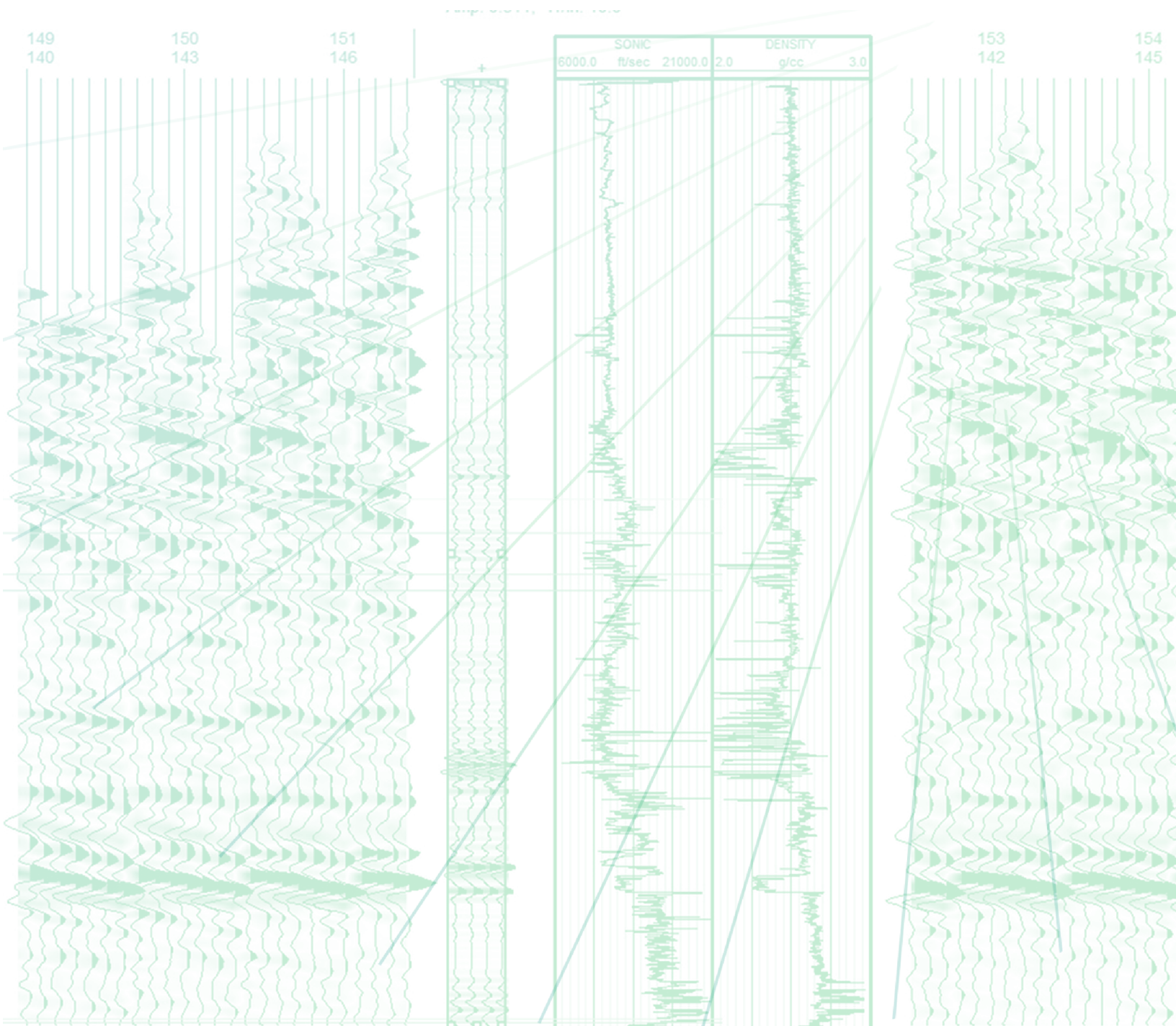


# GeoSyn 2D<sup>®</sup> 2020 User Manual

April 2020



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GeoSyn 2D ® 2020

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## About GeoSyn 2D

GeoSyn 2D is a two-dimensional seismic modeling program designed to quickly turn cross section depth models into pseudo seismic sections. With complete depth and time perspective, geoscientists have the ability to build structural and stratigraphic models using IHS Digital Logs or LAS files.

Multiple combinations of reservoir properties and geometries can produce the same seismic signature. Using GeoSyn 2D allows you to generate multiple scenarios of petrophysical changes in the subsurface and determine the relationship between seismic data and those subsurface changes.


Using GeoSyn 2D you can:

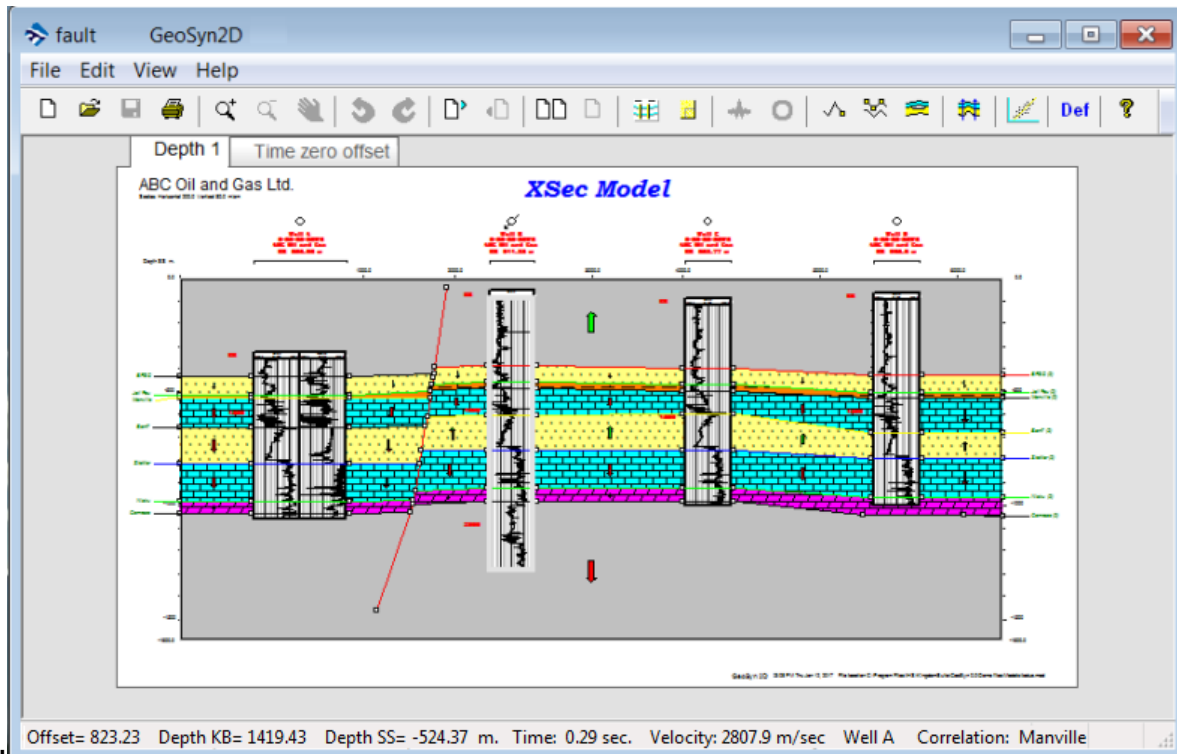
- Predict petrophysical and reservoir features of interest such as lithology, fluid composition, porosity from seismic data Predict petrophysical and reservoir features of interest such as lithology, fluid composition, porosity from seismic data.
- Understand the sensitivity of seismic data to lateral and vertical changes in lithology, fluid, and porosity along and in between wells Understand the sensitivity of seismic data to lateral and vertical changes in lithology, fluid, and porosity along and in between wells
- Automatically generate synthetic seismic response data from a geological model of well data.
- Compare the synthetic seismic response data to real seismic data with the assumption that a similarity in seismic response indicates similar underlying rock properties such as lithology, fluid, and porosity.

## Main display

The default view displays a single model with tabs that allow you to switch between depth and time. In version 2017 and later, both time and depth models can be displayed simultaneously in separate windows.







To view time and depth models in separate windows:

- From the tool bar, Click the dual windows button 
- From the menu, **View > Two pages**



**Note:** Depending on the complexity of your model, viewing both time and depth models simultaneously in AVO mode can impact performance. If you notice that your systems performance is reduced, switch back to the default single model view.

	Display time model.
	Display depth model.
	Display time and depth models in separate windows.
	Display single chart in primary window.
	Display parameters dialog, used to set display parameters for depth, time, wells, global parameters and map.
	Edit labels
	Edit Wavelet, allows user to edit wavelet properties and spectrum's.
	Port hole, captures the portion of the time model currently displayed in the resulting Port Hole window.

	Create a new correlation
	Edit correlations / nodes
	Edit zone parameters
	Create well correlations automatically.
	Crossplot wizard
	Set default configurations
The status bar provides model information relative to cursors X and Y position. Displayed parameters include: Offset, Depth, Time, Velocity and Correlation when applicable.	

## Recommended system specifications

IHS recommends the following system specifications:

Hardware	
Minimum	64-bit quad-core machine with 8 GB of physical RAM
Recommended	64-bit processor with 8 CPU cores and 16 GB of physical RAM or higher
Recommended Graphics card:	Video cards that support CUDA 4.x, have at least 1 GB of graphic card memory

Operating System	Install	Supported
Windows 7 SP1 (64-bit)	Yes	Yes
Windows 8	Yes *	Basic *
Windows 10	Yes	Yes
Windows 2008 R2 Server (Citrix based Applications)	Yes *	Basic*
Windows 2012 Server (Citrix based Applications)	Yes *	Basic*
* Basic support; Customer Care support provided but OS not certified.		




## Changing global properties

Configure general options in the main display including:

- Time and depth banners
- Measurement units used throughout GeoSyn
- Printer scale
- Print page border on time and depth pages.

Once a model is configured, save the display options in an import default file that applies to all new models.

### To change global properties:

1. Open the [Display Parameters: Global](#) dialog box:
  - From the menu, **Edit>Display Parameters**
  - From the tool bar, click  on the main toolbar
2. Change configuration settings as needed:
  - Enter a banner to appear on both time and depth pages and click **Update**.
  - Select unit of measurement: Metric or Imperial units then specify related sub unit (Meters/Kilometers or Miles/Feet)
  - Select Sonic unit: Transit or Velocity
  - Select whether a print page border that bounds the portion of the time and depth models that will be printed appears on the canvas in the main display. You can change the size of the print page border by configuring the page size for your printer (for details, see *Related Topics* below).
3. Click **Close**.

<b>Note:</b> These changes only apply to the current model
--

### Related Topics

["Main display" on page 1](#)

["Printing models" on page 140](#)

["Changing import defaults" on page 13](#)

## Configuring GeoSyn defaults

GeoSyn enables you to change basic configuration details that apply to all GeoSyn sessions, including:

- GeoSyn file directories
- Communication addresses
- IHS data retrieval credentials
- How imported logs are interpreted and displayed

Configuration changes made are automatically applied to this and future GeoSyn sessions.

### To configure GeoSyn defaults:

1. Open the Configuration Properties dialog box:
  - From the menu, **Edit > Configuration Properties**
2. Change configuration settings as needed.
3. Click **Close**.

---

**Note:** Configuration changes are automatically applied to this and future GeoSyn sessions.

---

### Related topics

["Changing log display properties" on page 106](#)

["Changing import defaults" on page 13](#)

["Contacting Customer Care" on page 12](#)

## Changing log definitions

GeoSyn maintains a centralized database file of log definitions (*LogInit50.gld*) where you can customize settings such as:

- Track widths
- Scales
- Aliases
- Color fills
- Several others

Settings are applied only to new models whose log settings have not already been defined in the import defaults file.

### To change log defaults:

1. Open the [Properties: Log Definitions dialog box](#) **Edit > Configuration properties > Log Library**.
2. In the tree displayed, click the plus sign (+) beside the appropriate node to expand it and view current configuration details.
3. Click **Edit curve** to open the [Edit Default Display Properties](#) dialog box
4. Configure the curve properties then click **OK** to return to the *Properties: Log Definitions* tab.
5. Click **Close** to return to the main display. The changes you made are applied to future models providing a different setting doesn't exist in the import defaults file for that model.

### Import defaults file

The import defaults file usually contains all default settings except those that apply to logs. When you update the import defaults file with settings from the current model, settings for log types in the current model are also written to it. Log settings in the import defaults file override, but don't overwrite settings in the log definitions database.

When GeoSyn creates a model, it first checks whether display settings for the logs upon which the model will be based exist in the current import defaults file. If they do, GeoSyn uses them instead of the settings in the log database.

### Related Topics

["Changing import defaults" on page 13](#)

["Changing log display properties" on page 106](#)

## GeoLaunching GeoSyn 2D from Kingdom

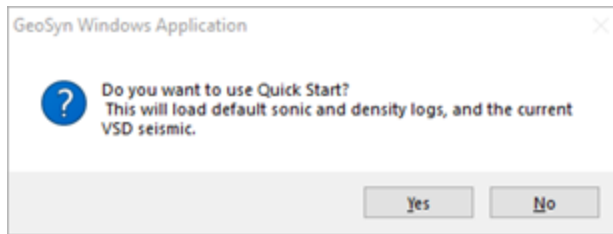
Launch GeoSyn 2D from IHS Kingdom to create time-depth models based on Kingdom wells.

When launched from Kingdom, GeoSyn creates a *GeoSyn* directory under the Kingdom project directory. All GeoSyn data associated with the model you create is written to this location.

### To launch GeoSyn from Kingdom:

1. From within Kingdom:

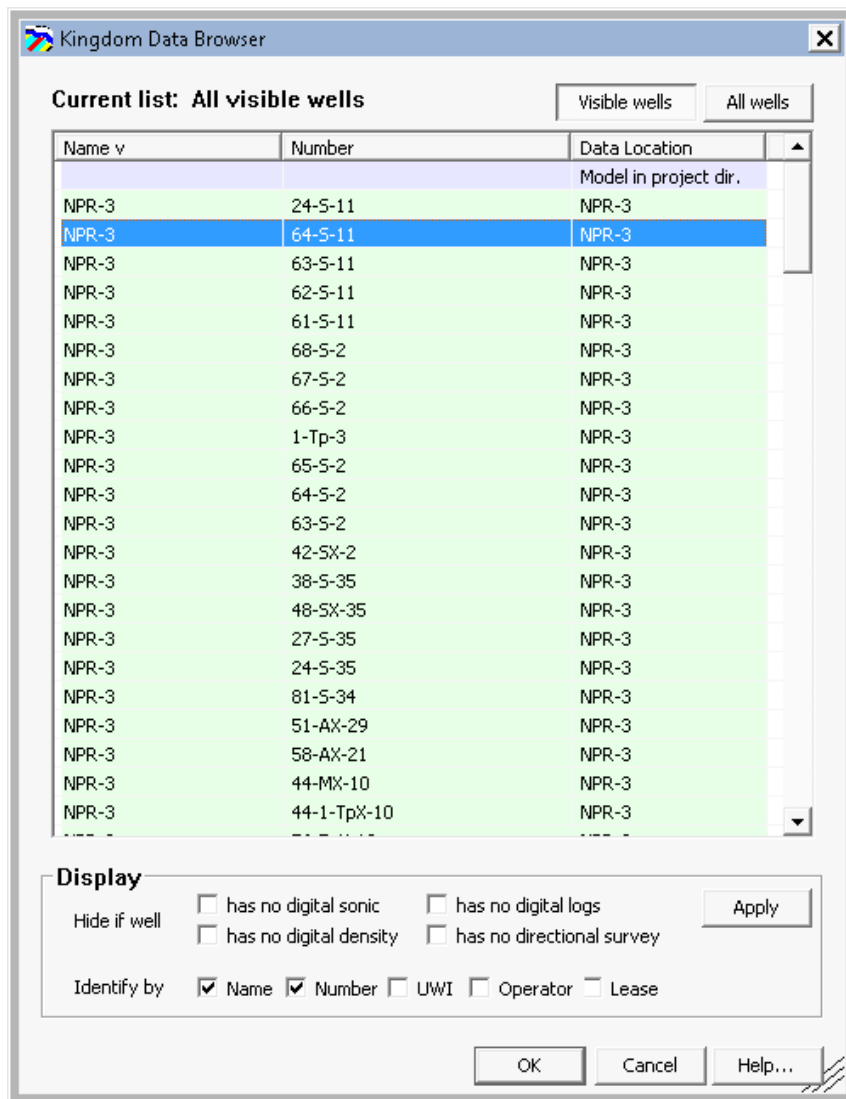
- Right-click on a single well on the base map or *Project Tree* and select GeoSyn. This will launch GeoSyn and give you the option of importing the well using *Quick Start*.



- Select **Yes** to automatically import the well using the default sonic, VSD seismic, and density logs bypassing the need to manually enter the information.
- Select **No** to import the well and manually enter your information starting in step 2 of the procedure described below.
- From the **Project** or **Wells** menu, click **GeoSyn**.

Opening GeoSyn from the **Projector Wells** menu data is imported for all of the wells on the Kingdom project's visible well list. Some of the wells on the Kingdom base map may be hidden, but can still be retrieved using GeoSyn at any time.

The [Kingdom Data Browser](#) dialog box appears.

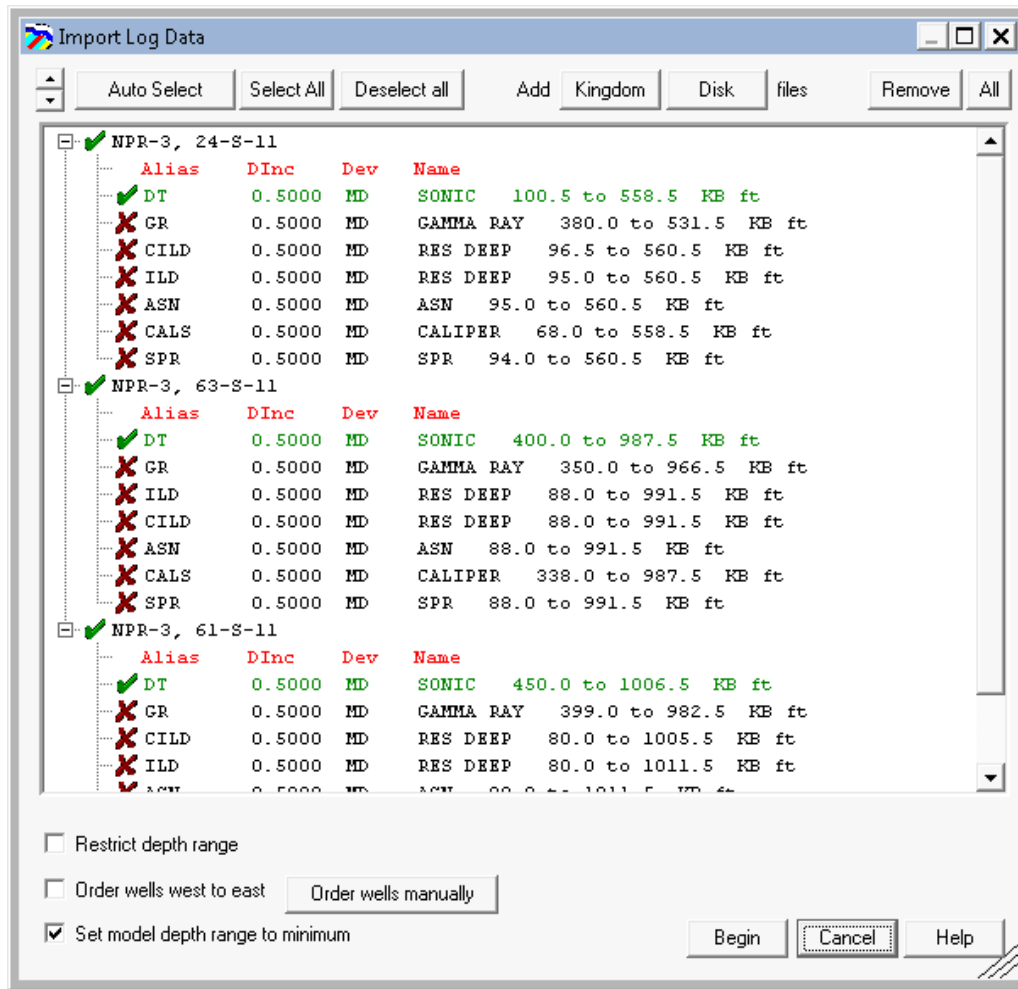


Filter the results displayed by clicking check boxes to the right of the *Hide if well* label, and select the columns to display by clicking check boxes to the right of the *Identify by* label.

Where the well includes a directional survey, select whether to convert it to true vertical depth.

2. Select the desired wells, and then click **OK**

The [Import Log Data](#) dialog box opens.



3. Select the wells and curves to import, and then click **Begin**.

The [Import Kingdom Well Data and Apply Corrections](#) dialog box appears.

**Import Kingdom Well Data and Apply Corrections**

**NPR-3, 24-S-11**

Seismic datum 5500.00 ft SS  
Well elev. ref. (KB) 5173.00 ft SS  
No deviation survey. Well is assumed to be vertical. [View directional survey...](#)

**Time depth charts**

☒ Apply time depth corrections to sonic [View and edit...](#)

Shared RMOTC 48-X-2mmmmmmIntegrated\_Shared [Set as default](#)

	MD	TVD (Elev Ref)	TVD (Seismic)	Subsea	Time 2Way
1	-1080.38	-1080.38	-753.38	6253.38	0.0000
2	-327.00	-327.00	0.00	5500.00	0.2196
3	507.60	507.60	834.60	4665.40	0.2495
4	511.60	511.60	838.60	4661.40	0.2497
5	526.60	526.60	853.60	4646.40	0.2505
6	530.10	530.10	857.10	4642.90	0.2507
7	544.10	544.10	871.10	4628.90	0.2513
8	547.60	547.60	874.60	4625.40	0.2515
9	554.60	554.60	881.60	4618.40	0.2517
10	568.10	568.10	895.10	4604.90	0.2520
11	572.10	572.10	899.10	4600.90	0.2521
12	575.10	575.10	902.10	4597.90	0.2521
13	581.60	581.60	908.60	4591.40	0.2522
14	586.60	586.60	913.60	4586.40	0.2523
15	593.60	593.60	920.60	4579.40	0.2525

Drift correction [Spline curve](#)

☐ Add drift curve to display

☐ Add the time depth chart to the display in velocity form

☐ Add an uncorrected (by TD chart) sonic

[Import 1 of 3](#) [Skip](#) [Cancel](#) [Help...](#)

Click **View and Edit** to display the [Time/Depth Quality Control](#) dialog boxes where you apply changes to the time depth curve before applying it to the sonic.

**Note:** In order for changes made using the *Time/Depth Quality Control* dialog boxes to be applied, upon exiting that dialog box, when the *Save Modified Time/Depth Chart* dialog box appears, you must click **Save**.

4. Click **Import...** to apply the changes, or click **Skip** to ignore the well.

The *Populate the GeoSyn2D Tops List* dialog box appears.

5. Select the tops repository into which to import the tops from the wells, and then click **OK**.

GeoSyn gives you the option to run the automatic correlation wizard. See *Related Topics* for details.

#### Related Topics

["Downloading logs from the IHS information hub" on page 15](#)

["Importing LAS or GeoSyn files from disk" on page 18](#)

["Creating correlations" on page 94](#)



## Contacting Customer Care

Contact IHS Customer Care for assistance with any questions or problems not answered in this help system.

<b>Phone</b>	1 800 IHS-CARE (1 800 447-2273) Mon. to Fri. 8:00 AM to 6:00 PM
<b>Email</b>	Kingdom users: <a href="mailto:kingdom_support@ihsmarkit.com">kingdom_support@ihsmarkit.com</a> Non-Kingdom users: <a href="mailto:support.cdn@ihsmarkit.com">support.cdn@ihsmarkit.com</a>
<b>Web site</b>	<a href="http://www.ihs.com/products/oil-gas-geosyn-software.html">www.ihs.com/products/oil-gas-geosyn-software.html</a>

When reporting a difficulty, please include any information that might help us diagnose the problem including the following:

- Version of GeoSyn (and AccuMap, if installed)
- Windows operating system
- Circumstances and steps that led to the problem
- Complete text from any error messages

### Related Topics

["Recommended system specifications" on page 3](#)

## Importing Wells

With GeoSyn 2D you can import wells in *.las* or *.syn* format from disk or the IHS Information Hub. When importing wells, GeoSyn alerts you if a well doesn't have any tops and prompts you to copy the tops from another well in your model to the well without tops. The copied tops are evenly spaced in the well into which they're copied and you manually adjust them.

When importing wells:


- Use the GeoSyn 2D [Directory Browser](#), to select *.LAS* and GeoSyn files. Directory Browser enables you to sort and manage numerous files based on Unique Well Identifier (UWI) instead of file name.
- Import any number of wells into a blank depth page
- Always import one well at a time If importing wells into an existing depth page with previously imported wells.

## Changing import defaults

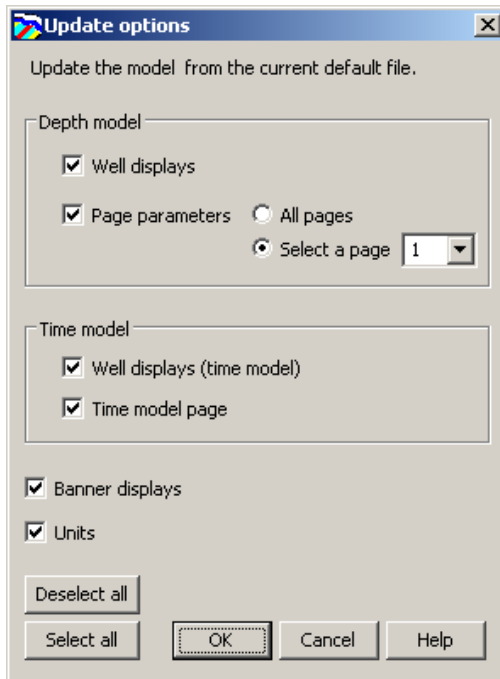
Import the control path settings and display parameters for everything in a new synthetic except logs from a default file. Log default settings are controlled by a centralized log database with one exception: when you update a default file with settings from the current model. Settings for the logs in the current model are saved to the import defaults file but don't overwrite settings in the log defaults database.

GeoSyn allows you to create unique default files for different projects with differing criteria, or several default files for the same project to switch between for viewing different scenarios. Defaults can either be applied to the current model, or the parameters set in the current model can be applied to a default file that you then save for future use.

### To change import defaults:

1. Open the [Configuration Properties](#) dialog :
  - From the menu, **Edit > Configuration Properties > Import defaults tab**
  - From the tool bar, click  on the main toolbar
2. Select an import defaults file to modify for click **New** to create a new file.

3. Click *Update model with current default file* Applies changes from selected default file to the current mode.



**Note:** The nodes in the import defaults file tree displays settings from the selected file. Nodes can be expanded for viewing current settings. To change the settings, use the *Display Parameters* (📊) option from the model window.

4. Click **Close** to return to the model display with your changes applied.

The current default file is automatically selected the next time you launch GeoSyn and is applied to all future models derived from imported logs.

### Related Topics

["Configuring GeoSyn defaults" on page 5](#)

["Changing log definitions" on page 105](#)

# Downloading logs from the IHS information hub

With a subscription to the IHS Information Hub, select a specific UWI or a range defined by NW and SE corners from which to download specific logs. You can also download directional surveys (if licensed) and request IHS digitize service curves.

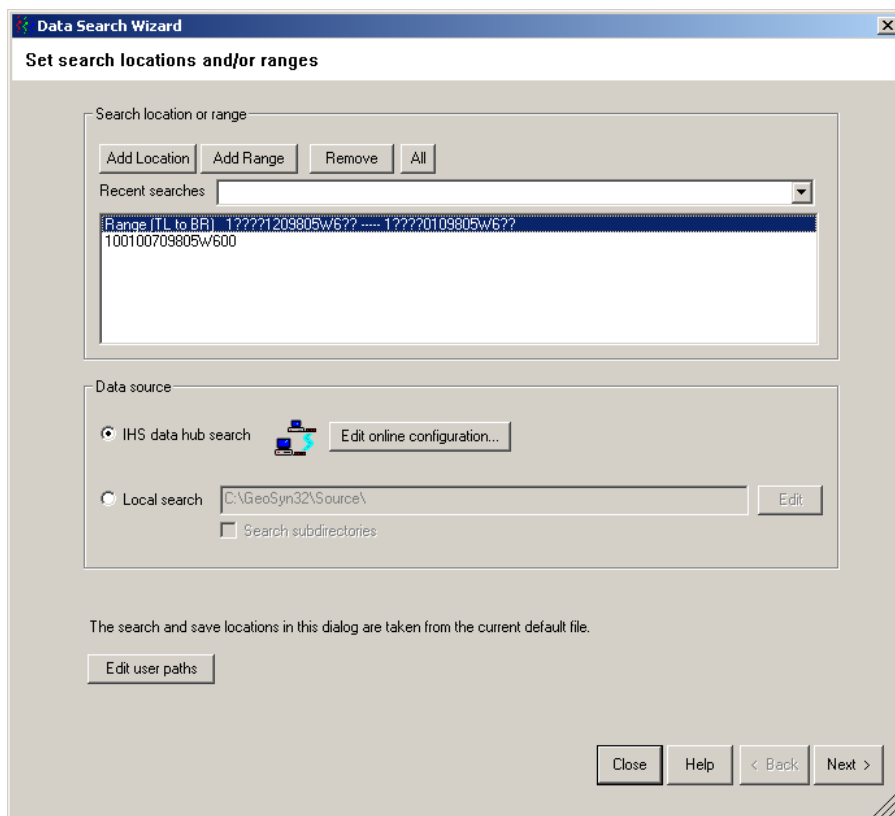
If your subscription is transactional, GeoSyn can warn you before downloading digits from the hub to eliminate unexpected charges.

GeoSyn curves are automatically saved in *.las* format in the GeoSyn target directory.

## To download logs from the IHS Information Hub:

1. From the **File** menu, select **Import**, and then **Data Search Wizard**.

The [Define search range](#) dialog box appears.

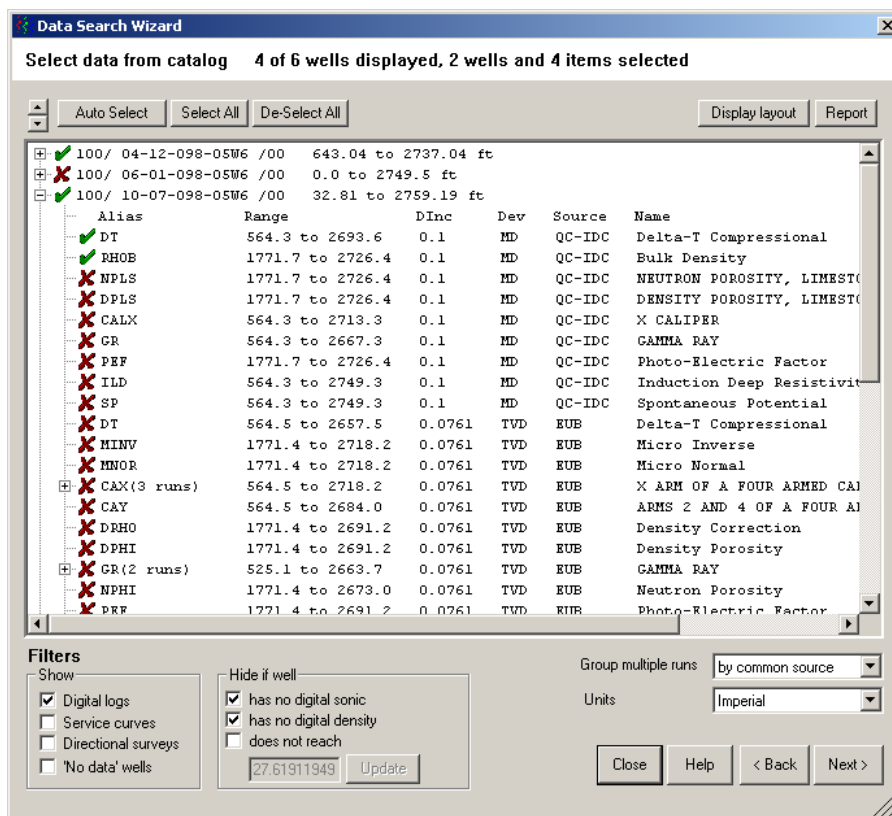


2. Click either **Add Location** or **Add Range** to display the [Edit a UWI](#) dialog box and specify the survey system and coordinates of the well(s) for which to retrieve logs.

To change your IHS Information Hub connectivity parameters or GeoSyn default directories, click **Edit online configuration** to display the [Configuration](#) dialog box. For network installations, hub connectivity parameters affect all GeoSyn users.

3. Click **Next**.

The [Select data from catalog](#) dialog box appears.



4. Click **Display Layout** to show the [Catalog display options](#) dialog box and configure the options with which to sort and filter the wells that appear in the above dialog box. Filter by column order (by dragging and dropping mnemonics in the display pane), row sorting, and whether wells without digital sonic and density logs or less than a certain depth appear.

A check mark (✓) appears beside logs that will import, a cross (✗) beside those that won't. Logs with true vertical depths and measured depths can't be selected during the same import.

5. Select the options by which to filter whether wells appear in the display pane and whether to group the overlapping portions of multiple runs from the same source.

6. Click **Next**.

The [Define save options](#) dialog box appears.

**Data Search Wizard**

**Save options**

Synthetic creation is disabled when more than one well is selected

☐ Import data and create a new synthetic or merge with existing one

**LAS save options**

C:\GeoSyn32\Target\ Browse

Depth increment: Smallest

Tops nomenclature: ACD

Multiple runs: Merge by common source

Trim: deeper curve when merging

**Directional survey save options**

C:\GeoSyn32\Target\ Browse

Format: Open Works Datum: NAD 27

Close Help < Back Next >


7. Select the locations in which to save downloaded files and whether to import downloaded logs into the GeoSyn model during the download. The above options are defined in the *Properties: Import Defaults* dialog box, which can be accessed by clicking **Edit Defaults** above.

If you save logs to disk and then import them into the model from disk, you can restrict the depth range.

8. Click **Next**.

The specified logs are downloaded from the IHS Information Hub and the results are listed in a summary report dialog box that you can save to an ASCII format file to log downloads.

9. Click **Close**.

If you're importing a well into a model that already contains wells, your cursor becomes a placement hand () and you click the location in which to place the well. If the well intersects a correlation, the [Insert a Well into an Existing Model](#) dialog box appears and you correlate tops in the well to place to the correlations it intersects by clicking first the top to link in the left pane and then the correlation name in the right pane. You can also click **Edit** to display the *Top Properties* dialog box and create a top in the well to place that you then link using the method above.

### Related Topics

["Changing import defaults" on page 13](#)

["GeoLaunching GeoSyn 2D from Kingdom" on page 6](#)

["Importing LAS or GeoSyn files from disk" below](#)

## Importing LAS or GeoSyn files from disk

In order to import LAS or GeoSyn files from disk, the current GeoSyn session can not have been launched using Kingdom.

GeoSyn enables you to create a model by importing raw log data from either LAS or GeoSyn files.

When you import a GeoSyn or LAS file, GeoSyn renders the file using the settings in the import defaults file and loads the formation tops defined in the well from your local AccuMap system tops and AccuMap user tops databases. For details on changing import default files, see *Related Topics* below.

### To import logs or GeoSyn files from disk:

1. From the **File** menu, select **Import > Wells**.

**OR**


with GeoSyn open and a blank GeoSyn canvas displayed, simply drag the .las file from a Windows location onto the canvas.

The [Select Log Data from GeoSyn or LAS Format Files](#) dialog box appears.

2. Select the root directory or drive from the **Look in** drop-down list then double-click folders in the display pane and browse to the directory that contains either the desired files or the subdirectories with those files. To filter the type of files displayed, from the **Files of type** drop-down list, select a file format extension.

3. Either click **Browse Directory** or **Browse subdirectories** to launch *Directory Browser*, or simply select the desired file in the display pane and click **Select**. For details on using *Directory Browser*, see *Related Topics* below.

The wells are automatically placed on the new model.

If you're importing a well into a model that already contains wells, your cursor becomes a placement hand () and you click the location in which to place the well. If the well intersects a correlation, the [Insert a Well into an Existing Model](#) dialog box appears and you correlate tops in the well to place to the correlations it intersects by clicking first the top to link in the left pane and then the correlation name in the right pane. You can also click **Edit** to display the *Top Properties* dialog box and create a top in the well to place that you then link using the method above.

If the import file has missing or invalid data such as an invalid UWI or log alias, GeoSyn enables you to correct it during the import. For details, see *Related Topics* below.

### Related Topics

- ["Changing import defaults" on page 13](#)
- ["Using Directory Browser" below](#)
- ["Changing log display properties" on page 106](#)
- ["Correcting invalid data when importing" on page 21](#)
- ["GeoLaunching GeoSyn 2D from Kingdom" on page 6](#)
- ["Changing depth models" on page 91](#)

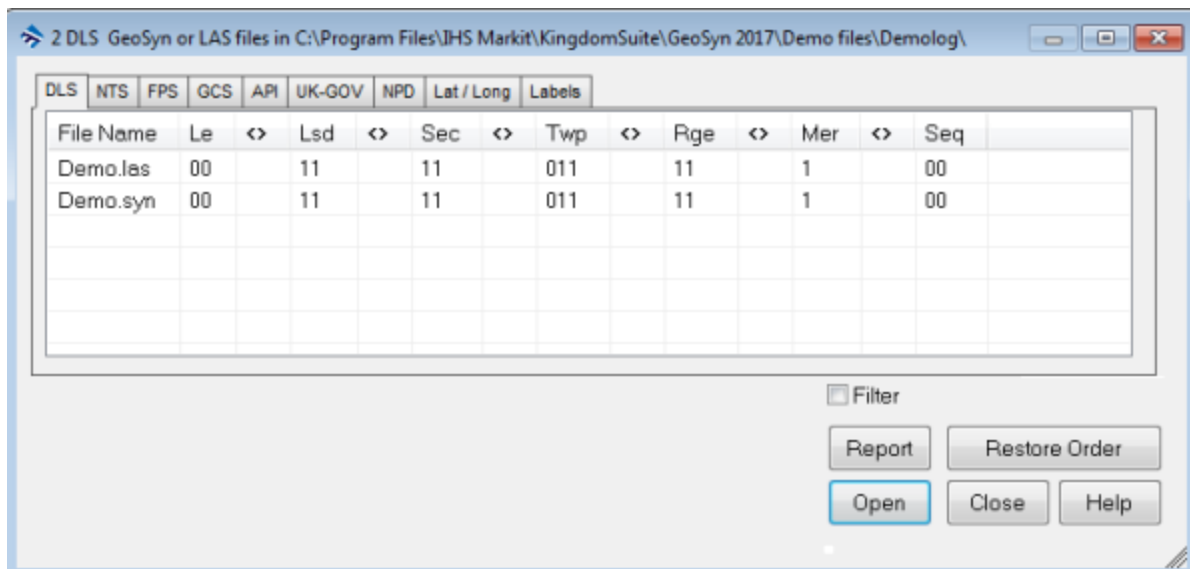
## Using Directory Browser

The GeoSyn Directory Browser displays and sorts the contents of LAS and GeoSyn files by UWI rather than file name in selected directories and associated sub-directories. Sorting by UWI instead of a file name allows users to:

- Filter files by geographic coordinates
- Sort by various UWI columns



- View basic details about the individual files before opening or importing



UWIs are listed in the appropriate survey system tab separated into columns representing each coordinate group of the survey system. Log files with missing or invalid UWIs are only listed in the **Labels** tab


## Cataloging files

The first time it reads a directory, the Directory Browser creates a catalog file (.cat) of all (.las) and GeoSyn files in the selected directories. Depending on the volume of files, this can take several minutes as each file is read and cataloged. As a best practice and to reduce time, search directories should only include .las and .syn files.

**Note:** Corrupt GeoSyn files in the target directory may cause Directory Browser to crash.

### To use Directory Browser:

1. From the **File** menu, select **Import log data**.  
The [Import log data](#) dialog box will open.
2. Select a directory path from the drop down list.
3. Click one of the action buttons to open the Directory Browser:
  - **Browse dir**, Opens Directory Browser with files in current directory only.

- **Browse sub-dir**, Opens Directory Browser with files in current directory and sub directories
4. Select the desired survey system tab and then click a column header to sort rows based on the values in that column or change the column order by clicking transpose () between two columns to swap.  
To remove UWIs that appear outside of a certain geographic boundary, select **Filter** then click **Edit** to display the *Edit a UWI* dialog box and specify the coordinates for the area within which to display UWIs.
  5. Right-click a row to view a popup window with basic log details.
  6. Select the row to open or import into GeoSyn file and click **Open**. Additionally you can:
    - Click a column header to sort rows based on column values
    - Change the column order by clicking transpose between two columns to swap
    - Remove UWIs that appear outside of a certain geographic boundary
    - Select **Filter** then click **Edit** to display the [Edit a UWI](#) dialog box and specify the coordinates for the pane within which to display UWIs.
    - Right-click a row to view a popup window with basic log details.
    - Click **Report** to display the *Browser report* dialog box.

## Related Topics

[Importing LAS or GeoSyn Files from Disk](#)

[Changing Import Defaults](#)

## Correcting invalid data when importing

Warning messages allow you to correct information during an import if:

- kelly bushing or depth increment of the imported file and the current synthetic don't match.
- the UWI is missing or invalid
- specific logs are missing
- log aliases are missing or unrecognized
- sonic and density log units don't match

<b>Note:</b>	You can change general synthetic display properties if you don't want to be notified of missing or an invalid UWI or unrecognized log
--------------	---

aliases.

---

Problem	Resolution
Kelly bushing and the current synthetic don't match.	GeoSyn offers to automatically depth shift the imported log to match the kelly bushing depth of logs in the current synthetic. Alternately, you can change the kelly bushing depth for the current synthetic:
Missing or invalid UWI	<ul style="list-style-type: none"> <li>• Modify the UWI and or labels before continuing.</li> <li>• Ignore the UWI and build the synthetic.</li> </ul>
Missing or invalid log alias	Logs associated with the <i>GENERAL</i> alias may not display correctly and GeoSyn won't recognize them as logs of importance (sonic, density, etc).
The sonic log is missing	GeoSyn can create a constant velocity sonic log.
The sonic log has invalid data.	GeoSyn can either reduce the sample rate until the integrated sonic data falls below the program limits or abandon the import.
The sonic and density units don't match.	GeoSyn issues a warning and automatically corrects the problem.
Importing data into a pre-existing synthetic with different parameters (different KB, different depth increment, etc.) than the imported file.	GeoSyn issues a warning and can correct all the problems before you import the data.

### Related Topics

["Importing LAS or GeoSyn files from disk" on page 18](#)

["Changing log definitions" on page 105](#)

["Configuring GeoSyn defaults" on page 5](#)

["Downloading logs from the IHS information hub" on page 15](#)

## Importing directional surveys

You can import and modify a directional survey saved in ASCII, GeoGraphix, or Open Works format, or create one from scratch by typing measured depth, dip, and azimuth values.

If a well from the IHS Information Hub has a directional survey available and you're licensed to access directional surveys, you can save it to disk while downloading the log and then import it into GeoSyn. For details, see *Related Topics* below.

### To import a directional survey:

1. In the depth page, right-click the well for which to import a directional survey and from the shortcut menu, select **Well properties**.

The [Well Properties: Well Properties](#) dialog box appears.

The screenshot shows the 'Well Properties' dialog box with the 'Directional properties' tab selected. The dialog is titled 'Well Properties 100/ 11-11-011-11W1 /00'. It has three tabs: 'Well properties', 'Log properties', and 'Directional properties'. The 'Labels' section contains fields for 'Unique Well Identifier' (10011110111W100), 'Labels' (ABC OIL AND GAS 11-11-11-11W1), and 'Status' (Dry and abandoned). The 'Well parameters' section includes 'KB elevation' (999.9 m), 'Depth inc.' (0.2 m), 'TVD status' (TVD corrected), 'Import directional survey' button, 'Calculate bottom hole position from directional survey' checkbox, 'Tops' (Edit), 'Editing history' (View), and 'Position' (Calculate from UWI (NAD27, Canada only)). The 'KB' and 'SS' sections show 'Top' and 'Bottom' values. The 'Datum' is NAD 27. The 'Surface hole' and 'Bottom hole' coordinates are provided.

KB	SS
Top 460.2	539.7 m
Bottom 2457.2	-1457.3 m

# depth points 9986

Datum NAD 27

Surface hole lat 49.910845° long -98.869988°, UTM Zone 14, E 509335 N 5528507

Bottom hole lat 49.910845° long -98.869988°, UTM Zone 14, E 509335 N 5528507

2. Beside the TVD corrected check box, click **Import directional survey**.

The [Measured Depth to True Vertical Depth correction](#) dialog box appears.

#	Measured Depth	Dip	Azimuth	True Vertical Depth	N (-S)	E (-W)	Dog Leg x/30
---	----------------	-----	---------	---------------------	--------	--------	--------------

#	MD	Dip	Azimuth
1	0.0	0.0	0.0

Input data set type: ☒ MD, DIP, AZ ☐ MD, TVD, dY, dX

Survey units are: ☐ Imperial ☒ Metric

Buttons: Update, Delete, Insert, Import Survey, Save Report, Apply, Close, Help

3. Either click **Import Survey** and browse for the desired directional survey file or type individual depth, dip, and azimuth values in the dialog box above and click **Insert**.

The *Import Directional Survey* dialog box appears.

If importing a file, complete the following bulleted steps:

Browse to the file to import then click **Open**.

The [Highlight first line](#) dialog box appears.

**Import Wizard**

Highlight first data line in red

Begin import on line

2	//Date: 02:45 PM Wed Apr 26, 2000			
3	// Depth Units : M			
4	//			
5	Data	Measured	Dip	Azimuth
6	Point	Depth		
7	//			
8		Meters	Degrees	Degrees
9	1	0.00	0.00	0.00
10	2	900.00	5.00	45.00
11	3	1000.40	20.00	65.00
12	4	1303.40	15.00	93.00
13	5	1400.40	10.00	129.00
14	6	1703.40	20.00	140.00
15	7	1803.40	20.00	180.00
16	8	1903.40	20.00	160.00
17	9	2003.40	30.00	120.00
18	10	2103.40	30.00	95.00

< Back **Next >** Cancel Help

Select the first line to import and click **Next**.

The [Highlight last line](#) dialog box appears.

