

Importing Geochemical Data

This *Importing Geochemistry Data* How-to Guide introduces you to working with Geochemistry data, including how to design a new survey, import data, merge and verify, extract and display standards and duplicates, and merge your data with a master database.

Geosoft provides sample data for you to use when working through these How-To Guides. These data files can be found in your ".../Geosoft/resourcefiles/data/geochemistry" folder.

The key steps involved in importing geochemistry data into the *Geochemistry* system and verifying the data prior to creating a master database are as follows:

1. [Design a Geochemistry Survey](#)
2. [Import survey data](#)
3. [Import assay data](#)
4. [Merge and verify survey and assay data](#)
5. [Setting ASSAY Attributes](#)
6. [Extract and display standards](#)
7. [Extract and display duplicates](#)
8. [Merge data with master database](#)

 *If your survey and assay data are already combined in one file then use the **GeochemImport** menu to import your data. This will ensure that the assay values are assigned to the 'ASSAY' class.*

Design Survey Tool

The Oasis montaj *Design Survey Tool* creates location data for a new ground survey. This tool enables you to plan a soil (or other type of geochemical) survey, laying out proposed lines and stations for sample collection. Plan a new or proposed geochemical sampling survey by defining line direction, line spacing, sample spacing, and QA/QC samples.

Designing a New Geochemistry Survey

Use the *Design Survey* dialog to plan a geochemistry survey.

1. On the *GeochemImport* menu, select **Design Survey**.
The *Design Survey* dialog appears.

2. Specify a *Dataset name* for the new survey database.
3. Select how you want to define the extents, using a *Polygon file* or *Manually*, by entering the limits of a bounding box.
4. To set the *Coordinate system*, select the **Set** button. The *Coordinate System* dialog will appear. (For more information on setting the *Coordinate system*, click the **Help** button on the *Coordinate System* dialog.)



The Coordinate system is automatically populated if the polygon has a defined coordinate system.



Geographic coordinate systems are not supported.

5. Specify the *Number of lines* to include in the survey (this field is optional).
6. Specify the *Line azimuth* (angle of the line azimuth clockwise from north), *Line spacing* (distance between adjacent lines), *Initial line number* and *Increment* (value at which line numbers increment in the database) for the survey.
7. Select whether to use an *Alternate line direction*, which enables survey plans to be created with adjacent line numbers sampled in opposite directions.
8. Specify the *Sample spacing* (distance between samples along the line) and the *Initial sample number* for the survey.



Sample numbers are sequential and can have an alphanumeric prefix and a number counter, for example, ABCDEF1234567890.

9. Enable the *Add QA/QC samples* and click the **Define** button. The *Add QA/QC Samples* dialog appears.

10. Specify the parameters as they apply to your data. (For more information on *Adding QA/QC Samples*, click the **Help** button on the *Add QA/QC Samples* dialog.)
11. Click **Add** to add the QA/QC Samples to your survey database. The *Design Survey* dialog appears.
12. Click **OK** and the survey locations will be populated and a Geosoft database file will be generated with the relevant surveying information, including lines, coordinates, and sample numbers.

Import Survey Data

A field survey data set is a list of all samples in a planned geochemical survey project together with sample locations, data standards and sample duplicates. The data may also include geology, comments, field codes, or whatever other field survey information is related to the samples. A field survey data set does not include geochemical assays.

The field survey file must contain a "Sample" column together with any survey information that is related to the sample. Typically, the following information is contained in the survey file:

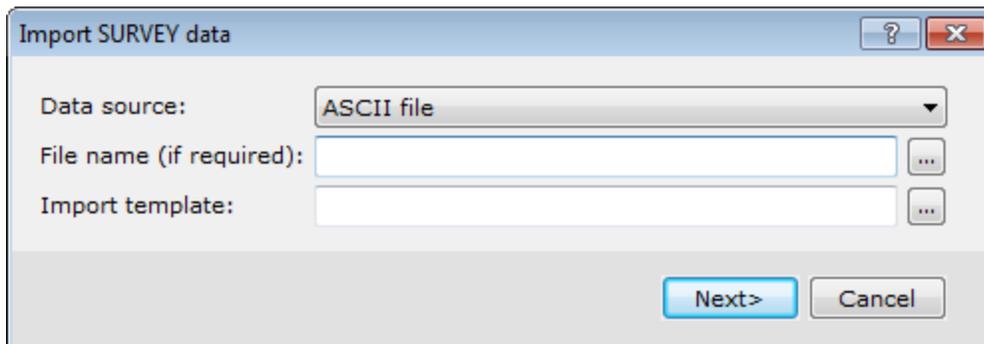
- > Sample - The sample name, which is a string of up to 16 characters. Every sample must have a unique sample name
- > X - x coordinate location in local grid
- > Y- y coordinate location on a local grid
- > Duplicate- If the sample is a duplicate, this is a number that indicates the order of duplicate samples. Duplicates are assumed to be in pairs based on the duplicate order “ 1,2 are duplicates, 3,4 are duplicates, etc. This allows duplicates to be distributed randomly within the batch if required
- > Standard- If the sample is a standard, this is the standard name. We assume there will be a standards table that contains historic standard results

The Import Wizard enables you to import the data interactively while creating an import template file (default file - _chimport.i3). This import template file can be edited or modified to be used as a standardised import template.

Importing Survey Data

1. On the *GeochemImport* menu, select **Import Survey Data**.

The *Import Survey Data* dialog appears.

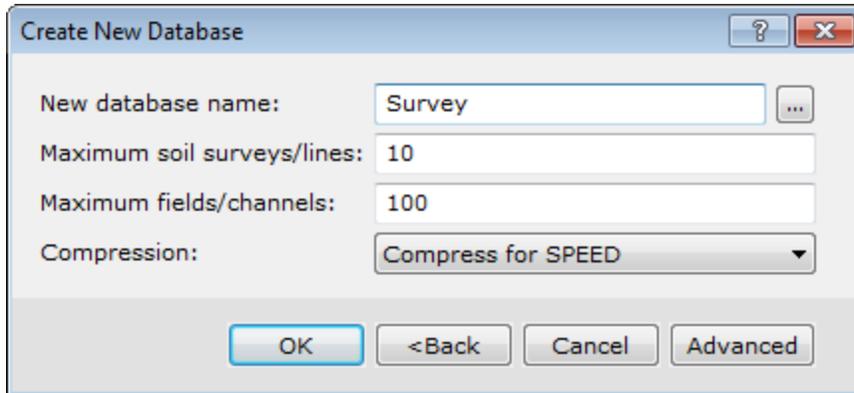


2. Select the *Data source* from the dropdown list.
3. Use the **Browse** button to select a *File name* as the data to be imported.



