

80. HSC Data

HSC Data is a data processing application of the HSC Chemistry program family. HSC Data has been designed to process data in Microsoft Access (*.mdb) databases, but some other database types can be opened and also Microsoft Excel files and TAB-separated ASCII files can be opened with the program.

With HSC Data it is possible to:

- draw different kinds of graphics directly from the database:
 - XY diagrams
 - Ternary diagrams
 - Spider diagrams
 - Box and whisker diagrams
 - Histograms
- do statistical analyses directly from the database:
 - Basic statistics
 - Correlation matrices
 - Principal component analysis models (PCA)
 - Population analyses

To run Data, press “Data” in the main navigation window of HSC Chemistry (Figure 1).

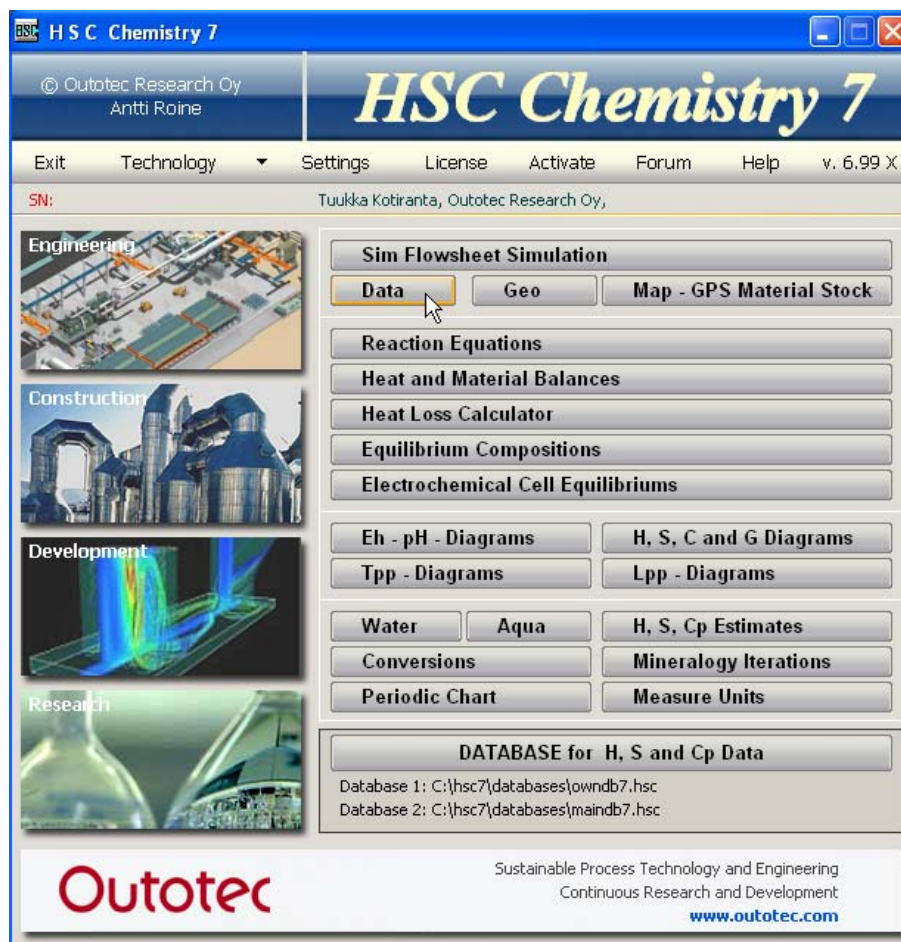


Figure 1. Running HSC Data from the main navigation window of HSC Chemistry.

The main window of HSC Data will appear. The different parts of the window are explained in Figures 2 and 3.

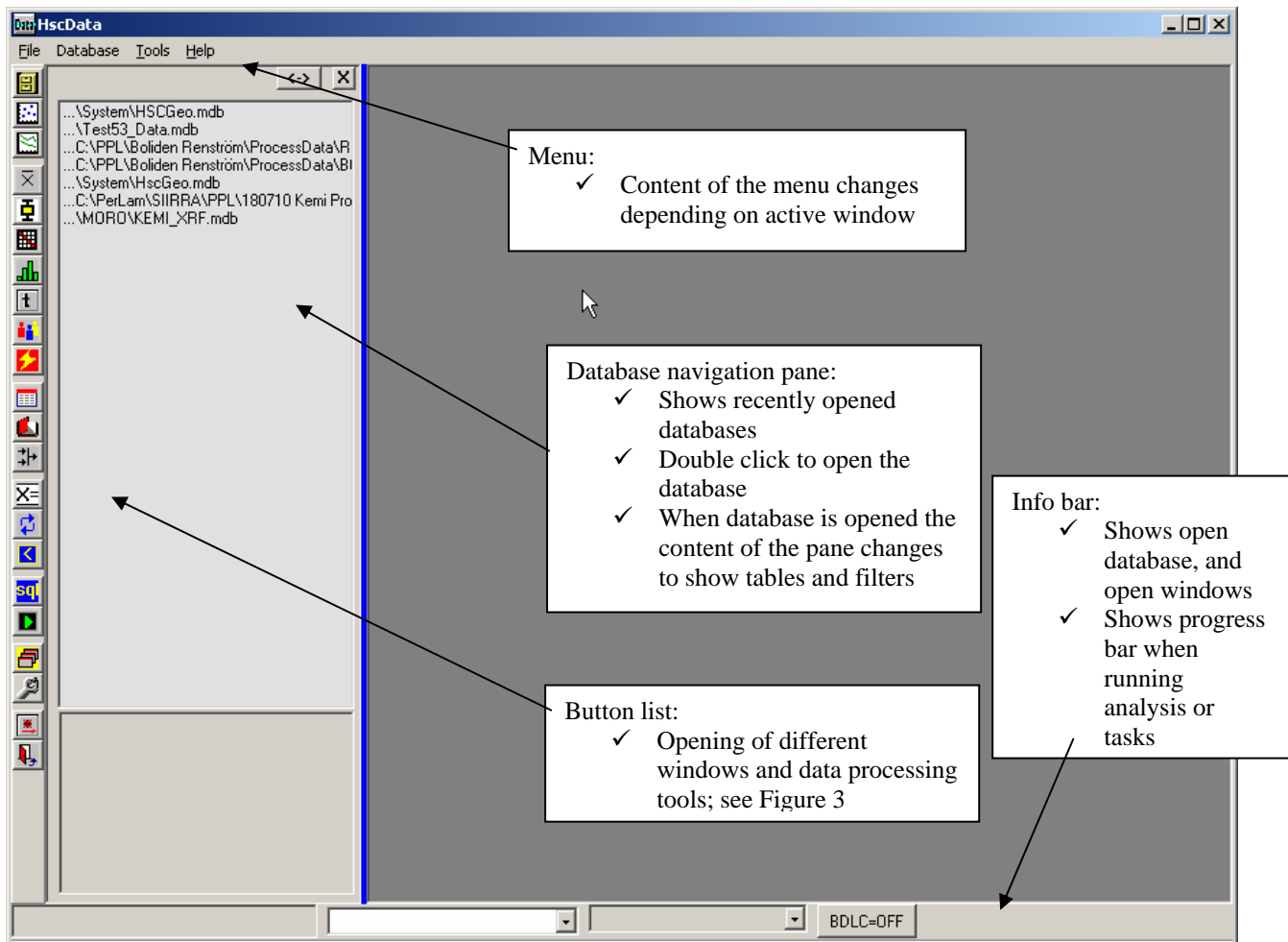


Figure 2. The main window of HSC Data.

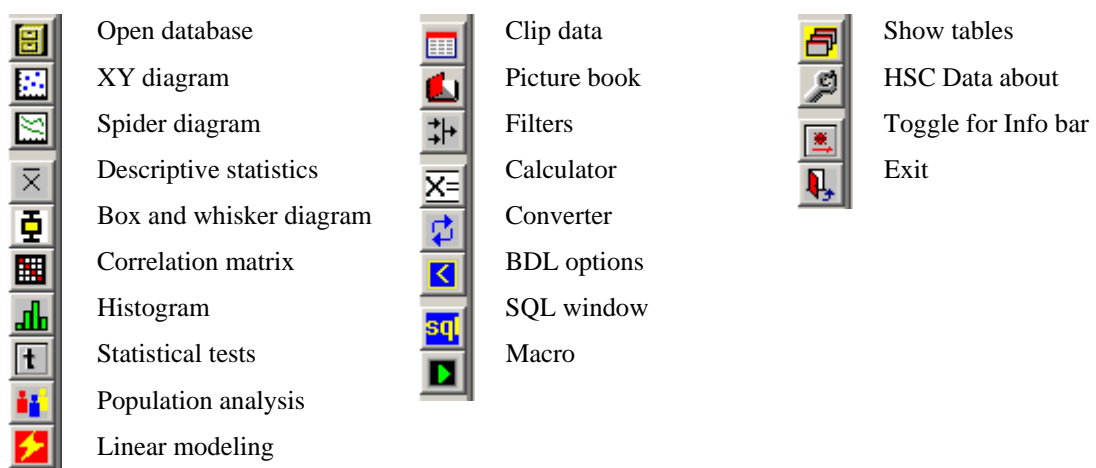


Figure 3. Key for the button list.