**Import Wizard**

Highlight last data line in red

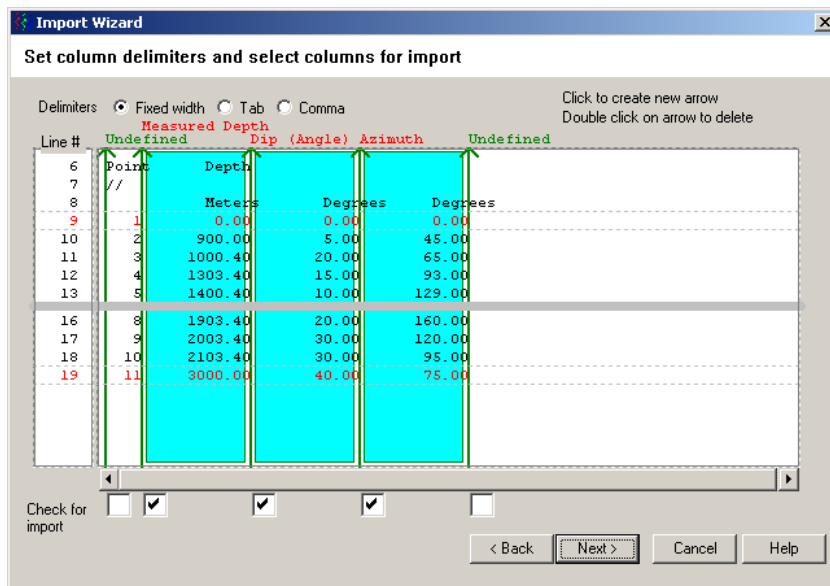
End import on line

12	4	1303.40	15.00	93.00
13	5	1400.40	10.00	129.00
14	6	1703.40	20.00	140.00
15	7	1803.40	20.00	180.00
16	8	1903.40	20.00	160.00
17	9	2003.40	30.00	120.00
18	10	2103.40	30.00	95.00
19	11	3000.00	40.00	75.00

< Back **Next >** Cancel Help

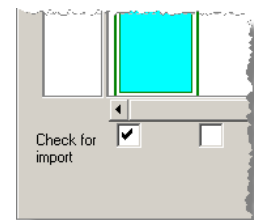
Select the last line to import and click **Next**.

The [Set column delimiters](#) dialog box appears.



Set the column delimiters (↑) by clicking in the display pane between required columns. The green line cannot bisect a data column. Double-click column delimiters to delete.

Click the box that appears below each delimiter to display the *Select from List* dialog box and identify the data type then click **Next**.



The [Finish](#) dialog box appears.

The 'Import Wizard' dialog box is titled 'Finish directional survey import'. It contains the following elements:

- Total lines:** 11
- Import lines:** 9 to 19
- Import data table:**

MD	Dip	Azimuth
0.00	0.00	0.00
900.00	5.00	45.00
1000.40	20.00	65.00
1303.40	15.00	93.00
1400.40	10.00	129.00
1703.40	20.00	140.00
1803.40	20.00	180.00
1903.40	20.00	160.00
2003.40	30.00	120.00
2103.40	30.00	95.00
3000.00	40.00	75.00
- Buttons:** < Back, Finish, Cancel, Help

Click **Finish**.

The [Measured Depth to True Vertical Depth correction](#) dialog box appears, populated with the typed or imported values.

The 'Measured Depth to True Vertical Depth correction' dialog box displays a table of survey data and options for editing and saving.

#	Measured Depth	Dip	Azimuth	True Vertical Depth	N (-S)	E (-W)	Dog Leg x/30
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	900.00	5.00	45.00	898.86	35.33	14.64	0.17
3	1000.40	20.00	65.00	996.60	47.70	32.30	4.60
4	1303.40	15.00	93.00	1285.48	64.91	120.82	0.96
5	1400.40	10.00	129.00	1380.15	57.51	140.09	2.79
6	1703.40	20.00	140.00	1672.46	2.69	195.87	1.03
7	1803.40	20.00	180.00	1766.43	-28.80	207.33	4.03
8	1903.40	20.00	160.00	1860.40	-62.31	213.24	2.04
9	2003.40	30.00	120.00	1950.91	-93.99	239.82	5.74
10	2103.40	30.00	95.00	2037.51	-108.90	287.13	3.73
11	3000.00	40.00	75.00	2771.03	-64.37	796.20	0.51

**Edit selected line**

#	MD	Dip	Azimuth
11	3000.00	40.00	75.00

**Buttons:** Update, Delete, Insert, Import Survey, Save Report, Apply, Close, Help

**Input data set type:** MD, DIP, AZ (selected), MD, TVD, dY, dX

**Survey units are:** Imperial (selected), Metric

4. Do any of the following:

To modify or add values, select the row to replace, or type values in the **MD**, **Dip**, and **Azimuth** boxes, and then click either **Update** or **Insert**.



To delete a row, select it in the display pane and click **Delete** or click **All** to clear the entire display pane.

To save the display pane to an ASCII format file, click **Save Report**.

5. Click **Apply** and **Close** to complete the import.

GeoSyn imports the data and displays the deviated log in the main display, where you can adjust the azimuth of the projection using the *Well Properties: Directional Survey* dialog box. For details see *Related Topics* below.

### Related Topics

["Changing deviated well properties" below](#)

["Downloading logs from the IHS information hub" on page 15](#)

## Changing deviated well properties

Import a directional survey saved in GeoGraphix, Open Works, or ASCII format. When the directional survey is applied to the model, display it showing deviation calculated from a projection of the wellbore onto a user-selected azimuth.

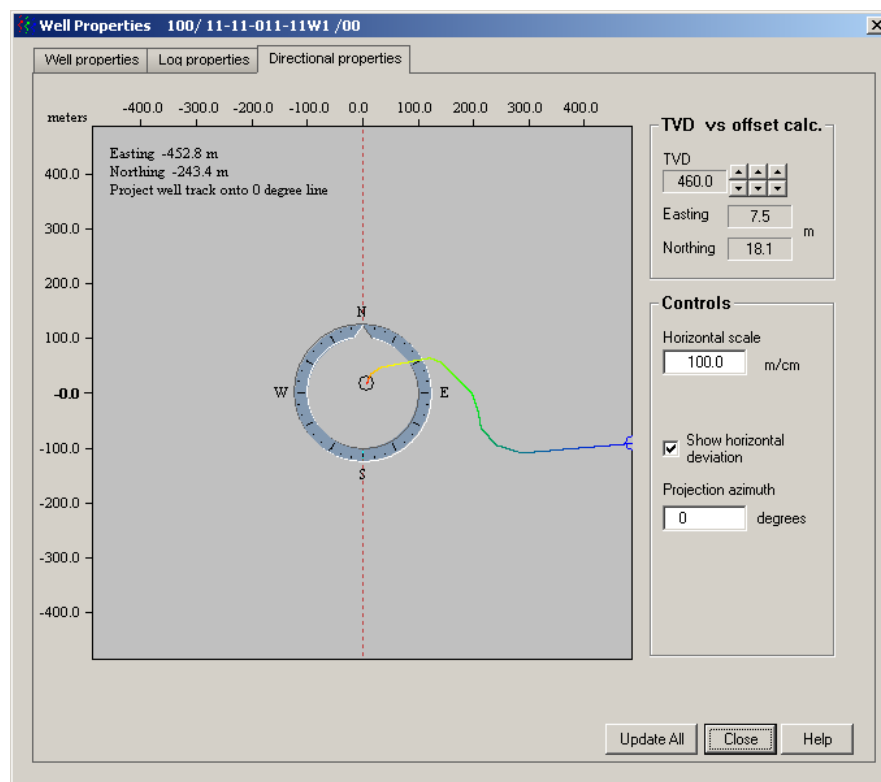
GeoSyn 2D cannot display the offset in the model because it complicates interpolating the velocity field.



You can only modify directional properties after you import a directional survey. For details, see *Related Topics* below.

### To change deviated well properties:

1. On the depth page, right-click a well with a directional survey to import and from the shortcut menu, select **Well properties > Directional properties**.

The [Well Properties: Directional properties](#) dialog box appears.



2. Hover the cursor () over the display pane and move it along the deviation line to view the Eastings and Northings.
3. Do either of the following:
  - Type a value in the **Projection azimuth** box.
  - Hover the cursor over the compass. The cursor becomes a hand (). Click and hold while dragging the dashed red projection line (oriented north-south by default), and release the mouse button to place the line.
4. Click **Update** to see the effects of your changes on the main display then click **Close**.

## Related Topics

["Importing directional surveys" on page 23](#)

["Changing well display properties" on page 88](#)

## Managing tops

GeoSyn includes four default lists for tops:

- **Generic**, which are tops listed in the imported LAS log files.

- **AccuMap System Tops**, which are always loaded from your local AccuMap database when you create a new model or launch an existing one. Information for these tops may change following AccuMap data loads.
- **AccuMap User Tops**, which are always loaded from your local AccuMap user tops database when you create a new model or launch an existing one. Information for these tops changes based on changes you make.
- **GeoSyn 2D Tops**. Only tops that appear in the GeoSyn 2D Tops list can be used for correlation. During a well log import, GeoSyn automatically creates and populates this list. When importing GeoSyn 1D *.syn* files, the GeoSyn 2D Tops list is populated from the generic tops list associated with the LAS file. Using the *Top Properties* dialog box, you can update this list by copying tops from other lists.

You can create an unlimited number of tops lists with customized depths, copy tops amongst lists, and delete individual tops in lists. You can't delete the four default lists above, but you can delete the tops within.

## Changing tops properties

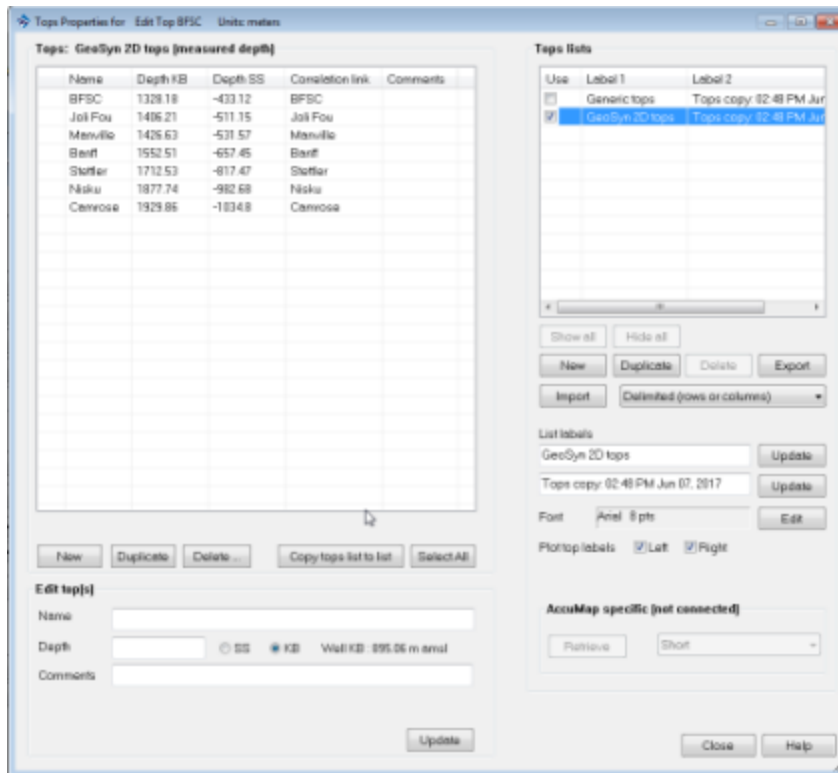
When you create a new synthetic or launch an existing one, GeoSyn automatically downloads the latest system tops and user tops from the local AccuMap database or the IHS Online Information Hub. If importing an LAS or GeoSyn file, you specify whether the well is in measured depth or true vertical depth units so the tops are placed at the correct depths.

The display properties of tops including formation name, depth, marker attributes, and lithology can be modified. Customized tops can be copied to multiple tops lists and displayed in the main synthetic display.

<b>Important:</b>	Changes you make in the GeoSyn user tops list in aren't updated in the AccuMap user database and will be overwritten by the AccuMap user database the next time you launch the synthetic. To change the value in the AccuMap user database, use AccuMap Tops Manager. To prevent the changed depth from being overwritten without changing the depth in the AccuMap user database, copy the top to the <i>Generic tops</i> list.
-------------------	--

### To change tops properties:

1. Launch the [Tops Properties](#) dialog box:
  - Menu: **Edit >Tops properties**
  - Depth model: Right click on a log and select **Tops properties**.



2. Select a list to display from *Tops lists*.
3. Choose a top to change from the selected list *Tops: [List name]*.
4. Change the tops display properties in the *Edit top(s)* section.
5. Click **Close** to return to the main synthetic display with the changes applied.

### Related Topics

["Importing tops from delimited files" below](#)

["Exporting tops lists" on page 146](#)

["Managing tops" on page 29](#)

["Importing tops from fixed width files" on page 35](#)

["Importing tops from GeoSyn files" on page 42](#)

## Importing tops from delimited files

You can import tops lists saved in delimited ASCII format files into GeoSyn tops lists so that they are available to your current model. Delimiters can include commas, tabs, or spaces.

Delimited format is different than fixed width columns. All entries in fixed width columns align on the left-edge of the column. Delimited simply includes one or more delimiters between entries, but the items may not align neatly in columns.

When importing tops, you have the option of overwriting existing tops in the list. If you keep the current tops, imported tops with the same name appear alongside them.

To duplicate and then modify an existing tops list within GeoSyn, see *Related Topics* below.

### To import tops from delimited files:

1. Right-click a log and select **Tops properties**.

The [Top Properties](#) dialog box appears.

**Tops Properties for 100/ 11-11-011-11W1 /00 Edit Top BFSC Units: meters**

**Tops: Generic tops (true vertical depth)**

Name	Depth KB	Depth SS	Comments
BFSC	477.39	522.51	
PADDY	677.14	322.76	
CADOTT	702.11	297.79	
HARMON	716.09	283.81	
NOTIK	749.05	250.85	
FALHER	821.96	177.94	
WILRCH	974.79	25.11	
BLUSKY	1084.88	-84.98	
GETHNG	1110.63	-110.73	
CADOMN	1213.6	-213.7	
FERNIE	1230.76	-230.86	
NORDEG	1299.73	-299.83	
BALDON	1324.13	-324.23	
CHARLK	1341.21	-341.31	
BNDYLK	1411.12	-411.22	
HALFWY	1512.9	-513.0	

**Tops lists**

Show	Label 1	L
<input checked="" type="checkbox"/>	Generic tops	T
<input type="checkbox"/>	AccuMap TVD	L
<input type="checkbox"/>	GeoSyn corrected AccuMap TVD	T

New Duplicate Delete Export

Import CSV or tab delimited

List labels: Generic tops Update

Tops copy: 07:59 AM Sep 06, 2011 Update

Font: Arial 8 pts Edit

Plot top labels: ☒ Left ☒ Right

AccuMap specific (connected): Retrieve

**Edit top(s)**

Name: BFSC

Depth: 477.39 ☐ SS ☒ KB

Comments:

Attributes: Shale Edit Thin

Black Update

Close Help

2. Below the Tops Lists pane to the right, beside the Import button, select **Delimited, rows or columns** from the drop-down list.

3. Click **Import**.

The *Import Delimited Tops File* dialog box appears.

4. Browse to the desired tops file, and then click **OK**.

The **Tops Import** dialog box appears.

	1	Names	Depths	4	5	6	7	8
65		are	used	in	this	output	file.	
66	~Curve	Information						
67	#	MNEM	.UNIT	API	CODE	:	Curve	Descripti
68	#	----	-----	:	-----			
69		DEPT	.FT	00	001	00	00	:
70		DT	.USEC/FT	60	520	00	00	:
71		RHOB	.G/CM3	45	350	01	00	:
72	~t	5	Tops					
73		BFSC	1235.9					
74		PEACER	1884.8					
75		SPIRIT	1967.8					
76		ELKTON	2647.0					
77		SHUNDA	2676.8					
78	~A	DEPTH	DT	RHOB				
79		640.0000	128.7408	2.2036				
80		640.5000	130.0574	2.2218				
81		641.0000	130.8836	2.2536				
82		641.5000	131.6847	2.2817				
83		642.0000	131.4099	2.2890				
84								
85								

**Data selection**

Tops in ☒ Columns ☐ Rows

Names in column 2 from 73 to 73

Depths in column 3 to 73

Search 10011110111W100 Update

**Top placement**

☒ Locate at specified depths

Import units ☐ Imperial ☒ Metric

Depths relative to ☒ KB ☐ SS

Bulk shift top depths by + - 0.0 meters

☐ Ignore depths and space evenly

☒ Delete current tops before importing new tops

**Import**

Import another file Delimiter space ☒ Ignore adjacent spaces

Qualifier quotation

Apply Cancel Help

GeoSyn automatically searches in the file you selected above for a UWI that matches the one in your GeoSyn file and highlights the row in which it appears in the tops source file.

5. Using the display pane, verify whether the tops in the source file are ordered in rows (formation top names run horizontally along a single row), or columns (formation top names run vertically down a single column).

Your selection above is saved and applied the next time you launch the *Tops Import* dialog box.

6. Using the *Names in row* or *column* and the *Depths in row* or *column* (depending on whether you selected *Tops in rows* or *Tops in columns* above), specify the row or column in which the formation top names and depths appear.

7. In the *from* and *to* boxes, specify the range to import.

**OR**

Drag in the display pane to select the tops to import.

Rows are highlighted gray simply to show the columns and rows in which





or more delimiters between entries, but the items may not align neatly in columns.

When importing tops, you have the option of overwriting existing tops in the list, if you keep the current tops, imported tops with the same name appear alongside them.

To duplicate and then modify an existing tops list within GeoSyn, see *Related Topics* below.

### To import tops from fixed width files:

1. Right-click a log and select **Tops properties**.

The [Top Properties](#) dialog box appears.

Name	Depth KB	Depth SS	Comments
BFSC	477.39	522.51	
PADDY	677.14	322.76	
CADOTT	702.11	297.79	
HARMON	716.09	283.81	
NOTIK	749.05	250.85	
FALHER	821.96	177.94	
WILROCH	974.79	25.11	
BLUSKY	1084.88	-84.98	
GETHNG	1110.63	-110.73	
CADOMN	1213.6	-213.7	
FERNIE	1230.76	-230.86	
NORDEG	1299.73	-299.83	
BALDON	1324.13	-324.23	
CHARLK	1341.21	-341.31	
BNDYLK	1411.12	-411.22	
HALFWY	1512.9	-513.0	

**Tops lists**

Show	Label 1	L
<input checked="" type="checkbox"/>	Generic tops	T
<input type="checkbox"/>	AccuMap TVD	L
<input type="checkbox"/>	GeoSyn corrected AccuMap TVD	T

New Duplicate Delete Export

Import CSV or tab delimited

List labels

Generic tops Update

Tops copy: 07:59 AM Sep 06, 2011 Update

Font Arial 8 pts Edit

Plot top labels ☒ Left ☒ Right

AccuMap specific (connected)

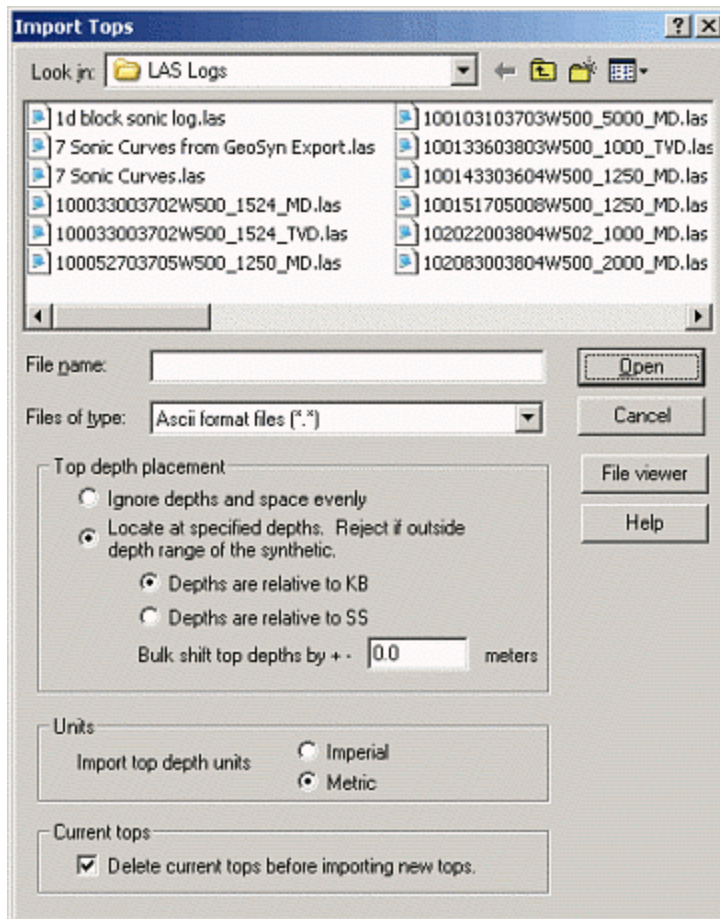
Retrieve

Close Help

2. Below the Tops Lists pane to the right, beside the Import button, select **Fixed Width, Delimited columns only** from the drop-down list.

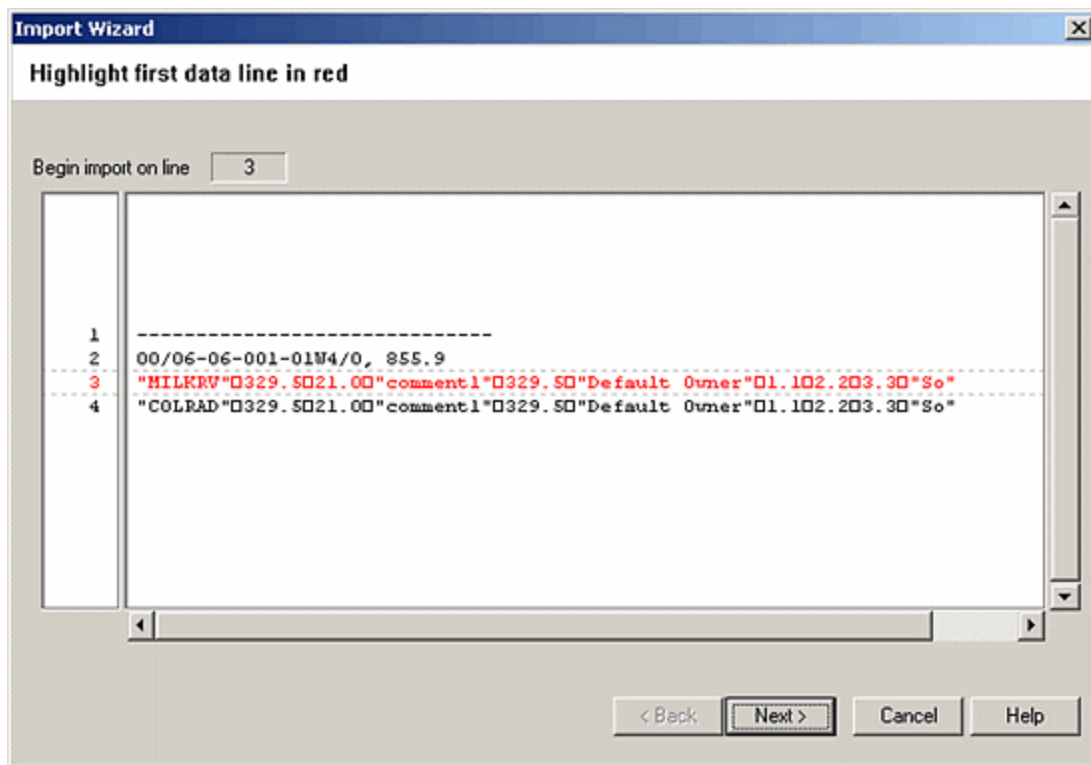
3. Click **Import**.

The [Import Tops](#) dialog box appears.



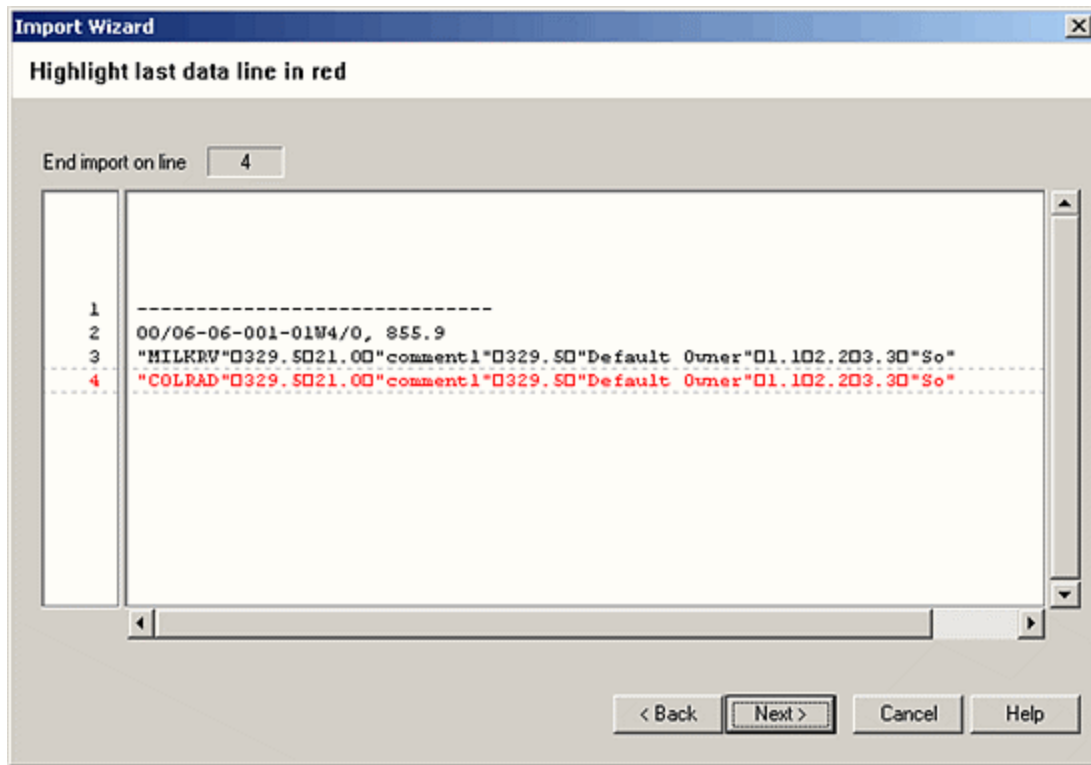
4. Browse to the desired tops file and select the depth placement options, units, and whether to delete current tops if importing into a tops list that's already populated, and then click **OK**.

The [Highlight first line](#) dialog box appears.



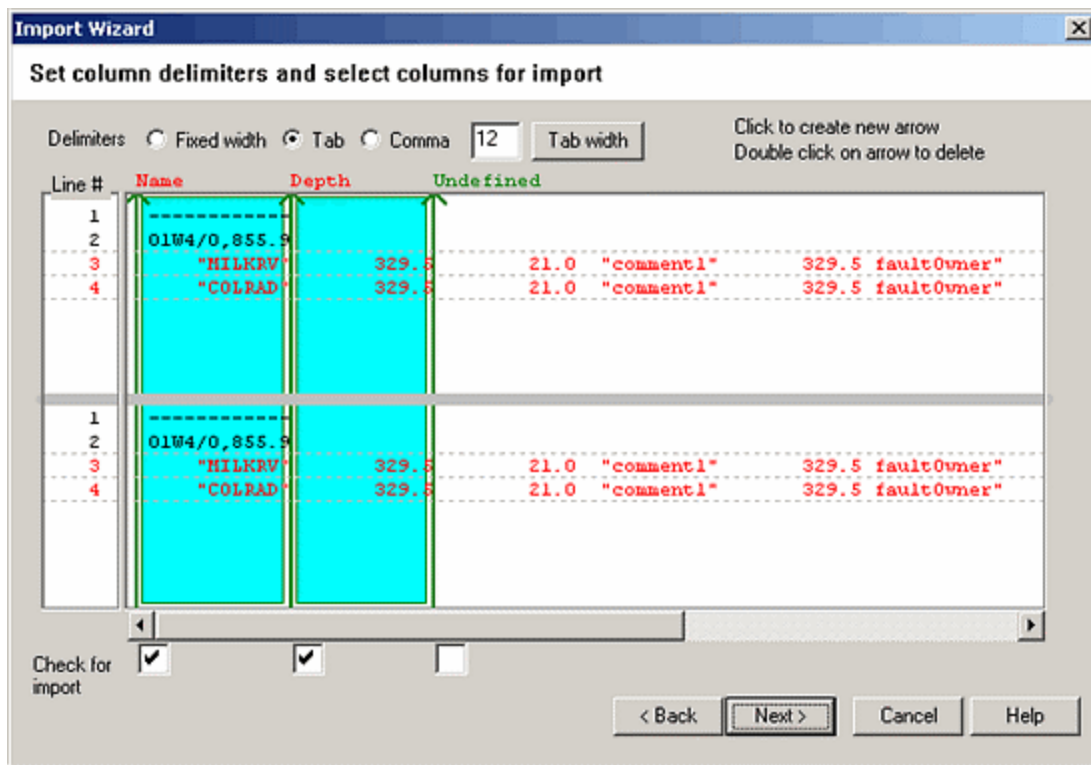
5. Select the row in which the first top appears, and then click **Next**.

The [Import Wizard: Highlight Last Line](#) dialog box appears.



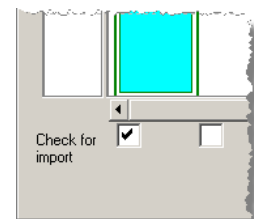
6. Select the row in which the last top appears, and then click **Next**.

The [Import Wizard: Set Column Delimiters](#) dialog box appears.

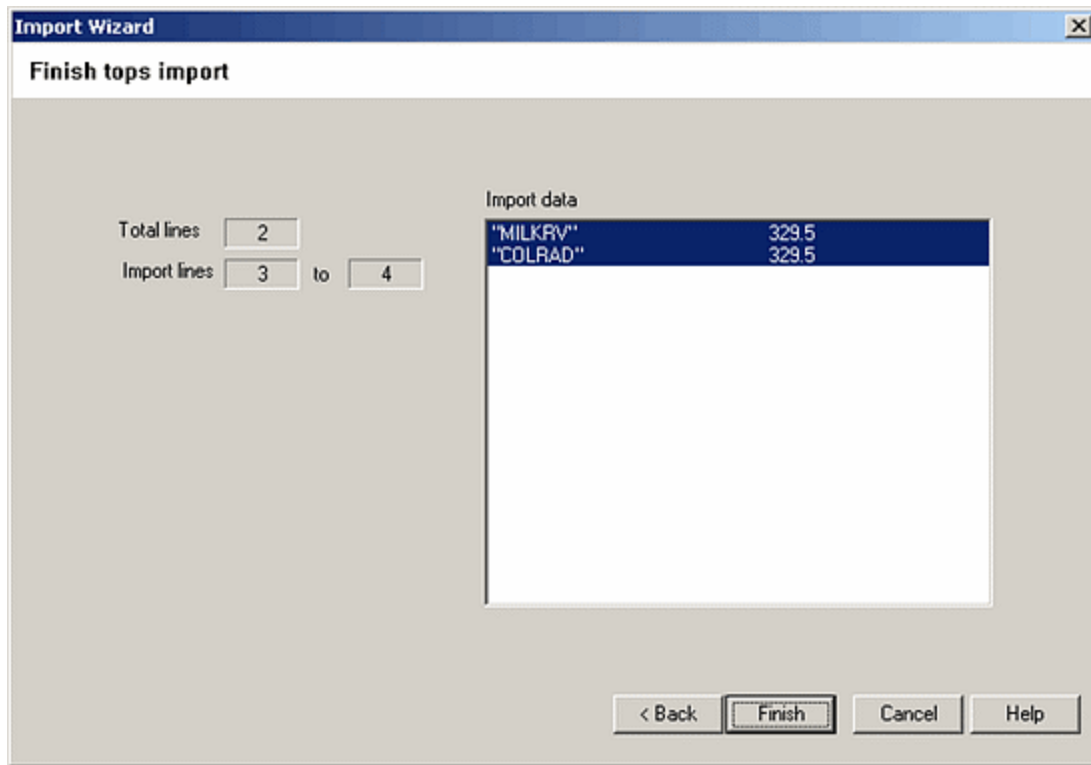


Set the column delimiters (↑) by clicking in the display pane between required columns. The green line cannot bisect a data column. Double-click column delimiters to delete.

Click the box that appears below each delimiter to display the *Select from List* dialog box and identify the data type then click **Next**.

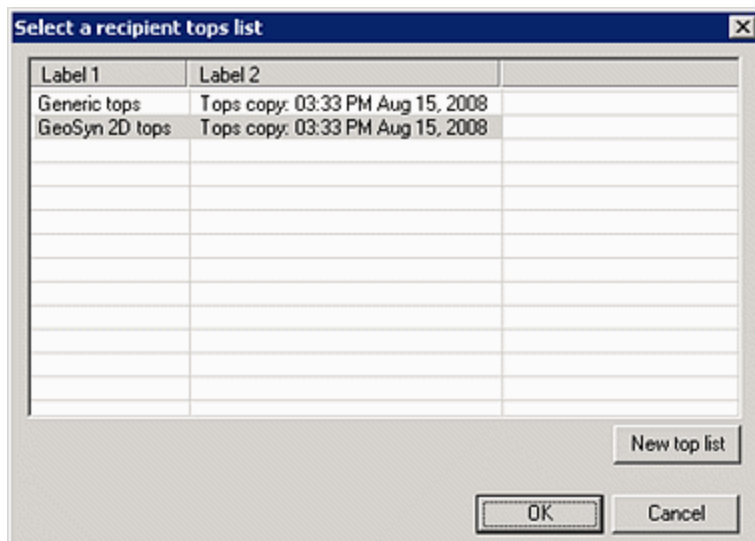


The [Import Wizard: Finish](#) dialog box appears.



7. Click **Finish**.

The *Select a recipient tops list* dialog box appears.



8. Select the list to which to import the tops or click **New top list**, define a new tops list, and then click **OK**. Shift+Click or Ctrl+Click to select more than one tops list to import into the list of tops.

### Related Topics

["Duplicating tops lists" on page 49](#)

["Managing tops" on page 29](#)

["Importing tops lists" on page 45](#)

["Importing tops from delimited files" on page 32](#)

## Importing tops from GeoSyn files

You can import tops lists saved in GeoSyn format into the GeoSyn tops list so that they're available to your current model.

When importing tops, you have the option of overwriting existing tops in the list, if you keep the current tops, imported tops with the same name appear alongside them.

To duplicate and then modify an existing tops list within GeoSyn, see *Related Topics* below.

### To import tops from GeoSyn files:

1. Right-click a log and select **Tops properties**.

The [Top Properties](#) dialog box appears.

**Tops: Generic tops (true vertical depth)**

Name	Depth KB	Depth SS	Comments
BFSC	477.39	522.51	
PADDY	677.14	322.76	
CADOTT	702.11	297.79	
HARMON	716.09	283.81	
NOTIK	749.05	250.85	
FALHER	821.96	177.94	
WILRCH	974.79	25.11	
BLUSKY	1084.88	-84.98	
GETHNG	1110.63	-110.73	
CADOMN	1213.6	-213.7	
FERNIE	1230.76	-230.86	
NORDEG	1299.73	-299.83	
BALDON	1324.13	-324.23	
CHARLK	1341.21	-341.31	
BNDYLK	1411.12	-411.22	
HALFWY	1512.9	-513.0	

**Tops lists**

Show	Label 1	L
<input checked="" type="checkbox"/>	Generic tops	T
<input type="checkbox"/>	AccuMap TVD	L
<input type="checkbox"/>	GeoSyn corrected AccuMap TVD	T

**Edit top(s)**

Name: BFSC

Depth: 477.39 ☐ SS ☒ KB

Comments:

Attributes: Shale  Thin

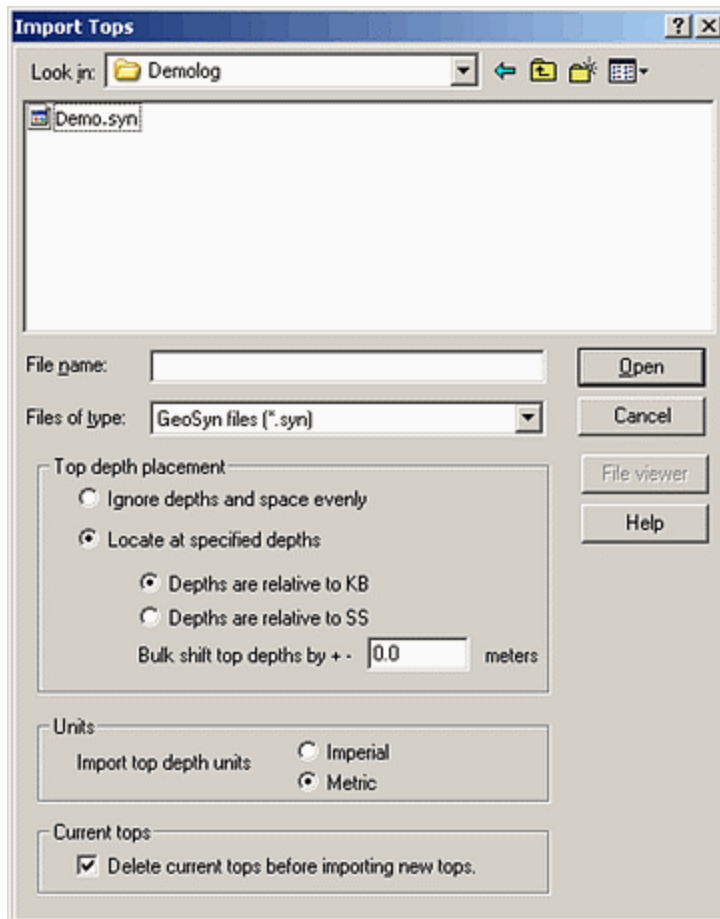
Black

**AccuMap specific (connected)**

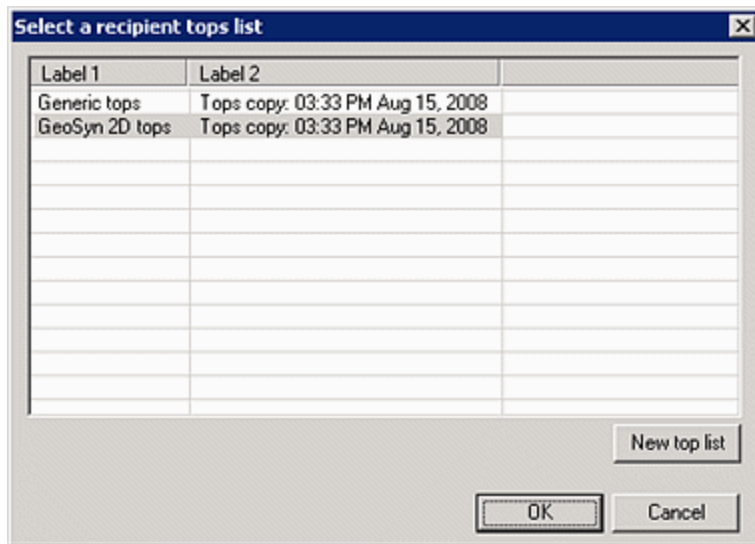
- Below the Tops Lists pane to the right, beside the Import button, select **GeoSyn** from the drop-down list.
- Click **Import**.



The [Import Tops](#) dialog box appears.



4. Browse to the desired GeoSyn file and select the depth placement options, units, and whether to delete current tops if importing into a tops list that's already populated, and then click **OK**.



The [Top Properties](#) dialog box appears.

**Tops Properties for 100/ 11-11-011-11W1 /00 Edit Top BFSC Units: meters**

**Tops: Generic tops (true vertical depth)**

Name	Depth KB	Depth SS	Comments
BFSC	477.39	522.51	
PADDY	677.14	322.76	
CADOTT	702.11	297.79	
HARMON	716.09	283.81	
NOTIK	749.05	250.85	
FALHER	821.96	177.94	
WILRCH	974.79	25.11	
BLUSKY	1084.88	-84.98	
GETHNG	1110.63	-110.73	
CADOMN	1213.6	-213.7	
FERNIE	1230.76	-230.86	
NORDEG	1299.73	-299.83	
BALDON	1324.13	-324.23	
CHARLK	1341.21	-341.31	
BNDYLK	1411.12	-411.22	
HALFWY	1512.9	-513.0	

New Duplicate Delete All Copy tops list to list Select All

**Edit top(s)**

Name: BFSC

Depth: 477.39 ☐ SS ☒ KB

Comments:

Attributes: Shale Edit Thin Black Update

**Tops lists**

Show	Label 1	L
<input checked="" type="checkbox"/>	Generic tops	T
<input type="checkbox"/>	AccuMap TVD	L
<input type="checkbox"/>	GeoSyn corrected AccuMap TVD	T

New Duplicate Delete Export

Import CSV or tab delimited

List labels: Generic tops Update

Tops copy: 07:59 AM Sep 06, 2011 Update

Font: Arial 8 pts Edit

Plot top labels: ☒ Left ☒ Right

AccuMap specific (connected): Retrieve

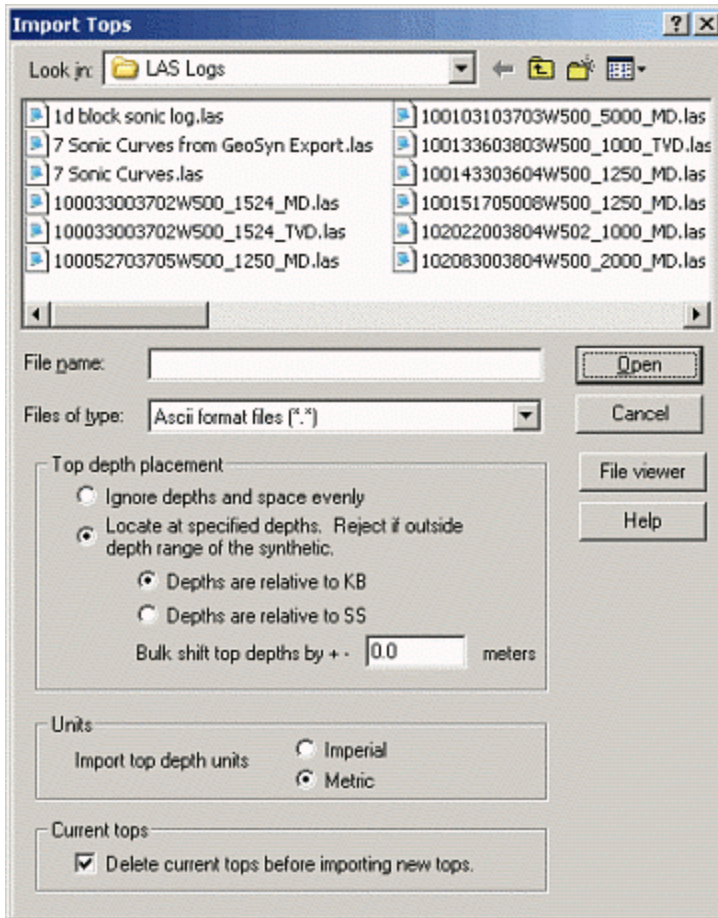
Close Help

2. In the Tops Lists pane to the right, select whether the desired tops are in GeoSyn or delimited format, and if delimited (by tabs, commas, or spaces), whether the tops appear in the file either in rows or in fixed width columns.

Space delimited and fixed width columns are not the same thing. All entries in fixed width columns align on the left-edge of the column. Space delimited simply includes one or more spaces between entries, but the items may not align neatly in columns.

3. Click **Import**.

Either the [Import Tops](#) dialog box (depicted below) or the *Import Delimited Tops File* dialog box appears.



4. Browse to the desired tops file and select the depth placement options, units, and whether to delete current tops if importing into a tops list that's already populated, and then click **OK**.

The [Tops Import](#) dialog box appears.

	1	Names	Depths	4	5	6	7	8
65	are	used	in	this	output	file.		
66	~Curve	Information						
67	#	MNEM	.UNIT	API	CODE	:	Curve	Descripti
68	#----	-----	:	-----				
69		DEPT	.FT	00	001	00	00	:
70		DT	.USEC/FT	60	520	00	00	:
71		RHOB	.G/CM3	45	350	01	00	:
72	~t	5	Tops					
73		BFSC	1235.9					
74		PEACER	1884.8					
75		SPIRIT	1967.8					
76		ELKTON	2647.0					
77		SHUNDA	2676.8					
78	~A	DEPTH	DT	RHOB				
79		640.0000	128.7408	2.2036				
80		640.5000	130.0574	2.2218				
81		641.0000	130.8836	2.2536				
82		641.5000	131.6847	2.2817				
83		642.0000	131.4099	2.2890				
84								
85								

**Data selection**

Tops in ☒ Columns ☐ Rows

Names in column 2 from 73 to 73

Depths in column 3

Search 100111101111W100 Update

**Top placement**

☒ Locate at specified depths

Import units ☐ Imperial ☒ Metric

Depths relative to ☒ KB ☐ SS

Bulk shift top depths by + - 0.0 meters

☐ Ignore depths and space evenly

☒ Delete current tops before importing new tops

**Import**

Import another file Delimiter space ☒ Ignore adjacent spaces

Qualifier quotation

Apply Cancel Help

GeoSyn automatically searches in the file you selected above for a UWI that matches the one in your GeoSyn file and highlights the row in which it appears in the tops file.

5. Using the display pane, verify whether the tops in the source file are ordered in rows (formation top names run horizontally along a single row), or columns (formation top names run vertically down a single column).

Your selection above is saved and applied the next time you launch the *Tops Import* dialog box.

6. Using the *Names in row or column* and the *Depths in row or column* (depending on whether you selected *Tops in rows* or *Tops in columns* above), specify the row or column in which the formation top names and depths appear.

7. In the from and to boxes, specify the range to import.

**OR**

Drag in the display pane to select the range of tops to import.

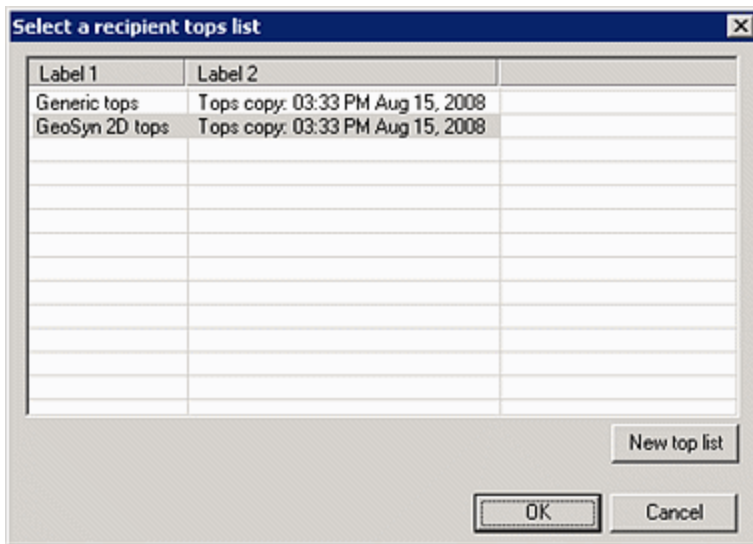
Rows are highlighted gray simply to show the columns and rows in which formation top names and depths appear. Rows and columns highlighted green are those that will be imported into GeoSyn.

