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User Manual for

# PatternFinder

Diagnostic Software for  
Time Series Data

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**STAR : ODDI**

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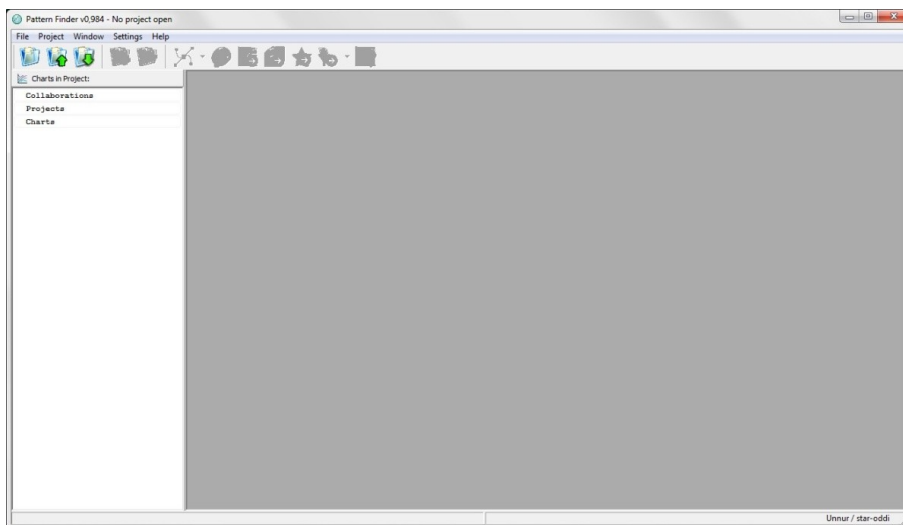
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# 1. Introduction

**PatternFinder** is a graphic data analysis software designed to make data analysis faster, more efficient and easier.

**PatternFinder** can further analyze all data from Star-Oddi loggers, but also data from other data logging systems. **PatternFinder** works seamlessly together with Star-Oddi supporting software SeaStar, Mercury and FoodStar, where data can be transferred to **PatternFinder** with the click of one button. Other text format data can be imported to **PatternFinder** for analysis by defining the data format  
In **PatternFinder** you can analyze data from several sources at the same time.



*Figure 1.1 PatternFinder interface*

This manual guides the users of **PatternFinder** through the operation of the software.

## 1.1 Key Features

**PatternFinder**'s key features are:

- Periodic statistical analysis of time series data
- Signal filtering
- Overlaying and analyzing multiple signals
  - normal trending
  - annual trending
  - multiple signals statistical analysis
- Event analysis
  - behavioral event analysis
  - ambient or level event analysis
  - periodic event analysis
- Pattern analysis
  - detecting occurrences of user defined patterns
  - scanning data for any possible patterns
  - periodic pattern analysis

## 2. Program Installation

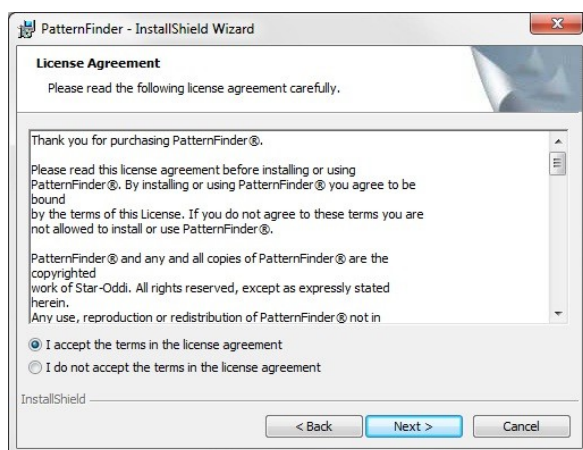
### 2.1 Install

The installation program is on the **PatternFinder** CD. Insert the CD into the CD drive. To install the program, follow the InstallShield Wizard.

If the InstallShield Wizard does not appear automatically, do the following:

1. Click on the Start button in Windows.
2. Go to My Computer
3. Click on the CD drive
4. Run the setup.exe application file.

The user will be asked to accept the License Agreement



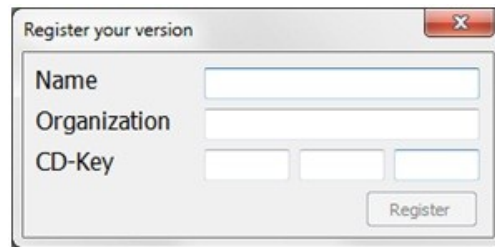
*Figure 2.1 License Agreement*

The user will be prompted for a directory name for the **PatternFinder** program.



*Figure 2.2 Destination Folder*

When the program is started for the first time, the following window appears:

A screenshot of a registration dialog box titled "Register your version". The dialog box has a standard Windows window border with a close button (X) in the top right corner. It contains three input fields: "Name" (a single text box), "Organization" (a single text box), and "CD-Key" (three separate text boxes for each character). A "Register" button is located at the bottom right of the dialog box.

*Figure 2.3 Registration*

Insert name, organization and the 12 character CD-Key which is provided on the CD holster. After you have registered, the program is activated and your license year begins.

Once the program has been installed, a shortcut to the program will appear on the start menu and the desktop.

## 2.2 Uninstall

To uninstall the program, do the following:

1. Click on the Start button in Windows.
2. Go to Settings and Control Panel.
3. Choose Add/Remove Programs
4. Choose **PatternFinder** and click on Change/Remove.

Note that data files created after installation will not be deleted even though the program is uninstalled.

## 2.3 Updates

The user will receive updates for one year after registration.

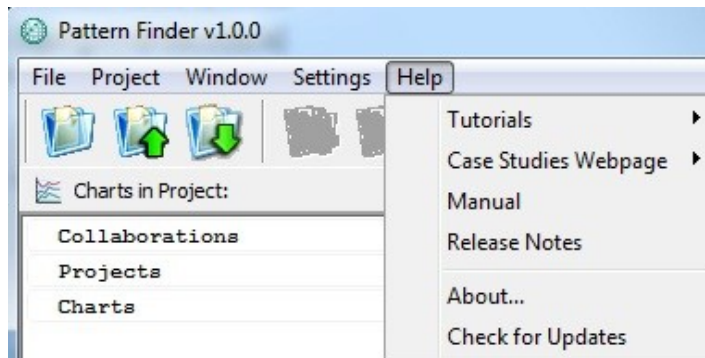
To download updates, select **Help-Check for updates**

Please note that the downloaded file has to be installed into the existing PF folder. The update alone is not a complete program and will not work as such.

The user will receive the last update within the license year even though it is downloaded after the license year has expired.

## 2.4 Help and Tutorial files on CD

Help and Tutorial files will be installed with the software. To access the files, select **Help** on the menu bar (see figure 2.4):



*Figure 2.4 Help Menu*

The **Help** menu offers the following options:

1. Tutorial  
PDF  
Video (AVI)
2. Case Studies Webpage
3. Manual
4. Release Notes
5. About
6. Check for updates

## 2.5 Directories created

The default directory is installed on C:\PatternFinder. The user can select another location.

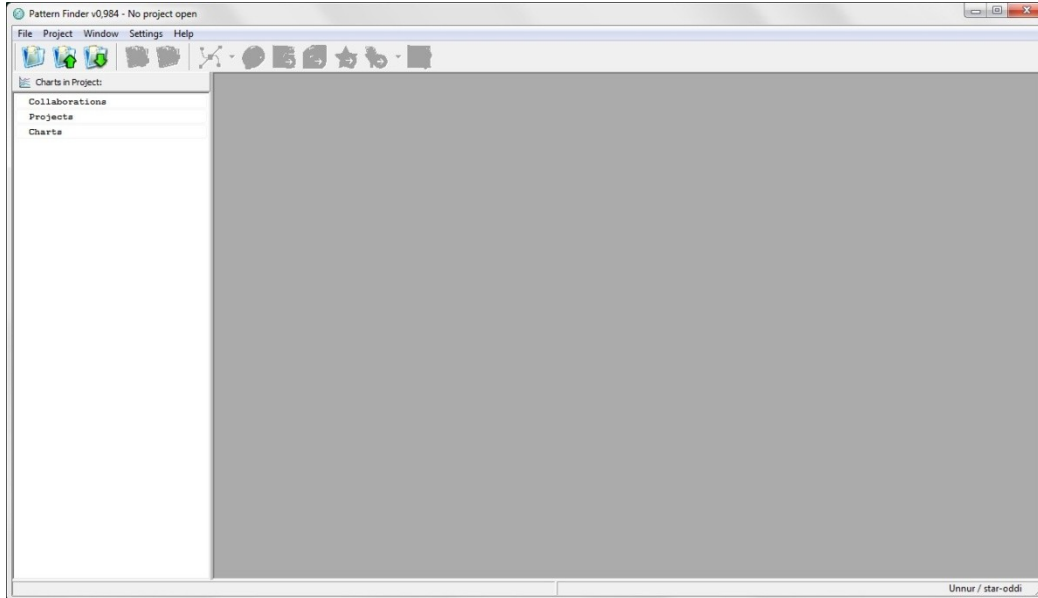
The directory contains the following folders:

- \Help
- \Projects
  - \SFP
  - \MFP
- \Settings



## 3. PatternFinder Interface

Upon entering **PatternFinder**, you will be presented with the **PatternFinder** interface:



*Figure 3.1 PatternFinder interface*

The PF interface consists of:

### 3.1 The Menu Bar



*Figure 3.2 The Menu Bar*

Options can be selected by pressing Alt and the underlined character key simultaneously, i.e., pressing Alt and F is equivalent to clicking File.

## File

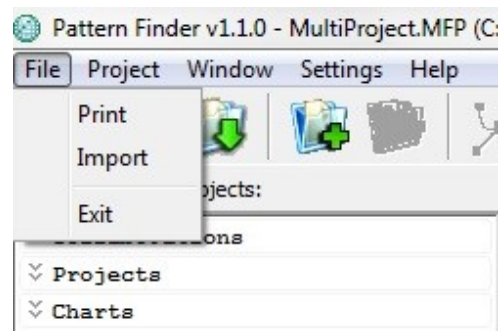


Figure 3.3 File menu

### Print

Select Print to print out the chart which is activate on the screen.

### Import

Select Import to import files into PF. See chapter 13 for more information.

### Exit

Select Exit to exit PF

## Project

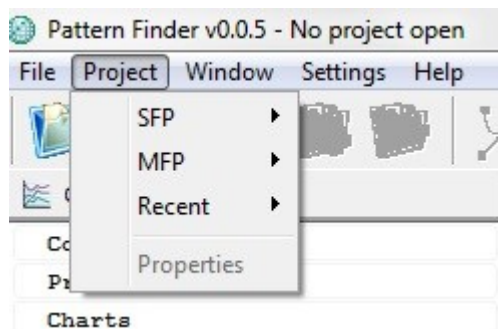


Figure 3.4 Project menu

### SFP

Select SFP to create a new Single file project or open an already created one.

### MFP

Select MFP to create a new Multiple file project or open an already created one.

### Recent

Select Recent to open a recently opened or created project.

## Window

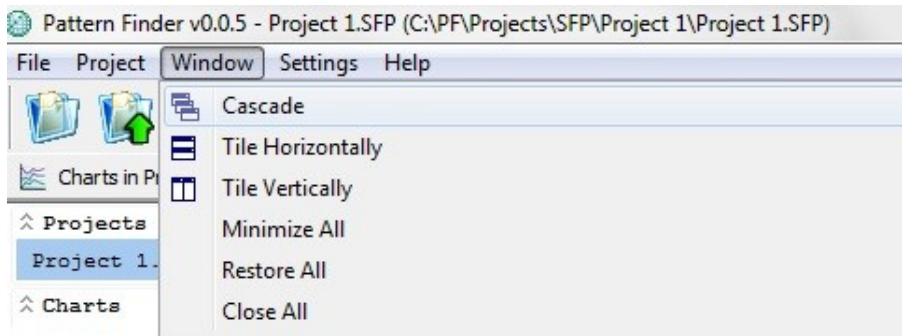


Figure 3.5 Window menu

The **Window** menu offers various options concerning the position of the chart windows.

## Settings

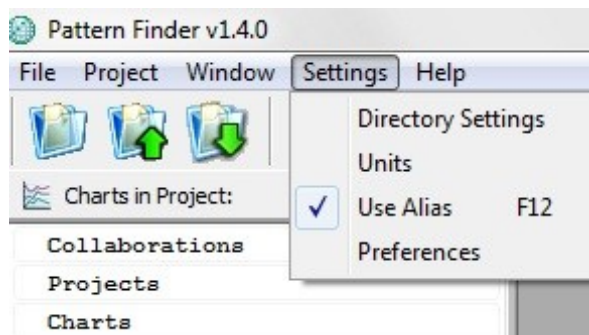


Figure 3.6 Settings menu

### Directory Settings

PatternFinder has a fixed directory structure that is created when installing the software. The user can define the location from where the DAT files, used for the projects, will be retrieved by selecting **Settings-Directory Settings** on the menu bar.