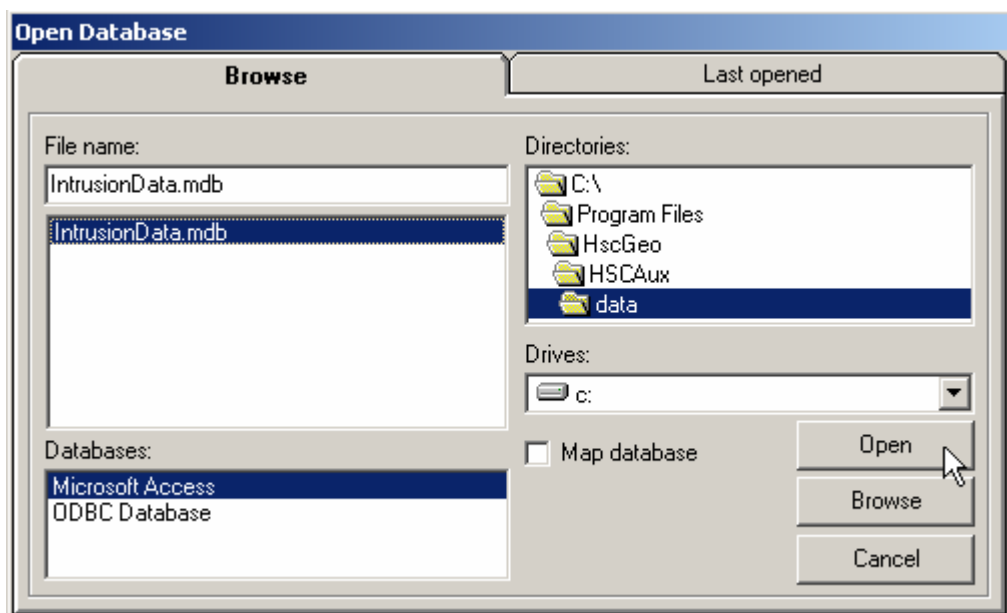
Tutorial for essential properties and processes of HSC Data

In this tutorial the Access database *IntrusionData.mdb* created in the HscGeo tutorial is used. The database includes data from two intrusions: Bruvann and Ekojoki (see Lamberg 2005). The tutorial covers:

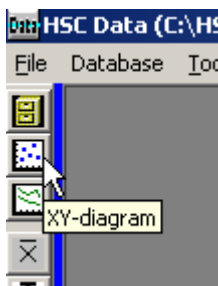
- Creating filters
- Drawing XY diagrams (page 7) (classifying, using filters, labels)
- Data fitting, discrimination with lines and curves
- Polygons in XY, discrimination with polygons
- Creating and using picture books
- Viewing tables

Opening database

Open the HSC Data and select File – Open Database (Ctrl+O) in the menu. Browse the *IntrusionData.mdb* database (should be in the data folder of HSC Data) and open it.



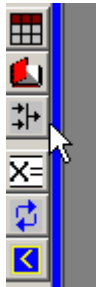
The open file is indicated on the caption line of HSC Data.



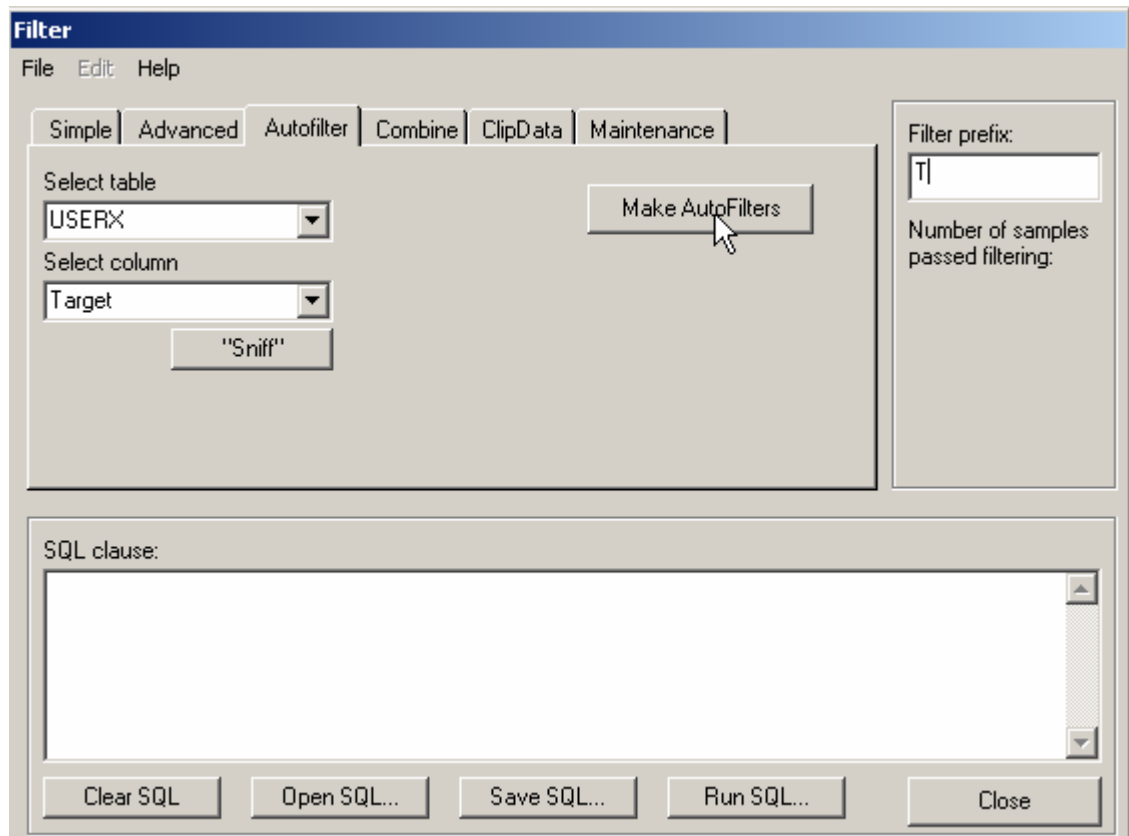
Creating filters

IntrusionData.mdb includes data from two intrusions and from several drill holes. It is useful and essential to process only some part of the data. With filters it is possible to do that. To

create filters, open the Filter window by pressing the Data Filter button in the left button panel.

