OpenWorks Layer** icon ( ).

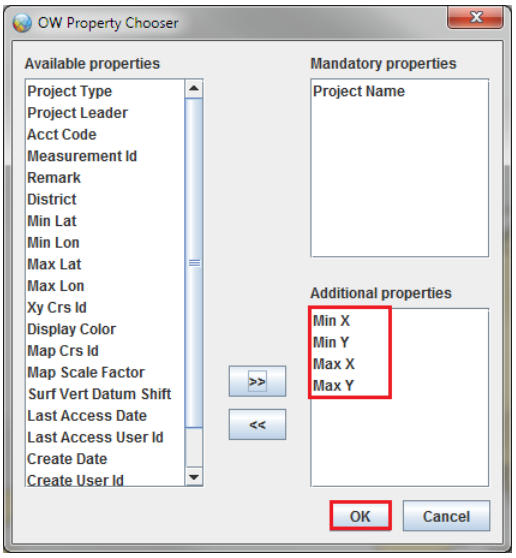


6. On the *Create Spacial Data* dialog, change the Data type to **Project Outline**. Select the OpenWorks project **DSG_NORWAY11** (or something similar). Toggle off **Use default property set** and click **OK**.



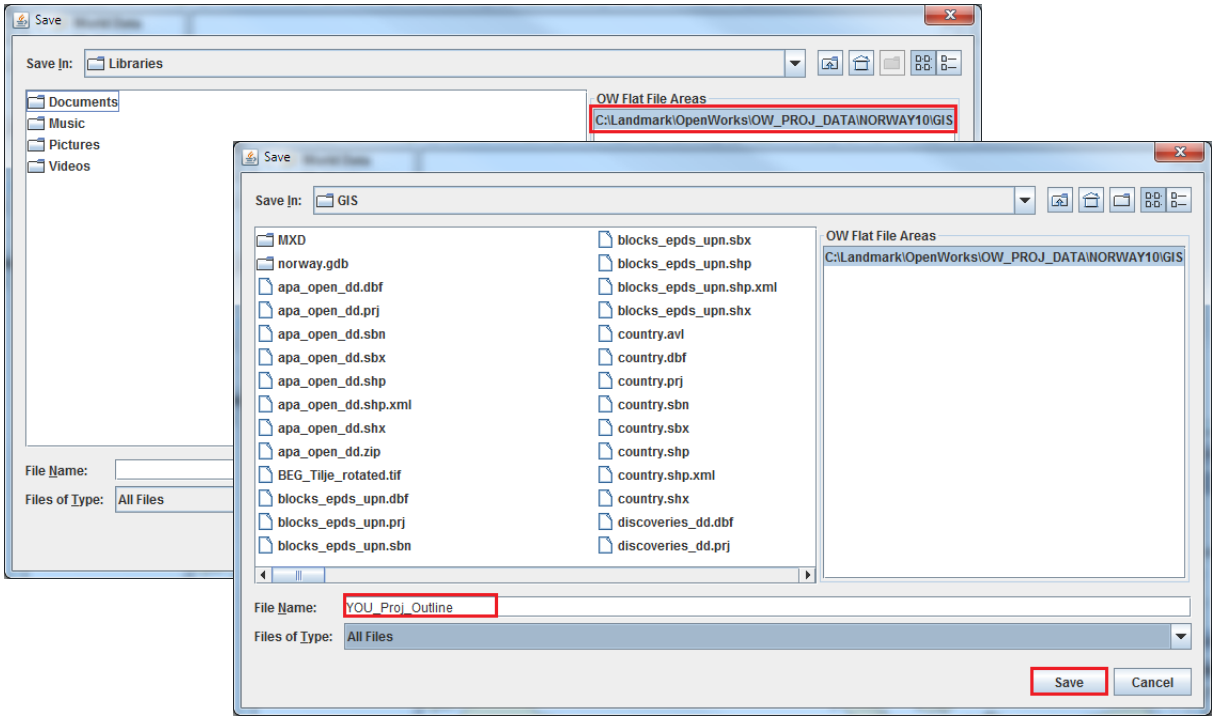
7. In the *OW Property Chooser* dialog, Project Name is designated as Mandatory. Highlight the **Min** and **Max** for **X** and **Y** in the Available properties panel. Click the (> >) button to add them to the Additional properties box. Click **OK**.





You will provide a location and name to save the GIS file. The default location may be your home directory or a Documents folder, but the preferred location for GIS information files is the OpenWorks flat file area. The OpenWorks flat file directory is available to other interpreters and is backed up with the project. If not already set, DecisionSpace can change to this location, as you will see in the next step.

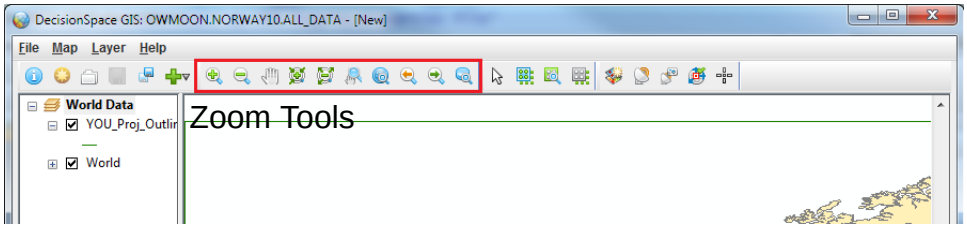
8. In the *Save* dialog, click the **path** in the OW Flat File Areas panel. If not already there, the Save In field will now indicate you are in the GIS folder. Type "**YOU_Proj_Outline**" in the File Name field. Click **Save**.



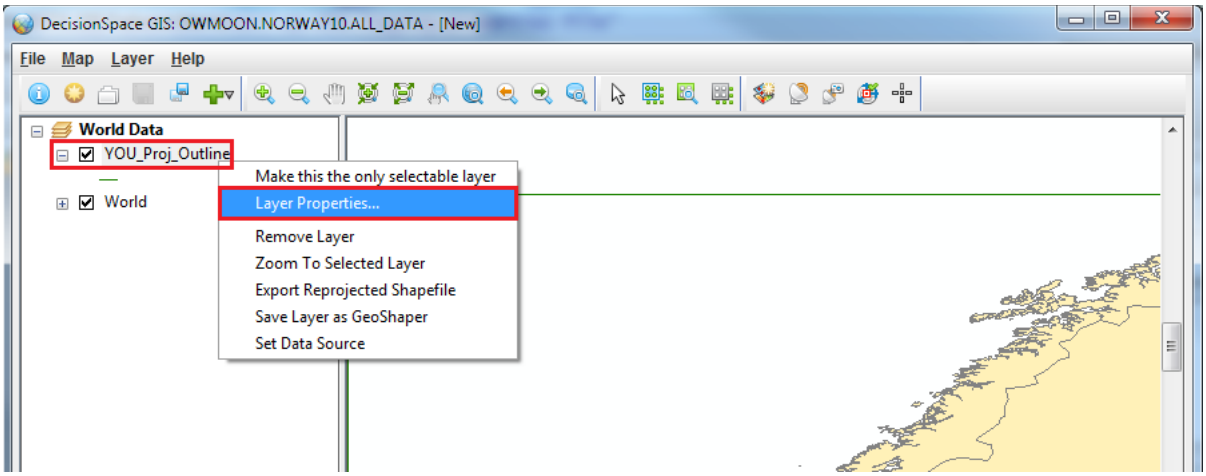
When the Progress on Writing Shapefile finishes, the data will be displayed on the map. The outline is mapped on the display using the GCS_WGS1984 projection so it matches the default world map.

You will change the properties of the project outline layer.

9. Using one of the many zoom tools in the icon bar at the top of the *DecisionSpace GIS* window, **zoom** in or out on the outlined area. Note the capability to zoom in and out using a stretchy box and a fixed zoom in and out. The scroll wheel on your mouse also controls the zoom. Hover over the icons to see the tool tips. Experiment with these zoom controls to get the view that you want.

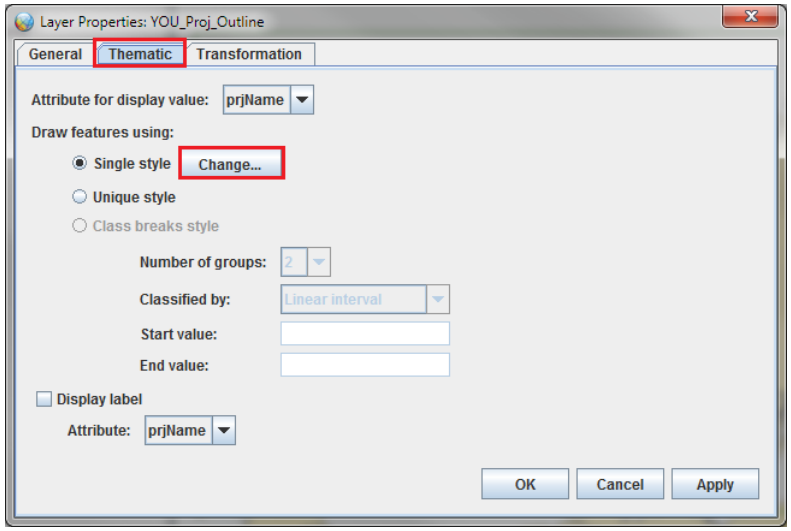


10. On the layer you just created,
    MB3 > Layer Properties.

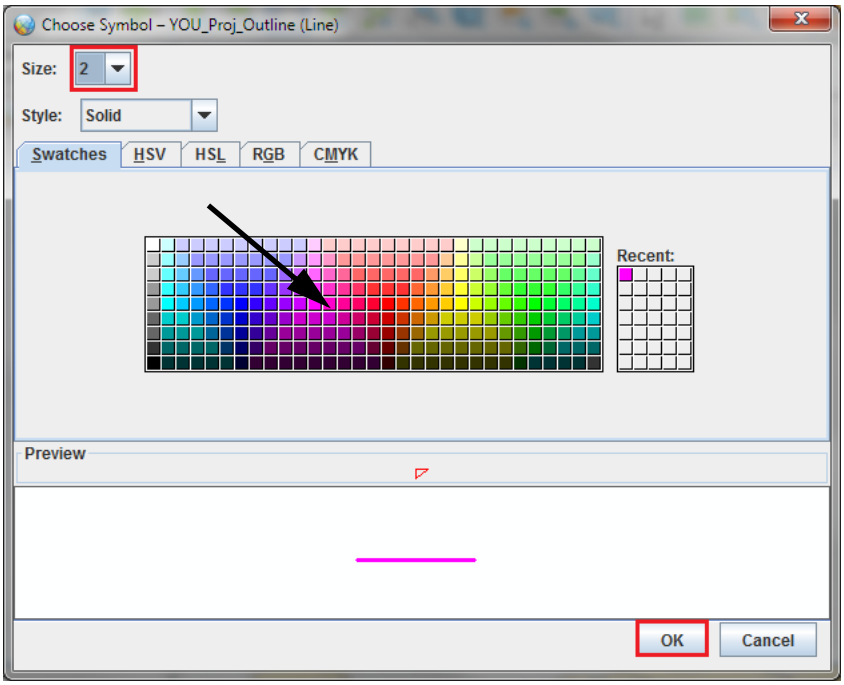


Layer Properties dialog include multiple tabs for setting transparency and thematic information and to provide transformation information.

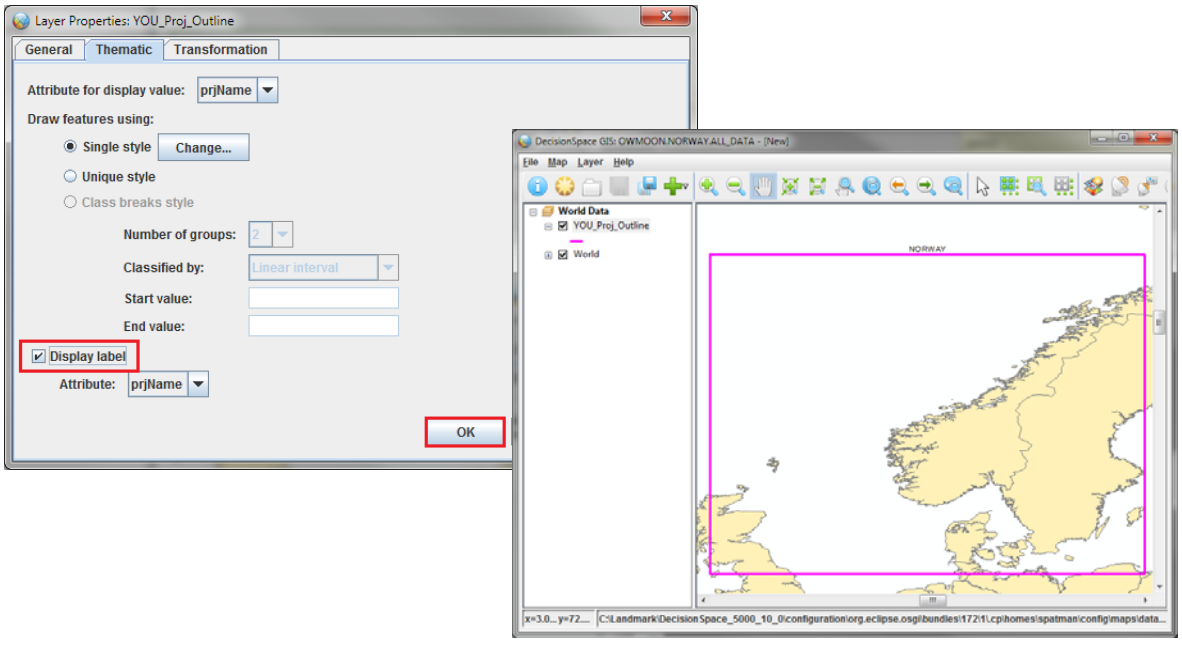
11. In the *Layer Properties* dialog, click the **Thematic** tab. Toggle on **Single style**. Click the **Change...** button.



12. In the *Choose Symbol* dialog, change the **size** to **2** and select a **color** of your choice. Click **OK**.

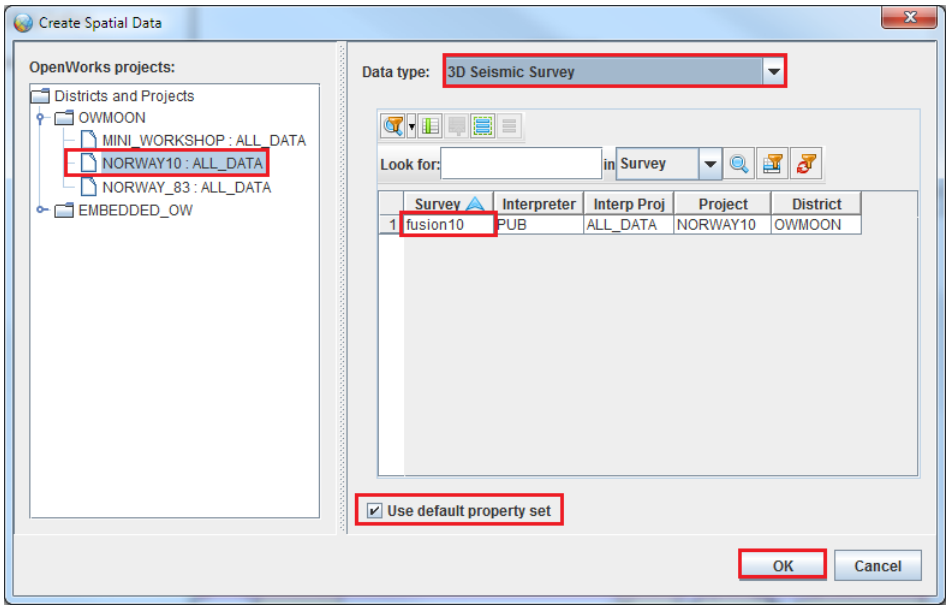


13. Back in the *Layer Properties* dialog, toggle **Display label**. Keep the Attribute selected to "prjName." Click **OK** and observe changes in your display.

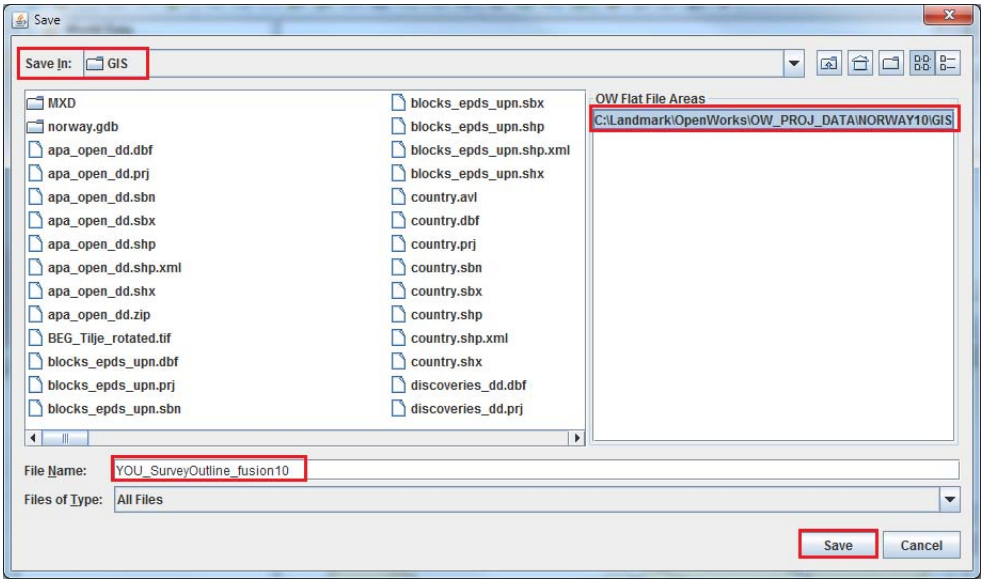


Creating OpenWorks Seismic Survey Layers

14. In the *DecisionSpace GIS* window, select **Layer > Create OpenWorks Layer…**. Then in the *Create Spatial Data* window, set Data type to **3D Seismic Survey** and select **DSG_NORWAY10** (or something similar). Select the **fusion10** survey. Keep **Use default property set** toggled on and click **OK**.



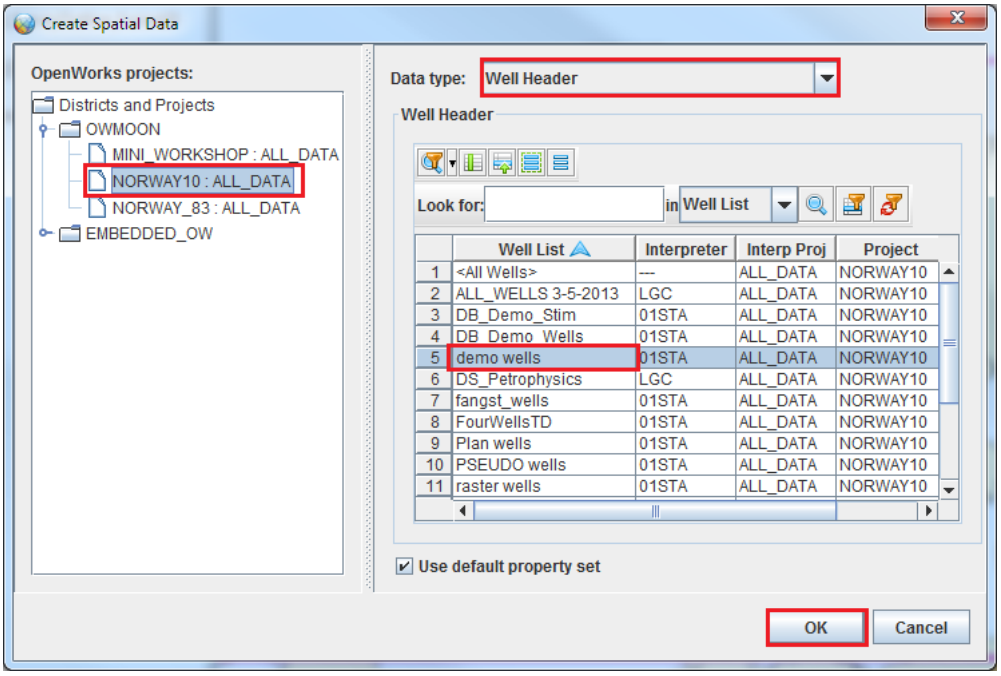
15. Confirm that the *Save* dialog indicates the GIS folder in the OW Flat File Area. (The Save In field should show GIS.) Type "**YOU_SurveyOutline_fusion10**" in the File Name field and click **Save**.