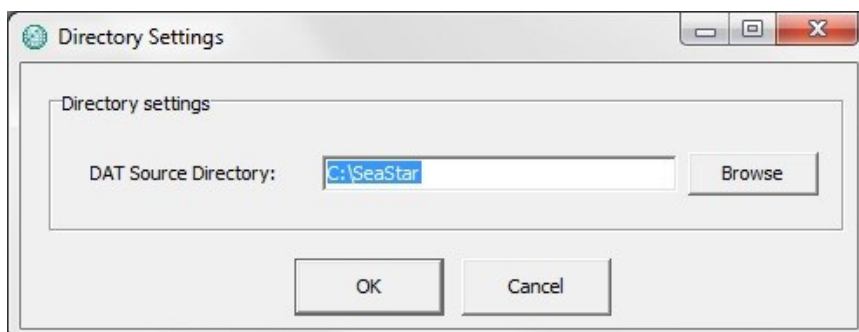


Figure 3.7 Directory Settings

## Units

Select **Units** and the following window appears:

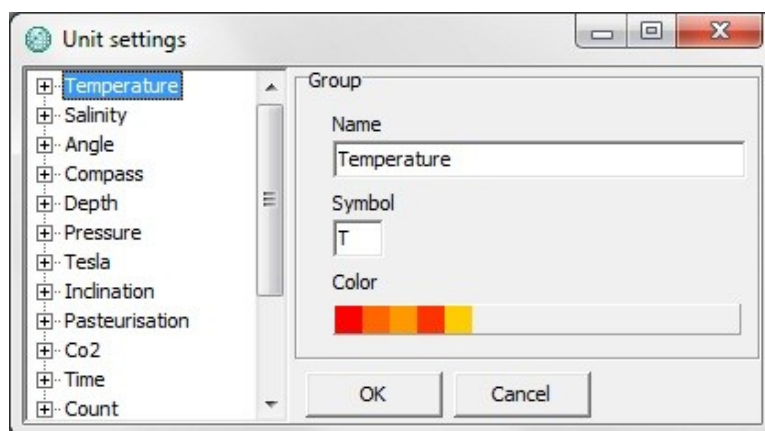


Figure 3.8 Unit settings

The user can create a new group of units by right-clicking on one of the groups and selecting **New Group** (see figure 3.9).

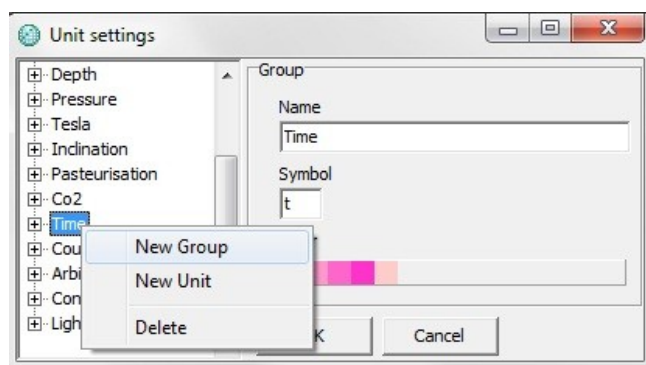


Figure 3.9 New Group

Enter a name and select a symbol and a color scheme for the new group. The color scheme is useful when viewing several signals with the same unit, for example, in overlays. The first five colors are default. The user can change the colors or add new ones by clicking on the color scheme.

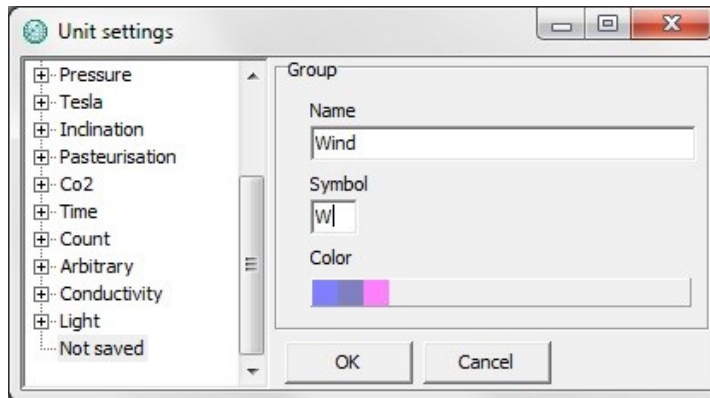


Figure 3.10 New Group

To create a new unit within a group, right-click on the group and select **New Unit** (see figure 3.9). Enter a name, abbreviation and a symbol/parameter for the unit (see figure 3.11).

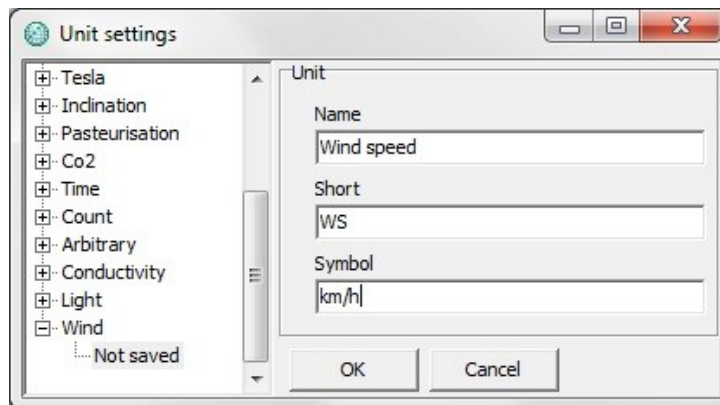


Figure 3.11 New Unit

Note that standard units cannot be changed

### Use Alias

Select **Use Alias** to shift between the original file name and the alias (see chapter 3.4).

You can also shift between the names by clicking F12 on the keyboard.

## Preferences

Select **Preferences** and the following window appears:

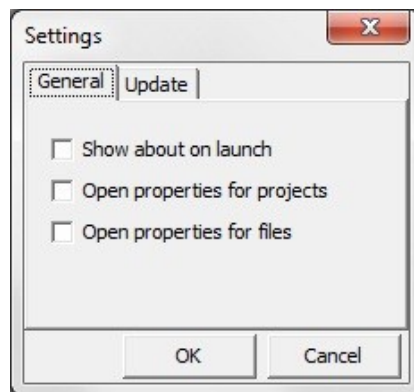


Figure 3.12 Preferences: General

### General

**Show about on launch:** If checked the **About** window appears when opening the program.

**Open properties for projects:** If checked the **Project information** window appears when opening projects.

**Open properties for files:** If checked the **History** window appears when opening files.

### Update

Select whether you want to update the program manually, every X number of days or every time **PatternFinder** is run (see figure 3.13).

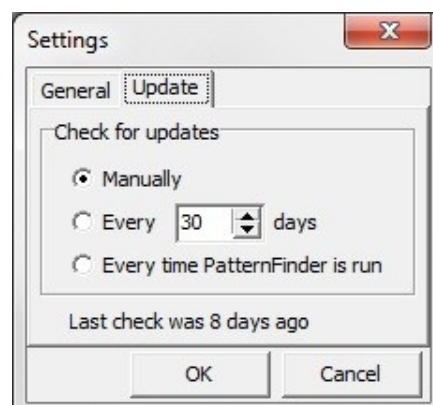


Figure 3.13 Preferences: Update

## Help

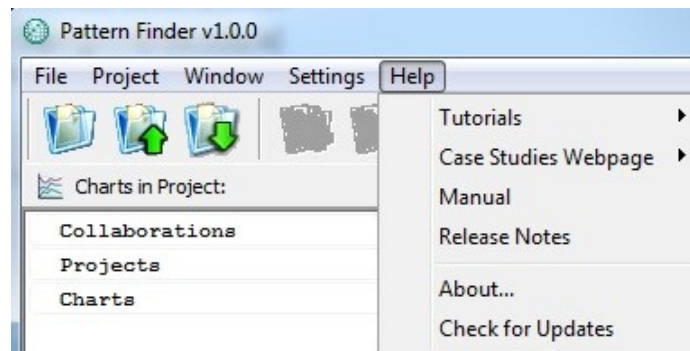


Figure 3.14 Help menu

### Tutorials

Select **Tutorials** to view the PF tutorials in both PDF and AVI format. To be able to view PDF files Acrobat Reader or similar programs must be installed.

### Case Studies Webpage

Select **Case Studies Webpage** to view the PF case studies in PDF format. To be able to view PDF files Acrobat Reader or similar programs must be installed.

### Manual

Select **Manual** to open the PF User Manual.

### Release Notes

Select **Release Notes** to view a description of the latest features added to PF, the date when they were added and a reference to the chapter number where the additions can be found.

### About

Select **About** for general information about PF.

### Check for Updates

Select **Check for Updates** to manually update the program, user manual, tutorials, case studies and release notes. The following window appears:

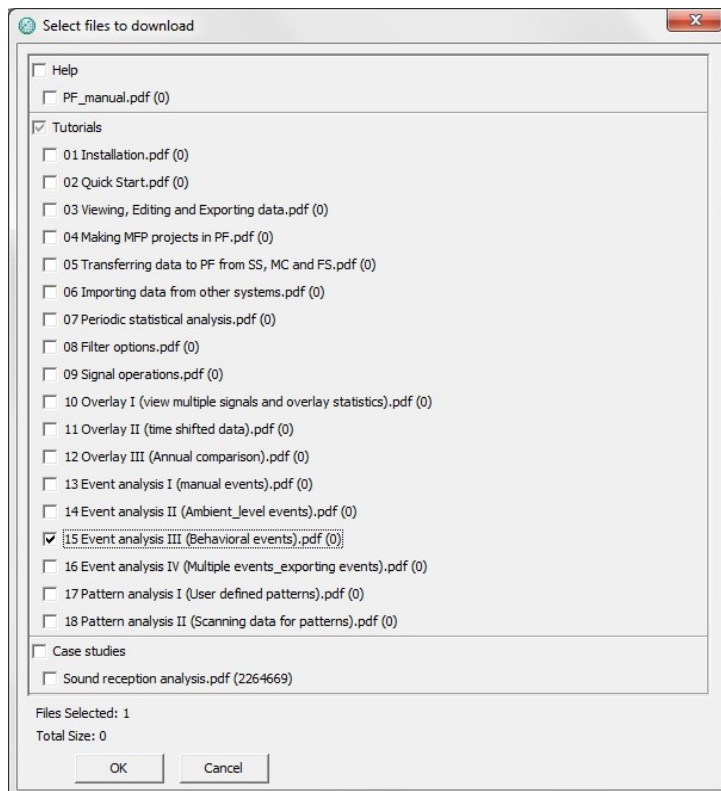


Figure 3.15 Select files to download

Select the files you want to download and click OK.

### 3.2 Main Toolbar



Figure 3.16 The Main Toolbar

#### Main Toolbar Buttons



##### Create a New Project

Click this button to create a new project



##### Open Project

This button is used to open an already created PF project.



##### Import File to new SFP

The user can import other files than .DAT files into PF. Before importing a file it is necessary to make some modifications (see further instructions in chapter 13).



**Add Files to Project**

Click this button to add files to a project.

**Remove Files from Project**

To remove files from a project, highlight the file you want to remove and click this button.

**Create Pattern Chart**

Click this button to create a pattern chart and pattern templates. More details in chapter 12.

**Create Event Chart**

Click this button to create and search for events. More details in chapter 11.

**Create Overlay Chart**

This button allows the user to create an overlay chart. More details in chapter 10.

**Create Multi Event Chart**

Click this button to overlay multiple event charts. More details in chapter 11.

**Create Multi Pattern Chart**

Click this button to overlay multiple pattern charts. More details in chapter x.

**Select Signal to Signal Chart**

Click this button to extract a signal and data range to view in a chart.

**Filter signal**

Click this button to filter the signal. Details can be found in chapter 8.

**Signal Period Statistics**

Click this button to perform a periodic statistics analysis. More details in chapter 9.

**Signal Operation**

Click this button to subtract and add signals. More details in chapter 8.

### 3.3 Overview Pane

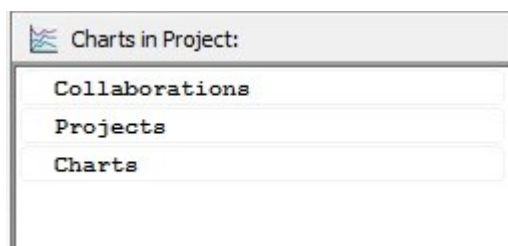


Figure 3.17 Overview Pane

The Overview Pane is divided into three categories:

**Collaborations:** Lists charts with combined signals from multiple projects.

**Projects:** Lists SFPs.

**Charts:** Lists charts in a project.

### 3.4 Aliasing

When working with multiple files which often have long and complicated names it can be useful to use an alias.

When creating a project, the default name of the project is the name of the DAT file. The user can change the name, for example, Project1 ; by entering a new name under Project name (see figures 3.18 and 3.19).

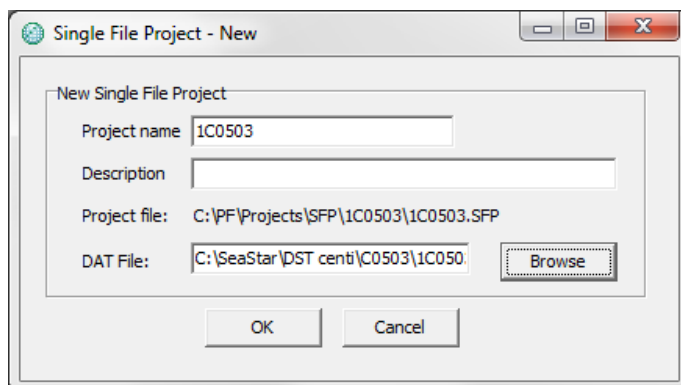


Figure 3.18 SFP

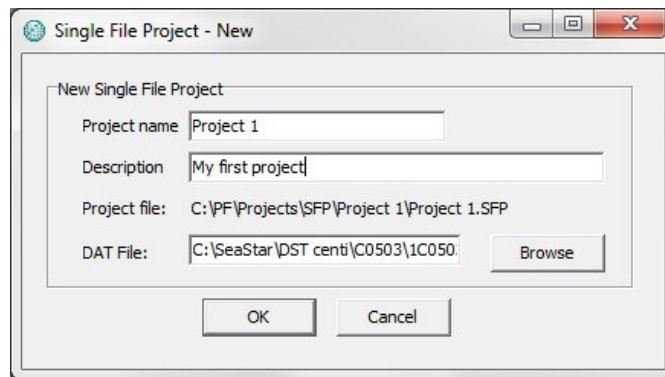


Figure 3.19 SFP

You can also change the name of the collaborations, projects and charts by right-clicking on the file name you want to change on the Overview Pane (see figure 3.20).