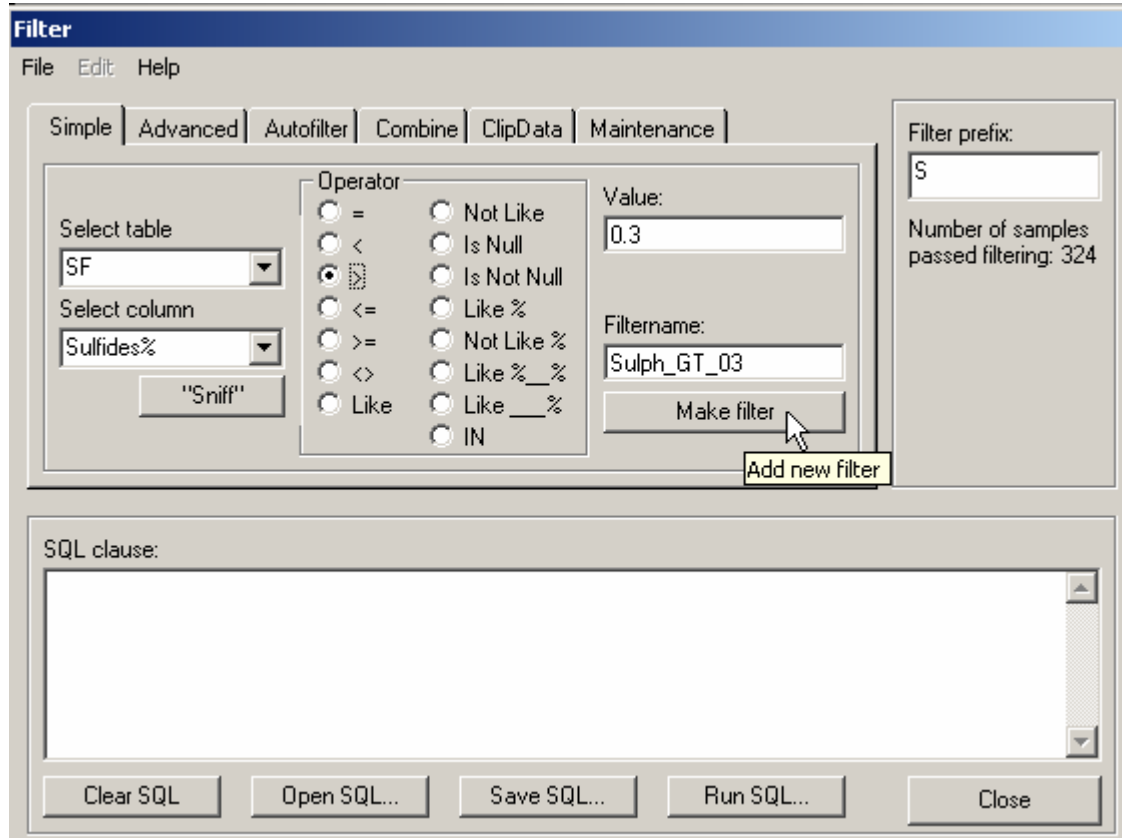


In the IntrusionData.mdb file the name of the intrusion is stored in the USERX table in the Target field. To create filters from each entry of a field, use AutoFilter. Select the Autofilter tab in the Filter window, select USERX in the Select table combo box and Target in the Select column combo box. For filter prefix use T by entering it in the Filter prefix: text box. Press **Make AutoFilters** to create a filter from each entry in the USERX.Target field.



To make the filters, press Make AutoFilters. Two filters will be created. Do the same with USERX.DDH (drill hole) with D prefix (24 filters).

Next a simple filter is created to exclude samples with less than 0.3% sulfides. This is required to study Ni# and Co# because if calculated from the whole-rock analyses they are reliable only in samples with >0.3% sulfides. Select the Simple filter tab in the Filter window. Select SF from the Select table combo box and Sulfides% in the Select field combo box. Select ">" for the operator and enter 0.3 in the value text box. The filter prefix is S and the name is Sulph_GT_03. Space and extra characters like >, <, =, . are not allowed in the filter name. Press Make Filter to create the filter.



To create a filter to exclude ore samples with Ni>0.5% and Cu>0.5%, select the Advanced tab in the Filter window. First select Chalcophile for the table and Cu_ppm for the column (i.e. field), select "<" for the operator and fill 5000 for the value. Press Add Clause button. Then select Chalcophile for the table, Ni_ppm for the field and "<" for the operator and the same 5000 for the value. Press Add Clause . Fill in the filter prefix ("NiCu") and press Make Filter.

Filter
File Edit Help

Simple | **Advanced** | Autofilter | Combine | ClipData | Maintenance

Aggregate
 And Or

Select table
 Chalcophile

Select column
 Cu_ppm

"Sniff"

Operator
 = Not Like
 < Is Null
 > Is Not Null
 <= Like %
 >= Not Like %
 <> Like %_ %
 Like Like ___ %
 IN

Value:
 5000

Add clause

Filename:
 LT_05

Make filter

Filter prefix:
 NiCu

Number of samples passed filtering: 0

SQL clause:
 SELECT [Chalcophile].* FROM [Chalcophile] WHERE ([[Chalcophile].[Ni_ppm] < 5000])

Clear SQL | Open SQL... | Save SQL... | Run SQL... | Close

Filter
File Edit Help

Simple | **Advanced** | Autofilter | Combine | ClipData | Maintenance

Aggregate
 And Or

Select table
 Chalcophile

Select column
 Cu_ppm

"Sniff"

Operator
 = Not Like
 < Is Null
 > Is Not Null
 <= Like %
 >= Not Like %
 <> Like %_ %
 Like Like ___ %
 IN

Value:
 5000

Add clause

Filename:
 LT_5000

Make filter

Filter prefix:
 NiCu

Number of samples passed filtering: 0

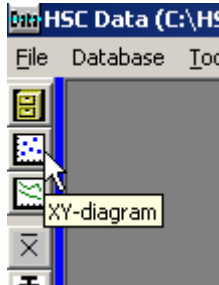
Add new filter

SQL clause:
 SELECT [Chalcophile].* FROM [Chalcophile] WHERE ([[Chalcophile].[Ni_ppm] < 5000]) AND
 ([[Chalcophile].[Cu_ppm] < 5000])

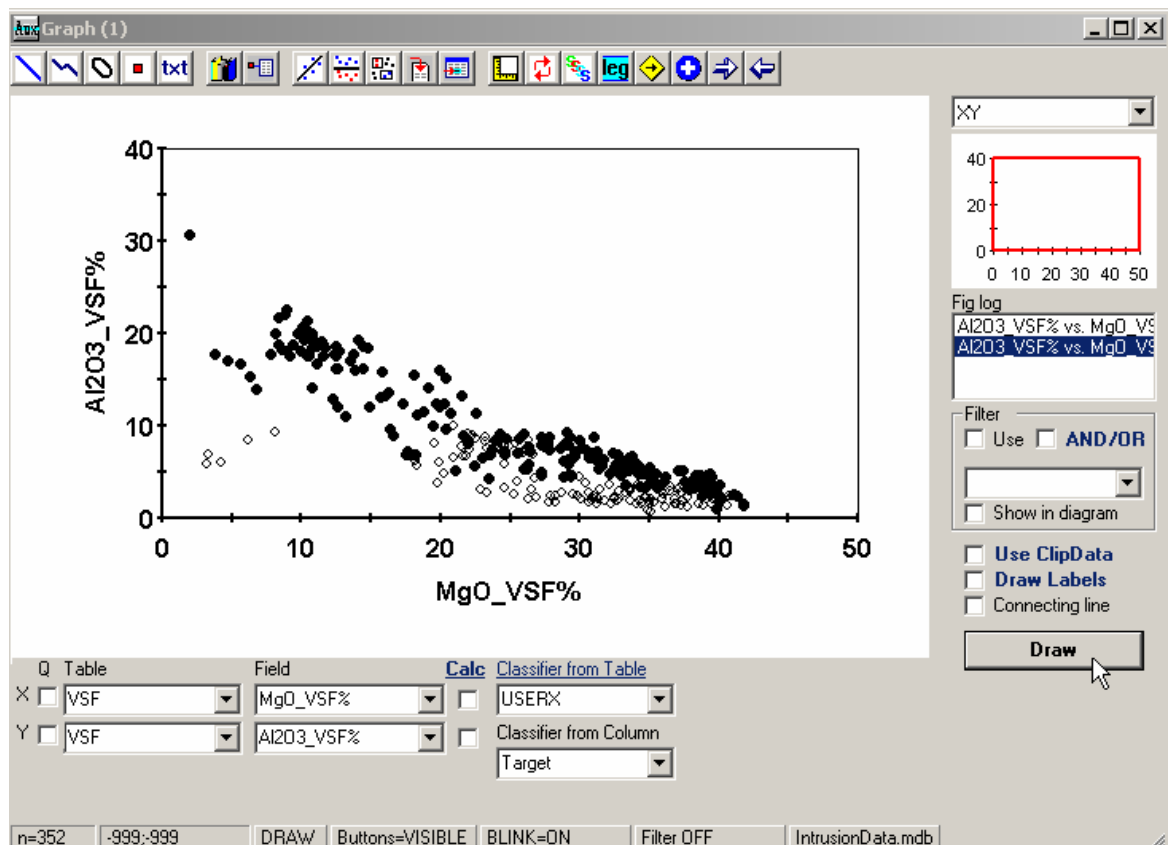
Clear SQL | Open SQL... | Save SQL... | Run SQL... | Close

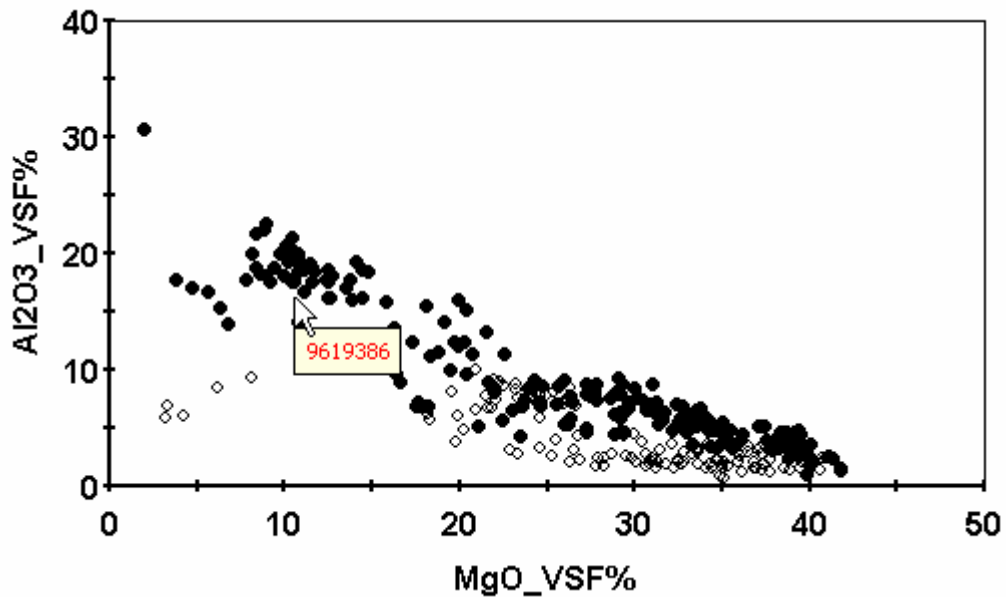
XY diagram

To open the XY window in HSC Data press the second button from the top in the left button bar.