16. Observe the addition of the layer to the map. You may need to zoom in to see it clearly.

Creating OpenWorks Wells Layers

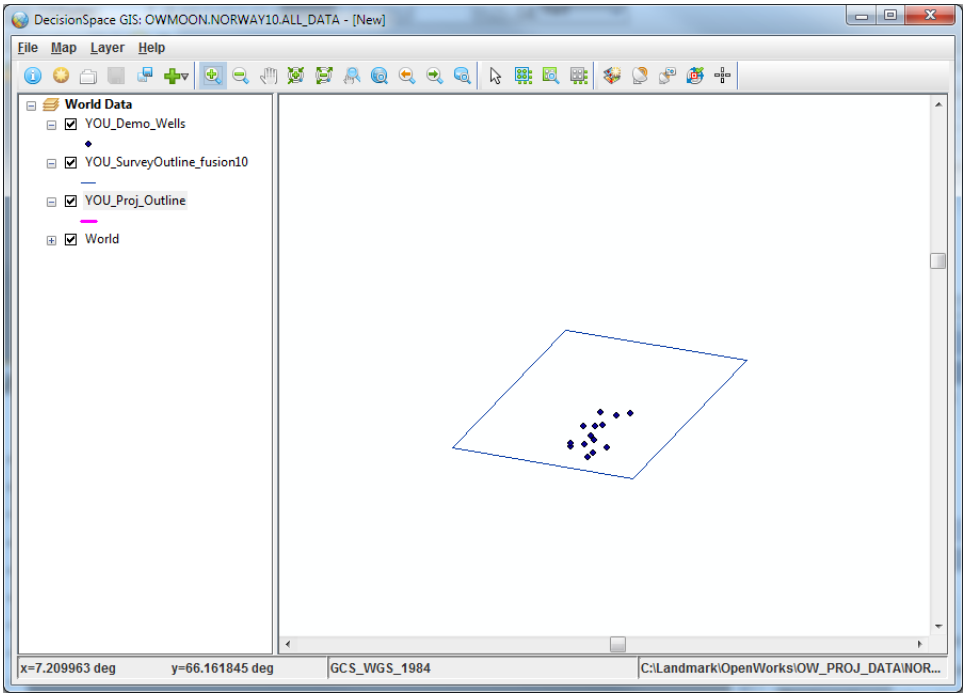
17. In the *DecisionSpace GIS* window, select **Layer > Create OpenWorks Layer…**. Set Data type to **Well Header**, then select **DSG_NORWAY10: ALL_DATA** (or something similar). Choose **demo wells** under Well List column and click **OK**.



Note:

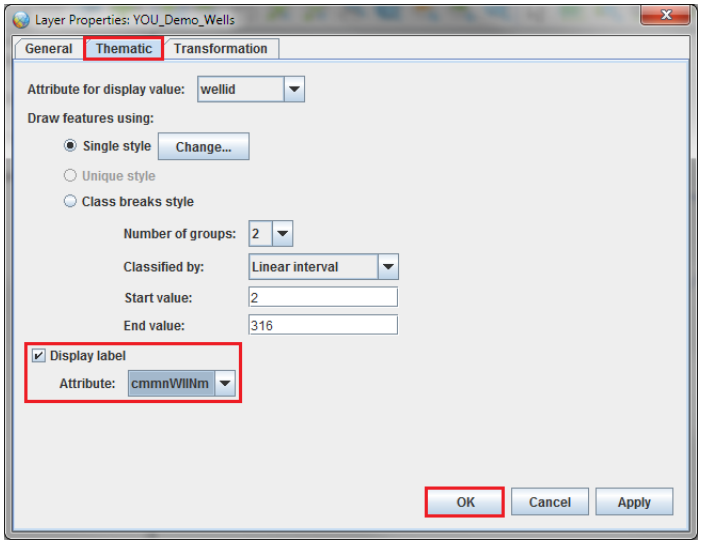
You can select wells from related or nearby OpenWorks projects. Use GIS layers, in conjunction with OpenWorks District and Project hierarchy, to help you understand what data might be missing from your interpretation project. Use this information to generate new well lists.

18. Again in the *Save* dialog, confirm that the new .shp file will be written to the GIS folder in the OW Flat File Area. Type "**YOU_Demo_Wells**" in the File Name field. Click **Save**. Zoom in to observe the well display.

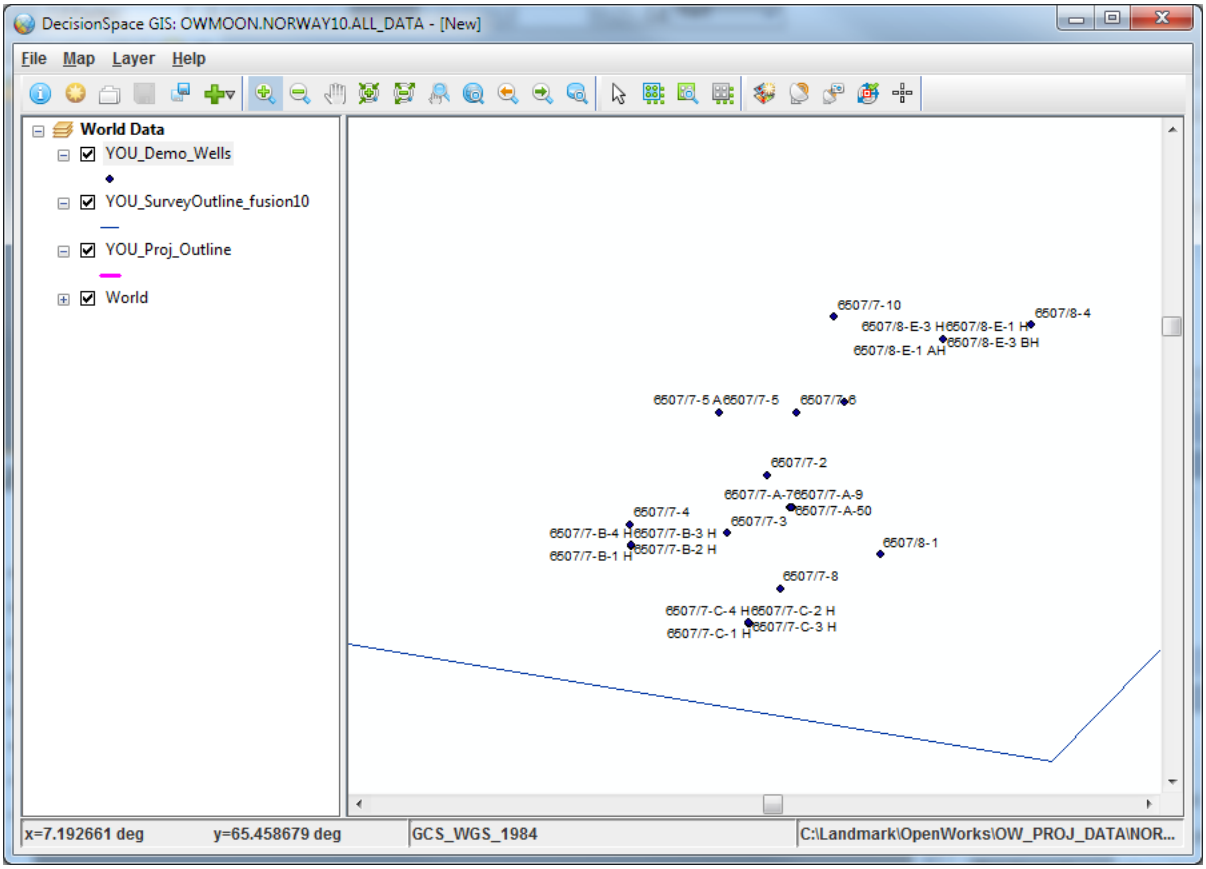


19. In the data tree of the *DecisionSpace GIS* window on your just created well map, **MB3 > Layer Properties...**.

20. In the *Layer Properties* dialog click the **Thematic** tab. Toggle on **Display label**, select **cmmnWllNm** for Attribute, and click **OK**.



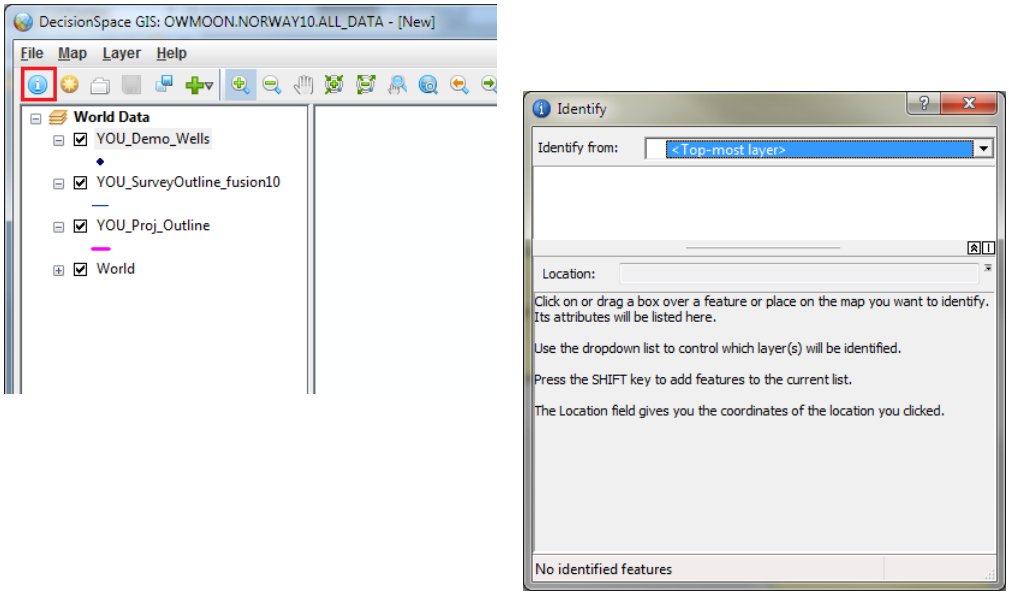
21. **Zoom in** and confirm that the well display update includes annotation (Display label).



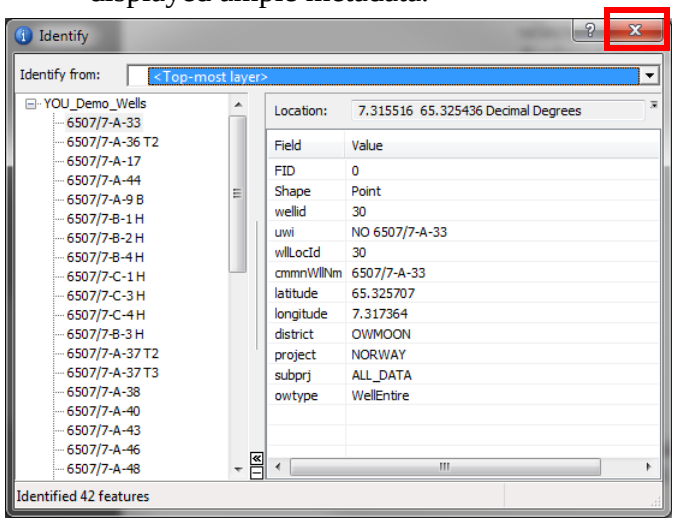
Displaying Metadata

To learn more about an object displayed in the GIS viewer, you can display its metadata.

22. Click the **Identify** icon ( ) in the top left corner of the *DecisionSpace GIS* window. Read the instructions shown in the *Identify* window.



23. Click an **object of interest** or draw a box around several objects to update the *Identify* window with information associated with the selected objects. **Close** the *Identify* window after you have displayed ample metadata.



Leave the GIS module open for the next exercise, which will show how you can transfer GIS information to the main *DecisionSpace* window.

Exercise 3.2: OpenWorks and GIS

In this exercise you will learn how to send live data to the *DecisionSpace* suite and create lists from it.

Loading, Displaying, and Manipulating OpenWorks Data through the GIS Tool

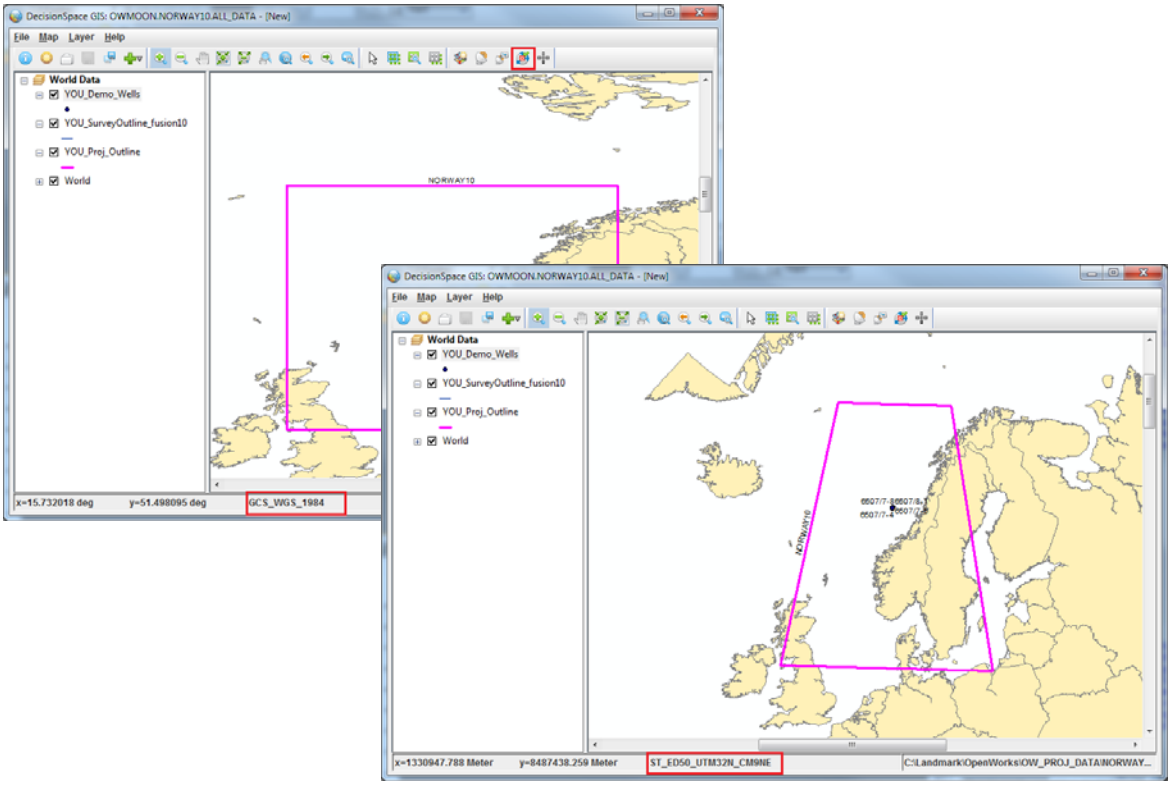
In the previous exercise you generated OpenWorks (GIS) layers using well data, seismic survey outline, and OpenWorks project outline. All of this data can be sent to *DecisionSpace* for display. From GIS, you can also send 2D Navigation, 3D Navigation, and Wells to the DecisionSpace *Inventory* as selected and active data.

Accessing Active OpenWorks Data

The previous exercise guided you through the creation of layers that contain OpenWorks data. This data has been referenced to a GCS_WGS_1984 projection. You will now use CartoSnap to match these layers to the projection used by the Norway project.

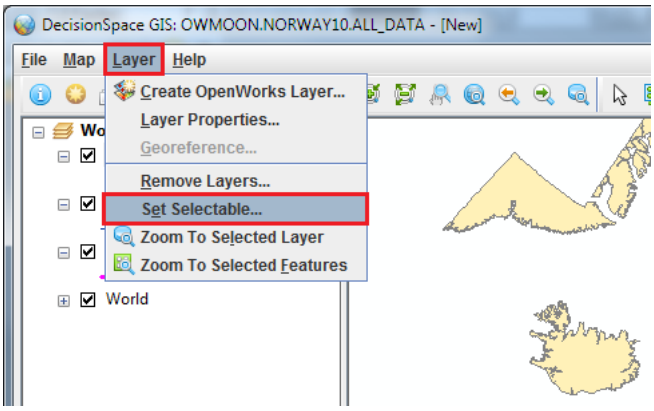
Continue from the previous exercise.

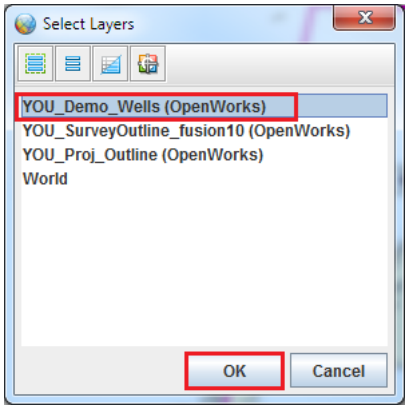
1. In the *DecisionSpace GIS* window, click the **CartoSnap** icon ( ) to change the projection from GCS_WGS1984 to the Project CRS.



2. In the *DecisionSpace GIS* window, **zoom in** on the well area.

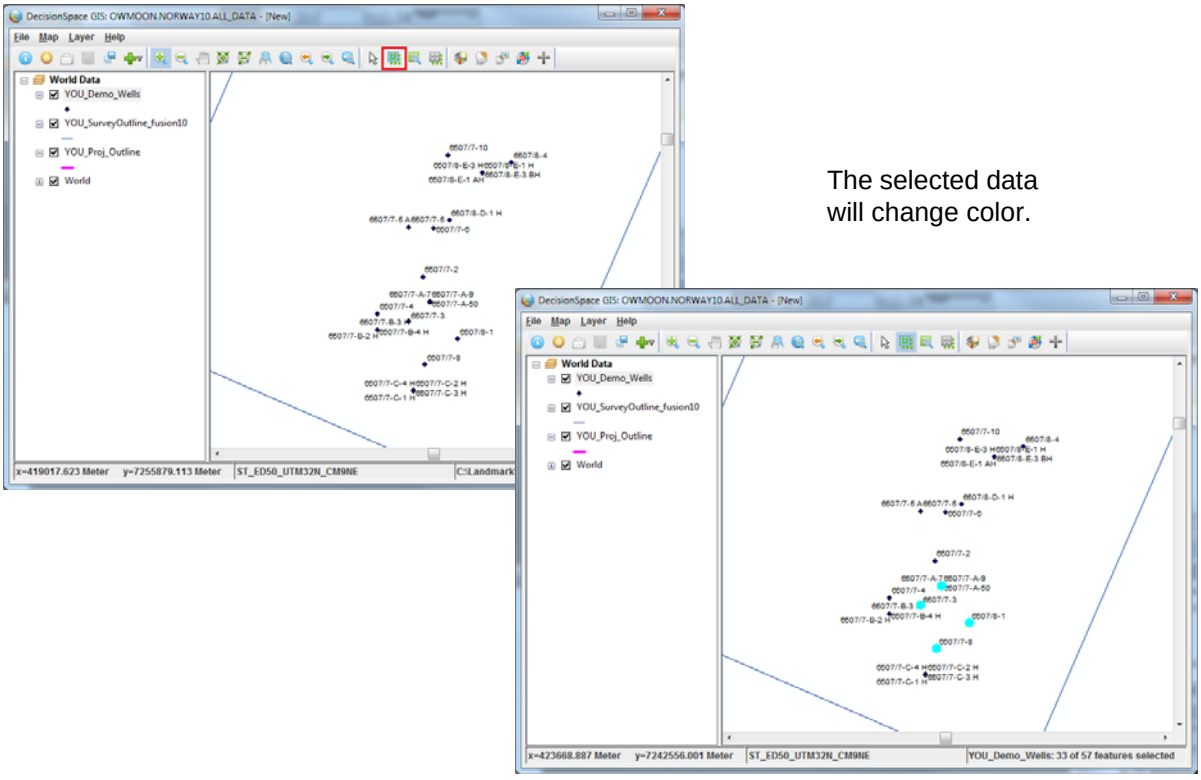
3. From the *GIS* tool top menu bar, select **Layer > Set Selectable…**. Select the **Wells** layer (to be sent to *DecisionSpace*) and click **OK**.