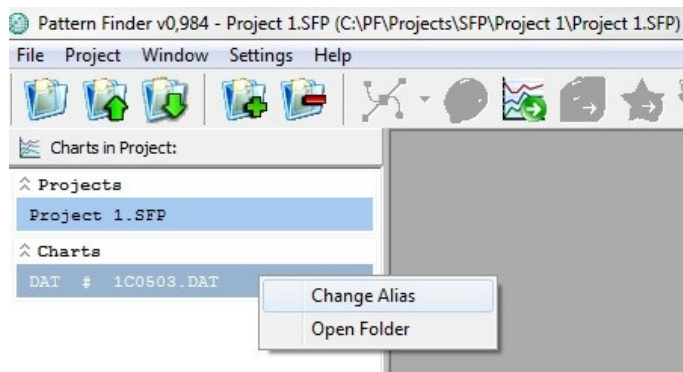


Figure 3.20 Change Alias

The following window appears:

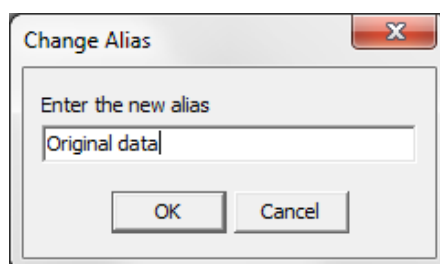


Figure 3.21 Change Alias

Enter the alias you want to use and click **OK**. The alias will appear on the Overview Pane (see figure 3.22).

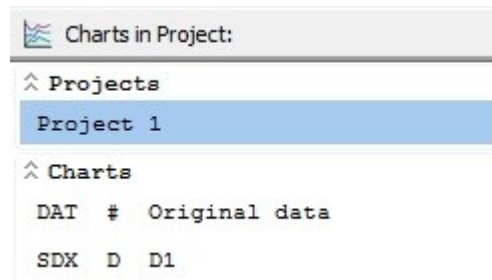


Figure 3.22 Alias

You can also create an alias when saving a chart (see figure 3.23). Click the **Save chart** button and the following window appears:

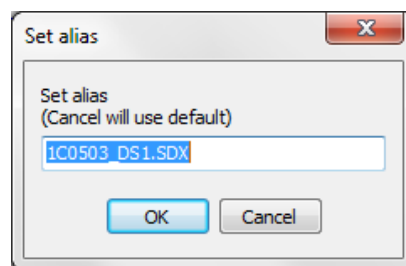


Figure 3.23 Set Alias

Enter the alias you want to use and click **OK**.

You can shift between the original name and the alias by selecting **Settings-Use Alias F12** (see figure 3.24) or simply by clicking F12 on the keyboard.

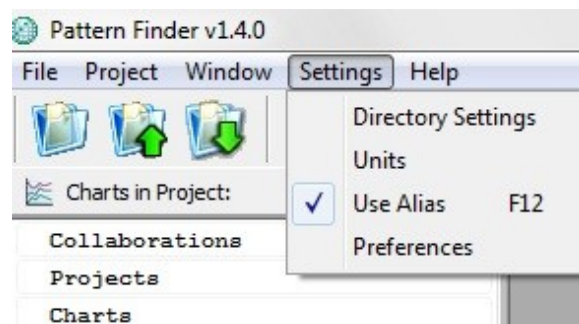


Figure 3.24 Use Alias

## 4. Single File Project (SFP)

### 4.1 Create SFP

Click the Create a New Project button and the following window appears:

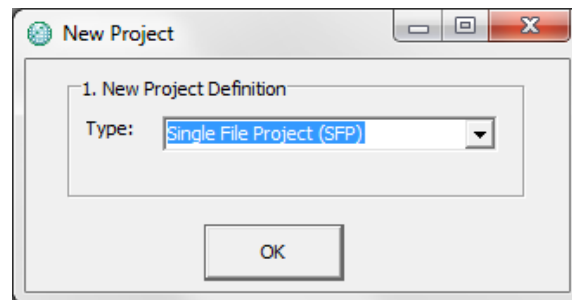


Figure 4.1 New Project

Select Single File Project. Note that you can also create a SFP by selecting Project-SFP-New.

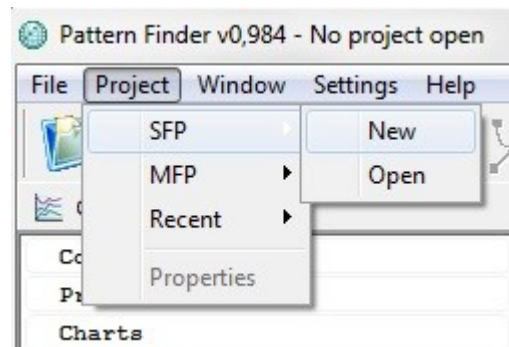


Figure 4.2 New SFP

Once SFP has been chosen the following window appears:

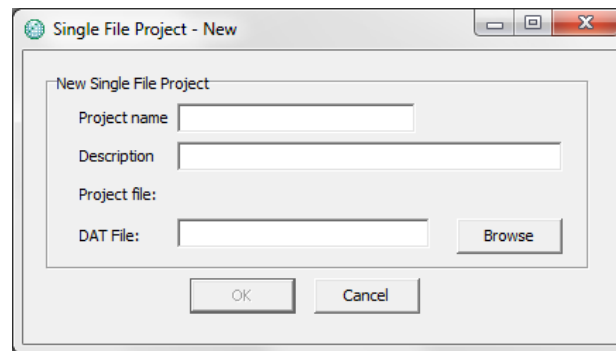


Figure 4.3 New SFP

Click the browse button to select the DAT file.

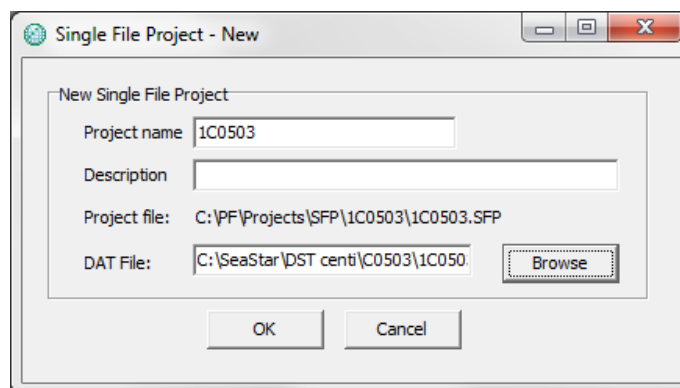


Figure 4.4 SFP

The default name of the project is the name of the DAT file. The user can change the name, for example, Project1, and enter a short description of the project.

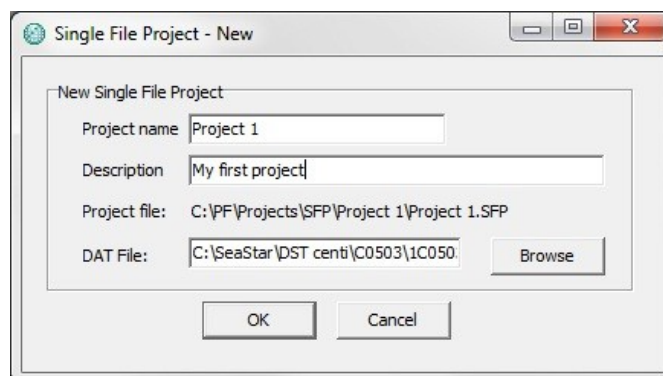


Figure 4.5 SFP

Press **OK** and the name of the project as well as its location appears on the PF header (see figure 4.6). You can see the project name in the Overview Pane under **Projects** and the DAT file under **Charts**.

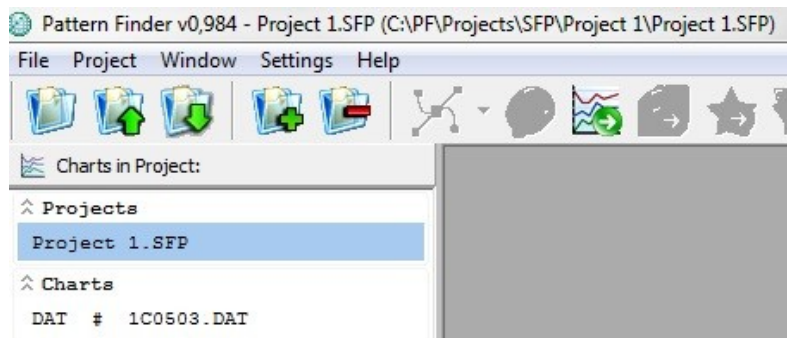


Figure 4.6 SFP

The project will be stored in the PF directory on your computer under Projects-SFP

## 4.2 Project information Data

Select Project-Properties and the following window appears:

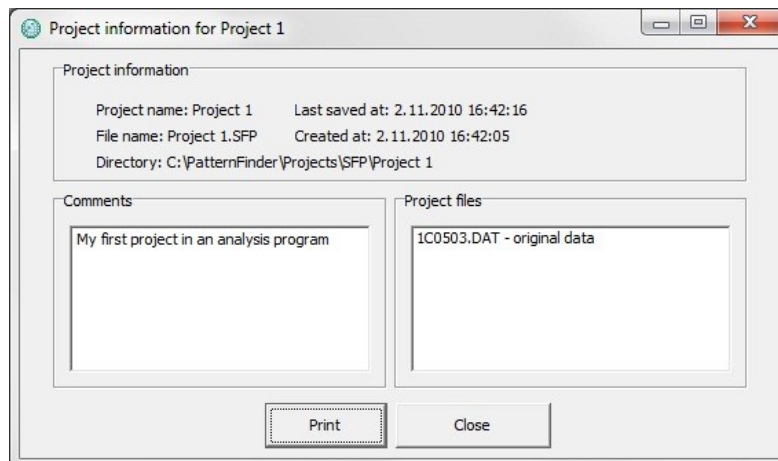


Figure 4.7 Project Information

In the right window you can see the original name and the alias of the project files. In the left window you can add comments about the project. To print out the information select **Print** (see figure 4.8).

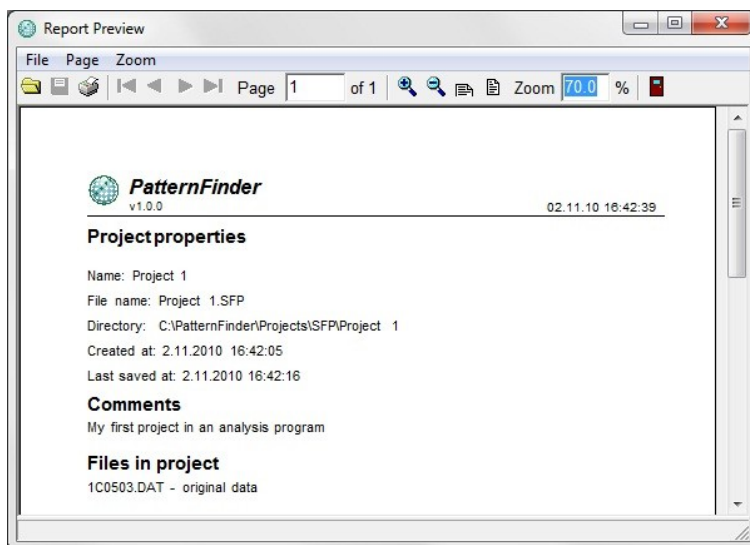


Figure 4.8 Print Preview

### 4.3 Create SFP from SeaStar, Mercury and FoodStar

To transfer data from your Star-Oddi's supporting software, do the following:

1. Enter the Star-Oddi application software (SeaStar, Mercury or FoodStar)
2. Select a recorder and a DAT file or import a DAT file for viewing
3. When the DAT chart is active, click the PF button on the chart bar



When you click the PF button, PF will be activated. PF will be launched if it is not already running

The SFP window in figure 4.9 appears:

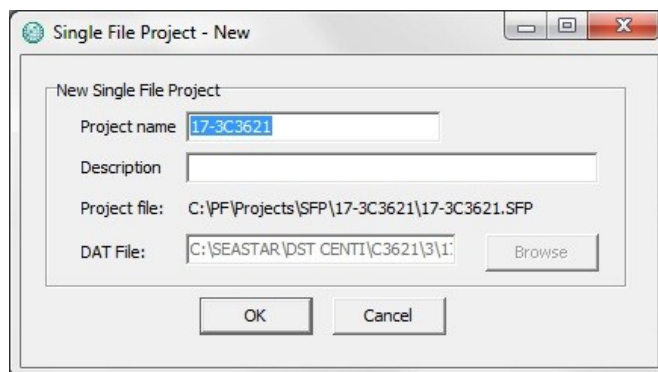


Figure 4.9 New SFP



The default Project name is the name of the recorder you transferred. You can change the name and enter a short description of the project.

Click **OK** and the DAT file will be transferred and a SFP created which will appear in the Overview Pane (see figure 4.10).

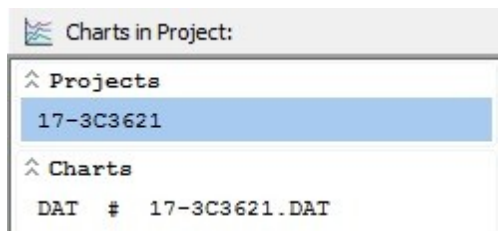


Figure 4.10 Overview Pane

## 4.4 Adding Files to SFP

To add files to a SFP click the **Add Files to Project** button and select the file you want to add.