To draw an XY diagram in the window, select a table and field for the X and Y axes, e.g. VSF.MgO_VSF% for the X axis and VSF.Al2O3_VSF% for the Y axis. Press Draw. To draw Ekojoki and Bruvann samples with a different plot mark (classes) select USERX.Target for the classifier (see figure below). Press Draw (or Enter) to draw.





When moving the mouse on the figure, HSC Data shows the ID of the point under the mouse. To see the data of some specific sample double click on the left mouse button when HSC Data shows the ID of the sample you are interested in. HSC Data opens the data browser in the right panel. To see the content of the same table all the time check the “Always from this table” option. You can change the data content directly in the browser and press Save to save the changed content in the database.

The List>>> button lists all the tables which include data from the sample in question (according to the ID field SampleNo).

To draw the content of the filter only, e.g. samples from the drill hole TY-152, classified by the most voluminous cumulus mineral (CUMNAME.C1) with the cumulus name used as label follow the next figure. The labels are defined by checking the Draw Labels check box and by defining the appropriate Table and Field (CUMNAME.Cumname).

The legend becomes visible by clicking the “leg” button in the top panel or by pressing Ctrl+L (toggles between legend visible and hidden).

To zoom in, press Shift and press the mouse down in one corner and release it in another. To reset the zoom, press the right mouse button in the Zoom and Pan box in the right top corner of the window.

To Scale the Chart:

1. Press CTRL, and hold down both mouse buttons (or the middle button on a 3-button mouse).
2. Move the mouse down to increase the chart size, or move the mouse up to decrease the chart size.

To Move the Chart:

1. Press SHIFT, and hold down both mouse buttons (or the middle button on a 3-button mouse).
2. Move the mouse to change the positioning of the chart inside the ChartArea.

To Graphics Zoom an Area of the Chart:

1. Press CTRL, and hold down the left mouse button.
2. Drag the mouse to select the zoom area and release the mouse button.

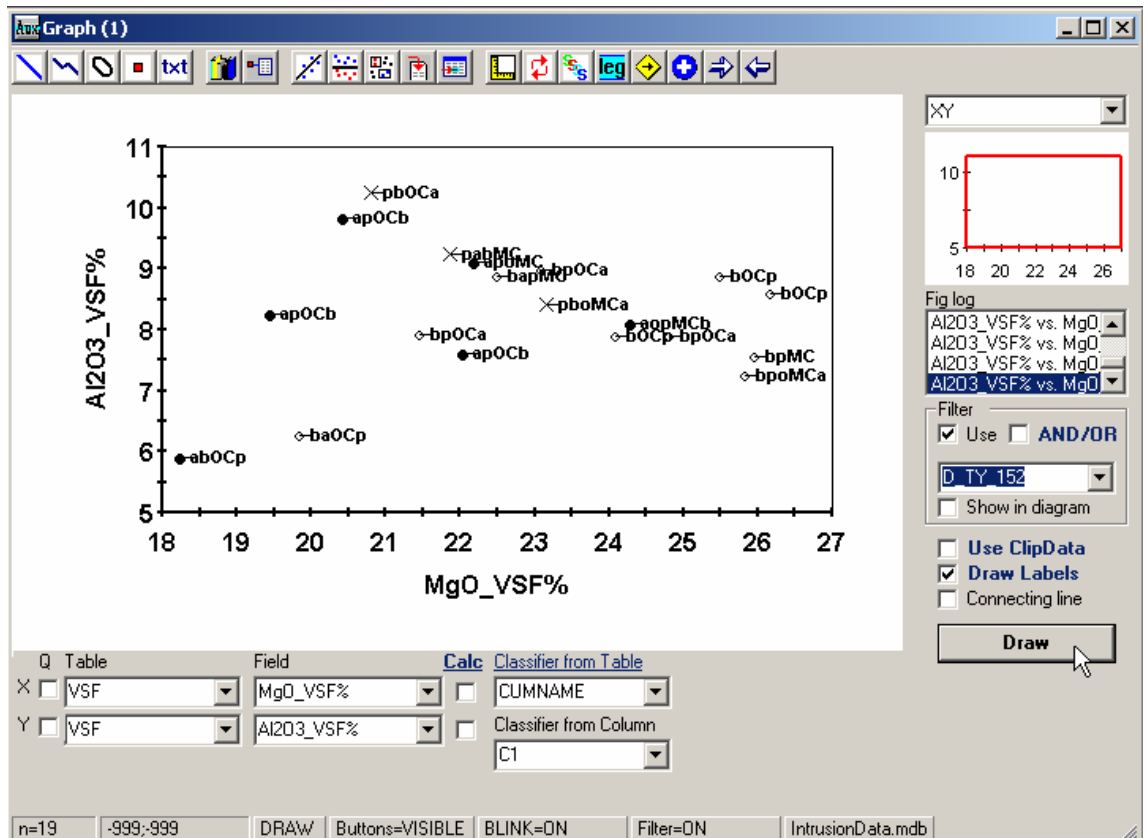
To Axis Zoom the Chart:

1. Press **SHIFT**, and hold down the left mouse button.
2. Drag the mouse to select the zoom area and release the mouse button.

To Reset to Automatic Scale and Position:

- Press the “r” key to remove all scaling, moving, and zooming effects; then the chart regains control of PlotArea margins.

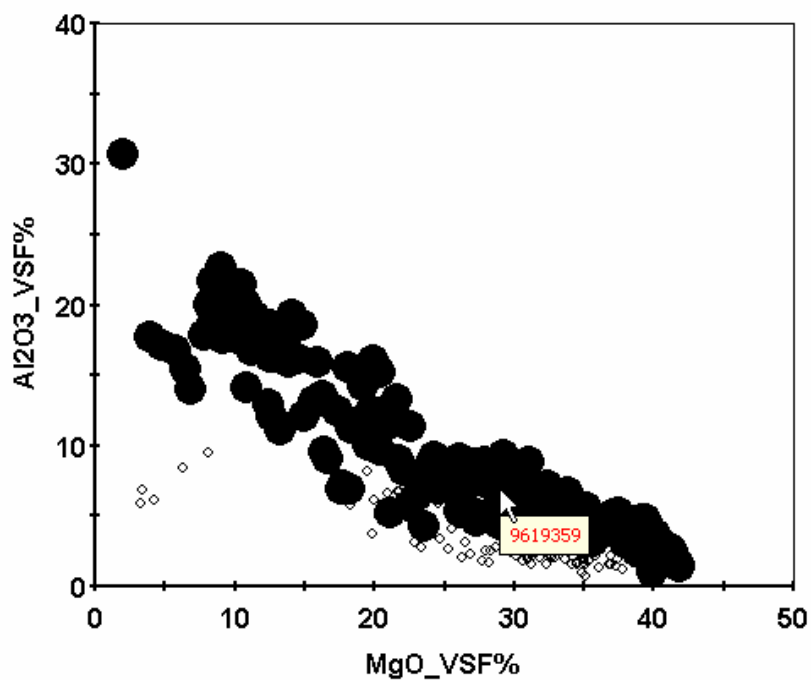
Field	Value
SampleNo	9619313
S_SF%	37.67381
Fe_SF%	53.12068
Co_SF%	0.802616
Ni_SF%	6.437307
Cu_SF%	1.179354
Zn_SF%	0.4586377
As_SF%	0.1637992
Mo_SF%	0
Rh_SF%	0
Pd_SF%	0
Pt_SF%	0
Au_SF%	0
Pb_SF%	0.1637992
Sulfides%	0.6105037
Ni#	84.51613
Co#	9.533074



Data fitting and discriminating with lines

In the Al₂O₃_VSF% vs. MgO_VSF% diagram, Bruvann and Ekojoki have different relationships. To have fitted lines for both series do the following:

