Geotechnical Instrumentation and Monitoring

Version 8.095

Sobek

Time – Geotechnical Instrumentation and Monitoring – Version 8.095
User Guide

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TIME - GEOTECHNICAL INSTRUMENTATION AND MONITORING

The **Time** module is used for the monitoring of piezometric data over time. Time uses a Graphical User Interface (i.e. with windowing) that is compatible with Microsoft Windows 7, 8 and 10.

Time uses the Geo and X3D libraries created by Sobek Technologies Inc. for data editing, the definition of the presentation style, and viewing and editing graphic results. Please refer to the Geo and X3D guides for all details.

1.   LAUNCHING THE TIME MODULE

Double-click on this icon to open the **Time** module.

The connection to the database can be done directly when calling Time by entering the following string as target. The string will be:
C:\Geotec80\Bin\Time.exe username/password@odbc:connection_alias

See paragraph 1 of chapter 2 of the X3D guide for all the details about the connection to a database. Once the connection to a database is done, the user can execute a data query to produce the graphic output.

When **Time** is first launched, the following files are loaded from ***C:\Geotec80\Style***:
- the markers file **geotec8.mrk**;
- the patterns file **geotec8.ptn**;
- the style file **TimeSobek_Eng.sty** which is a model showing the current piezometer over several years.

The user can begin working with this initial presentation, or open another style file included with the software. He can modify the style file and save it in a new presentation. In subsequent loadings, Time opens the style, markers and patterns files that were in use when last closed.

2.   FILE, EDIT, INSERT AND VIEW MENUS

None of the options of the **File**, **Edit**, **Insert** and **View** menus is specific to Time. The detailed description of each option of these menus is done in chapters 2, 3, 4, and 5 of the X3D guide.

3.   TOOLS MENU

The options of the **Tools** menu are used to define the utilisation parameters of Time and to edit the graphic components produced by Time: the characteristics of the graphic page, of the graphs, legends, axes, markers and patterns used. All these options are described in details in chapter 6 of the X3D guide.

Options is specific to Time. It is presented in paragraph 3.1. The definitions of the graphs, curves and axes are presented afterwards.

3.1. Options

The **Options** item of the **Tools** menu or this button opens the options window for data display, illustrated in figure 1. The user can define the data selection parameters. The options are saved in the style file. The first tab is for **Piezometers**. The inclinometers and profilometers will be added in the future.
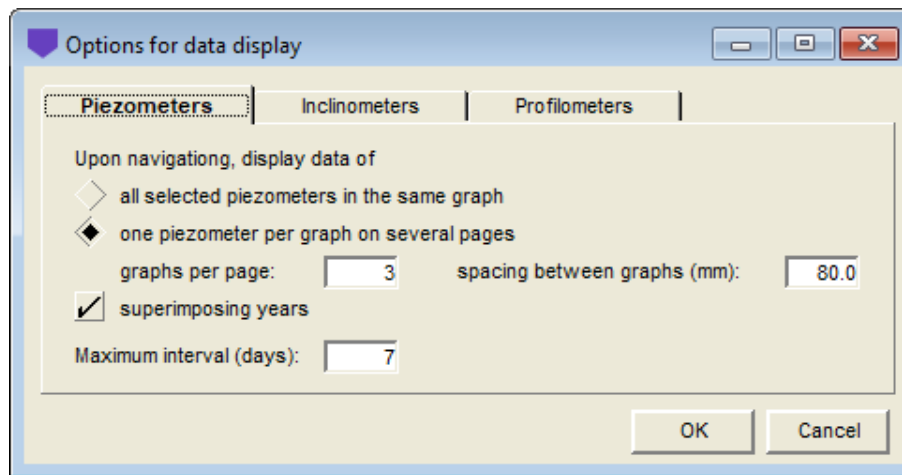

Figure 1 – Options for data display

The user chooses between displaying the curves of **all selected piezometers in the same graph**, or to display **only one piezometer per graph** with possibility of several graphs on multiple pages.

3.1.1. Selected piezometers in the same graph

With this option, the user displays superimposed data of a group of piezometers, with a time scale that adjusts with the data. The predefined curves are numbered **200 and up**.

3.1.2. One piezometer per graph

With this option, the user displays only one piezometer per graph, and can show multiple graphs per page, on several pages.