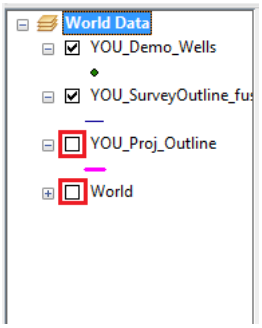
The graphical selection of features in the next step is now limited to the wells layer.

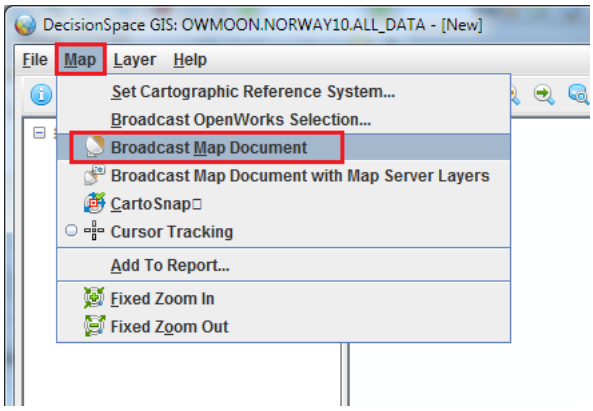
4. Click the **Select Features** icon ( ), then M1-drag a **stretchy box** around the data (wells) to be sent.



5. In the *DecisionSpace* window, toggle on the **Listening** icon ( ) to enable communication.

6. In the left panel of the *DecisionSpace GIS* window, toggle off (uncheck) the **Project Outline** and **World** layers so they will not be sent to *DecisionSpace*. From the *GIS* top menu bar, select **Map** > **Broadcast Map Document**.





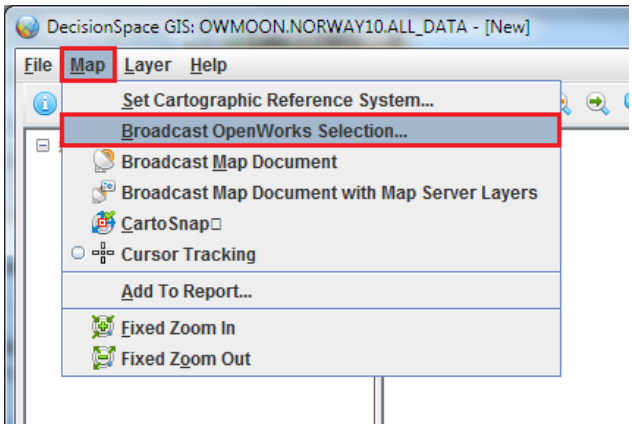
The data will be sent to *DecisionSpace* and will be available in the *Inventory* under the MAPS heading. By default it will be displayed in the *Cube* and *Map* views. Use the familiar visibility toggles for display control of these GIS map layers.

7. **Zoom in** on the *Cube* and *Map* views to better see the GIS Map layer listed in the *Inventory* under MAPS.

These maps are valuable, but the individual wells are not independently accessible in *DecisionSpace*. You can transmit active wells to *DecisionSpace* by using the Broadcast OpenWorks Selection in the *GIS* tool, as shown in the next steps.

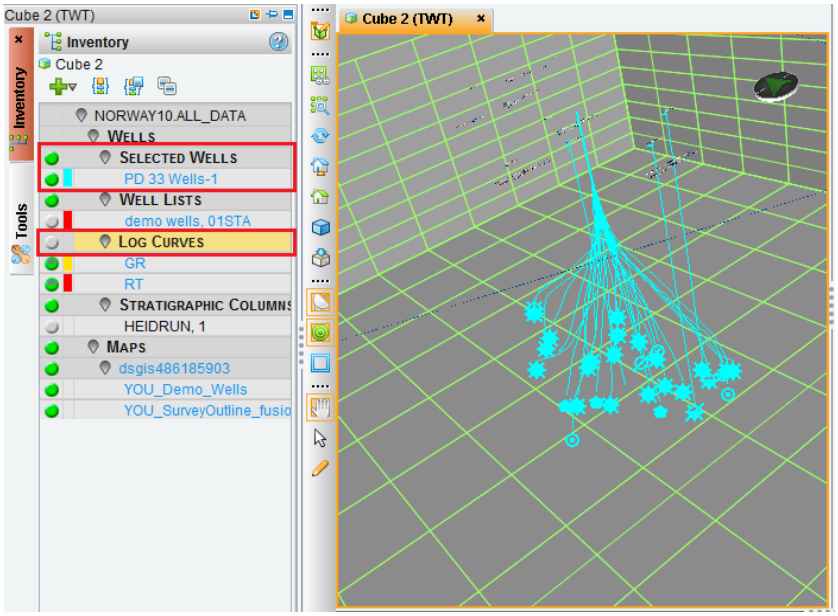
8. Make the ***Cube*** view active and in the *Inventory* hide (toggle off) the **Map** you just broadcast.

9. In the menu bar at the top of the *DecisionSpace GIS* window, select **Map > Broadcast OpenWorks Selection....**

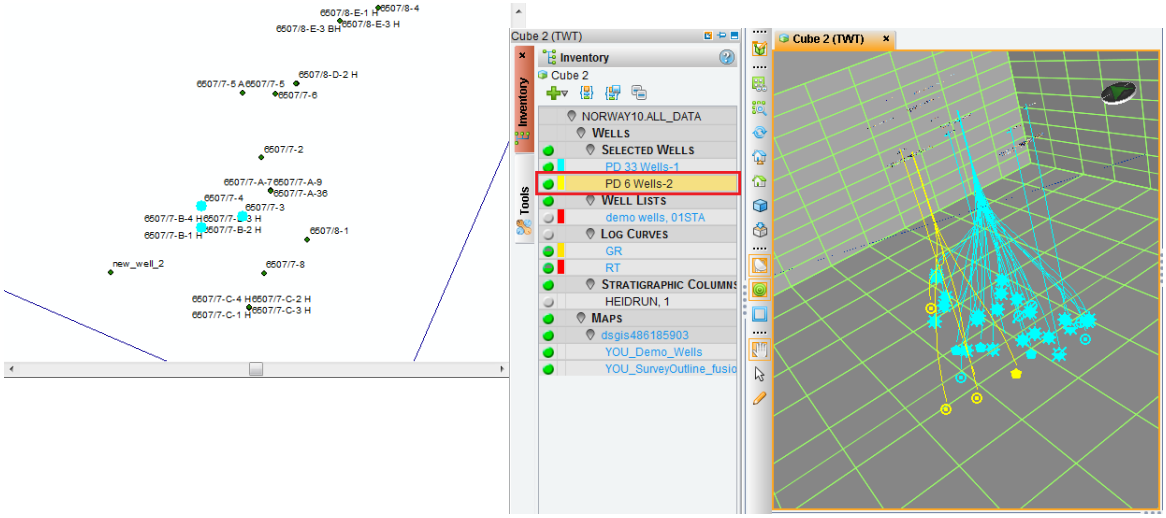


The highlighted wells in your GIS map will be broadcast and received by the active *Cube* view.

10. In the DecisionSpace *Inventory* Task pane, note the new category, SELECTED WELLS. In your *Cube* view, **Show** these broadcast wells, but **hide** the LOG CURVES.



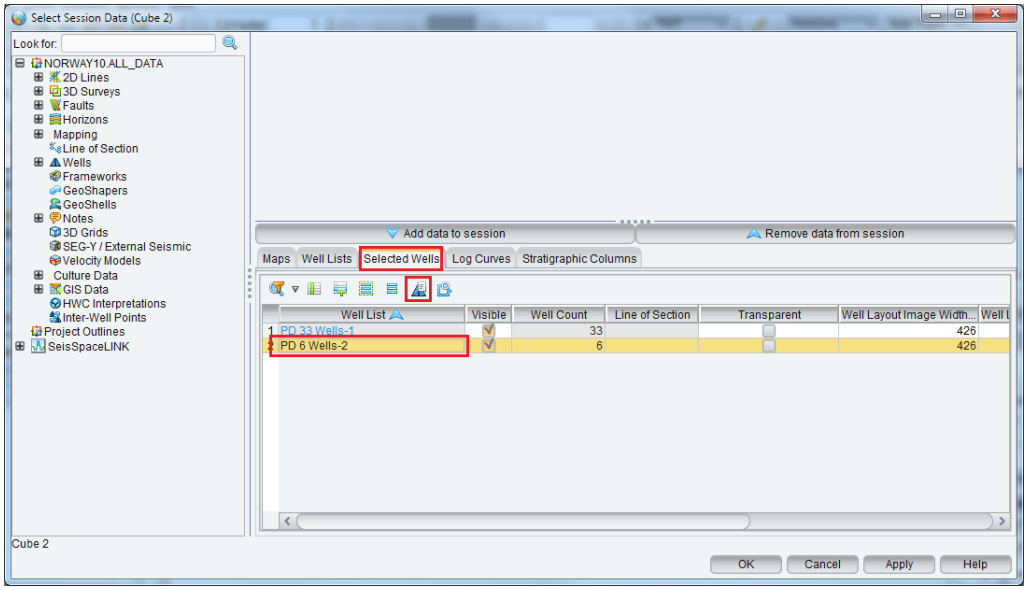
11. In the *DecisionSpace GIS* window, highlight a different **group of wells** ( )and again select **Map > Broadcast OpenWorks Selection...**. **Toggle on** the new PD object in the *Inventory* (DecisionSpace).



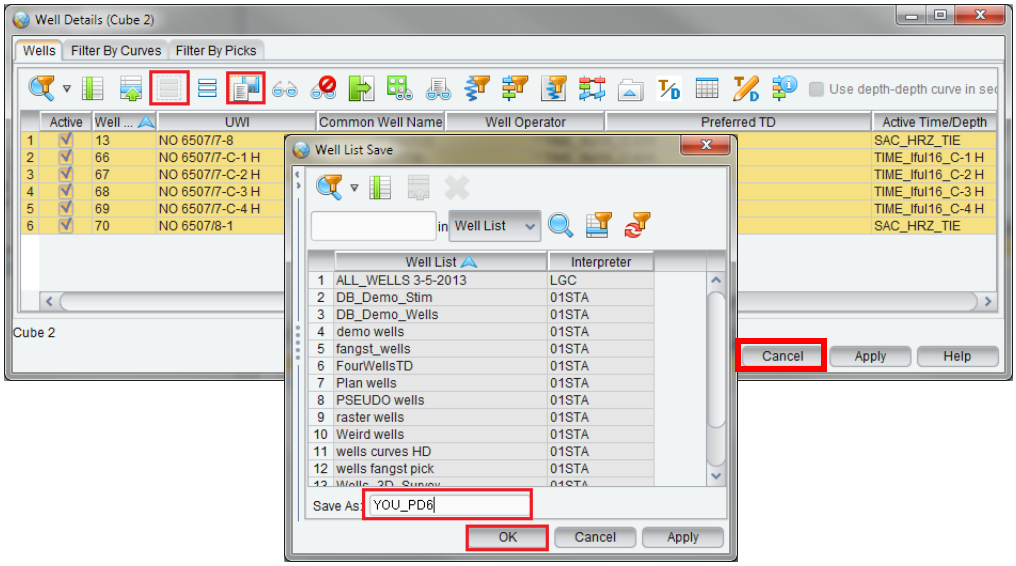
Generating a Well List from GIS Selection

You can use the data broadcast from GIS to DecisionSpace in numerous ways. By means of many controls you can sort, filter, and select the data. In the next several steps you will generate a well list from the wells that you just sent from GIS.

12. Open the *Select Session Data* window ( ) and activate the **Selected Wells** tab, then highlight a **Well List** and click the **Well Details** icon.



13. In the *Well Details* window, click the **Select All** icon ( ), then click the **Save as List** icon ( ). In the *WellList Save* dialog, type a **name** that includes your initials and click **OK**. Then click **Cancel** to dismiss the *Well Details* dialog.



Note that the *Inventory* under WELL LISTS now includes your new list.

This simple example showed what the Selected Wells functionality can do. Many other filtering options are available on the *Well Details* dialog to help you isolate data.

14. Click **Cancel** in the *Select Session Data* dialog.

Displaying ArcGIS Shape Files in DecisionSpace

GIS allows you to browse for layers, shape files, and raster files that have been previously created or that are accessible through the ArcGIS server (SDE data). In this exercise you will load previously created files. You cannot connect to an ArcGIS server in this class, but the *DecisionSpace GIS* interface for that will be shown later.

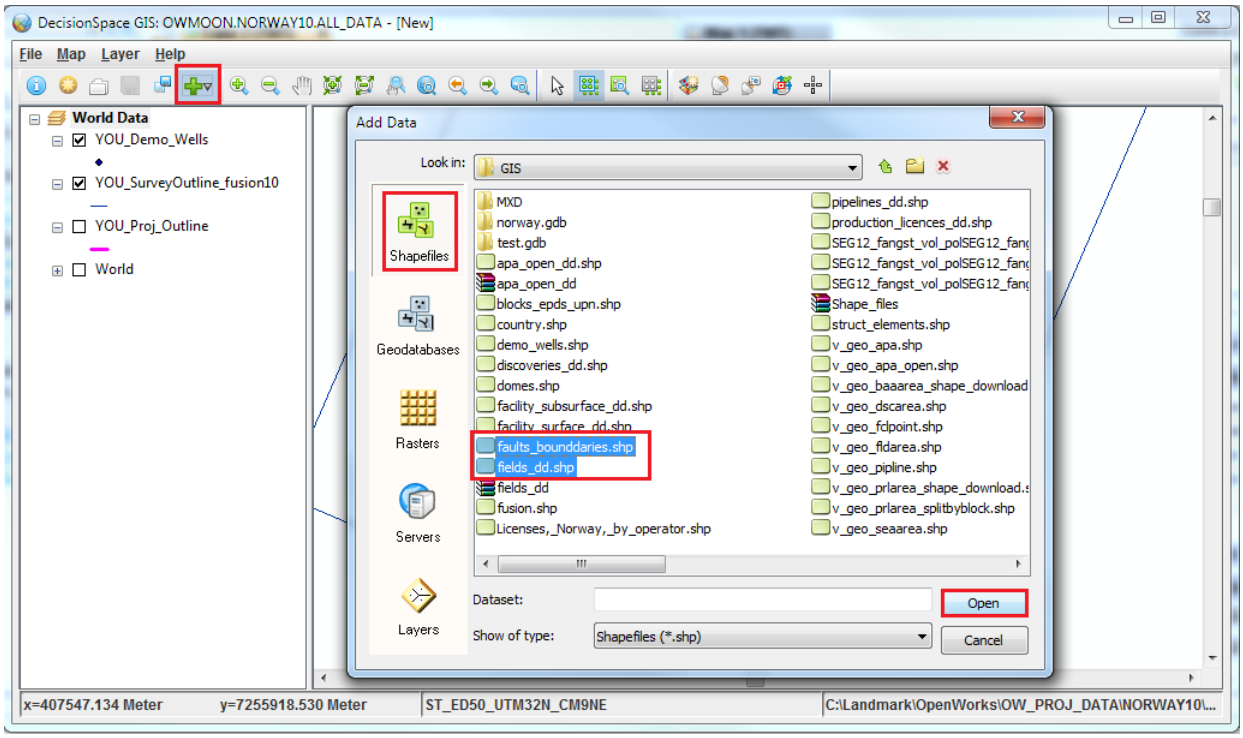
Adding Raster Data and Shape Files

15. Display the **demo wells** in the *DecisionSpace Cube* view. Zoom to see all the wells in the *Cube*.

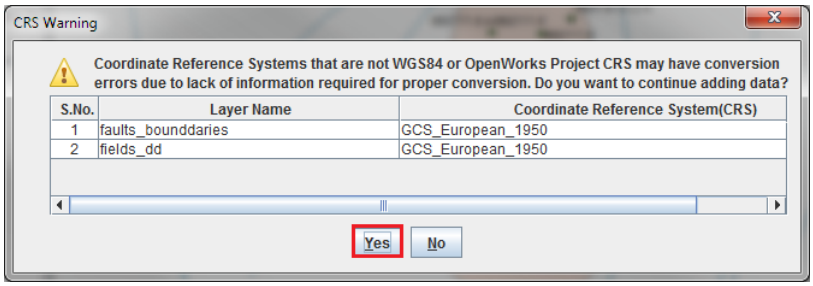
16. In the *DecisionSpace GIS* window, click the **Add Data** icon ( ).

> **Note:**
>
> For the next step, you may have to navigate (change directories) to find the files requested.The GIS files are located within the GIS directory under the OW_PROJ_DATA/ OpenWorks project database. An example path is -/spinner/OW_PROJ_DATA/ DSG_NORWAY10/GIS
>
> The *Add Data* file selection dialog may open in your home directory or other location.
>
> If you do not see the GIS files shown in the *Add Data* dialog, navigate to the OpenWorks project database/GIS (.../OW_PROJ_DATA/DSG_NORWAY10/GIS).

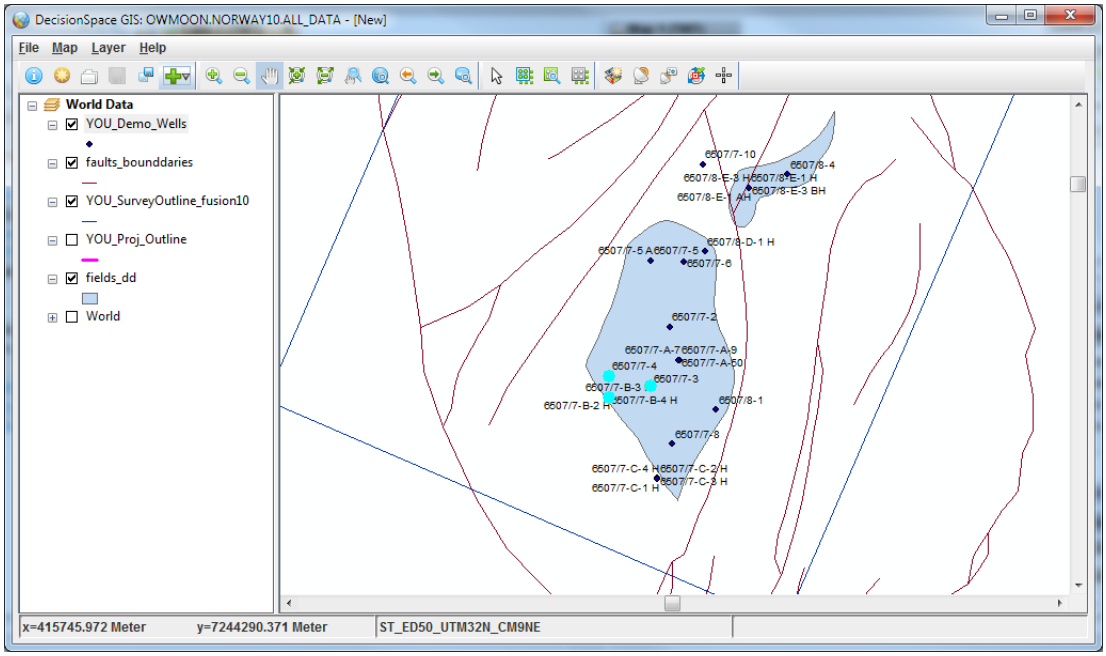
17. In the *Add Data* dialog, click the **Shapefiles** icon ( ), then select **faults_bounddaries.shp** and **fields_dd.shp** and click **Open**.



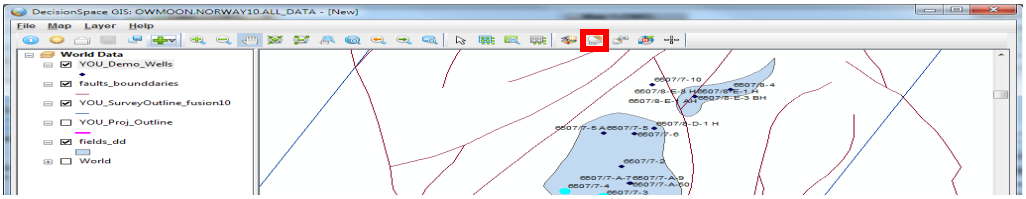
18. A *CRS Warning* box will appear because the CRS of the .shp file is slightly different from the project's. The differences are small, so click the **Yes** button to continue.



