Wella users' guide

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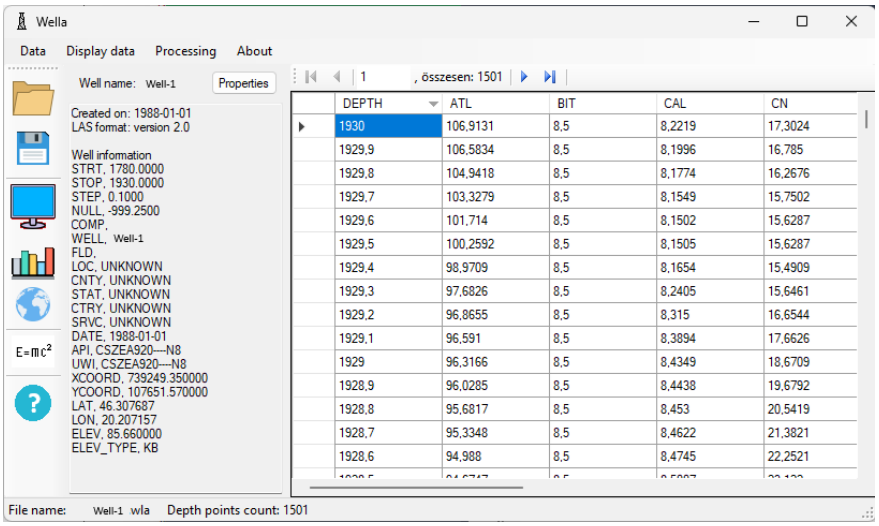

Figure 1.1: The opening screen

1.1 Summary

This document is a users guide for the Wella system (Well Log Analysing System). Wella is a well log interpretation system. You can import *las* files and open *wla* files which is Wella's own format. You can display available well logs, make cross-plots, edit, and run interpretation formulas, and finally display well locations on a map.

1.2 First steps

1.2.1 Installation and start

Wella does not need to be installed. Copy and run. Copy the *wella.zip* file where you want to and unzip it. Start the *wella.exe*.

1.2.2 Import *las* files

If you want to import a *las* file click on *Data/Import LAS file* menu item (Fig. 1.1). After importing save data to Wella's format by clicking to *Data/Save changes to wla format* menu item. On the left side icon bar too the *Save changes to wla format* are available. Full functionalities are reached for wla format data only.

1.2.3 Open *wla* files

You can open the entire well data by clicking on *Data/Open wla file* or *Open* icons on the left iconostasis (Fig. 1.1).