Verify the delimiter GeoSyn chose is correct. GeoSyn attempts to determine the correct delimiter by reading the source file.

In the Top placement pane, verify the options originally displayed on the [Import Tops](#) dialog box are as desired.

8. Click **Apply**.

The *Select a recipient tops list* dialog box appears.



9. Select the list to which to import the tops or click **New top list** and define a new tops list, and then click **OK**. Shift+Click or Ctrl+Click to select more than one tops list to which to import the list of tops.

## Related Topics

["Duplicating tops lists" below](#)

["Managing tops" on page 29](#)

## Duplicating tops lists

Duplicate and then customize an entire list of tops or copy only select tops from one list to another. Tops copied from one list to another don't overwrite tops with the same name in the recipient list.

Only tops listed in the GeoSyn 2D tops list are available to your model, but you can copy any tops you want into this list.

### To duplicate tops lists:

1. Right-click a log and select **Tops properties**.

The **Top Properties** dialog box opens.

Name	Depth KB	Depth SS	Comments
BFSC	477.39	522.51	
PADDY	677.14	322.76	
CADOTT	702.11	297.79	
HARMON	716.09	283.81	
NOTIK	749.05	250.85	
FALHER	821.96	177.94	
WILRCH	974.79	25.11	
BLUSKY	1084.88	-84.98	
GETHNG	1110.63	-110.73	
CADOMN	1213.6	-213.7	
FERNIE	1230.76	-230.86	
NORDEG	1299.73	-299.83	
BALDON	1324.13	-324.23	
CHARLK	1341.21	-341.31	
BNDYLK	1411.12	-411.22	
HALFWY	1512.9	-513.0	

2. In the **Tops lists** pane, select the tops list to copy then click **Duplicate**.

To copy only select tops to an existing list instead, in the **Tops for list** pane, **SHIFT+CLICK** or **CTRL+CLICK** the tops to copy, then click **Copy selected tops to another list** to display the *Select a recipient tops list* dialog box and select the receiving tops list.

The tops names and depths are copied to a new list that appears below the existing tops lists in the **Tops lists** pane.

3. Select the duplicate tops list to display its tops in the **Tops for list** pane and select a row that contains a top to change, duplicate, or below which to add a new row and do one of the following in the boxes below the Tops for list pane:

To change an existing top, type and select the desired details then click **Update**.

To make a copy of a top to modify, select the top below which to place the copy and click **Duplicate**.

To add a blank row where you can type new top details, select the top below which to add a blank row, click **New**, type top details, then click **Update**.

### Related Topics

["Importing tops from delimited files" on page 32](#)

["Importing tops from fixed width files" on page 35](#)

["Managing tops" on page 29](#)

["Importing tops from GeoSyn files" on page 42](#)



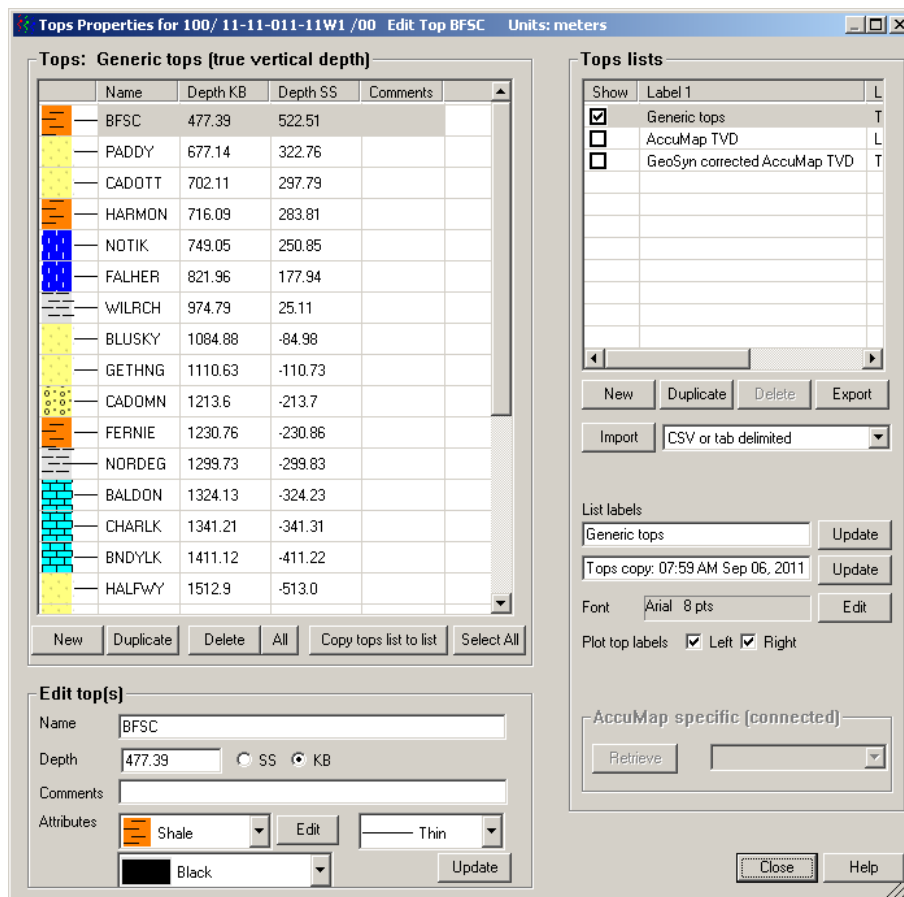
## Exporting tops lists

You can save tops lists to disk in ASCII format. The exported file contains formation names, depths, a units flag, and the Kelly Bushing depth. If you select multiple lists to export, they're written to a single file that you can then edit to remove duplicate entries.

### To export tops lists:

1. Right-click a log and select **Tops properties**.

The [Top Properties](#) dialog box appears.



2. In the Tops lists pane, select the tops list(s) to export to disk and then click **Export**. **CTRL+CLICK** or **SHIFT+CLICK** for multiple selection.

3. Browse to a disk location in which to save the file, type a file name, and then click **Save**.

The tops are written to the file based on the order in which the tops lists appear in the Tops lists pane above and in the order in which the individual tops names appear in each list. Duplicate tops names aren't overwritten.

### Related Topics

["Managing tops" on page 29](#)

["Importing tops from delimited files" on page 32](#)

["Importing tops from fixed width files" on page 35](#)

["Importing tops from GeoSyn files" on page 42](#)

["Exporting logs" on page 142](#)

## About Modeling

Seismic reflections occur when there are differences in the seismic wave (P and S-wave) velocities and the rock densities encountered in the subsurface. The changes in seismic velocities and rock densities are influenced by changes in lithology, porosity, pore fluid, and subsurface pressures. One of the best ways of interpreting seismic amplitudes is to use a seismic model generated from well data. Using GeoSyn2D, you can generate synthetic seismic models from well data to visualize the seismic amplitude response to changes in petrophysical rock properties across reflecting boundaries.

**Note:** Be aware that there are several factors besides geology that can influence a seismic amplitudes response when generating and using synthetic seismic models for interpretation. .

Using GeoSyn2D, you can generate numerous synthetic seismic models to help with seismic amplitude interpretation. A few of these synthetic models are:

- Wedge model—Useful for determining vertical resolution
- 1D Synthetic models based on log data—Involves generating a synthetic to tie wells to seismic (formation tops to seismic events)
- 2D models—Working with multiple wells simultaneously to visualize and predict the effect varying rock properties and thicknesses may have on the seismic amplitude response

## Creating AVO logs

Generate AVO logs using either depth or velocity logs. You can use these derived logs to create crossplots. The derived logs appear in the log display pane with a Yes under the Derived column.

### To create AVO logs using logs:

1. From either the Depth or Tim model, right-click on a log from to derive the AVO log suite, and select **Well Properties > Log Properties**.

The [Well Properties: Log Properties](#) dialog box opens.

Show	Alias	Display name	Active	Derived	Scale range	Units	Raw data range	Intg.
<input checked="" type="checkbox"/>	AC	SONIC	Yes	No	Auto Range	usec/m	138.16 to 535.7	154.
<input checked="" type="checkbox"/>	DEN	DENSITY	Yes	No	1500.0 to 3000.0	kg/m3	1601.3 to 2992.1	1695
<input checked="" type="checkbox"/>	DTOS	SHEAR SONIC	Yes	Yes	600.0 to 100.0	usec/m	197.35 to 2289.2	226.
<input checked="" type="checkbox"/>	RILD	DEEP INDUCTION	Yes	No	0.2 to 2000.0	ohmm	0.757 to 6181.6	0.91
<input checked="" type="checkbox"/>	AC	SONIC	No	Yes	2000.0 to 7000.0	m/sec	8806.6 to 722.31	8445
<input checked="" type="checkbox"/>	DTOS	SHEAR SONIC	No	Yes	500.0 to 4000.0	m/sec	5067.1 to 436.83	4424

**Name:** SONIC

**Type:** ☒ Active SONIC

**Alias/API:** AC 07 520 80 00

**Units:** usec/m ☒ Transit ☐ Velocity

**Scales:** 535.7 138.16 Defaults ☒ Auto  
 Linear Background

**Infill:** Lithology left Edit

☒ XPlot underlay link

☐ Derive using Gardner's relationship  
 $.3048 * ((\text{Den} / 229.5)^{-4})$  Edit

**Trace:** Color Black Pattern Thickness

**Track width:** 2.54 cm **Font:** Edit

**Properties common to all logs**

Description options: User defined name

Depth markers (KB) Major: None Minor: None

Track layout: ☒ One ☐ Multiple logs / track Edit

Update All Close Help

2. Select the logs from which to derive the AVO log suite, and then click **Create AVO Logs**. The [Generate logs for well](#) dialog box will open.
3. Click the individual logs to create, or click **Select All**, and then click **OK**.

To modify the formulas used to derive the Shear Sonic or Density AVO logs, click **Edit** to the right of those rows.

## Related Topics

["Creating crossplots" below](#)

["Applying math equations to logs" on page 124](#)

## Creating crossplots

Create crossplots using data from logs, seismic, and models.


Following are some of the more common crossplots you might create:

offset trace along the x axis and an amplitude trace along the y axis.

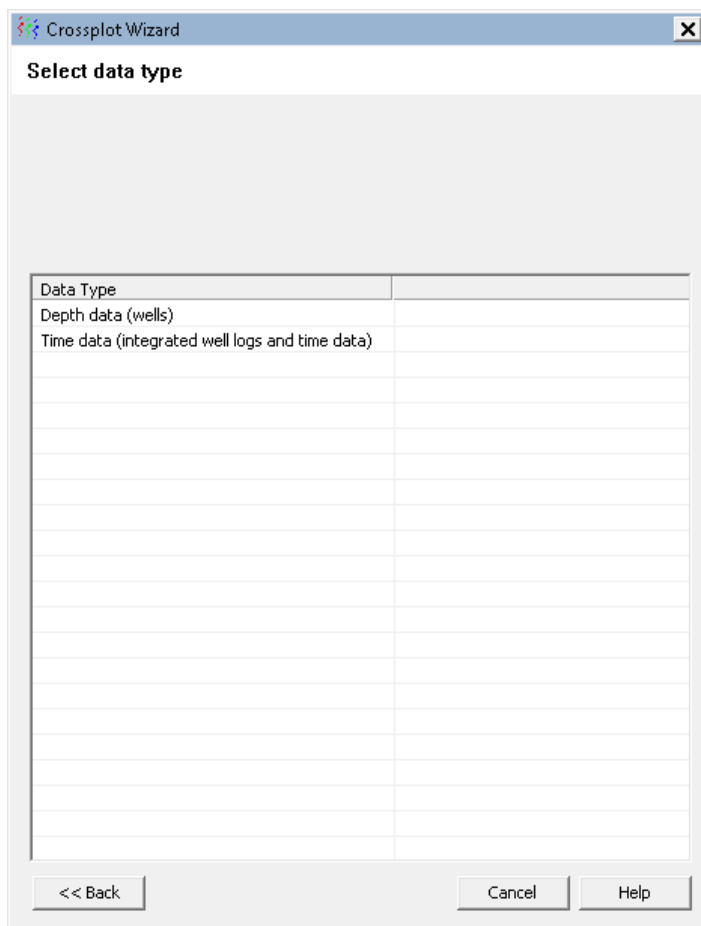
incident angle along the x axis and the amplitude from the seismic along the y axis.

gradient on one axis and intercept on the other.

To create crossplots:

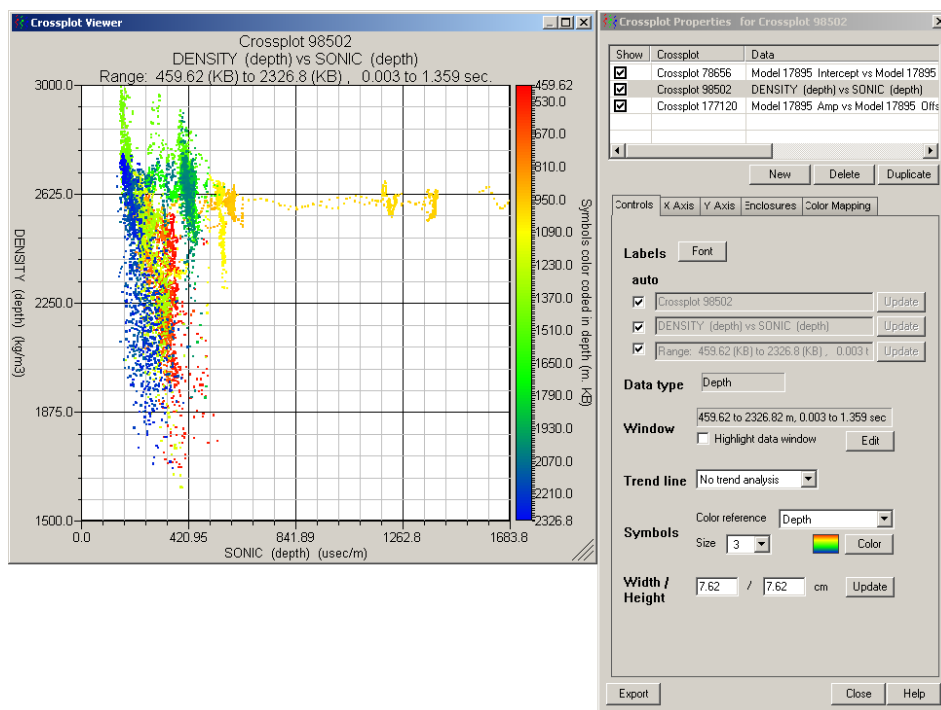
1. From the **Edit** menu, select **Cross Plots** ()

If there isn't already a crossplot in the main synthetic display, the [Crossplot Wizard: Select Data Type](#) dialog box appears.



Otherwise, the *Crossplot Viewer* and [Crossplot Properties](#) dialog box appears, and

you must click **New** to display the above dialog box.



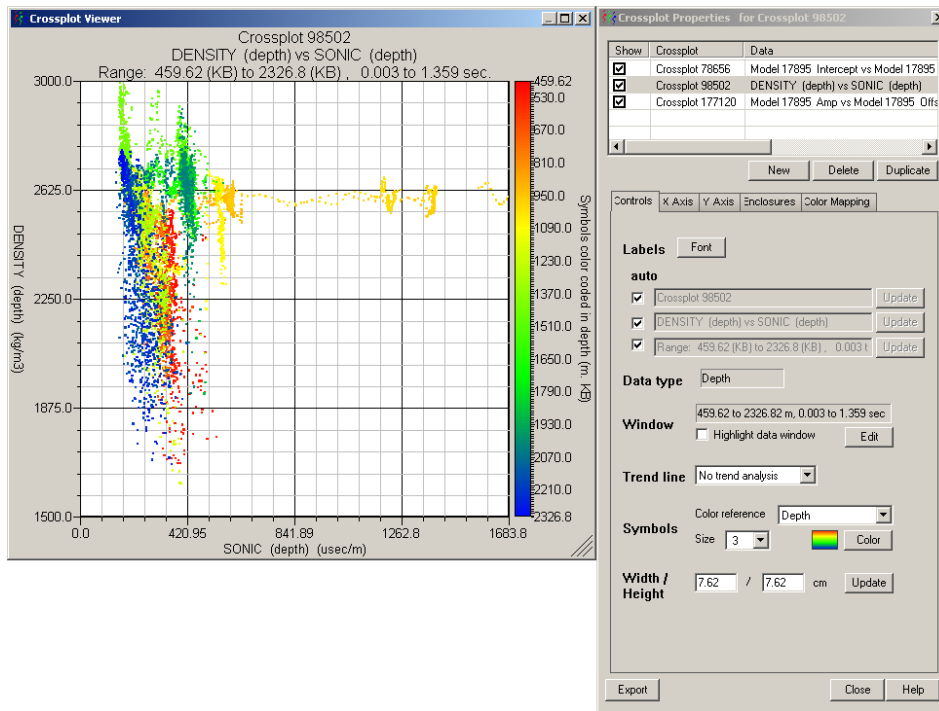
2. Select whether to base the crossplot on time or depth.







The *Crossplot Viewer* and [Crossplot Properties](#) dialog box appears.



5. Configure display options using the [Crossplot Properties: Controls](#), [Crossplot Properties: X and Y Axis](#), [Crossplot Properties: Enclosures](#), and [Crossplot Properties: Color Mapping](#) tabs.

### Related Topics

["Annotating Crossplots" on the facing page](#)

[See \*Exporting Crossplots\*, p. 1](#)

[See "Inspecting Logs"](#)

["Color mapping crossplots" on page 62](#)


["Changing Color Palettes" on page 64](#)

# Annotating Crossplots

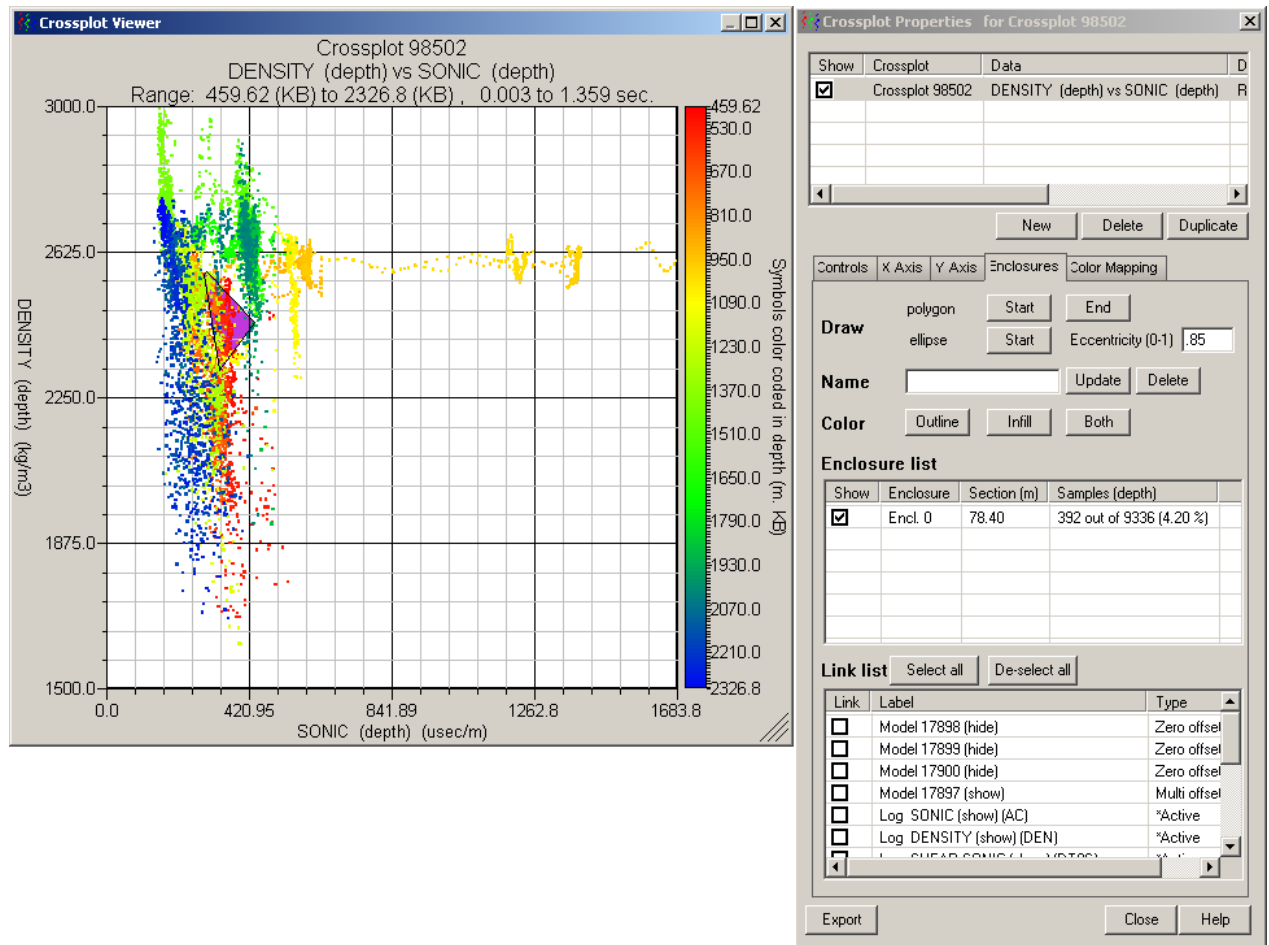
Highlight crossplot features by drawing either a polygon or ellipse in the Crossplot Viewer and then changing the default annotation display properties. The data points that fall within the polygon you draw are highlighted on the model. This enables you to see where data points of interest on the crossplot come from. For details on creating a crossplot, see *Related Topics* below.

When drawing an ellipse, you can specify an eccentricity of 0 to 0.99 where 0 represents a circle and 0.99 represents the narrowest (most eccentric) ellipse. Typing 1 draws a line instead of an ellipse.

## To annotate crossplots

1. With at least one crossplot created in the model display, from the **Edit** menu, select **Crossplot properties** ().

The *Crossplot Viewer* and *Crossplot Properties: Enclosures* dialog box appears.



2. Click the **Enclosures** tab.

3. Do one of the following:

- **To draw a polygon**, click **Start**, and then click to define the anchor points for the polygon segments in the Crossplot Viewer. Click **End** to complete and automatically enclose the polygon.
- **To draw an ellipse**, type a decimal value from 0 to 0.99 in the eccentricity box. Click **Start** and then click to anchor one end of the ellipse. Move your mouse across from the start anchor point to the desired end point and then click to anchor that point.

As you draw polygons and ellipses, they're added to the Enclosure list below the drawing controls. Draw multiple annotations to encompass different features.

4. In the Enclosure List, select the annotation with which to work .

In the Name box, type a descriptive name for the annotation(s) selected above.

5. Select from the following display properties:

- **Outline** to specify the annotation border color.
- **Infill** to specify the annotation fill color within the annotation border.
- **Both** to select one color for both the annotation border and fill.

6. In the Link List pane, click the synthetic or log on which to display the data point highlighting.

To hide an annotation from the Crossplot Viewer, clear the check box in the Show column of the Enclosure list. You can also select the enclosure and then press **Delete**.

### Related topics

["Creating crossplots" on page 55](#)


["Color mapping crossplots" below](#)

## Color mapping crossplots

Select areas of the crossplot to color. Either work with a color gradient to change the default palette or use a block fill to change the color of desired cells on the grid. The color you apply is also displayed for the data points on the log or synthetic that also fall within that cell.

This functionality is similar to drawing annotations that encompass desired data points. For details, see *Related Topics* below.

### To color map crossplots:

1. Open the [Crossplot Properties: Color Mapping](#) dialog box:
  - From the menu, **Edit>Crossplot properties**
  - From the tool bar, click  on the main toolbar
2. Click the **Color Mapping** tab.
3. Select either of the following:
  - **Gradational**, to apply a color to one of the four quadrants that blends with the colors from the surrounding three quadrants.
  - **Blocked**, to fill individual cells you click with a solid color. In the Columns and Rows boxes, type the number of segments into which to divide the overall Crossplot Viewer canvas size. For example, if you type 2 in both boxes, the Crossplot viewer canvas is divided into four quadrants. If you type 100 in both boxes, the Crossplot viewer canvas is divided into a 100 x 100 grid.
4. Click **Brush** to select the desired color.
5. In the Link List pane, click the synthetic or log on which to display the data point highlighting.

---

<b>Note:</b>	To hide color coding from the Crossplot Viewer, clear the <b>Enable color coding</b> check box.
--------------	---

---

### Related Topics

["Creating crossplots" on page 55](#)

["Annotating Crossplots" on page 61](#)

## Changing Color Palettes

Specify color fills for logs and traces in seismic, logs, cross plots, models, and more using the Color Palette dialog box. Color schemes can be loaded from stock color palettes that ship with GeoSyn, or from color templates you save in the GeoSyn *Working* directory with a *.pal* extension. Templates can be quickly applied to any synthetic and can be shared amongst GeoSyn users.

Color schemes can also be configured for the current synthetic without creating a template and can be automatically saved with individual GeoSyn files.

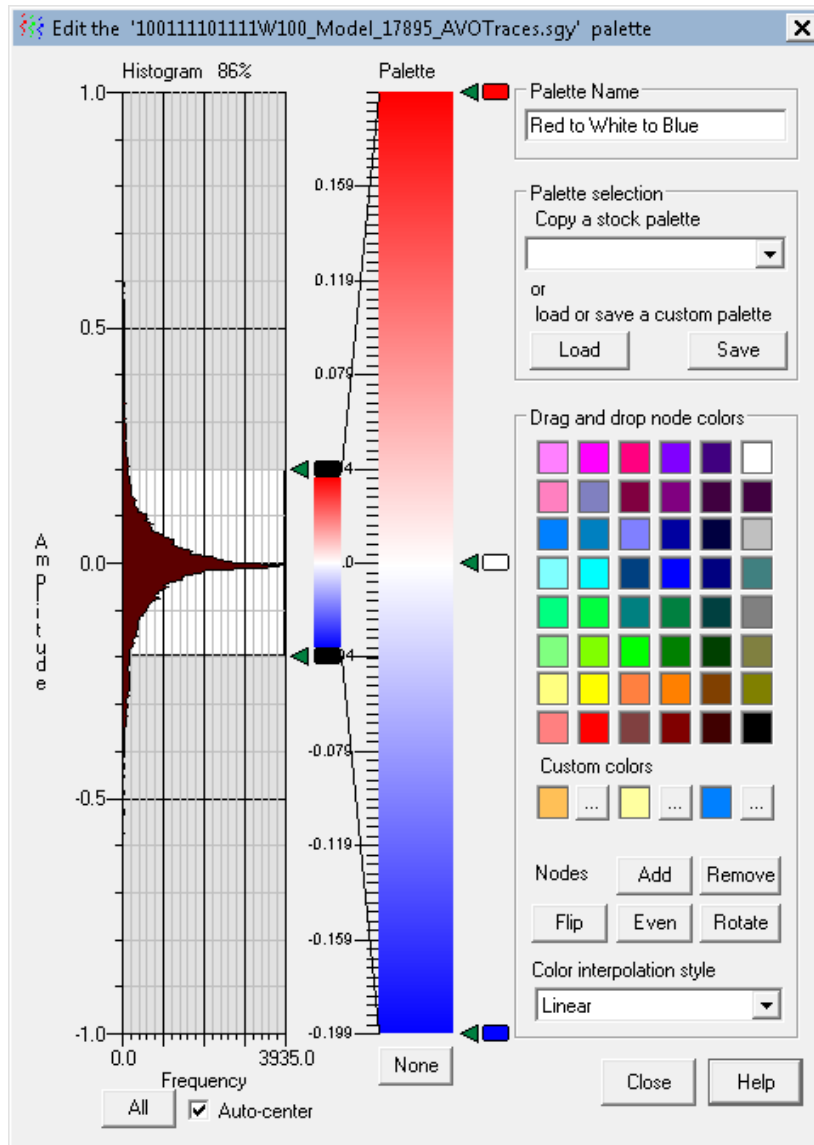
To automatically apply a color scheme to all new synthetics, apply it to the current synthetic then update the import defaults file with the current synthetic options. For details, see *Related Topics* below.

When working with models and certain types of crossplots, you can drag the min max color nodes that appear at the top and bottom of the histogram to tighten them to the desired amplitude range so that a fuller color spectrum is displayed in GeoSyn. This option isn't available for cross plot properties with a depth-based color reference type, or for logs, as typically a certain color represents a certain log value and is related to lithology.

### To change color palettes:

1. Open the Edit color palette:
  - *Well Properties: Log Properties*, select **Edit** adjacent to the Infill display ().
  - *Model Properties* dialog box, select **Edit** adjacent to the color display ().
  - *Seismic Properties* dialog box, select **Edit** adjacent to the Color underlay display ().

The [Edit color palette](#) dialog box appears. The top and bottom of the color bar represent the fixed extremes in the data values of the selected log or trace. Nodes along the display bar associate a color to a particular data value.



2. Choose a palette:

- **Copy a stock palette** drop-down list
- **Load** import a previously saved custom palette .
- **None** remove all colors

#### To create a custom color palette:

1. Creating a custom color bar can be done in several ways:
  - Drag and drop color on existing node.
  - Drag and drop color on the color bar. GeoSyn creates a corresponding node for each color you drop.
  - Create a custom color

2. Type a unique name for this color configuration in the **Palette Name** box then click **Save** to save it in the GeoSyn *Working* directory.

### Related topics

["Changing log display properties" on page 106](#)

["Creating crossplots" on page 55](#)

["Changing import defaults" on page 13](#)

## Changing model porosity

Porosity is modeled by changing a well logs density and or velocity.

- Sonic porosity( $V_p$ ) is calculated using one of three selectable equations:

**Wyllies time average** 
$$V_p = \frac{1}{\left(\frac{\phi}{V_{fl}} + \frac{(1-\phi)}{V_m}\right)}$$

**Velocity average** 
$$V_p = (1 - \phi) V_m + \phi V_{fl}$$

**Raymers etal** 
$$V_p = (1 - \phi)^2 V_m + \phi V_{fl}$$

( $m$ ) mineral matrix, ( $fl$ ) pore fluid

- Density porosity ( $\rho_B$ ) is calculated as a simple volumetric average of the densities.

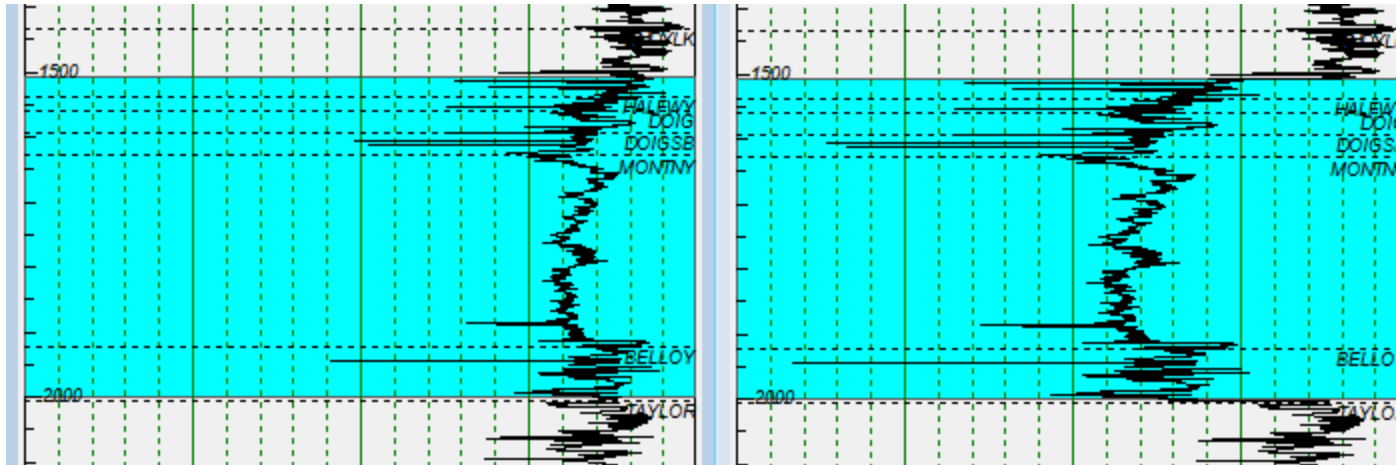
$$\rho_B = (1 - \phi) \rho_m + \phi \rho_{fl}$$

( $m$ ) mineral matrix, ( $fl$ ) pore fluid

**Note:** Mineral matrix velocities are calculated internally by solving the velocity equation for mineral velocity followed by plugging in the VP and fluid velocities. Once mineral matrix velocities are known then the equation is reset to solve for Vp and porosity may be adjusted, which changes VP.

Below is an example of changing the porosity from 13% to 30% using the model porosity tool.






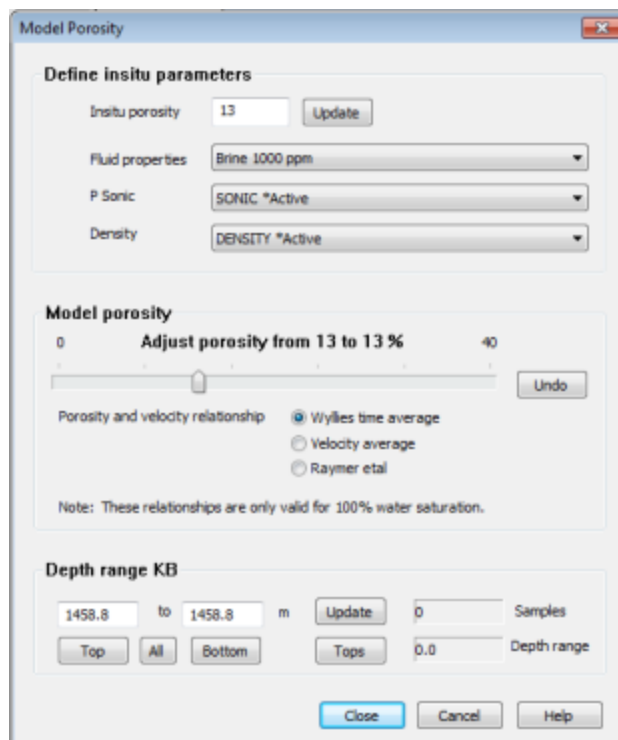
Insitu porosity = 13%


Model porosity = 30%

### To model the porosity of a log

Modify the percentage of porosity to a selected portion of a log using the Log Editor.

1. Open the [Log Editor](#).
2. Click the **Model porosity tool** (  ) on the Log Editor toolbar to open the [Model Porosity dialog](#).




3. Enter the logs **Insitu** porosity value and click **Update**. This creates a starting point for the porosity model.
4. Select a value for the fluid property from the drop down list.
5. Select a **P Sonic** and or **Density** log.
6. Select a velocity equation to apply to the model. See equations above.
7. Set the depth range. Once set, the number of samples and a measurement for the selected depth range will be updated on the dialog. The depth range will also be highlighted in on the log in cyan . The depth range is set using one of four methods:
  - Click and drag the Log editor cursor  to select a depth range.
  - Type values in the depth fields and click **Update**
  - Click **Top** or **Bottom** to accept the absolute depth from the log or click **All** to accept both
  - Click **Depths from tops** to display and select formation tops that signify your zone of interest from a drop-down lists .
8. Use slider to change percentage of porosity. Changes made will be reflected on the selected Sonic and density logs.
9. Click **Close** to apply changes or **Cancel** to discard changes.

## Related Topics

[Model porosity dialog](#)

## About Time Models

The time model is a series of one-dimensional synthetics calculated at constant intervals across the depth model. The time model makes no attempt to model diffraction effects, and in essence represents a perfectly migrated seismic section.

GeoSyn only generates a time model after you create a correlation that horizontally spans the entire depth page. After GeoSyn generates the time model, the Time page button () in the main toolbar is active.

Using GeoSyn's porthole functionality, capture portions of the synthetic in a separate window in which you change the frequency and other wavelet properties to view different scenarios, such as what strength of source signal will be required in order to clearly see a play.


Create an entire suite of logs that can be used for AVO analysis using reflection coefficients. Instead of creating each type of log individually, one selection from the Reflection Coefficients drop-down list enables you to create them with a single click.

## Changing time models

Change the dimensions and display properties of the time model and also the display properties of synthetic traces themselves.

Create multi-offset models for amplitude offset analysis. If summing traces, you can define groups of traces (near, middle, far) and then using mathematical operations between the three groups, filter or enhance certain portions of the offset trace. For example, you might subtract the far traces from the near traces and then multiply the difference by the far traces to enhance the far offset amplitude.

### To change time models:

1. Open the [Display Parameters: Time Model](#) dialog box:
  - From the main menu: **Edit > Display Parameters...**
  - From the toolbar click ()
  - Double-click on the time model.

The [Display Parameters](#) dialog box opens on the Display tab.

**Display Parameters**

Depth Model | Time Model | Wells | Global

Display | Parameters | Horizon Plots | Multi Offset

**Dimensions**

# Depth/time traces: 150 [Update]

Duplicates (at wells): 10 [Update] [Color]

☒ Highlight well traces

**Display range (relative to flattened correlation)**

Top: -0.6175 [Update] [All]

Bottom: 0.4221 [Update]

**Scales** [Font]

Horizontal traces/in.: 10.0 [Update] ☐ Metric

Vertical in/sec: 10.0 [Update] ☒ Imperial

**Correlations** ☒ Show [Font]

Flatten: WAB [None]

**Plot elements**

☒ Show well logs

☒ Trace overlay: Amplitude [Color] [Amplitude (+): 1.0 [Update]]

☒ Color underlay: Amplitude [Edit] ☒ Color Bar

Range: ☒ Auto [Update] [Defaults]

Quick change: [Options]

**Legend** [Font]

**Timing lines** ☒ 100 ms ☐ 10 ms

Required paper size: Width 24.8 in (63.1 cm), Length 13.8 in (35.1 cm)

[Update All] [Close] [Help]

- Set all display configuration options for your model.
- Click the [Parameters](#) tab and select any options required.
- If generating a multi offset model, click the **Multi Offset** tab and select any options required.  
If any of the curves required for multi-offset modeling are missing, GeoSyn prompts you to generate them.
- Click **Update All** to accept changes.

### Related Topics

["About Time Models" on the previous page](#)

["Changing depth models" on page 91](#)

## Displaying images and annotations


GeoSyn enables you to create text annotations and import or select stock images to display in either the depth or time pages. You control the display options of all annotations and images from a single dialog box.

A metafile image pasted into your Windows Clipboard in another application by pressing ALT+PRINT SCRN can be pasted into GeoSyn. For example, you could paste a surface map into your Windows Clipboard and then paste this into GeoSyn.

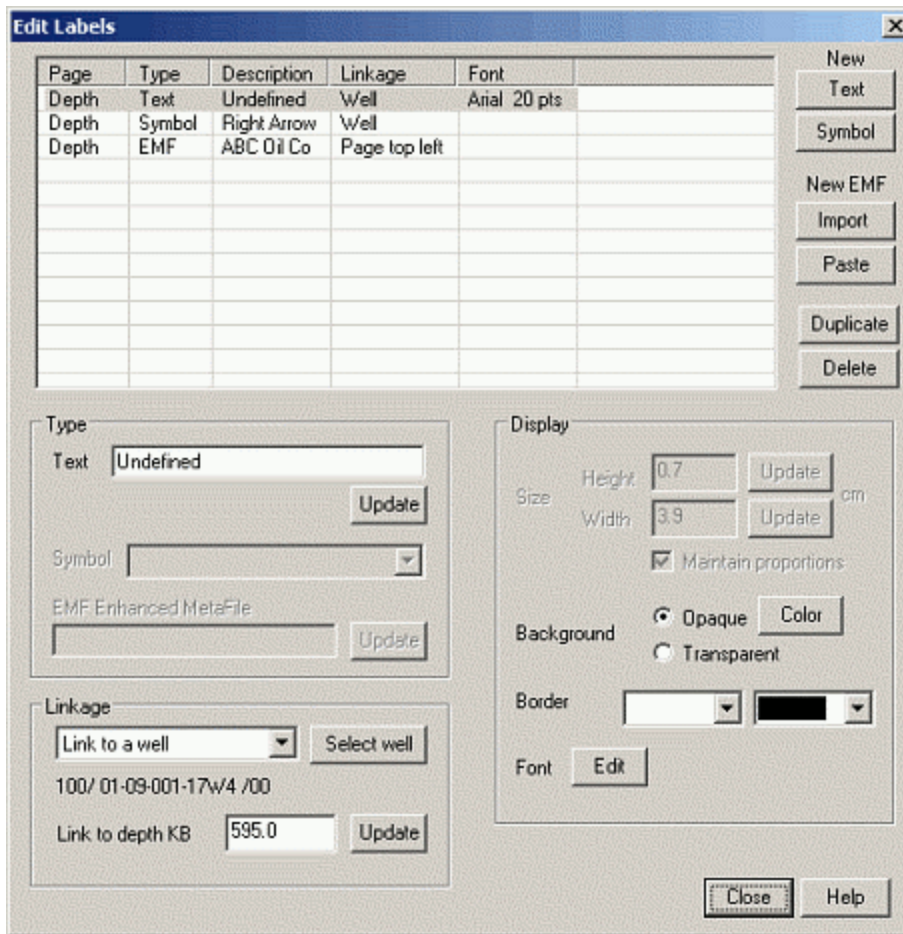
The image or annotation is displayed in either the depth or time page depending from which you launched the Edit Labels dialog box.

Separate procedures for importing images and annotations appear below.

### To import images


1. Open the [Edit labels](#) dialog:
  - Menu: **Edit > Labels**
  - Toolbar: Click 

The [Edit Labels](#) dialog box opens.



2. Click **Import** and browse to the location where the *.emf* file to import is located, select the file, and then click **Open**.
3. Select either an anchor point or **Floating** from the Linkage drop-down list then click **Update**.
4. Click **Duplicate** to create a copy of the selected image that you can anchor to a different location.

### To create annotations or select stock symbols

1. Open the [Edit labels](#) dialog:
  - Menu: **Edit > Labels**
  - Toolbar: Click (  )

The [Edit Labels](#) dialog box opens

2. Click either **Text** or **Symbol** and depending on your selection, do one of the following:

- For annotations, type the text to display in the Text box and select linkage options, then in the Display pane select font, color, and text box display options.
- For symbols, select the type from the Symbol drop-down list and linkage options, then in the Display pane select size, color, and border options.

### Related Topics





["Main display" on page 1](#)

["Changing global properties" on page 4](#)

## Zooming

You can draw the boundary upon which to zoom in the main display.

### To zoom:

1. From the **View** menu, select **Zoom In** ().  
The cursor changes to a magnifying glass (.
2. Click and hold one of the corners that will become your zoom extents then drag the zoom rectangle to the opposite corner of your zoom extents and release the mouse button.
3. Either repeat the above steps to zoom in further or from the **View** menu, select **Zoom Out** () to return to the previous view. If you've zoomed in multiple times, each time you zoom out returns to only the previous view. To return to the original unzoomed view, and provided the last step you did was zoom in, from the **Edit** menu, select **Undo** ().

### Related Topics

["Main display" on page 1](#)

["Changing global properties" on page 4](#)

## Displaying multiple views of individually filtered time sections

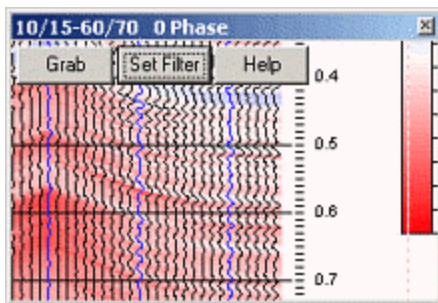
You can use the Port Hole window to capture portions of the time model at different frequencies to determine what frequency and source parameters you'll need in order to see a play.

You can display multiple Port Hole windows containing the same time model portion at different frequencies alongside each other for comparison.

**To display multiple views of individually filtered time sections:**

1. Zoom into the portion of the time model you want to capture. For details, see *Related Topics* below. You can also resize the *Port Hole* window so your zoom measurements don't have to be exact.
2. From the **View** menu, select **Port Hole** (🔍).

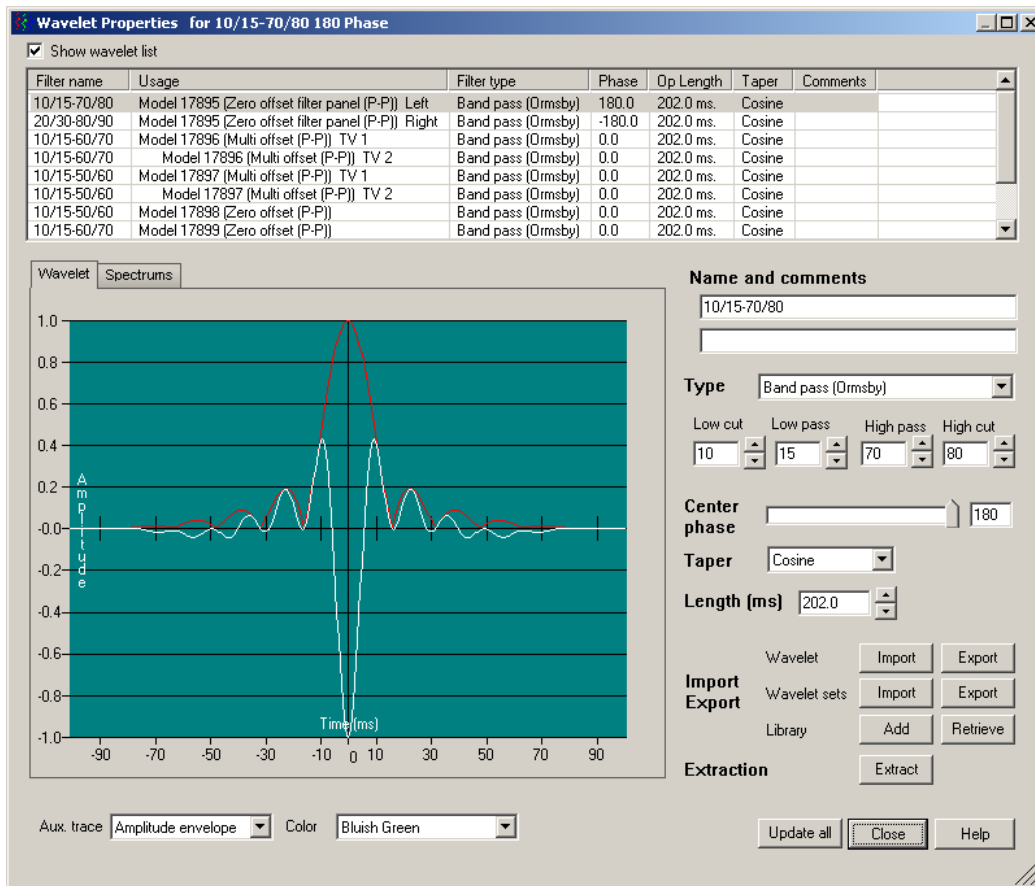
The [Port Hole](#) window appears.