The layer will be created and your GIS window should look something like that shown below.

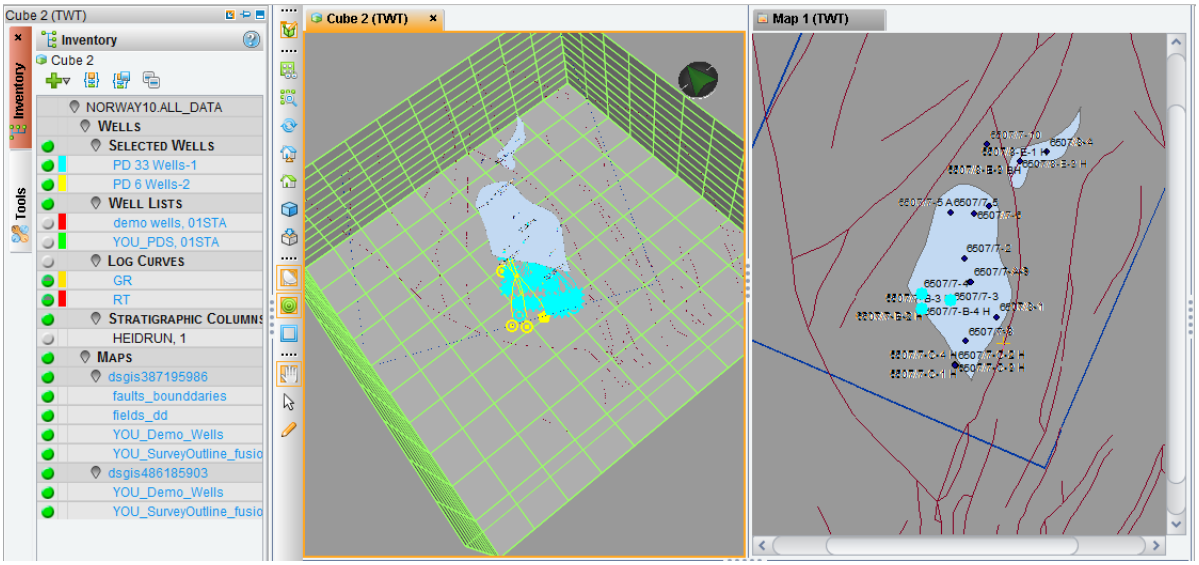


19. In the *GIS* window, click the **Broadcast Map Document** icon ( ).



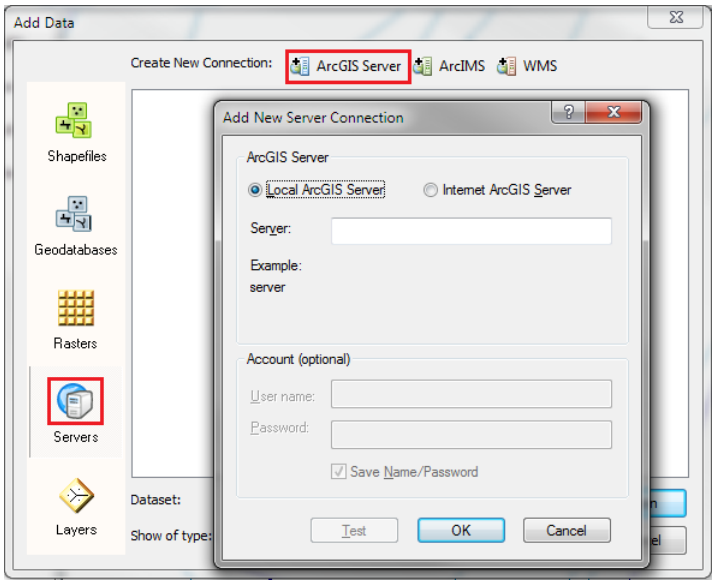
20. In the *DecisionSpace Inventory*, toggle **off** the first **maps** you loaded to eliminate interference.

The layer files will be displayed in *Cube* and *Map* views and another 'dsgis' object group will be added to the *Inventory.*



Adding Data from ArcGIS Server or Database on Local Disk

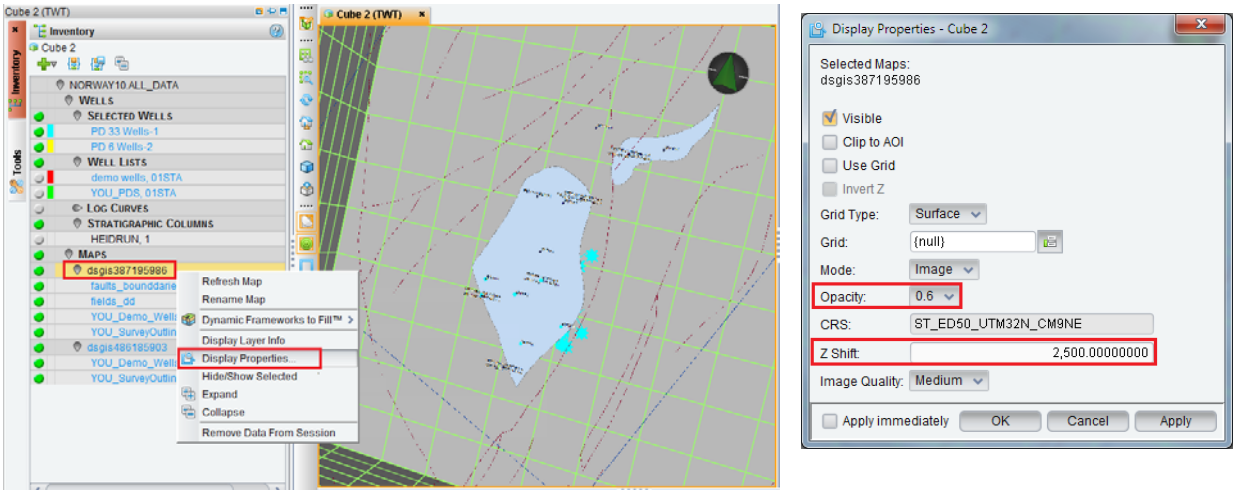
If your company has an ArcGIS server, *DecisionSpace GIS* can access that data. Use the Select the Data icon ( ) to load SDE data from a server. Then click the Servers icon and specify the connection in the dialog. If you have a saved database, you can load from it using the Geodatabases dialog.



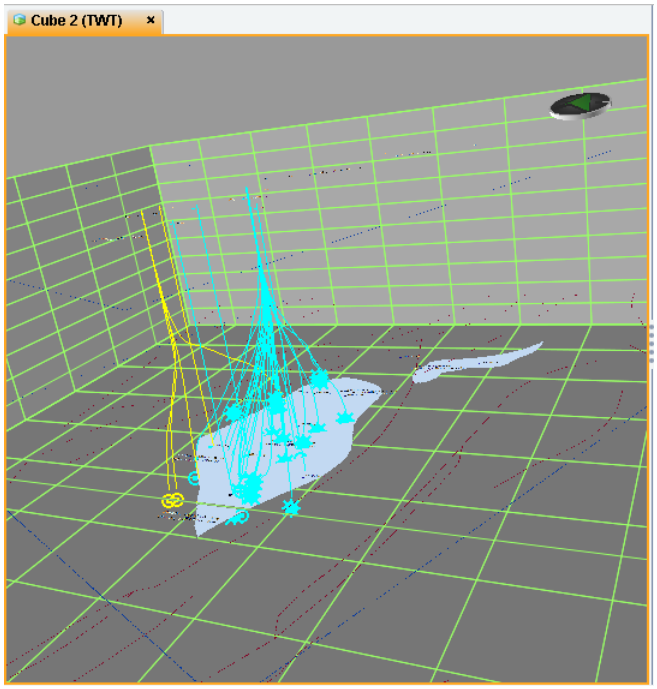
Editing Layer Properties

Properties of the layers can be edited just like any other data item in the session. The main properties to edit for Map data are transparency and depth.

21. In the DecisionSpace *Inventory* for *Cube* view on the last ‘dsgis’ MAP you broadcast, **MB3 > Display Properties**. Change the opacity to **0.6** and the Z Shift to **2500**. Click **OK**.



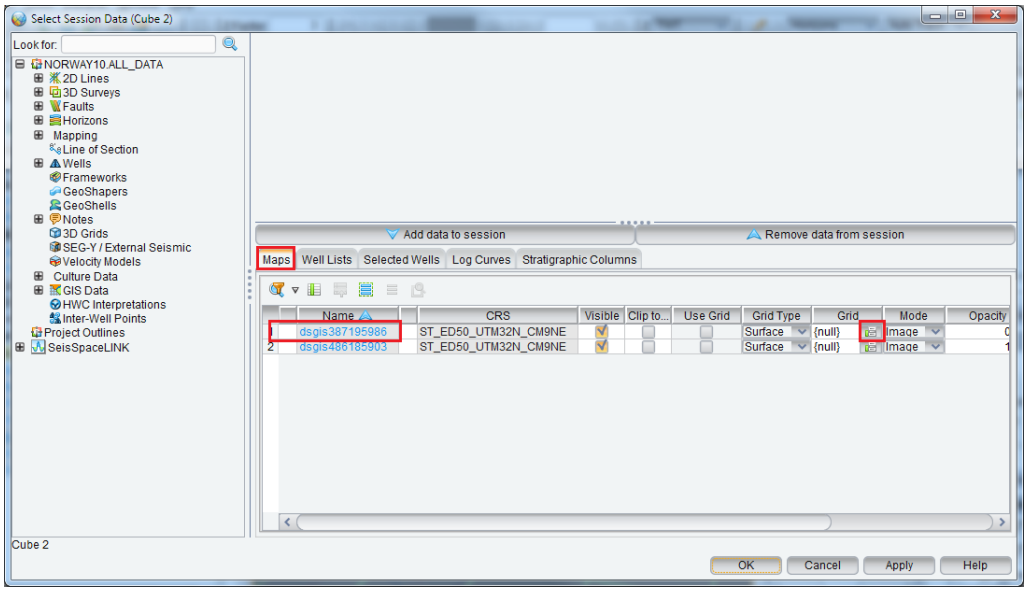
The map is lowered to reveal the well bores.



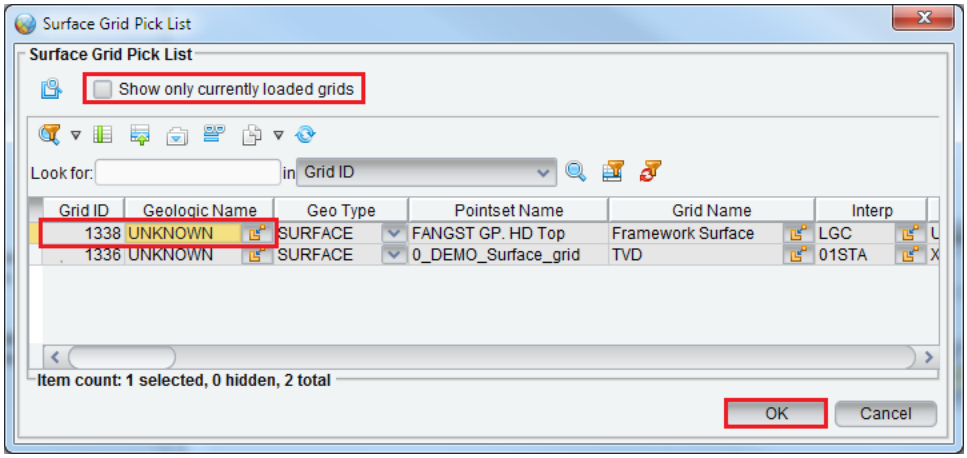
Overlaying Shape Files on OpenWorks Grids

Layers (maps) can be draped on top of OpenWorks grids.

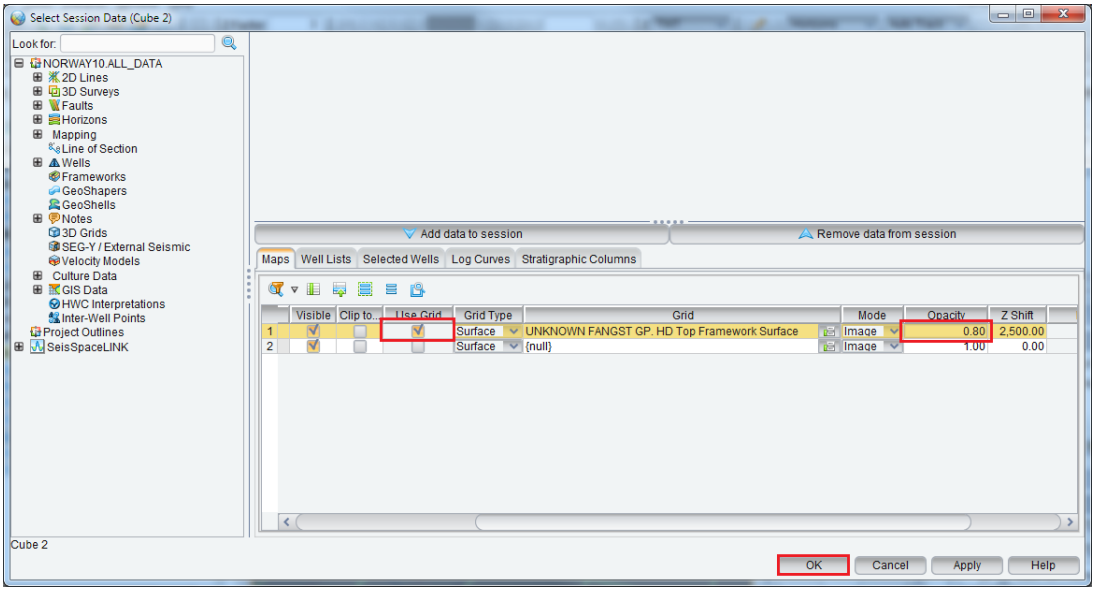
22. With *Cube* view active, click the **Select Session Data** ( ) icon. In the lower pane of the *Select Session Data* window select the ***Maps*** tab. Select the **map** you just created and click the **Grid** icon ( ) in the Grid column.



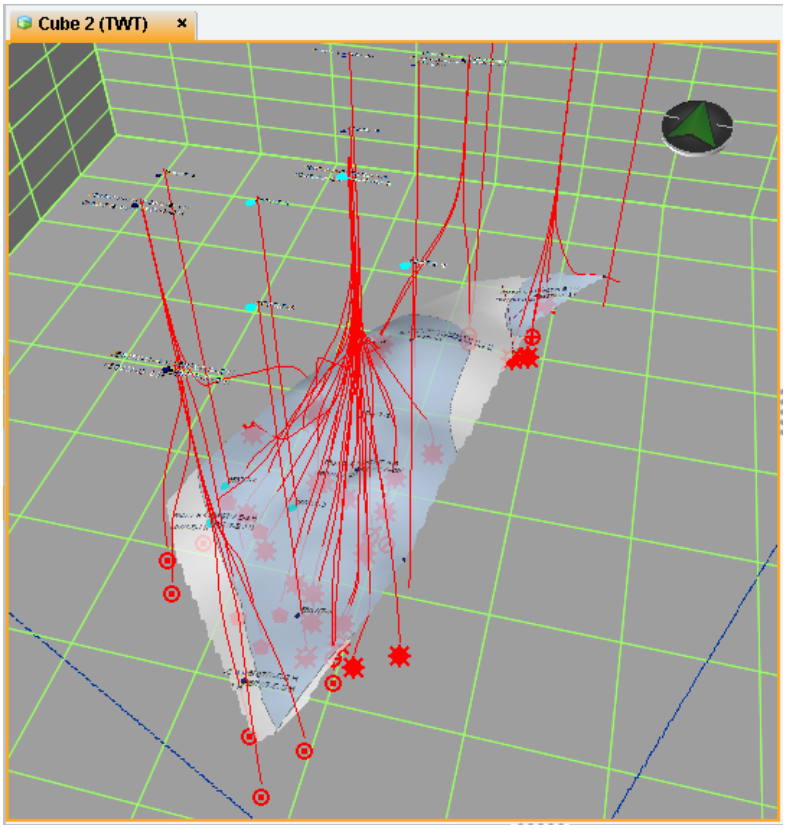
23. In the *Surface Grid Pick List* dialog, toggle off **Show only currently loaded grids**. Select the **FANGST GP. HD Top** grid from the OpenWorks database. The grid does not have to be loaded to the session for the map to be draped on it. Click **OK**.



24. Back on the *Select Session Data* dialog *Maps* tab, toggle on **Use Grid** and change the Opacity to **0.80** for your selected Map, then click **OK**.



Your display should look like the following image. Note that the white parts of the map that were transparent in earlier views are now opaque, so you can see the shape of the draped surface.



If you wish, you can load the grid into the cube for comparison with the draped surface. Select Session Data > Mapping > Surface Grids to find and load this grid.

25. Select **File > Exit** from *DecisionSpace GIS* tool.

26. You can save your DecisionSpace session if you wish; select **File > Save Session**. If not, select **File > Exit** from the main DecisionSpace Geoscience suite.

This completes your introduction to the GIS module and DecisionSpace Geosciences. DecisionSpace has more capabilities than you saw in this manual. To more fully understand the functions of DecisionSpace, refer to online help.

Review

This chapter provides a good overview of some of the interactions between the DecisionSpace GIS tool with the rest of the DecisionSpace Geoscience suite. With the GIS tool you can apply many types of graphical information in your interpretation and planning activities.

In this chapter you:

- Initialized the DecisionSpace GIS tool and learned how to control the display, including zooming and panning, and how to change properties and labels
- Loaded OpenWorks data (including wells, project, and seismic boundaries) into map layers
- Learned ways to sort, select, and broadcast GIS data to DecisionSpace for further analysis
- Generated and edited GIS layers, including raster and shape files
- Displayed GIS map data in the GIS display and the DecisionSpace views
- Changed depth and transparency of Maps layers in DecisionSpace displays
- Overlaid GIS map data onto OpenWorks grids

Appendix A
Project Designer

Chapter 2 of this manual described many ways to organize your activities as you perform interpretation in Decision Space. In addition to the content of Chapter 2, DecisionSpace software also possesses a powerful organizational tool, Project Designer. In this appendix you will explore its capabilities in enabling you to produce and record an organized workflow of your interpretation activities that will be valuable to you and others.

The DecisionSpace Project Designer enables you to create a workflow record that you will save with your session. The project design appears as a flow diagram in a Project Designer tile (display) of the *DecisionSpace* window. The diagram can contain information on tools used, actions performed, decisions made, and other text information that you may want to save with the project. Project designs are saved with the session; however, these saved project designs do not contain any status information or report items that may have been added from a Report, so when the session is restored, you will have only the data-less project design outline.

Project Designer is a valuable tool for creating and transferring knowledge between people and organizations. It also provides a knowledge capture mechanism within an organization. You can attach any external document, such as a PDF file of a research paper, an image (.jpg and other image formats), a Microsoft Office document, and so forth, to any of the nodes in the workflow diagram.

With Project Designer, key procedures and insights will no longer reside only in the notebook of a former team member.

Exercise A1: Using the Project Designer

Diagramming Workflow

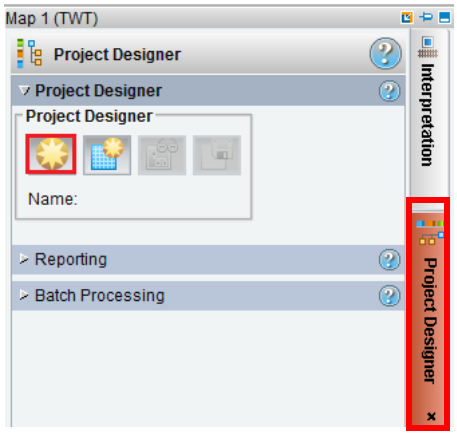
1. If DecisionSpace is running from the end of Chapter 1, proceed with step 3 below.

2. If not, start DecisionSpace. When the *DecisionSpace Session Manager* opens click the ***Existing Sessions*** tab, if it is not already active. In the upper list select the session you saved at the end of Chapter 1 (it was named YOU_GS_Ch1, or something similar). One of your session files from Chapter 2 will also work. Click **OK**.