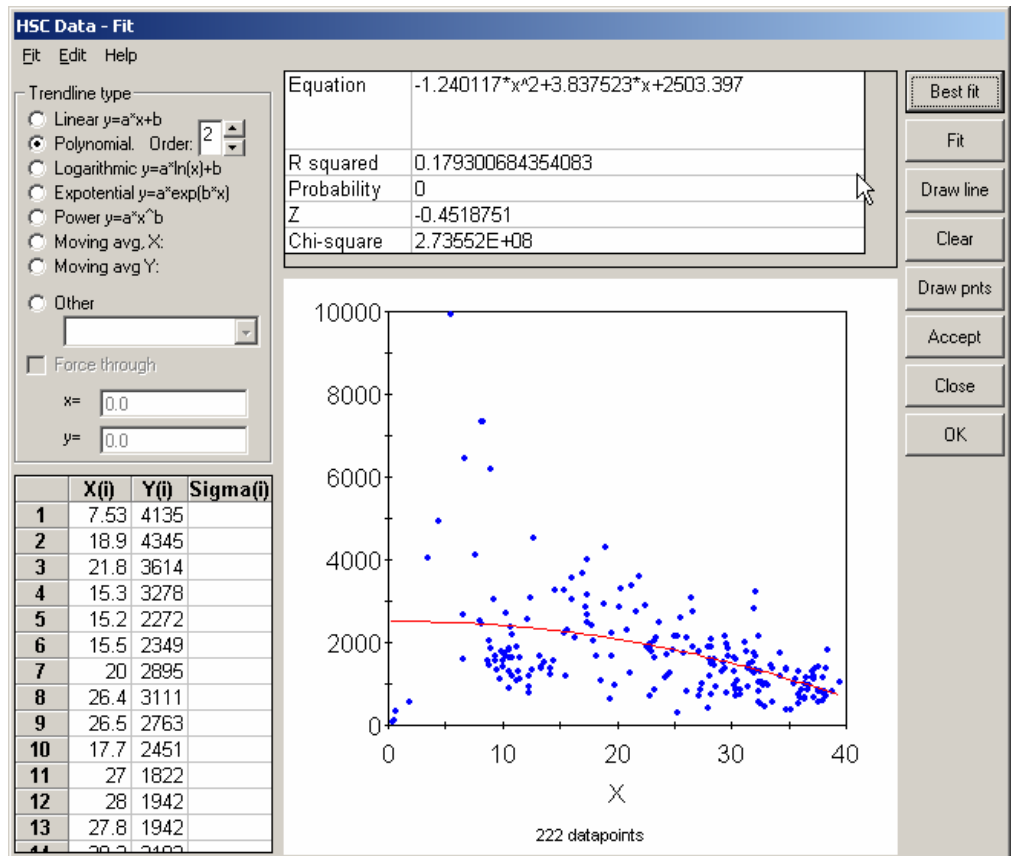
Press the Alt or Alt Gr button down and click with the left mouse button the series you are interested in. This will select the series and selection is indicated with larger plot mark sizes.



Press the Fit button in the top panel

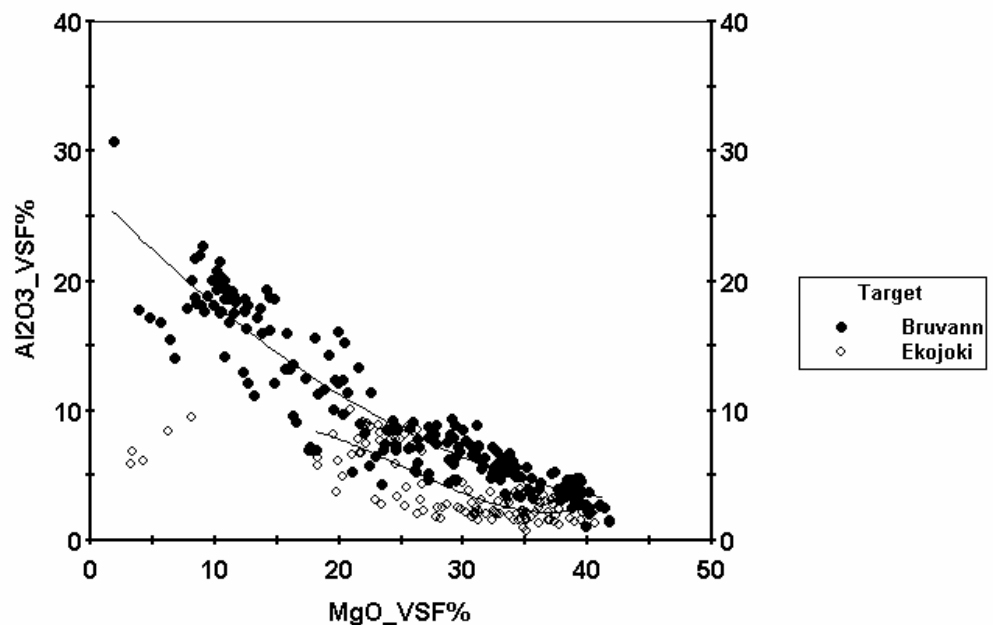


In the Fit window select the appropriate equation type in the left panel and press Fit or press Best Fit to find the best fit curve.



Press OK to copy the curve in the XY window and close the Fit window.

Do the same for the Ekojoki series as well.



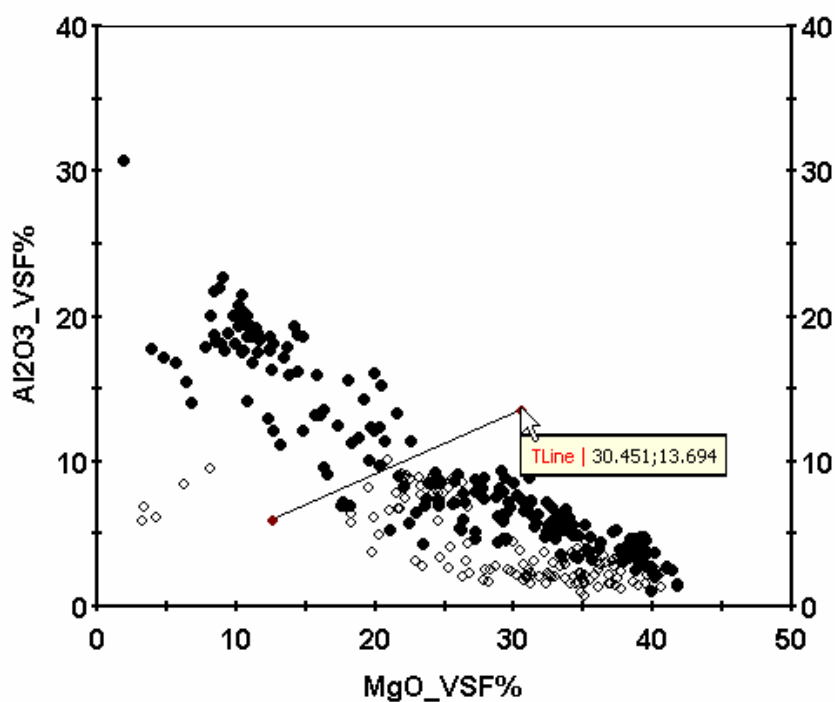
To discriminate with lines:

- In the same Al₂O₃_VSF% vs. MgO_VSF% diagram the aim is to classify the samples in two series.

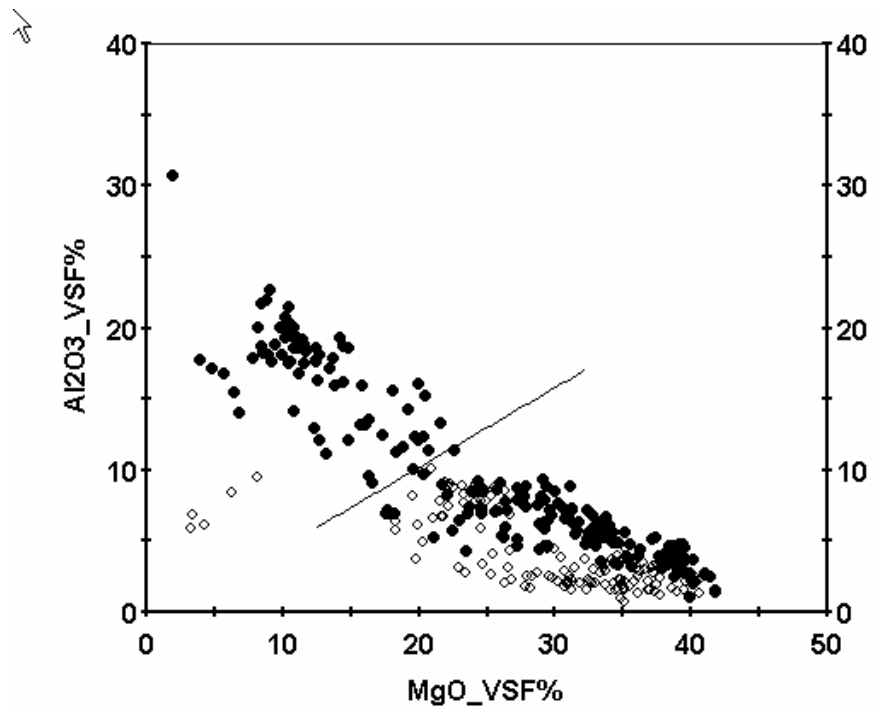
- Draw the trendline by pressing the Create trendline button in the top panel.