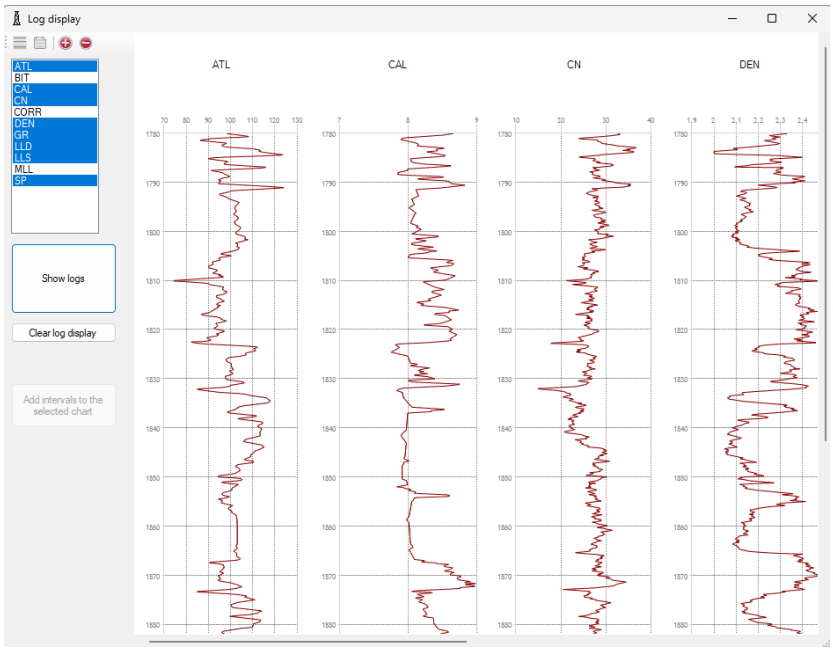

Figure 1.2: On the log display you can see the selected logs

1.2.4 Display well logs

To display logs click on *Display data/Show data as graphics* or *Display* icon on the left side (Fig.1.2).

1.2.5 Create cross-plot

Cross-plots can be drawn by clicking on *Display data/cross plot* menu or *Diagram* icon on the left side (Fig. 1.3).

1.2.6 Map display

If you wonder the location of your well click on the *Display data/Map display* menu item or the *Globe* icon on the left side (Fig. 1.4).