You can leave the Import template blank and the default template (_chsurvey.i3) will be created in your project directory.

4. Click **Next**. The system displays the *Create New Database* dialog.

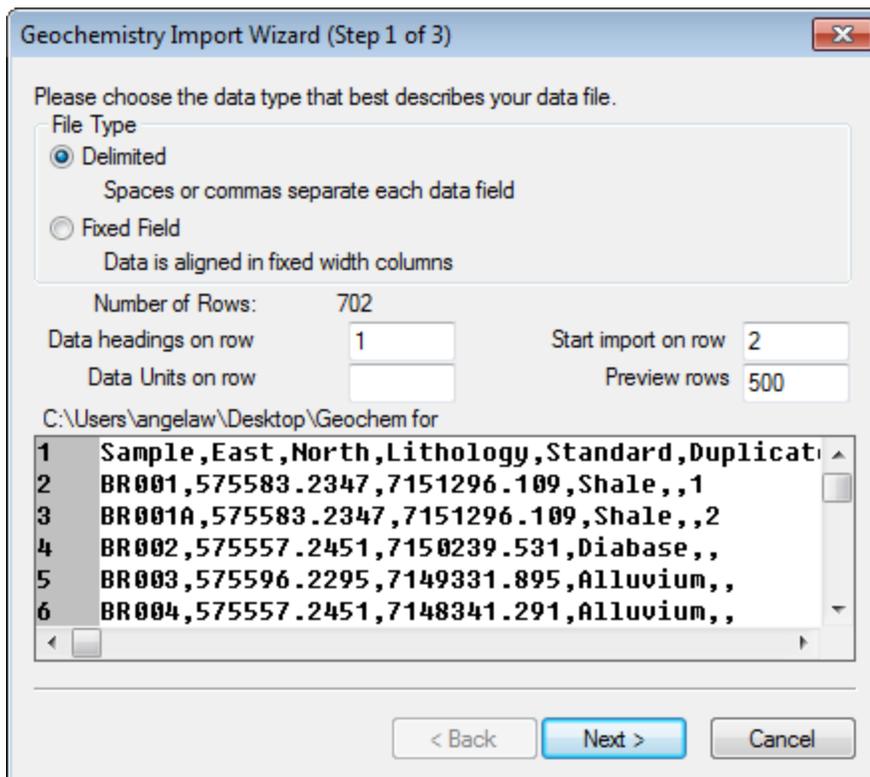


5. Type a name for the *New database*.
6. You can set the *Maximum survey lines* and *Maximum fields/channels* or leave the default values.



*Survey lines are typically used with line-oriented data (i.e. data collected along parallel lines). If you are not working with line data, the default of 10 is recommended. Fields/channels are the survey information fields/channels associated with each sample. For more information, click the **[Help]** button on the Create New Database dialog.*

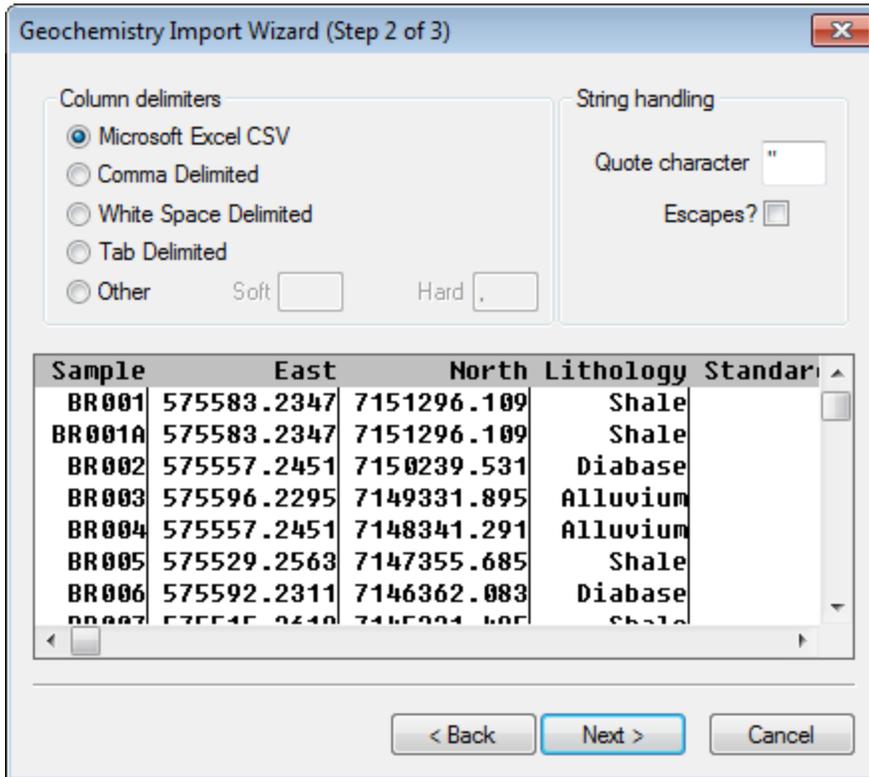
7. Click **OK**. The new database is displayed in the background of your project, and the *Geochemistry Import Wizard* dialog is displayed in the foreground.