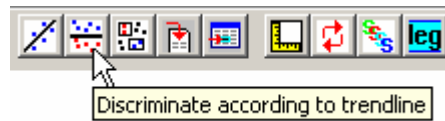
- Move the mouse to the starting point, click with the left mouse button, release the button, move it to the end point and click again.



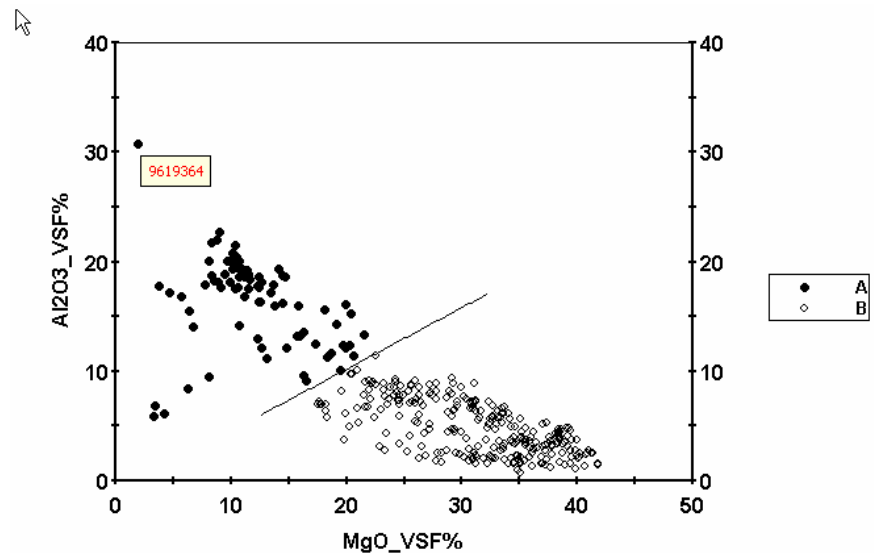
- Now you have the line according to which you wish to divide the data into two classes



- To classify press the “Discriminate according to trendline” button.

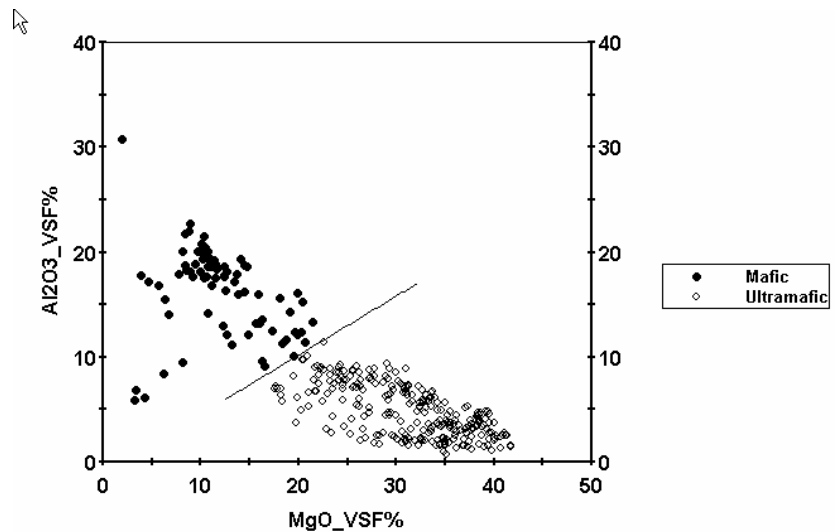


- HSC Data redraws the figure without the classifier and then performs the classification. Classes are named A (above) and B (below).



- To rename the classes press the Rename discriminate classes button. Give new names A-> Mafic and B -> Ultramafic

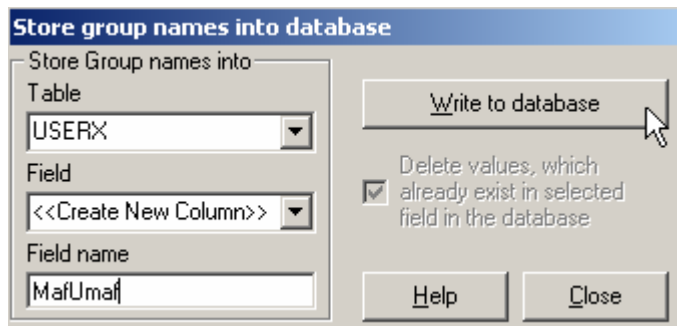




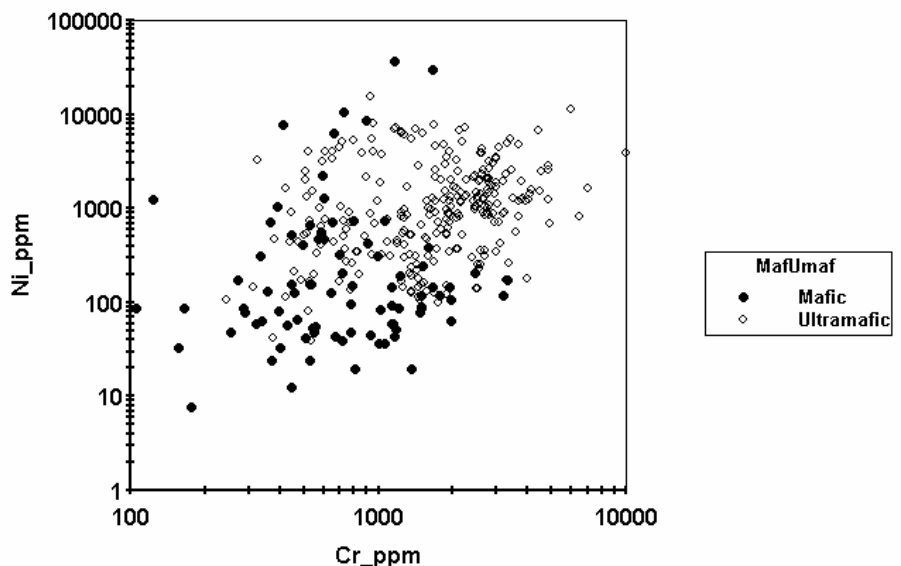
- To store this information in the database press the Write discriminate result in database button.



- Select the table (USERX) and for the field select the last option <<Create New Column>> and give the name MafUmaf for the new field. Press Write to database to store the result.



- Now this data can be used in classifying, filtering, labeling etc.

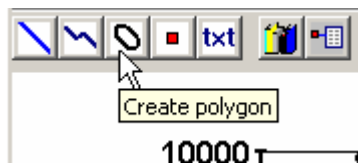


You can use polygons in the same manner as trendlines. To draw polygons first draw the appropriate XY figure. To draw a polygon in the figure select the Create polygon icon.