3. Drag the *Port Hole* window over the portion of the time model to capture and resize the *Port Hole* window to contain the portion of the synthetic to capture by dragging the *Port Hole* window borders.
4. Click **Set Filter**.



The [Wavelet](#) dialog box opens.



5. Change the frequency settings and then click **Close** to return to the time model page. For details about setting wavelet properties, see *Related Topics* below.
6. Click **Grab**.
7. Drag the *Port Hole* window to any location on the time page.

To capture additional samples at different frequencies for comparison, repeat from *step 2* above.

## Related Topics

["Zooming" on page 105](#)

["Changing wavelet properties " on page 83](#)

## Working with Wavelets

A seismic wavelet is an approximation of the pulse generated by a source (dynamic, pulse, etc.) as it appears at the given depth and after it has been processed. To generate a synthetic, you must provide a velocity curve and a wavelet. The wavelet is extracted from the seismic data or from standard theoretical wavelets (Ormsby, O'Brien, Klauder, Butterworth, Minimum Phase, Gaussian, or Ricker). The wavelet is then convolved with the reflection series to produce the synthetic.

### Related topics:

- ["Importing wavelets and sets" below](#)
- ["Changing wavelet properties" on page 83](#)
- ["Extracting wavelets" on page 84](#)
- ["Exporting wavelets and sets" on page 144](#)

## Importing wavelets and sets

Import wavelets in ASCII or SEG-Y format and import wavelet sets in .wav format. Wavelets can be saved and imported using a centralized library of wavelets you create. The wavelet library is accessed by all GeoSyn projects.

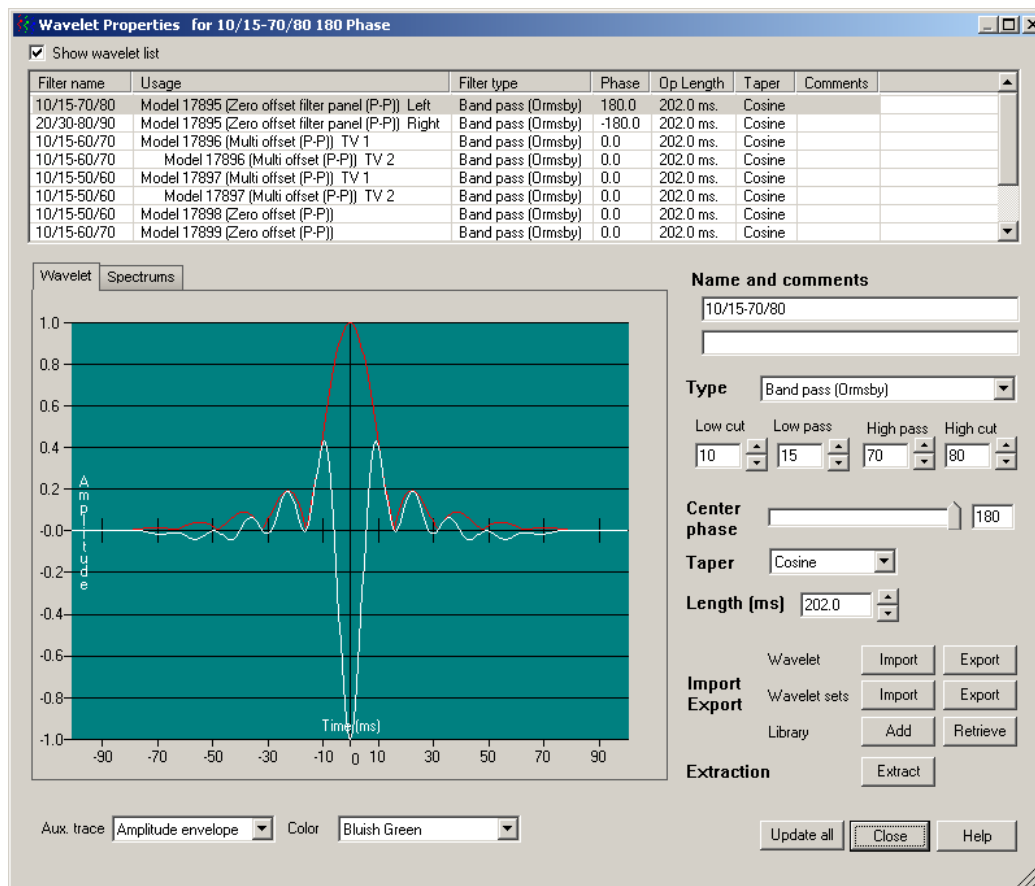
To avoid aliasing, GeoSyn doesn't extract frequency information higher than the Nyquist frequency of either the import data or the current model, whichever is lowest.

Separate procedures for importing wavelets and wavelet sets appear below.

### To import wavelets:

1. From the **Edit** menu, select **Wavelet properties** (.

The [Wavelet Properties](#) dialog box appears.

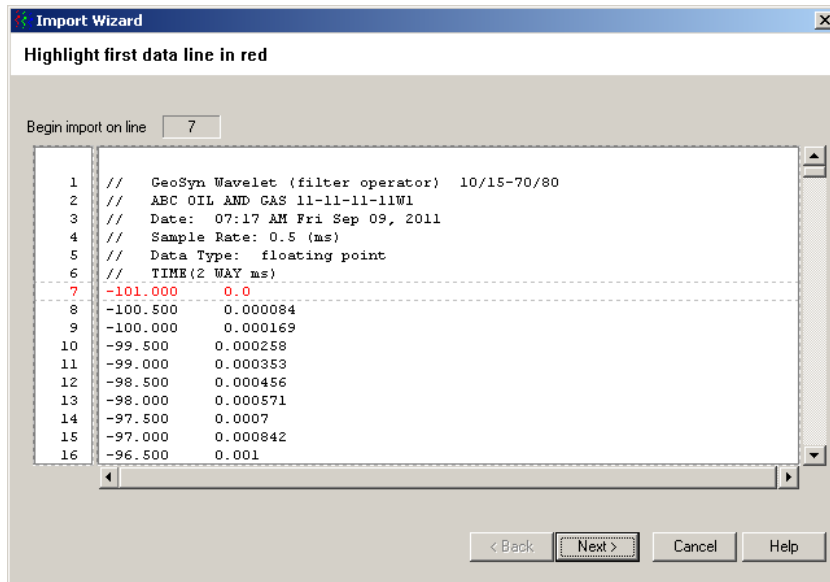


2. In the **Import/Export** pane, click **Import** to the right of the wavelet label to import a wavelet from disk. Alternately, import wavelets from a centralized wavelet library used by all GeoSyn models by clicking **Retrieve** to the right of the **Library** label to display the [Wavelet Library](#) dialog box, where you select the wavelet and then click **Import wavelet**; otherwise, continue with the steps below.

The *Import time data* dialog box appears.

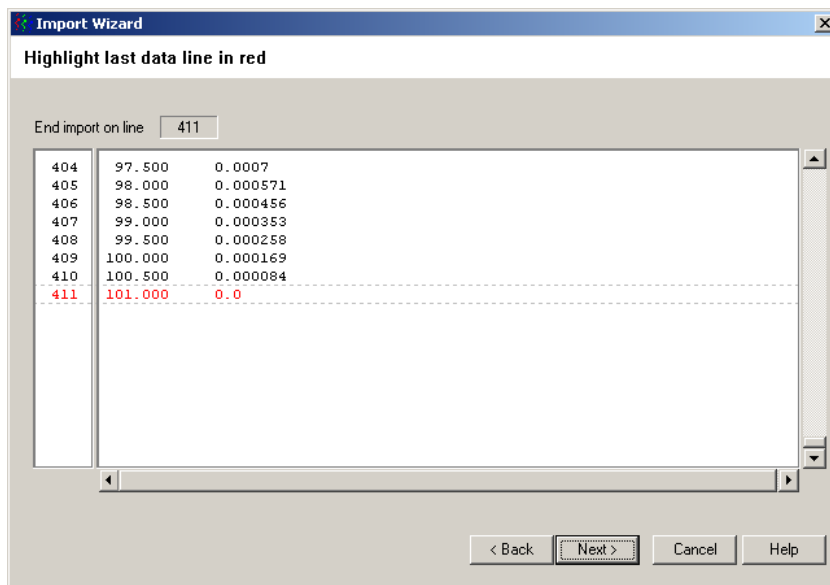
3. In the **Files of type** drop-down list, select whether to import SEGY or ASCII data then browse to and select the file.

If you select a SEGY file, the [Import Wavelet Processing Flow](#) dialog box appears; otherwise, if you select ASCII, the [Highlight First Line](#) dialog box appears.



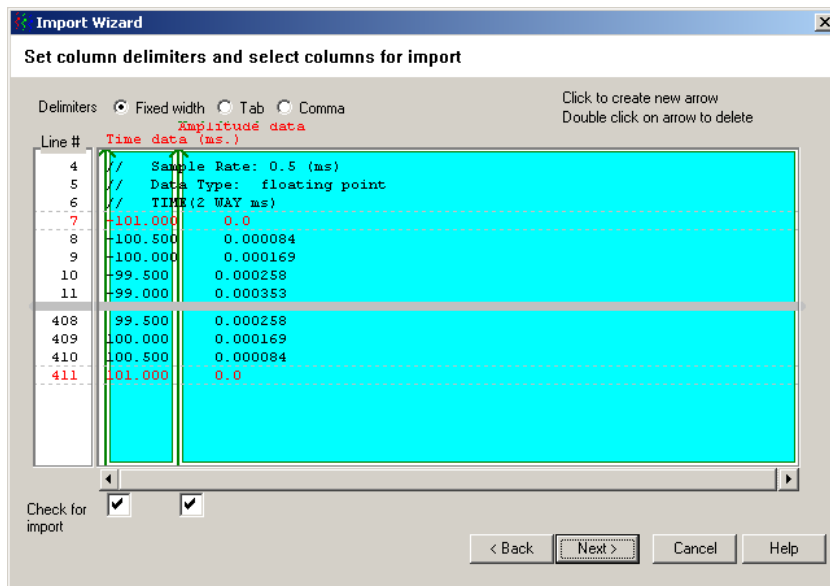
4. Select the first line to import then click **Next**.

The [Highlight Last Line](#) dialog box appears.



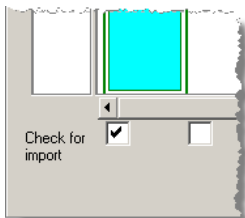
5. Select the last line to import the click **Next**.

The [Set Column Delimiters](#) dialog box appears.



6. Set the column delimiters (↑) by clicking in the display pane between required columns. The green line can't bisect a data column. Double-click column delimiters to delete.

7. Click the box that appears below each delimiter to display the *Select from List* dialog box and identify the data type.



8. Click **Next**.

The [Finish](#) dialog box appears.

The screenshot shows the 'Import Wizard' dialog box with the title 'Finish wavelet import'. It contains three input fields for 'Start time' (-101.000), 'End time' (101.000), and 'Sample rate' (0.5000000). To the right, there are two columns: 'Line number' with values 7 and 411, and 'Total lines' with the value 405. At the bottom, there are four buttons: '< Back', 'Finish' (highlighted with a dashed border), 'Cancel', and 'Help'.

8. Click **Back** to change any previous selections or click **Finish**.

The [Import Wavelet Processing Flow](#) dialog box appears.

The screenshot shows the 'Import Wavelet Processing Flow' dialog box with four numbered steps. Step 1: 'Import Wavelet' with 'Sample rate' (0.5 ms) and 'Operator length' (202.0 ms). Step 2: 'Apply taper during import' with a dropdown set to 'None'. Step 3: 'Calculate phase and amplitude spectrums'. Step 4: 'Create wavelet from phase and amplitude spectrums' with 'GeoSyn sample rate' (0.5 ms), 'Wavelet name' (ABC\_OIL\_AND\_GAS\_11-11-11), 'Operator length' (202.0 ms), and 'Taper' (Cosine). A note at the bottom states: 'Note\* Maximum extracted frequency is the lesser of the import and GeoSyn nyquist frequencies.' At the bottom right are 'OK', 'Cancel', and 'Help' buttons.

9. Specify whether to taper the file on import, the name by which to identify the wavelet, the length of the operator, and then click **OK**.

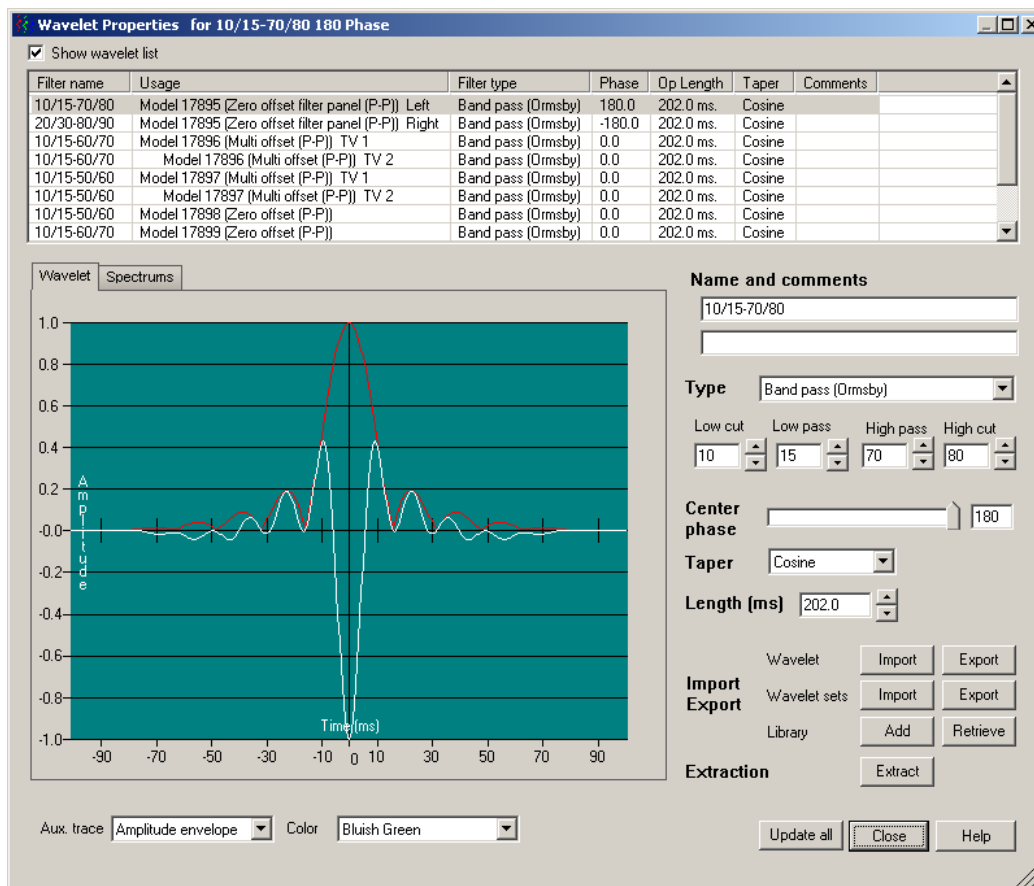
To import wavelet sets

1. From the **Edit** menu, select **Wavelet properties** ()

**OR**

Right-click a wavelet and select **Wavelet properties** from the popup menu.

The [Wavelet Properties: Wavelet](#) dialog box appears.



2. In the **Import/Export** pane, click **Import** to the right of the *Wavelet Sets* label. Alternately, import wavelets from a centralized wavelet library used by all GeoSyn models by clicking **Retrieve** to the right of the *Library* label to display the [Wavelet Library](#) dialog box, where you select the wavelet and then click **Import wavelet**; otherwise, continue with the below steps.

The *Import a wavelet set* dialog box appears.

3. Browse to and select the wavelet file in .wav format then click **OK**.

The *Import Wavelet Groups from Wavelet Set* dialog box appears.

4. Select the wavelet group(s) to import then click **OK**.

## Related Topics


["Changing wavelet properties " on the facing page](#)

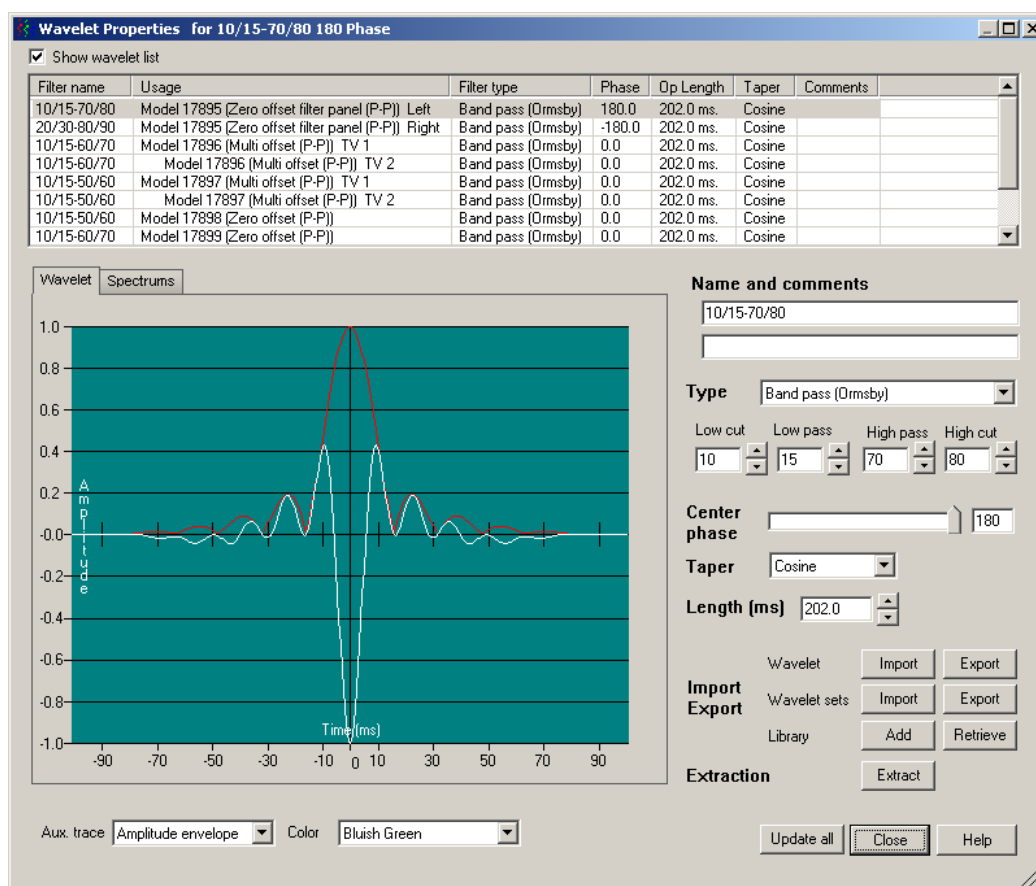
## Changing wavelet properties

Apply up to three filters to different segments of a model and specify the amount of overlap between filters.

To change wavelet properties:

1. Open the [TheWavelet](#) dialog box :

- Menu: **Edit > Wavelet**
- From the toolbar click 

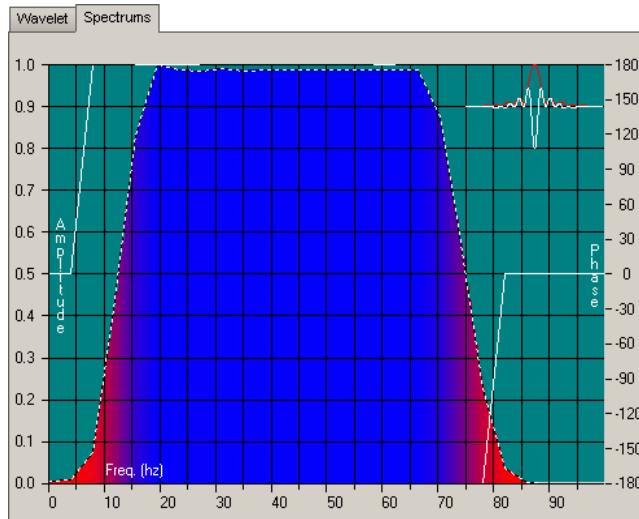


2. From the **Aux. trace** drop-down list, select whether to display a background trace to which to correlate the displayed trace
3. From the **Background** drop-down list, select whether to display a different color scheme.
4. Type a value in the **center phase** box or drag the slider below it.
5. Type a length for the operator, which controls the sample size displayed in the window.



6. To customize the amplitude or phase spectrum of the selected wavelet, click the **Spectrums** tab.

The [Spectrums](#) tab appears.



6. Hover your cursor over the amplitude display then click to define points that describe the modified spectrum.
7. Click either **Amp** or **Phase** to apply the defined points to either, or click **Clear** (or press **ESC**) to exit drawing mode without applying changes.
8. Click the horizontal arrows at the bottom of the view window to change the amount of frequency shown.
9. Click the **Wavelet** tab to review how the changes will appear then click **Close** to apply them to the main display.

### Related Topics

["Extracting wavelets" below](#)

["Importing wavelets and sets" on page 77](#)

## Extracting wavelets

Traces are extracted into zero-phase wavelets using the following process:

During extraction, all import traces are summed and the resulting trace tapered.

Next the import trace is auto-correlated and an operator is extracted from the center. This is likely a non-zero operator at the operator extremities and must therefore also be tapered using either Cosine, Hanning, or Cosine Squared

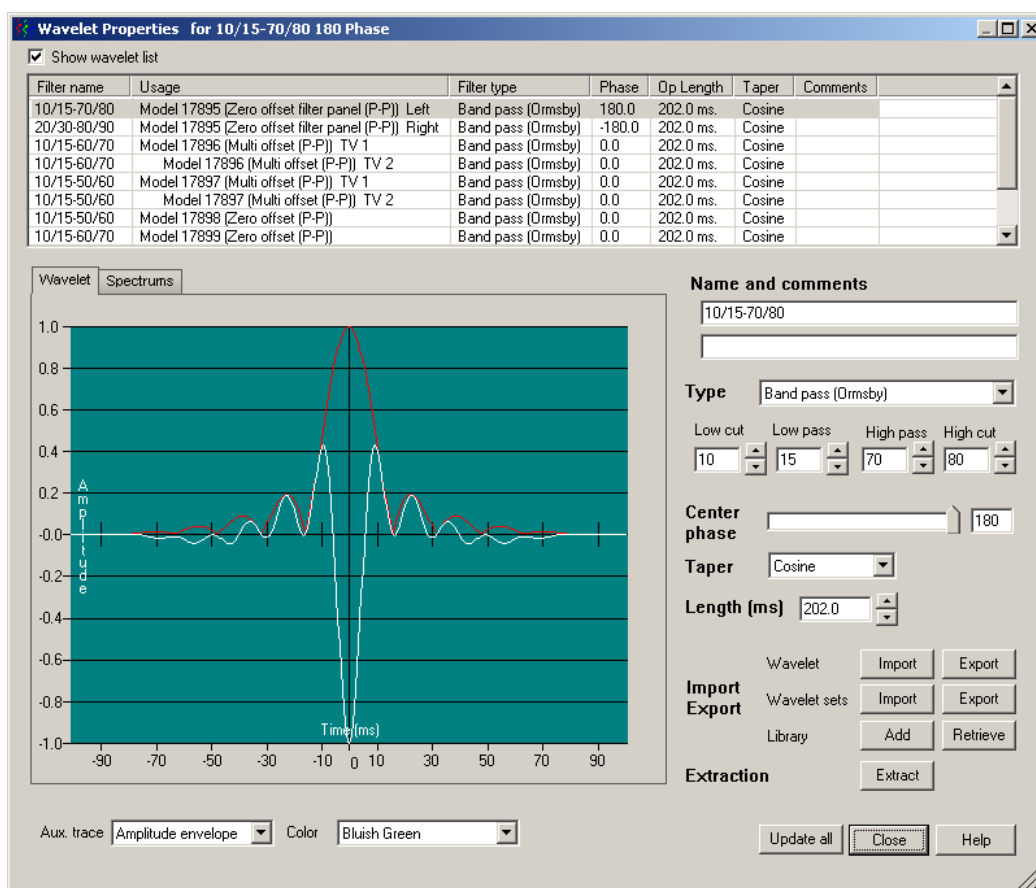
methods. The longer the extracted operator, the more detailed the extraction. You may want to extract the wavelet using long operators (high detail), then shorten the wavelet length after to avoid damaging the amplitude spectrum detail. GeoSyn saves only the amplitude and phase spectrums and calculates time wavelets when required.

Lastly, an amplitude spectrum is calculated from the extracted, tapered wavelet. The phase spectrum is set to zero.

### To extract wavelets:

1. From the **Edit** menu, select **Wavelet** (📡).

The **Wavelet** dialog box appears.

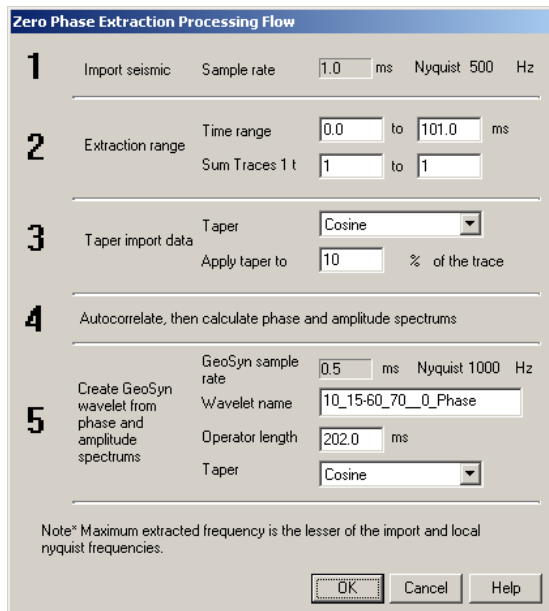


2. Beside the **Extraction** label, click **Extract**.

The **Import time data** dialog box appears.

3. Select the SEGY file with data upon which to base the extracted wavelet then click **Open**.

The [Zero Phase Extraction Processing Flow](#) dialog box appears.



The dialog box is titled "Zero Phase Extraction Processing Flow" and contains five numbered steps:

- 1** Import seismic: Sample rate 1.0 ms, Nyquist 500 Hz.
- 2** Extraction range: Time range 0.0 to 101.0 ms, Sum Traces 1 to 1.
- 3** Taper import data: Taper Cosine, Apply taper to 10 % of the trace.
- 4** Autocorrelate, then calculate phase and amplitude spectrums.
- 5** Create GeoSyn wavelet from phase and amplitude spectrums: GeoSyn sample rate 0.5 ms, Nyquist 1000 Hz, Wavelet name 10\_15-60\_70\_0\_Phase, Operator length 202.0 ms, Taper Cosine.

Note: Maximum extracted frequency is the lesser of the import and local nyquist frequencies.

Buttons: OK, Cancel, Help.

4. Specify the time range and number of traces to sum, the method by which to sum the traces, the length of operator to derive from the summed traces, and the method by which to taper the operator, and then click **OK**.

The extracted wavelet appears in the *Wavelet Properties* dialog box.

### Related Topics

["Changing wavelet properties " on page 83](#)


["Importing wavelets and sets" on page 77](#)

## Exporting wavelets and sets

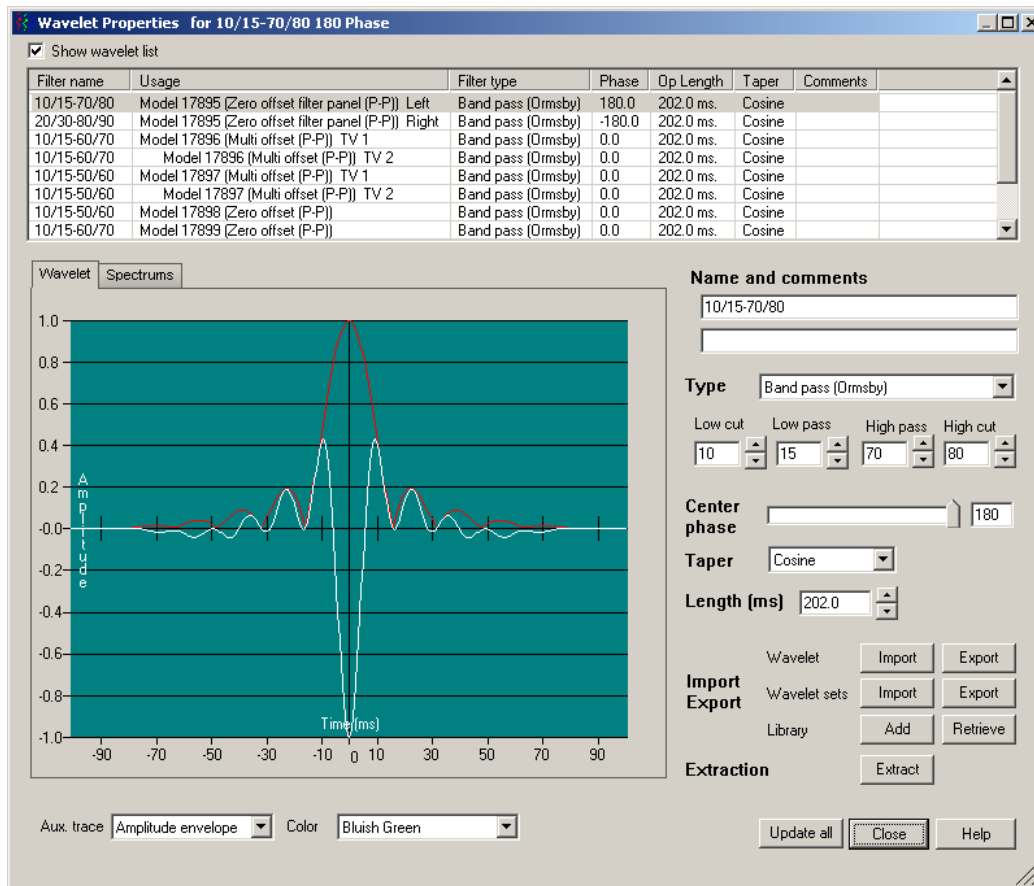
You can export individual wavelets in ASCII or SEG-Y format, or export multiple wavelets bundled as a wavelet set in .wav format. Wavelets can be saved and imported using a centralized library of wavelets you create. The wavelet library is accessed by all GeoSyn projects.

For details on extracting a zero phase wavelet, see *Related Topics* below.

### To export wavelets:

1. From the **Edit** menu, select **Wavelet** (.

The [Wavelet Properties](#) dialog box appears.



2. In the **Selected wavelet attributes** pane, beside **Wavelet**, click **Export**, or click **Add** to the right of the *Library* label to add the wavelet to the centralized *Wavelet Library* shared by all GeoSyn models.

3. Browse to a disk location in which to save the file then click **Save**.

## Related Topics

["Extracting wavelets" on page 84](#)

["Exporting time data" on page 141](#)

## About depth models

A depth model consists of a minimum of two zones, which are closed polygons. You generate zones by either drawing correlations with your mouse, or by using the Create Well Correlations dialog box.

Zones encapsulate velocity fields, which may be generated by interpolating or extrapolating impedance data from wells that intercept a zone, or with a constant impedance value you define. Once zones are created, you can view the resulting time model. You modify zones, correlation nodes, and log readings on the depth page to influence the time model.

Any number of logs can be included in a model, but GeoSyn only uses a single sonic and a single density from each well to create the time model. These logs are called the active sonic and active density. You can select any two logs in each well as active, which enables you to quickly shift between logs that represent different geological scenarios.

## Changing well display properties

Change general properties that apply to all wells, including scale annotations and model trimming, or specific properties that apply to individual wells, including well labels, KB elevations, depth increments, and more.

Drag a well anywhere on the cross section before drawing correlations. After you've drawn correlations, it's more difficult to drag wells because GeoSyn doesn't allow you to move a well across an existing correlation node. If you must cross a correlation when dragging a well, using the Display Parameters: Wells dialog box, duplicate the well then click the cross section in the desired location to place it, and then delete the old well.

To adjust global well display properties:

1. From the **Edit** menu, select **Display Parameters** () > **Wells**.

The [Display Parameters: Wells](#) dialog box appears.

**Well** meters

Width: 2.54 cm Update

Position: 4999.0 m Update

Template: Edit Copy

Space evenly: Update

Sort east to west: Update

**Scale annotations**

Horizontal: Font

Vertical: 250 Font

Markers: Major: None Minor: None

**Header anno.** Depth Time

**Operations**

Trim well: ☐ by KB ☒ by SS

above: 669.67 Update

below: -39.53 Update

**Well list** Select all

Num	Unique Well Identifier (UWI)	Label 1
1	102/ 06-01-098-05w/6 /00	CNRL 102 B0THA 6-1-98-5
2	100/ 06-01-098-05w/6 /00	SHELL B0THA 6-1-98-5
3	102/ 06-01-098-05w/6 /00	CNRL 102 B0THA 6-1-98-5
4	100/ 04-12-098-05w/6 /00	CNRL B0THA 4-12-98-5

Export Logs Tops Properties Duplicate Delete

Close Help

2. **CTRL+CLICK** or **SHIFT+CLICK** the wells to modify in the Well list pane.  
Only options that can be applied to multiple wells remain active in the dialog box.
3. Select the display options to apply to the selected wells then click **Close**.

### To adjust single well display properties

1. In the depth model, right-click a well and select **Well properties**.

The [Well Properties: Well properties](#) dialog box opens.

The screenshot shows the 'Well Properties' dialog box with the 'Well properties' tab selected. The title bar reads 'Well Properties 100/ 11-11-011-11W1 /00'. There are three tabs: 'Well properties', 'Log properties', and 'Directional properties'. The 'Labels' section contains a 'Unique Well Identifier' field with '100111101111W100', a dropdown with '100/ 11-11-011-11W1 /00', and an 'Edit' button. Below this are two text fields for 'Labels' containing 'ABC OIL AND GAS 11-11-11-11W1' and '00/11-11-011-11W1/0', and another text field containing 'ABC OIL AND GAS LTD.'. The 'Status' section has a radio button for 'Dry and abandoned' (which is selected) and a checked checkbox for 'Retrieve from AccuMap database'. The 'Well parameters' section includes 'KB elevation' (999.9 m) and 'Depth inc.' (0.2 m). It also has a table for KB and SS elevations: KB Top (460.2 m), KB Bottom (2457.2 m), SS Top (539.7 m), and SS Bottom (-1457.3 m). The number of depth points is 9986. There are checkboxes for 'TVD corrected' and 'Calculate bottom hole position from directional survey', both of which are unchecked. Buttons for 'Import directional survey', 'Edit' (for Tops), and 'View' (for Editing history) are present. The 'Position' section has a dropdown set to 'Calculate from UWI (NAD27,Canada only)' and an 'Edit' button. At the bottom, there are buttons for 'Update All', 'Close', and 'Help'.

	KB	SS	
Top	460.2	539.7	m
Bottom	2457.2	-1457.3	m

# depth points 9986

2. Select the desired options then click **Close**.

### Related Topics

["Editing correlations" on page 98](#)

["Changing deviated well properties" on page 28](#)

["Trimming models" on page 104](#)

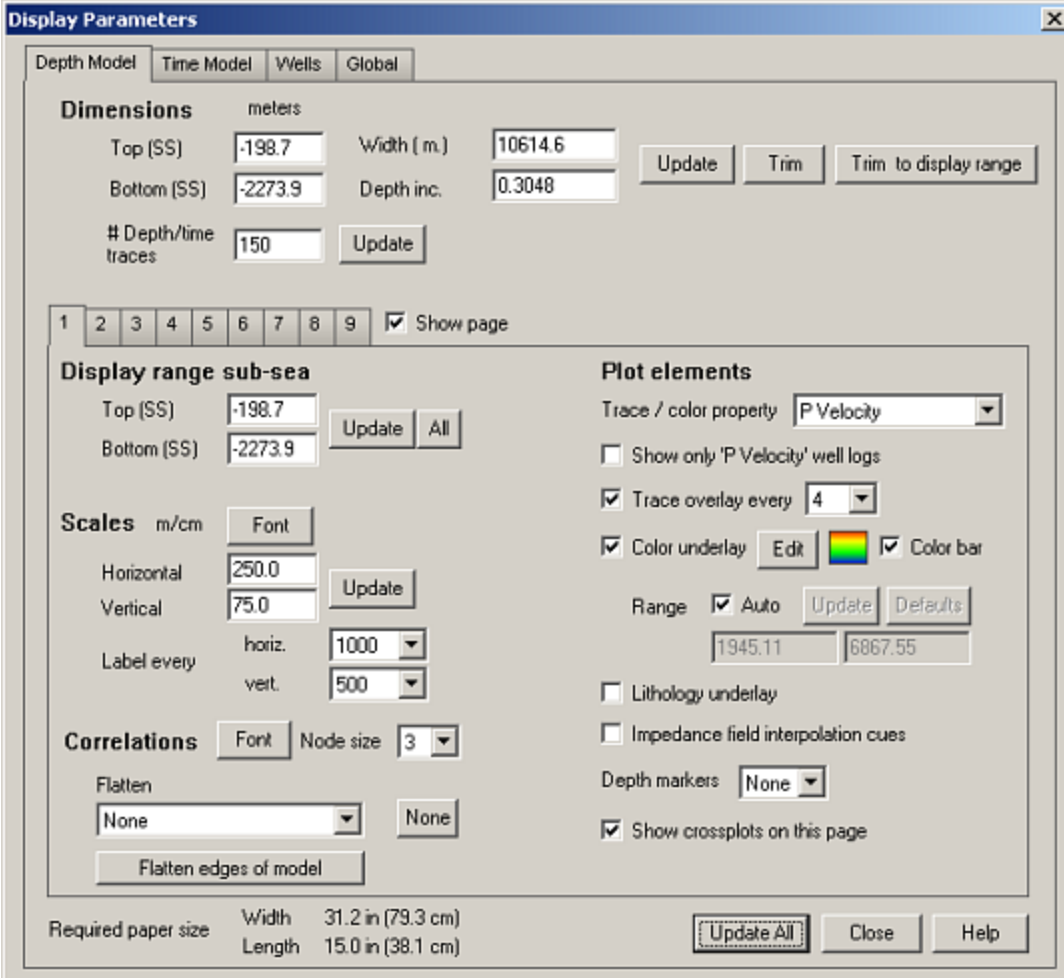
# Changing depth models

Set depth model properties including the overall size of the canvas, the depth increment with which to resample the impedance field, properties for scales, traces, correlations, and correlation nodes.

## To change depth models:

1. From the **Edit** menu, select **Display parameters** (.

The [Display Parameters: Depth Model](#) dialog box appears.



**Display Parameters**

Depth Model | Time Model | Wells | Global

**Dimensions** meters

Top (SS)  Width (m.)  Update Trim Trim to display range

Bottom (SS)  Depth inc.

# Depth/time traces  Update

1 2 3 4 5 6 7 8 9 ☒ Show page

**Display range sub-sea**

Top (SS)  Update All

Bottom (SS)

**Scales** m/cm Font

Horizontal  Update

Vertical

Label every horiz.  vert.

**Correlations** Font Node size

Flatten  None

Flatten edges of model

**Plot elements**

Trace / color property

☐ Show only 'P Velocity' well logs

☒ Trace overlay every

☒ Color underlay Edit ☒ Color bar

Range ☒ Auto Update Defaults

☐ Lithology underlay

☐ Impedance field interpolation cues

Depth markers

☒ Show crossplots on this page

Required paper size Width 31.2 in (79.3 cm) Length 15.0 in (38.1 cm)

Update All Close Help

2. To change the size of the main display, you can either drag and drop the canvas borders, type different dimensions above, click **Trim** and type a start or stop depth, or type a different display range above. Trimming the model deletes well and correlation data with which the new model borders intersect, while resizing the display simply moves the canvas borders without affecting the underlying data. For details, see



*Related Topics* below.

3. Select a tab to configure and select **Show page** so that the tab also appears as a tab in the main window. To copy elements from one tab to another, select the elements from the **Select a copy option** drop-down list and then click **Copy**. Note that this can be used to update the existing tab with settings from another or to replicate settings from the current tab to another.
4. Select the options to define a geologic scenario, and then click **Update All**.

### Related topics

- ["Trimming models" on page 104](#)
- ["Creating correlations" on page 94](#)
- ["Changing log display properties" on page 106](#)
- ["Changing time models" on page 70](#)
- ["Configuring Zones" on page 100](#)
- ["Changing well display properties" on page 88](#)
- ["Printing models" on page 140](#)

## Displaying images and annotations

GeoSyn enables you to create text annotations and import or select stock images to display in either the depth or time pages. You control the display options of all annotations and images from a single dialog box.

A metafile image pasted into your Windows Clipboard in another application by pressing ALT+PRINT SCRN can be pasted into GeoSyn. For example, you could paste a surface map into your Windows Clipboard and then paste this into GeoSyn.

The image or annotation is displayed in either the depth or time page depending from which you launched the Edit Labels dialog box.

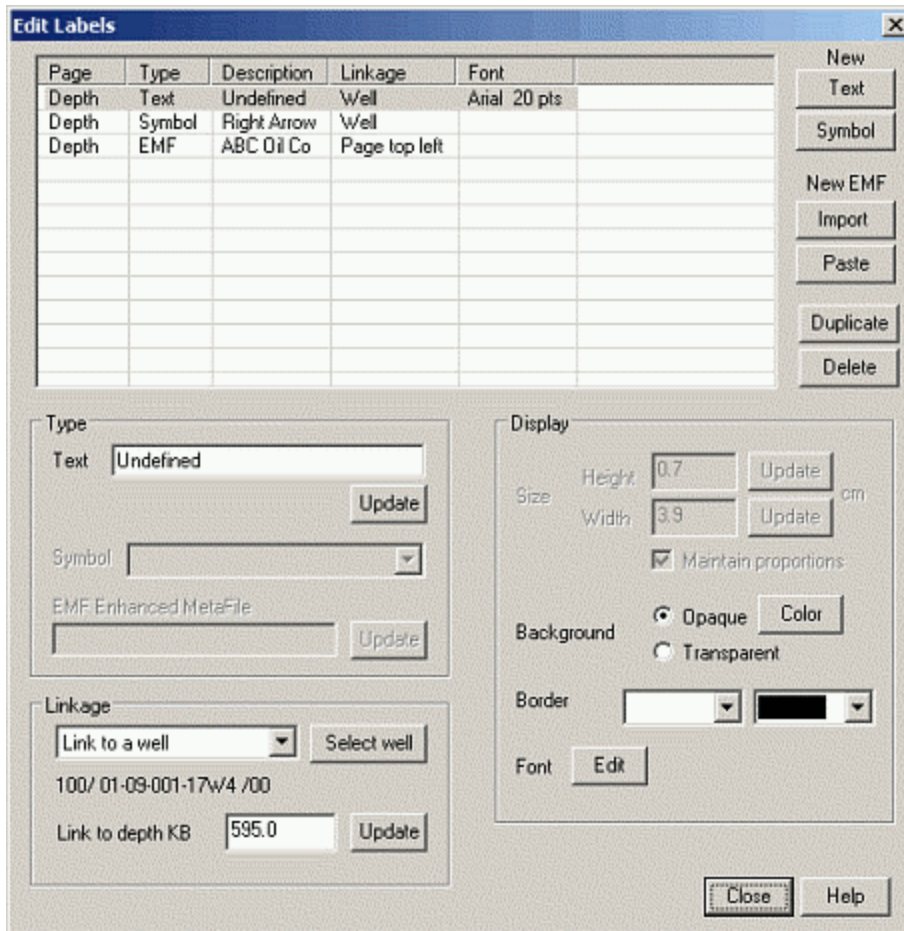
Separate procedures for importing images and annotations appear below.

### To import images

1. Open the [Edit labels](#) dialog:

- Menu: **Edit > Labels**
- Toolbar: Click (🏷️)

The [Edit Labels](#) dialog box opens.



2. Click **Import** and browse to the location where the *.emf* file to import is located, select the file, and then click **Open**.
3. Select either an anchor point or **Floating** from the Linkage drop-down list then click **Update**.
4. Click **Duplicate** to create a copy of the selected image that you can anchor to a different location.

### To create annotations or select stock symbols

1. Open the [Edit labels](#) dialog:
  - Menu: **Edit > Labels**
  - Toolbar: Click (🏷️)

The [Edit Labels](#) dialog box opens

2. Click either **Text** or **Symbol** and depending on your selection, do one of the following:
  - For annotations, type the text to display in the Text box and select linkage options, then in the Display pane select font, color, and text box display options.
  - For symbols, select the type from the Symbol drop-down list and linkage options, then in the Display pane select size, color, and border options.

### Related Topics

["Main display" on page 1](#)

["Changing global properties" on page 4](#)


## Creating correlations

After importing wells into your depth page, you draw correlations either using your mouse, the Create Well Correlations dialog box, or the Correlation Wizard. Correlations are used to establish the boundaries of zones, and zones encapsulate velocity fields. For details about zones, see *Related Topics* below.

Draw correlations that span the entire cross section and that replicate horizons, or draw correlations to replicate geological anomalies such as inter-well channels.

The border of the depth page canvas is one large correlation and the outside border of each well another. Crossing these objects with a correlation line automatically latches the correlation line to the canvas or the well border. Crossing an existing correlation line while drawing a new correlation line latches the new correlation line to the existing one and ends the current correlation.