You indicate the number of **graphs to display per page**, as well as the **spacing (in mm)** between the top of the 1st graph and the top of the following graph. The characteristics of graph #1 are defined by the user (graph dimensions, curves and legend, axes, associated objects). Time will then adjust the number of graphs per page and the number of required pages in the report to see all the piezometers returned by the query. It is however possible to edit the characteristics of each graph independently, if desired.

The **years** on the X axis can be **superimposed**. Each year is then represented with a different color and the predefined curves are numbered **100 and up**. See paragraph

3.1.3.   Maximum interval

In the PIEZOMETER entry form, a maximum interval between 2 measurements (in days) can be entered. When consecutive readings are spaced by more days than the imposed interval, the curve will be discontinued between these two measurements. With a 0 value, no discontinuity is done.

In the options, a maximum interval can also be indicated and will be used if no value is entered for the piezometer.

Note that if a value is isolated, in other words the previous and the following measurements are spaced by more days than the imposed interval, a marker must be displayed for the curve in order to see the point on the graph.

3.2.   Definition of the graphs

The list of graphs is established and updated in the graph editing window opened by selecting the **Graphs**… option of the **Tools** menu or by clicking the button shown on the left. More details about the graph editing are available in paragraph 3 of chapter 6 of the X3D guide. Figure 2 shows the graph editing window in Time.
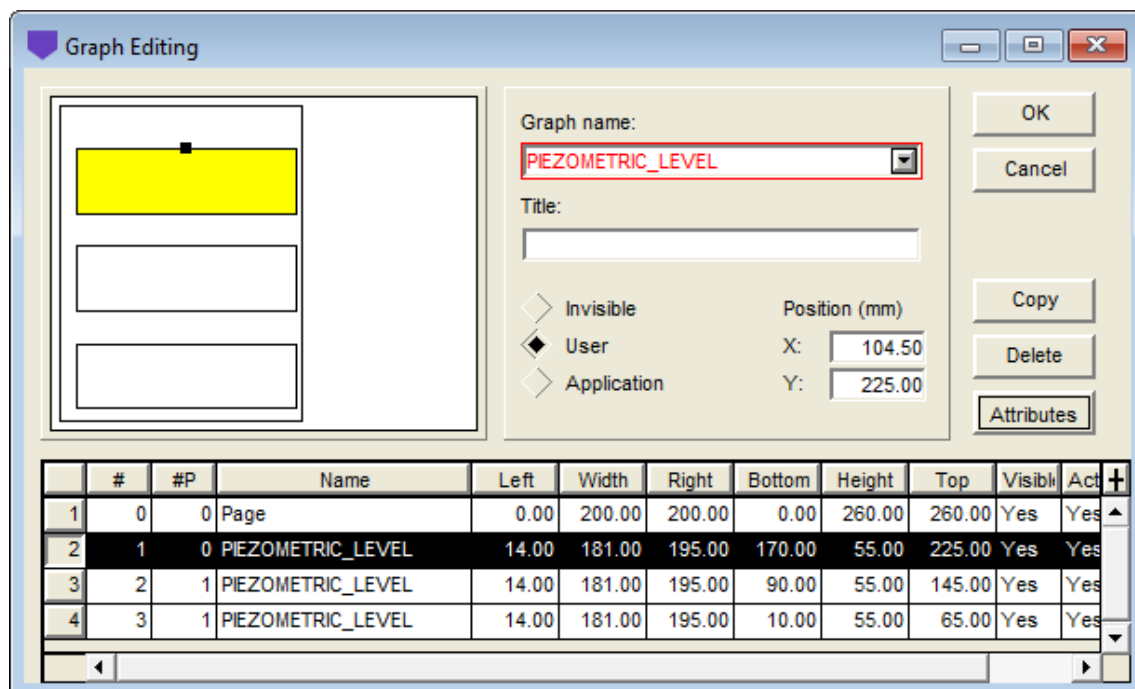

Figure 2 - Graph editing window

The table in this window contains the graphs defined in the style file. Each graph is identified by a unique number in the **#** column. The first graph is always **Page** with **# 0**. This graph represents the graphic page and cannot be deleted.

The primary graph (with a positive #) whose **#P** cell is **0** must be **PIEZOMETRIC_LEVEL**. The user can define its position and dimension with the **Left**, **Width**, **Right**, **Bottom**, **Height** and **Top** fields.