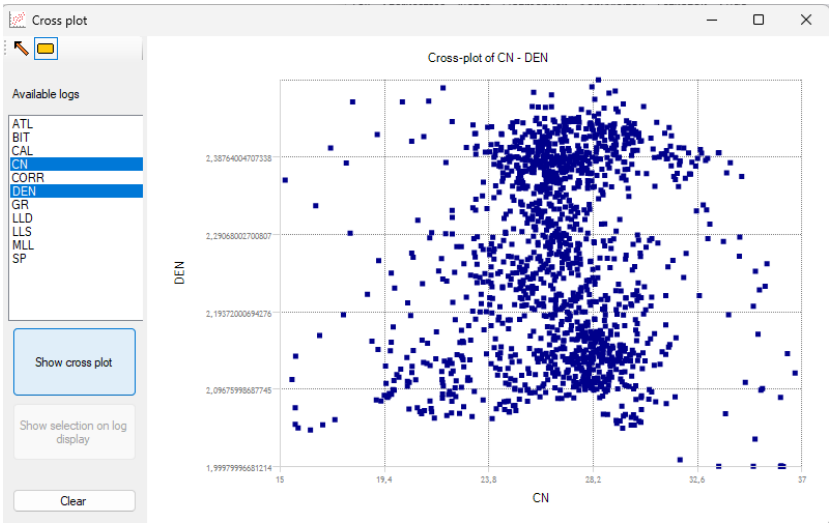

Figure 1.3: You create a cross-plot from any two selected logs

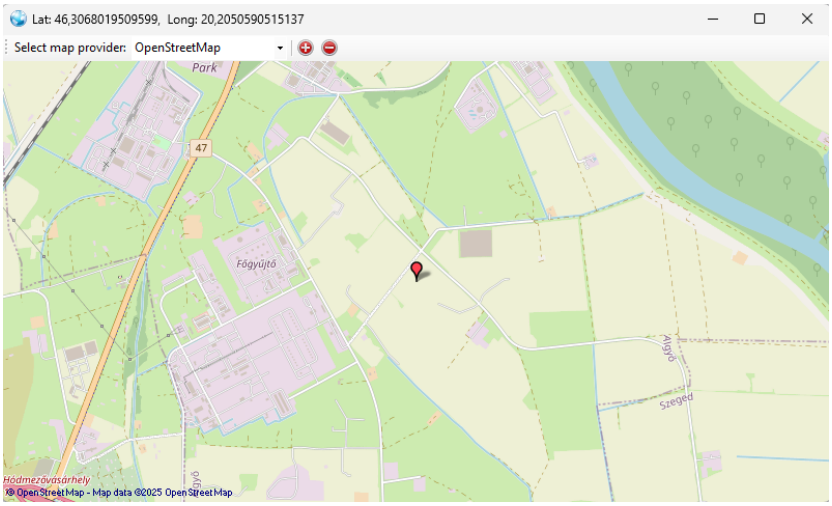

Figure 1.4: Well-1 on the map

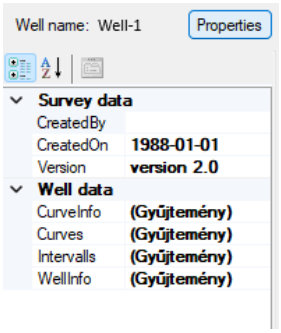

Figure 1.5: Wella data structure

1.3 Advanced functionalities

1.3.1 Wla Data Structure

Well data are organized into a special inner data format as it can be seen in Fig. 1.5. There are two groups: the *Survey data* and the *Well data*. *Well info* contains well name, well location coordinates, start and stop depth, elevation, etc.). *Curvinfo* contains log names and measure units. *Curves* contains log values. *Intervals* contains the boundaries of different rock bulks.

1.3.2 Select depth points by cross-plots

Make a cross-plot. Look at the outstanding or strange points and select them by using the rectangle or pointing selection tools. The selected points can be seen on a log display if you click on the *Show selection on log display* button.

1.3.3 Handling intervals

At first, the intervals were empty since the original *las* file did not contain interval data so you should create intervals. To do so let us open the log display with the desired logs. Click on the log where you want to identify the intervals. The background of the clicked chart changes to pale red.

Now click on the small layer icon on the upper left side iconostasis. If you move your mouse over the pale red chart and click where you want to put the boundary a blue line will appear. This is the lower boundary of the new layer. The upper one is the previous boundary bottom line. Further layers can be created with the same method. If you want to save the intervals click on the save icon in the same iconostasis (Fig. 1.7).

It needs to be emphasized this save function saves the result until you exit the program. If you want to save the newly created intervals for further actions click on the *Save changes* icon in the left side iconostasis or *Data/Save changes to wla format* menu item. If you want to zoom in or zoom out the charts click on the relevant buttons.

Remarks: Deleting existing or insert new layer has not been implemented yet.