Once the file has been added it is stored under **Charts** in the Overview Pane (see figure 4.11).

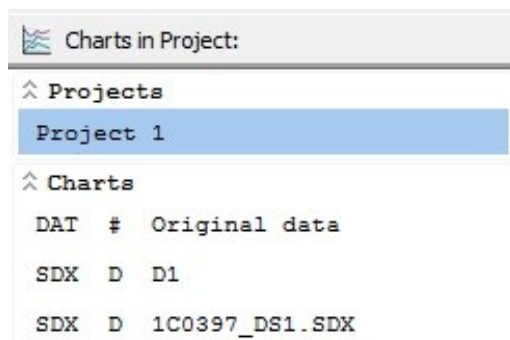
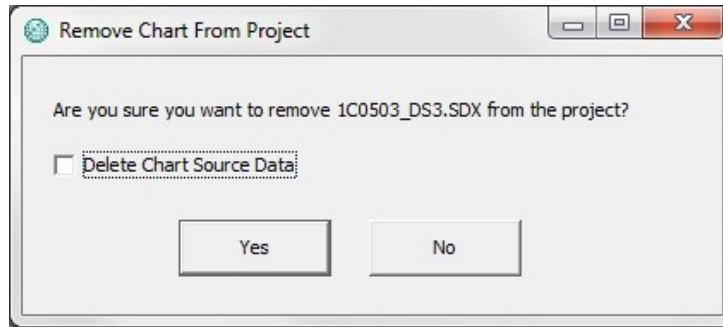


Figure 4.11 Add Files to SFP

## 4.5 Removing Files from SFP

To remove files from a SFP, highlight the file you want to remove in the Overview Pane and click the **Remove Files from Project** button. The following window appears:



*Figure 4.12 Remove Chart from Project*

It is important to be careful when removing files from a project.

If you check the **Delete Chart Source** box, the file will be removed both from the Overview Pane and the Project directory. If the file is not saved in another location it will be lost.

If you do not check the **Delete Chart Source** box, the file will only be removed from the Overview Pane, but will still be accessible in the Project directory.

Note that it is not possible to remove the original DAT file.

## 5. Multiple File Project (MFP)

### 5.1 Create MFP

Click the Create a New Project button and the following window appears:

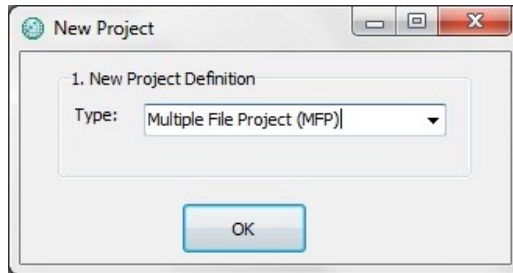


Figure 5.1 New Project

Select Multiple File Project (MFP). Note that you can also create a MFP by choosing Project-MFP-New (see figure 5.2)

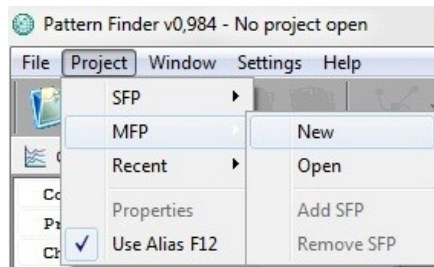


Figure 5.2 New MFP

Once MFP has been selected the following window appears:

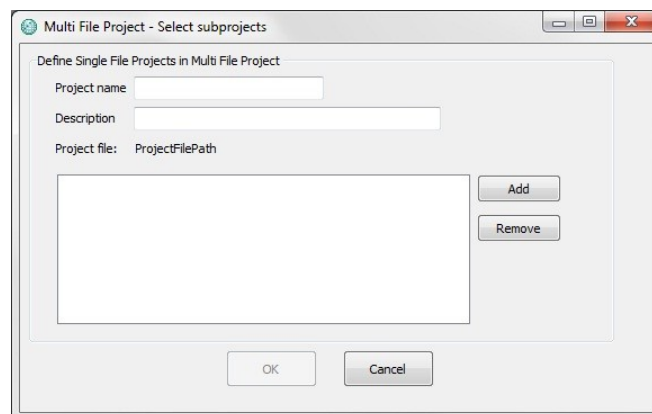


Figure 5.3 Select Subprojects

Enter a name and a short description of the project. Add the files you want to use in the project by clicking the **Add** button (see figure 5.4).

You can add both DAT and SFP files. If a DAT file is added then a new SFP will be created.

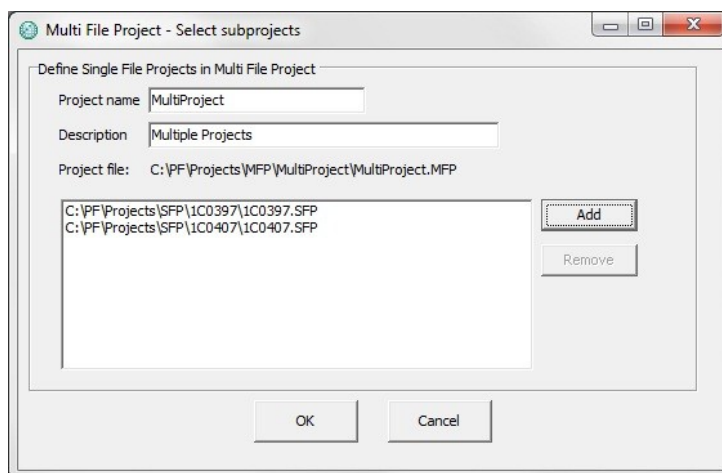


Figure 5.4 Select Subprojects

Once all the files have been added, press **OK** and the name of the project as well as its location appears on the PF header (see figure 5.5). You can see the project name in the Overview Pane under **Projects** and the DAT file under **Charts**

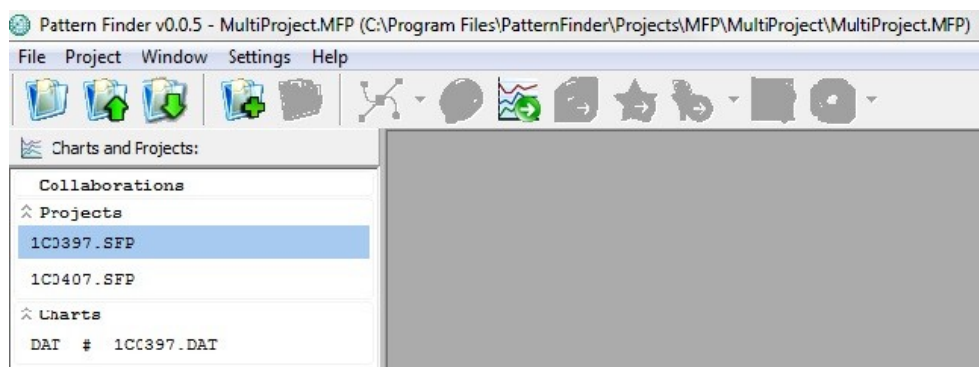


Figure 5.5 Overview Pane

When double-clicking on one of the projects in the Overview Pane, the corresponding chart will be visible in the pane below (see figure 5.6).

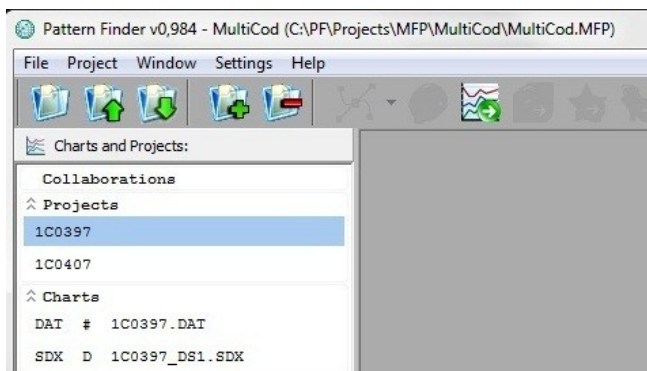


Figure 5.6 Overview Pane

## 5.2 Adding Files to MFP

To add files to a MFP, click on the **Add Files to Project** button. Files will be stored under **Collaborations** in the Overview Pane (see figure 5.7). The file will also be automatically stored in the MFP directory.

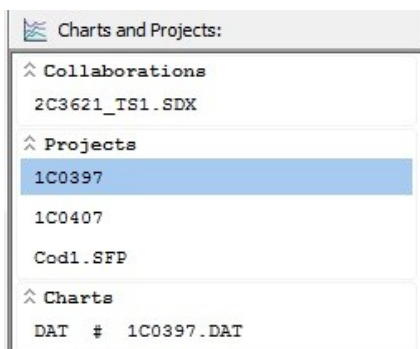


Figure 5.7 Add Files to MFP

## 5.3 Adding a SFP to MFP

To add a SFP to a MFP choose **Project-MFP-Add SFP**.

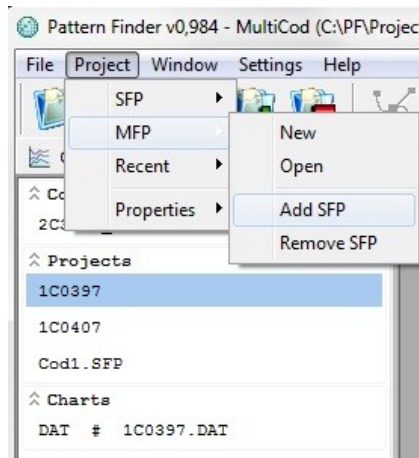


Figure 5.8 Add SFP to MFP

The following window appears:

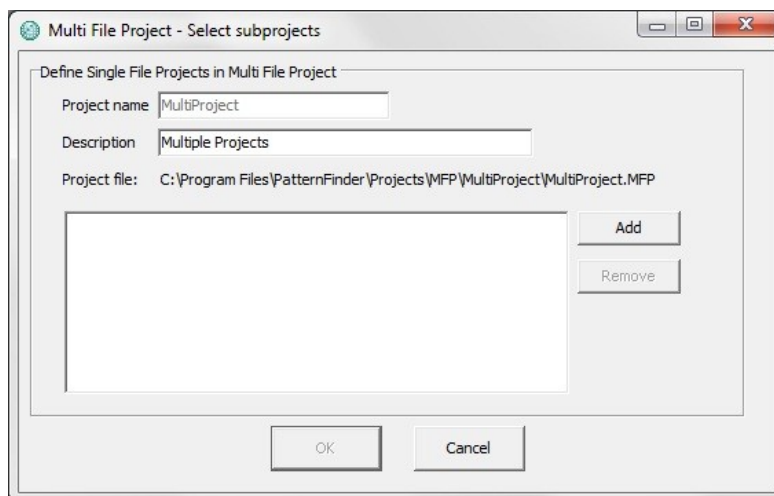


Figure 5.9 Select subprojects

Select the SFP you want to add to the project and click **OK**

The project will be stored under **Projects** in the Overview Pane (see figure 5.10).

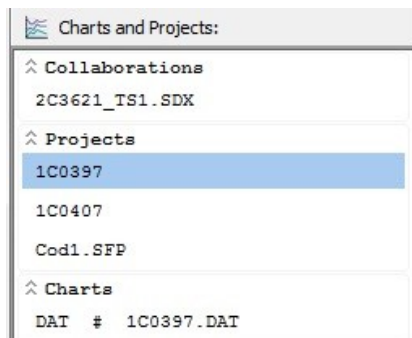


Figure 5.10 Add SFP to MFP

## 5.4 Adding SFP to MFP from SeaStar, Mercury and FoodStar

To transfer a SFP from SeaStar, Mercury and FoodStar to a MFP, do the following:

1. Activate PF
2. Open an already created MFP or create a new one.
3. Enter the Star-Oddi application software (SeaStar, Mercury or FoodStar)
4. Select a recorder and a DAT file or import a DAT file for viewing
5. When the DAT chart is active, click the PF button on the chart bar



PF automatically opens on the screen and the SFP window appears:

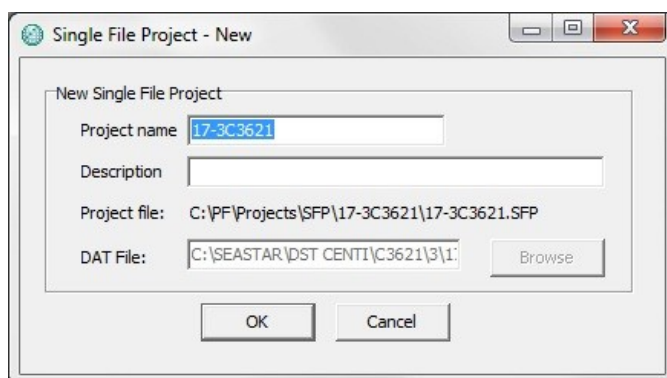


Figure 5.11 New SFP

The default Project name is the name of the recorder you transferred. You can change the name and enter a description.

Click OK and the following window appears:

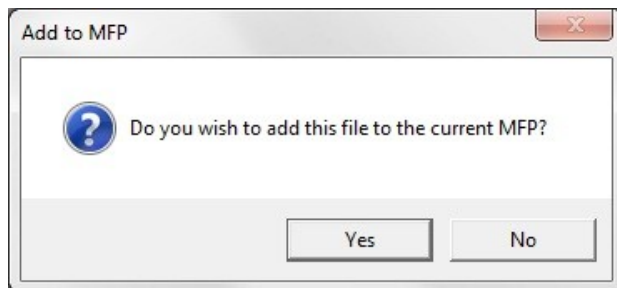


Figure 5.12 Add to MFP

Click **Yes** if you wish to add the file to the MFP. If you click **No** the file will not be added to the MFP but will become a regular SFP.

The project will appear in the Overview Pane along with the other projects.