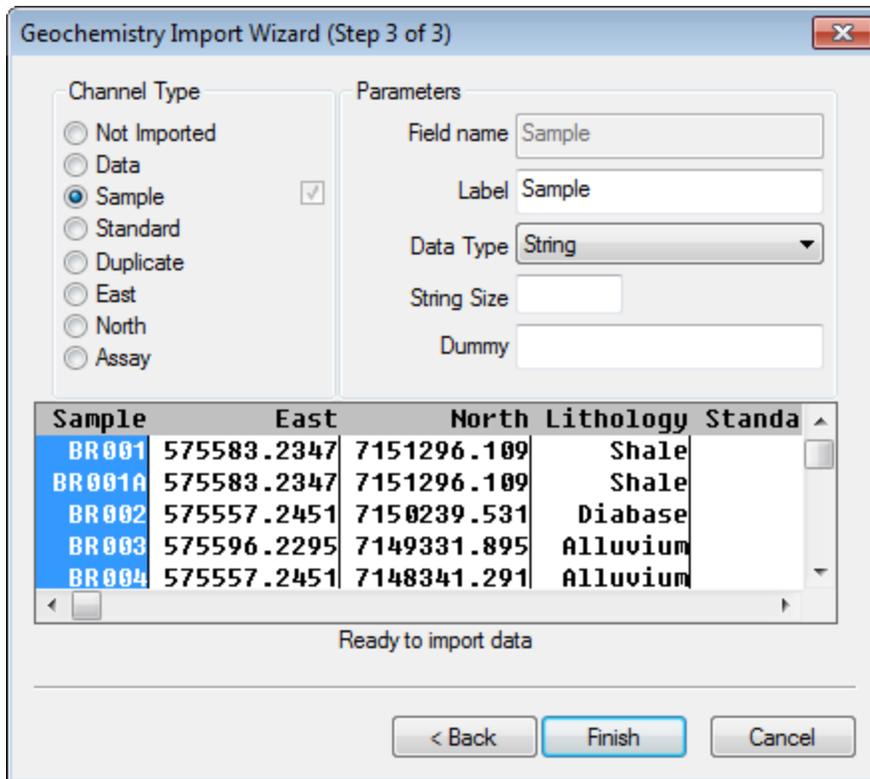


The **Geochemistry Import Wizard** enables you to easily import data from any ASCII spreadsheet or data file. The Import Wizard supports both Delimited and Fixed Format ASCII files. The Import Wizard also imports Flat Archive and Comma Separated Value (CSV) data files. The window at the bottom the dialog displays a preview of the ASCII data file. The line above this window shows the file that is being imported. For more information on Import Wizard settings, read the ASCII Import Wizard help topic or click the **Help** button on the dialog.

8. This dialog is used to specify how the data in the file is formatted. Select the **File Type**.
9. In the four fields in the middle of the dialog box, specify which line in the file contains the data headings, data units, which line to begin importing data, and the number of lines to display in the preview window.
10. Click the **Next** button. The system displays the second *Import Wizard* dialog.



11. Select the type of character or white space used to separate the column text. The system draws lines in the preview window to show where data columns end.
12. Click the **Next** button. The system displays the third *Import Wizard* dialog. This dialog has data type, parameters and a preview window area.



13. The Import Wizard scans your data to determine the type of data with which you are working (i.e. *Channel Type*). It is a good idea to review your data to ensure that the wizard selected the correct columns. The Parameters box shows the name and type of data, of the column highlighted in the preview window.
14. To edit the channel parameters, select the channel in the preview window and specify the name, data type, or data format in the parameter fields.



The Data Types supported are: Integer (4 byte signed integer can be between -2,147,483,648 to 2,147,483,647), Floating Point (8 byte floating point with a range of 1.7E +/- 308 - 15 digits of precision), and String (a string of characters).

15. The message below the preview window indicates how many channels remain unspecified. Each channel must have a name to continue the import process.
16. When you are finished naming the channels, click the **Finish** button. The data will be imported into the survey database and the import process is finished.

Import Assay Data

An assay data set is a single lab assay batch, containing a list of all data samples and their corresponding geochemical assay values.

The assay file must contain a "Sample" column together with all the "geochemical assay elements" related to each sample. After import, the database will include the following columns (channels):

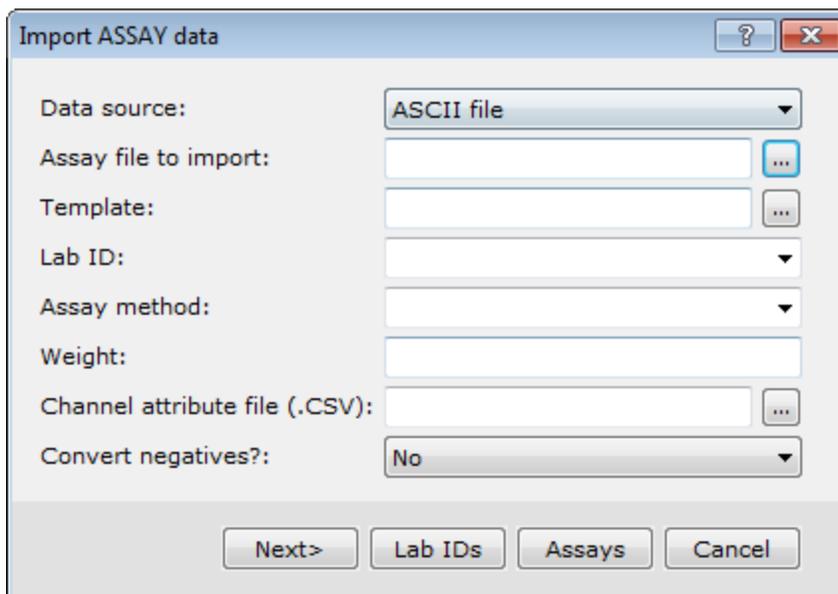
- > Sample - The sample name, which is a string of up to 16 characters. Every sample must have a unique sample name.
- > Order - The order in which the samples were imported.
- > Batch - The assay batch name, which is assumed to be the same as the root file name.
- > Lab_ID - The name of the Laboratory.
- > Weight - The weight of the individual samples sent to the Laboratory (e.g. specify 500, if each of your samples are 500 grams).
- > Assay Elements - The assay elements and compounds included in the batch (e.g. Au, Ag etc.).

The *Import Wizard* enables you to import the data interactively while creating an import template file (`_chimport.i3`). This import template file can be edited or modified to be used as a standardised import template. For more information on importing assay data click the **Help** button on the dialog.

Importing Assay Data

1. On the *GeochemImport* menu, select the **Import Assays** menu item.

The *Import ASSAY data* dialog appears.



2. Select the *Data source*.
3. Use the *Browse* button to and select the import file.



If you leave the Import template blank the default template (`_chassay.i3`) will be created in your project folder.

4. Select the *Lab ID* and *Assay method* parameters from the dropdown lists.



To add new Lab ID and Assay method items, type the new information in the appropriate box, the dropdown list will be automatically updated. To manage the list by adding or deleting items, click the Lab IDs or Assays buttons to display the appropriate dialog. User defined pick lists are stored in the "..\Oasis montaj\user\etc\" folder. For more information, click the **Help** button.

5. Specify the Weight of your samples, and then using the **Browse** button you can locate a *Channel Attribute file* (CSV). For more information, see the *Setting ASSAY Attributes* topic, in the online help.
6. Select *Yes* or *No*, from the *Convert negatives?* dropdown list. (No, the default value imports the data as is, if Yes is selected then if the detection limit is set for the channel, any value less than the detection limit (including those less than 0.0) is replaced with a value equal to one-half the detection limit.
7. Click **Next**.