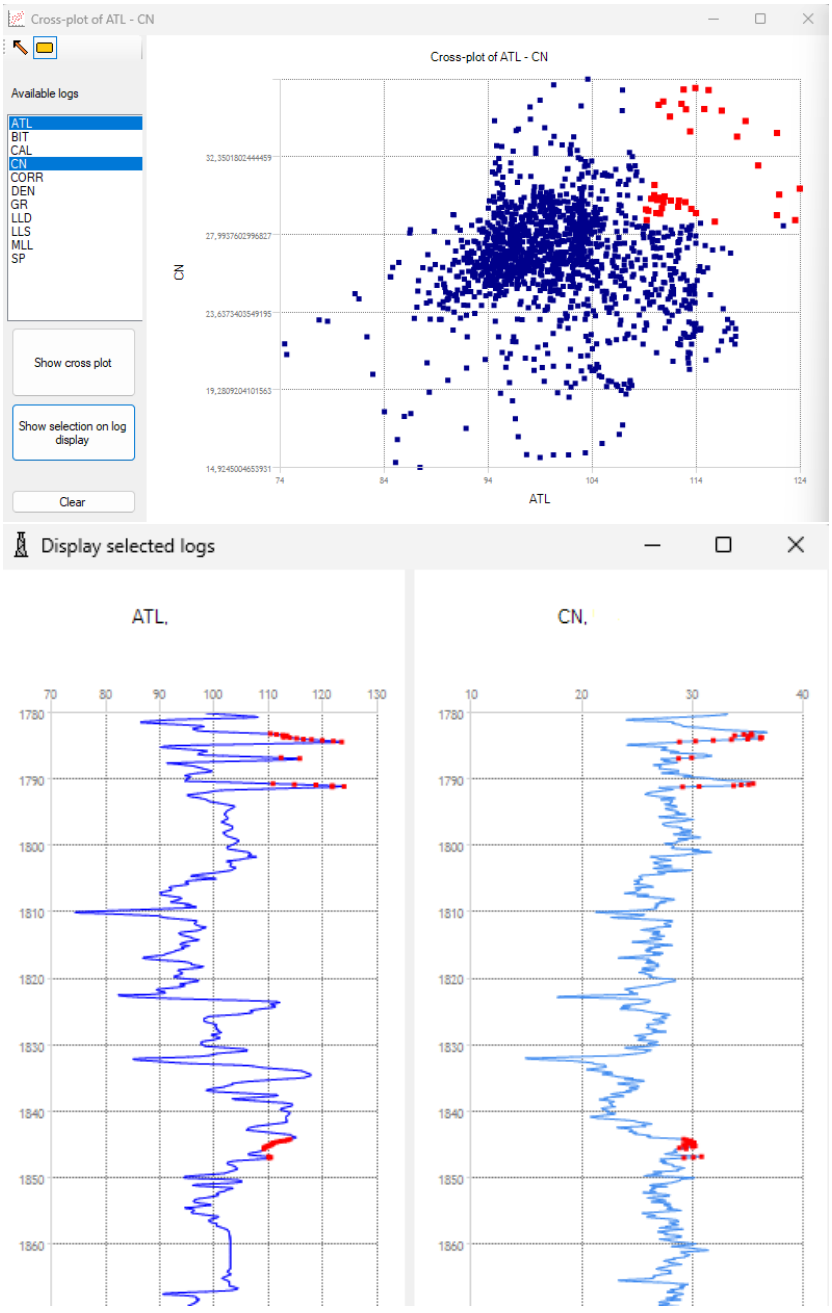

Figure 1.6: Select depth point by cross-plots

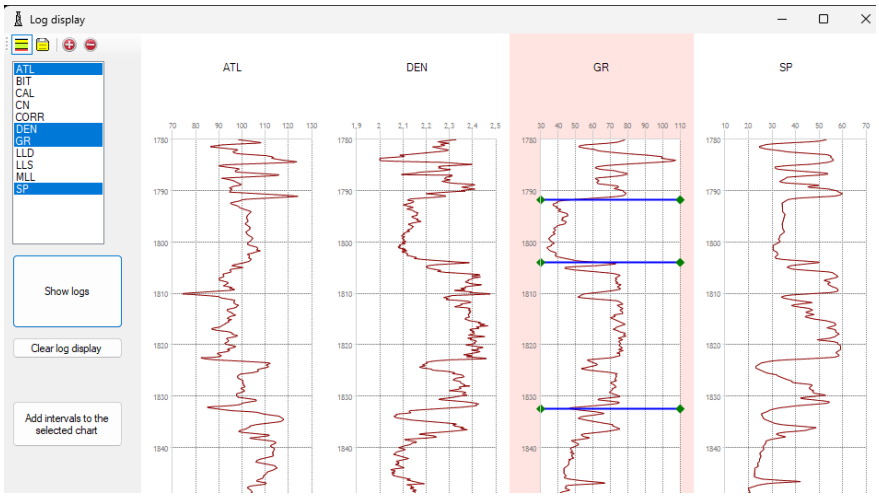

Figure 1.7: The result of interval creation

Intervals can have descriptive data. After creation, these fields contain automatically generated, fictive data. If you want to give realistic data, such as formation description you can do it with the right mouse click when a small text box appears where you can type the desired text. By pushing the Enter button this text is saved. Later, if you want to see what formation is in a certain position click to a point and a small textbox appears with the description.

1.3.4 Processing data

You can compute petrophysical parameters from logs with *Processing* menu. There are some submenus in it such as *Formula editor* and *Clustering*.

Formula editor

There are no built-in methods to compute any petrophysical parameters, but the *Formula editor* menu item or the $E = mc^2$ button helps you construct any method. *Formula editor* can be seen in the Fig. 1.81.8.