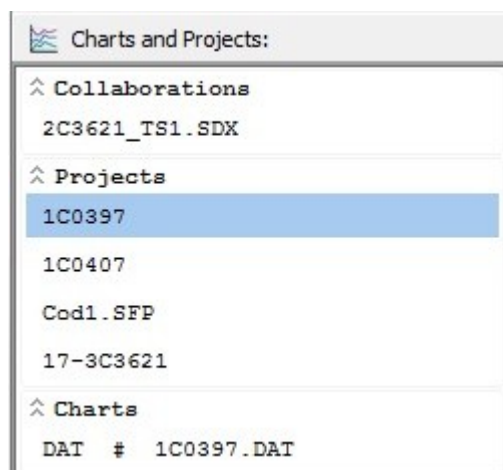


Figure 5.13 Overview Pane

## 5.5 Removing Files from MFP

To remove files from a MFP, highlight the file you wish to remove on the Overview Pane and click on the **Remove Files from Project** button.

The following window appears:



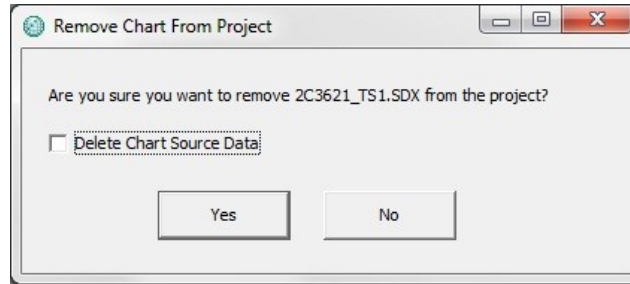


Figure 5.14 Remove Files from MFP

It is important to be careful when removing files.

If you check the **Delete Chart Source** box, the file will be removed both from the Overview Pane and the Project directory. If the file is not saved in another location it will be lost.

If you do not check the **Delete Chart Source** box, the file will only be removed from the Overview Pane, but will still be accessible in the Project directory.

## 5.6 Removing SFP from MFP

To remove a SFP from a MFP, select **Project-MFP-Remove SFP** (see figure 5.15).

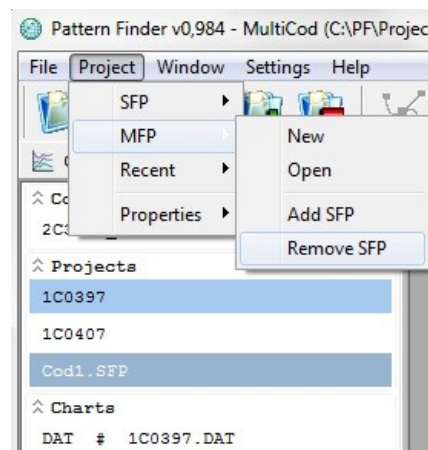
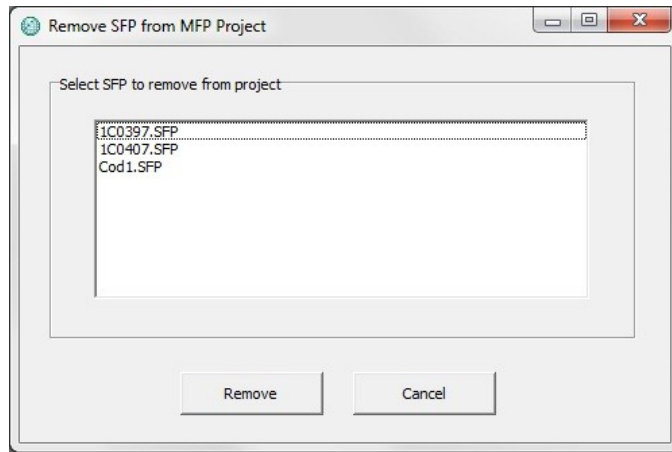


Figure 5.15 Remove SFP from MFP

The following window appears:



*Figure 5.16 Remove SFP from MFP*

Highlight the SFP you want to remove and click the **Remove** button. The SFP will be removed from the Overview Pane.

## 6. Files

### 6.1 Projects

**SFP** – Single File Project  
**MFP** – Multiple File Project  
**DAT** – Source file

When creating projects, the user needs to define them as either Single file projects (SFP) or Multiple file projects (MFP). The default name of the SFP project is the name of the DAT file with a SFP extension.

The user defines the name of the MFP.

A subfolder for each project is created. SFPs are stored under PatternFinder\Projects\SFP. All the files that are created when working in a SFP are stored in the SFP folder.

MFPs are stored under PatternFinder\Projects\MFP. All collaboration files that are created when working in a MFP are stored in the MFP folder.

### 6.2 SDX files

SDX files are created when extracting data from a DAT file and each time the data is filtered or when performing a signal operation.

The original SDX file is named after the SFP + \_ + a letter indicating the parameter type + S + an incrementing number + .SDX.

The last number is incremented each time an operation is performed on a signal and when the same parameter is extracted from a DAT/SDX file.

The parameters are grouped according to Star-Oddi recorder parameters. The default letter for the groups is as follows:

T	Temperature (°C, °F)
P	Pressure (Bar, psi)
D	Depth (m, fathoms)
S	Salinity (psu)
C	Conductivity (mS/cm)
A	Angle (°)
H	Compass heading (°)
M	Tesla (nT, mGauss)
I	Inclination (°)
U	Pasteurization unit (PU)
c	CO2 (mg/l)
t	Time (time units)

N Count (number of items/points)  
L Light (Lux, footcandle)  
a Arbitrary (undefined)

**Example:**

You have a project named P1 with temperature and depth parameters. You extract the depth and the result file is named P1\_DS1.SDX.

You extract from the DAT file again. The name of the result file will be P1\_DS2.SDX.

If you filter the P1\_DS2.SDX the resulting file will be named P1\_DS2S1.SDX and so forth.

## 6.3 Overlay

When creating an overlay solely from files from a singular SFP, the file will be named after the project + MO (multiple overlays) + a number + .ODX.

The number is an incremental number for the overlays in a particular SFP.

**Example:**

The first overlay created from files from the project P1, will be named P1\_MO1.ODX.

The second overlay will be named P1\_MO2.ODX.

## 6.4 Statistics files

### Periodic statistics

There are three types of periodic statistics files. In each type the name of the file it is based on the source file name+ X+ a number. The number is incremented each time a statistical analysis is performed with that particular chart. The extension depends on the type.

**STA**

Created from signal (SDX) files

**STE**

Created from event (ESX) files

**STP**

Created from pattern (PSX) files

### Overlay statistics

The name of the file is based on the overlay file name + X+ an incrementing number + a STO extension. The number is incremented each time a statistical analysis is performed with that particular chart.

**STO**

Created from overlay (ODX) files

## 6.5 Events

**ESX**

The events files are named after the source file + E + an incrementing number + an ESX extension

**MEX-Multiple Events**

Multiple event files are created when overlaying two or more event files. The files are named after the project + \_ + ME + an incrementing number + a MEX extension.

## 6.6 Patterns

**PSX**

The pattern files are named after the source file + P + an incrementing number + a PSX extension.

**MPX**

MPX files are Patterns created from multiple event files. The files are named after the source file + P + an incrementing number + a MPX extension.

## 6.7 Collaboration files

When files from more than one SFP are used in an operation the resulting files are defined as collaboration files.

These operations include:

- Overlaying
- Multiple events
- Patterns from multiple events
- Results from signal operations

All subsequent operations on collaboration files are also defined as collaboration files.

Collaboration file are named after the project + \_ + MO + an incrementing number + the correct extension.

## **6.8 Additional files**

### **BIN files**

Every time the user creates a new file, a BIN (binary) file is created simultaneously.

The BIN file contains the series signal data.

The BIN file is named after the source file with the extension BIN, for example, the file NAME.SDX would have the binary file NAME.SDX.BIN.

### **SCT**

A SCT file is created when the user makes adjustments to the chart. The file is named after the source file with the extension SCT, for example, the file NAME.SDX would have the SCT file NAME.SDX.SCT.

## 7. Charts

### 7.1 DAT chart

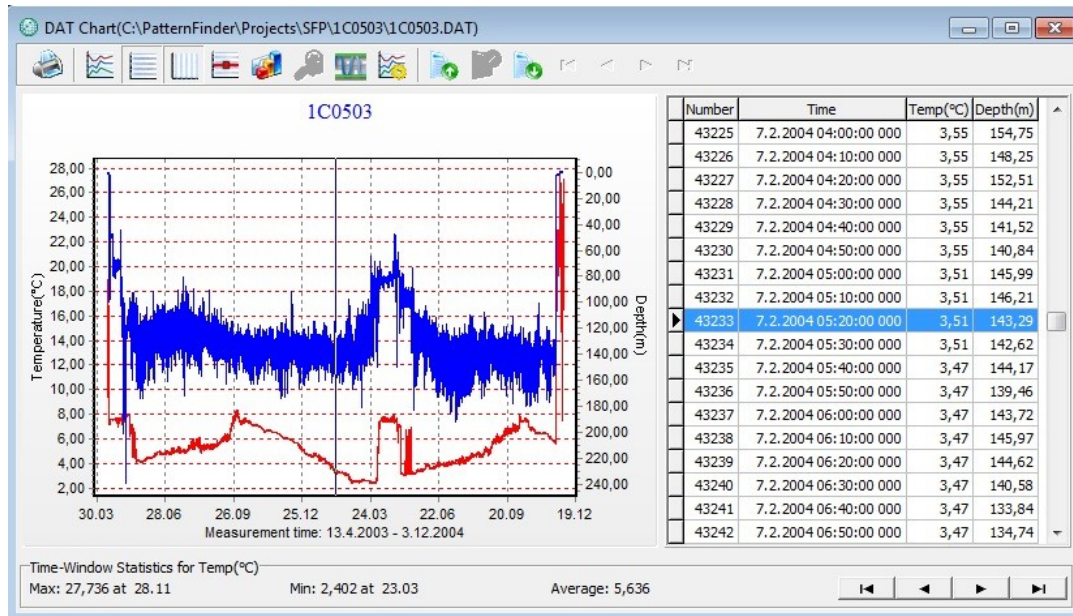


Figure 7.1 DAT chart

### 7.2 DAT chart bar



Figure 7.2 DAT chart bar



#### Print Chart

The chart can be printed. For more information see chapter 15.



#### Active Series List

This button can be useful when working with multiple signal units as it offers the option of selecting which unit to display in the chart. For example, when working with a chart displaying temperature and depth recordings, the user can hide the depth measurements.

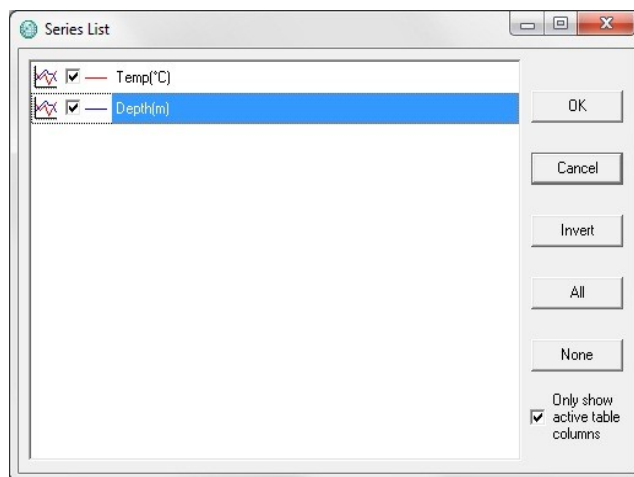


Figure 7.3 Series list

By checking **Only show active table columns** only the selected series will appear in the table.

The table columns can also be changed manually by right-clicking on the table (see figure 7.4).

	Number	Time	Temp(°C)	Depth(m)
	43225	7.2.2004 04:00:00 000	3,55	154,75
	43226	7.2.2004 04:10:00 000	3,55	148,25
▶	43227	7.2.2004 04:20:00 000	3,55	152,51
	43228		3,55	144,21
	43229		3,55	141,52
	43230		3,55	140,84
	43231		3,51	145,99
	43232		3,51	146,21

Figure 7.4 Table



### Horizontal/Vertical Gridlines

These two buttons give the option of hiding/displaying the horizontal/vertical gridlines in the chart. The horizontal lines refer to depth and temperature. It is not possible to have both lines available at the same time (see figure 7.5).

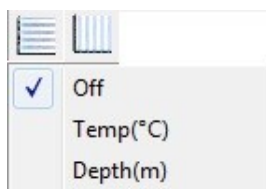


Figure 7.5 Gridlines



A drop-down menu appears when clicking the **Vertical gridlines** button (see figure 7.6). Select the minimum grid size.

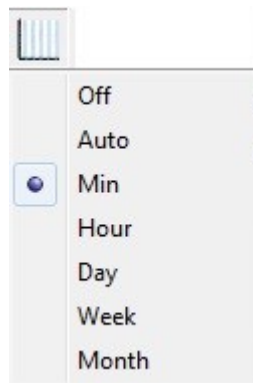


Figure 7.6 Vertical gridlines



### Data Point Marker

This button gives the option of displaying/hiding data points in the chart.