3. Make the ***Map*** tab active, then click the ***Project Designer*** tab on the task pane. (Hint: Perspective: **Default**.)

In the Project Designer task pane you can open an existing project designer template or create a new one. You will now generate a short workflow diagram to describe the elements covered in this chapter.

4. In the *Project Designer* task pane, expand the Project Designer panel. Click the **New Project Design** icon ( ) to create a new *Project Designer* view.

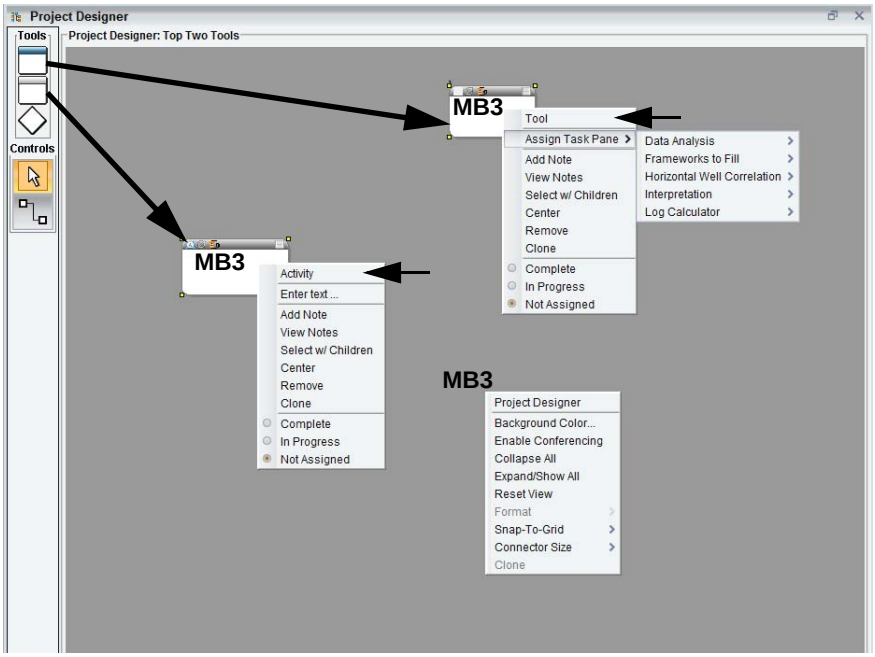


5. In the *Create New Project Design* dialog, enter "**YOU_flow1**" for the project design name and click **OK**. Double-click the newly created ***Project Designer*** tab to maximize the display.

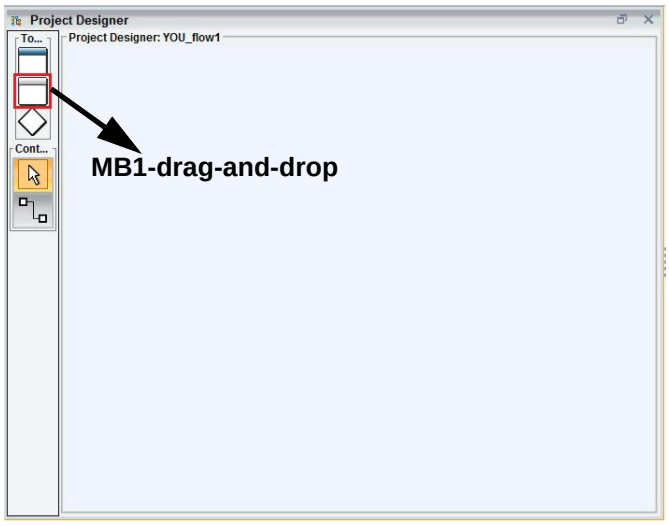
The *Project Designer* workspace is currently empty.

Note:

There is a difference between the top two Tools icons. The topmost Tool Project Design Element allows you to link directly to a DecisionSpace process (MB3 > Assign Task Pane). After a task pane is assigned, you can MB3 > Open Task Pane to reach that process or functionality.

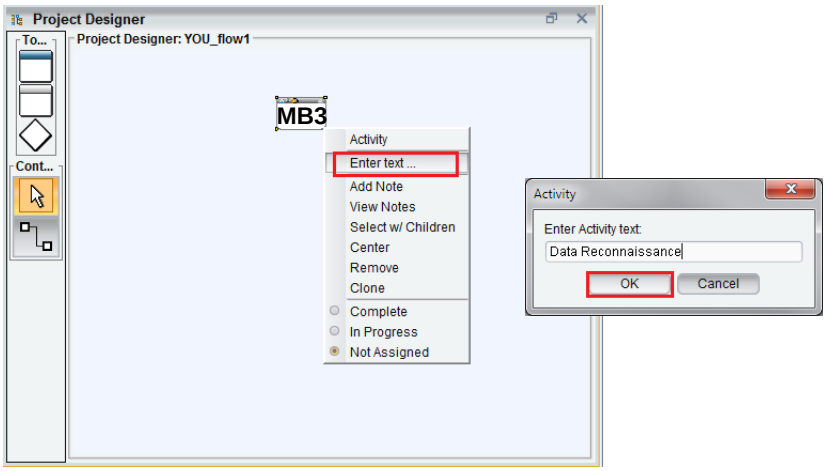


6. Drag-and-drop the **Activity Box** icon ( ) into the empty area.



In the Activity Box that appears you can add text, resize, reposition, or assign an activity.

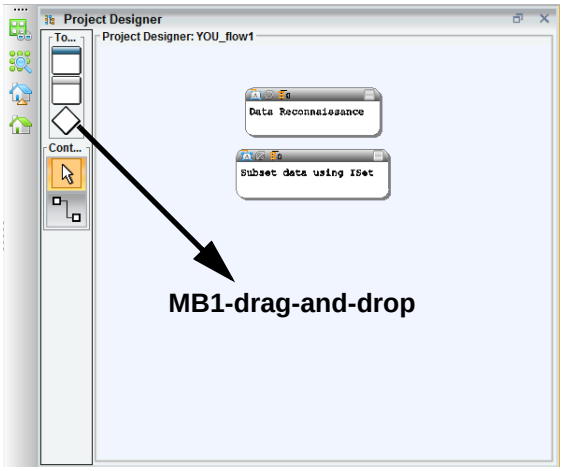
7. On the newly created box, **MB3** > **Enter text...**. In the *Activity* dialog type "**Data Reconnaissance**" and click **OK**.

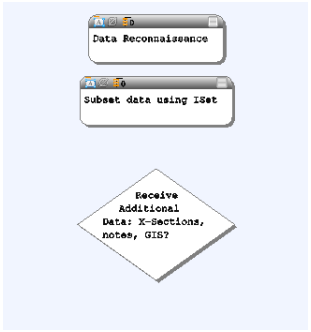


8. MB1-drag a **yellow corner handle** and resize the **box** to fit the text on one line.

9. Drag-and-drop another **Activity Box** onto the Project Designer view below the first one. **MB3 > Enter Text...** and type "**Subset data using ISet**". Then click **OK**. Grab the **yellow corner handles** and adjust **box size**.

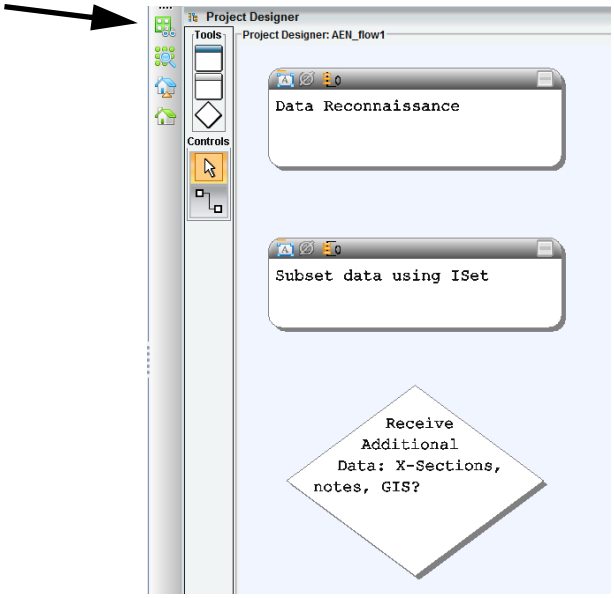
10. Drag-and-drop a **Decision Node** (◇) into the Project Designer view, name it "**Receive Additional Data: X-Sections, notes, GIS?**", and adjust its size.





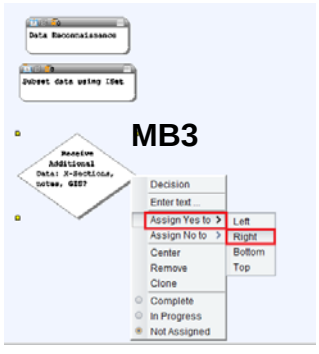
The Project Designer does not have a zoom icon or zoom slider bar. However, ways to resize the image are described in the next step. You can MB2-drag to move (translate or pan) and mouse scroll-wheel to zoom the display. MB1+MB2-drag (vertical motion) also zooms the scene.

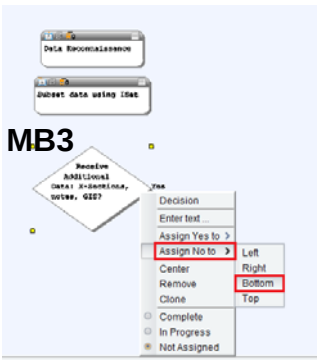
11. Click the **View All** icon ( ) to see that it sizes the scene to visualize all objects, including room for additional boxes. Surround both **Activity Boxes** and the **Decision Node** with a stretchy box (MB1-drag) to select them. Click the **View Selected Objects** icon ( ) to enlarge the three objects to cover most of the view. Use the scroll-wheel to **zoom in** further and **MB2-drag** to reposition.



Activity Boxes and Decision Nodes can be connected to show the direction of flow in your flowchart.

12. Select the **Decision Node**, then **MB3 > Assign Yes to > Right**. Again on the Decision Node, **MB3 > Assign No to > Bottom**.

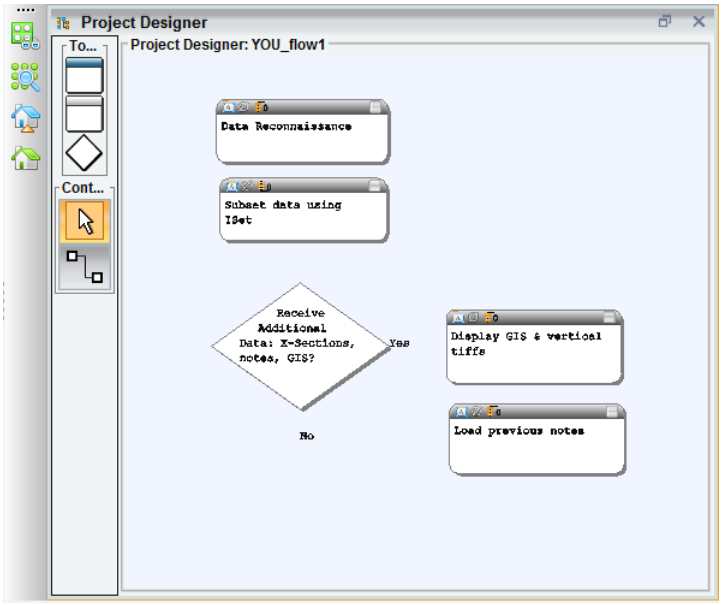




This indicates the direction to proceed if your decision is yes or no.

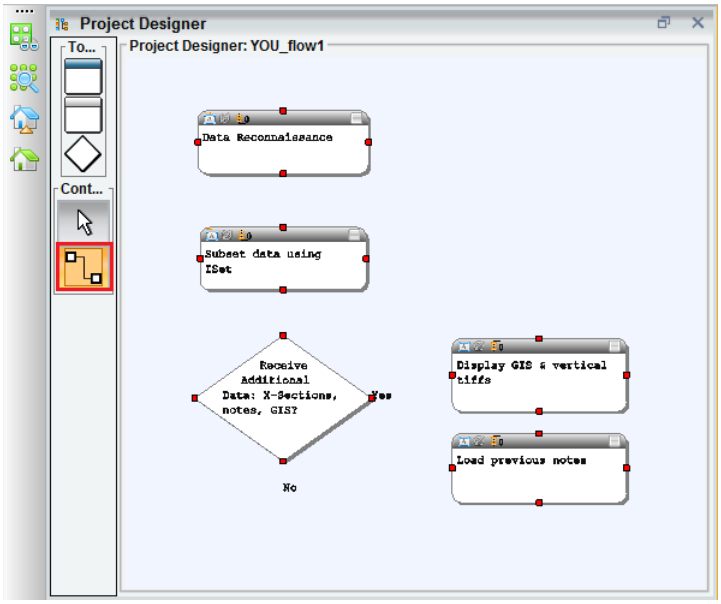
13. Drag-and-drop two more **Activity Boxes** into position next to Yes on the Decision Node. Enter "**Display GIS & vertical tiffs**" in the upper field and "**Load previous notes**" in the lower.

Your flow diagram should resemble the following image.



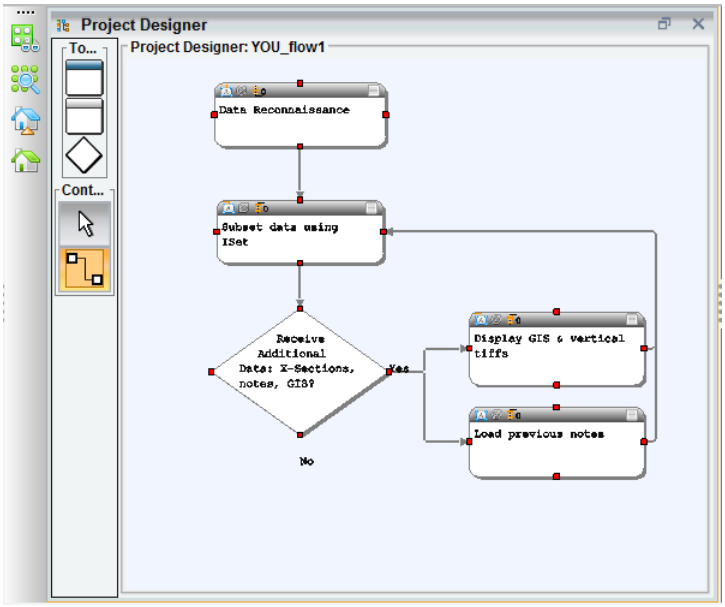
Next, you will connect these boxes.

14. Click the **Connect Objects** icon ( ) to activate Connector mode.



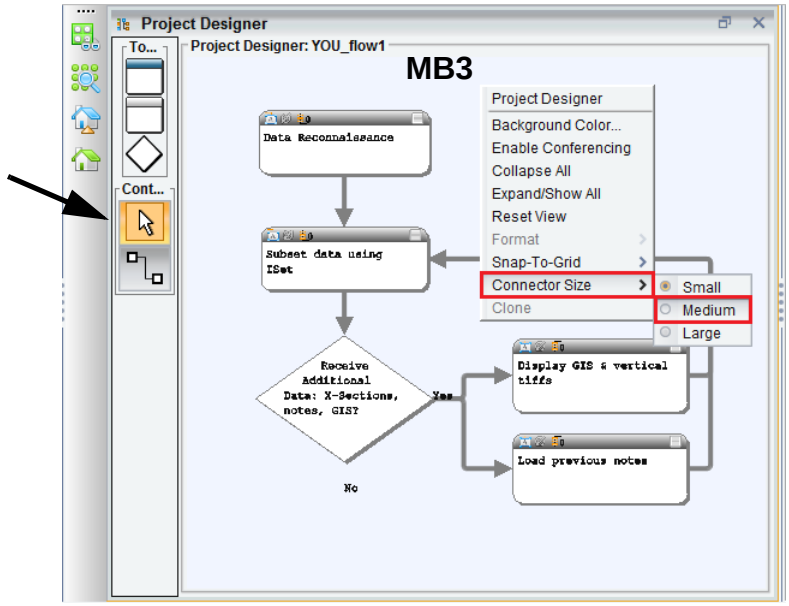
Red squares appear on the tool boxes, indicating all possible connector points. In the next few steps MB1-drag from one connector point to another to make connections.

15. Still in Connector mode, click **connector points** and **drag** to other connector points to make the connections shown below. The connector will snap when you release MB. If you make a mistake, you can remove a connector by **MB3 > Remove**.

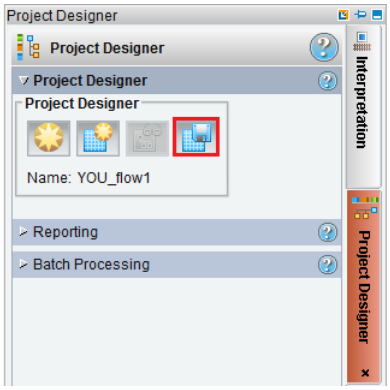


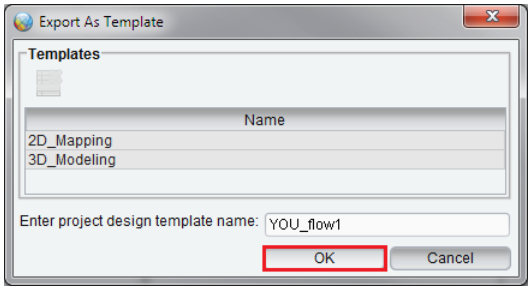
16. Click the **Select, Move, Resize** icon ( ) to exit Connector mode. On the view background, **MB3** to reveal the Project Designer pop-up menu, which will allow you to change several display settings. Experiment with changing the connector size. Other options include changing the background color, snapping the boxes

to a grid, and cloning a currently selected box.



17. Click the **Export As Template** icon ( ) in the *Project Designer* task pane to save the Project Design. (You might need to scroll to the right to see the icon.) You can change the name if you wish. Click **OK**.

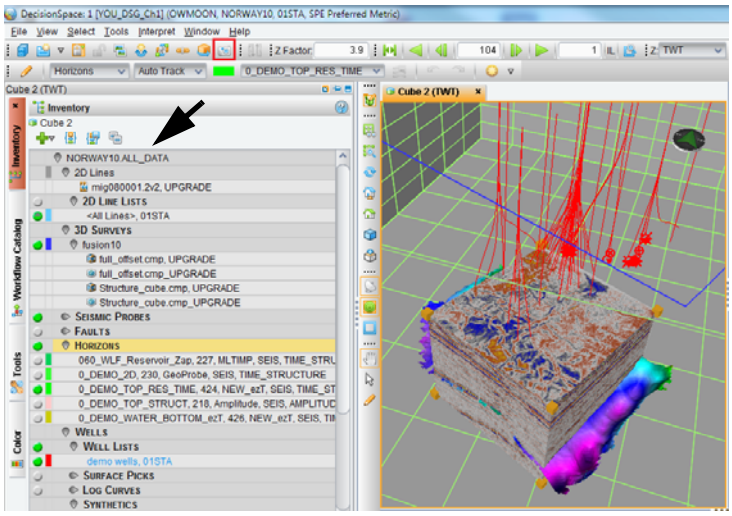




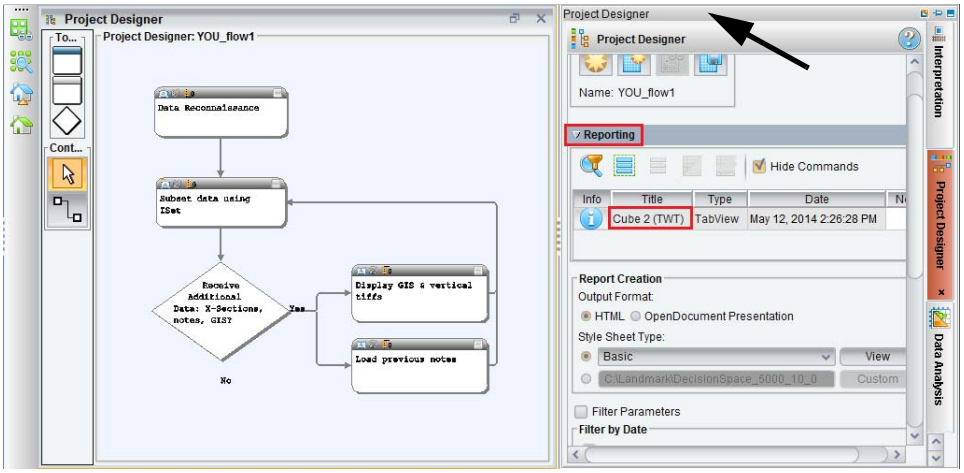
As you move through the remaining steps of the workflow, you will add screen shots of your work. For now, you will add a picture of your *Cube* view into the Data Reconnaissance Activity Box.