The *Create New Database* dialog appears.

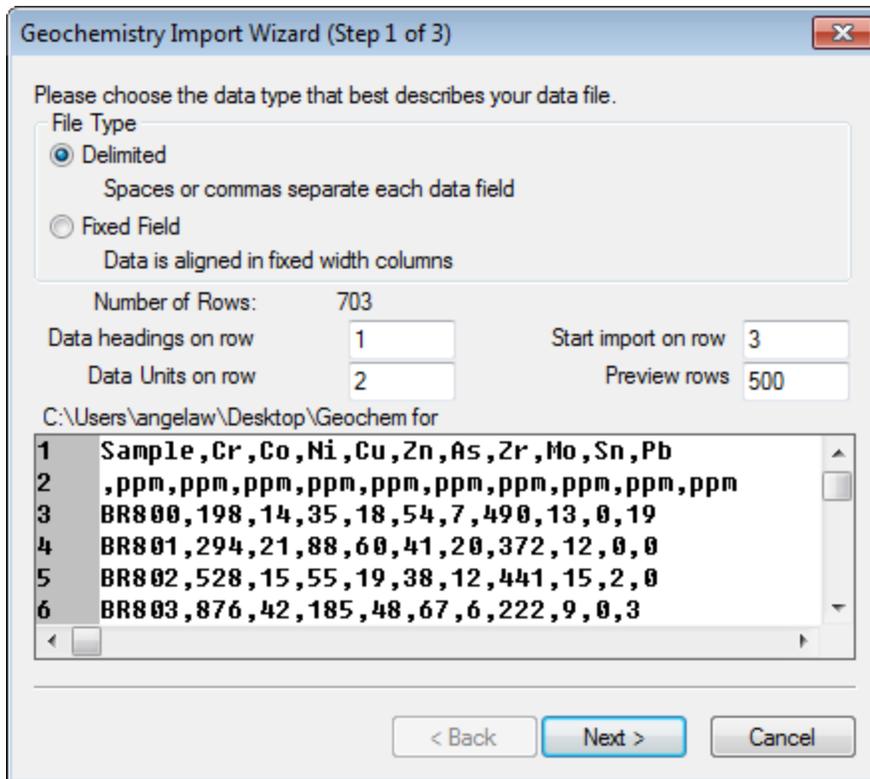
8. Specify a *New database name*.



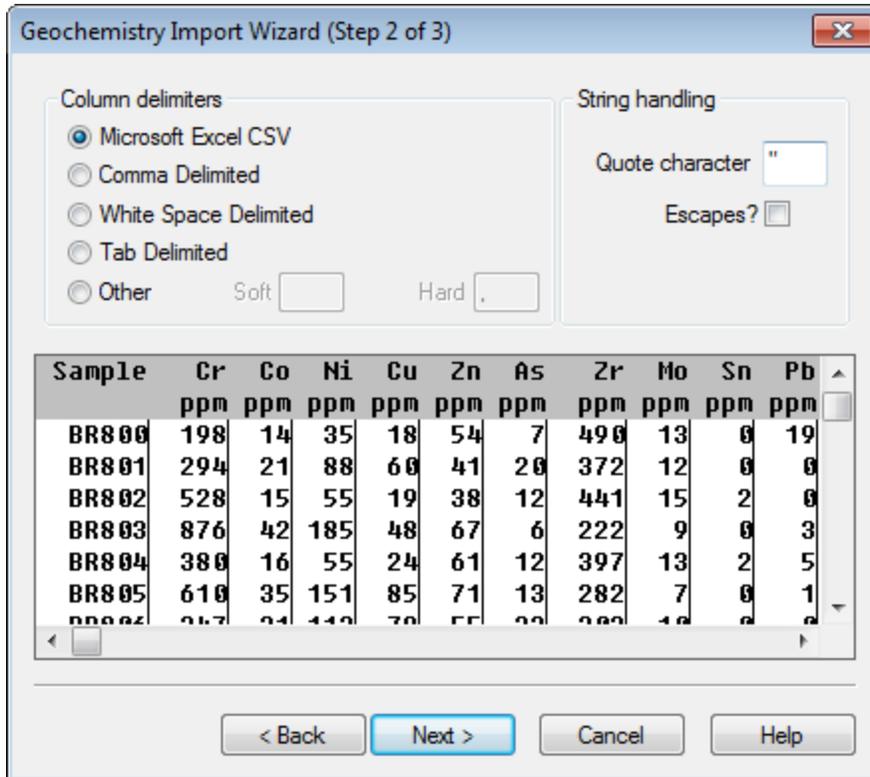
The default database file name is derived from the input file name.

9. Configure *Maximum soil surveys/lines* and *fields/channels* as required.

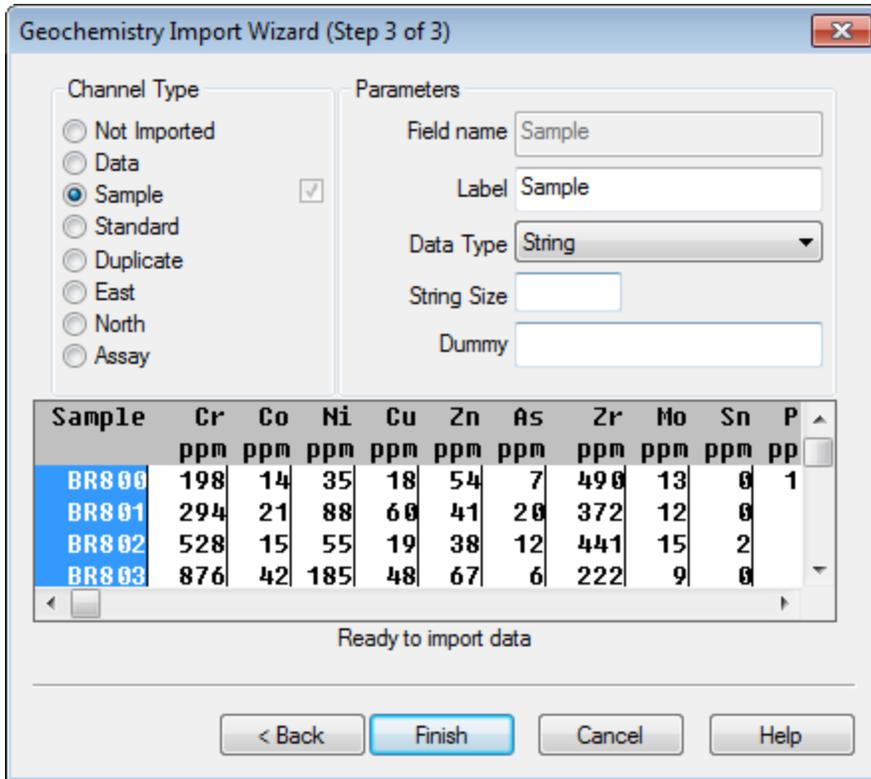
Click **OK**. The new database is displayed in the background of your project, and the *GeochemistryImport Wizard* dialog is displayed in the foreground.