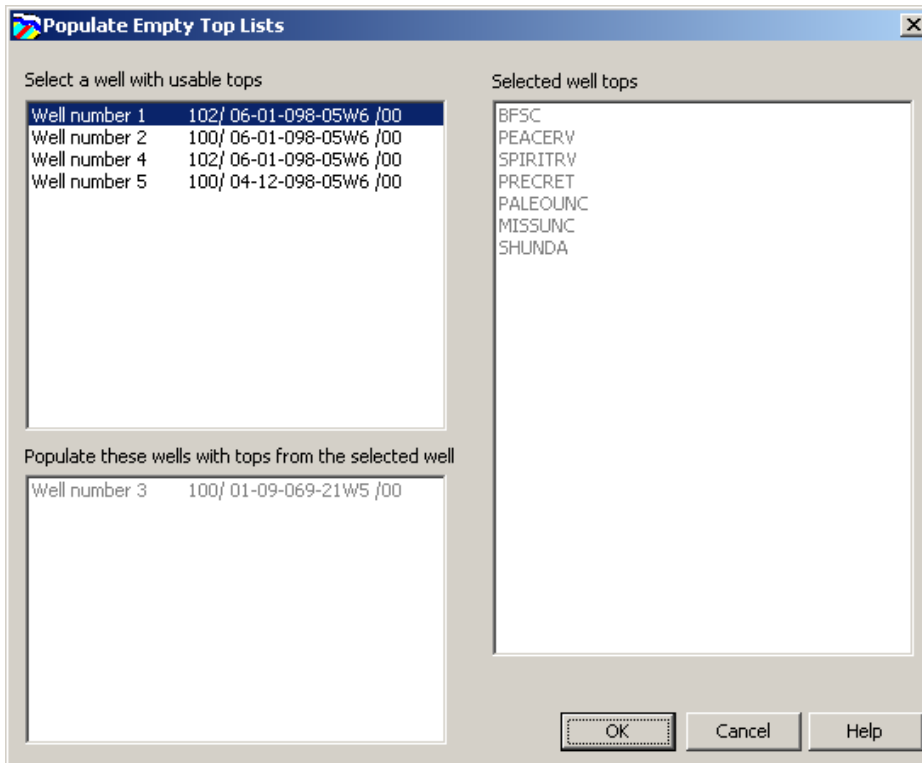
GeoSyn can't generate a time model without at least one correlation that horizontally spans the entire depth page canvas creating an upper zone and a lower zone.

Before creating correlations, from the **Edit** menu, select **Display Parameters** () and ensure that **Color Underlay** is selected, but that **Range Auto** is cleared.

### To create a correlation using the Create Well Correlations dialog box:

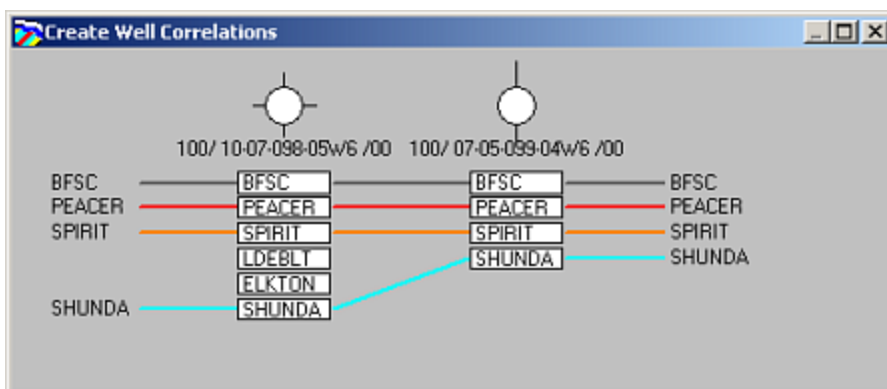
Using the *Create Well Correlations* or *Correlation Wizard* dialog boxes enables you to latch correlations more accurately than using your mouse.

If a well doesn't have any tops, GeoSyn prompts you to populate the well's empty top list with tops from another well. The [Populate Empty Top Lists](#) dialog box appears. Select the well with the tops with which to populate wells without tops, and then click **OK**.



1. From the **Edit** menu, select **Correlate Wells** (🔗).

The [Create Well Correlations](#) dialog box opens.



2. Do any of the following:

To create a new correlation, click **Start** in the Create Well Correlations toolbar. Working from left to right, click the top to which to latch the correlation within the

desired wells. You don't have to include each well in your correlation.

The correlation automatically ends after you click the last well. To end a correlation without latching it to the right-most well, in the Create Well Correlations toolbar, click **End**.

To change the top properties, right-click the top name and select **Edit top N**, where **N** is the name of the top to edit, and then change the top properties in the *Top Properties* dialog box (for details, see *Related Topics* below).

Each correlation takes its name from the left-most top in the correlation.

### To create a correlation using the Correlation wizard:

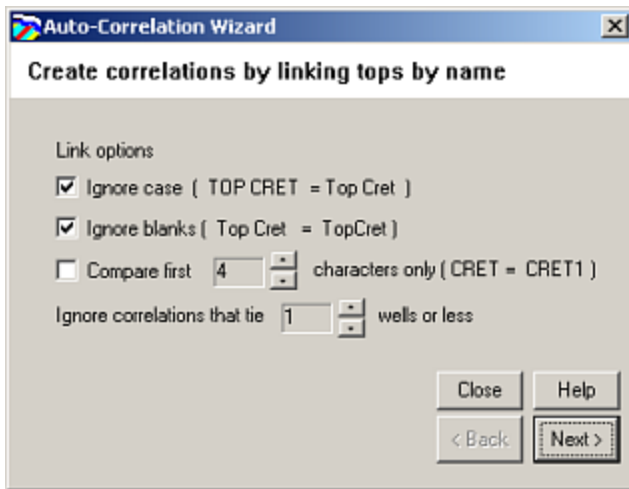
1. From the **Edit** menu, select **Correlate Wells** (🔗).

The [Create Well Correlations](#) dialog box appears.

2. In the toolbar beside the *Create Well Correlations* dialog box, click **Auto Cor Wizard**.



The [Auto-Correlation Wizard](#) dialog box appears.



3. Specify the criteria by which to link correlations then click **Next**.

GeoSyn displays the number of complete and partial correlations.

Click **Back** to select further criteria in the *Correlation Wizard* dialog box above, or click **Apply** to create the correlations.

Each correlation takes its name from the left-most top in the correlation.

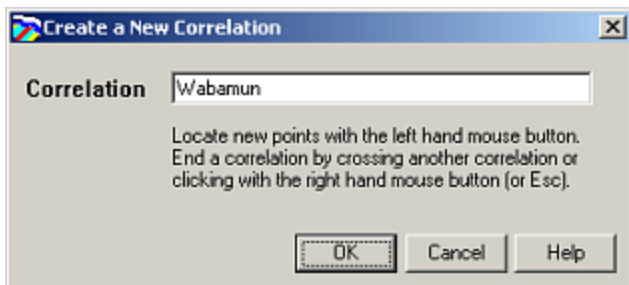
If your model becomes corrupted, launching the *Correlation Wizard* and then closing it without applying any correlation changes will correct it, although you'll have to recreate any inter-well nodes.

To create a correlation using the mouse

Although you can create correlations without a well in the depth model, you'll typically create correlations using only your mouse when drawing geologic anomalies such as channels.

1. From the **Edit** menu, select **New Correlation** (↵).

The [Create a New Correlation](#) dialog box appears.



2. Type a name for the correlation or accept the automatically generated number and then click **OK**.

3. Click to the left of the left-most vertical scale to establish the start of the correlation then click the right-most border of the first well to latch the correlation to this well.

A new top with the same name as the correlation you specified above appears in the well. This top is also created in the GeoSyn 2D Tops list.

4. Click to the right of each remaining well to latch the correlation at the desired depth then click to the right of the right-most vertical scale to create a correlation that horizontally spans the entire depth model. You can't skip over a well when correlating.

To create a partial correlation that doesn't span the entire depth model, after clicking to establish the final node, either press ESC, or cross the current correlation line over itself by dragging the cursor left of the last node you established and click. Also note though that correlations that don't horizontally span the entire cross section and don't cross over themselves to encapsulate a velocity field don't affect the time model.

To tie the current correlation to an existing correlation, cross the new correlation line over the existing correlation line and click.

Two zones are automatically created on either side of the correlation line you drew.

### Related Topics

["Editing correlations" below](#)

["Configuring Zones" on page 100](#)

["Changing tops properties" on page 31](#)

## Editing correlations

You access most correlation editing functionality by right-clicking a correlation on the depth page.

### To edit correlations:

Right-click the correlation to modify and select from the following:

- **Edit correlation**, to display the [Edit Correlations/Nodes](#) dialog box and specify the name and display style of the correlation and depth of nodes along it.
- **Delete** to remove the entire correlation. To restore a deleted correlation recently after deleting it, select **Edit > Undo > Delete a correlation**.
- **Break** to display the [Break Old Correlation, Rename New Correlations](#) dialog box and type names by which to identify the segments left and right of the break. The break occurs where you right-clicked the segment. Segments keep the names you type here even after they're attached to a different segment or reconnected.  
If the correlation you break defines a zone, the zone is deleted.
- **Extend** to change your cursor to a cross-hair (✂) with which you click to define nodes. If neither end of the correlation are latched to a well or to the models vertical scale, a dialog prompts you whether to extend the left or right node.  
You can continue to create nodes until your cursor crosses either an existing correlation or the vertical scale of the depth model. In both cases the correlation will latch and if possible, create a zone.  
You can reconnect broken nodes by either selecting **Extend** or by simply dragging the node nearest the break over an existing correlation so it latches.
- **Add a node**, to place a node on the location you right-clicked. Adding nodes enables you to increase precision when defining geological anomalies.

### Related Topics

["Configuring Zones" on the next page](#)

["Changing tops properties" on page 31](#)




## Configuring Zones

A zone is a closed polygon with the physical dimensions of depth vs. offset between two correlated wells. The impedance characteristics of the zone depend on whether that zone intersects a well bore. If it does, the impedance characteristics are the interpolated velocity and density logs. If it doesn't, such as an inter-well channel, the impedance characteristics are a static (blocked) velocity and density value. The boundaries of zones are highlighted yellow when you hover the mouse over one in the main interface. The sub-zones are highlighted blue.

When GeoSyn is first launched you see a blank page. A minimum of one correlation, running from one side of the model to the other is required to create the minimum two zones necessary to create a valid model. A model can be comprised of any number of complete zones and sub-zones.

Within the zone (the polygon that runs the entire length of multiple correlated wells) are sub-zones, which exist between each well. While the boundaries of zones are highlighted yellow when the mouse is hovered over them, the boundaries of sub-zones are highlighted blue. The interpolation of zones and sub-zones can be configured separately. Sub-zones allow for more granular interpretation.

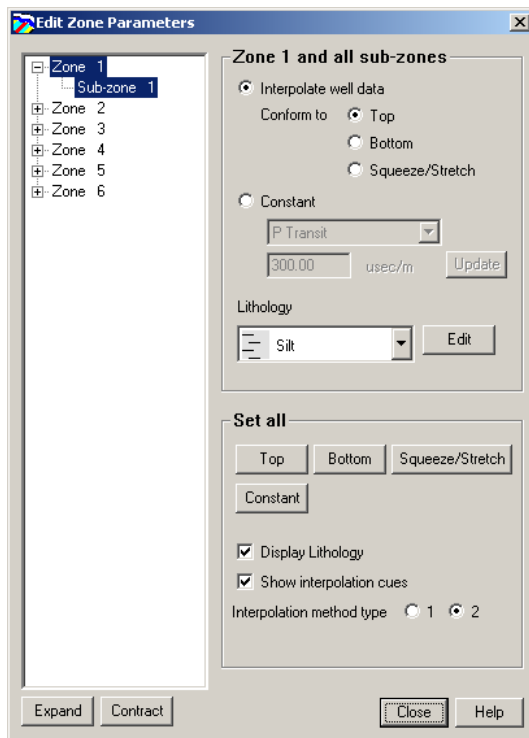
### To configure zones:

1. After creating a correlation (for details, see *Related Topics* below), from the **Edit** menu, select **Zones** ()

**OR**

Right-click a zone and select either **Zone Interpolation** or **Sub-zone Interpolation** from the context menu.

The [Edit Zone Parameters](#) dialog box appears.



2. In the zone list, select the zone with which to work. As you select a number, the corresponding zone is highlighted on the depth page.

Overlapping zones can corrupt your GeoSyn model. A quick way to locate corrupt zones is to display the *Edit Zone Parameters* dialog box and select each zone number in the zone list (or click each zone on the depth page) to verify it is highlighted on both the depth page and in the zone list. Any zones that aren't highlighted can be deleted on the depth page.

3. For zones that intersect a well bore, select whether the zone impedance should be interpolated from the bottom of the zone upwards (to simulate offlap), from the top of the zone downwards (to simulate onlap), or by stretching and squeezing (to simulate compaction). Note that onlap and offlap are loosely applied stratigraphic definitions which won't hold true in situations where there are overturned beds.

You can apply the same impedance characteristics to all zones in the model by clicking one of the buttons in the Set all pane.

4. Select whether to fill the zone with a specific lithology and whether to display that lithology on the depth page. To change the display color of any lithology throughout this and future models, click **Edit** to display the [Edit Lithology](#) dialog box.
5. Select whether arrows appear on the depth page indicating the direction of interpolation and whether to use interpolation algorithm **1** (recommended) or **2** (thinning zone with a large horizontal impedance gradient). Click [Interpolation Method](#) for a sample of how the two methods interpolate zones differently.

### Related Topics

["Creating correlations" on page 94](#)

## Flattening correlations

You can flatten either the depth model or the time model along any correlation that spans the entire cross section. Being able to flatten along a correlation that represents an established time marker or a formation with which you're familiar enables you to see how the flattened formation, and those below it, looked when the formation was initially deposited.

You can draw channels along a flattened formation and then remove flattening to see what effect time and deposition has had on adjacent formations on the depth page and on synthetic traces on the time page. When you flatten or remove flattening on a correlation, GeoSyn automatically inserts inflection points into correlations above and below the correlation you changed so you can easily determine impact. These inflection points are automatically removed when you remove flattening.

You can flatten on different horizons on the depth page and the time page. Flattening on one page has no effect on the other.

When flattening on the time page, GeoSyn interpolates the velocity field above the wells by extending the last few values on each log. You can flatten on an upper-horizon to tame the variable velocity field, which looks like an ocean wave and is caused by the above interpolation.

### To flatten correlations:

With a correlation that horizontally spans the entire cross section, in either the depth page or the time page, right-click the correlation and select **Flatten N** from the shortcut menu, where **N** is the name you assigned to the correlation when creating it.

For details on drawing channels using correlations, see *Related Topics* below.

---

**Note:** To remove flattening, right-click the correlation and select **Remove flattening**.

---

### Related Topics

["Creating correlations" on page 94](#)

## Trimming models

Change the depth range of the depth model by using the Display Parameters: Depth Model dialog box and either typing a new depth range in the Dimensions area, or by clicking Trim Model. While clicking Trim Model automatically deletes all correlations, nodes, and well data outside of the trim range, typing new dimensions won't reduce the model depth range if it entails deleting data.

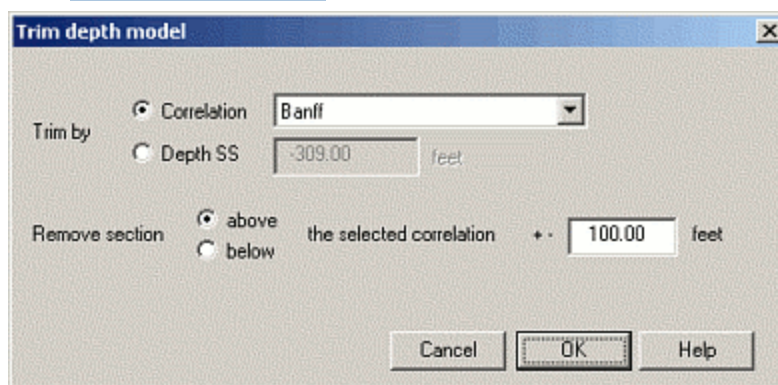
Instead of trimming the depth model, reduce the portion of the depth model that's displayed by typing values in the Display Range pane of the Display Parameters: Depth Model dialog box. Changing the display range doesn't delete anything, it merely hides the top or bottom of the model. You can also change the display range by hovering your mouse over the top or bottom canvas border until the cursor changes to a cross hair (↕↔), and then dragging the canvas border.

If trimming by subsea values instead of by correlation marker, ensure you remove flattening from your cross section because the Trim Depth Model dialog box trims using true subsea values while flattening references the correlation upon which you flatten as zero.

### To trim models:

1. Right click the correlation above or below which to trim and from the shortcut menu, select **Trim model above correlation** or **Trim model below correlation**.

The [Trim Depth Model](#) dialog box opens.



2. Select whether to trim based on a specific correlation or by subsea depth, and the amount of buffer to leave between the trim line and the correlation, and then click **OK**.

## Related Topics





["Creating correlations" on page 94](#)

["Cutting logs" on page 128](#)

## Zooming

You can draw the boundary upon which to zoom in the main display.

### To zoom:

1. From the **View** menu, select **Zoom In** ().  
The cursor changes to a magnifying glass ().
2. Click and hold one of the corners that will become your zoom extents then drag the zoom rectangle to the opposite corner of your zoom extents and release the mouse button.
3. Either repeat the above steps to zoom in further or from the **View** menu, select **Zoom Out** (). If you've zoomed in multiple times, each time you zoom out returns to only the previous view. To return to the original unzoomed view, and provided the last step you did was zoom in, from the **Edit** menu, select **Undo** ().

## Related Topics

["Main display" on page 1](#)

["Changing global properties" on page 4](#)

## Changing log definitions

GeoSyn maintains a centralized database file of log definitions (*LogInit50.gld*) where you can customize settings such as:

- Track widths
- Scales
- Aliases
- Color fills
- Several others

Settings are applied only to new models whose log settings have not already been defined in the import defaults file.

### To change log defaults:

1. Open the [Properties: Log Definitions dialog box](#) **Edit > Configuration properties > Log Library**.
2. In the tree displayed, click the plus sign (+) beside the appropriate node to expand it and view current configuration details.
3. Click **Edit curve** to open the [Edit Default Display Properties](#) dialog box
4. Configure the curve properties then click **OK** to return to the *Properties: Log Definitions* tab.
5. Click **Close** to return to the main display. The changes you made are applied to future models providing a different setting doesn't exist in the import defaults file for that model.

## Import defaults file

The import defaults file usually contains all default settings except those that apply to logs. When you update the import defaults file with settings from the current model, settings for log types in the current model are also written to it. Log settings in the import defaults file override, but don't overwrite settings in the log definitions database.

When GeoSyn creates a model, it first checks whether display settings for the logs upon which the model will be based exist in the current import defaults file. If they do, GeoSyn uses them instead of the settings in the log database.

### Related Topics

["Changing import defaults" on page 13](#)

["Changing log display properties" below](#)

## Changing log display properties

Change the display properties of logs in the current model including label information, which logs are the active sonic and density, and other details. The term Active denotes the log upon which the model is based. If you have several sonic logs with different geological scenarios in one model, for example, you can switch which of the sonic logs is the active one to see what affect it has on the model.

Create new logs or duplicate logs and modify existing logs. These changes affect only the current model, not log defaults for new models. For details on changing log defaults and import defaults, see *Related Topics* below.

## To change log display properties:

1. In the depth page, right-click the log to modify and select **Log properties** from the shortcut menu.

The [Well Properties: Log properties](#) dialog box appears.

Show	Alias	Display name	Active	Derived	Scale range	Units	Raw data range	Intg.
<input checked="" type="checkbox"/>	AC	SONIC	Yes	No	Auto Range	usec/m	138.16 to 535.7	154.
<input checked="" type="checkbox"/>	DEN	DENSITY	Yes	No	1500.0 to 3000.0	kg/m3	1601.3 to 2992.1	1695
<input checked="" type="checkbox"/>	DTOS	SHEAR SONIC	Yes	Yes	600.0 to 100.0	usec/m	197.35 to 2289.2	226.
<input checked="" type="checkbox"/>	RILD	DEEP INDUCTION	Yes	No	0.2 to 2000.0	ohmm	0.757 to 6181.6	0.91
<input checked="" type="checkbox"/>	AC	SONIC	No	Yes	2000.0 to 7000.0	m/sec	8806.6 to 722.31	8449
<input checked="" type="checkbox"/>	DTOS	SHEAR SONIC	No	Yes	500.0 to 4000.0	m/sec	5067.1 to 436.83	4424

**Name** SONIC ☐ Derive using Gardner's relationship  
**Type** ☒ Active SONIC  
**Alias/API** AC 07 520 80 00  
**Units** usec/m ☒ Transit ☐ Velocity  
**Scales** 535.7 138.16 Defaults ☒ Auto  
 Linear Background ☒ Show offscale  
**Infill** Lithology left ☐ Edit  
☒ XPlot underlay link

**Trace** Color Black Pattern Thickness  
**Track width** 2.54 cm **Font** Edit  
**Properties common to all logs**  
 Description options User defined name  
 Depth markers (KB) Major None Minor None  
 Track layout ☒ One ☐ Multiple logs / track Edit  
 Update All Close Help

2. In the display pane, select the log(s) to modify using the controls below. **SHIFT+CLICK** or **CTRL+CLICK** for multiple selection. You can duplicate and modify selected logs, and also clear logs in the *Show* column to save them with the model but hide them from the main display.
3. In the **Properties common to all logs** pane, specify label and scale information. Although the One log/track option appears, you can't select it.
4. In the **Log properties** pane, specify log associations such as the type of log, whether it's the active sonic or density, and whether it measures transit time or velocity, and then click **Close**.

## Related topics

["Changing log definitions" on page 105](#)

["Changing import defaults" on page 13](#)

["Changing Color Palettes" on page 64](#)



["Combining logs in tracks" on the facing page](#)

## Combining logs in tracks

Logs can occupy either separate tracks in the main display or can share tracks to save work space. GeoSyn enables you to specify the logs to display in up to ten tracks and displays an unlimited number of logs in any track. The same log can be repeated in multiple tracks.

With a left and right log defined in the same track, select cross over options and adjust the horizontal placement of the logs to infill areas where the two logs overlap.

Save composite log layouts with different configurations as templates with a *.tpl* extension in the GeoSyn *Working* directory.

### To combine logs in tracks:

1. In the depth page, right-click the log to modify and select **Log properties** from the shortcut menu.

The [Well Properties: Log properties](#) dialog box appears.

Show	Alias	Display name	Active	Derived	Scale range	Units	Raw data range	Intg.
<input checked="" type="checkbox"/>	AC	SONIC	Yes	No	Auto Range	usec/m	138.16 to 535.7	154.
<input checked="" type="checkbox"/>	DEN	DENSITY	Yes	No	1500.0 to 3000.0	kg/m3	1601.3 to 2992.1	1695
<input checked="" type="checkbox"/>	DTOS	SHEAR SONIC	Yes	Yes	600.0 to 100.0	usec/m	197.35 to 2289.2	226.
<input checked="" type="checkbox"/>	RILD	DEEP INDUCTION	Yes	No	0.2 to 2000.0	ohmm	0.757 to 6181.6	0.91
<input checked="" type="checkbox"/>	AC	SONIC	No	Yes	2000.0 to 7000.0	m/sec	8806.6 to 722.31	8449
<input checked="" type="checkbox"/>	DTOS	SHEAR SONIC	No	Yes	500.0 to 4000.0	m/sec	5067.1 to 436.83	4424

**Name:** SONIC ☐ Derive using Gardner's relationship  
**Type:** ☒ Active SONIC ☐ Transit ☐ Velocity  
**Scales:** 535.7 138.16 Defaults ☒ Auto  
 Linear Background ☒ Show offscale  
**Infill:** Lithology left Edit  
☒ XPlot underlay link  
**Trace:** Color Black Pattern Thickness  
**Track width:** 2.54 cm Font Edit  
**Properties common to all logs**  
 Description options User defined name  
 Depth markers (KB) Major None Minor None  
 Track layout ☒ One ☐ Multiple logs / track Edit  
 Update All Close Help

2. In the *Properties common to all logs* pane to the bottom right of the dialog, beside the Multiple logs / track option, click **Edit**.

The [Multi-Log per Track Template](#) dialog box appears.

Multi-log/track template editor for well 100/ 11-11-011-11W1 /00

Template name:

Populate tracks: ☒ automatically by type ☐ manually by name

Show: ☐ Empty tracks ☒ Scale lines ☒ Scale header ☒ Track outlines

Track 1 Track 2 Track 3 Track 4 Track 5 Track 6 Track 7 Track 8 Track 9 Track 10 Track 11 Track 12

☒ Show track

Track width:  cm

Following gap:  cm

Scale type:

Minor divisions:

Major divisions:

Show	Log name	Tracks	Population method
<input checked="" type="checkbox"/>	SONIC	3	include if not used elsewhere
<input checked="" type="checkbox"/>	DENSITY	3	include if not used elsewhere
<input checked="" type="checkbox"/>	SHEAR SONIC	3	include if not used elsewhere
<input checked="" type="checkbox"/>	SONIC	3	include if not used elsewhere
<input checked="" type="checkbox"/>	SHEAR SONIC	3	include if not used elsewhere
<input type="checkbox"/>	EASTING	3	include if not used elsewhere
<input type="checkbox"/>	NORTHING	3	include if not used elsewhere
<input type="checkbox"/>	MD	3	include if not used elsewhere

Cross-overs:

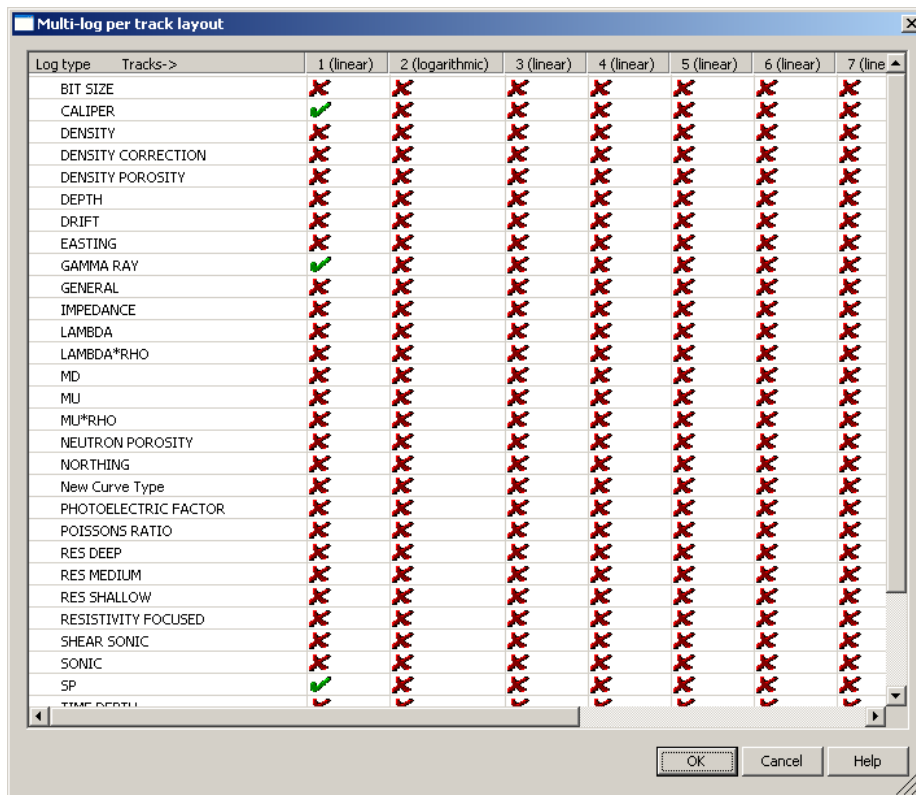
☐  over

☐  over

Scale shift:  %

- For the Populate tracks radio buttons, select either **automatically by type** (sonic, density, etc), or **manually by name** (Delta-T, Bulk Density, etc.) depending on the degree of control you want over which logs appear, and then click **Edit**.

The [Multi-log per track layout](#) dialog box appears.



- For each of the track columns, click the log type to display, and then click **OK**.

**Note:** To ensure a log doesn't get dropped, click the *All unselected linear logs* and the *All unselected logarithmic logs* options.

The log types selected above are displayed in the various track tabs of the main *Multi-log per Track Edit* dialog box.

- Using the *Multi-log per Track Edit* dialog box, for the tracks to display, click the Track tab, specify whether to show the track and select other criteria such as the track width, scale type, and so on.
- In the log display pane click or clear **Show** as depicted below to display or hide a log in a given track.

Show	Log name	Tracks	Population method
<input checked="" type="checkbox"/>	SONIC	3	include if not used elsewhere
<input checked="" type="checkbox"/>	DENSITY	3	include if not used elsewhere
<input checked="" type="checkbox"/>	SHEAR SONIC	3	include if not used elsewhere
<input type="checkbox"/>	SONIC	3	include if not used elsewhere
<input checked="" type="checkbox"/>	SHEAR SONIC	3	include if not used elsewhere
<input type="checkbox"/>	EASTING	3	include if not used elsewhere
<input type="checkbox"/>	NORTHING	3	include if not used elsewhere
<input type="checkbox"/>	MD	3	include if not used elsewhere

The Tracks column above displays the tracks in which a log appears. In the example above, the density log can be displayed in track 1. It also appears in track 3. The column to the right of the Log name column specifies whether the log appears in a track by default or was deliberately designated to appear in that track.

To fill areas where curve readings for two or four curves intersect within the same track, select the check box to the left of the drop-down lists in the *Cross overs* section and then select either logs that appears in your model or select **fixed value** depending on whether you want to infill where curves intersect, or where a curve exceeds a given value. Manually shift a curve by clicking   to the right of the curve drop-down list to enhance the cross over, or type a percentage by which to shift the log scales.

7. Type a descriptive name in the **Template name** box and click **Save** to write the file to the current GeoSyn *Working* directory with the name *GSTemplateX.tpl* where **X** is an incrementing number based on the number of template files already in the *Working* directory. When importing the template file in the future, whatever is typed in the **Template name** box appears as the file description.
8. Click **Apply** to update the current model with your changes.

### Related Topics

["Changing log display properties" on page 106](#)

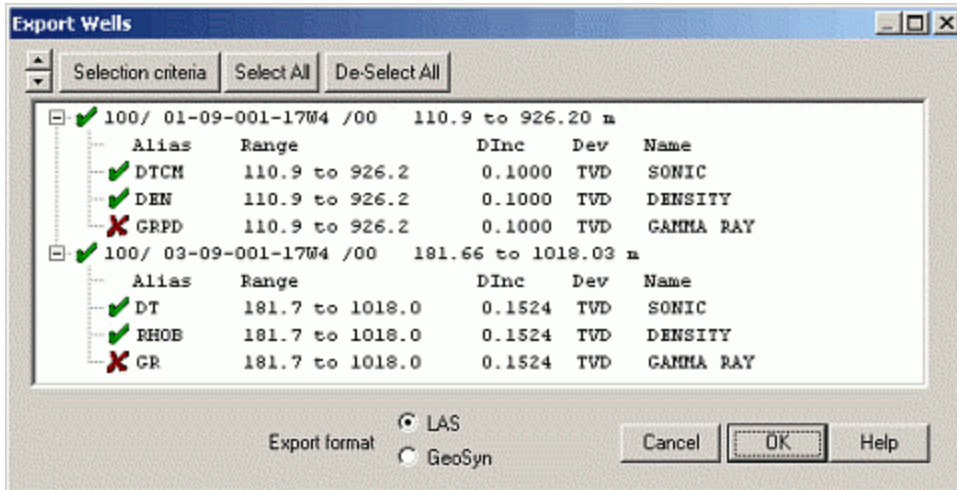
## Exporting logs

Well logs can be exported in LAS format to use with other geologic applications as well as GeoSyn, or exported to GeoSyn format to use only with GeoSyn.

### To export logs:

1. From the **File** menu, select **Export > Wells**.

The [Export Wells](#) dialog box appears.



2. Click **Selection criteria** to display the [Selected curves must have](#) dialog box and **CTRL+CLICK** the logs to automatically select based on type, author, and more; otherwise, click the individual logs to export.

A check mark (✓) appears beside logs that will export, a cross (✗) beside those that won't.

3. Select whether to convert exported logs into GeoSyn or LAS format.

### Related Topics

["Importing LAS or GeoSyn files from disk" on page 18](#)

["Exporting tops lists" on page 146](#)

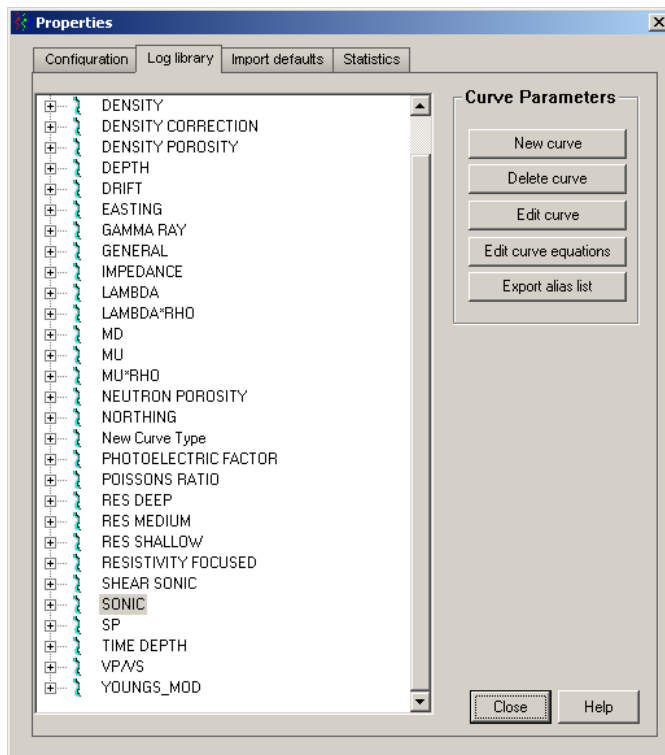
## Exporting log aliases

Export a list of all the aliases GeoSyn uses to recognize imported logs. The file is exported in ASCII format and you can view it using numerous third-party products to determine whether GeoSyn is using a desired alias.

### To export log aliases:

1. From the **Edit** menu, select **Configuration Properties > Log Library**.

The [Properties: Log Library](#) tab appears.



2. Click **Export alias list**.

3. Browse to a location in which to save the file, and then click **Save**.

Now open the file using a third-party application such as Microsoft Excel or Windows Notepad.


### Related Topics

["Changing log definitions" on page 105](#)

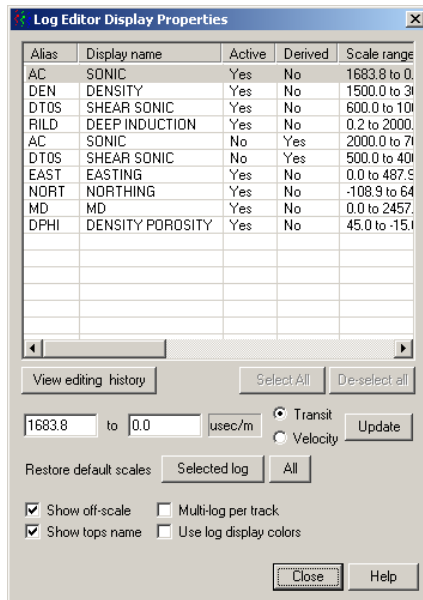
## Changing log editor display

Change the minimum and maximum values that define the scale range for logs.

To change log editor display:

1. Open the [log editor](#):
  - **Edit > Log editing**
  - Double click on a log in the model.
  - Right-click on a log and select **Log editing**.
2. In the log editor toolbar click the **Set log editor scales** tool ()

The [Log Editor Display Properties](#) dialog box appears.



3. In the display pane, select the log and type minimum and maximum scale values in the boxes below the display pane then click **Close**.

**Note:** These changes apply to only the current model. To change the default scale for a log in all future synthetics

## Related Topics





["Changing log definitions" on page 105](#)



## Drawing Straight Edge and Freehand Curves

Draw a single segment straight line or multi-segment freehand line to replace a curve portion.

To draw straight edge and freehand curves:

1. Open the [log editor](#):
  - **Edit > Log editing**
  - Double click on a log in the model.
  - Right-click on a log and select **Log editing**.
2. Click either the straight line () or freehand tool ()
3. Hover the cursor ( or ) over the location at which to draw a line. The cursor position appears in the banner of the *Log Editor*.
4. Starting at the top or bottom of the log portion to change, drag to draw the line.
5. Click **End Draw** in the popup dialog box to complete the line.

### Related Topics

["Creating Blocked Log Models" on page 119](#)

# Inserting log sections

Create a section of log with a constant value and insert it at a specific depth to provide a time datum shift or to provide room for new geological section. You can also specify whether to raise or lower the log start depth or stop depth to accommodate the insertion.

When you insert a section in any log, new data is inserted in all logs throughout the model. You can specify different constant values to insert in each of the individual logs.

## To insert log sections:

1. Open the [log editor](#):
  - **Edit > Log editing**
  - Double click on a log in the model.
  - Right-click on a log and select **Log editing**.
2. Select the tab for the log in which to insert a log section and in the Log Editor toolbar, click the **Insert Section** tool (+|).

The [Insert Constant Value Log Section](#) dialog box appears.

**Insert Constant Value Log Section**

**1 Insertion point**

Insert at ☒ Depth point  meters  
☐ Time point  ms 2wT

**2 Insertion range**

☒ In depth  meters  
☐ In time  ms 2wT  
 Time calculation based on a sonic value of  usec/m


**3 Insertion values**

Log alias	Name	Value	Un
AC	SONIC *Active	841.893	use
DEN	DENSITY *Active	2250.000	kg/m
DTOS	SHEAR SONIC *Active	350.000	use
RILD	DEEP INDUCTION *Active	1000.100	ohm
AC	SONIC *Derived	4500.000	m/s
DTOS	SHEAR SONIC *Derived	2250.000	m/s
EAST	EASTING *Active	242.955	

Edit log insertion value

**4 Resetting top or bottom of well**

☐ Raise top of log above new section  
☒ Drop bottom of log below new section

3. Hover the cursor () at the top of the zone at which to insert a log section. The cursor position appears in the banner of the *Log Editor*.
4. Drag to the bottom of the zone.
5. In the Insertion point pane, type a more precise depth at which to insert the log section or click **top** or **bottom** to select the absolute top or bottom of the log.
6. In the Insertion range box, type the thickness to insert. This section is inserted in every log throughout the synthetic.
7. In the Insertion values display pane, select a log to display the constant value that will be inserted in the Edit log insertion value box and each of the logs. Type a different constant value if desired.
8. Select whether to raise the start depth or lower the stop depth and click **Apply**.

### Related Topics



["Cutting logs" on page 128](#)

["Shifting logs" on page 132](#)

## Inserting tops

When inserting a top at a location on a log , you can specify the tops list to which to write the top information so that you can update it, correlate it, and so on.

### To insert tops:

1. Open the [log editor](#):
  - **Edit > Log editing**
  - Double click on a log in the model.
  - Right-click on a log and select **Log editing**.
2. Select the tab for the log in which to insert a top and in the Log Editor toolbar, click the **Insert a Top** tool (.
3. Click the cursor () at the location on the log at which to insert a top. The *Insert Top in Selected List* dialog box appears.
4. Select the list in which the name and depth of the top you insert will be saved, and then type a name for the top and click **OK**.

### Related Topics


["Managing tops" on page 29](#)

["Changing tops properties" on page 31](#)

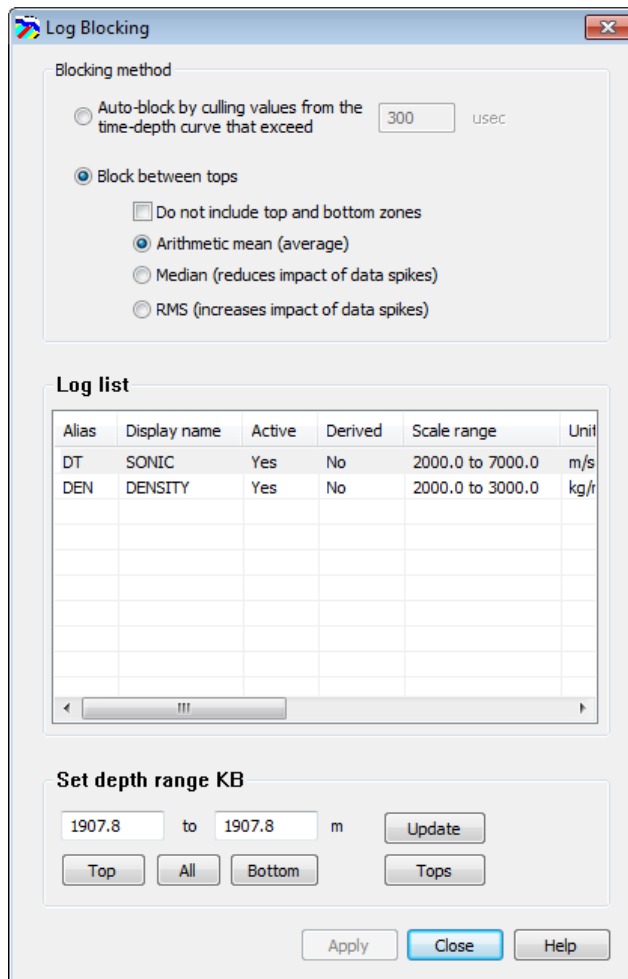
# Creating Blocked Log Models

Block sections of existing logs using Log Editor so that GeoSyn, working within the highlighted zone, applies the mean, median, or RMS value between two tops to each set of tops.

To block portions of existing logs using Log Editor:

1. Open the [log editor](#):
  - **Edit > Log editing**
  - Double click on a log in the model.
  - Right-click on a log and select **Log editing**.
2. In the log editor toolbar click the **Blocking** tool ()

The [Log Blocking](#) dialog box opens.



The Log Blocking dialog box contains the following sections:

- Blocking method:**
  - ☐ Auto-block by culling values from the time-depth curve that exceed  usec
  - ☒ Block between tops
    - ☐ Do not include top and bottom zones
    - ☒ Arithmetic mean (average)
    - ☐ Median (reduces impact of data spikes)
    - ☐ RMS (increases impact of data spikes)
- Log list:**

Alias	Display name	Active	Derived	Scale range	Unit
DT	SONIC	Yes	No	2000.0 to 7000.0	m/s
DEN	DENSITY	Yes	No	2000.0 to 3000.0	kg/r
- Set depth range KB:**

to  m

Buttons at the bottom:


3. Select the algorithm used to derive a constant value that's applied to the zone between shallowest and deepest tops within your selection.

GeoSyn automatically connects your selection to the nearest top.

4. Select the log(s) to block.

**CTRL+CLICK** or **SHIFT+CLICK** for multiple selection.

5. Do one of the following:

- Drag the cursor () on the Log Editor log display pane to select a range to block.
- Type values in the Depth range KB pane for the start and stop depth and click **Update**.
- Click either **top** or **bottom** to accept the absolute depth from the log or click **All** to accept both.
- Click **Depths from tops** to display the *Depth Range from Tops* dialog box and then select the formation tops that signify your zone of interest from the drop-down lists and click **OK**.

6. Click **Apply**.

### Related Topics

["Drawing Straight Edge and Freehand Curves" on page 116](#)

["Clipping or filtering logs" on page 122](#)

["Cutting logs" on page 128](#)

["Inserting log sections" on page 117](#)

["Applying math equations to logs" on page 124](#)

["Shifting logs" on page 132](#)

## Stretching and squeezing Logs

Stretch and squeeze a selected log portion in either time or depth using the Log Editor, which displays the log view in depth, or stretch it in time using the Correlation Window, which enables you to hover the log over seismic.

Stretch and squeeze functionality is also available when tying seismic to models or by specifying values when importing check shot surveys. For details, see *Related Topics* below.

### To stretch and squeeze logs:

1. Open the [log editor](#):
  - **Edit > Log editing**
  - Double click on a log in the model.

- Right-click on a log and select **Log editing**.
- 2. Select the tab for the log to stretch or squeeze and in the Log Editor toolbar, click the **Stretch Squeeze** tool (X).

The [Stretch/squeeze log curves in time](#) dialog box appears.

- 3. Select whether to stretch or squeeze the log in time or depth.
- 4. Do one of the following:
  - Drag the cursor (X) on the Log Editor log display pane to select a range to stretch or squeeze. The cursor position appears in the banner of the *Log Editor*.
  - Type values in the Set depth range KB pane for the start and stop depth and click **Update**.
  - Click either **top** or **bottom** to accept the absolute depth from the log or click **All** to accept both.
  - Click **Depths from tops** to display the *Depth Range from Tops* dialog box and then select the formation tops that signify your zone of interest from the drop-down lists and click **OK**.
- 5. Do one of the following:
  - If you selected depth above, type the desired thickness of the zone defined above after stretching or squeezing. If the value is less than the difference between the start and stop depth, the log will be squeezed. If more, the log will be stretched.
  - If you selected time above, type a value by which to adjust the transit times for the zone defined above and the number of samples over which to taper the change.

6. Click **Apply**.

### Related Topics


["Clipping or filtering logs" below](#)

["Cutting logs" on page 128](#)

## Clipping or filtering logs

Clip the data of either an entire log or a zone of interest within that log to remove data spikes or incorrect data.

### To clip or filter logs:

1. Open the [log editor](#):
  - **Edit > Log editing**
  - Double click on a log in the model.
  - Right-click on a log and select **Log editing**.
2. In the log editor toolbar click the *Log Editor*, click the **Clip** tool .





- Click either **top** or **bottom** to accept the absolute depth from the log or click **All** to accept both.
  - Click **Depths from tops** to display the *Depth Range from Tops* dialog box and then select the formation tops that signify your zone of interest from the drop-down lists and click **OK**.
5. Click **Apply**.

### Related Topics

["Applying math equations to logs" below](#)

["Creating Blocked Log Models" on page 119](#)

## Applying math equations to logs

The Math dialog box enables you to generate derived logs based on readings from other logs as inputs. The log reading inputs are used as variables in either common industry equations provided by GeoSyn by default, or you can create your own equations. The equation calculates values on a sample by sample basis as it moves down the log.

The logs from which those readings are drawn as well can be either standard log types provided by GeoSyn (sonic, density, resistivity), or log types that you create. You can set any log type in GeoSyn (including a derived log type that you create) as the active log upon which synthetics are based.

Equations describing common relationships such as density to sonic and resistivity are available from a function library.

For details about merging log runs, see *Related Topics* below.

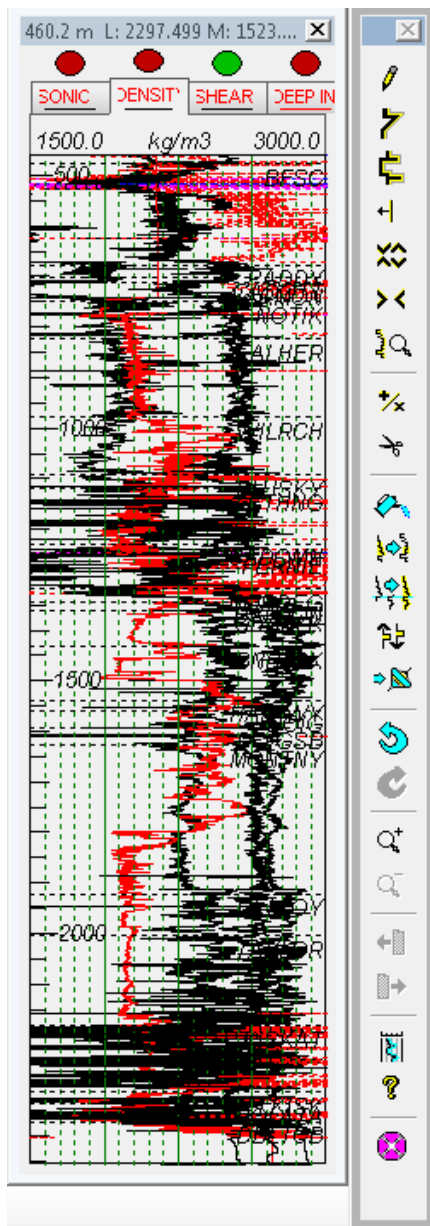
### About the function library

(missing or bad snippet)

#### To apply math equations to logs:

1. Right-click the log and select **Log editing**.

The [Log Editor](#) dialog box appears.