Select proper logs for computation from *Logs to select for the computation* list. Multiselect is possible of course. To accept these logs click on *Add selected logs to the list for computation* button. After that select an existing formula or create your own. Formulas use symbols *a b* or *c*. The first log on the list connects to *a*, the second to *b*, and the third to *c*, etc. Click on *Accept formula*, and click on *Run procedure on the selected logs* button. The result is temporarily stored in a log named *tmp*. If you check the *Show result in log display* check box you can see the result in a log display (Fig. 1.9). If you want to save the result for further work click on the *Save result as a new log*. After saving the window closes.

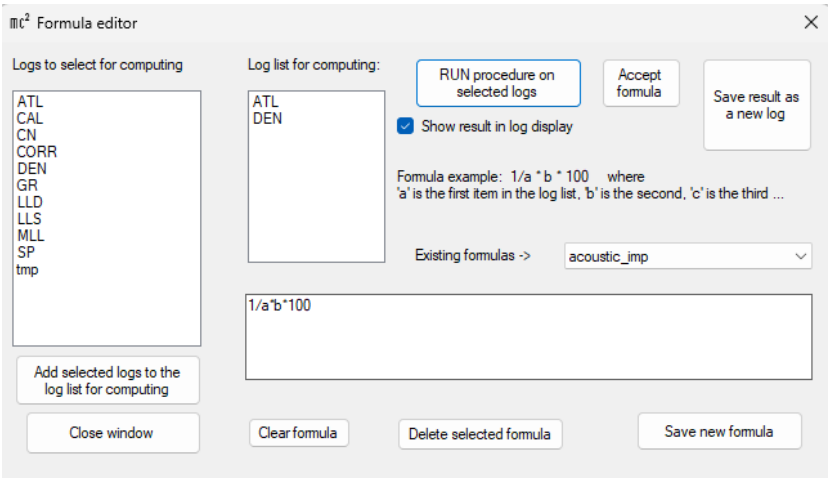

Figure 1.8: The *Formula editor* window

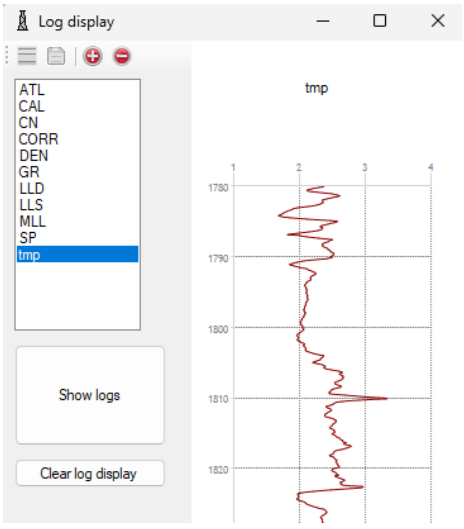

Figure 1.9: The result on the *Log display*

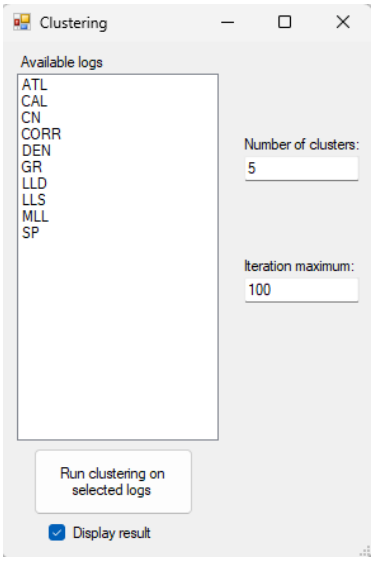

Figure 1.10: The k-means dialog window

If we did not save the result *tmp* log was lost. If you create your special formula you save it by clicking on the *Save new formula* button. If a certain formula is not necessary you delete it with the proper button.

Clustering

Recently only the k-means method was implemented only. Click on *Procedure/Clustering/K-means* menu item to start clustering. In the dialog window, you can set the necessary parameters such as the *Number of clusters* and *Iteration maximum* (Fig.1.10).