With the option of one piezometer per graph, the user defines the characteristics of **graph #1**. Time will automatically generate copies of this graph under graph #1 based on the number of graphs per page and spacing defined in the options. To force the regeneration of the graphs after a modification of graph #1, delete the "extra" graphs (#2 and #3 in the example).

If we display several piezometers in the same graph, only graph #1 is required and can take up the entire page.

3.3.   Definition of the curves

The list of curves of a graph is established and updated in the legend and curves editing window opened by selecting the **Legend** option of the **Tools** menu or by clicking on the button shown here. More details about the legend and curves editing are available in paragraph 4 of chapter 6 of the X3D guide.
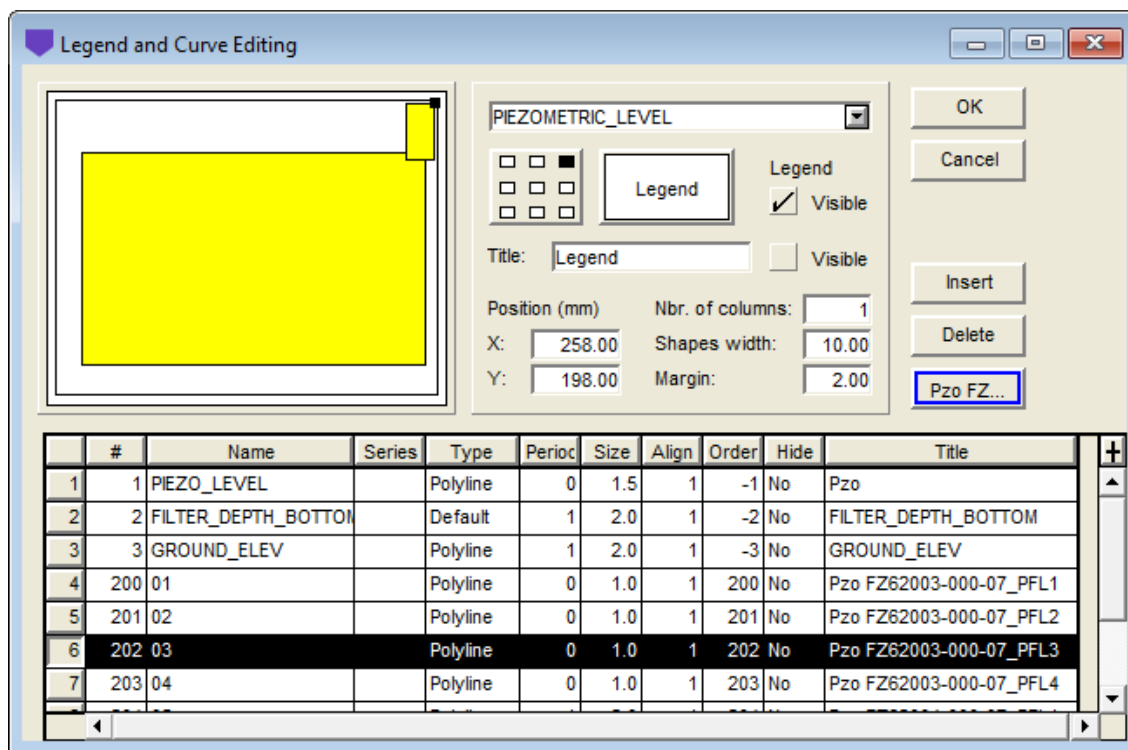

Figure 3 - Curves editing window – several piezometers per graph

Figure 3 show the curves editing window for the display of several piezometers in a single graph. After the query, curves **#200 and up** are automatically generated, one per piezometer.

Figure 4 shows the window for one piezometer per graph with superimposed years. After the query, the curves **#100 and up** are generated, one per year.