10. This dialog is used to specify how the data in the file is formatted. Select the *File Type*.
11. In the four fields in the middle of the dialog box, specify which line in the file contains the data headings, data units, which line to begin importing data, and the number of lines to display in the preview window.
12. Click **Next**. The second *Import Wizard* dialog appears.



- Select the type of character or white space used to separate the column text. The system draws lines in the preview window to show where data columns end.
- Click **Next**. The third *Import Wizard* dialog appears.



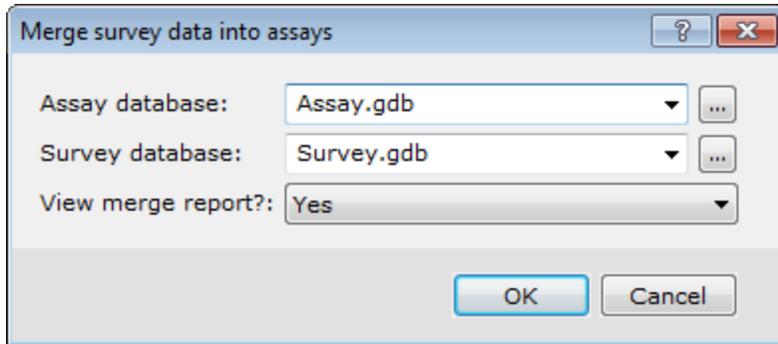
15. This dialog has *Channel Type*, *Parameters* and a preview window area.
16. The *Import Wizard* scans your data to determine the type of data with which you are working (i.e. Channel Type). It is a good idea to review your data to ensure that the wizard selected the correct channel types.
17. The *Parameters box* displays the name, type of data, and the data format of the column highlighted in the preview window. To edit the channel parameters, select the channel in the preview window and specify the parameters in the appropriate fields. The message below the preview window indicates how many channels remain unspecified. Each channel must have a name to continue the import process. The import routine will replace negative values (assumed to be the lower detection limit) with a positive value at half the lower detection limit (or negative value).
18. When you are finished naming the channels, click **Finish**. The data will be imported into the assay database and a spreadsheet window is displayed, indicating that the import process is finished.

To Merge and Verify Data

After you have imported your data files into Geochemistry databases you are ready to merge the survey database with the assay database.

 *All channels of the Survey database will be created in the Assay database, and all information will be copied to the Assay database.*

1. On the *GeochemImport* menu, select **Merge and Verify**.
The *Merge survey data into assays* dialog appears.



2. Select the *Assay database* and *Survey database* from the dropdown lists.
3. Choose **Yes** to *View merge report?*
4. Click **OK**. The system merges the two databases and checks for errors. If any errors are found (such as missing location data), they will be displayed in the error report that appears on your screen.

The following shows a sample error report that, in this case, was generated by not having X Y locations for the duplicate samples. However, if in your example, you have done all processes correctly, you will not see these errors.

Location merge error report

=====

1999/05/25 15:57:00

BR001A sample missing location at record 698

BR010A sample missing location at record 699

BR020A sample missing location at record 700

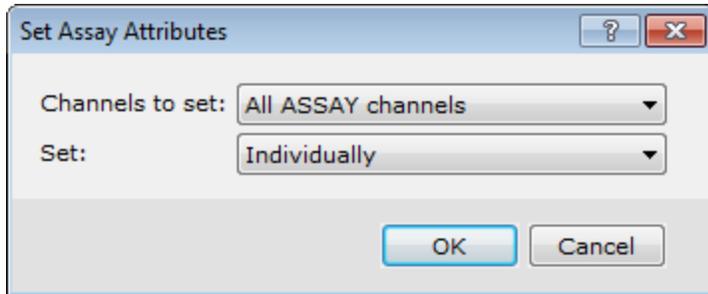
 *If you are working with your actual data and encounter errors, we recommend you stop processing, make changes to the original raw data and then re-import all data.*

Setting ASSAY Attributes

The Geochemistry system enables you to set the CLASS attribute for each selected channel as an "ASSAY" channel. The Geochemistry system enables you to set the Assay attributes within the system, import assay attributes from a CSV file, and export the Assay attribute information to a CSV file.

Setting Assay Attributes

1. On the *GeoChemImport* menu, click *Assay Attributes* and then select **Set Attributes**. The *Set Assay Attributes* dialog appears.



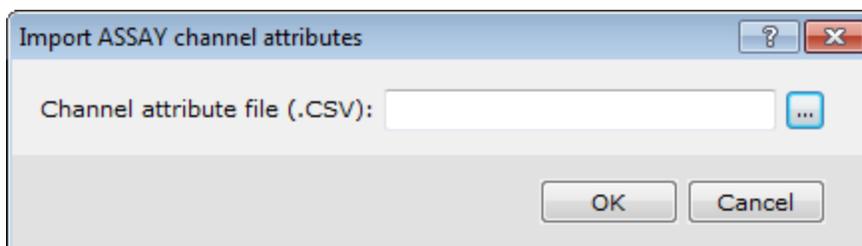
- From the *Channels to set* dropdown list you can select *All ASSAY channels*, *Displayed ASSAY channels*, *All Element channels*, *Displayed Element channels*, *Displayed channels* and *Select from list*.

Displayed channels will set all channels that are displayed, except for the following:

- > Location channels: X, Y, Z
 - > Mask channels: Mask, Chemmask
 - > Geochemistry general channels: Sample, Order, Batch, Lab_ID, Weight, Standard, Duplicate, Seq.
 - > Principal component channels: Those beginning with "PC", or re-synthesized element channels.
 - > Any channel whose CLASS attribute is defined, and which is not "ASSAY" (those without classes, which often include those just imported using a non-standard import, are included).
- From the *Set* dropdown list, you can select *Individually*, or *All at once*. This parameter enables you to set each Assay channel's assay information individually or in batch mode.
 - If you select *Individually* you are presented with information dialogs for each element channel you selected. Type the relevant information for each element in its dialog and click **Next** to display the next elements information dialog.