18. Restore your Project Designer view so you see the three tiles. Click the ***Cube*** tab to make it active. In the *Inventory*, show a **Box Probe**, **Horizons > 0_DEMO_TOP_RES_TIME**, and **Well Lists > demo wells**. Other objects should be hidden.

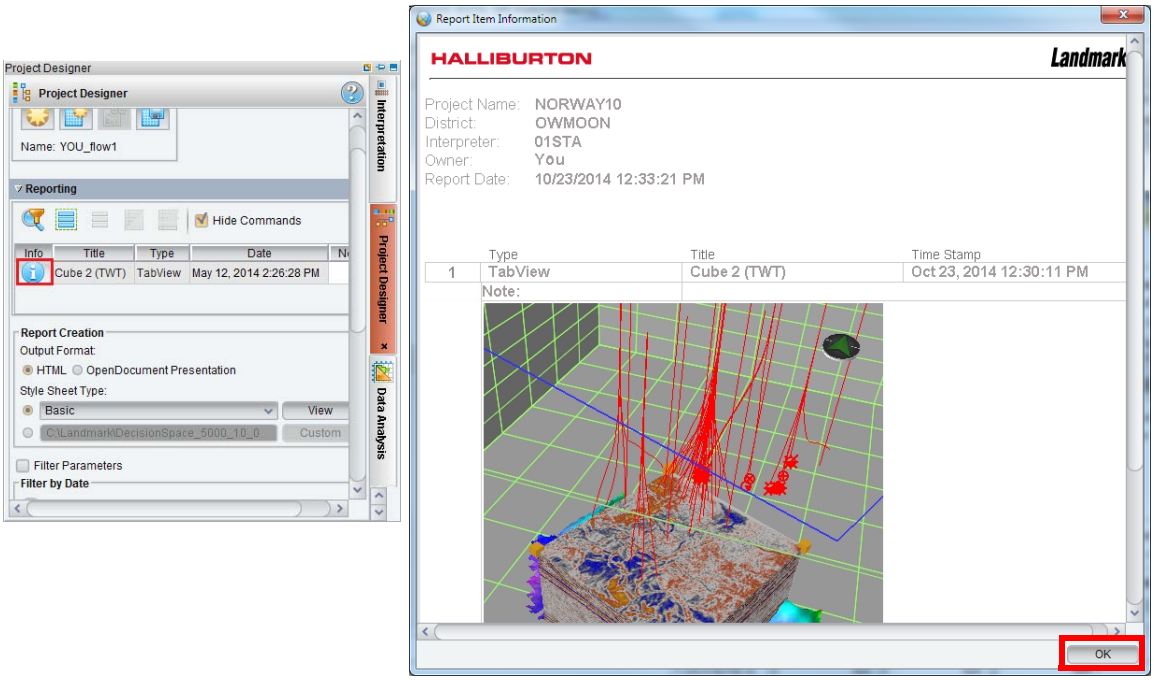
19. In the upper icon toolbar, click the **Add to Report** icon (), then click the ***Cube*** view. This will capture the image of your *Cube* view. Click the **Add to Report** icon again to exit the capture mode.



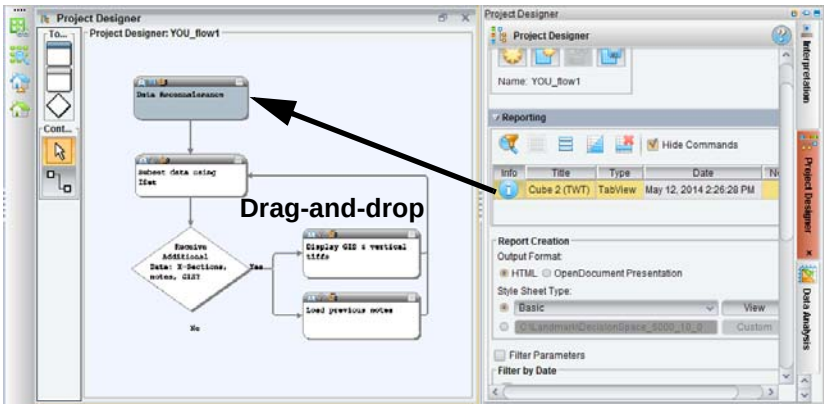
20. Click the ***Project Designer*** tab to make that view active. In the Project Designer task pane expand the Reporting panel. Notice the list entry entitled Cube 2; this is your captured image. You can take as many pictures as you like and they will be added to this list.



21. Click the **Info** icon ( ) in the first column of this row. A *Report Item Information* window will open, containing the image and information about it. Click **OK** to dismiss this window.



22. Drag-and-drop the **Cube 2** screen shot into the Data Reconnaissance Activity box. The box will turn blue, indicating the Activity is in progress and a 1 will be noted at the top.



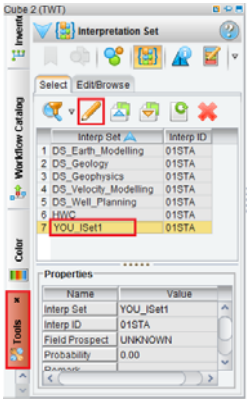
The above steps showed you how to initiate and add to your flowchart. If you wish, you can complete this next section to better understand how you can add additional tools and controls to your flowchart.

Recording ISet Work in the Project Designer

The following exercise assumes you have completed exercise 2.1 that builds an ISet, though any of the listed ISets will work.

To record the workflow of building your ISet, reinitialize the ISet.

23. Activate ***Cube*** view. Select the ***Tools*** tab and confirm Interpretation Set configuration. Select your **ISet** from the list under the Select tab and click the **Edit/Browse** icon ( ).



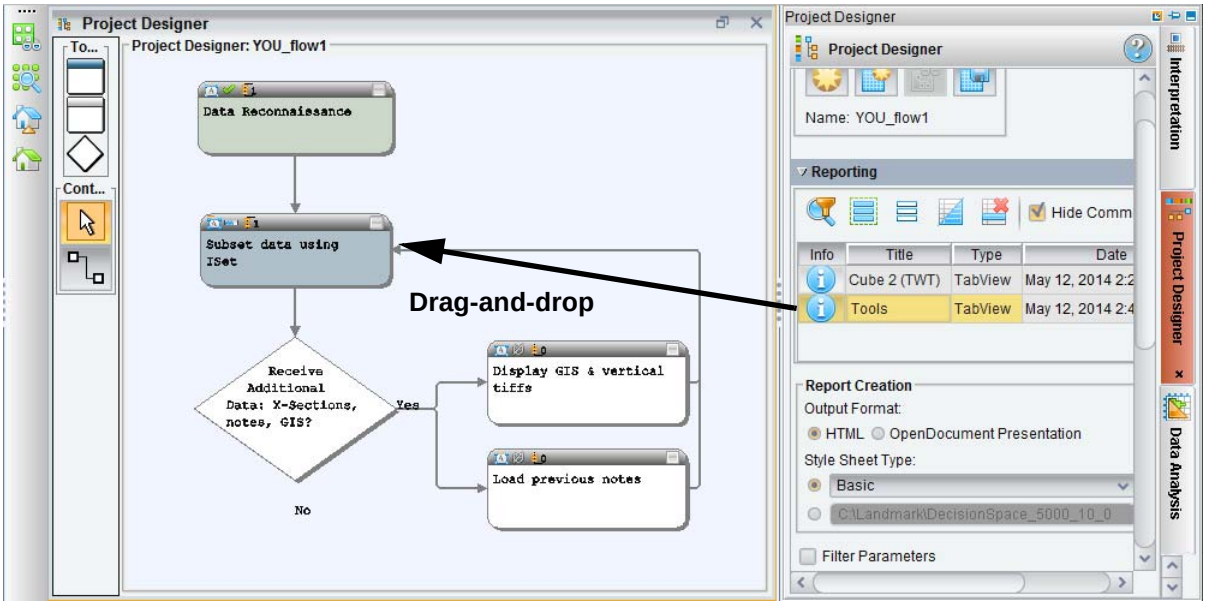
24. In the main menu bar, click the **Add to Report** icon ( ). In this mode you can capture any view or task bar. Move the mouse over the Tools task pane. Note that the pane changes to a shaded pattern. Click this **shaded pattern** to make a screen capture of that area. Click the **Add to Report** icon again to halt screen capture mode.

25. Return to the ***Project Designer*** tab (view) and the *Project Designer* task pane. In the Data Reconnaissance activity box, **MB3 > Complete**.

The Activity Box should turn green to indicate a completed event.

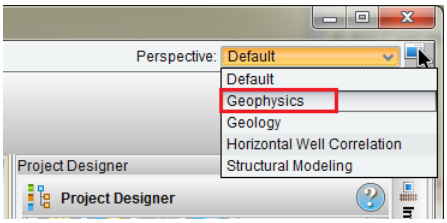
26. From the Reporting section of the *Project Designer* task pane, drag the screen shot entitled **Tools** and drop it into the **Subset Data**

using ISet Activity Box. It will show one report and turn blue (indicating a step In Progress).

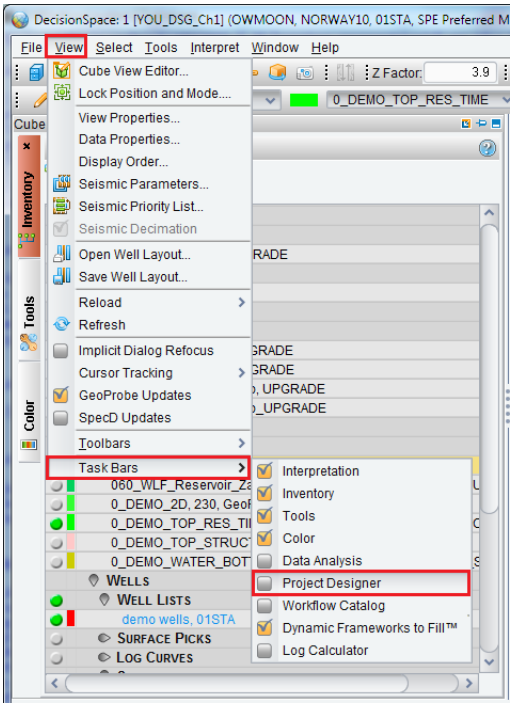


You can optimize the task bar user interface to add the Project Designer.

27. In the upper right of the main window, set Perspective to **Geophysics**, if it is not already set. From the menu bar, select **View > Task Bars > Project Designer**.



Toggle **on** the Project Designer task bar.



Appendix B
Hardcopy with Print Preview

The Print Preview functionality is in the *Tools* task pane of *Map*, *Section*, and *Correlation* views. (Note that it is not available in *Cube* view. We'll discuss this later.) With this functionality you can:

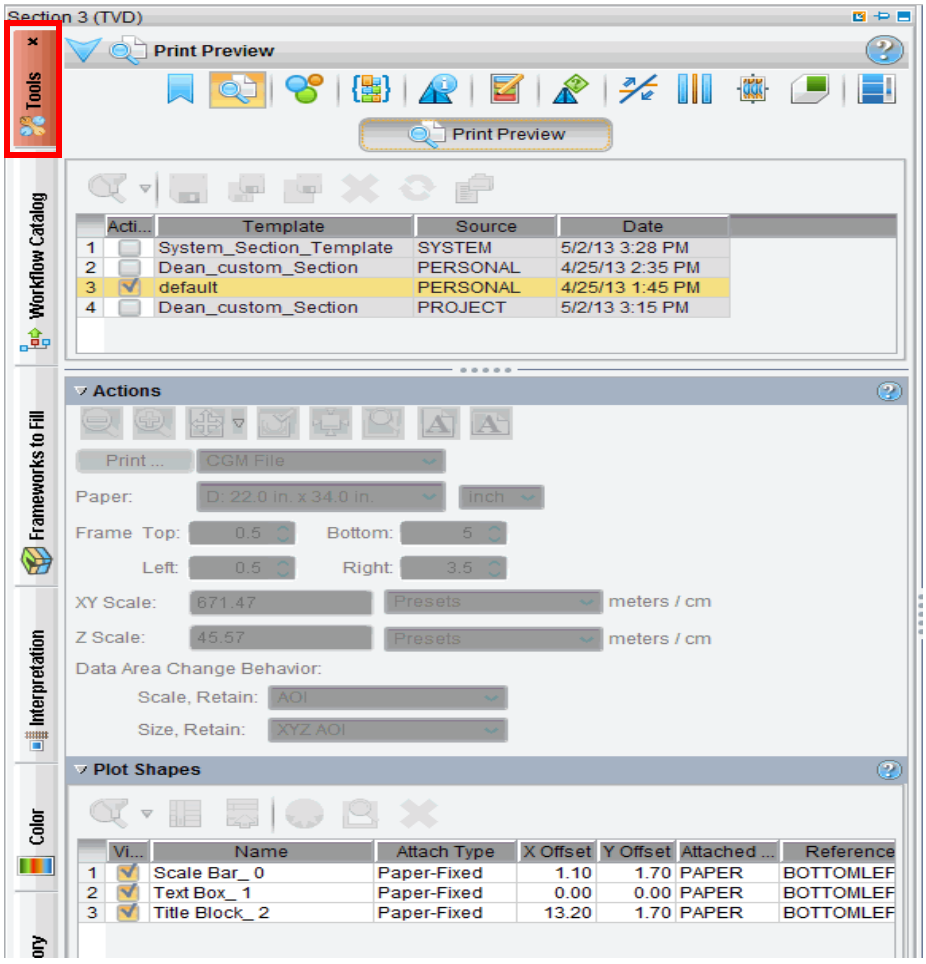
- Create and save templates that contain the information you want in a plot.
- Import a template into a project.
- Select and edit plot shapes including title boxes, text boxes, scale bars, borders, and color bars.
- Set frame dimensions, scales, and data area behaviors.
- Select paper fit, plot orientation, and advanced plot properties.
- Customize or select paper sizes.
- Integrate the CGM Montage Tool into your work.
- Determine the kind of plotter to be used, such as CGM Files, PDF File, CGM Montage, and ZEH Server.

Accessing Print Preview

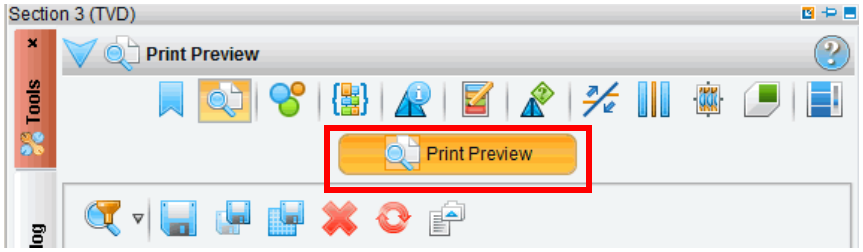
To access Print Preview, perform one of the following procedures:

- Select **File > Print Preview** from the main menu in a ***Map***, ***Section***, or ***Correlation*** view.
- Choose the **Print Preview** ( ) in the main toolbar.
- Click the ***Tools*** tab on the side of a window. You will then select the **Print Preview** icon

When you open the **Print Preview** dialog, note that the *Tools* task pane is visible.



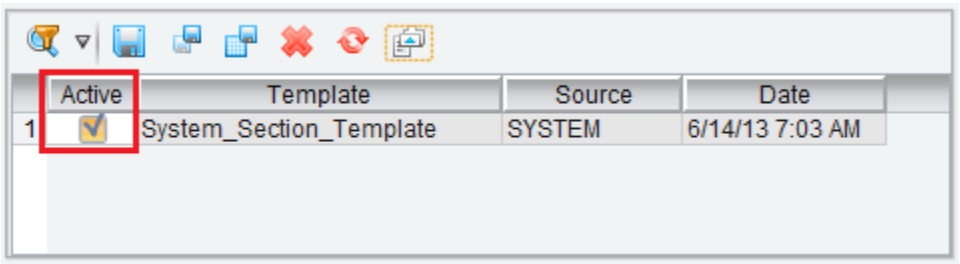
Click the **Print Preview** button at the top of the *Tools* task pane to activate the Print Preview functionality. The button will turn orange to indicate it is activated.



Using Templates

Directly beneath the **Print Preview** button (shown in the foregoing image), you can select a template that will contain the information and plot shapes that you will submit to a plotter or printer.

1. Check the **Active** box next to a template you want. Templates contain the information and plot shapes you select for your hardcopy plot.



By default, you will receive at least one template, depending on the current view associated with the Print Preview function:

- System_Section_Template—with a Source of SYSTEM for *Section* view (see above)
- System_Map_Template—with a Source of SYSTEM for *Map* view
- System_Correlation_Template—with a Source of SYSTEM for *Correlation* view
- default—with a Source of PERSONAL (optional)

Source indicates you can save these templates in different locations on your system. Project is a third Source. The Sources are mapped as follows:

PERSONAL: C:\Users\hbl2816\Landmark\DecisionSpace\templates\plot\HCPersonalTemplates\default.sec for *Section* view (and default.cor for *Correlation* view and default.map for *Map* view.)

PROJECT: …\OW_PROJ_DATA\OWPROJ\HCProjectTemplates*.sec for *Section* view (and *.cor for *Correlation* view and *.map for *Map* view.)

SYSTEM: C:\Landmark\OpenWorks\DecisionSpace5000.10\config\HCSystemTemplates\System_Section_Template.sec for *Section* view (and System_Correlation_Template.cor and System_Map_Template.map).

Text box templates (.tbt) location: C:\Users\hbl2816\Landmark\DecisionSpace\templates.

Template Actions

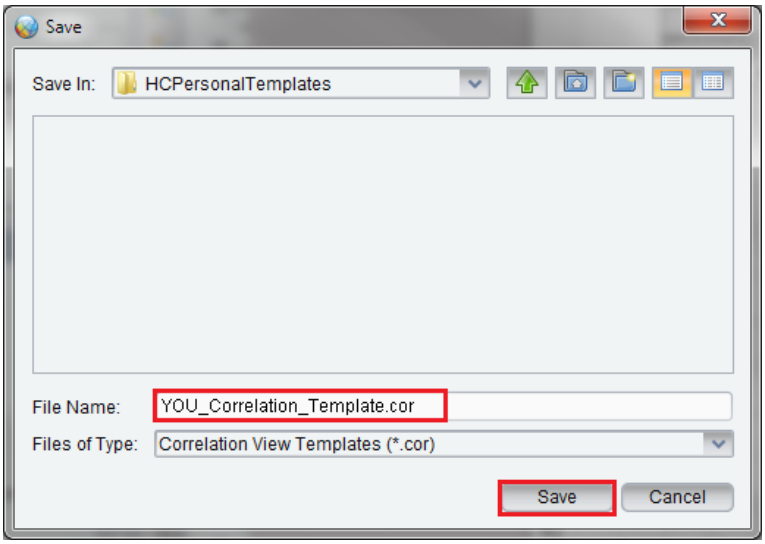
Save an Active Template

1. Click the **Save Template** icon ( ).

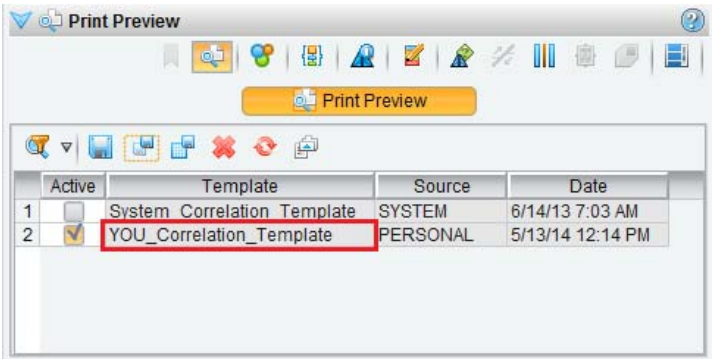
Save an Active Template as a New Template

1. Click the **Template Save As** icon ( ). The *Save* dialog appears.

2. Enter a **filename**. Click **Save**.



3. The new template name appears in the Template list.



Save an Active Template as the Default

1. Highlight the **template name**.
2. Click the **Template Save As Default** icon ( ).
3. In the next session the software will highlight the template name as the default.