The user defines curve #1 to display in the scrolling list associated to the **Name** field, which shows the list of fields from the PIEZOMETRIC_LEVEL table. It is generally the **PIEZO_LEVEL** or the **PRESSURE**. The curve title will be used in the legend for all predefined curves. The year (**curves 100**) or the concatenation of the boring and piezometer numbers (**curves 200**) are automatically generated.
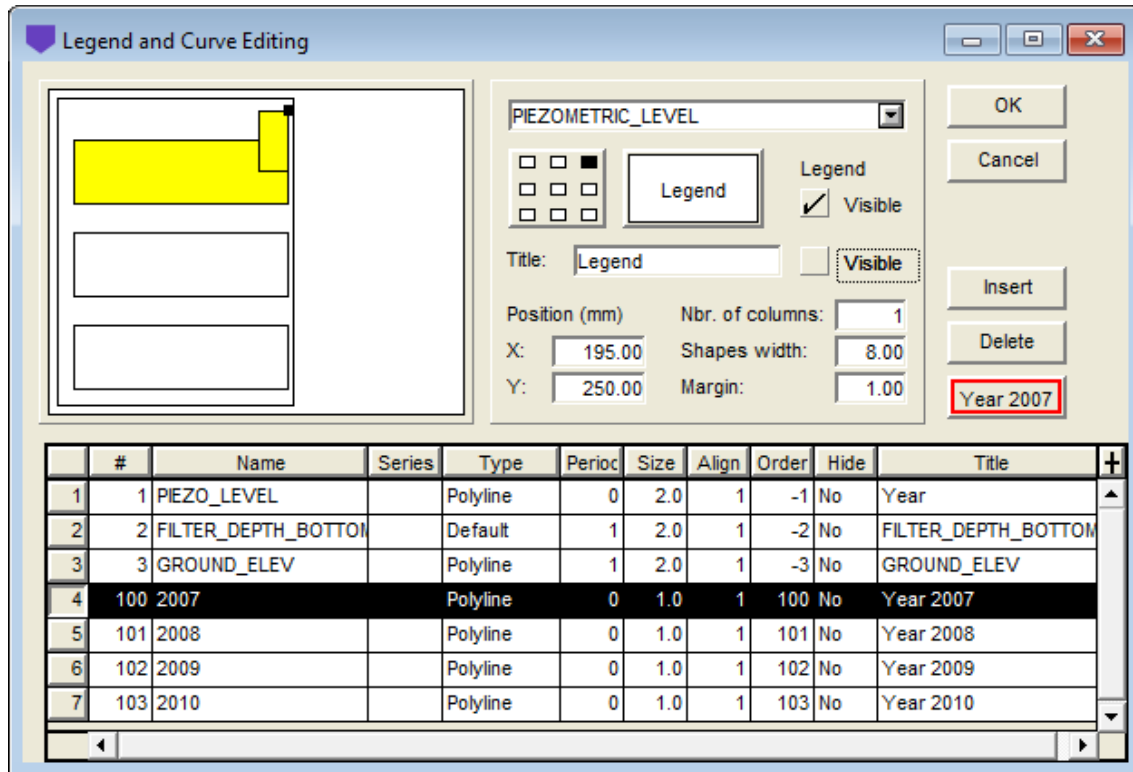
Figure 4 - Curves editing window – one piezometer per graph

The **FILTER_DEPTH_BOTTOM** is automatically added and can be hidden with the cell in the Hide column. It displays the depth of the bottom of the filter at the first point of the associated polyline, with the same color. The filter depth bottom is indicated only with the option of several piezometers in the same graph.

The **GROUND_ELEV** curve is automatically added and can be hidden. It displays a horizontal line at the elevation of the natural ground indicated in the BORING table. When curve #1 is PRESSURE instead of PIEZO_LEVEL, the horizontal line representing the natural ground elevation is not shown.

When several piezometers are superimposed, it is the natural ground elevation of the reference piezometer that is shown. The reference piezometer can be modified in the list opened via the # button. If there are several graphs per page with one piezometer per graph, the natural ground elevation is not necessarily shown because it may be outside the Y-axis limits.

The **type** of curve has no impact. The drawing attributes that the user can modify are:

- The line; the polyline connecting the position of each measurement will have the line attributes;

- The marker; the position of each measurement will be accentuated by the chosen marker.