Importing ASSAY Attribute Information

- On the *GeochemImport* menu, select *Assay Attributes* and then select **Import Attributes**. The *Import ASSAY channel attributes* dialog is displayed. This dialog enables you import ASSAY channel attribute data stored in a CSV file. This is a fast way to set channel attributes on different Geochemistry databases.



- Use the *Browse* button to select the CSV file to import.
- Click **OK** to import the channels attributes to the current database.

The following is an example of a typical channel attributes file. The names must be spelled as shown for the data to be correctly recognized.

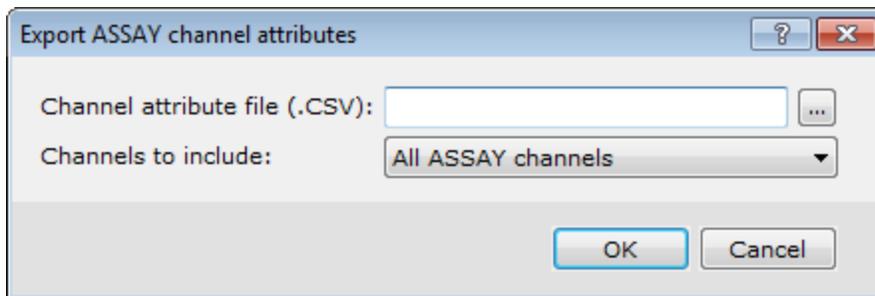
```
"Channel","Label","Units","Detection","Outlier","StdMin","StdMax","Log","SymbSci","Method"
Cu,Cu, ppm,0.05,10,20000,Yes,50,TECHNIQUE
Mo,Mo, ppm,0.01,2,2000,No,10,TECHNIQUE
```

Each row in the CSV file defines attributes for one channel. The first parameter in the row is a channel name, which must match a channel in the database. Only matched channels are altered. Values, which are blank in the file, are not altered in the database.

If the CLASS attribute has not yet been set, this dialog automatically sets it to ASSAY, but it will skip any channel, which has already had its CLASS set to something other than ASSAY.

Exporting ASSAY Attribute Information

1. On the *GeochemImport* menu, select *Assay attributes* and then select **Export Attributes**. The *Export ASSAY channel attributes* dialog appears. This dialog enables you export ASSAY channel attribute data to a CSV file.



2. Specify the *Channel attribute file (.CSV)* name.
3. Select the *Channels to include* as *All ASSAY channels* or *Displayed ASSAY channels*.

The following is an example of a typical channel attribute file:

```
"Channel","Label","Units","Detection","Outlier","StdMin","StdMax","Log","SymbSci","Method"
Cu,Cu, ppm,0.05,10,20000,Yes,50,TECHNIQUE
Mo,Mo, ppm,0.01,2,2000,No,10,TECHNIQUE
```

To Define Minimum and Maximum Standard Values

You can specify the acceptable minimum and maximum tolerance value for each element in the standards database or use the default error tolerance of (+/- 2 standard deviations).

1. Select (highlight) the header of the assay channel. Right-click and select **Attributes** from the pop-up menu. The *Assay Information* dialog appears. You can now enter the acceptable standard minimum and maximum values



You will need to do this for each element in the standards database, but once done the attributes are stored in the database.

- To use these values when displaying the standard report, from the *GeochemImport | Standards* menu, select **Display Standards**.

The Display Standards dialog appears.

- To use the standards minimum and maximum tolerance values set in the database, select **Use Channel Values** for the *Tolerance selection* parameter.

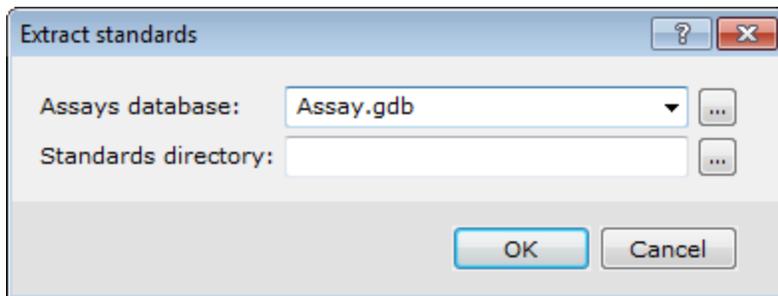
 If you select this option by mistake, and there are no standard minimum and maximum values set in the standard database, the program will automatically calculate the tolerance values as +/-2 standard deviations.

Extracting Standards and Displaying Standard Report

Once you have merged your survey data into your assay database, you will want to extract your standards (control values). At this point, you can extract the standards and compare them to existing values in a standards database. This process is an essential part of your due diligence process, enabling you to confirm the validity of your data as received from the various laboratories you use in practice. For more information on extracting and displaying Standards click the **Help** button on the dialog.

Extracting Standards

1. On the *GeochemImport* menu, select *Standards* and then select **Extract standards**. The *Extract standards* dialog appears.



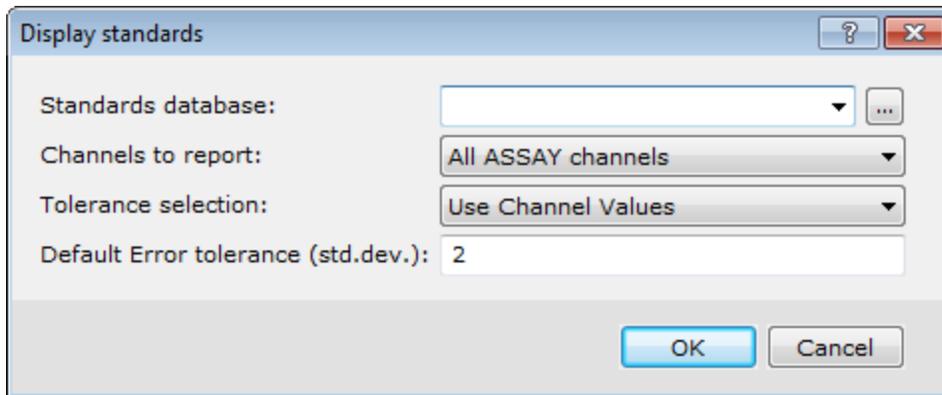
2. Use the *Browse* button to select the name of the *Assays database*.

 If you merged your Survey and Assay data, be sure to select the merged assay database to extract the standards.

3. Specify a *Standards directory* location, in which to locate/create the standards database. If you leave this field blank, the Standards database is created in your current project directory.
4. Click **OK**. The system looks for the Standard database.
5. The system extracts the standard data from the merged database and adds the assay results to the standard database. Once the data has been extracted, the standard log file "chstdn.log" is displayed, showing the number of standards extracted.
6. Close the text editor to continue, The Standards database is displayed.