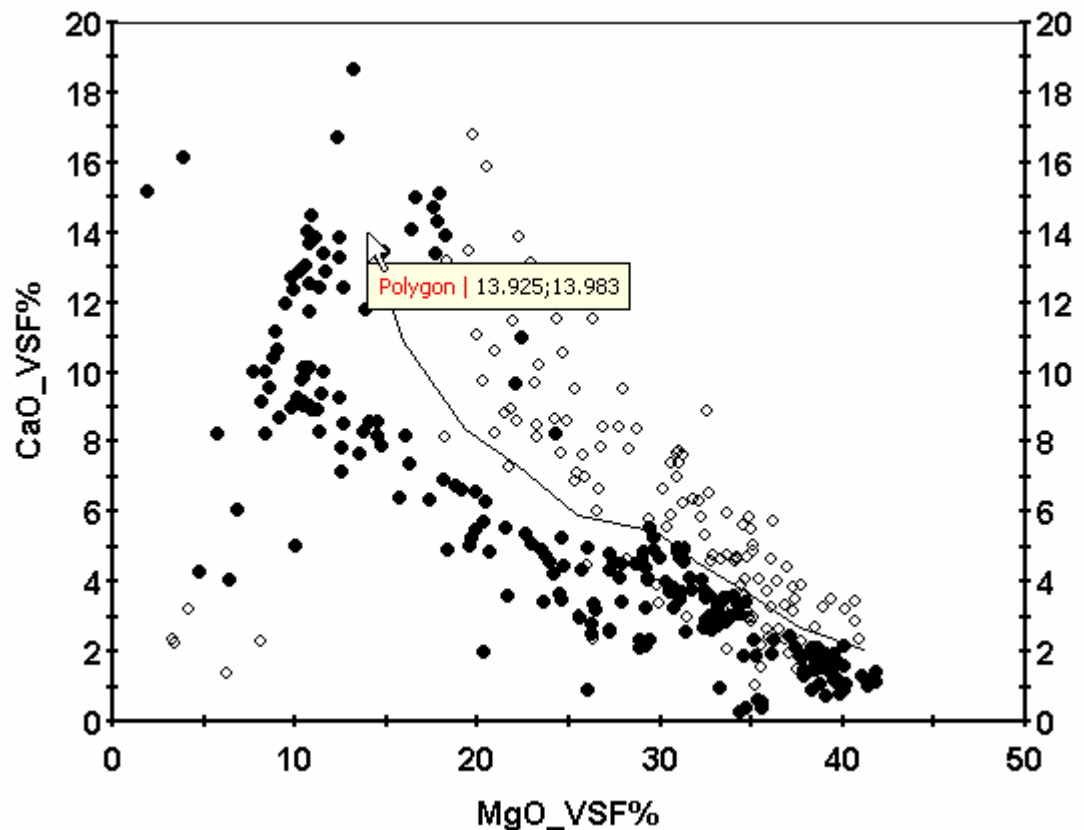
Polygons and discriminating with them

In geology different groups are often divided and discriminated with fields drawn in an XY diagram. HscGeo has special properties for this. In the IntusionData.mdb VSF.CaO_VSF% vs. MgO_VSF% diagram, samples form different groups. To digitize the polygon in an XY diagram:

1) Press the Create polygon button in the top panel.



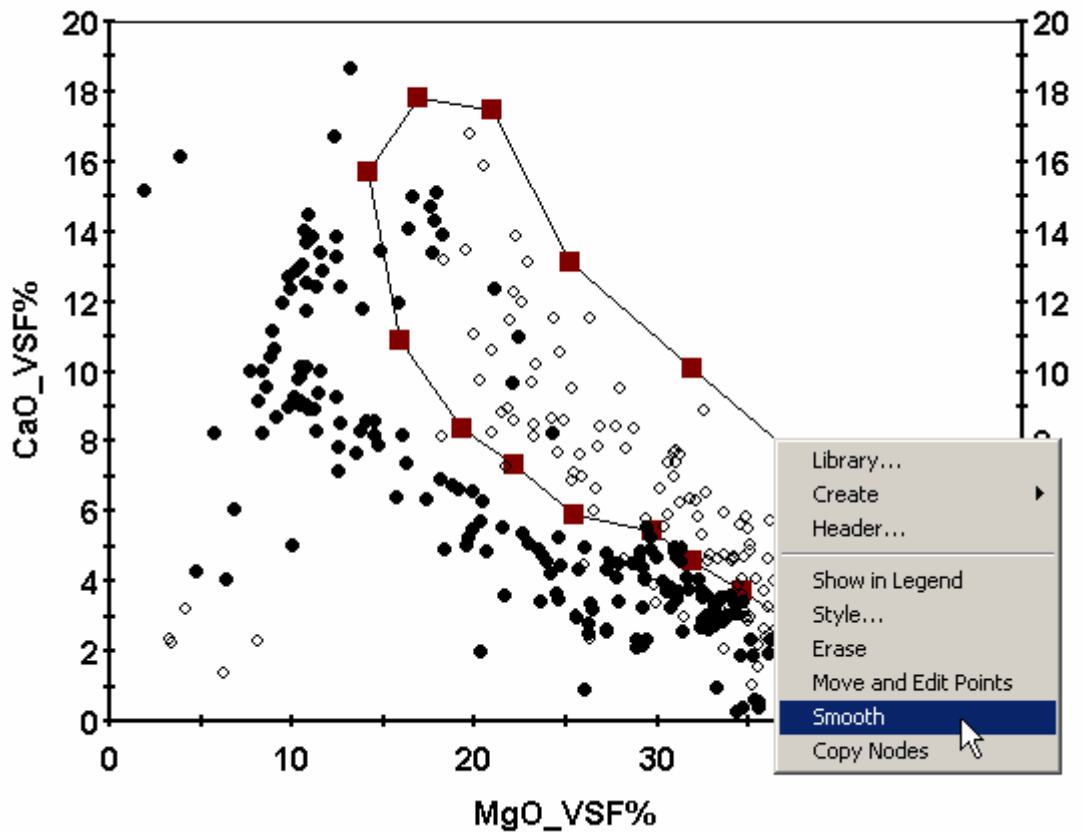
2) Digitize the polygon nodes on screen.



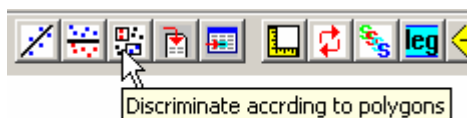
3) Double click the last node and HscGeo will close the polygon.

4) To smooth the polygon select press Alt (or Alt Gr) and click with the left mouse button on some of the polygon nodes to select the polygon. Nodes are shown as brown squares to indicate the selection.

5) Press the right mouse button down and in the pop up menu select smooth to smooth the polygon.



6) To use the polygon in discrimination press the “Discriminate according to polygons” button.



7) To rename the classes press “Rename discriminate classes” in the top panel.

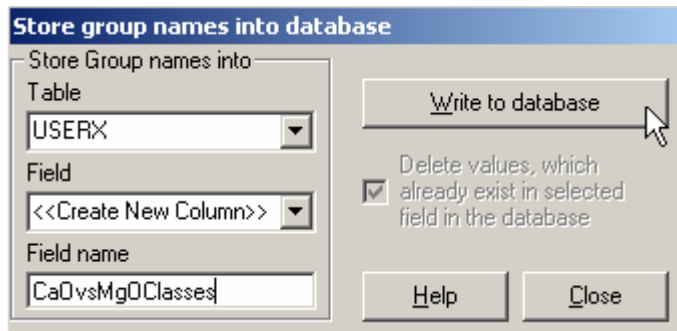


8) Rename the classes (e.g. Gr1 and Gr2).

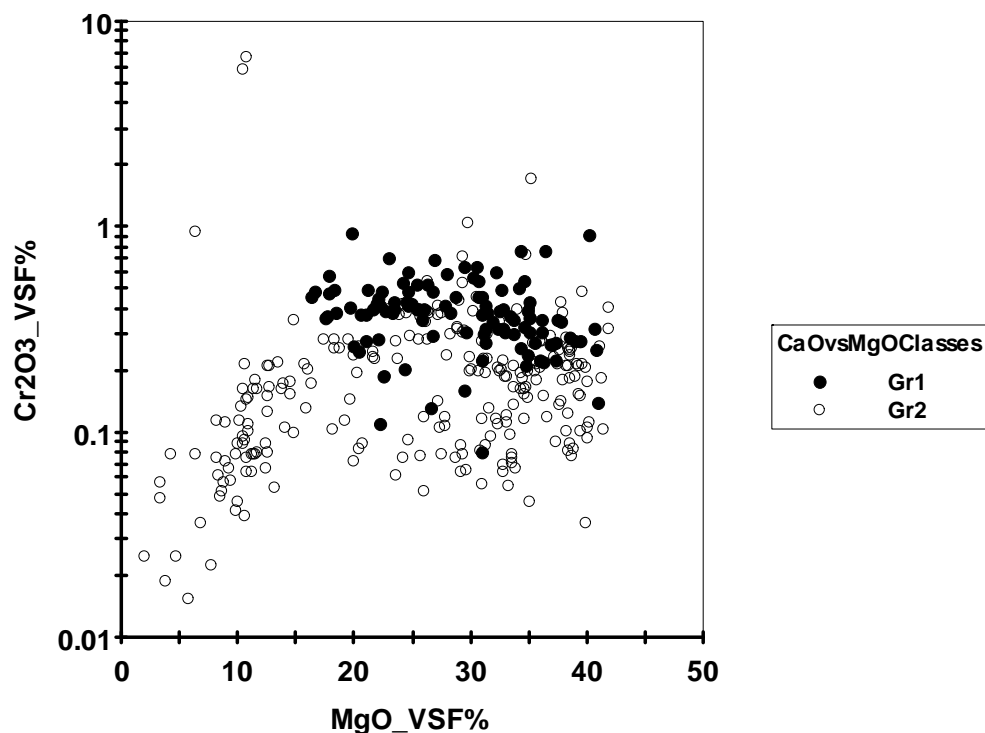
9) To store the result press the “Write discriminate result in database” button.



10) Select table (USERX) and <<Create New Column>> and give the name of the field (CaOvsMgOClasses) and press the “Write in database” button.



11) Once the result has been saved, USERX.CaOvsMgOClasses can be used in classification as shown in the figure below.