2. In the toolbar beside the Log Editor, click the **Math** tool ( $\pm$ ).

The [Log Math](#) dialog box appears.

**Log Math**

**Compose an equation**

vs=vp\*((.5-pois)/(1.0))^.5 Update Clear

Add a log by Z number (log index) or by equation reference

add operators (angles in radians) add constants

Add a function from the library Edit

Compose an equation then resolve any unknown log references.  
Examples: Generically 'A=B+10' or Vs=Vp-1360/1.16' or explicitly by log index 'ZA=ZB+10'

**Log resolution**

ZC = ZA \* ((.5 - ?) / (1.0)) ^ .5

VS= ZC SHEAR SONIC \*Active velocity

VP= ZA SONIC \*Active velocity

POIS= ? Select a log

Create new log

**Depth range KB**

1391.62 to 1391.62 m Update 0 Samples

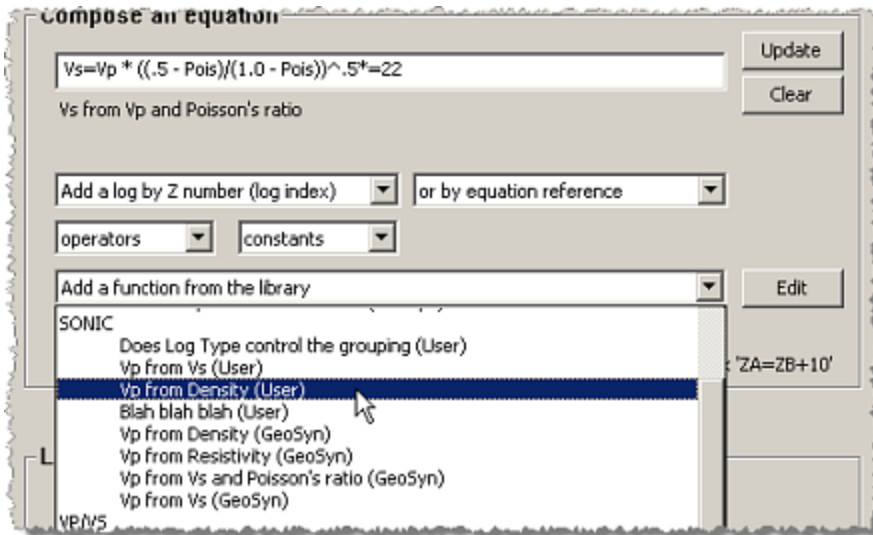
Top All Bottom Tops 0.0 Depth range

☐ Reset output log scales Apply Close Help

To copy a portion of one log to another, enter the following equation  $XX=YY$ , (where XX is the recipient log and YY is the source log) drag the interval to copy in the source log, and then click **Apply**.

3. Do either of the following:

To build an equation based an equation in the function library, select the equation from the Add a function from the library drop-down list,




and then do either of the following to modify the equation. If the desired function doesn't appear, click **Edit** to the right of the drop-down list to launch the *Log Equation Editor* dialog box and create it.

Type equation terms directly in the top box of the Compose an equation pane.

Select equation terms from the drop-down lists above the Add a function from the library drop-down list.

4. Using the Log Resolution pane, select a log from each drop-down list to the right of each equation term to associate a log with each term.

5. Do one of the following:

- Drag the cursor () on the Log Editor log display pane to select a range to which to apply the mathematical equation.
- Type more precise values in the Depth range KB pane for the start and stop depth and click **Update**. Click either **Top** or **Bottom** to accept the absolute depth from the log or click **All** to accept both.
- Click **Depths from tops** to display the *Depth Range from Tops* dialog box and then select the formation tops that signify your zone of interest from the drop-down lists and click **OK**.

6. Click **Apply**.

## Related Topics

["Clipping or filtering logs" on page 122](#)

[Merging Logs](#)

## Building Equations using the Log Equation Library


### Cutting logs

Cut a section from a log and then either lower the start depth or raise the stop depth so that either the tops below or above the cut maintain accurate depths.

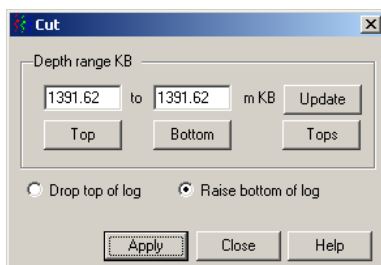
If you change the shallowest or deepest depth in the entire depth page, also resize the model by either dragging the canvas borders or by changing the display range in the Display Parameters: Depth Model tab so that portions of the depth model that aren't occupied by any wells, but that would otherwise influence your time model, are removed.


You can also insert a constant value log section the same thickness as the section removed. For details, see *Related Topics* below.

#### To cut logs:

1. Open the [log editor](#):
  - **Edit > Log editing**
  - Double click on a log in the model.
  - Right-click on a log and select **Log editing**.
2. Click the **Cut** tool () on the *Log Editor* toolbar.

The [Cut](#) dialog box opens.



3. Do one of the following:
  - Drag the cursor () on the Log Editor log display pane to select a range to cut.
  - Type more precise values in the Depth range pane for the start and stop depth and click **Update**.
  - Click either **top** or **bottom** to accept the absolute depth from the log.
  - Click **Depths from tops** to display the *Depth Range from Tops* dialog box and then select the formation tops that signify your zone of interest from the drop-down lists and click **OK**.

4. Click **Apply**.

### Related Topics

["Inserting log sections" on page 117](#)


["Shifting logs" on page 132](#)

## Creating log composites

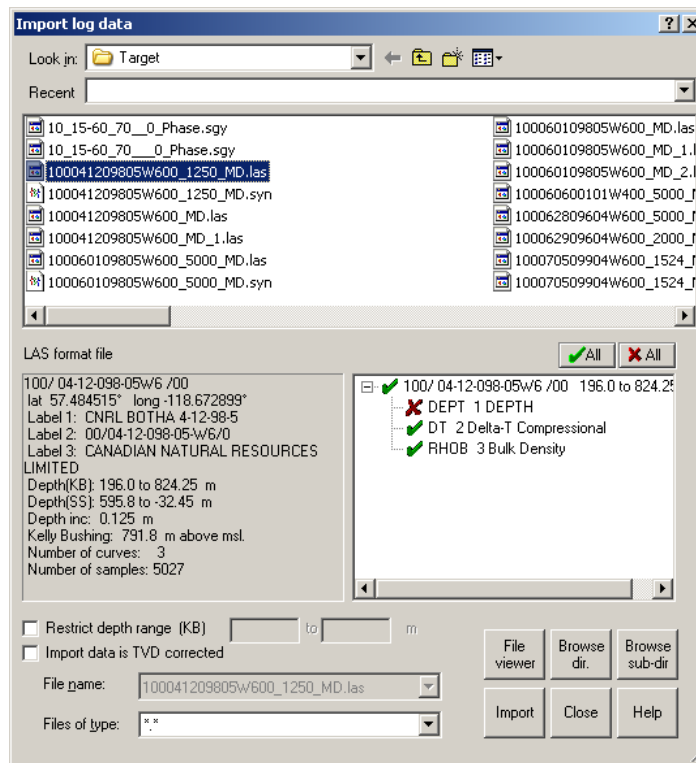
Take a range of data from a donor well and either insert it into or replace part of a host well.

Log data from the specified depth range of the donor well is copied to the corresponding log type in the host well. Logs in the donor well without corresponding logs in the host well are ignored unless you manually associate them with logs in the host well.

### To create log composites:

1. Open the [log editor](#):
  - **Edit > Log editing**
  - Double click on a log in the model.
  - Right-click on a log and select **Log editing**.
2. In the toolbar beside the *Log Editor*, click the **Composite** tool ()

The [Import log data](#) dialog box opens.



3. Select the root directory or drive from the **Look in** drop-down list then double-click folders in the display pane to browse to the directory that contains either the desired files or the subdirectory with those files. To filter the type of files displayed, from the **File filter** drop-down list, select a file format extension.
4. Either click **Browse dir.** or **Browse sub-dir** to launch *Directory Browser* displaying LAS and GeoSyn files sorted by UWI, or simply select the desired file in the display pane. For details on using *Directory Browser*, see *Related Topics* below. For LAS files, you can inspect and modify the raw data in an ASCII text editor before importing it by clicking **File Viewer**. When you select the file, details appear in the **format file** pane.
5. In the well tree, select whether to import specific logs. A check mark (✓) appears beside logs that will import, a cross (✗) beside those that won't. For wells with numerous logs, toggle the group by clicking **All** depending on whether to import or ignore the majority of logs then toggle the individual logs to import or ignore and click **Import**.

The [Log Composite](#) dialog box opens displaying which logs from the donor well will be inserted into logs of the host well.

**Log Composite**

Unmatched Matched Sort using User name

Donor logs Donor logs Host logs

Alias	User name	Alias	User name	Alias	User name
RHOB	3 Bulk Density	No match	Use host median value	AC	SONIC
		No match	Use host median value	DEN	DENSITY
		No match	Use host median value	DTOS	SHEAR SONIC
		No match	Use host median value	RILD	DEEP INDUCTION
		No match	Use host median value	AC	SONIC
DT	2 Delta-T Compressi...	DTOS	SHEAR SONIC		
		No match	Use host median value	EAST	EASTING
		No match	Use host median value	NORT	NORTHING
		No match	Use host median value	MD	MD
		No match	Use host median value	DPHI	DENSITY POROSITY

Use the mouse to rearrange, insert or remove donor logs.

Donor copy range 0.0 m

-1.0 to -1.0 Update

Top Bottom Depths from tops

Host replacement range 0.0 m

-1.0 to -1.0 Update

Top Bottom Depths from tops

☐ Raise log data and tops above the insertion

☒ Lower log data and tops below the insertion

☒ Copy tops

Apply Close Help

6. Logs that match appear in the pane to the right. Logs that don't completely align and for which some constant values will need to be applied are colored red in the cell between the donor and recipient log.
  - Drag a log from the *Unmatched* pane into the *Matched* pane in the left-most cell of the row that lists the desired recipient log, or drag it from the *Matched* pane to the *Unmatched* pane if you don't want it to be a donor log.
  - Drag the alias in the left-most column of the *Matched* pane to change the default recipient log.
7. Do one of the following:

Type precise values in the Copy range and Replacement range boxes and then click **Update**.

- Click **top** and **bottom** to accept the absolute depth from the log.
  - Click **Depths from tops** to display the *Depth Range from Tops* dialog box and then select the formation tops that signify your zone of interest from the drop-down lists and click **OK**.
8. Click **Apply** and then click **Close**.



## Related Topics

["Clip or filter the log" on page 173](#)

["Inserting log sections" on page 117](#)

["Using Directory Browser" on page 19](#)


[Merging Logs](#)

## Shifting logs

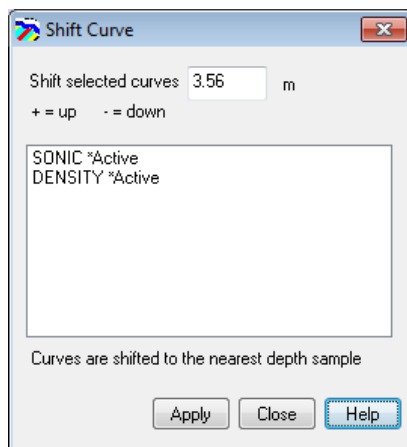
Correct log depths with cable stretch and other errors by adding a segment to the top or bottom of one or multiple logs in the current model. New data points added to the top or bottom of logs are extrapolated using the last available data point. If the top or bottom value is anomalous, it will be propagated and may require further editing.

GeoSyn requires that all logs have the same top and bottom, so when one log is shifted in depth, GeoSyn adds data to the top or bottom of all logs to compensate.

### To shift logs:

1. Right-click the log and select **Log editing**.  
The [Log Editor](#) dialog box opens.
2. In the toolbar beside the *Log Editor*, click the **Shift** tool (.

The [Shift Curve](#) dialog box opens.



3. In the display pane, select the logs to shift. SHIFT+CLICK or CTRL+CLICK for multiple selection.
4. Type a signed value to shift the log(s) in the **Shift selected curves** box then click **Apply**.

## Related Topics

["Cutting logs" on page 128](#)

["Drawing Straight Edge and Freehand Curves" on page 116](#)

["Inserting log sections" on page 117](#)


## Modeling fluid replacement

In Amplitude vs. Offset modeling, as seismic waves reflect off an interface, the amplitude of the reflected wave is affected by the amount and type of fluid that occupies the pore space of the rock.

GeoSyn applies Gassman's equation to model this using a P sonic, shear sonic, and density log. You change the water saturation to apply different scenarios to your model. The available pore space not saturated with water is assumed to contain oil and gas.

Click for in-depth details on [how fluid replacement modeling is implemented in GeoSyn](#).

### To model fluid replacement:

1. Open the [log editor](#):
  - **Edit > Log editing**
  - Double click on a log in the model.
  - Right-click on a log and select **Log editing**.
2. In the toolbar beside the *Log Editor*, click the **Fluid Replacement Modeling** tool ().

The [Fluid Replacement Wizard \(Input and output logs, depth range\)](#) dialog box opens.

**Fluid Replacement Wizard (Gassman)**

Setup 1: Input and output logs, depth range

Log tool kit

**Input logs**

P Sonic: SONIC \*Derived

S Sonic: SHEAR SONIC \*Derived

Density:

Porosity: Use constant porosity value 6 %

Porosity units:

**Output logs**

Use 'Active' versions for instant model updates

P Sonic: SONIC \*Active

S Sonic: SHEAR SONIC \*Active

Density: DENSITY \*Active

**Depth range KB**

1391.62 to 1391.62 ft Update

Top All Bottom Tops

Close Help < Back Next >

3. GeoSyn automatically populates the Input logs and Output logs drop-down lists if the required logs are available in your model; otherwise, click **Log tool kit** to display the *Fluid Replacement Tool Kit* dialog box and complete the three bullet steps below.

The [Fluid Replacement Tool Kit](#) dialog box opens.

**Fluid Replacement Tool Kit**

Create missing log types Create

Duplicate 'Active' logs to use as input logs Duplicate ☒ Hide new input logs

Copy all data from input to output logs Copy data

Close Help

4. Click **Create**.

The [AVO log suite](#) dialog box opens.

**Generate logs for well: 100/ 11-11-011-11W1 /00**

Log Type	Derive from	Maintain link	Equation	Edit
<input checked="" type="checkbox"/> P Sonic	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	$Vp = .3048 * ((Den / 229.5)^4)$	Edit
<input checked="" type="checkbox"/> Shear Sonic	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	$Vs = (Vp - 1360) / 1.16$	Edit
<input type="checkbox"/> Density	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	$Den = 229.5 * (Vp / .3048)^{.25}$	Edit
<input type="checkbox"/> Poisson's Ratio	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	$Pois = (.5 - (Vs / Vp)^2) / (1 - (Vs / Vp)^2)$	
<input type="checkbox"/> Mu	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	$Mu = (Den * Vs^2) / 10^9$	
<input type="checkbox"/> Mu*Rho	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	$MR = ((Den * Vs)^2) / 10^{12}$	
<input type="checkbox"/> Lambda	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	$Lambda = Den * (Vp^2 - 2 * Vs^2) / 10^9$	
<input type="checkbox"/> Lambda*Rho	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	$LR = ((Den * Vp)^2 - 2 * (Den * Vs)^2) / 10^{12}$	
<input type="checkbox"/> Vp/Vs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	$VpbyVs = Vp / Vs$	
<input type="checkbox"/> Young's Modulus	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	$YMod = Den * Vs^2 * (3 * Vp^2 - 4 * Vs^2) / (10^9 * (Vp^2 - Vs^2))$	

Select All

Select 'Maintain Link' to rederive the log after every GeoSyn update. The log cannot be directly edited.

Note\* Users may create any log they wish from the Log Properties tab of the Well Properties dialog.

OK Cancel Help

5. Click the log types to create in the left column and ensure **Maintain link** is cleared so that changes you make to the derived log aren't overwritten by the parent log, and then click **OK**.
  - Click **Edit** to the right of a log type to display the [Edit the Derivation Equation for Log](#) dialog box and modify the equation used to derive the log.
  - Using the [Fluid Replacement Tool Kit](#) dialog box, click **Duplicate** to copy the created logs to the Output logs pane of the [Fluid Replacement Wizard \(Input and output logs, depth range\)](#) dialog box.
  - If you want to undo fluid replacement changes made to the output logs, using the [Fluid Replacement Tool Kit](#) dialog box above, click **Duplicate** to refresh the output logs with the original input logs data.
6. Click **Next**.

The [Fluid Replacement Wizard \(In-situ reservoir properties\)](#) dialog box opens.

**Fluid Replacement Wizard (Gassman)**

Setup 2: In-situ reservoir properties

**Rock matrix**

Sandstone (Quartz) [Calculator]

Bulk modulus: 37.000 GPa Vp= 6008 m/s  
 Shear modulus: 44.000 GPa Vs= 4075 m/s  
 Density: 2650.000 kg/m3 Pois= 0.074

**Fluids**

Hydrocarbon: Gas [Calculator]

Bulk modulus: 0.021 GPa Vp= 458 m/s  
 Density: 100.000 kg/m3 Pois= 0.5

Water/brine: Brine 1000 ppm

Bulk modulus: 2.640 GPa Vp= 1635 m/s  
 Density: 987.000 kg/m3 Pois= 0.5

Water saturation %: 100

Fluid average: ☒ Reuss iso-stress ☐ Voigt iso-strain (patchy saturation)

Bulk modulus: 2.640 GPa Vp= 1635 m/s  
 Density: 987.000 kg/m3 Pois= 0.5

**Quality control**

The following values, derived from the insitu rock properties defined above, should roughly match the input logs.  
 Average porosity over interval = 6%

☐ Time average Vp= 5178 m/s ☐ Shear vel = 4154 m/s  
☐ Velocity average Vp= 5746 m/s ☐ Density = 2550 kg/m3  
☐ Raymer et al. Vp= 5407 m/s

Close Help  
 < Back Next >

7. Select default Rock matrix, Hydrocarbon, and Water/brine types from the drop-down lists in the Rock matrix and Fluids panes. For Water saturation, instead of typing a percentage in the field, you can drag the slider below it to change the value and note the effect it has on the Bulk modulus and density values in the bottom portion of the dialog box.

For detailed calculations, click **Calculator** in the Rock matrix and Fluids panes to display either the [Minerals Calculator](#) or the [Batzle and Wang Fluid Properties Calculator](#) dialog boxes and select values more specific to your zone of interest.

8. Click **Next**.

The [Fluid Replacement Wizard \(Calibrate shear log for water saturations < 100%\)](#) dialog box appears if the water saturation defined using the previous

dialog box is less than 100%.

**Fluid Replacement Wizard (Gassman)**

**Setup 3: Calibrate shear log for water saturations < 100%**

Shear sonics derived from P sonics using relationships such as Castagna's are valid only if the zone of interest is 100% wet.

Skip this page if the shear log is a field log or has already been calibrated for hydrocarbons.

☒ Apply correction using Mavko's procedure

Mavko et al.  
Fluid Substitution:  
Estimating changes in Vp without knowing Vs.  
Geophysics, Nov-Dec, 1995.

A 100% wet Pwave is calculated and used to generate corrected shear wave data.

The following equation is taken from the input shear log.  
Logs referenced in this equation are selected from the input logs defined on the first tab

Castagna's mud rock relationship

$V_s = (V_p - 1360) / 1.16$

Edit

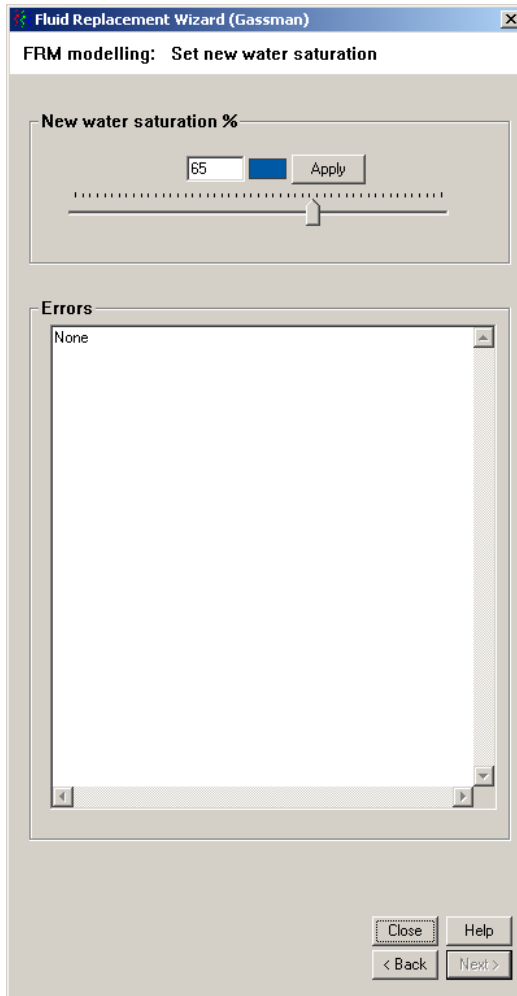
Close Help

< Back Next >

The above dialog box is used to compensate for the fact that the shear log is frequently derived from a sonic log using Castagna's formula. Castagna's formula requires a correction when gas is present in the zone of interest.

- Select the check box and click **Next**.

The [Fluid Replacement Wizard \(FRM Modeling: Set new water saturation\)](#) dialog box appears.



9. Ensure the above dialog box doesn't overlap the *Log Editor* displaying the well for which you're modifying water saturation, and then drag the slider while viewing the affect in the *Log Editor* dialog box and in the model.
10. Click **Apply** to save these changes to the log.


### Related Topics

["Changing log display properties" on page 106](#)

[Notes on GeoSyn Fluid Replacement](#)




## Printing models

By default, a printer page outline appears on the main display bounding the area that will fit on the paper size selected for the default printer. Toggle whether the printer page outline appears using the Display Parameters () > Global dialog box.

Because most printers don't print right to the edge of the page, an additional three-quarters of an inch of image inside the print margin won't be printed. If you change the paper size using the File > Print Setup dialog box, the page outline in the main display changes too.

If your model exceeds the printer page outline, those portions of the model won't print. Ensure you select a page size large enough to include your entire model in the File > Print Setup dialog box.

### To print models:

1. Verify how the current page will appear when printed by selecting **File** > **Print Preview**.  
The [Print Preview](#) dialog box opens.
2. From the **File** menu, select **Print** () , or click **Print** in the *Print Preview* dialog box above.  
The [Print](#) dialog box opens.
3. Select the desired print options then click **OK**.

### Related Topics

["About depth models" on page 88](#)

["About Time Models" on page 70](#)

## Exporting depth fields

Depth fields are exported as an ASCII text file that delineates the impedance field in depth. Other applications can import this file to generate a sophisticated time model based on wave equations or ray tracing.

### To export depth fields:

1. From the **File** menu, select **Export** > **Depth** field in ASCII format.
2. Browse to the desired location, type a file name, click **Save**.
3. Open the generated file in an ASCII text editor to view the specific data fields exported.

### Related Topics

["Exporting logs" on the next page](#)

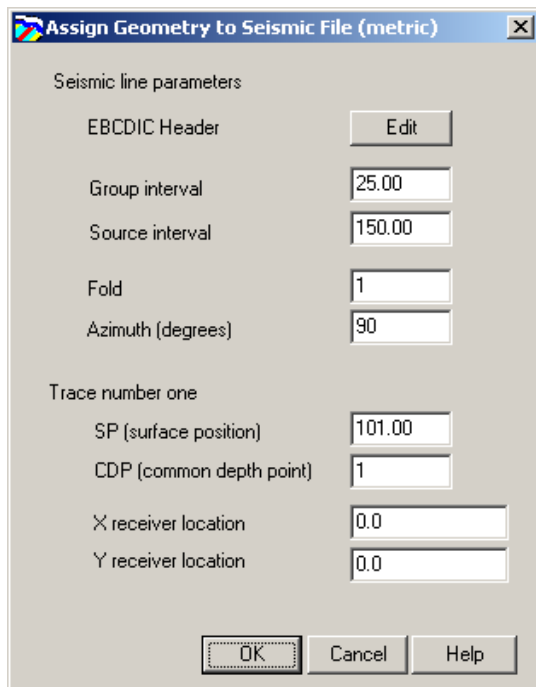
## Exporting time data

Time data is exported in SEG-Y binary format (for importing in geophysical workstations) that can be used by other seismic applications. You must specify the X and Y positions of the first trace in Universal Transverse Mercator format.

### To export time data:

1. From the **File** menu, select **Export** > **SEG-Y format** > and then **Reflection Coefficients, Impedance, Amplitude**, or **Current Display Option**.

The [Assign Geometry to Seismic File](#) dialog box appears.



2. Click **Edit** to display the [Edit EBCDIC Header](#) dialog box.
3. Type seismic line and trace parameters in the various boxes then click **OK**.

### Related Topics

[Exporting reflection coefficient data in SEG-Y format](#)

["Exporting wavelets and sets" on page 144](#)

[Exporting horizons](#)

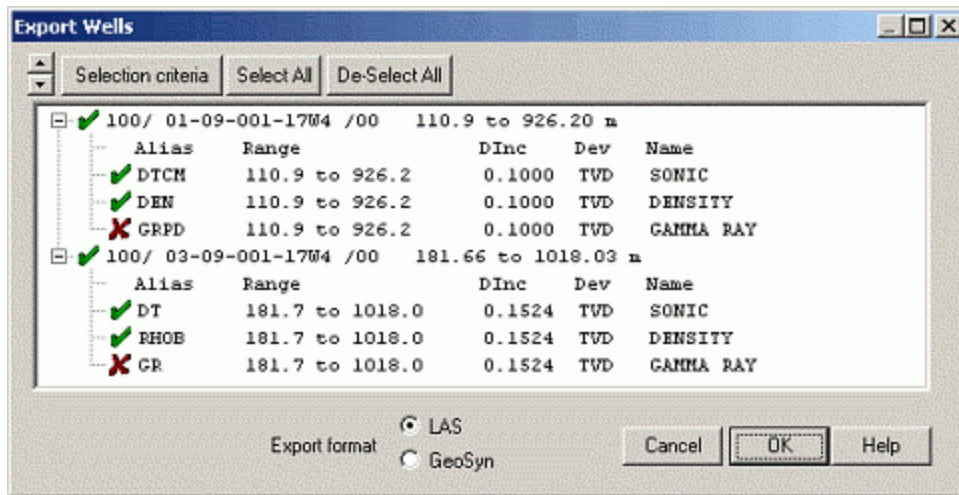
## Exporting logs

Well logs can be exported in LAS format to use with other geologic applications as well as GeoSyn, or exported to GeoSyn format to use only with GeoSyn.

### To export logs:

1. From the **File** menu, select **Export > Wells**.

The [Export Wells](#) dialog box appears.



2. Click **Selection criteria** to display the [Selected curves must have](#) dialog box and **CTRL+CLICK** the logs to automatically select based on type, author, and more; otherwise, click the individual logs to export.

A check mark (✓) appears beside logs that will export, a cross (✗) beside those that won't.

3. Select whether to convert exported logs into GeoSyn or LAS format.

## Related Topics

["Importing LAS or GeoSyn files from disk" on page 18](#)

["Exporting tops lists" on page 146](#)

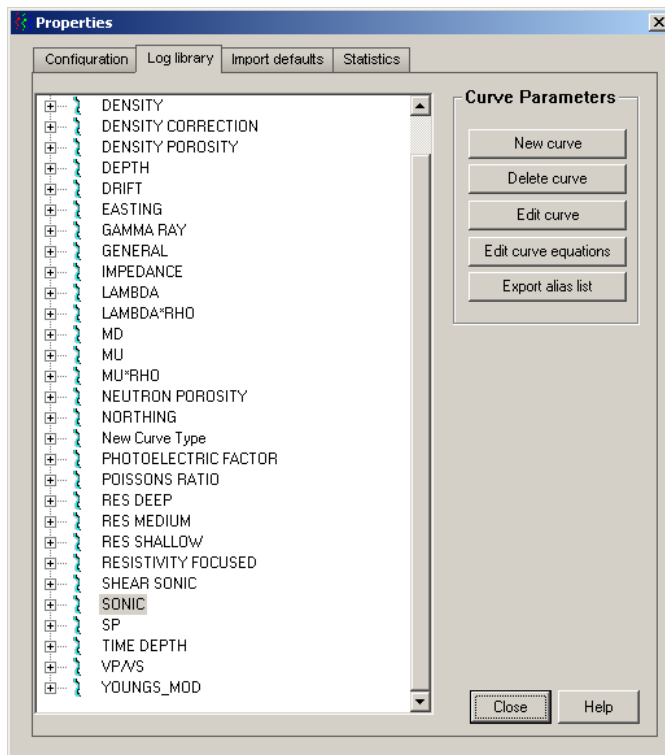
## Exporting log aliases

Export a list of all the aliases GeoSyn uses to recognize imported logs. The file is exported in ASCII format and you can view it using numerous third-party products to determine whether GeoSyn is using a desired alias.

### To export log aliases:

1. From the **Edit** menu, select **Configuration Properties > Log Library**.

The [Properties: Log Library](#) tab appears.



2. Click **Export alias list**.

3. Browse to a location in which to save the file, and then click **Save**.

Now open the file using a third-party application such as Microsoft Excel or Windows Notepad.

### Related Topics


["Changing log definitions" on page 105](#)

## Exporting wavelets and sets

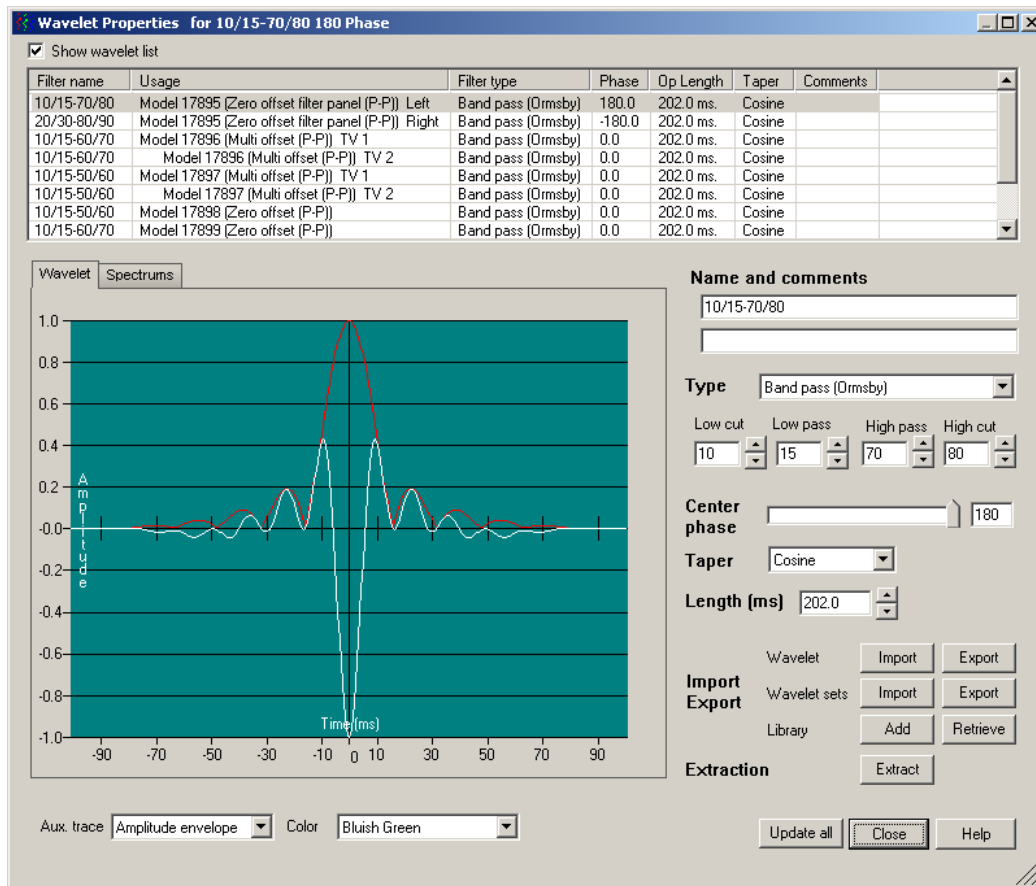
You can export individual wavelets in ASCII or SEGY format, or export multiple wavelets bundled as a wavelet set in .wav format. Wavelets can be saved and imported using a centralized library of wavelets you create. The wavelet library is accessed by all GeoSyn projects.

For details on extracting a zero phase wavelet, see *Related Topics* below.

### To export wavelets:

1. From the **Edit** menu, select **Wavelet** (.

The [Wavelet Properties](#) dialog box appears.



2. In the **Selected wavelet attributes** pane, beside **Wavelet**, click **Export**, or click **Add** to the right of the *Library* label to add the wavelet to the centralized *Wavelet Library* shared by all GeoSyn models.

3. Browse to a disk location in which to save the file then click **Save**.

## Related Topics

["Extracting wavelets" on page 84](#)

["Exporting time data" on page 141](#)

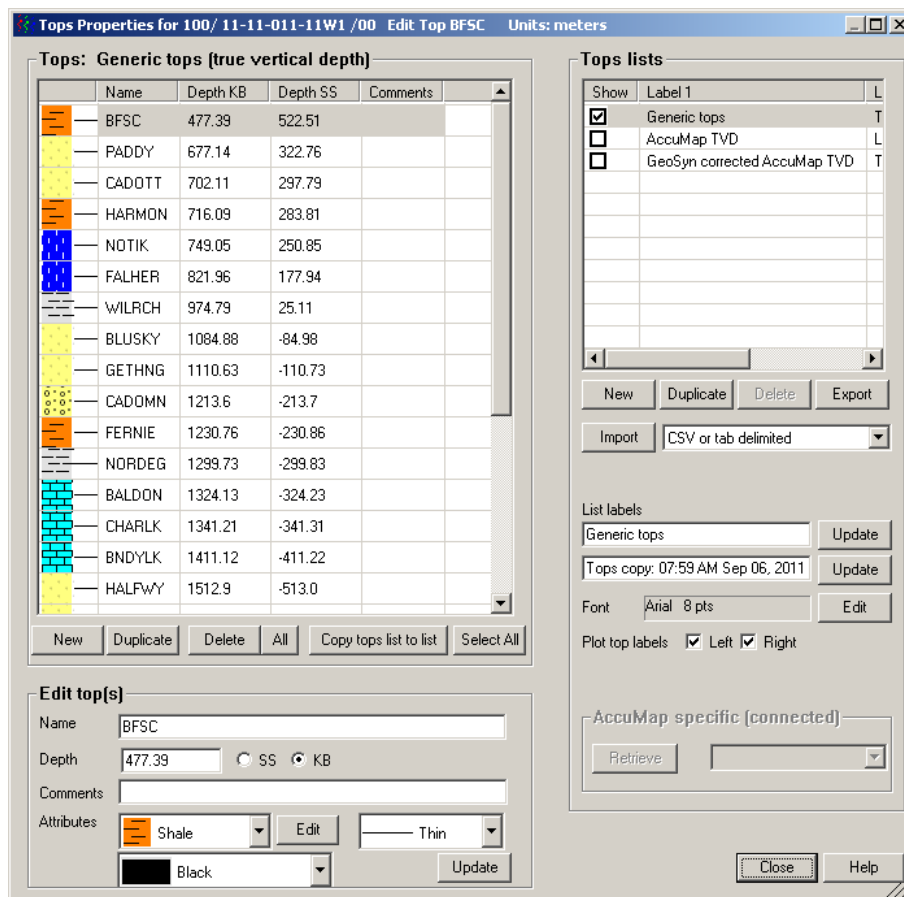
## Exporting tops lists

You can save tops lists to disk in ASCII format. The exported file contains formation names, depths, a units flag, and the Kelly Bushing depth. If you select multiple lists to export, they're written to a single file that you can then edit to remove duplicate entries.

### To export tops lists:

1. Right-click a log and select **Tops properties**.

The [Top Properties](#) dialog box appears.



2. In the Tops lists pane, select the tops list(s) to export to disk and then click **Export**. **CTRL+CLICK** or **SHIFT+CLICK** for multiple selection.

3. Browse to a disk location in which to save the file, type a file name, and then click **Save**.

The tops are written to the file based on the order in which the tops lists appear in the Tops lists pane above and in the order in which the individual tops names appear in each list. Duplicate tops names aren't overwritten.

### Related Topics

["Managing tops" on page 29](#)

["Importing tops from delimited files" on page 32](#)

["Importing tops from fixed width files" on page 35](#)

["Importing tops from GeoSyn files" on page 42](#)

["Exporting logs" on page 142](#)

## Exporting tops tables


GeoSyn displays a list of tops in a tops table that can be exported in either *.emf* or ASCII text for other applications. When multiple tops lists are shown in the main display, all tops are grouped in one tops list. To display lists separately in the main synthetic display (such as a list of check shot values and a list of tops), show one of the lists in the main synthetic display and copy and paste it into GeoSyn, then hide the original list —not the pasted one, and show the other list.

You can copy the data that appears in the tops table as either a static image or as ASCII text.

Tops tables copied as ASCII text can be pasted into other applications for modification including AccuMap Tops Manager, with which you update the AccuMap user tops database.

When the tops table is shown in the main synthetic display, it offsets other synthetic elements instead of floating over them. Tops tables copied as images can be pasted back into the main synthetic display as floating images without offsetting other synthetic elements or pasted into other applications to create a montage.

### To export tops tables:

1. To display the tops table, from the **Edit** menu, select **Synthetic properties** () and in the *Synthetic Properties* dialog box, select the **Tops table** check box and the adjacent position radio button.
2. Right-click the tops table and from the popup menu, select one of the following:



**Copy tops table image** to load an image in the Windows clipboard that can be pasted into other applications or pasted back into GeoSyn.

**Copy name and md depth** to load only top names and measured depth values into the Windows clipboard as ASCII text to paste into a text editor or spreadsheet application.

**Copy all tops info** to load all information that appears in the tops table into the Windows clipboard as ASCII text to paste into a text editor or spreadsheet application.

**Export tops** to display the *Export Manager* and write tops data to disk in ASCII format.

### Related Topics

["Duplicating tops lists" on page 49](#)

["Managing tops" on page 29](#)

["Exporting logs" on page 142](#)

["Exporting tops lists" on page 146](#)

## Appendices

<a href="#">"File formats" on page 287</a>	.ihs, .syn, .las, .seggy
<a href="#">"Well symbol legend" on page 293</a>	Table of well symbols provided in GeoSyn 2D
<a href="#">"Wizards and dialog boxes " below</a>	Alphabetical listing of all user dialogs

## Wizards and dialog boxes

The following pages provide descriptions and definitions of all the wizards and dialogs used in GeoSyn.

### Auto correlation wizard

With this feature...	Do this...
Ignore case	Select whether to link tops with the same combination of letters regardless of case.
Ignore blanks	Select whether to link tops with the same combination of letters regardless of inter-letter spaces.

Compare first	Specify the number of matching letters after which tops are automatically linked.
Ignore correlations that tie	Specify the number of wells with matching tops (subject to the selection criteria selected above) after which tops are automatically linked. Because only correlations that span the entire cross section create zones, you may want to specify a value that's one less than the total number of wells in your cross section.

### Parent Topics

[Creating Correlations](#)

[Create Well Correlations dialog box](#)

## Crossplot wizard: Select data type

With this feature...	Do this...
Depth data Time data	Select whether to base the crossplot on depth or time readings.

### Parent Topics

["Creating crossplots" on page 55](#)

["Crossplot wizard: Select axis data" on the facing page](#)

## Crossplot wizard: Select axis data

With this feature...	Do this...
Display pane	Click the log upon which to base first the X and then the Y axis.

### Parent Topics

["Creating crossplots" on page 55](#)

[Data Search Wizard: Select data from catalog](#)

["Crossplot wizard: Select data type" on the previous page](#)

## Crossplot wizard: Set the data range

With this feature...	Do this...
Display pane	<p>Click the data upon which to base the crossplot based on the following:</p> <p><b>Select all</b> to select the entire log depth.</p> <p><b>Define a data range</b> to display the <b>Define Data Window</b> dialog box and specify the portion of the log.</p> <p><b>Pre-selected Data Range</b> to use the depth range specified in the <i>Log Inspection</i> dialog box, which is launched from the Log Editor.</p>

### Parent Topics

["Creating crossplots" on page 55](#)

["Define data window" on page 186](#)

["Crossplot wizard: Select axis data" above](#)

## Fluid replacement wizard: Input and output logs, depth range

With this feature...	Do this...
Log tool kit	Click to display the <i>Fluid Replacement Tool Kit</i> dialog box to populate the input and output logs.
Input logs (P Sonic, S Sonic, Density)	GeoSyn automatically populates these boxes with P wave, shear sonic, and density logs if they're present in your model. Otherwise, click <b>Log Took Kit</b> above to derive them from other logs. The input logs are the source logs for Gassman's equation.
Porosity	Select either a constant porosity percent (most common), or derive the porosity percent from a density log. Note that a porosity log derived from a density log may not be accurate

	for zones in which gas is present.
Porosity units	Select a scale of either 0-10 or 0-100. GeoSyn analyzes the data extents and picks the units that seem most likely, but you can override them if some abnormal data values cause GeoSyn to select the wrong units.
Output logs	Initially, these are copies of the input logs, to which you then apply fluid replacement changes. Specify <b>*Active</b> logs in the drop-down lists so that fluid replacement changes are automatically reflected in the current model.
Depth range KB	Do one of the following: Type start and stop depths and click <b>Update</b> . Click either <b>Top</b> or <b>Bottom</b>

	<p>to select an absolute depth from the log, or click <b>All</b> to select both.</p> <p>Click <b>Range from tops</b> to select a zone of interest using the formation top names that also appear in the tops list selected in the <i>Top Properties</i> dialog box.</p> <p><b>Tip:</b> You can also use your mouse pointer to drag a specific zone on the <i>Log Editor</i> to specify a zone of interest.</p>
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### Parent Topics

["Modeling fluid replacement" on page 134](#)

["Fluid replacement tool kit" on page 225](#)

## Fluid replacement wizard: In-situ reservoir properties

With this feature...	Do this...
Rock Matrix	<p>Select the reservoir rock from the drop-down list to populate the Bulk modulus, Shear modulus, and Density fields with typical values, which you can change.</p> <p>When you change a value, the drop-down list above the Bulk modulus field displays <b>Custom</b>.</p> <p>For detailed derivations, click <b>Calculator</b> to display the <i>Minerals Calculator</i> dialog box and specify the mineral composition in your zone of interest.</p>
Hydrocarbon	<p>Select the hydrocarbon to populate the Bulk modulus and Density fields, which you can change.</p> <p>When you change a value, the drop-down list above the Bulk modulus field displays <b>Custom</b>.</p> <p>For detailed derivations, click <b>Calculator</b> to display the <i>Batzle and Wang Fluid Properties Calculator</i> dialog box and specify more precise values for your zone of interest.</p>
Water/Brine	<p>Select the reservoir fluid to populate the Bulk modulus, Density, and Water saturation fields, which you can change.</p> <p>When you change a value,</p>



	<p>the drop-down list above the Bulk modulus field displays Custom.</p> <p>For detailed derivations, click <b>Calculator</b> to display the <i>Batzle and Wang Fluid Properties Calculator</i> dialog box and specify values specific to your zone of interest.</p> <p>For the Water saturation value, instead of typing a value, you can instead drag the slider below the field. Note that the fluid average at the bottom of the dialog box changes as you change the water saturation percentage.</p>
Fluid Average	<p>Select <b>Reuss iso-stress</b> if fluid ratios are consistent in pores throughout the zone of interest; otherwise, select <b>Voight iso-strain</b>.</p>

#### Parent Topics

["Modeling fluid replacement" on page 134](#)

["Fluid replacement wizard: Input and output logs, depth range" on page 229](#)

["Batzle and Wang Fluid Properties Calculator" on page 169](#)

["Minerals calculator" on page 251](#)

## Fluid replacement wizard: Calibrate shear log for water saturations < 100%

This dialog box only appears if the water saturation defined using the previous dialog box is less than 100%.

With this feature...	Do this...
Apply correction using Mavko's Procedure	It's recommended that you select this to compensate for the fact that the shear log is frequently derived from a sonic log using Castagna's formula. Castagna's formula requires a correction when gas is present in the zone of interest.
Edit	Click to display the <i>Edit the Derivation Equation for log</i> dialog box and change the formula.

### Parent Topics

["Modeling fluid replacement" on page 134](#)

["Edit the derivation equation for log" on page 220](#)

## Fluid replacement wizard, FRM modeling: Set new water saturation

With this feature...	Do this...
New Water Saturation %	Drag the slider while viewing the effect in the <i>Log Editor</i> dialog box and in the model. Click <b>Apply</b> to save these changes to the log.

### Parent Topics

["Modeling fluid replacement" on page 134](#)

["Fluid replacement wizard: In-situ reservoir properties" on page 227](#)

["Fluid replacement wizard: Calibrate shear log for water saturations < 100%" on page 226](#)

## Import wizard: Highlight last data line in red

With this feature...	Do this...
Display pane	Click to define the last line of data to import.

### Parent Topics

["Importing tops from fixed width files" on page 35](#)

["Importing directional surveys" on page 23](#)

["Importing wavelets and sets" on page 77](#)

["Import wizard: Highlight first data line in red" on the next page](#)

["Import wizard: Set column delimiters" below](#)

## Import wizard: Highlight first data line in red

With this feature...	Do this...
Display pane	Click the first line of data (not column headers) to import.

### Parent Topics

["Importing tops from fixed width files" on page 35](#)

["Importing directional surveys" on page 23](#)

["Importing wavelets and sets" on page 77](#)

["Import wizard: Highlight last data line in red" on the previous page](#)

## Import wizard: Set column delimiters

With this feature...	Do this...
Fixed width Tab Comma	Select the character used to separate values in the file being imported.
Display pane	Click to place a column delimiter (↑) before a column of data to import or double-click to remove an existing delimiter. Delimiters

	need to be placed on both the left and right of columns to import.
Identify for Import	Click and select the column type from the <i>Select from list</i> dialog box. Columns without headers aren't imported.