Displaying Standards Report

1. On the *GeochemImport* menu, select *Standards* and then select **Display Standards**. The *Display standards* dialog appears.



2. Use the *Browse* button to select the *Standards database*.
3. Then, select the *Channels to report*, the *Tolerance selection*, and the *Default Error tolerance (std. dev.)*.
4. Click **OK**. The *Standards Report* is displayed as a map providing you with a visual report of your standards and enabling you to confirm the validity of your data as received from the various laboratories you use in practice.
5. You can save this document for use later or print for inclusion in a report. At this point you may wish to close the Standards Report. Minimize or close the standards database. If you close the database, click **Yes** to accept all changes.



If you find errors in your standards, we recommend that you stop processing and correct these errors before proceeding.



*For more information on the Standards Report, click the **Help** button on the Display Standards dialog.*

Dynamic Linking between Standards Database and Report

You can now use dynamic linking to link between your Standards database and your Standards Report.

To Select a point in the Standards Report and link to the sample in the Standards database:

1. Select the Standards Report to make it your active map.
2. In the View/Group Manager Tool, select a view (i.e. select an element).
3. Click the Shadow Cursor Tool () from the toolbar.
4. Click on a sample in the Standards Report for the selected element.
You will see the cursors update for the other elements in the plot.
The Fiducial cell for the corresponding sample will be selected in the Standards database.

To select a sample in the Standards database and link to the point in the Standards Report:

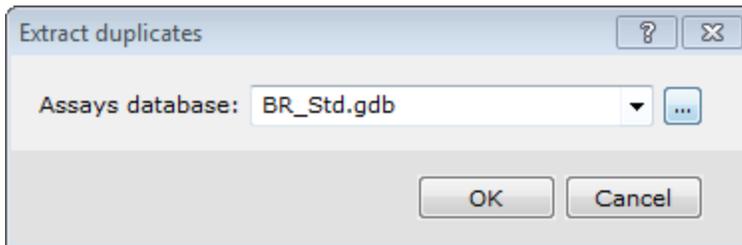
1. In the Standards database, select any cell.
2. The cursors will update to the corresponding sample for each element plot in the Standards Report.

Extracting Duplicates and Displaying Duplicate Report

The typical assay database contains duplicates (control values). At this point, you can extract the duplicates and compare them. This process is an essential part of your due diligence process, enabling you to confirm the validity of your data as received from the various laboratories you use in practice. For more information on extracting and displaying Duplicates click the **Help** button on the dialog.

Extracting Duplicates

1. On the *GeochemImport* menu, select *Duplicates* and then select **Extract Duplicates**.
The *Extract duplicates* dialog appears.

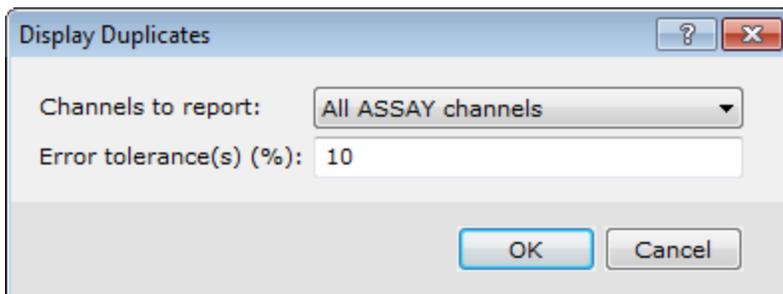


2. Use the *Browse* button to select the name of the *Assay database*.
3. Click **OK**. The system looks for the Duplicate database. If the duplicate database is not found the *Duplicate database not found* dialog box is displayed.
4. To create a *Duplicate* database, click the **Yes** button. The system extracts the duplicate data from the assay database and creates a Duplicate database.

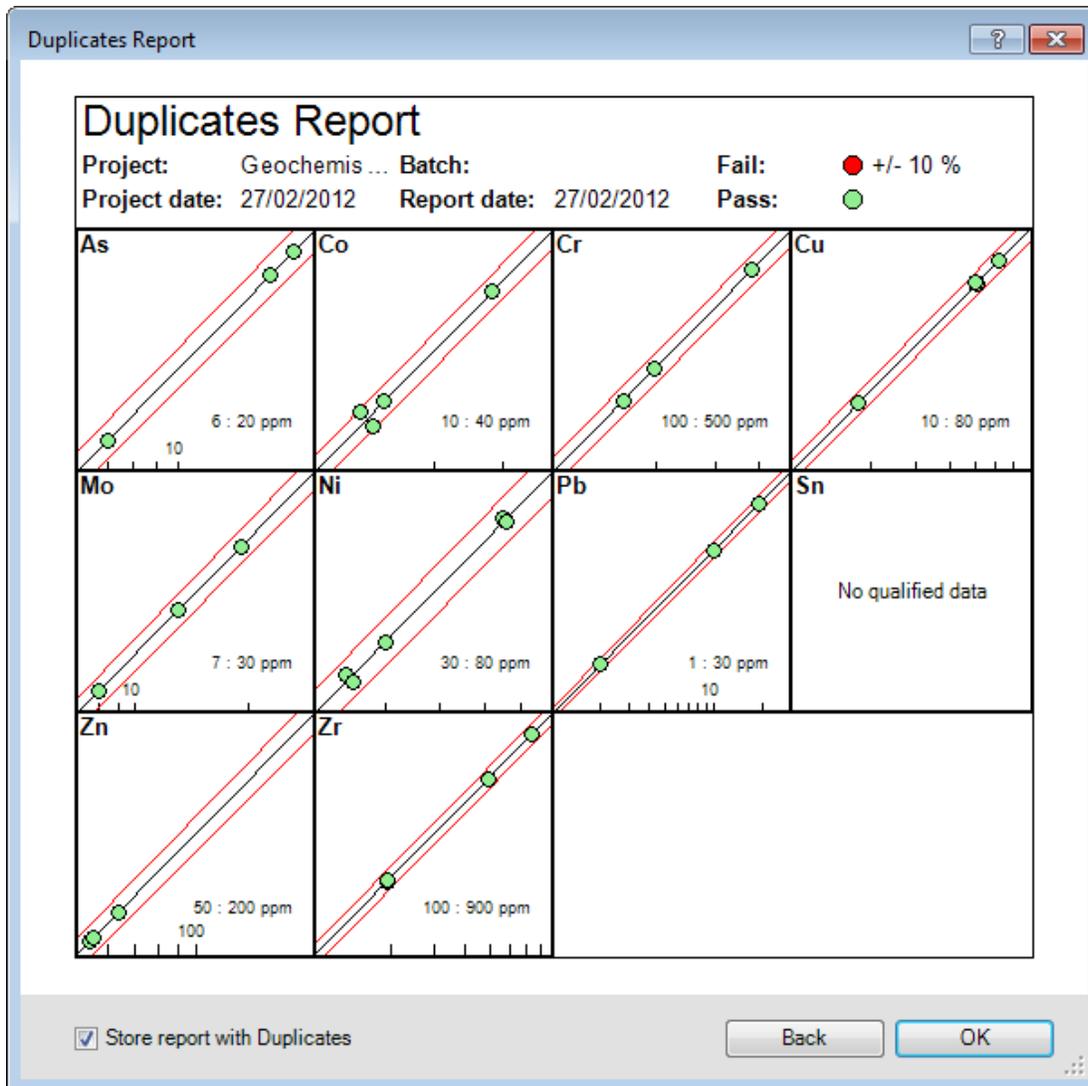
 *In a pair of duplicates, the first sample stays in the assay database and the second duplicate sample is removed to the duplicate database.*