Delete a Template Name from the List

1. Highlight the **template name**.
2. Click the **Delete** icon ( ).

Reload a Template and Discard Changes

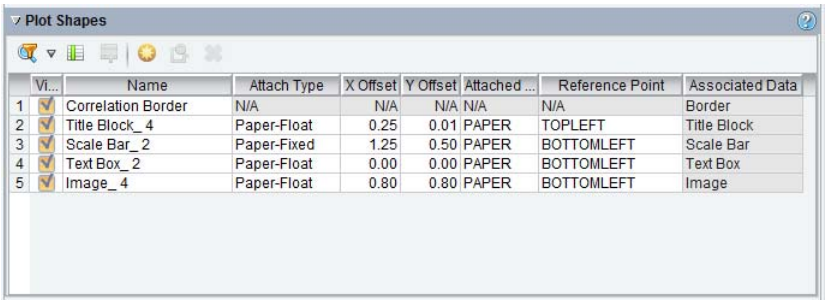
1. Highlight the **template name**.
2. Click the **Reload Template** icon ( ).
3. The software undoes any changes in memory.

Import a Template into Your Project

1. Click the **Import** icon ( ). The **Open** dialog appears.
2. Navigate and select a **file name** with the appropriate extension (.map, .section, or .correlation).
3. Click **OK**. The file name appears in the **Templates** panel. The **Source** is marked **PROJECT** in the list.

Using Plot Shapes

The **Plot Shapes** panel is available in the **Print Preview** task pane. In the **Plot Shapes** panel you can select plot shapes you want in your templates. The shape list can vary slightly based on the current view.



	Vi...	Name	Attach Type	X Offset	Y Offset	Attached ...	Reference Point	Associated Data
1	☑	Correlation Border	N/A	N/A	N/A	N/A	N/A	Border
2	☑	Title Block_ 4	Paper-Float	0.25	0.01	PAPER	TOPLEFT	Title Block
3	☑	Scale Bar_ 2	Paper-Fixed	1.25	0.50	PAPER	BOTTOMLEFT	Scale Bar
4	☑	Text Box_ 2	Paper-Float	0.00	0.00	PAPER	BOTTOMLEFT	Text Box
5	☑	Image_ 4	Paper-Float	0.80	0.80	PAPER	BOTTOMLEFT	Image

Attach Type (Column Definition)

Float: This plot shape is positioned as a % of the paper size. Changes to paper size retain the %, but may change the actual spacing.

Fixed: The plot shapes are positioned at a fixed distance, in paper units. Changes to the paper size do not matter. The distance is retained.

Map, *Section*, and *Correlation* views share the same plot shapes:

- Scale bar
- Text box
- Title Box
- Border
- Color Bar
- Image

In addition, a *Map* view has a north arrow.

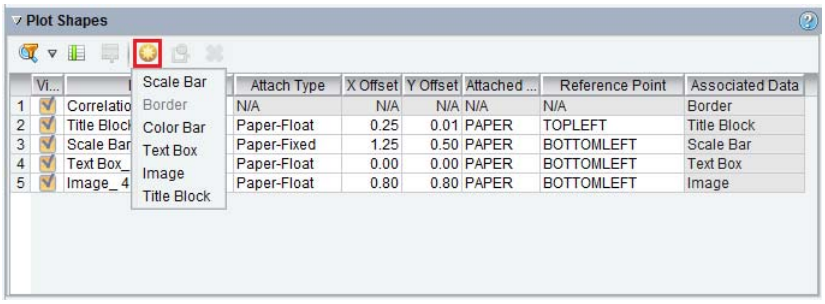
In most cases, at the start of a session, the Scale Bar, Text box, and Title box plot shapes are listed in the panel and marked as **Visible**. These plot shapes appear in the active template as soon as you turn on **Print Preview**. You can turn off any of these by deselecting the **Visible** box.

Plot Shape Actions

Add and Create Plot Shape

1. Click the **Create** icon ( ).

2. Select a **Plot Shape** from the pull-down menu.



The plot shape appears in the view. You can select the same kind of plot shape more than once; if you do, sequential numbers are attached to its name.

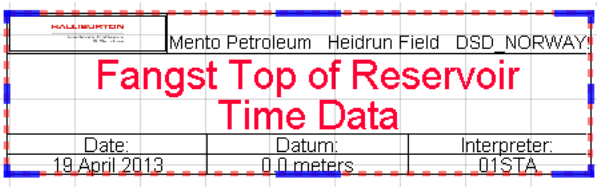
Delete a Plot Shape

1. Highlight the **name** of a plot shape.

2. Click the **Delete** icon ( ). The plot shape name is removed from the list.

Move a Plot Shape

1. Click the **Plot Shape**. A dashed blue-and-red border appears around the plot shape (see image below).



2. Put your **cursor** close to the border.

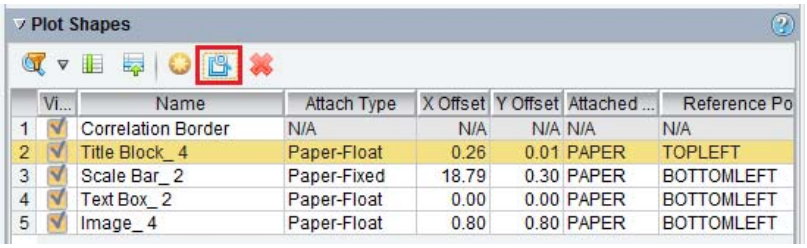
3. When the cursor becomes a cross-hair, **MB1-drag** the **Plot Shape** to a new position.

Resize a Plot Shape

1. Click the **Plot Shape**.
2. Put your **cursor** close to the plot shape border; a double arrow appears.
3. **MB1-drag** to resize the **Plot Shape**.

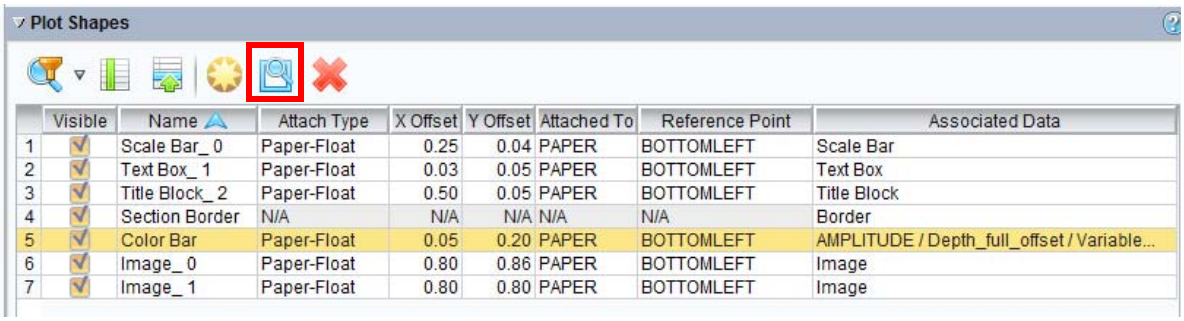
Edit a Plot Shape

1. Click the **Plot Shape**.
2. A red-and-blue dashed border outlines the selected **Plot Shape**.
3. With your cursor over the Plot Shape, **MB3 > Properties**.



	Vi...	Name	Attach Type	X Offset	Y Offset	Attached ...	Reference Po
1	☑	Correlation Border	N/A	N/A	N/A	N/A	N/A
2	☑	Title Block_ 4	Paper-Float	0.26	0.01	PAPER	TOPLEFT
3	☑	Scale Bar_ 2	Paper-Fixed	18.79	0.30	PAPER	BOTTOMLEFT
4	☑	Text Box_ 2	Paper-Float	0.00	0.00	PAPER	BOTTOMLEFT
5	☑	Image_ 4	Paper-Float	0.80	0.80	PAPER	BOTTOMLEFT

Alternatively, you can highlight the **row** that contains the Plot Shape name and click the **Set Plot Shape Properties** icon in the Plot Shapes menu bar.



	Visible	Name	Attach Type	X Offset	Y Offset	Attached To	Reference Point	Associated Data
1	☑	Scale Bar_ 0	Paper-Float	0.25	0.04	PAPER	BOTTOMLEFT	Scale Bar
2	☑	Text Box_ 1	Paper-Float	0.03	0.05	PAPER	BOTTOMLEFT	Text Box
3	☑	Title Block_ 2	Paper-Float	0.50	0.05	PAPER	BOTTOMLEFT	Title Block
4	☑	Section Border	N/A	N/A	N/A	N/A	N/A	Border
5	☑	Color Bar	Paper-Float	0.05	0.20	PAPER	BOTTOMLEFT	AMPLITUDE / Depth_full_offset / Variable...
6	☑	Image_ 0	Paper-Float	0.80	0.86	PAPER	BOTTOMLEFT	Image
7	☑	Image_ 1	Paper-Float	0.80	0.80	PAPER	BOTTOMLEFT	Image

Changing Display Properties for Plot Shapes

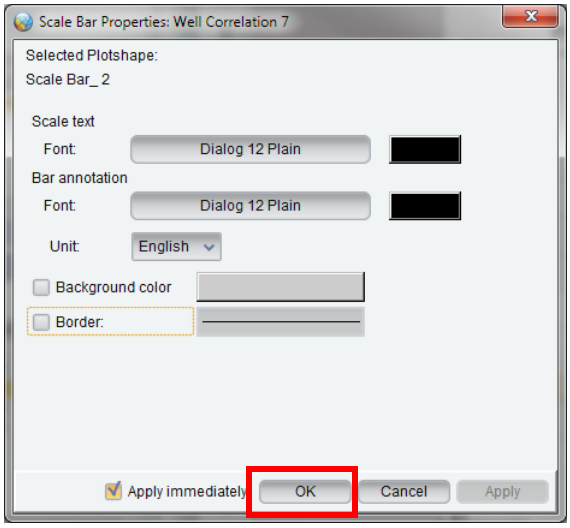
In this section you will learn how to change the display properties of several plot shapes.

Text and Scale Bar Annotation

Selecting Scale Text

To select scale text, follow these steps.

1. Click the button next to font.
2. Select the font, its style, and size from the resulting **Select Font** dialog.
3. View in the Preview sub-panel.
4. Click **OK** in the **Select Font** dialog.
5. Click OK in the **Scale Bar Properties** dialog.



Choosing Color for Text and Scale Bar Annotation

To choose a color for the text and scale bar annotation follow these steps.

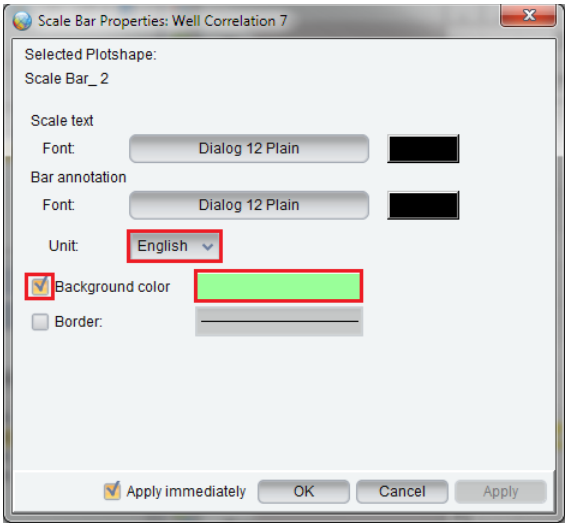
1. Click on the **color swatch** next to each category.
2. Select a swatch in the **Select a color** dialog.
3. Click **OK** in the **Select a color** dialog.
4. Click **OK** in the **Scale Bar Properties** dialog.

Set the Scale Bar Annotation

To set the scale bar annotation, follow the instructions for Choosing Color for Text and Scale Bar Annotation (above).

Choosing Units

1. On the pull-down menu choose **English** or **Metric**.

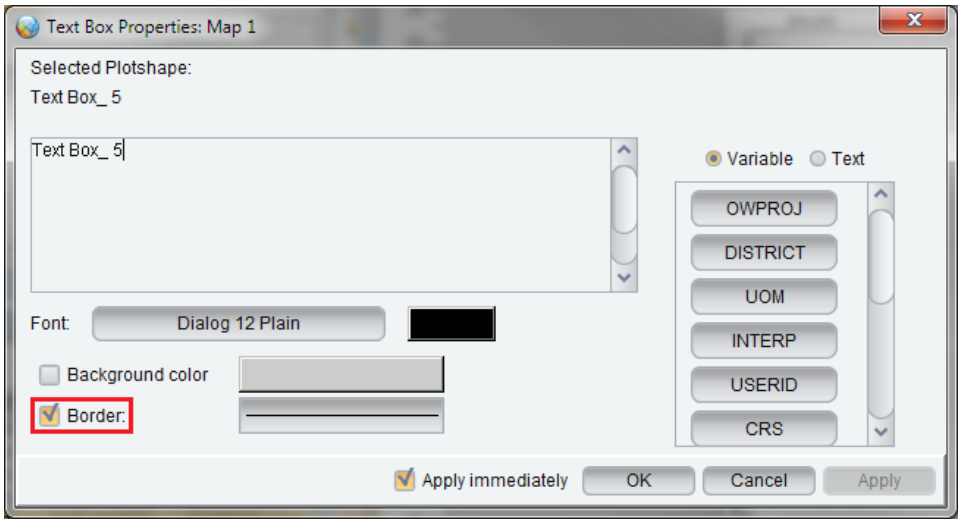


Setting Background Color

1. Check the **box** to see a background color.
2. Click on the **swatch** to open the **Select background color** dialog.
3. Select a **color**.
4. Press **OK** in the Color dialog. The color swatch you chose displays in the **Scale Bar Properties** dialog.
5. Click **OK** in the **Properties** dialog.

Choosing a Border

1. First select the text box then click on **Set Plot Shape Properties** icon. On the *Text Box Properties* dialog, check the **Border** box to display a border around the Scale bar.



Entering Text

1. In the panel at the top of the dialog, type the wording you want to display (see image above).

Choosing Font

1. Click on the button next to **Font**.
2. Select the font, style, and size from the **Select Font** dialog.
3. View in the Preview sub-panel.
4. Select **OK** in the **Select Font** dialog.
5. To select a color for the font, click the color swatch in the **Font** row.
6. Select a swatch in the **Select a color** dialog. Click **OK**.
7. Click **OK** in the **Text Box Properties** dialog.

Turning on Background Color

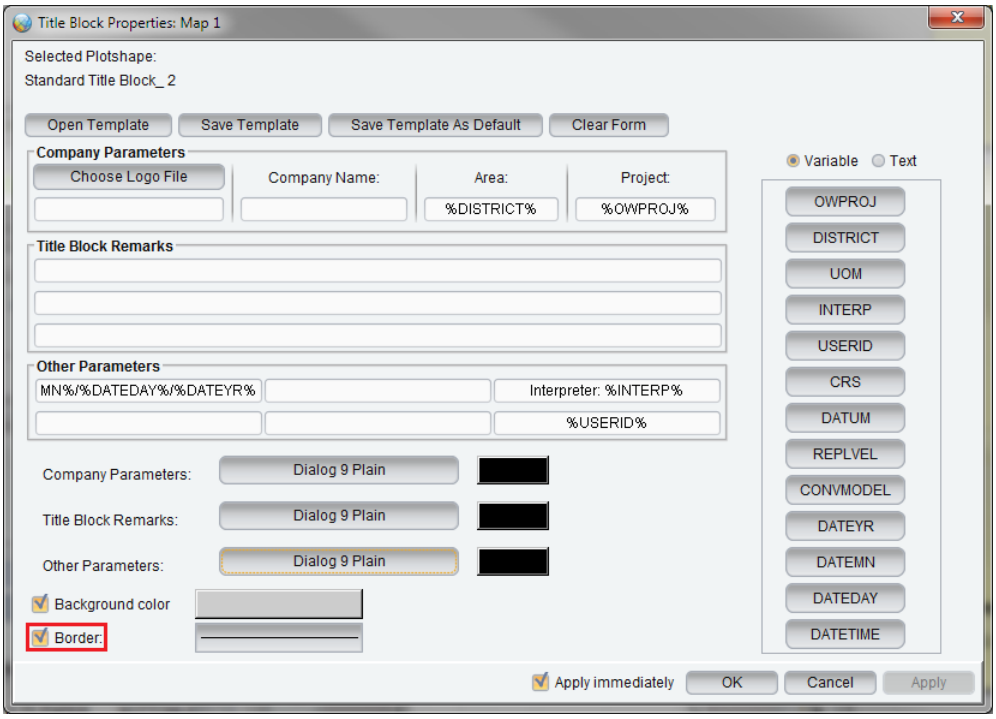
1. To turn on a **Background Color**, check the box.

2. To select a color for the background, click on the swatch and select a color as instructed directly above.

Choosing a Border

The *Properties* dialog for the Title Block plot shape is used in the example below.

1. Select the **Border** check box to see a border around the Text Box.



Text Fields

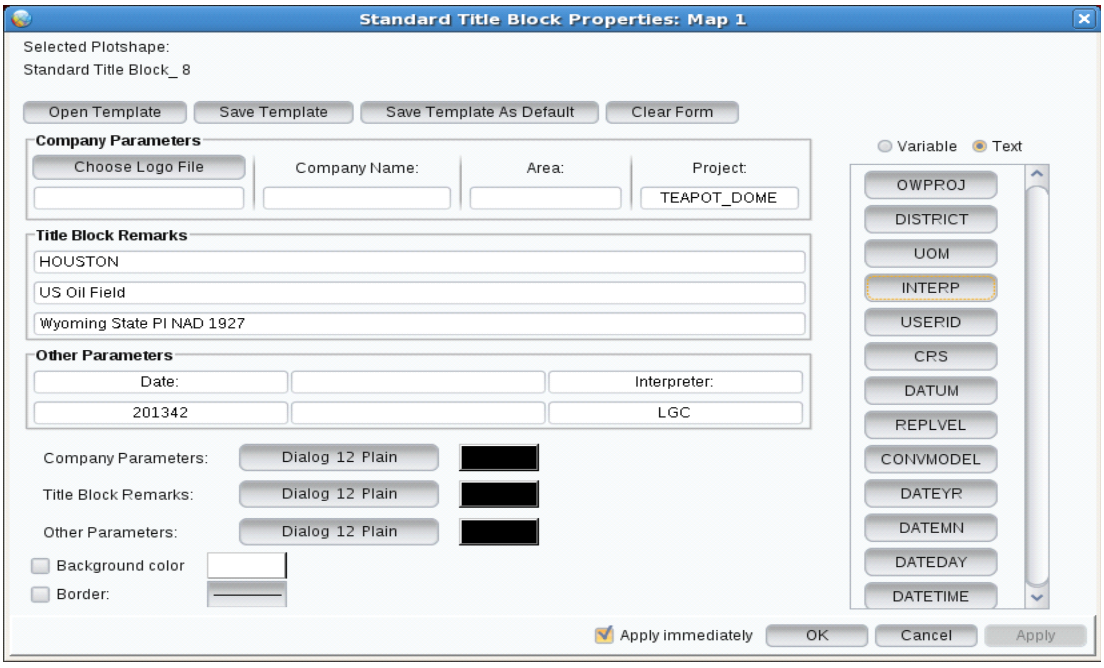
1. Place your cursor in a text field of Other Parameters.

2. With **Variable** toggled on, click a **button**. The variable appears in the text field, as shown below. At the same time, the text in the **Title Box** updates dynamically, as it pulls information from the current environment.

The following table contains definitions of variables in the title block.

Name	Set to the current...
%OWPROJ%	OpenWorks project name
%DISTRICT%	OpenWorks district name
%UOM%	Session measurement system
%INTERP%	OpenWorks interpreter
%USERID%	Login user ID
%CRS%	Cartographic reference system
%DATUM%	Project datum
%REPLVEL%	Replacement velocity
%CONVMODEL%	Current velocity model set for domain conversion
%DATEYR%, %DATEMN%, %DATEDAY%	Year. Month, Day
%DATETIME%	Time (Hour, minute)

3. Toggle on **Text** and click one of the buttons on the right. The text field displays the information in the form below. The software updates the information in the template.