### Parent Topics

["Importing tops from fixed width files" on page 35](#)

["Importing directional surveys" on page 23](#)

["Importing wavelets and sets" on page 77](#)

["Import wizard: Highlight last data line in red" on page 157](#)

["Import wizard: Finish" below](#)

## Import wizard: Finish

With this feature...	Do this...
Display pane (for tops, check shot, and directional survey imports)	Review the data that will be imported and click <b>Back</b> to make any changes.
Start time End time Sample rate (for wavelet	Type the

imports) Time data...	interval time and sample fre- quency.
-----------------------	--

### Parent Topics

["Importing tops from fixed width files" on page 35](#)

["Importing directional surveys" on page 23](#)

["Import wizard: Set column delimiters" on page 158](#)

## Data search wizard: Define search range


With this feature...	Do this...
Add Location Add Range	Click to display the <i>Edit a UWI</i> dialog box and select the survey system then type coordinates within which to retrieve logs.
Remove All	Select the specific location or range in the display pane and click <b>Remove</b> , or click <b>All</b> to clear all locations and ranges from the list.

Recent Searches	Select a search you previously conducted from the drop-down list.
Data Source	Select whether to retrieve logs from the IHS Information Hub or from a local or networked drive. Click <b>Edit online configuration</b> to display the <i>Properties: Configuration</i> dialog box and change folders in which downloaded logs are saved and your connectivity parameters for the IHS Information Hub. For GeoSyn network installations, connectivity parameters (except user name) affect all GeoSyn users.
Edit user paths	Click to display the <i>Set Source and Target directories</i> dialog box where you select the source to search for data and the location in which to save downloaded files.

## Parent Topics

["Downloading logs from the IHS information hub" on page 15](#)  
[Data Search Wizard \(Select data from catalog\)](#)

## Data search wizard: Select data from catalog

With this feature...	Do this...
Node expansion buttons (  )	Click to expand or contract all well nodes in the display pane.
Auto Select	Click to display the <i>Auto Curve Selection dialog</i> where you specify the curve type, author, and other details with which to select rows. To select all logs for a well, simply click the well.
Select all Deselect all	Click to toggle all logs in the display pane.
Display Layout	Before specifying the <b>Selection criteria</b> above, click to display the <i>Catalog display options</i> dialog box and specify the parameters under which wells appear in the display pane.
Report	Click to output the information that currently appears in the display pane to an ASCII text file.
Display pane	Click + and - to expand or contract individual nodes and select the desired logs. To select all logs for a well, simply click the well.

Show	<p>Toggle whether wells with digital sonic, digital density, and a specific depth appear in the display pane. GeoSyn automatically creates a constant velocity sonic log if none is available in the downloaded log. Specify whether undigitized logs and directional surveys appear in the display pane. If you try to download an undigitized log, an online digitization request form appears that you submit to IHS. Showing wells without data enables you to at least determine that a well UWI exists in the data.</p>
Hide if well	<p>Click whether wells with digital sonic or density, or that don't reach a certain depth appear in the display pane.</p>
Group multiple runs	<p>Select whether to merge the overlapping portions of curves. Further merge options such as whether to merge only curves from a common source and whether to trim the shallower or deeper curve appear in the <i>Data Search Wizard: Save Options</i> dialog box, which appears after you click <b>Next</b>.</p> <p>By default, data on the IHS Information Hub is</p>



	metric, but it can be converted to Imperial.
--	--

### Parent Topics

["Downloading logs from the IHS information hub" on page 15](#)

["Auto curve selection" on page 263](#)

["Data search wizard: Define search range" on page 160](#)

["Data search wizard: Model display and data save options" below](#)

## Data search wizard: Model display and data save options

With this feature...	Do this...
2D model creation	<p>Select from the following options:</p> <p><b>Import data into 2D model</b> - whether to import well and related data directly into the model or save it as an LAS file on disk.</p> <p><b>Set model depth range to minimum</b> - whether to trim the depth of the model to match the bottom of wells within that model.</p> <p><b>Order wells west to east</b> - whether to order wells using the UWI. Click <b>Order wells manually</b> to drag and drop them in the desired locations.</p>
LAS save options	Specify whether downloaded curves

	<p>are saved to the default target directory.</p> <p><b>Depth increment</b> - select the depth increment with which curves will be resampled. If you select <b>User defined</b> a second drop-down list appears where you type the desired depth increment. Using a larger depth increment may mute some curve details in curves with a small depth increment. Using a smaller depth increment may add some undue influences in curves with a large depth increment.</p> <p><b>Tops nomenclature</b> - select the naming terminology for your tops.</p> <p><b>Multiple runs</b> - select whether to merge only curves from the same source and for curves that are merged, whether to use the portion from the shallower curve (trim deep) or use the portion from the deeper curve (trim shallow).</p>
Directional survey save options	When you select a

	<p>directional survey in the <i>Online Data Search Wizard</i>:  <i>Select Data from Catalog</i> dialog box, specify the folder and format in which to save it. For directional surveys to be visible in <i>Online Data Search Wizard</i>:  <i>Select Data from Catalog</i> dialog box, click <b>Display</b> and select the <b>Show service curves</b> check box.</p>
--	--

### Parent Topics

["Downloading logs from the IHS information hub" on page 15](#)

["Properties: Import defaults" on page 259](#)

["Data search wizard: Select data from catalog" on page 162](#)

## Assign geometry to seismic file

With this feature...	Do this...
EBCDIC Header	Click <b>Edit</b> to display the <i>Edit EBCDIC Header</i> dialog box and change selected values.
Group Interval	Type the distance between groups of geophones.
Source Interval	Type the distance

	between energy sources.
Fold	Type the number of traces summed in the stack fold.
Azimuth	Type the clockwise angle of departure from true north.

SP	Type the position of the first shot point.
CDP	Type the position of the first common depth point.
X Y receiver location	Type the location of the first receiver group in UTM coordinates, which controls where the seismic line appears on the map when imported into a seismic workstation and the direction in which the waves move.

#### Parent Topics

["Exporting time data" on page 141](#)

[Exporting horizons](#)

[Horizon Export dialog](#)

[Exporting reflection coefficient data in SEG-Y format](#)

## AVO log suite

With this feature...	Do this...
Log type	Select the log type to create.
Derive from	Select to derive the log using industry standard formulas, which you can modify by clicking <b>Edit</b> to display the <i>Edit the Derivation Equation for log</i> dialog box. Clearing both the <b>Derive from</b> and <b>Maintain link</b> checkboxes, creates a straight line log.
Maintain link	Ensure this check box is cleared so that the parent log doesn't overwrite changes you make to the derived log.

### Parent Topics

[Modelling Fluid Replacement](#)

[Fluid Replacement Tool Kit](#)

## Batzle and Wang Fluid Properties Calculator

With this feature...	Do this...
Top portion of dialog box	Specify the pressure, temperature, and salinity of the reservoir.
Hydrocarbon	Specify whether the reservoir includes gas (most com-

	<p>mon), and the specific gravity for the hydrocarbons. To simulate dead oil (oil without the presence of gas), reduce the GOR to zero.</p> <p><b>Note:</b> Click <b>Close</b> to preserve the values you've specified, or click <b>Cancel</b> to restore the previous values.</p>
--	--

## Parent Topics

[Modelling Fluid Replacement](#)

[Fluid Replacement Wizard \(In-Situ Reservoir Properties\) dialog box](#)

## Break old correlation, rename new correlations

With this feature...	Do this...
New name	Type a name by which to identify the correlations left and right of the break point.

## Parent Topics

["Edit correlations" on page 213](#)

## Catalog display options

With this feature...	Do this...
Curve Info Layout Order	Toggle the data type to display and drag and drop mnemonics to change the order in which log information appears in the <i>Online Data Search Wizard: Select Data from Catalog</i> dialog box.
Well Sorting Order	Toggle whether to sort the <i>Online Data Search Wizard: Select Data from Catalog</i> display area by UWI (and click <> to transpose columns on either side of the <>), or by sub-surface or kelly bushing depth.
Display Filter	Toggle whether only wells with



	<p>digital sonic, digital density, and a specific depth appear in the display pane. GeoSyn automatically creates a constant velocity sonic log if none is available in the downloaded log. Specify whether undigitized logs and directional surveys appear in the display area. If you try to download an undigitized log, an online digitization request form appears that you submit to IHS.</p>
Display and download units	<p>Select whether logs are downloaded in metric, imperial, or original units. For Canadian wells, original units are imperial if the</p>

	log was run before January 1, 1979. All U.S. logs are in imperial units.
--	--

## Parent Topics

## Clip or filter the log

With this feature...	Do this...
Select Logs	Select the log to clip or filter.
Clip and Replace	Select to replace values outside of a defined range with specified minimum and maximum values.
DeSpike	Select to replace spikes outside of a defined range with data values interpolated from the last good data point.
Median Mean Triangular filter	Select to average the number of samples defined in the <b>Operator length</b> box by the value that

	<p>appears exactly in the middle of all the values within that group when sorted from smallest to largest (median), the value derived from the sum of all values within a group and divided by the number of values within that group (mean), or the value between three points (triangular).</p> <p>Type a small Operator length (7 to 15 samples) for de-spiking and a large Operator length (&gt;100) to achieve an approximation of a blocked log.</p>
Time filter	<p>Select to filter log at seismic resolution.</p> <p>Click <b>Edit</b> to set filter parameters: type, center freq, phase, taper</p>

	and length.
Select depth range KB	<p>Do one of the following:</p> <p>Type start and stop depths and click <b>Update</b>.</p> <p>Click either <b>Top</b> or <b>Bottom</b> to select an absolute depth from the log or click <b>All</b> to select both.</p> <p>Click <b>Depths from tops</b> to select a range using the formation top names that also appear in the tops list selected in the <b>Top Properties</b> dialog box.</p>

## Parent Topics

["Clipping or filtering logs" on page 122](#)

## Create a new correlation

With this feature...	Do this...
Correlation	Type a name for the correlation or accept the GeoSyn default. If you're correlating a time marker, you may want to name the correlation the same as that time marker, if you're drawing a geologic anomaly such as a channel, you can name the correlation accordingly.

### Parent Topics

["Creating correlations" on page 94](#)

## Create new curve type

With this feature...	Do this...
Name	Type a descriptive name that appears above the log in the main display.
API number	Type the API number.
Alias	Either type a name in the adjacent box and click <b>Add</b> to include it in the list of aliases associated with the log type or select an alias to remove from the associated aliases and click <b>Delete</b> . Generally, it's best to have as many aliases associated with a log type as possible so they don't have to be added when importing a GeoSyn or LAS file.
Curve infill	Select whether to display a scaled color or lithology. For litho-

	logy to appear in the main synthetic display, formation lithologies must also be configured in the <i>Top Properties</i> dialog box.
Infill orientation Infill palette Trace	Select whether to fill the left or right side of the log, the color palette to use (if scaled color is selected instead of lithology above), and display properties for the trace line itself.
Metric to Imperial conversion factor	Type a conversion factor.
Track width	Type the desired track width to display in the main synthetic display.
Lines Type	Select the line type to display and whether to display them in the foreground, background, or not at all.
Auto range	Select to automatically adjust scales to actual data limits.

#### Parent Topics

["Correcting invalid data when importing" on page 21](#)

["Well properties: Log properties" on page 280](#)

## Create well correlations

With this feature...	Do this...
Well display pane	Right-click a top and select <b>Edit top</b> to change top properties, or right-click the canvas and select <b>Start new correlation</b> and then click a top in each well to which to latch the new correlation.
Depth	Select whether to display either or both sub-sea and kelly bushing depths along-side tops.
Wizard	Click to launch the <i>Correlation Wizard</i> dialog box and specify the criteria GeoSyn uses when automatically correlating tops.
Correlations Edit	Click to display the <i>Edit Correlations</i>

	dialog box and change top display properties.
Tops Edit	Click to display the <i>Select a well</i> dialog box, choose the well for which to edit tops, then click <b>OK</b> and the <i>Top Properties</i> dialog box appears.
Draw with mouse	Click either <b>Start</b> or <b>End</b> to begin or complete drawing a correlation manually.

## Parent Topics

["Creating correlations" on page 94](#)

## Crossplot properties: Color mapping

With this feature...	Do this...
Enable color coding	Select whether to display the Gradational or Blocked color coding in the Crossplot Viewer.
Brush	Click to display a dialog box from which you select the desired color for either gradational or block fill.
Link list	Click the synthetic or log on which to display the data point highlighting.



## Parent Topics

"Creating crossplots" on page 55

## Crossplot properties: Controls

With this feature...	Do this...
Labels	Clear the check box and type different text you want to appear in the main display.
Highlight data window	Select whether an outline in the main display shows the portion of the synthetic on which the crossplot is based. Click <b>Edit</b> to display the <i>Define Data Window</i> dialog box and specify the depth or time upon which to base the crossplot.
Trend line	Select whether to display a

	linear regression trend line on the crossplot.
Symbols	Select the symbol size, color scheme, and data to which to link scatter points. Depending on the Color Reference type selected, when you click <b>Color</b> to display the <i>Edit Color Palette</i> dialog box, a Histogram pane in the <i>Edit Color Palette</i> dialog box enables you to set the min max color nodes and thus control how much of the color spectrum is used across the data. When

	<i>Depth</i> is specified as the <i>Color reference</i> , the histogram doesn't appear in the <i>Edit Color Palette</i> dialog box.
Width/Height	Type the crossplot dimensions and click <b>Update</b> .

#### Parent Topics

["Creating crossplots" on page 55](#)

[Exporting crossplots](#)

["Edit color palette" on page 210](#)

## Crossplot properties: Enclosures

With this feature...	Do this...
polygon	Click <b>Start</b> and then click to define the anchor points of your polygon on the crossplot canvas. Click <b>End</b> to complete and automatically enclose the polygon.
ellipse	Type a value in the eccentricity box below then click <b>Start</b> and click to anchor one end of

	the ellipse. Move your mouse to the other desired end of the ellipse and click to anchor that point.
Eccentricity	Type a decimal value from 0.01 to 0.99 where 0 represents a circle and 0.99 represents an ellipse. Typing 1 draws a line instead of an ellipse.
Name	Type a meaningful name for the selected annotation(s).
Color	Click <b>Outline</b> , <b>Infill</b> , or <b>Both</b> and select the desired color for the selected annotation(s).
Enclosure list	Click <b>Show</b> to display the selected annotation in the Crossplot Viewer.
Link list	Click the synthetic or log on which to highlight the data points encompassed by an annotation.

## Parent Topics

["Annotating Crossplots" on page 61](#)

## Crossplot properties: X and Y axis

With this feature...	Do this...
Data	Click Edit to select different series data for the X or Y axis.
Swap axis	Click to switch the X and Y axis.
Auto	Clear to specify a axis label, units, values, grid options, and scale type other than that automatically calculated by GeoSyn based on the crossplot data.

### Parent Topics

["Creating crossplots" on page 55](#)

## Cut

With this feature...	Do this...
Depth range	Type the start and stop depth to remove from the log, click <b>Top</b> or <b>Bottom</b> to select either the absolute top or bottom of the log, or click Depths from Tops to specify a zone of interest using tops selected for display in the <i>Tops Properties</i> dialog box .
Drop top of log Raise bottom of log	Select whether to lower the start depth or raise the stop depth to compensate for the cut portion. Depending on your selection, all log data either above or below the cut portion is shifted.

Parent Topics

["Cutting logs" on page 128](#)

## Define data window

With this feature...	Do this...
Sample	Select a sample range to plot. Time samples are used for time plots and depth samples are used for depth plots.
Time	Select a time range to plot.
Depth	Select a depth range to plot based on Kelly Bushing depth.
Top	Select a depth range to plot based on formation tops.

Parent Topics

["Creating crossplots" on page 55](#)

["Crossplot properties: Controls" on page 180](#)

## Directory Browser

With this feature...	Do this...
Survey system tabs	Click to select the appropriate survey system. All files with either a <i>.syn</i> or <i>.las</i> extension (depending on how you launched this dialog box) appear in the <i>Labels</i> tab, regardless of whether they include a valid UWI.
Display pane	Click a column header to sort rows based on the values in that column. Click <b>&lt;&gt;</b> to transpose the columns on either side of it. Right-click a file to view basic log details in a popup window.
Filter	Select then click <b>Edit</b> , which appears beside the <b>Filter</b> box, to display the <i>Edit a UWIDialog</i> box and specify the geographic coordinates within which to display UWIs in the <i>Directory Browser</i>



	display pane.
Report	Click to display the <i>Browser report</i> dialog box then click <b>Save Report</b> to save the above display to an ASCII format file.
Restore order	Click to restore the original horizontal and vertical column order.
Open	Click to open the file selected in the display pane above. If <i>Directory Browser</i> is opened from the <i>Import log data</i> or <i>Open a GeoSyn format file</i> dialog boxes, you can only select one file. If it's launched from the <i>Batch printing</i> or <i>Batch reformat</i> dialog boxes, you can select multiple files. SHIFT+CLICK or CTRL+CLICK for multiple selection.

### Parent Topics

["Using Directory Browser" on page 19](#)

["Import log data" on page 232](#)

## Display parameters: Depth model

With this feature...	Do this...
Top Bottom Width	Specify the dimensions of the actual canvas. You can't reduce the canvas size to less than that of wells unless you click <b>Trim model</b> below, but you can reduce the display range to hide portions of the model.
# Depth/time traces	Type the total number of traces to display.
Width Depth inc.	Type the depth increment used for the depth model. This value is defined by your current default file, not the individual wells on the depth page. The depth increment of individual wells is specified on the <i>Well properties</i> dialog box . High-frequency models work better with smaller

	depth increments, but smaller depth increments also affect system performance.
Trim	Click to display the <i>Trim depth model</i> dialog box and specify the zone of interest above and below which to remove canvas.
Trim to display range	Click to trim the model to the display range specified below.
Display range sub-sea	Type the zone of interest to include in the model. You may want to trim models when importing them instead of reducing the display range because superfluous data can affect system performance.
Scales	Type the geographic distance represented by each model

	increment and click <b>Font</b> to change the scale text display properties.
Label every	Select the label frequency from the drop-down list.
Correlations	Click <b>Font</b> and specify the display properties for correlation names that appear on either side of the vertical scale.
Node size	Select a node size from the drop-down list. If drawing geological anomalies with correlation lines, you may want to increase the node size to see what affect the anomalies have on adjacent time markers when you flatten and unflatten the model. You can drag nodes.
Flatten	Select a correlation upon which to flatten or click <b>None</b> .

Flatten edges of model	Click to align the start and end points of a correlation with the adjacent correlation nodes that appear within the canvas borders.
Trace / color property	Select whether depth traces are based on transit, density, or impedance. For example, if your density log is inaccurate and there's little velocity contrast, select <b>Transit</b> , but for horizons with high density contrast, for example, limestone over porous dolomite, select <b>Density</b> .
Show only '_ Velocity' well logs	This setting is based on the settings in the <i>Display Parameters: Global</i> tab.
Trace overlay every	Select whether to display every trace or every second

	or third trace to determine how velocity field is being interpolated.
Color underlay Lithology underlay	Specify whether the underlay is based on color values or lithology. You configure lithology on a zone by zone basis using the <i>Edit Zone Parameters</i> dialog box . Generally, the <b>Range</b> check box should be cleared so you have more control over the depth model presentation.
Impedance field interpolation cues	Select whether arrows that indicate the direction in which the impedance field was interpolated appear on the depth page.

Depth markers	Select the frequency of depth markers.
Show crossplots on this page	Select whether the crossplot appears on the depth page or is hidden.

### Parent Topics

["Changing depth models" on page 91](#)

## Display parameters: Global

With this feature...	Do this...
Text Banner	Type the text to display in the top-left corner of both the time and depth pages.
Graphics Banner	Select whether an image in enhanced metafile format appears. Click <b>Edit</b> to display the <i>Enhanced Metafiles Properties</i> dialog box then browse to and select the image, or

	with the image copied into the Windows Clipboard, click <b>Paste</b> .
Units	Select whether to apply Imperial or Metric units throughout the model and the related increment.
Sonic Units	Specify whether the time and depth models are based on transit or velocity units. Your selection affects which overlay and underlay options you can select in the <i>Display Parameters: Time Model</i> dialog box.
Undo levels	Select the number of successive actions you can undo



	and redo.
Printer	Type a percentage by which to increase the plotting scale for laser jet printers, which can vertically compress models by up to 2%. And select whether a page outline appears on the model bounding the portion of the model that will fit on the currently selected page size.
Warnings	Display a warning message when importing a log that's not defined in the <i>Properties: Log Defaults</i> dialog box.

#### Parent Topics

["Changing global properties" on page 4](#)

["Properties: Log library" on page 261](#)

## Display parameters: Time model - display

With this feature...	Do this...
# Depth/time traces	Type the total number of traces to display in the time model. This number affects the depth model if you selected a value in the <b>Trace overlay every</b> drop-down list in the <i>Display Parameters: Depth Model</i> tab. It also affects where you can place a well on the depth page because a well can only be placed on a trace.
Duplicates (at wells)	Type the number of times to copy the non-interpolated trace from each well. Copies appear alongside the existing non-interpolated trace. Click color to change the color in which duplicates appear. To highlight non-interpolated traces, click <b>Highlight well traces</b> .
Display range	Type the range for the vertical scale. When the time model isn't flattened, the top of the model is zero, when flattening is on, the flattened correlation is zero.
Scales	Type the number of traces per running unit for the horizontal scale, and the number of units per second in the vertical scale.
Correlations	Select whether cor-

	relations drawn on the depth page appear. Correlations deleted on the time page are also removed from the depth page.
Flatten	Select a correlation upon which to flatten.
Show well logs	Select whether to display well logs on top of the seismic cross section.
Trace overlay	Select whether to display a trace overlay and whether the trace shows velocity, wiggle, or transit readings. Clearing this check box and selecting the <b>Underlay</b> check box below helps you detect washouts.
Amplitude	Type the display amplitude of the trace data.
Color underlay	Select whether to display a color fill then click <b>Edit</b> to select the colors to use and whether to display a color bar reference to the right of the model.
Range	Select whether the color range is based on the minimum and maximum values inherent in the model or based on minimum and maximum values you type.

Quick Change	Select common customizations.
Legend	Click <b>Font</b> and specify the display properties for trace information that appears above the model adjacent to the logo.
Timing lines	Select whether and the frequency with which timing lines appear.

### Parent Topics

["Changing time models" on page 70](#)

## Display parameters: Time model - multi-offset

With this feature...	Do this...
Ray trace method	Select Dix NMO for a preliminary fast view, or Ray trace for improved accuracy using a full Snell's law ray-tracing algorithm.
Vertical sampling	Type the increment for time sampling.
Depth range	Select the depth interval to sample either by subsea depth or by correlation zone. Limiting the range reduces the time it takes GeoSyn to generate the

	AVO model.
CDP interval	Type a value that matches the common depth point interval of the seismic to which the model will be compared. CDP is half of the surface offset.
Num traces	Type the total number of traces to display in the model.
Sum traces	Select whether to show individual traces for each receiver and whether to sum all the traces into one trace displayed to the left of the model. Click <b>Edit</b> to display the <i>Sum Options</i> dialog box where you define groups of traces (near, middle, far) and then do mathematical operations between the three groups, which enables you to filter or enhance certain portions of the offset trace. For

	example, you might subtract the far traces from the near traces and then multiple the result by the far traces to enhance the far offset amplitude.
Near trace offset	Type the distance from the source at which the nearest receiver appears. The distance to other receivers is calculated using this value, the CDP interval, and the Num traces values above.
Mute	Apply an inside or outside angle outside of which data won't be included in the trace. The incident angle is calculated at each sample. The mute line is drawn on your synthetic to show where data is being cutoff. Select the color in which this line is drawn using the

	Mute color drop-down list.
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## Parent Topics

["Changing time models" on page 70](#)

## Display parameters: Time model - parameters

With this feature...	Do this...
Sample rate	Select the time between successive samples of the digital time series. Sample rate is in two-way time. To prevent time aliasing, wavelet frequencies greater than the nyquist frequency should not be used. The nyquist frequency is equal to half of the sampling frequency.
Wavelet	Click to display the <i>Wavelet Properties: Spectrum</i> dialog box.
Model type	Select either <b>Zero offset model</b> or click <b>Multi offset model</b> to enable the <b>Multi-Offset</b> tab and to generate any sonic or density logs required for offset modelling.
Reflection Coefficients	If all wells in your model include density logs, you can use a combination of sonic and density logs to calculate the reflection coefficient. If all of your wells don't have a

	density log, you can create one using <i>Log Editor</i> .
AGC length ms	Type a value for the automatic gain control applied to the data. AGC uses a box car method where a sliding window calculates an arithmetic average that is used to normalize the data point in the center of the window. Set AGC to zero for no automatic gain control.
Noise	Select the <b>Apply</b> check box and then click <b>Edit</b> to display the <b>Noise Parameters</b> dialog box, where you apply noise type.
Multiples	Select whether to display simulated first order multiples alongside primary reflections, or to just display multiples and not the primary reflection. First order multiples are the first reflection of a primary reflection.

## Parent Topics

["Changing time models" on page 70](#)



## Display parameters: Wells

With this feature...	Do this...
Width	Type the width to display the wells selected in the display pane on the depth page.
Position	Type the distance to display the well selected in the display pane from the left canvas edge on the depth page.
Template	Click <b>Edit</b> to display the <i>Edit Multi-log per track</i> dialog box and configure track properties including which logs appear in various tracks.
Space evenly Sort east to west	Click <b>Update</b> to change wells from proportional spacing to evenly dispersed along the cross section. If spacing evenly, GeoSyn moves interwell nodes too. You can only sort east to west when

	there aren't already correlations drawn in the depth model.
Scale annotations	Click <b>Font</b> to change text display properties and select an increment for the vertical scale from the drop-down list.
Markers	Select the increment for major and minor markers from the drop-down list.
Header annotations	Click to display the <i>Edit Well Header Display</i> dialog box and select the fields to display in the well headers on either the time or depth pages.
Trim wells	Select whether to trim wells by Kelly Bushing or Subsea depths then type the start and stop depth for the well. If simultaneously trimming multiple wells,

	select subsea. Only the shallowest start depth and deepest stop depth in the range selected appear, though all wells are trimmed.
Display pane	Select the well (s) to modify. <b>SHIFT+CLICK</b> or <b>CTRL+CLICK</b> for multiple selection.
Export	Click to display the <i>Export Wells</i> dialog box and save wells to disk in either GeoSyn or LAS format.
Logs	Click to display <i>Log Editor</i> .
Tops	Click to display the <i>Top Properties</i> dialog box.

Properties	Click to display the <i>Well Properties</i> dialog box.
Duplicate	Click to duplicate the well selected in the display pane then click the depth model in the location in which to insert it. If there are correlations already drawn in the depth model, the <i>Insert a well into existing model</i> dialog box automatically appears and you correlate the tops in the duplicated well with those in the cross section.
Delete	Click to delete the well(s) selected in the display pane. <b>CTRL+CLICK</b> or <b>SHIFT+CLICK</b> for multiple selection.

### Parent Topics

["Edit well header display" on page 220](#)

["Changing well display properties" on page 88](#)

## Edit default display properties

With this feature...	Do this...
API number	Type the API number.
Alias	Either type an alias in the box above the Add button and then click <b>Add</b> to include it in the <i>Alias</i> list, or select an alias in the <i>Alias</i> list and click <b>Delete</b> . Deleting aliases may prevent GeoSyn from recognizing the aliases of imported logs in the future.
Curve infill	Select whether the log is colored with a scaled gradient or based on lithology. Even with lithology selected, the lithology of formation tops must be configured in the <i>Top Properties</i> dialog box before it appears in the main display.
Infill orientation Infill palette	Select whether the positive or negative portion of the log is colored. Custom color palettes aren't available for default curve types.
Trace	Select the display properties.
Metric to Imperial conversion factor	Type the factor with which to convert Metric to Imperial.
Track width	Type the desired track display width.
Lines Type	Select whether lines appear on the log and whether they're logarithmic or linear.
Auto range	Select to automatically adjust scales to data limits or clear and type custom minimum and maximum values.
Display in velocity units (for sonic logs)	Select whether to display the log in velocity units and type the range.

### Parent Topics

["Changing log definitions" on page 105](#)

["Properties: Log library" on page 261](#)

## Edit a UWI

With this feature...	Do this...
Survey system pane	Click the desired survey system tab and then type coordinates for either a UWI or UWI range (depending on how you launched this dialog box). Type ?? as a wildcard when a specific value is unknown.

### Parent Topics

["Downloading logs from the IHS information hub" on page 15](#)

["Changing well display properties" on page 88](#)

["Directory Browser" on page 187](#)


["Using Directory Browser" on page 19](#)

["Well properties: Well properties" on page 283](#)

[Data Search Wizard: Search locations and ranges](#)

## Edit color palette

With this feature...	Do this...
<p>Histogram (appears for models and some cross plots)</p>	<p>View where amplitudes in the selected model fall. A histogram is a density graph, with amplitude range along the vertical scale and bins along the horizontal scale. Seeing where the amplitudes cluster enables you to tailor the color display accordingly so that a fuller color spectrum is expressed in the model or cross plot. This is done by dragging the min max colors closer to the bottom and top of where most of the amplitude data falls. Note that for cross-plots, the color reference type specified in the cross plot dialog box determines whether the histogram pane appears. For logs, colors are typically associated with particular values based on lithology so it's not possible to override this by dragging the min max color nodes for logs.</p>
<p>Palette</p>	<p>Hover the cursor over an adjacent node until the cursor becomes a square then click and hold the mouse button</p>

	while dragging the color node up or down to move the corresponding color.
Palette Name	Type a unique name by which to save the current palette configuration in the <i>GeoSyn Working</i> directory then click <b>Save</b> .
Palette selection	Either select a default palette that shipped with GeoSyn or click <b>Load</b> to browse to and select a custom palette you previously created.
Drag and drop node colors	Click and hold the mouse button on a color then drag it onto either the color bar or onto a node adjacent to the color bar and release the mouse button. If you release the color on the color bar, a new corresponding node for that color appears beside the color bar.
Custom colors	Click  to display the <i>Custom Colors</i> dialog box where you click the color to set as a custom color, and then drag the color to the desired location on the Palette strip to apply it. Custom colors are set in the registry so that they persist



	across GeoSyn sessions.
Nodes	<p>Select from the following:</p> <p><b>Add</b> to place additional nodes beside the color bar on which you can drop colors.</p> <p><b>Remove</b> to delete the last node placed.</p> <p><b>Flip</b> to flip the color bar on its center horizontal axis.</p> <p><b>Even</b> to evenly disperse the existing nodes along the color bar.</p> <p><b>Rotate</b> to shift all the colors one node down. The bottom node becomes the top node.</p>
Color Interpolation style	Select whether to display a color gradient or solid color blocks.
Frequency	<p>Select so that the center of the palette is anchored to the center of the amplitude data. Clear to skew the coloring of the amplitude points. You might choose to skew the coloring for logs, but not likely for models. Click <b>All</b> to return the min max colors to the bottom and top of the histogram.</p>
None	Click to remove all color from the color bar.

## Parent Topics

# Edit correlations

With this feature...	Do this...
Display pane	Select the correlation with which to work. <b>SHIFT+CLICK</b> or <b>CTRL+CLICK</b> for multiple selection.
Correlation Name	Type the desired name to apply to the correlation selected in the display pane above then click <b>Update</b> .
Delete All	Select whether to delete the correlation selected in the display pane above or all correlations in the model.
Color drop-down list	Select the color to apply to the correlations selected in the display pane above.

## Parent Topics

["Create a new correlation" on page 176](#)

["Create well correlations" on page 178](#)

["Creating correlations" on page 94](#)

## Edit labels

With this feature...	Do this...
Display pane	View whether an image or annotation appears on the depth or time page, then select a row to change, delete, or duplicate ( <b>SHIFT+CLICK</b> or <b>CTRL+CLICK</b> for multiple selection).
Text	Click to create a new row for a text label in the adjacent display pane then type a more descriptive reference for it in the Text box below the display pane and click <b>Update</b> .
Symbol	Click to create a new row for a symbol label in the adjacent display pane then select a symbol type from the drop-down list below the display pane.
Import	Click to browse to an image file in <i>.emf</i> format.
Paste	Click to paste a metafile image copied to your Windows clipboard from another application when you pressed

	<b>ALT+PRINT SCRN.</b>
Duplicate	Click to make a second copy of the image selected in the display pane above.
Delete	Click to delete the rows selected in the display pane ( <b>CTRL+CLICK</b> or <b>SHIFT+CLICK</b> for multiple selection).
Linkage	Select whether the label is floating, which can be dragged anywhere in the model, or anchored to either a well or a position on the canvas.
Link to depth KB	For labels linked to wells, specify a fixed KB depth at which to link it.
Size	For symbols, select whether to maintain the label proportions then type a desired height or width, or click and hold the mouse button while dragging one of the image's handles in the main display.

Background	Specify whether to color the label background.
Border	Select a border style and color.
Font	Click <b>Edit</b> to change font display.

### Parent Topics

["Displaying images and annotations" on page 92](#)

["Changing global properties" on page 4](#)

## Edit lithology

With this feature...	Do this...
Display pane	Select the lithology for which to change the color.
	<p>Click to display the <i>Color</i> palette and using the <i>Color</i> palette, click the desired color for the lithology selected in the Edit Lithology display pane above.</p> <p>You can also click <b>Define Custom Colors</b> to create a color that doesn't already appear in the <i>Basic colors</i> options.</p> <p>The new color is applied to the lithology type throughout this and future cross sections.</p>

### Parent Topics

["Configuring Zones" on page 100](#)

["Edit zone parameters" on page 221](#)

## Edit correlations / nodes

With this feature...	Do this...
Correlations	Select the correlation to show its corresponding nodes in the Nodes pane. As you select a correlation, it's highlighted in the model and you can change its display properties including name, line style, and color.
Flatten edges of model	Click to align the start and end points of a correlation with the adjacent correlation nodes that appear within the canvas borders.
Nodes	Select the node to change. As you select a node, it's highlighted in the model.
Delete	Click to remove the node selected in the Nodes pane from the model. You can't delete nodes that are latched to a well.
Offset	Type the amount by which to offset the node to the right. You can only change the offset when flattening mode is off.
Depth SS Depth KB	For nodes latched on a well, type the desired depth then click the corresponding button.

## Parent Topics

["Creating correlations" on page 94](#)

## Edit EBCDIC header

With this feature...	Do this...
Display pane	Select a value to change and then click <b>Update</b> .

## Parent Topics

["Exporting time data" on page 141](#)

["Assign geometry to seismic file" on page 166](#)

## Edit multi-log per track template

With this feature...	Do this...
Template name	Type a descriptive name for the template to distinguish it from others you create. The template file is saved in the GeoSyn <i>Working</i> directory with the associated description you type.
Show empty tracks	Select to display tracks regardless of whether they contain logs and provided that <b>Show Track</b> is also selected on each individual tab below.
Show track	Select to display the selected track provided it contains a log. To ensure the selected track appears regardless of whether it contains a log, also select <b>Show empty tracks</b>

	above.
Track width   Following gap	Type the width of the track and the space between tracks.
Scale type	Select either <b>Linear</b> or <b>Logarithmic</b> scale display types.
Minor division   Major division	Depending on the scale type selected above, type either the minor and major scale increments, or the left and right scale.
Include curves of type	Click <b>Add</b> to display the <i>Select from List</i> dialog box and select the log (s) to add to the current track. GeoSyn adds logs from left to right and any log not included in one track becomes available to the next track to the right. To ensure GeoSyn doesn't drop any logs, for the last two tracks select <b>All remaining linear curves</b> and <b>All remaining logarithmic curves</b> .
Import   Save	Click to either load a template from the GeoSyn <i>Working</i> directory or to save the existing template.

## Parent Topics

["Combining logs in tracks" on page 109](#)

["Well properties: Log properties" on page 280](#)



## Edit the derivation equation for log

With this feature...	Do this...
Equation	Modify the formula.
Function library	Select a different library to display a different formula, or if you've modified the equation, select a library to revert to the original formula.

### Parent Topics

["Modeling fluid replacement" on page 134](#)

["AVO log suite" on page 169](#)

["Fluid replacement wizard: Calibrate shear log for water saturations < 100%" on page 226](#)

## Edit well header display

With this feature...	Do this...
Drop-down lists	Select the items to appear in the well header. Select <b>Unformatted UWI</b> for malformed UWIs.
Font	Click to set font display properties.
Select time/depth well header to match	Click to display identical well headers on the time and depth pages.
Drop-down lists	Select the field to display in the corresponding position on the model.

### Parent Topics

["Changing well display properties" on page 88](#)

["Display parameters: Wells" on page 204](#)

## Edit zone parameters

With this feature...	Do this...
Zone list	Select the zone or sub-zone with which to work. By default, selecting the zone node selects all of the sub-zones beneath that node to which to apply changes. You can select either a single sub-zone or all of the sub-zones within a Zone, but not only some of the sub-zones within a zone. When highlighting is enabled using the View menu, as you select a zone or sub-zone, the boundaries of that zone are highlighted on the depth model (zones in yellow and sub-zones in blue).
Interpolate Well	For a zone that intersects a well bore, select whether to interpolate the velocity field between wells by first taking a value from the top of the zone and then from the bottom of the zone and grading downwards ( <b>Top</b> ); or by first taking a value from the bottom of the zone and then from the top of the zone and grading upwards ( <b>Bottom</b> ). If there isn't sufficient data to interpolate, select <b>Squeeze/Stretch</b> instead.
Constant	Type values for a constant impedance field when you don't have wells for an area. To automatically

	change all zones in the model, click <b>Constant</b> in the Set all pane below.
Lithology	Select whether to apply a specific lithology to the zone from the drop-down list. Click <b>Edit</b> to display the <i>Edit Lithology</i> dialog box and change the color applied to a lithology throughout this and other models.
Set all	Click to apply the options available in the Interpolate Well and Constant areas above to all zones throughout the model.

Display Lithology	Select whether to color the zone using the pattern selected in the Lithology drop-down list above. If selected, the coloring won't appear until you select a different zone or close this dialog box.
Show interpolation cues	Select whether to display arrows on the model that indicate whether the zone was interpolated from top down (↓), bottom up (↑), or by stretch squeeze (↕).
Interpolation Method	<p>Select either Type 1 or Type 2 based on the following:</p> <p><b>Type 1</b> (Recommended)  Starting at either the top or bottom of the zone, depending on the Interpolate well option selected above, GeoSyn takes a data sample from each well and fills the distance between wells using interpolation based on distance and then moves to the next data point above or below the current position and repeats the above process. If a pinch-out occurs where one of the wells has no more data, GeoSyn switches from interpolation to extrapolation mode using the remaining data in the other well. This rapid switch from interpolation to extrapolation mode over only a single sample can</p>

	<p>generate a false reflection - especially in zones with strong horizontal velocity gradients.</p> <p><b>Type 2</b> Data values are interpolated between two points on adjacent wells just as above, but when a pinch-out occurs instead of switching to extrapolated mode, GeoSyn continues to interpolate using the last value from the well that ran out of data. This may result in an interpolation that's heavily biased by the last data value in the pinched out wedge and if that value is radically different than other data in the well, it may generate an incorrect amplitude.</p>
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#### Parent Topics

["Configuring Zones" on page 100](#)

## Export wells

With this feature...	Do this...
Selection criteria	After specifying the <b>Display parameters</b> below, click to display the <i>Selected curves must have</i> dialog box and specify the parameters by which to select logs in multiple wells that appear in the display pane.
Select all Deselect all	Click to toggle all logs in the display pane.

Export format	Select whether to export logs in GeoSyn or LAS format. GeoSyn format includes more data than LAS format that can be loaded using GeoSyn 1D or 2D.
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### Parent Topics

["Exporting logs" on page 142](#)

["Auto curve selection" on page 263](#)

["Display parameters: Wells" on page 204](#)

## Fluid replacement tool kit

With this feature...	Do this...
Create	Click to display the <i>AVO log suite</i> dialog box and derive the logs required as input logs for fluid replacement modelling from other logs in your model. For example, the shear log is typically derived from the sonic log.
Duplicate	Click to create exact copies of existing logs in your model for the input logs.

Hide new input logs	Click this to prevent the newly created input logs from appearing on your model.
Copy data	Click to synchronize the output logs with the original input logs. For example, if you've substantially changed data such as the depth range. This button is the equivalent to Undo.

#### Parent Topics

["Modeling fluid replacement" on page 134](#)

["Fluid replacement wizard: Input and output logs, depth range" on page 229](#)

["AVO log suite" on page 169](#)

[Notes on GeoSyn fluid replacement](#)

## Fluid replacement wizard: Calibrate shear log for water saturations < 100%

This dialog box only appears if the water saturation defined using the previous dialog box is less than 100%.

With this feature...	Do this...
Apply correction using Mavko's Procedure	It's recommended that you select this to compensate for the fact that the shear log is frequently derived from a sonic log using Castagna's formula. Castagna's formula requires a correction when gas is present in the zone of interest.
Edit	Click to display the <i>Edit the Derivation Equation for log</i> dialog box and change the formula.

#### Parent Topics

["Modeling fluid replacement" on page 134](#)

["Edit the derivation equation for log" on page 220](#)

## Fluid replacement wizard, FRM modeling: Set new water saturation

With this feature...	Do this...
New Water Saturation %	<p>Drag the slider while viewing the effect in the <i>Log Editor</i> dialog box and in the model.</p> <p>Click <b>Apply</b> to save these changes to the log.</p>

### Parent Topics

"Modeling fluid replacement" on page 134

"Fluid replacement wizard: In-situ reservoir properties" below

"Fluid replacement wizard: Calibrate shear log for water saturations < 100%" on the previous page

## Fluid replacement wizard: In-situ reservoir properties

With this feature...	Do this...
Rock Matrix	<p>Select the reservoir rock from the drop-down list to populate the Bulk modulus, Shear modulus, and Density fields with typical values, which you can change.</p> <p>When you change a value, the drop-down list above the Bulk modulus field displays <b>Custom</b>.</p> <p>For detailed derivations, click <b>Calculator</b> to display the <i>Minerals Calculator</i> dialog box and specify the mineral composition in your zone of interest.</p>
Hydrocarbon	<p>Select the hydrocarbon to populate the Bulk modulus and Density fields, which you can change.</p> <p>When you change a value,</p>



	<p>the drop-down list above the Bulk modulus field displays <b>Custom</b>.</p> <p>For detailed derivations, click <b>Calculator</b> to display the <i>Batzle and Wang Fluid Properties Calculator</i> dialog box and specify more precise values for your zone of interest.</p>
Water/Brine	<p>Select the reservoir fluid to populate the Bulk modulus, Density, and Water saturation fields, which you can change.</p> <p>When you change a value, the drop-down list above the Bulk modulus field displays Custom.</p> <p>For detailed derivations, click <b>Calculator</b> to display the <i>Batzle and Wang Fluid Properties Calculator</i> dialog box and specify values specific to your zone of interest.</p> <p>For the Water saturation value, instead of typing a value, you can instead drag the slider below the field. Note that the fluid average at the bottom of the dialog box changes as you change the water saturation percentage.</p>
Fluid Average	<p>Select <b>Reuss iso-stress</b> if fluid ratios are consistent in pores throughout the zone of interest; otherwise, select <b>Voight iso-strain</b>.</p>

### Parent Topics

["Modeling fluid replacement" on page 134](#)

["Fluid replacement wizard: Input and output logs, depth range" below](#)

"Batzle and Wang Fluid Properties Calculator" on page 169

"Minerals calculator" on page 251

## Fluid replacement wizard: Input and output logs, depth range

With this feature...	Do this...
Log tool kit	Click to display the <i>Fluid Replacement Tool Kit</i> dialog box to populate the input and output logs.
Input logs (P Sonic, S Sonic, Density)	GeoSyn automatically populates these boxes with P wave, shear sonic, and density logs if they're present in your model. Otherwise, click <b>Log Took Kit</b> above to derive them from other logs. The input logs are the source logs for Gassman's equation.
Porosity	Select either a constant porosity percent (most common), or derive the porosity percent from a density log. Note that a

	porosity log derived from a density log may not be accurate for zones in which gas is present.
Porosity units	Select a scale of either 0-10 or 0-100. GeoSyn analyzes the data extents and picks the units that seem most likely, but you can override them if some abnormal data values cause GeoSyn to select the wrong units.
Output logs	Initially, these are copies of the input logs, to which you then apply fluid replacement changes. Specify <b>*Active</b> logs in the drop-down lists so that fluid replacement changes are automatically reflected in the current model.
Depth range KB	Do one of the following: Type start and


	<p>stop depths and click <b>Update</b>.</p> <p>Click either <b>Top</b> or <b>Bottom</b> to select an absolute depth from the log, or click <b>All</b> to select both.</p> <p>Click <b>Range from tops</b> to select a zone of interest using the formation top names that also appear in the tops list selected in the <i>Top Properties</i> dialog box.</p> <p><b>Tip:</b> You can also use your mouse pointer to drag a specific zone on the <i>Log Editor</i> to specify a zone of interest.</p>
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## Parent Topics

["Modeling fluid replacement" on page 134](#)

["Fluid replacement tool kit" on page 225](#)

## Import log data

With this feature...	Do this...
	Expand or contract the nodes that appear in the display pane.
Auto select	Display the <i>Auto-</i>

	<p><i>matic</i>  <i>Curve selection</i> dialog box where you specify the properties of curves to automatically select in the <i>Import Log Data</i> dialog box.</p>
Add	<p>Select either of the following:  <b>Kingdom</b> - display the <i>Kingdom Data Browser</i> dialog box  <b>Disk</b> - display the <i>Select Log Data...</i> dialog box, where you specify a local file in .syn or .las format.</p>
Restrict depth range	<p>Click to display the actual depth specified in the file and then type different values in the adjacent boxes to change the zone of interest.</p>

Order wells west to east	Select whether to order wells based on the well identifier, or click <b>Order wells manually</b> to display the <i>Change well Order</i> dialog box where you select a well identifier and click either <b>Up</b> or <b>Down</b> . The top-most well is displayed in GeoSyn as the left-most well.
Set model depth range to minimum	Automatically restrict the depth range based on the smallest depth range common across all wells.

### Parent Topics

["GeoLaunching GeoSyn 2D from Kingdom" on page 6](#)

["Importing LAS or GeoSyn files from disk" on page 18](#)

["Auto curve selection" on page 263](#)

## Import tops

With this feature...	Do this...
Top depth placement	Select whether to space tops evenly or according to the kelly bushing or subsea. If based on depth, tops outside of the depth range of the model aren't placed.
Bulk shift top depths by + -	Type a negative or positive value by which to shift the top depth.

Import top depths units	Select the measurement system GeoSyn is using.
Delete current tops before importing new tops	Select to delete all tops in the tops list to which tops will be imported. If this check box is cleared, tops with the same name in the donor and recipient list appear twice in the recipient list.
File viewer	If importing an ASCII format file, select the file and then click to display the file contents in an ASCII text editor.