Displaying Duplicates Report

1. On the *GeochemImport* menu, click *Duplicates* and then select **Display Duplicates**.
The *Display Duplicates* dialog appears.



2. Select the *Channels to report* and an *Error tolerance (%)*.
3. Click **OK**. The *Duplicates Report* is displayed.



4. You can save this document for use later or print for inclusion in a report. At this point, you may wish to close the Duplicates Report. Minimize or close the Duplicate database. If you close the database, click **Yes** to accept all changes.



If you find errors in your duplicates, we recommend that you stop processing and correct these errors before proceeding.



*For more information on the Duplicate Report, click the **Help** button on the Display Duplicates dialog.*

Dynamic Linking between Duplicates Database and Report

You can now use dynamic linking to link between your Duplicates database and your Duplicates Report.

To select a point in the Duplicates Report and link to the sample in the Duplicate database:

1. Select the Duplicates Report to make it your active map.
2. In the View/Group Manager Tool, select a view (i.e. select an element).
3. Click the Shadow Cursor Tool () from the toolbar.
4. Click on a sample in the Duplicates Report for the selected element.
You will see the cursors update for the other elements in the plot.
The Fiducial cell for the corresponding sample will be selected in the Duplicate database.

To select a point in the Duplicate database and link to the sample in the Duplicates Report:

1. In the Duplicate database, select any cell.
2. The cursors will update to the corresponding sample for each element plot in the Duplicates Report.

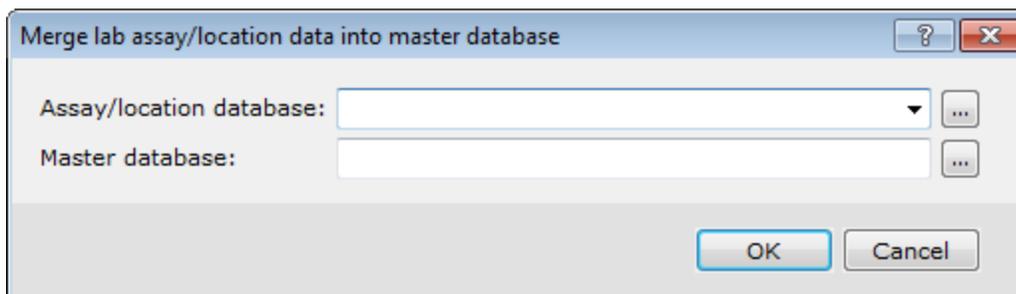
Updating the Master Database

Once you have merged and verified your survey and assay databases and extracted the standards and duplicates, your data is now ready to add to your master database. The final import step is to update the master database.

The lab and master databases *must* contain a "Sample" channel. Both databases are re-sampled to make all channels match the "Sample" channel before data is appended.

Updating the Master Database

1. On the *GeochemImport* menu, click **Merge to Master Database**.
The *Merge lab assay/location data into master database* dialog appears.



2. Use the *Browse* button to select the *Assay database* and the *Master database*.



At this point, you can create a new master database by typing the name of your new master database.

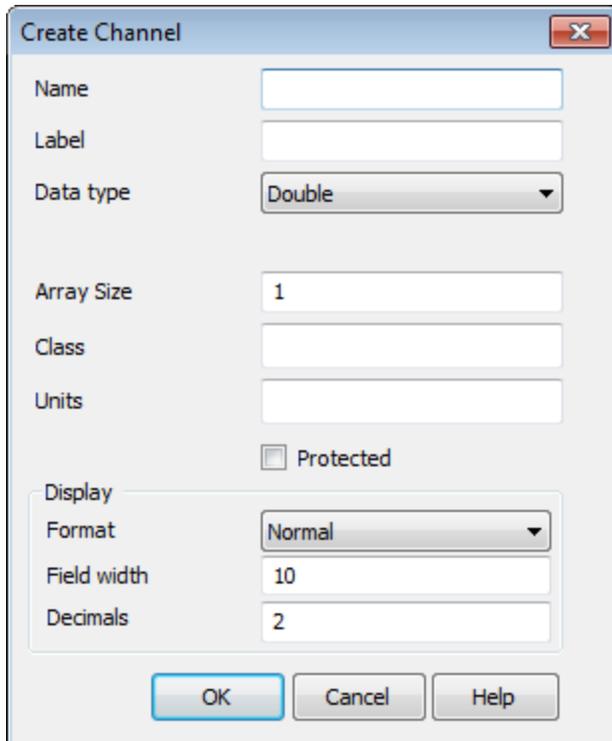
3. Click **OK**. The system updates your existing database (or creates a master database).

 Each time you update your master database, the system adds the updated information to the bottom of the spreadsheet. Note that you should be very careful when updating since the system does not check for repeated values. In the worst case, you could append the exact same values to the bottom of the spreadsheet.

Create a Mask Channel

1. Select (highlight) the header of the next available channel in your database. *Right-click* and from the pop-up menu select **New**.

The *Create Channel* dialog appears.



2. Type the *Name of the new channel*.
3. In the *Class* parameter box, type the channel name 'Mask'. This will identify this channel as a mask channel and will enable the channel to be displayed in all *Mask* dropdown lists available in the Geochemistry system.

 Ensure that the **Mask** channel is not protected, as you cannot write to a protected channel.

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