### Histogram

The chart can be shown as histogram, showing various data statistics. Click the Histogram button and the following window appears:

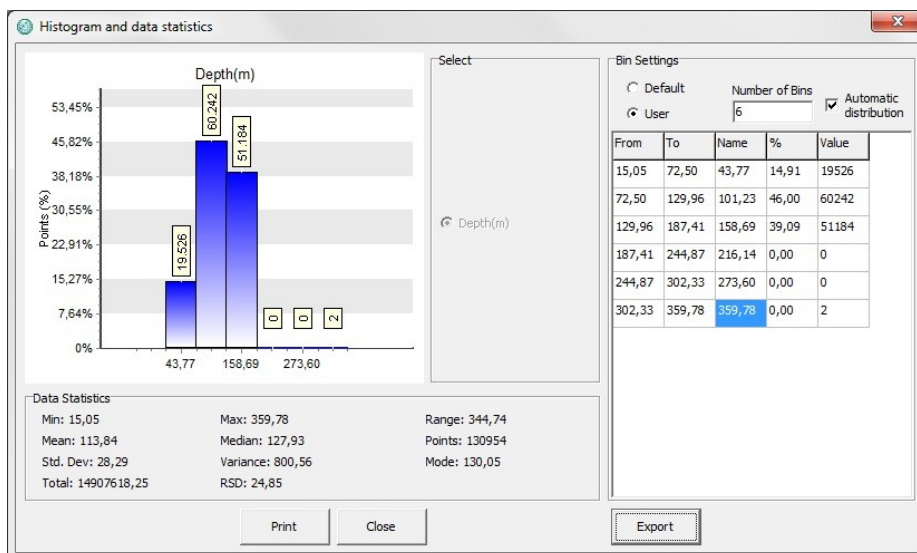


Figure 7.7 Histogram and data statistics

Under **Bin Settings** there are two options, **Default** and **User**. Select **User** to select the number of bins and the minimum and maximum values you wish to display. In **Name** enter the title of the column. If you enter the following formulas [min] [mid] [max] in the **Name** column the numerical value will appear automatically. Data points are divided into groups defined by the From and To rows. If groups overlap the first valid group row is used.

You can display and hide the bin tags by clicking on the bins.

The Histogram can be printed out by clicking the **Print** button.



### **Zoom Out**

This button is used to zoom out the chart.



### **Adjust axis to selected time**

This button adjusts the axis in order to display all data within the zoomed timeline.



### **Edit Chart**

This button gives several options regarding the look of the chart. For more information see chapter 7.5.



### **Display table completely**



### **Partial table display**



### **Hide table**

## **7.3 Using the Mouse**

### **Scroll the Chart**

A straight vertical line should be visible in the chart (see figure 3). By clicking on this line and holding down the left button on the mouse the line can be dragged through the chart and the data table will scroll along with the position of the line.

The chart can be scrolled upward, downwards and to the sides, by holding down the right button of the mouse and moving the cursor in the desired direction.

### **Zoom**

The chart can be zoomed in on by holding down the left button of the mouse, and using the cursor to create a box to the right around the area the user wants to view.

### **Go Back to Initial View**

To go back to the initial view of the chart, simply hold down the left button of the mouse and make a box to the left with the cursor. The position of the box on the chart is irrelevant.

## Change the Axis

To change the time scale of the chart, click on the X axis. The window in figure 7.8 appears.

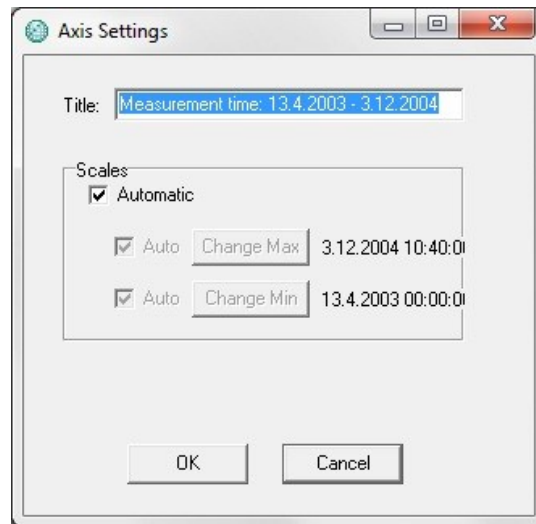


Figure 7.8 Axis Settings: Measurement time

By disabling the Automatic option, the minimum and maximum time values become active. By clicking on the **Change** buttons for the maximum and minimum values, the time range can be specified. By enabling the Automatic option, the measurement time will go back to the initial range.

To change the unit range, click on the Y axis. The window in figure 7.9 appears.

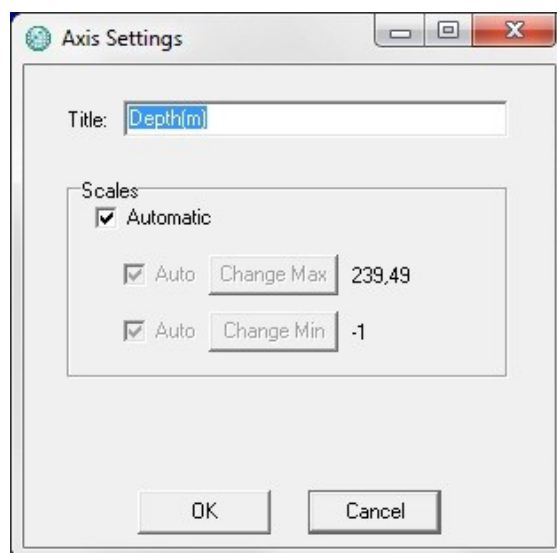


Figure 7.9 Axis Settings: Unit range

By disabling the Automatic option, the minimum and maximum measurement values become active. By clicking on the **Change** buttons for the maximum and minimum

values, the unit range can be specified. By enabling the Automatic option, the measurements will go back to the initial range.

## Change the Title

Click on the title name to change the title of the chart. The window in figure 7.10 appears.

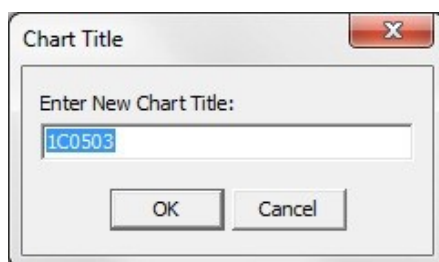


Figure 7.10 Chart title

Enter a new chart title and click OK.

## 7.4 Time Window Statistics

The time statistics window shows the minimum, maximum and average measurement values of the selected parameter.

Time-Window Statistics for Temp(°C)		
Max: 27,736 at 28.11 21:40	Min: 2,402 at 23.03 20:00	Average: 5,636

Figure 7.11 Time window statistics

## 7.5 Table

The table in the chart window gives an overview of the data numbers, recording time, temperature and depth depending on which signal unit is visible. The user can browse through the numbers by using the arrows in the right corner (see figure 7.12).

Number	Time	Temp(°C)	Depth(m)
19808	28.8.2003 13:10:00	5,228	128,56
19809	28.8.2003 13:20:00	5,192	127,85
19810	28.8.2003 13:30:00	5,157	130,14
19811	28.8.2003 13:40:00	5,122	138,89
19812	28.8.2003 13:50:00	5,122	127,35
19813	28.8.2003 14:00:00	5,122	134,74
19814	28.8.2003 14:10:00	5,122	141,19
19815	28.8.2003 14:20:00	5,122	141,19
▶ 19816	28.8.2003 14:30:00	5,122	140,73
19817	28.8.2003 14:40:00	5,122	140,27
19818	28.8.2003 14:50:00	5,122	141,42
19819	28.8.2003 15:00:00	5,122	131,28
19820	28.8.2003 15:10:00	5,157	134,99
19821	28.8.2003 15:20:00	5,157	131,76
19822	28.8.2003 15:30:00	5,192	120,92
19823	28.8.2003 15:40:00	5,192	116,29
19824	28.8.2003 15:50:00	5,228	115,38

Figure 7.12 Table

## 7.6 SDX chart

### Selecting data for analysis (creating SDX files)

Double click on the DAT chart file in Overview Pane. The original DAT file appears in graphic form (see figure 7.13).

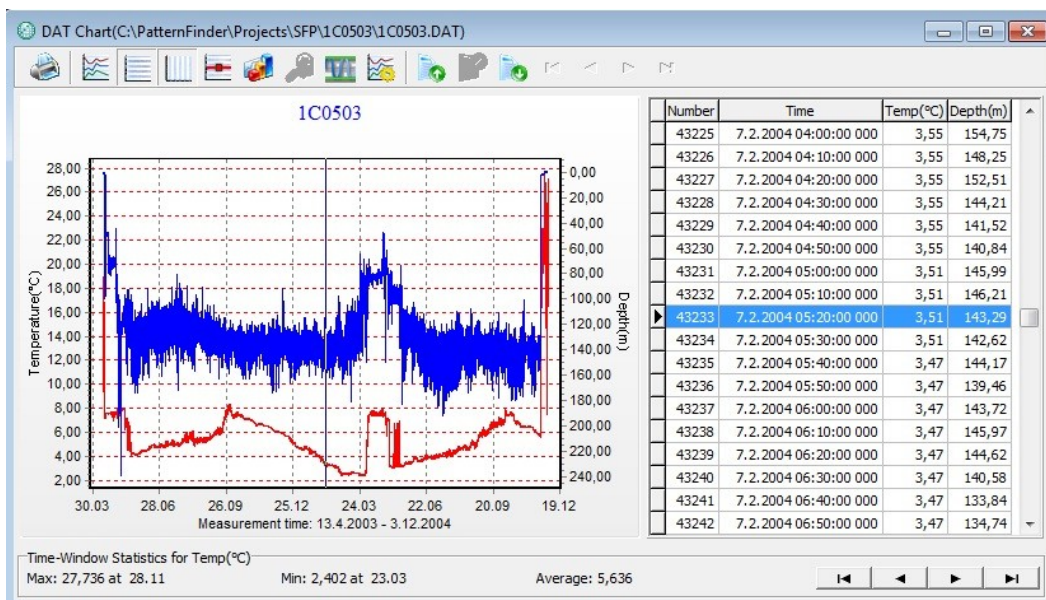


Figure 7.13 Chart

To extract the series and data range you want to view in the chart, click the **Select Signal to Signal Chart** button on the main toolbar and the following window appears:

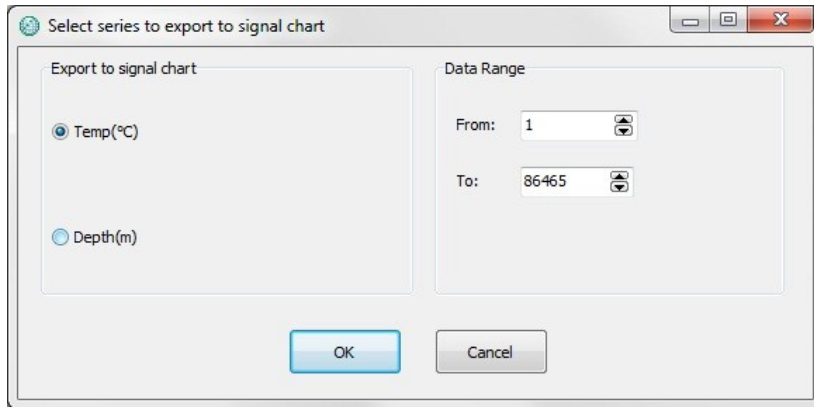


Figure 7.14 Select series to export to signal chart

Select the series and data range you want to use and click **OK**

A signal (SDX) chart appears:

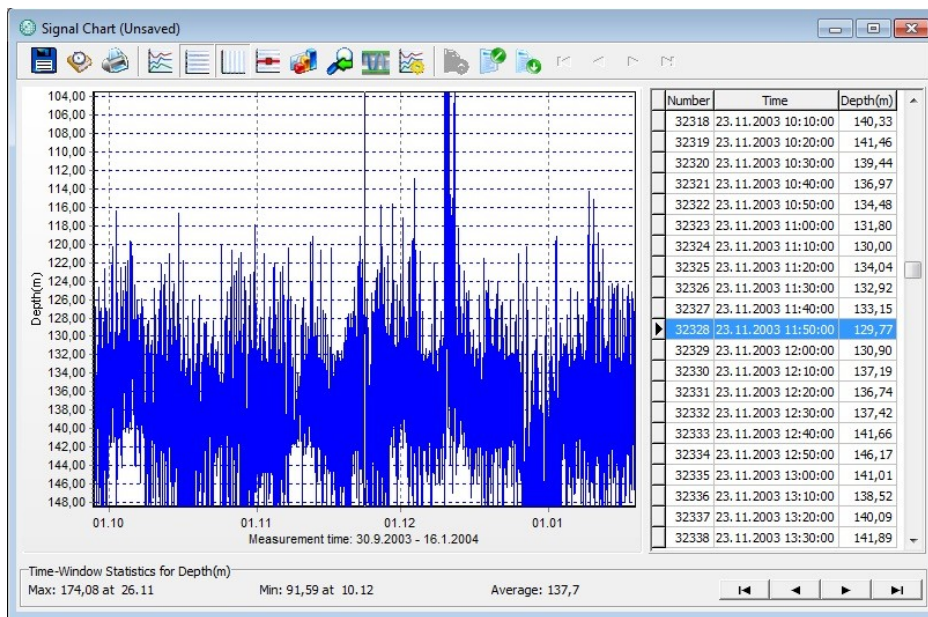


Figure 7.15 Signal Chart

## 7.7 SDX Chart bar

When the SDX chart is opened, buttons related to the chart are displayed:



Figure 7.16 The Chart Bar

All of the buttons on the SDX chart bar have the same functions as the DAT chart buttons except that the SDX chart has a **History** button:



### History

Click this button to view information on the origin of the signal and the progress of the project. The history window also displays the results of each procedure, for example, when performing a pattern search

The user can also add comments to each step or the whole signal history by clicking the **Add Comment** button (see figure 7.17). Click **Print** to print out the information (see figure 7.18).