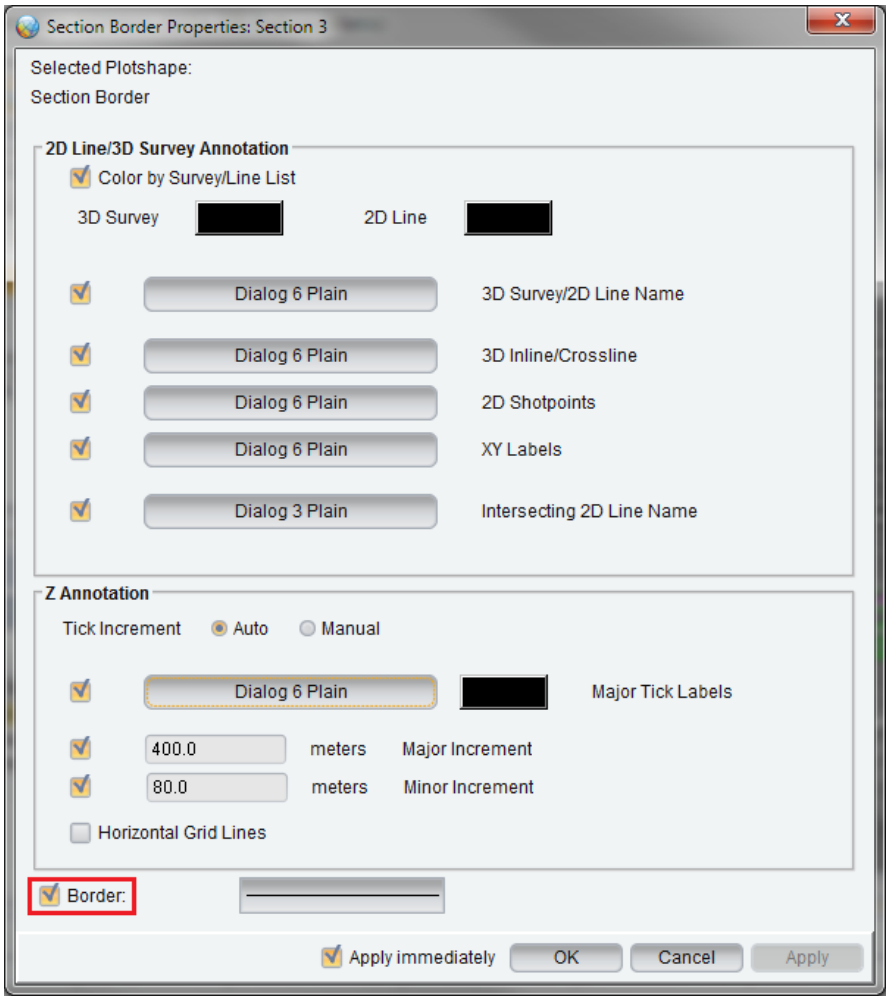


4. You set all **Parameters** fonts and their style, size, and color in the same way you set them for Text Box and Scale Bar shapes.

5. For a Background color, check the box and click the swatch to select a color.

Specifying Border Style

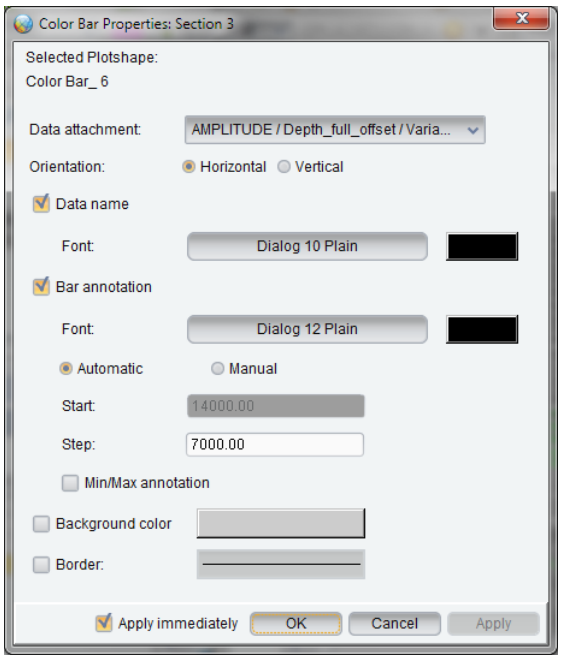
1. You can specify border color, width, and style by selecting the **Border** check box and clicking the line box next to it.



2. Make Border annotation property changes as you see fit.

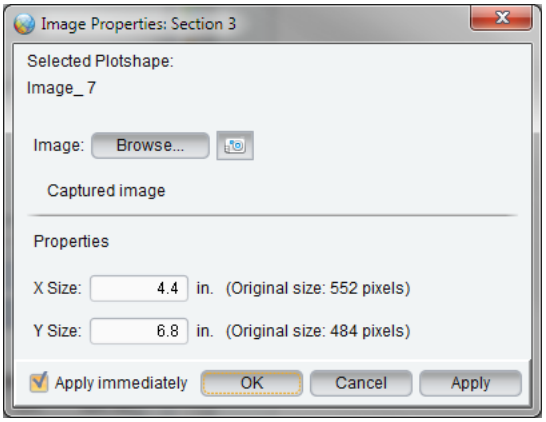
Changing Color Bar Properties

1. Make changes in the *Color Bar Properties* dialog to suit your need.



Changing Image Properties

1. Make changes in the *Image Properties* dialog to suit your need.



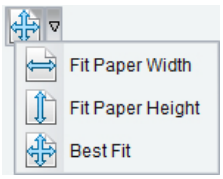
Using the Actions Panel

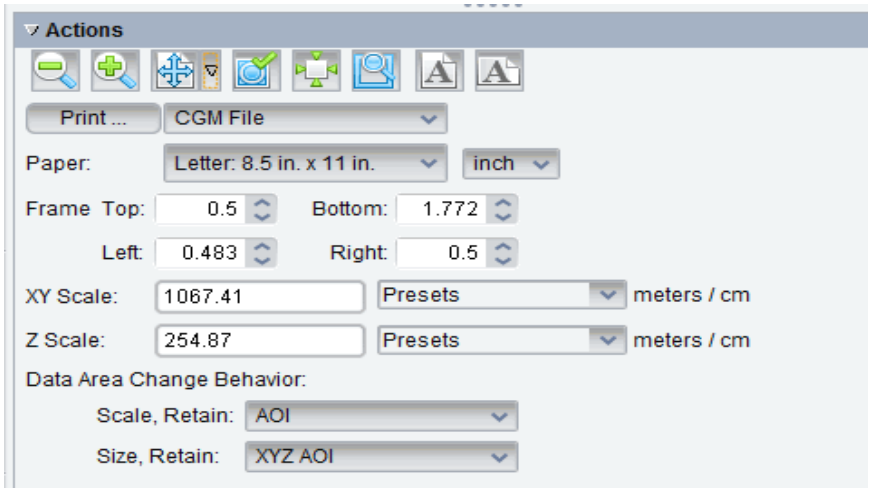
You can open the **Actions** panel from the **Print Preview** task pane. On the **Actions** panel you can:

- Determine the kind of printer and plotter that will be used.
- Select paper size.
- Choose Frame dimensions.
- Set X, Y, and Z Scales (*Map* view displays only an X, Y Scale)
- Determine the **Data Area Change Behavior**, including AOI.

Icons on the Actions panel enable you to perform various tasks.

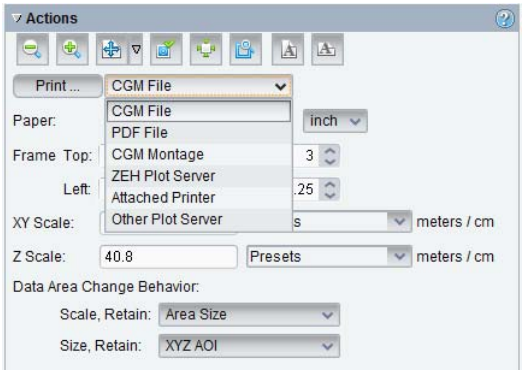
- Zoom the display in ( ) and out ( ).
- Select a fit ( ) pull-down menu: width ( ), height ( ) or best fit ( ).
- Restore template AOI ( ).
- Restore template scale ( ).
- Choose Advanced Plot Properties ( ).
- Set a Portrait ( ) or Landscape ( ) Orientation.





Determine the kind of Plotter or Printer or File

1. Click the pull-down menu next to the Print button to select the kind of plotter or printer or file to be used (CGM File, PDF File, CGM Montage, ZEH Server, Attached Printer, or Other Plot Server).



Note:

If you choose **Attached Printer**, it will print directly to the printer chosen from the list of printers that are attached to your system without generating a saved print file.

The files are stored at:

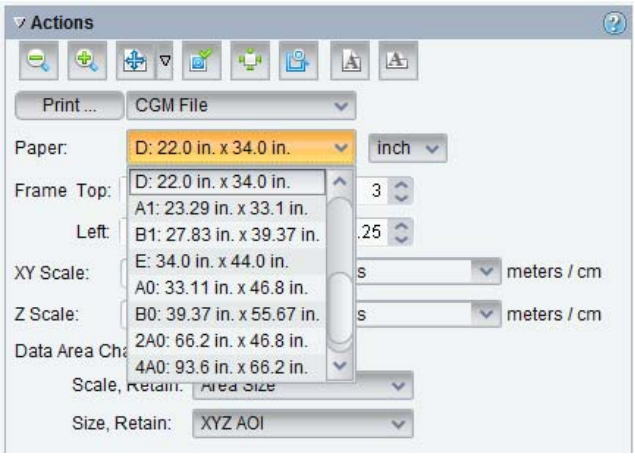
C:\Users\hbl2816\Landmark\DecisionSpace\PrintPreview.

Selecting a Paper Size

1. Click the button next to **Paper** and select paper size from the pull-down menu, or customize it in either inches or millimeters.

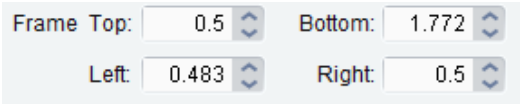
The choices listed in the menu depend on whether you have chosen **inch** or **mm** in the pull-down menu that is associated with the second button on the **Paper** row (image below).

The annotation in the template changes according to the measurement system you choose. The figure below shows the English (inch) measurement system.



Choosing Frame Dimensions

To position a data display in a template, adjust the Frame dimensions. Use the arrow keys in the Top, Bottom, Left, and Right text fields to adjust the display in the template.

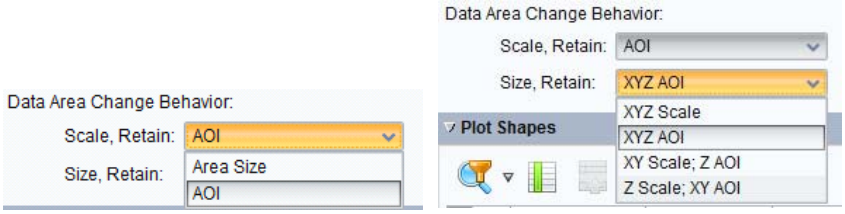


Adjusting Scale

When you display a *Section* or *Correlation* view, values for X, Y Scale and Z Scale appear in the first text field next to those categories (image below). Note that *Map* view displays only an X, Y Scale. You can type in a new value, or, to select a round number quickly, select from the Presets pull-down menu.

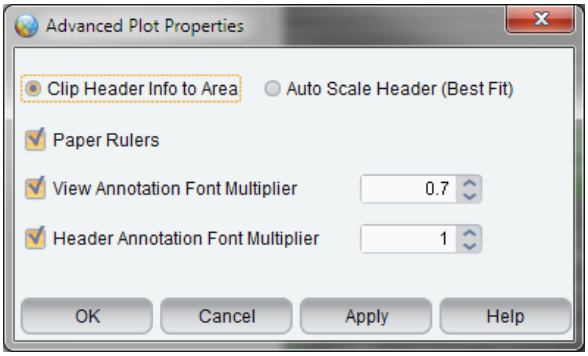
Data Area Change Behavior

In this section of the Actions panel, you can choose to retain Size and Scale as you make changes in the X, Y, Z scale fields.



Setting Advanced Plot Properties

1. You can access the *Advanced Plot Properties* dialog by clicking the **Advanced Plot Properties** icon ( ) in the **Print Preview Actions** panel.



   On the *Advanced Plot Properties* dialog you can set the following values.

   - Clip Header Info to Area
   - Auto Scale Header (Best Fit)
   - Paper Rulers
   - View Annotation Font Multiplier
   - Header Annotation Font Multiplier

2. Click **Apply** or **OK** when you have made your choices.

3. In the pull-down menu next to the **Print...** button, choose a printer or plotter.

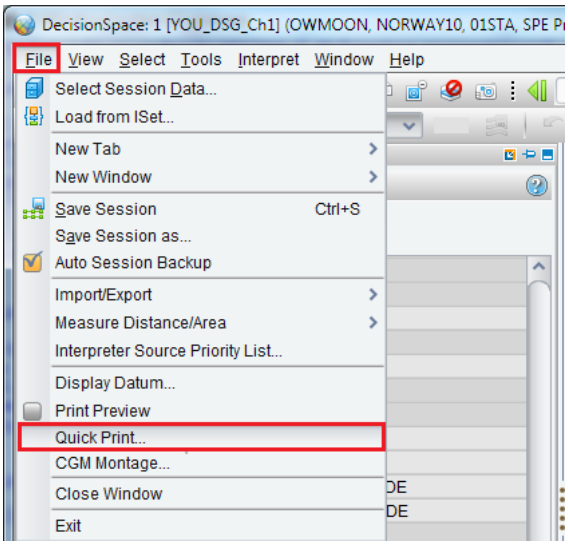
4. When you have the full print parameters defined, press the **Print...** button.

Using the Quick Print Option

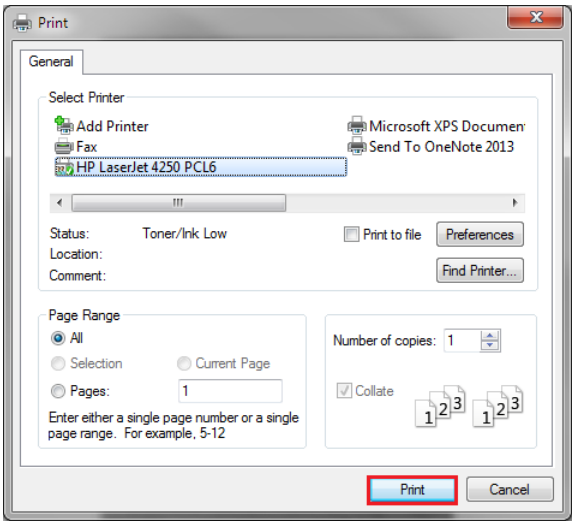
This option is in the DecisionSpace main menu. It sends window captures to a selected printer that is connected to your computer.

1. Activate a view.

2. Select **File > Quick Print…** on the main menu.



3. On the **Print** dialog, select a printer.



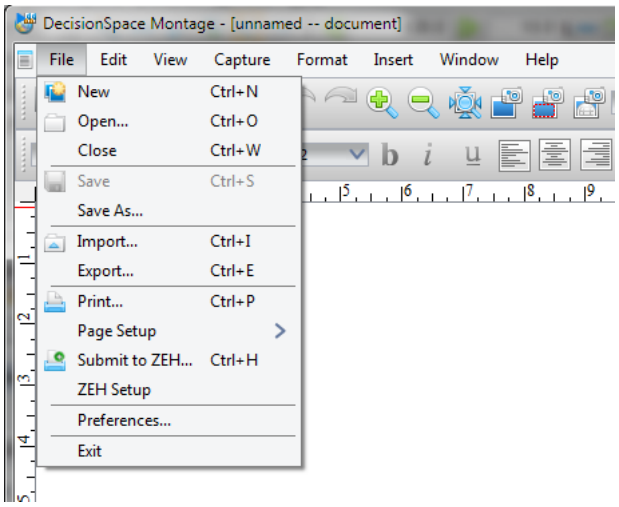
4. Click **Print**.

Creating a Montage

You can access ZEH Montage Professional for use in viewing and montaging CGMs. For more information, see the Getting Started Guide and Release Notes in the ZEH directory of your DecisionSpace installation. See: C:\Landmark\DecisionSpace_5000_10_0\Zeh

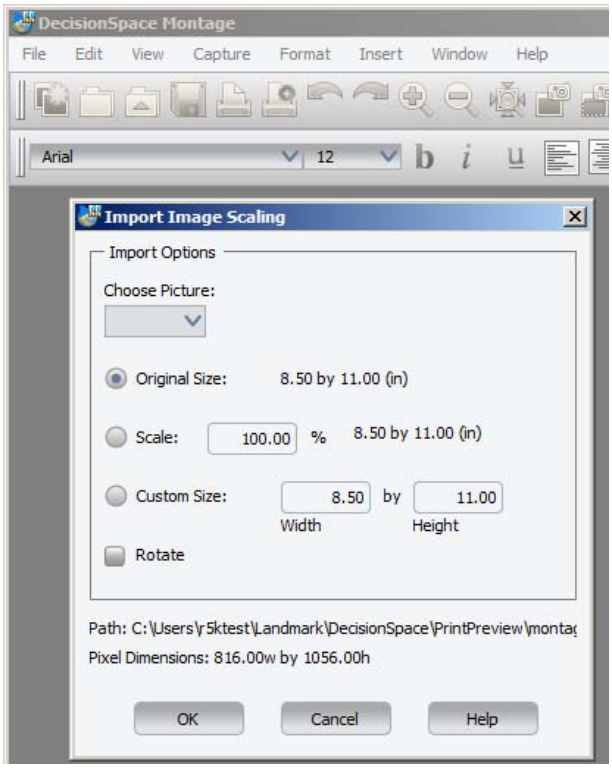
Two Ways to Create a CGM Montage

- In the main DecisionSpace window, select **File > CGM Montage...** to launch the *DecisionSpace Montage* (ZEH) window. Go to **File > New** to launch your canvas size (you can resize the canvas by selecting **File > Page Setup > Resize Canvas…**). Then, **File > Import** your .cgm files to arrange in your montage. A crosshair icon will mark your location on the window to place the .cgm. You can move and resize the .cgm file with **MB1**. When your montage is complete, go to **File > Save (As)** to save the montage as a .zmd file.



- In the **Print Preview** dialog, **Actions Panel**, choose **CGM Montage**, click **Print**, and provide a .cgm file name. Click **Save**. The *DecisionSpace Montage* (ZEH) window will open with the Import Image Scaling box. Click **OK**. Your .cgm file will be displayed. The .cgm will fill the canvas. Resize the canvas **(File > Page Setup > Resize Canvas**) and the original .cgm and then add more .cgm files to your montage. When your montage is

complete, go to **File > Save (As)** to save the montage as a .zmd file.



Plotcap Notes

In a past release you could submit directly to a plotter through the plotcap file.

VENDOR:SCRIPT-LOCATION:PLOTTER-NAME:FILETYPE

SDI:/home/sdi/pm_submit/bin/sdi_potfile:HP1055CM:cgm

In the past release, this was not honored on Windows.

Submit to Other Plot Servers

Sample plotcap file

VENDOR:SCRIPT-LOCATION:PLOTTER-NAME:FILETYPE

SDI:${SDI_BIN}/sdisubmit.exe –l ENG: HP 4000:cgm

SDI:"${SDI_BIN}/shared dir/submit.exe" –l ESP: HP 1050

SDI APEX is available only if the "{SDIROOT}/apsx/bin/apsx.exe exists.

Use **LGC_PLOTCAP_FILE** as an environment variable to point to the "plotcap" file. Use this first, then look in **$OWHOME/hardcopy**.

Notes:

Customers use the " to handle cases where the path name has spaces.

Add the –f filename and –p printername at the end of the executable name, and before remaining parameters in the executable column.

Environmental Variables

DS_PLOT_CGM_DIR points to the location for .cgm files to be saved.

LGC_PLOTCAP_FILE points to the location of the plotcap file. The default location is $OWHOME/hardcopy.

Notes:

Two maps are unlocked in Print Preview.

Templates save English or metric choice.

Can photo a cube and use as an image in Print Preview or Montage.

No importing PDFs into Montage.

Can export Montage as any format (can only save as .zmd).

Can choose from a multiple color bar image.