### Parent Topics

["Importing tops from fixed width files" on page 35](#)

["Importing tops from GeoSyn files" on page 42](#)

## Import wavelet processing flow

With this feature...	Do this...
Apply taper during import	Select whether to apply tapering during import. Although optional, if non-zero data is encountered near the end of an imported trace, spurious high-frequency energy may appear in the wavelet.
Wavelet name	Type the name by which to identify the wavelet in the main display.
Operator length	Type the operator length (longer operators include more detail) at which to extract wavelets. Extracting wavelets using a long operator enables you to shorten the wavelet length later without damaging the detail of the amplitude spectrum. GeoSyn saves only the amplitude and phase spectrums, and calculates time wavelets as required.
Taper	Select the taper method to apply to the operator that's extracted from the import trace after it's auto-correlated.

### Parent Topics

["Importing wavelets and sets" on page 77](#)

## Insert a well into an existing model

With this feature...	Do this...
Edit	To automatically link correlations, click to display the <i>Top Properties</i> dialog box and type top names that match correlation names and automatically link them by clicking the <b>Auto Correlate</b> button below.
Well Tops	To manually link tops to correlations, click a top to link to an existing correlation then click the correlation in the Intersecting correlations pane.
Auto Correlate	Click to link top names you created using the <b>Edit</b> option above to matching correlation names.
Clear	Click to erase all links between tops and correlations.

### Parent Topics

["Inserting log sections" on page 117](#)



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## Insert constant value log section

With this feature...	Do this...
Insert at	Select either depth or time and then either type a depth below or above which to insert a log section or click <b>Top</b> or <b>Bottom</b> to select the absolute top or bottom of the log.
Insertion range	Select either depth or time and then type a depth thickness to insert.
Insertion values	To adjust the value inserted in various logs, select the desired row and type a constant value to insert in the <b>Edit log insertion value</b> box.
Resetting top or bottom of well	Select whether to raise the start depth or lower the stop depth to accommodate the insertion.

### Parent Topics

["Inserting log sections" on page 117](#)

## Kingdom import horizon picks

Drop down list	List of available surveys tied to selected well
Visible only	Selects only active surveys
2D search radius	Custom search radius setting for 2D seismic lines
Retrieve 1 picks	Select either: <ul style="list-style-type: none"><li>• Time picks</li><li>• Depth picks</li></ul>
Tie to well	Select picks from either: <ul style="list-style-type: none"><li>• Surface</li></ul>

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	<ul style="list-style-type: none"> <li>• Bottom (default)</li> </ul>
Visible horizons only	Display only active horizons
Depths in KB	Toggles pick list between KB or SS
Horizon list	List of available horizon picks to import
Import	Imports selected horizon picks. <b>Note:</b> Kingdom time picks are converted to depth picks in order to display in GeoSyn as a top.

## Parent Topics

[Top Properties](#)

## Kingdom import tops by author

With this feature...	Do this...
Author list	Click which author(s) to import tops from.

## Parent Topics

[Top Properties](#)

## Log blocking

With this feature...	Do this...
Auto-block by culling values...	Select the range above which to ignore readings
Block between Tops	Select whether to apply a mean, median, or RMS constant average to the

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	log portion between the shallowest and deepest top within your selection. Remove the top and bottom zones, which can skew the model with inaccurate data.
Log list	Select the log to block.
Set depth range KB	Type start and stop depths and click <b>Update</b> . Click either <b>Top</b> or <b>Bottom</b> to select an absolute depth from the log or click <b>All</b> to select both. Click <b>Get range from tops</b> to select a range using the formation top names that also appear in the tops list selected in the <i>Top Properties</i> dialog box .

#### Parent Topics

["Creating Blocked Log Models" on page 119](#)

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## Log composite

With this feature...	Do this...
Unmatched	Drag logs that weren't automatically matched to the desired host log in the Matched pane or drag matched logs from the Matched pane into the Unmatched pane to remove the association.
Matched	Drag the left-most cell up or down to a different log to change an association.
Resort	Select either Alias or GeoSyn name. Typically the most accurate option is GeoSyn name.
Range	Do one of the following: Type start and stop depths and click <b>Update</b> .

	<p>Click either <b>Top</b> or <b>Bottom</b> to select an absolute depth from the log.</p> <p>Click <b>Depths from tops</b> to select a range using the formation top names that also appear in the tops list selected in the <i>Top Properties</i> dialog box .</p> <p>The selected donor depth range must fall within the host depth range.</p> <p>To add the donor log section to the base of the host well, in the <b>Host replacement depth range</b>, click <b>Bottom</b> to display the exact base of the host well and then type this value in the donor well <b>Top</b> box.</p>
Raise log data and tops above the insertion Lower log data and tops below the insertion	Select whether to move over-

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	lapping data in the host log above or below the insertion.
Copy tops	Select whether to copy tops from the donor well to the host well. These tops are copied to the <i>Generic</i> tops list.

#### Parent Topics

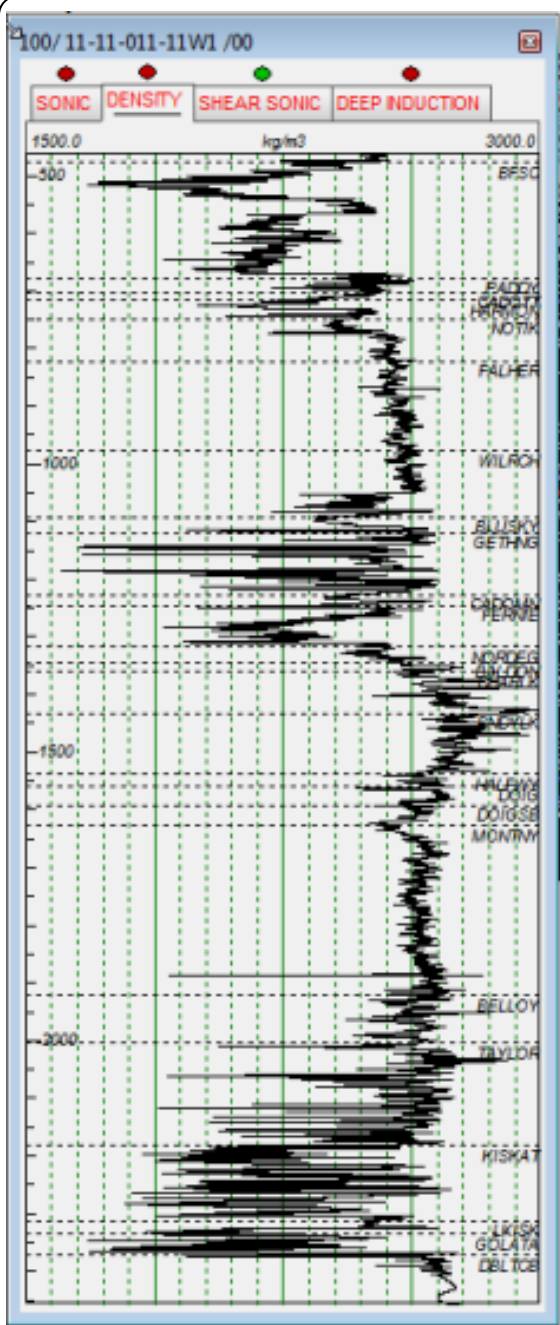
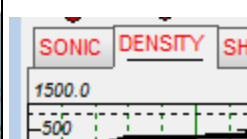


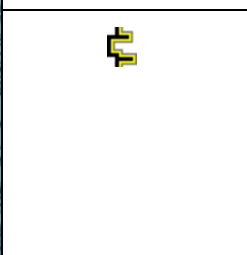
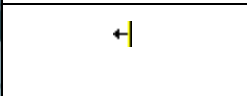

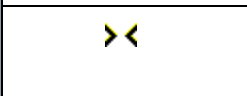





["Creating log composites" on page 129](#)









## Log editor

The Log editor allows you to edit and manipulate well logs.

To open the Log editor:

- **Edit > Log editing**
- Double click on a log in the model.
- Right-click on a log and select **Log editing**.

		Log tabs across the top —Click to view and work with different logs. Drag tabs left or right to change order.
	Draw a free-hand line.	
	Draw a straight line.	
	Redraw all or some of the log as blocks using an averaging or a culling method.	
	Insert a new log section.	
	Stretch or squeeze a log.	
	Clip or filter a log.	
	Apply a math equation to a log.	
	Remove a segment from a log.	
	Model different water saturation effects on the log.	
	Model different porosity levels on the log.	
	Create a log composite by	

		inserting log data from another well.
		Merge two logs.
		Shift a log relative to other logs by depth.
		Insert a top at a location you click on the log.
		Undo and redo previous changes.
		Zoom a log portion in or out.
		Expand or contract the Log Editor tab display.
		Change the minimum maximum values of the log scale.
		Close the <i>Log Editor</i>

## Parent Topics

["Drawing Straight Edge and Freehand Curves" on page 116](#)

["Creating Blocked Log Models" on page 119](#)

["Stretching and squeezing Logs" on page 120](#)

["Applying math equations to logs" on page 124](#)

["Modeling fluid replacement" on page 134](#)

["Creating log composites" on page 129](#)

["Changing log editor display" on page 114](#)

["Inserting log sections" on page 117](#)

["Inserting tops" on page 118](#)

["Clipping or filtering logs" on page 122](#)



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["Cutting logs" on page 128](#)

["Shifting logs" on page 132](#)

["Log editor display properties" on page 264](#)

## Math: Predefined functions

With this feature...	Do this...
Function library	Select from numerous pre-defined log equations.
Log identifiers	Click to place logs in the <b>Equation</b> box or simply view to correlate variables in the formula with their associated log. Click <b>Create new log</b> to create a new log populated with values from an equation that uses existing logs.

Create new log	Click to derive a new log by applying the mathematical function to the log selected in Log Editor.
Define range KB	Do one of the following: Type start and stop depths and click <b>Update</b> . Click either <b>Top</b> or <b>Bottom</b> to select an absolute depth from the log or click <b>All</b> to select both. Click <b>Depths from tops</b> to select a range using the formation top names that also appear in the tops list selected in the <b>Top Properties</b> dialog box .
Reset output log scales	Select to reset the log scales based on the resulting data range.

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## Math: User defined functions

With this feature...	Do this...
Top box	Type your equation directly in the box or click <b>Calculator pad</b> to populate the box using a calculator interface.
Calculator pad	Click to populate the above box using a calculator interface. The calculator interface includes a <b>Depth</b> button that generates a depth value of the sample
Function library	Select from numerous pre-defined log equations.
Log identifiers	Click to place logs in the <b>Equation</b> box or simply view to correlate variables in the formula with their associated log. Click <b>Create new log</b> to create a new log populated with values from an equation that uses existing logs.
Create new log	Click to derive a new log by applying the mathematical function to the log selected

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	in Log Editor.
Define range KB	<p>Do one of the following:</p> <p>Type start and stop depths and click <b>Update</b>.</p> <p>Click either <b>Top</b> or <b>Bottom</b> to select an absolute depth from the log or click <b>All</b> to select both.</p> <p>Click <b>Depths from tops</b> to select a range using the formation top names that also appear in the tops list selected in the <b>Top Properties</b> dialog box .</p>
Reset output log scales	Select to reset the log scales based on the resulting data range.

## Measured depth to true vertical depth correction

With this feature...	Do this...
Display pane	Select the row to adjust.
Insert Update Delete	<p>Select a row in the display pane above and click one of the following:</p> <p><b>Insert</b> to add a new row with the values typed in</p>

	<p>the MD, Dip, and Azimuth boxes. Regardless of the row selected, the inserted row is placed according to its depth.</p> <p><b>Update</b> to apply the values typed in the MD, Dip, and Azimuth boxes to the selected row.</p> <p><b>Delete</b> to remove the row.</p>
Delete	Click to remove the row selected in the display pane.
Input data set type	<p>Select from the following:</p> <p><b>MD, AZ, DIP</b> for data that includes azimuth and dip data</p> <p><b>MD, TVD, dX, dY</b> for data that includes True Vertical Depth, Delta X, and Delta Y. Delta X and Delta Y values are optional.</p>

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Survey units are	Select the units used in the import file. The default is the unit type in which the model is displayed.
Import survey	Click to display the <i>Import a Directional Survey</i> dialog box and browse to the file to import. Imported files overwrite values in the display pane above.
Save report	Save the display pane as an ASCII text file.

#### Parent Topics

["Importing directional surveys" on page 23](#)

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## Minerals calculator

With this feature...	Do this...
Mineral	Click <b>Select</b> to display the <i>Mineral Selector</i> dialog box for up to five minerals for which GeoSyn calculates an average using either the Voight-Reuss-Hill or Hashin-Shtrikman formulas specified.
Volume	Type the percentage of pore volume this mineral occupies. Note that you can't proceed beyond this dialog box until the combined volume of the minerals you've selected equals 100%.
Matrix Averaging Formula	Select <b>Voight-Reuss-Hill</b> if the matrix

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	<p>is fairly homogenous for a straight arithmetic averaging formula, or select <b>Hashin-Shtrikman</b> if the matrix is more complex.</p>
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#### Parent Topics

["Modeling fluid replacement" on page 134](#)

["Fluid replacement wizard: In-situ reservoir properties" on page 227](#)

["Mineral selector" below](#)

## Mineral selector

With this feature...	Do this...
Rock Properties	Click the mineral with which to populate the selected field in the <i>Minerals Calculator</i> dialog box.
References	If uncertain why to pick one member over another in the Rock Properties tab, note the number for each in the Reference column and then click the References tab and scroll to the corresponding number for a text and page reference that describes the unique properties of each.

#### Parent Topics

["Modeling fluid replacement" on page 134](#)

["Minerals calculator" on the previous page](#)



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## Noise parameters

With this feature...	Do this...
Signal to Noise	Adjust the signal to noise ratio.
Noise Type	Select the noise type to apply to the model. Select from White or Gaussian.
Band Limiting	Select a predefined filter to apply to the model.

### Parent Topics

["Changing time models" on page 70](#)

## Port hole

With this feature...	Do this...
Grab	Click to capture the portion of the time model currently displayed in the Port Hole window.
Set Filter	Click to display the <i>Wavelet Properties</i> dialog box,

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	change the wavelet settings, and then click <b>Grab</b> above.
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Parent Topics

"Displaying multiple views of individually filtered time sections" on page 74

Print

With this feature...	Do this...
Name	Select a printer or plotter.
Properties	Click to set print properties. Options in the <i>Properties</i> dialog box are unique to various printers, so we don't discuss them here. Refer to the printer documentation for details. If using a plotter, to customize the page size, click the <b>Paper Size</b> tab then click <b>Properties &gt; MoreSizes</b> .

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Print range	Type the page number range to print.
Copies	Select the number of copies to print.

## Parent Topics

["Printing models" on page 140](#)

## Print preview

With this feature...	Do this...
Print	Click to display the <i>Print</i> dialog box and print directly from the current dialog box.
Next page prev (previous) page	If printing a multi-page layout, click to navigate through the pages.
Zoom in Zoom out	Click to zoom. <b>Zoom Out</b> is grayed out until you zoom in one level.
Two Page One Page	Click to specify whether this dialog box displays one or two pages at a time.

## Parent Topics

["Printing models" on page 140](#)

["Print" on the previous page](#)

## Print setup

With this feature...	Do this...
Name	Select the printer model.
Properties	Click to display the <i>Properties</i> dialog box


	<p>where you select options unique to your printer. Note that if you are using a plotter, you are not limited to the paper sizes shown in the <b>Size</b> box of the <i>Print Setup</i> dialog box . To customize your page size, click the <b>Paper Size</b> tab then click <b>Properties &gt; More Sizes</b>.</p>
Paper	<p>Select the <b>Size</b> and <b>Source</b> options specific to your printer. For example, if you select a plotter, you will see some large paper sizes in the <b>Size</b> list. If you are printing</p>

	Letter size paper, you can also select which paper tray you want to print from in <b>Source</b> .
Orientation	Select <b>Portrait</b> or <b>Landscape</b> orientation.
Network	This function is not discussed as it is specific to your computer network.


## Parent Topics

["Printing models" on page 140](#)

## Properties: Configuration

With this feature...	Do this...
Executables	View the directory where GeoSyn operational files are located. For standalone installations, the <i>Executables</i> and <i>Working</i> directories are the same. For networked configurations, the <i>Executables</i> directory is shared. Changing this directory may prevent GeoSyn from locating both the licensing file it requires to launch, and the IHS Information Hub download parameters.
Working	View the directory where customizable files such as color palette, log import defaults, and user default files are located or click browse (  ) to change it. To maintain the integrity of each users' custom settings, it's recommended that the Working directory not be shared.

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GeoSyn Addresses	View GeoSyn contact information and click browse (  ) to write an email message or launch the IHS web site.
IHS Online Data Retrieval Info	View information required to connect to the IHS Online Data Hub. For network installations, these settings affect all users. If you don't have a subscription to download online digits, leave these boxes blank. Changing this connectivity information may prevent GeoSyn from downloading online digits.
User name Show transaction warning prompt	View or type your user name and toggle whether to display a warning message when downloading digits may incur a charge.

### Parent Topics

["Configuring GeoSyn defaults" on page 5](#)

["Downloading logs from the IHS information hub" on page 15](#)

["Properties: Import defaults" on the facing page](#)

[Data Search Wizard: Select data from catalog](#)

---

## Properties: Import defaults

With this feature...	Do this...
Current default file	<p>From the drop-down list, select a default file to either modify or apply to the current model, or click <b>New</b> to display the <i>New default file name</i> dialog box and type the name of the default file to create that inherits its settings from the current model.</p> <p>Default files are saved in the <i>GeoSyn Working</i> directory and as part of the current model configuration.</p>
Update current default file with model	<p>Write the configuration settings in the model to the default file selected in the <i>Current default file</i> drop-down list above.</p>
User Paths	<p>Click to display the <i>Set Source and Target Directories</i> dialog box where you click ... to define the location of log files to import and</p>

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	export.
Update model with current default file	Apply the configuration settings from the default file selected in the <i>Current default file</i> drop-down list above to the model, overwriting any configurations you may have made in the current file.
Default file description	Double-click each heading or click <b>+</b> and <b>-</b> to expand and contract related properties beneath each node. The parameters in the default file tree display the settings of the default file selected above.

#### Parent Topics

["Changing import defaults" on page 13](#)

["Import log data" on page 232](#)



---

## Properties: Log library

With this feature...	Do this...
Display pane	To view current default settings, double-click node text or click + and -.
New curve	Click to display the <i>Create New Curve Type</i> dialog box and specify default parameters for a new curve.
Delete curve	Click to delete the selected curve type. Curves that can be used as active logs (sonic, shear sonic, time depth, density, and poisson's ratio) can't be deleted. Deleting logs may prevent GeoSyn from recognizing imported log aliases.

---

Edit curve	Click to display the <i>Edit Default Display Properties</i> dialog box where you change curve display properties and create curve equations for only the current curve type. To change properties for any curve type, click <b>Edit Curve Equations</b> below.
Edit Curve Equations	Click to display the <i>Log Equation Library</i> dialog box where you change curve display properties and create curve equations for any curve type.
Export alias list	Click to export a list of all the aliases GeoSyn uses to recognize imported logs.

#### Parent Topics

["Changing log display properties" on page 106](#)

["Changing log definitions" on page 105](#)

---

## Auto curve selection

With this feature...	Do this...
Curve type	Select this check box and then click the curves to include in the curve display pane in the lower-left of the dialog box. Further select whether all of duplicate curve types should be included from each well, whether all of the selected curve types must be present for a well to be included, and whether the current selections should be used as your default curve selections in future sessions.
Author	Select and then specify the author(s) of curves to include.
Deviation status	Select and then specify either measured depth or true vertical depth measurements.
Deviation Survey	Select whether to include deviation surveys.
Depth	Select whether to include logs with a depth greater than or less than values you type.
Depth increment	Select and then type a different depth increment.

### Parent Topics

["Downloading logs from the IHS information hub" on page 15](#)

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## Log editor display properties

With this feature...	Do this...
Display pane	Select a log to modify. You can only select one log at a time, but you can apply scale changes to all logs by clicking <b>All</b> below the display pane.
Show off-scale	Select whether red lines appear in <i>Log Editor</i> beside amplitudes that exceed the minimum and maximum scale values.
Show tops name	Select whether to display formation top names in <i>Log Editor</i> .

---

Multi-log per track	Click to display all logs in the same track then select or clear the Show check box in the display pane above. The log selected in the display pane above is highlighted blue in the track (providing Use log display color is cleared below) and you can edit it using another displayed log as a reference.
Use log display color	Select whether traces appear in the track in the color you set in the <i>Well Properties: Log Properties</i> dialog box . If this option is selected and Multi-log per track is also selected above, traces aren't highlighted blue.
Velocity Transit	If a sonic log is selected in the display pane above, select whether it displays velocity or transit units.

#### Parent Topics

["Changing log editor display" on page 114](#)

---

## Shift curve

With this feature...	Do this...
Shift selected curves	Type the amount by which to raise or lower the selected logs. A positive value raises the log and a negative value lowers it.
Display pane	Select the logs to shift. GeoSyn automatically shifts all logs when one log is shifted. SHIFT+CLICK or CTRL+CLICK for multiple selection.

### Parent Topics

["Shifting logs" on page 132](#)

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## Time filter

With this feature...	Do this...
Type	<p>Select a predefined filter to apply:</p> <ul style="list-style-type: none"><li>• <b>Band pass (Ormsby)</b> — computed from a trapezoidal frequency spectrum.</li><li>• <b>Ricker</b> — defined by its peak frequency.</li><li>• <b>Butterworth</b> — computed from low and high pass cutoff frequency values.</li><li>• <b>Butterworth low-pass</b> — computed from low pass cutoff frequency values.</li><li>• <b>Lobeless</b> — non-sizable wavelet distinguished by the lack of side lobes.</li></ul>
Center phase	<p>Type a value or drag slider to move the wavelet relative to the center point displayed in the Wavelet tab.</p>

Taper	Select equation type to apply to taper : None, Cosine, Cosine squared, Hanning
Length (ms)	Enter value for length of sample time in ms.

## Top properties

<b>Tops:[list name]</b>	Highlighting individual tops selects them for editing, deleting, or copying.
Show all	Shows all tops on model and table.
Hide all	Removes all tops from model and table.
New	Click to create a new top. <b>Note:</b> When a new top is created, the attributes in the Edit Top(s) fields are applied to the new top. Best practices are to enter the new tops attributes in the Edit top (s) fields before clicking <b>New</b> .
Duplicate	Duplicates highlighted top.
Delete	Delete <b>All</b> or <b>Highlighted</b> tops from list.
Copy tops list to list	Select the tops in the <i>Tops for list</i> pane and then click this button and select the destination list from the <b>Select a recipient tops list</b> dialog box.
Select All	Click to highlight all of the tops in current list.
<b>Edit tops</b>	Edit the display properties for the selected top.
Name	Highlighted tops name
Depth	Selected depth
Attributes	<ul style="list-style-type: none"> <li>• Lithology</li> <li>• Color</li> <li>• Thickness</li> </ul>
<b>Tops lists</b>	Available Tops lists to select tops from.
Show all	Displays tops from all tops lists on the synthetic display.



Hide all	Removes all tops lists them from synthetic display.
Export	Outputs the tops to an ASCII format file.
Import	Selects type and file for imports tops lists.
List Labels	Enter top label information.
Plot tops labels	Select side of logs that labels appear.
<b>AccuMap specific</b>	Requires licensed installation of AccuMap. See AccuMap documentation for additional information.
<b>Kingdom specific</b>	Imports and displays Kingdom specific data items for selected: <ul style="list-style-type: none"> <li>• <a href="#">Horizon time or depth picks</a></li> <li>• <a href="#">Tops by specific authors</a></li> </ul>

## Parent Topics

"Changing tops properties" on page 31

"Changing import defaults" on page 13

"Exporting tops lists" on page 146

"Duplicating tops lists" on page 49

"Create new curve type" on page 176

"Tops import" below

"Edit default display properties" on page 208

"Importing tops from GeoSyn files" on page 42

"Importing tops from delimited files" on page 32

"Importing tops from fixed width files" on page 35

## Tops import

With this feature...	Do this...
Display Pane	Drag to select the tops to import into GeoSyn.
Tops in	Select whether the tops in the source file are ordered in rows (formation top names run horizontally along a single row), or columns (formation top names run vertically down a single column).

Names in row/column Depths in row/column	Depending on your selection above, this field changes to support either rows or columns. Specify the row or column in which the formation names and depths appear. Click the directional arrows to either move forward or backward by one column or to move to the first or last column.
Search	GeoSyn automatically searches the formation tops import file for a UWI that matches the well currently displayed in GeoSyn and highlights it in red. You can override this selection by typing a different UWI.
Import	Click to import the tops selected above into GeoSyn.
Delimiter Qualifier	GeoSyn automatically interprets this information from the source file. You can override GeoSyn's comma, tab, or space selection. Delimiter is the character that denotes each individual item to import. Qualifiers are symbols that enclose items to ignore.
Locate at specified depths Ignore depths and space evenly	Select whether to space tops evenly or according to the kelly bushing or subsea. If based on depth, tops outside of the depth range of the model aren't placed.
Import units	Select the measurement system used in the file from which you're importing tops. GeoSyn will convert them to the unit system GeoSyn is using if required. The unit system GeoSyn is using appears after the <i>Bulk shift top depths by</i> option below.
Depths are relative to KB SS	Select whether to space tops according to the kelly bushing or subsea.
Bulk shift top depths by	Type a negative or positive value by which to shift the top's depths in GeoSyn.
Delete current tops before importing new tops	Select to delete all tops in the tops list to which tops will be imported. If this check box is cleared, tops with the same name in the donor and recipient list appear twice in the recipient list.

## Parent Topics

["Importing tops from delimited files" on page 32](#)

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["Top properties" on page 268](#)

["Import tops" on page 234](#)

## Stretch/squeeze log curves in time

With this feature...	Do this...
Stretch/squeeze in time Stretch/squeeze in depth	Select either time or depth based on the following: <b>Time</b> to modify the transit values through the selected depth zone. The change in the sum of all the transit time changes must equal the desired stretch/squeeze value. <b>Depth</b> to stretch or squeeze the selected depth range to the thickness defined.
Thickness (when Stretch/squeeze in depth selected)	Type the desired thickness of the zone defined above after stretching or squeezing. If the value is less than the difference between the start and stop depth, the log will be squeezed. If more, the log will be stretched.

Change time interval by (when Stretch/squeeze in time selected)	Type a value by which to adjust the transit times for the zone defined above.
Taper the change over (when Stretch/squeeze in time selected)	Type the distance over which to taper the change. A transit modification must be tapered to avoid creating new reflection coef- ficients at the top and bottom of the stretch/squeeze zone. GeoSyn uses a linear taper at the top and bottom of the zone where the correction starts at zero and tapers up to a calculated value, then tapers down to zero again. The length of the taper is reported in depth samples and is the sum of the top and bottom tapers.
Set depth range	Type a depth range over which to taper the change and click <b>Update</b> . Click either <b>Top</b> or <b>Bottom</b> to select the absolute top or bottom of the log, or click <b>All</b> to select both. Click <b>Depths from Tops</b> and select the top and bottom of

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	your zone of interest using formation names.
--	--

#### Parent Topics

["Stretching and squeezing Logs" on page 120](#)

## Sum options

With this feature...	Do this...
Range definition	Either select <b>Auto</b> or specify the trace numbers to include in the near, middle, and far groups.
Range relationships	Using the drop-down lists, create mathematical expressions to filter or enhance traces.

#### Parent Topics

["Changing time models" on page 70](#)

["Display parameters: Time model - display" on page 197](#)

["Display parameters: Time model - multi-offset" on page 199](#)

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## Trim depth model

With this feature...	Do this...
Trim by	Click either <b>Correlation</b> and select the correlation above or below which to trim from the drop-down list, or select <b>Depth SS</b> and type the subsea depth above or below which to trim (preface the value you type with a minus sign to signify below sea level).
Remove section	Select whether to remove a portion of the model above or below the correlation selected in the drop-down list above and the amount of model to remove.

### Parent Topics

["Trimming models" on page 104](#)

["Display parameters: Depth model" on page 189](#)



## Wavelet properties: Spectrums

With this feature...	Do this...
Display pane	Select the wavelet with which to work. Clear <b>Show all wavelets</b> if you're already working with the desired wavelet to increase the work space in this dialog box.
Name	Type a name with which the wavelet is identified in the main synthetic display.

Type	Select a predefined filter to apply to the wavelet selected in the display pane. Controls to specify the cut and pass frequencies appear below based on your selection.
Low cut Low pass High cut High pass	Modify the energy shape either by typing the actual source values provided with the seismic data or by modifying the wavelet shape to visually match the seismic data.
Center phase	Type a value or drag the slider to move the wavelet relative to the center point displayed in the <i>Wavelet</i> tab.
Taper	Select whether to taper using an equation.
Operator length	Type the overall length of the sample to display in the adjacent window.
Import/Export	Beside either <i>Wavelet</i> or <i>Wavelet sets</i> (depending on whether to save a single wavelet or group of wavelets), click <b>Import</b> or <b>Export</b> to read or write the wavelet or wavelet set that

	<p>appears in the display pane to or from disk.</p> <p>To save or import a wavelet(s) from a centralized wavelet library used by all GeoSyn models, beside the <i>Library</i> label select either <b>Add</b> to save the current wavelet to the library, or <b>Retrieve</b> to display the <a href="#">Wavelet Library</a> dialog box where you apply one or more wavelets to the current synthetic.</p>
Import Wavelet	<p>Select either of the following and then click:</p> <p><b>Replace wavelets in selected models</b></p> <ul style="list-style-type: none"> <li>- overwrites the wavelets selected in the Show wavelet list pane of the Wavelet Properties dialog box with those selected in the <i>Wavelet Library</i> dialog box.</li> </ul> <p>Create new models - adds the selected wavelet alongside other wavelets available in the synthetic.</p>
Extraction	<p>Click <b>Extract</b> to load a wavelet saved in ASCII or SEGY format.</p>



Left right arrows (   )	Click to expand or compress the spectrum.
Show	Select whether to display the spectrum for power, amplitude, and phase.

## Parent Topics

["Changing wavelet properties " on page 83](#)

["Importing wavelets and sets" on page 77](#)

["Exporting wavelets and sets" on page 144](#)

["Extracting wavelets" on page 84](#)

["Wavelet properties: Wavelet" below](#)

## Wavelet properties: Wavelet

With this feature...	Do this...
Display pane	Select the wavelet with which to work. Clear <b>Show all wavelets</b> if you're already working with the desired wavelet to increase the work space in this dialog box.
Name and Comments	Type a name with which the wavelet is identified in the main synthetic display.
Type	Select a predefined filter to apply to the wavelet selected in the display pane. Controls to specify the cut and pass frequencies appear

	below based on your selection.
Low cut Low pass High cut High pass	Modify the energy shape either by typing the actual source values provided with the seismic data or by modifying the wavelet shape to visually match the seismic data.
Center phase	Type a value or drag the slider to move the wavelet relative to the center point displayed in the <i>Wavelet</i> tab.
Taper	Select whether to taper using an equation.
Length	Type the overall length of the sample to display in the adjacent window.
Import   Export	<p>Beside either <i>Wavelet</i> or <i>Wavelet sets</i> (depending on whether to save a single wavelet or group of wavelets), click <b>Import</b> or <b>Export</b> to read or write the wavelet or wavelet set that appears in the display pane to or from disk.</p> <p>To save or import a wavelet(s) from a centralized wavelet</p>

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	library used by all GeoSyn models, beside the <i>Library</i> label select either <b>Add</b> to save the current wavelet to the library, or <b>Retrieve</b> to display the <a href="#">Wavelet Library</a> dialog box where you apply one or more wavelets to the current synthetic.
Extraction	Click <b>Extract</b> to load a wavelet saved in ASCII or SEGY format.
Aux. trace	Select an additional trace to display in the trace display pane and a color format. For example, the Amplitude Envelope shows where the wavelet energy is and helps you to align the wavelet phase.
Color	Select a background color for the display pane.

### Parent Topics

["Changing wavelet properties " on page 83](#)

["Extracting wavelets" on page 84](#)

["Exporting wavelets and sets" on page 144](#)

["Importing wavelets and sets" on page 77](#)

["Wavelet properties: Spectrums" on page 274](#)

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## Well properties: Directional properties

With this feature...	Do this...
TVD vs. offset calculator	Click the arrows to adjust the depth and offset values by 1, 10, and 100 respectively.
Horizontal scale	Type a value for a horizontal scale to bridge the real world and the display world. For example 100 m = 1 cm.
Show horizontal deviation	Toggle whether to display the horizontal deviation in the main display.
Projection azimuth	Type a value or hover the cursor over the compass then click and drag to change the projection azimuth.

### Parent Topics

["Changing deviated well properties" on page 28](#)

## Well properties: Log properties

With this feature...	Do this...
Display pane	Select the log to modify and either change its display properties or click <b>Duplicate</b> then change the display properties of the copied log. Click <b>New</b> to create a blank log type. SHIFT+CLICK or CTRL+CLICK for multiple selection, or click Select All.
Name	Type a descriptive name with which to overwrite the original log name.

---

Type	Select a log type from the drop-down list and whether to make it the active log upon which your model is derived.
Alias / API	Select an alias and then type the API number.
Units	Type the unit suffix and for sonic logs either transit or velocity units.
Scales	Select whether to automatically adjust scales to data limits or type custom minimum and maximum values.
Show offscale	Select whether portions of a log that over-run the horizontal width of the track are drawn on the other side of the track in a different color and different line style. Log portions that over-run more than one track are colored differently than logs that over-run only a single track.
Infill	If displaying a single log per track, specify a lithology fill and whether to fill the left or right portion of the trace.

---

XPlot underlay link	Select whether the color infill for the log is derived from a crossplot. This option is enabled using the <i>Crossplot Properties: Color Mapping</i> tab.
Derive using	Select to apply a constant mathematical formula to the selected curves that persists despite changes to the log. Click <b>Edit</b> to launch the <i>Edit the derivation equation</i> dialog box and specify different variables. Note that selecting this option will prevent you from doing some log editing functions.
Trace	Select display properties for the logs selected in the display pane above.

---

Track Width	Specify the width at which the track will be printed.
Properties common to all logs	Select whether the log name is customized or based on the criteria defined in the default files. Select the increments for major and minor depth markers. Select whether one log per track or multiple logs per track are displayed. If multiple, click <b>Edit</b> to display the <i>Multi-Log per Track</i> dialog box and configure the track settings.

#### Parent Topics

["Changing log display properties" on page 106](#)

["Combining logs in tracks" on page 109](#)

## Well properties: Well properties

With this feature...	Do this...
Unique Well Identifier	Click <b>Edit</b> to display the <i>Edit a UWI</i> dialog box then specify a survey system and survey coordinates. Both UWI labels update.
Labels	Type any log header information to show in the main display.
Status	Select a well status

---

	from the drop-down list and whether to update this status if it's changed in the AccuMap database.
KB elevation	Type the kelly bushing elevation.
Depth inc.	Type the depth increment.
TVD status	Select whether the well is measured in True Vertical Depth or Measured Depth. If Measured Depth, you can import an ASCII format directional survey file by clicking the adjacent button.



---

Import Directional Survey	Click to launch the <i>Measured Depth to True Vertical Depth correction</i> dialog box. Also select whether to calculate the bottom hole position based on the directional survey imported.
Editing History	Click <b>View</b> to display a list of all changes made to the curve. Saved changes span multiple GeoSyn sessions.
Position	Select whether to use the default datum, the datum specified in the AccuMap database, or one based on another standard datum you select or coordinates that you type using the <i>Set Location</i> dialog box.

#### Parent Topics

["Changing well display properties" on page 88](#)

["Changing import defaults" on page 13](#)

["Importing directional surveys" on page 23](#)

["Changing tops properties" on page 31](#)

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## Zero phase extraction processing flow

With this feature...	Do this...
Time range Sum traces	Select the time range and number of traces to sum.
Taper Apply taper to	Select the taper method and percentage of the summed traces to taper.
Wavelet name	Type the name by which the resulting wavelet is identified in GeoSyn.
Operator length	Select the longest operator possible to ensure the amplitude spectrum retains as much detail as possible.
Taper	Select the method by which to taper the operator extracted from the center of the summed and tapered traces.

### Parent Topics

["Extracting wavelets" on page 84](#)

## File formats

The following supported file formats are defined below:

- GeoSyn 2D depth model format
- SYN
- LAS
- SEG Y

### GeoSyn 2D depth model format

GeoSyn2D generates impedance vs. depth field as the first step in creating a time model. This field is exportable as an ASCII format file.

The file begins with a brief header area with information on the depth model parameters and a description of the Data Field Format. This area is followed by a data block made up of records described in the Data Field Format.

```
// GeoSyn2D Depth Field
// Date: 08:01 AM Thu Jan 19, 2006
//
// Depth Units : meters
// Model top : 0.0
// Model bottom : -1600.0
// Depth increment : 0.3048
// Model width : 6500.0
// Offset increment : 132.653059
// Data Field Format: COLUMN,ROW,X_M,Y_M_SS,P_VELOCITY
//
//
0,0,0.0,0.0,3827.147
0,1,0.0,0.3048,3827.147
0,2,0.0,0.6096,3827.147
0,3,0.0,0.9144,3827.147
0,4,0.0,1.2192,3827.147
0,5,0.0,1.524,3827.147
0,6,0.0,1.8288,3827.147
0,7,0.0,2.1336,3827.147
0,8,0.0,2.4384,3827.147
0,9,0.0,2.7432,3827.147
0,10,0.0,3.048,3827.147
0,11,0.0,3.3528,3827.147
```

## SYN file format

After you have created and saved a new synthetic, the synthetic is saved to disk as a binary file with the optional extension *.syn*. This file contains all the information necessary to re-create the state of the synthetic as well as the raw log data.

## LAS format

The Canadian Well Logging Society's Floppy Disk Committee has designed a standard format for log data on floppy disks. It is known as the LAS format (Log ASCII Standard). LAS consists of files written in ASCII and containing minimal header information. The LAS format has evolved over the years. GeoSyn currently supports the import of two versions, 2.0 and 1.2.

GeoSyn will read an attached tops file, although strictly speaking tops are not included in the official LAS format. Two styles of tops formats are supported in Version 2.0, and one format is supported in Version 1.2.

**Truncated Example of LAS Version 2.0**

```

~VERSION INFORMATIONVERS. 2.00:CWLS LOG ASCII STANDARD - VERSION
2.00WRAP. NO :One Line per depth step#~WELL INFORMATION#MNEM.UNIT
DATA DESCRIPTION#-----
-----STRT.M 249.7836 :START DEPTHSTOP.M 1254.2520 :STOP
DEPTHSTEP.M 0.1520 :STEP LENGTHNULL. -999.2500 :NULL VALUECOMP.
AnyCompany OIL & GAS LIMITED :COMPANYWELL. AnyCompany etal
AnyWhere :WELLLOC . AnyWhere :LOCATION#~CURVE
INFORMATION#MNEM.UNIT DATA DESCRIPTION#-----
-----DEPT.M :1 DepthDT .US/M 7 520
80 00 :2 Sonic Travel TimeRHOB.G/C3 31 350 02 00 :3 Bulk Dens-
ity#~PARAMETER INFORMATION#MNEM.UNIT DATA DESCRIPTION#-----
-----EKB .M
300.0000 :Kelly bushing#~t 7 Tops //or ~T 7 TopsT0 647.98T1 800.89T2
1011.86Wabamun 1132.40Ireton 1536.64Slave Point 1812.01Pre Cambrian
1841.80#~A DEPT DT RHOB249.7836 410.825 1819.972249.9356 410.752
1791.029250.0876 410.679 1802.005250.2396 410.607 1869.852250.3916
410.534 1908.247250.5436 410.461 1958.225250.6956 410.388
1987.873250.8476 410.316 2014.986250.9996 410.249 2022.811...1253.4396
169.758 2730.6461253.5916 169.758 2730.6461253.7436 169.758
2730.6461253.8956 169.758 2730.6461254.0476 169.758 2730.6461254.1996
58.382 939.106No special end of file characters are required.**alternate tops
format~Formation Tops Information#TOPS NAME . DEPTH:BR .
7221.0410:WPBI . 8034.6790:COLO . 8539.9220:CARD . 9553.6900:CARD .
9671.7980:L CA . 9743.9760:BKST . 9799.7500:

```

**Truncated Example of LAS Version 1.2**

```

~Version : LASOUT vs 1.20VERS. 1.20: CWLS Log ASCII Standard -VERSION
1.20WRAP. NO: One line per depth step~Well Information Block#MNEM.UNIT
Data Type Information#----.-----: -----
STRT.M 250.0000: Start DepthSTOP.M 2413.0000: End DepthSTEP.M .2000:
Depth IncrementNULL. -999.25:COMP. COMPANY:WELL. WELL: Dog Patch
LAKE 5-4FLD . FIELD: Dog PatchLOC . LOCATION: 10-10-99-1w6PROV.
PROVINCE: ALBERTASRVC. SERVICE COMPANY: FlyByNight LoggersDATE.
LOG DATE: 1889/12/29UWI . UNIQUE WELL ID: 0101010101010~Parameter
Information Block#MNEM.UNIT Value Description#----.-----: ----
-----BHT .DEGF .0000: Bottom Hole TemperatureBS .MM
.0000: Bit SizeDFD .0000: Mud Weight (Density)DFV .0000: Mud ViscosityDFL
. .0000: Mud Fluid LossDFPH .0000: Mud pHRM .OHMM .0000: Mud Res-
istivityRMT .DEGF .0000: Mud Resistivity TemperatureRMFS.OHMM .0000:
Mud Filtrate ResistivityRMFT.DEGF .0000: RMF TemperatureRMC .OHMM
.0000: Mud Cake ResistivityRMCT.DEGF .0000: RMC TemperatureEKB .M
987.5000: Elevation Kelly BushingEGL .M 982.3000: Elevation Ground
Level~Curve Information Block#MNEM.UNIT API CODE Curve Description#---
-.-----: -----DEPT.M : 1 DEPTHDT .USM 60 520 0
1: 2RHOB.KM3 42 350 1 1: 3~A Depth DT RHOB250.0000 376.4800
1922.6000250.2000 345.2000 1998.4000250.4000 313.9200
2363.4000250.6000 282.6400 2512.2000250.8000 254.4400
2463.2000251.0000 275.8800 2392.0000...2411.2000 -999.2500
2715.90002411.4000 -999.2500 2713.90002411.6000 -999.2500
2712.40002411.8000 -999.2500 2707.20002412.0000 -999.2500
2691.00002412.2000 -999.2500 2674.80002412.4000 -999.2500
2658.60002412.6000 -999.2500 2640.70002412.8000 -999.2500
2683.40002413.0000 -999.2500 2730.9000No special end of file characters
are required.

```

## SEGY format

GeoSyn can export integrated time data (traces, wavelets, wells, rocs, etc.) in SEG Y format. The format specification discussed here is a derivative of the SEG Y 9-track standard. Because there is no official MS DOS standard, some liberties have been taken with respect to the original specifications. For a discussion of the 9-track SEG Y format, refer to "Recommended Standards for Digital Tape Formats" K.M. Barry, D.A. Cavers, C.W. Kneale: *Geophysics*, Vol. 40 No. 2, p. 344-352.

A SEG Y file consists of three sections or blocks:

- ASCII file identification header
- Binary file header
- Trace header

### ASCII file identification header

The first 3600 bytes of the file is the File Identification Header and consists of a 3200-byte ASCII card image block followed by a 400-byte binary block. The 3200-byte ASCII section represents a deviation from the 9-track SEG Y standard, which specifies that this section be in EBCDIC format. Both are text formats, but use of the ASCII format enables a user to read this portion of the SEG Y file in any PC-based text editor. This deviation from the standard has no detrimental effects because most programs rely on the binary data for hard information.

The ASCII section consists of 40 lines of 80 characters each. Each line starts with a C and the line number. The following is an abridged example of the 3200-byte ASCII header for a typical GeoSyn SEG Y file and describes the well name, sample rate, data type, and byte order. This same information is encoded in the 400-byte binary section.

```
C1 GeoSyn Synthetic Seismogram
C2 ABC OIL AND GAS 11-11-11-11W1
C3 Date: 11:35 AM Fri Dec 01, 1995♦
C4 Sample Rate: 2.00 (ms)
C5 Data Type: Integer(2 byte)
C6 Byte Swap: Yes
C7
.....
C36
C37
C38
C39
C40
```

### Binary file header

The 400-byte binary file header follows the ASCII file header and is situated on bytes 3201 to 3600. GeoSyn does not require or make use of most of the space.

The following bytes are used:

3213 to 3214 Number of byte traces per record = 1  
 3217 to 3218 Sample interval in microseconds  
 3221 to 3222 Number of samples per data trace  
 3225 to 3226 Data sample format code (will be either 1 or 3)  
 1=floating point (4bytes)  
 2=fixed point (4 bytes)  
 3=fixed point (2 bytes)  
 4=fixed point with gain code (4 bytes)  
 3261 to 3262 Total number of traces per line = 1  
 3269 to 3270 Start time of data trace (can be negative in the case of a wavelet)

## Trace header

The trace header is a 240-byte binary section that precedes each section of trace data. GeoSyn only writes one data curve, so there is one trace header in the file. The trace header occupies bytes 3601 to 3840. The bytes used by GeoSyn are tabulated below. Note that some values are 4 bytes long instead of 2-byte integer.

The following bytes are used:

3601 to 3604 Trace Number.  
 3629 to 3630 Trace identification code 1=seismic data, 2=dead trace.  
 3715 to 3716 Number of samples.  
 3717 to 3718 Sample interval in microseconds.

## Trace Data



















Trace data is stored in binary format and follows the 240-byte trace header. The binary data may be stored in one of two formats, 16-bit integer or IEEE floating point. The 16-bit integer format requires 2 bytes per amplitude value, whereas the floating point format requires 4 bytes.

## Data Area

The data area follows the trace header and consists of a number of 2- or 4-byte numbers representing the amplitude data of the trace or wavelet. Note that the number of samples in this record will exceed the number of samples in the synthetic if a trace is being saved, because the roll out portion of the trace below the bottom of the log is included. The number of extra samples will equal the length of the trace plus half the length of the wavelet operator.



## Well symbol legend

	Location		Suspended
	Service or Drain		Oil
	Gas		Dry and Abandoned
	Heavy Oil		Suspended Oil
	Abandoned Oil		Suspended Gas
	Abandoned Gas		Abandoned Service
	Oil and Gas		Suspended Heavy Oil
	Abandoned Heavy Oil		Suspended Oil and Gas
	Abandoned Oil and Gas		Injection