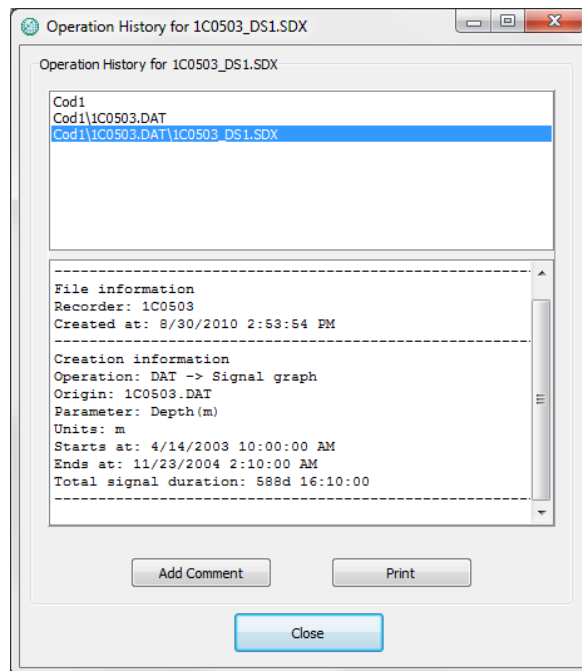


Figure 7.17 History

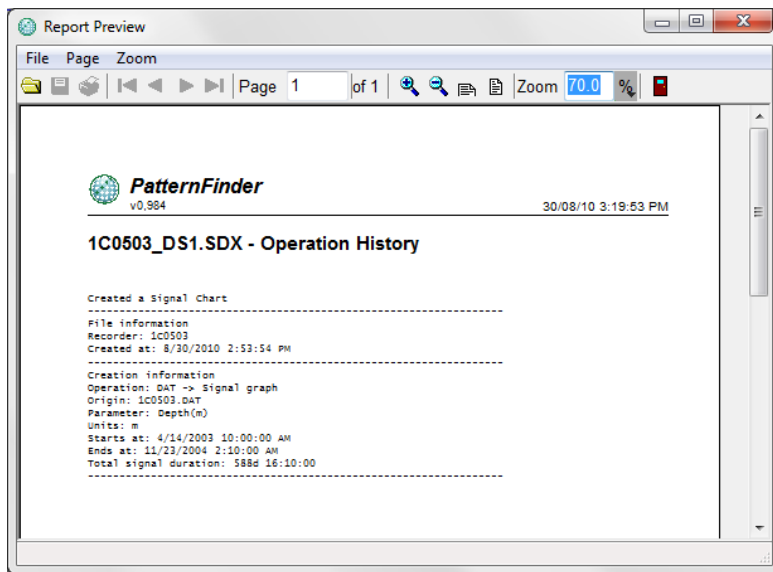


Figure 7.18 Print preview

## 7.8 Edit Chart operations

Click the **Edit Chart** button on the chart bar to open the Chart Editor. The Chart Editor is a multi-option menu with a Tree View interface.

There are four main branches on the tree:

1. Series
2. Chart
3. Data
4. Export

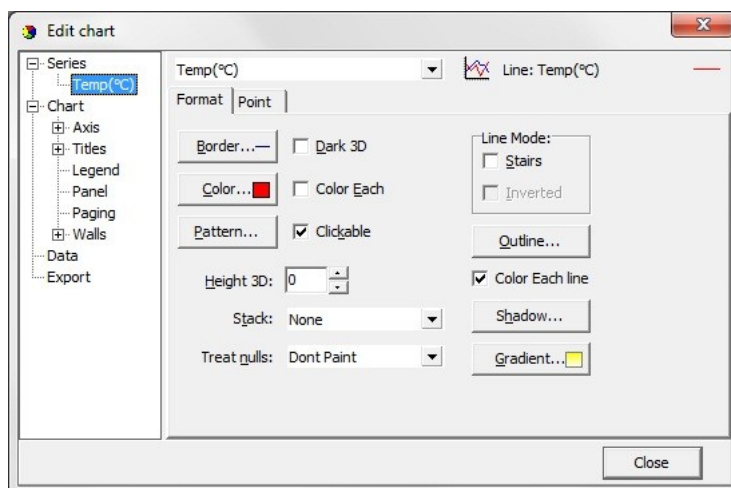


Figure 7.19 Edit chart



## Series

The Series window offers the same features as the **Active Series List Button**.

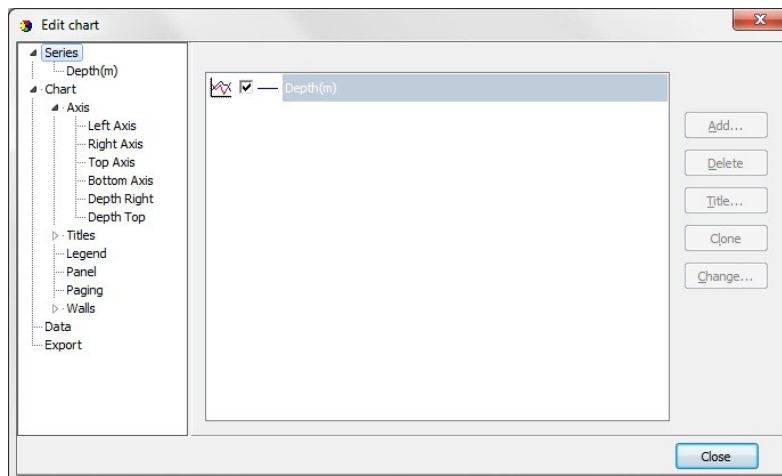


Figure 7.20 Edit chart: series

When a particular series is selected, for example, the Depth series, a two tab menu opens, as seen in fig. 7.21. Under **Format**, the user can format each series. The **Point** tab has the same function as the **Data Point Marker** button on the chart, plus formatting of the points.

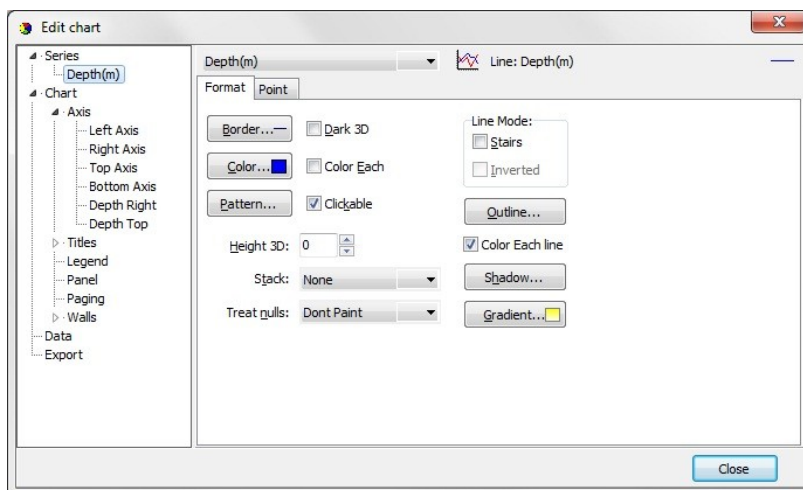


Figure 7.21 Format Series

## Chart

The chart branch has six sub branches:

1. Axis
2. Titles
3. Legend
4. Panel

- 5. Paging
- 6. Walls

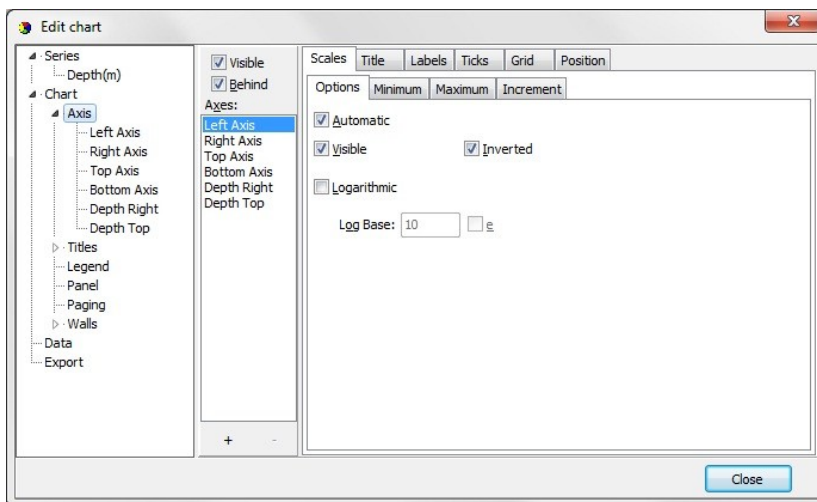


Figure 7.22 Axis Formatting

Figure 7.22 shows a six tab Axis menu. There are numerous options, some of which can drastically change the behavior of the chart. For example, under **Minimum** and **Maximum** the user can set the min. and max. measurement values which are displayed on the chart. The Ticks tab has the same function as the **Horizontal/Vertical gridline** buttons in the chart bar.

## Titles

The Titles menu, figure 7.23, gives access to 4 titles. Each title presents a multi line text window which can be positioned anywhere on the chart. There are multiple formatting options.

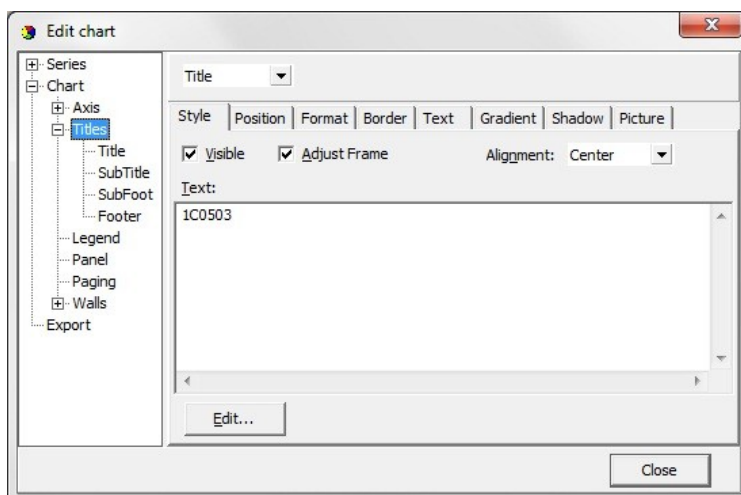


Figure 7.23 Titles menu

## Legend

The legend menu (see figure 7.24) gives the user the option of displaying a series legend on the chart. The 10 tab menu offers various styling, positioning and formatting options of the legend.

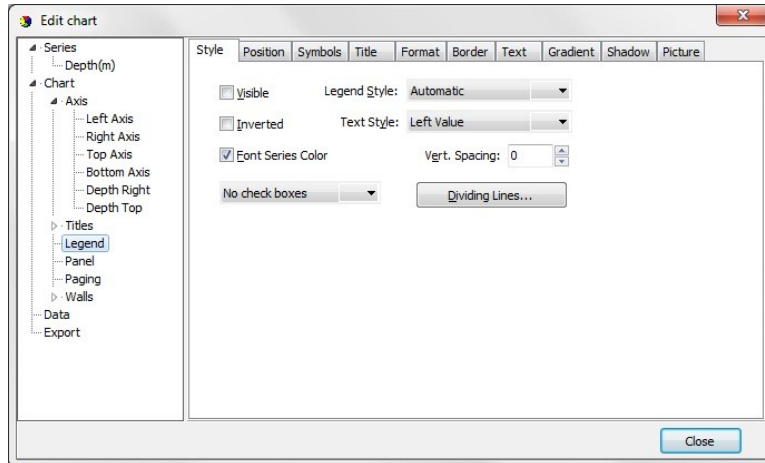


Figure 7.24 Legend Menu

## Panel

The Panel menu (see figure 7.25) offers various format options for the panel. Images, pictures and icons can be imported onto the panel as back images.

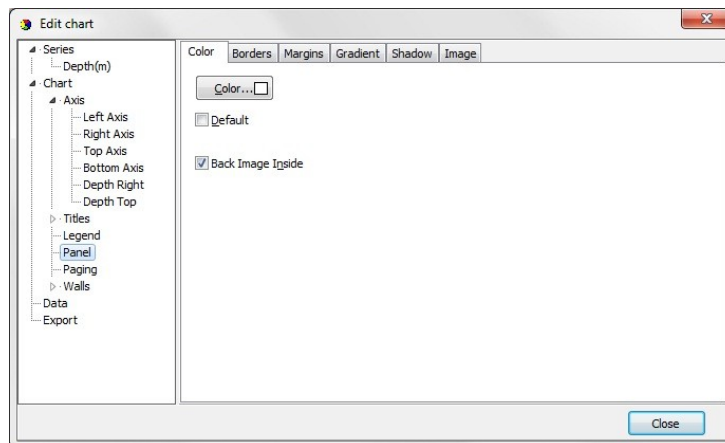


Figure 7.25 Panel Menu

## Paging

The data series can be split up into pages, with a user defined number of points per page. Only one page is displayed at a time, and the user can scroll through the pages using the arrow buttons which are enabled on the chart when paging is activated.

Paging can be useful when viewing different time periods.

It is not possible to define an offset and sampling periods and start time can limit the usefulness of this option.