3.4.   Definition of axes

The characteristics of the X and Y axes are defined in the axes editing window opened by selecting the **Axes** option of the **Tools** menu or by clicking on this button. More details about the axes editing are available in paragraph 5 of chapter 6 of the X3D guide.
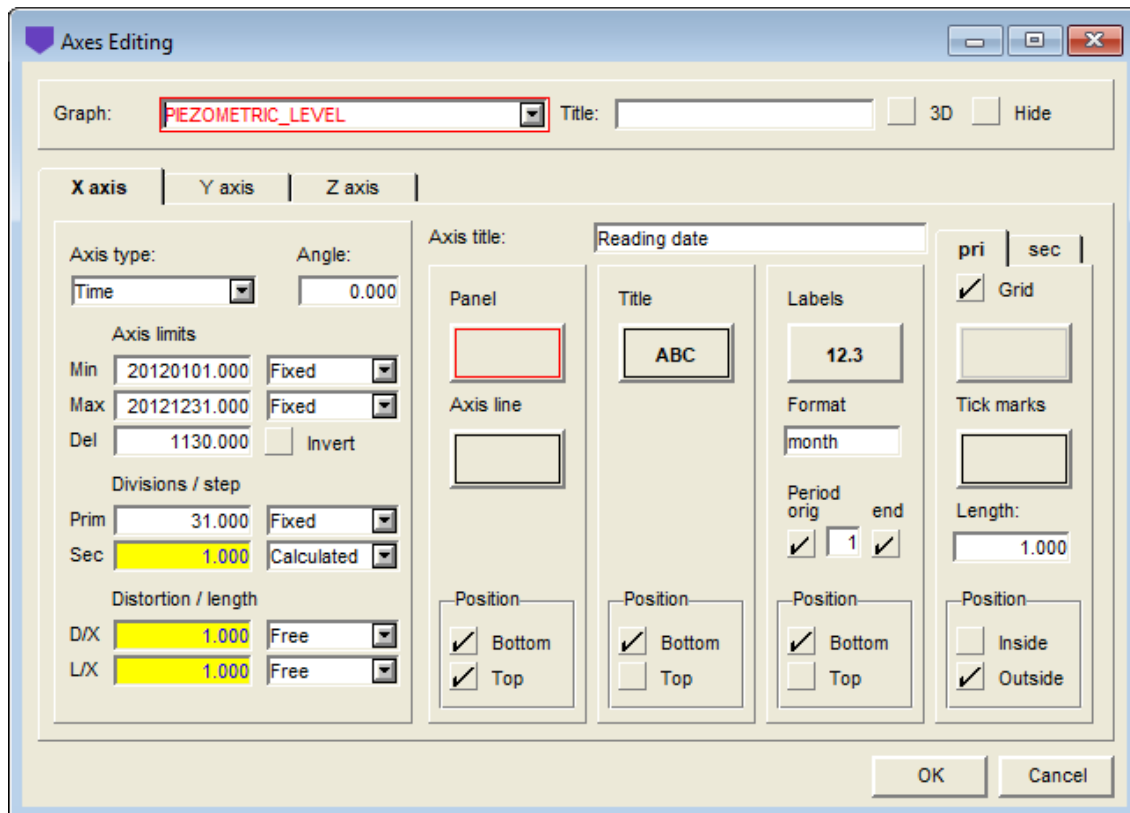
Figure 5 - Axes editing window

3.4.1.   X-axis (dates)

For superimposed years: To display data from a certain period (either a full year or a specific period), go to the axes editing. For the X-axis, the min and max limits are indicated in the format **yyyymmdd**. Impose and modify the month and day according to the desired period. The year is not important because the same critical period is displayed for all years, but it must be the same in the min and max. For example, enter 20120401 to 20120531 to see all data from April 1st to May 31st each year, or 20150101 to 20151231 to see all data from each full year.

When years are not superimposed, it is recommended to leave the limits of the X-axis as rounded, to make sure all retrieved data are displayed. Otherwise, it is possible to impose the beginning and end dates if desired.

3.4.2.   Y-axis

For the display of one piezometer per graph (several graphs per page), Time calculates for the Y-axis the greater interval in the data displayed (whether piezometric levels or water pressures are displayed). This same interval is used for all graphs, by centering the data vertically. For this automatism, the limits of the Y-axis for graph **#1** must be **exact**. With **rounded** limits, the interval for each graph must differ slightly. It is also possible to **impose** different axis limits for each graph, if desired.

4. DATA MENU

The options of the **Data** menu are detailed in chapter 7 of the X3D guide. The options are mainly used to retrieve data in the tables of the **Geotec** database. In Time, the default retrieval (**simple query**) is done on the **Piezometer** table.

In Time, the data entry options available in the **Data** menu (**Entry** option) and with the buttons of the application toolbar ( ) are those of **Site**, **Boring**, **Piezometer**. The user first inserts the sites, followed by the borings related to the sites, then the piezometers and piezometric levels.