Picture book

Picture book is a collection of figures, or in fact the items defining the X and Y axis components of the picture, which can be used in redrawing the corresponding figure with another database. To create PictureBook do the following:

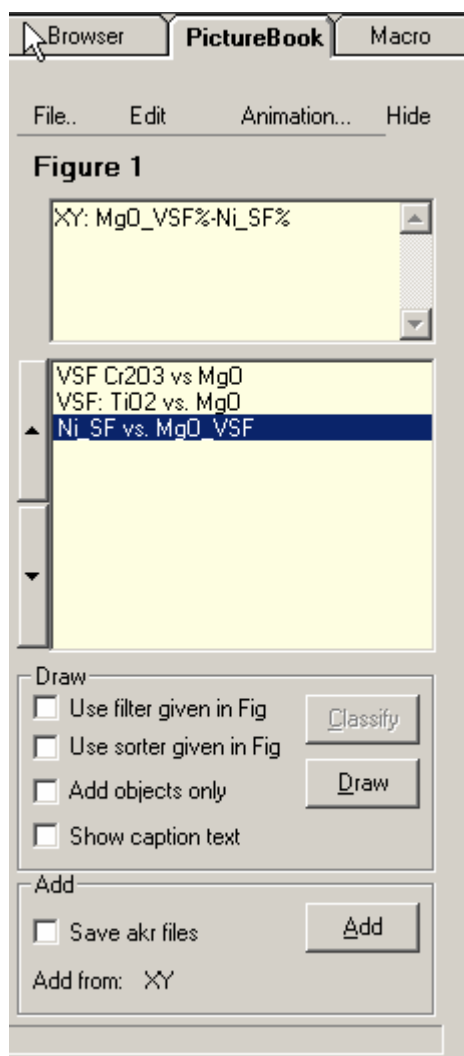
1) Draw the figure in the XY diagram with X-diagrams, Y-diagrams, filters and classifiers and press the “Add current figure to the PictureBook” button.



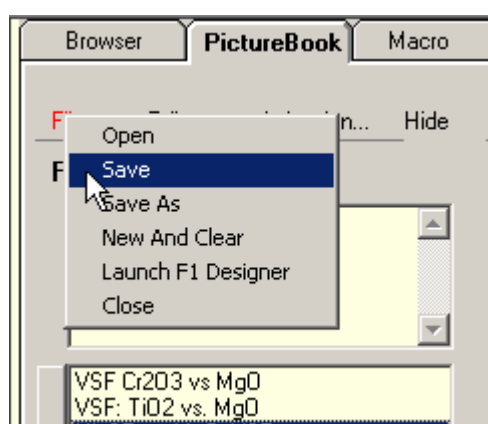
2) To see the PictureBook browser press the Show/Hide toggle.



3) Repeat step 1 for figures you want to store.



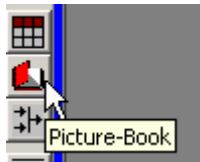
4) To save the PictureBook select File – Save in the PictureBook menu.



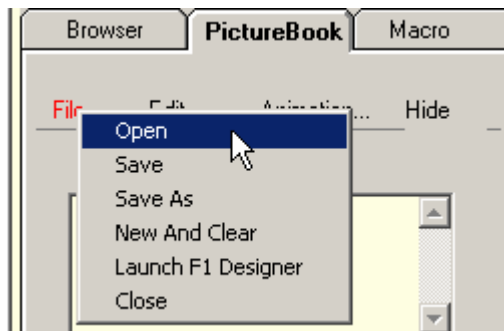
5) Give a name to the PictureBook and press Save.

To open the PictureBook and use the existing PictureBook:

- 1) Open the HSC Data program.
- 2) Open the data file (IntrusionData.mdb, see tutorial 1).
- 3) Press the "PictureBook" button in the left panel.

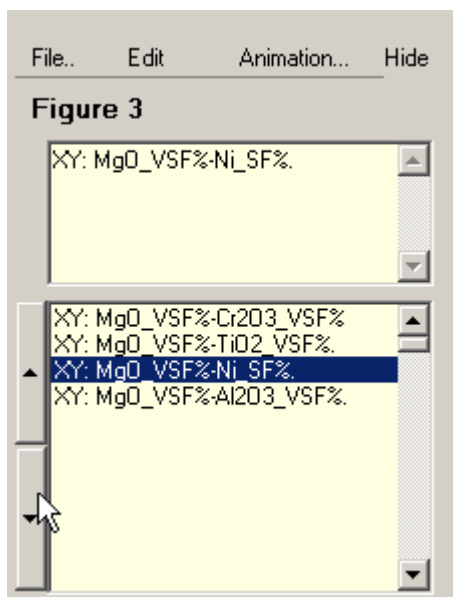


4) To open the PictureBook file select File – Open in the Picture Book menu.



5) Open the PLBook1.bok file.

6) To navigate between pictures use the up and down buttons.



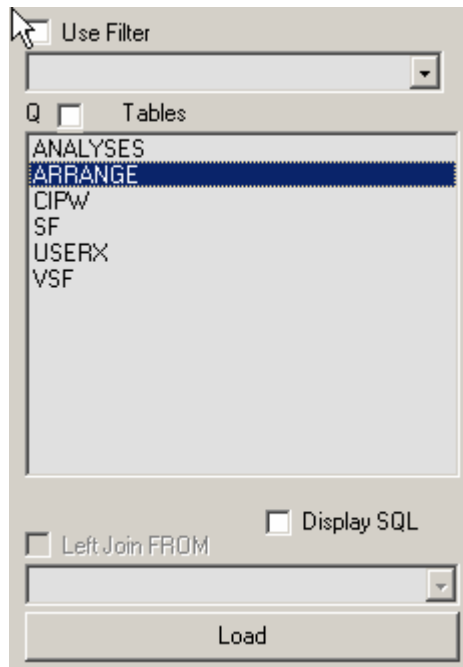
Viewing tables

To view the data in tables:

- 1) Press the View Tables button in the left panel.



- 2) Select one or several tables from the list, e.g. USERX and VSF.
- 3) If required use a filter by checking the “Use filter” box and by selecting the appropriate filter in the combo box below.

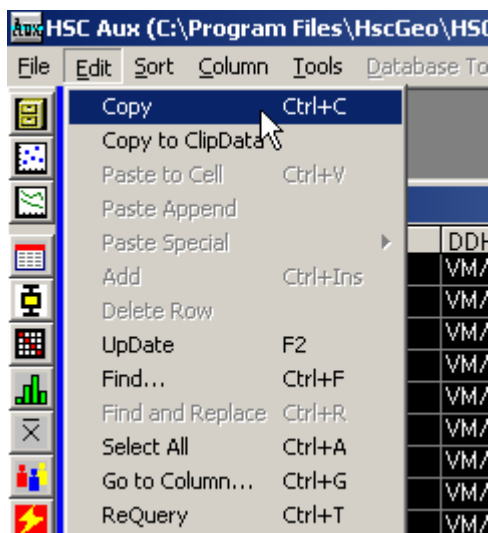


- 4) Press Load to see the table.
- 5) To hide some of the columns press the “Cols” button in the right panel.

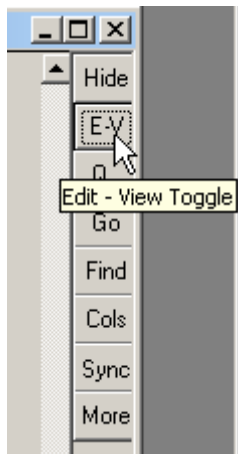
SampleNo	P ppm	Cl ppm	Ti ppm	V ppm
9619251	580.4399		4135.466	259.6677
9619256	615.3535		4345.236	151.5861
9619257	654.6315	50	3614.038	151.5861
9619258	445.1494	90	3278.406	324.9246
9619259	152.7473	290	2271.51	383.3837
9619260	235.6673	260	2349.424	342.5983
9619261	331.6799	110	2894.826	195.0907
9619262	384.0504		3110.59	127.1148
9619263	340.4083		2762.971	114.1994
9619264	353.501	30	2451.313	115.5589
9619265	257.4884	40	1822.003	99.92449
9619266	336.0441	50	1941.871	120.3172
9619267	218.2105	70	1941.871	165.1813
9619268	231.3031	40	2181.608	166.5408
9619269	192.0252	40	1995.812	151.5861
9619270	218.2105	50	2187.602	201.8883
9619271	292.402	30	3703.939	299.7735
9619272	100.3768	50	2978.734	386.1028
9619273	109.1052	40	1480.377	197.1299
9619274	314.2231	50	1905.911	174.6979
9619275	196.3894	80	1917.897	239.9547
9619276	362.2294		2846.879	167.2206
9619277	200.7536		1294.581	102.6435

6) Check the columns you wish to see. Finish by pressing OK.

7) To copy the data in the clipboard select from the menu: Edit – Select All and Edit – Copy.



8) To edit the data you have to change it to edit mode by pressing the Edit – View Toggle (E-V) in the right button bar.



9) In edit mode the table is light yellow and the view mode is indicated by white.

10) To close the table select File – Close in the menu.