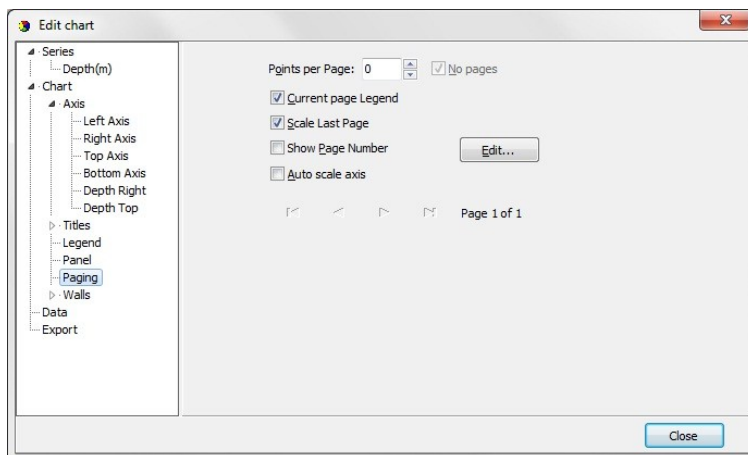


Figure 7.26 Paging Menu

## Walls

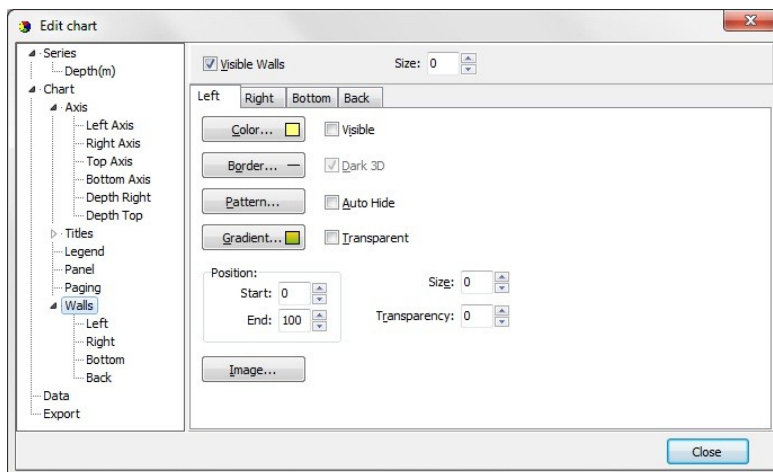


Figure 7.27 Walls Menu

The **Walls** menu in figure 7.27 offers the option of formatting the four walls of the chart. The menu has similar options as the **Panel** menu, for example, by click the **Pattern** button the user can import an image and place it on the wall.

## Data

The **Data** menu in figure 7.28 gives the user access to the database on which the chart is based. Here text labels can be set to each measurement point. The user can also change the time and measurement values.

When making changes to the data the **Save Window Data** button is activated allowing the user to save the changes.

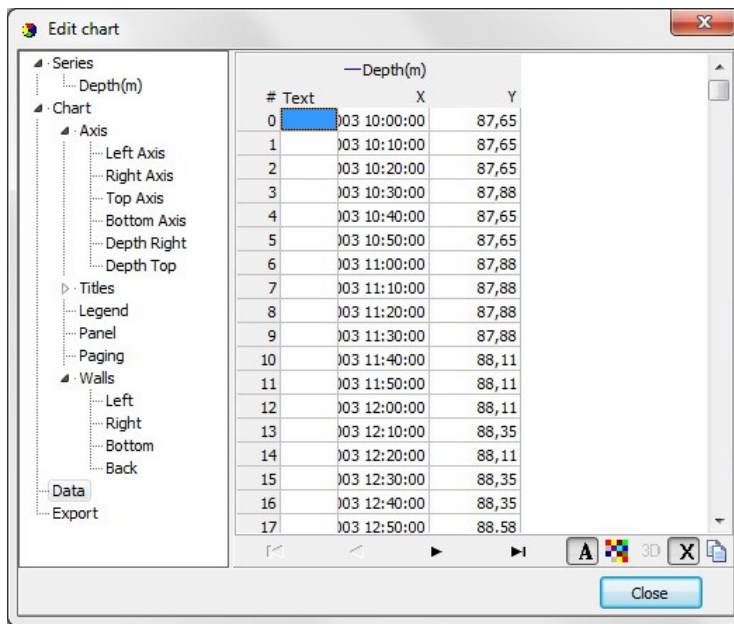


Figure 7.28 Edit chart: data

### Export

See chapter 14 for more information.

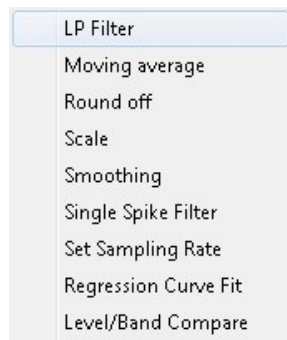
## 8. Filtering and Operations

This chapter explains the filter and signal operations available on the main toolbar.

### 8.1 Filtering

Select a SDX file and click the **Filter Signal** button.

The following options appear:



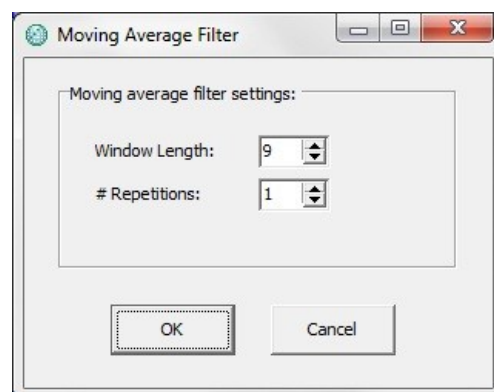
*Figure 8.1 Filter Signal*

All the filter options result in a new SDX file where the filtered signal is displayed and the difference between the original SDX signal and the filtered signal can be viewed. The difference signal can be accessed through the **Active series** button on the chart bar.

### Moving average

**Moving average** is an efficient method to even out large irregularities in the signal. It is especially useful when preparing a signal for behavioral event analysis.

Click the **Filter Signal** button and select **Moving average**. The window in figure 8.2 appears:



*Figure 8.2 Moving Average Filter*

Under **Window Length** define the size of the window, i.e., the number of measurement values. The minimum is 3 values.

Under **Repetitions** define how often the procedure is to be carried out.

Click **OK** and a signal chart appears:

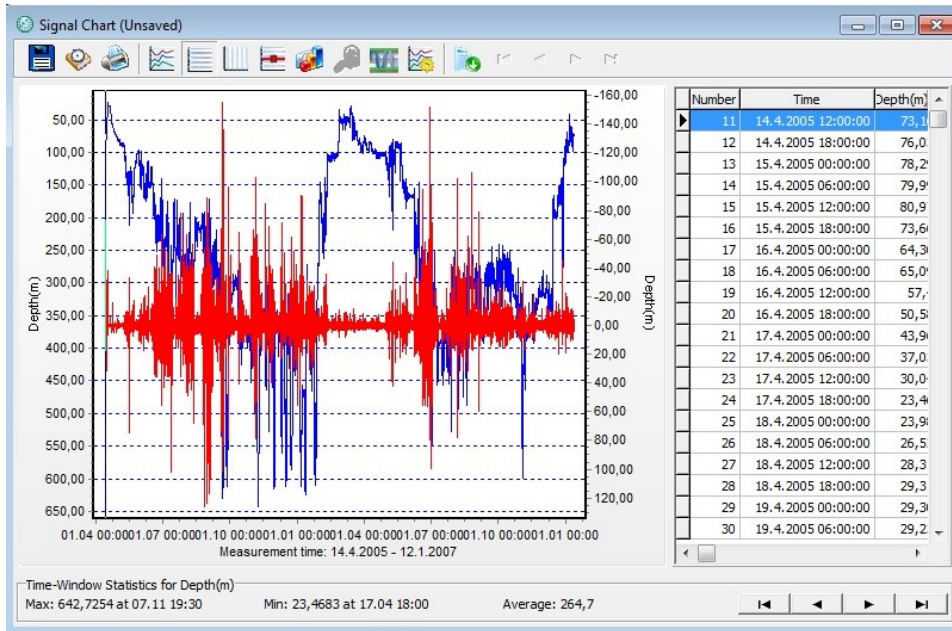


Figure 8.3 Signal chart

Click the **Histogram** button on the chart bar and select **Difference**. The histogram shows that **Moving average** mainly targets relatively small amplitude variations.

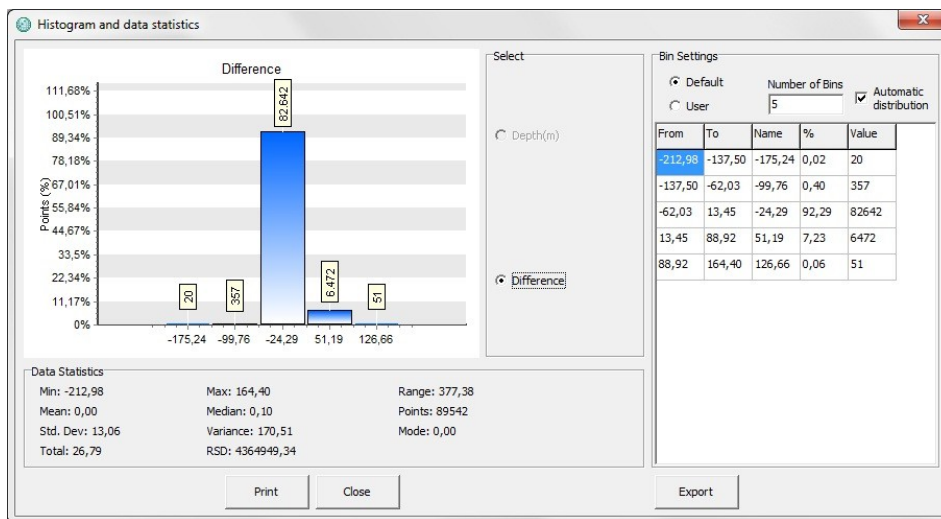


Figure 8.4 Histogram

Note that **Moving Average** inevitably results in amplitude distortion and time shifting. PF automatically corrects the time shift in the resulting signal.

## Round Off

Round off is used, for example, when preparing a signal for ambient/level event analysis.

Click the **Filter Signal** button and select **Round off**. The window in figure 8.5 appears:

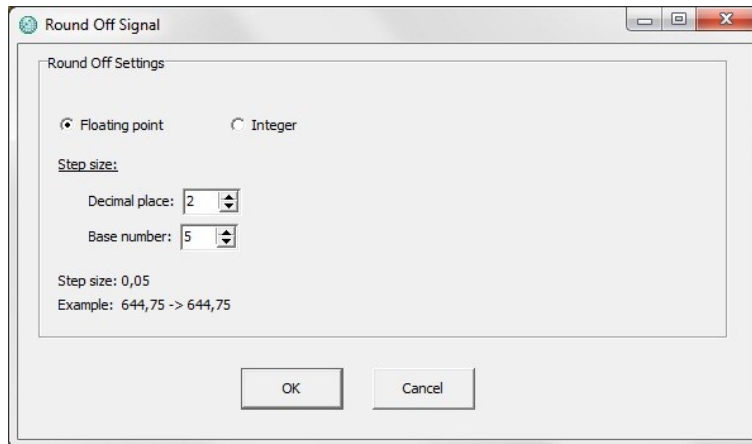


Figure 8.5 Round off

The user can choose between **Floating point** and **Integer**.

### Floating point

By selecting **Floating point** you can filter the decimal values. This can be useful when working with low bar values where the decimals play a significant role. First you select the decimal place you want to work with (see figure 8.5).

Secondly, select the **Base number**. The **Base number** defines the resolution of the selected decimal (see figure 8.5).

Click **OK** and a signal chart appears:

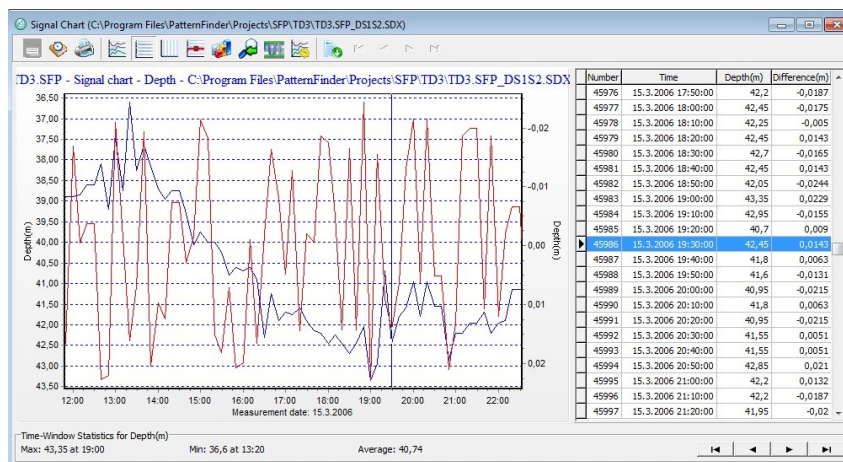


Figure 8.6 Round off: Floating point



### Integer

The **Integer** round off is useful, for example, when preparing a signal for ambient analysis where you want to decrease the number of events around the level values.

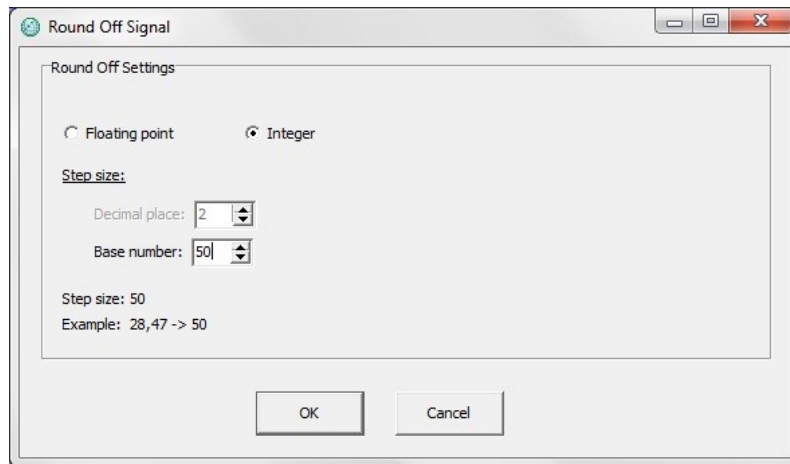


Figure 8.7 Round off

When selecting **Integer**, the decimal values are rounded off. The integer values can be rounded down to a **Base number** defined in the unit values of the signal (m, °C, etc.).

Click **OK** and a signal chart appears:

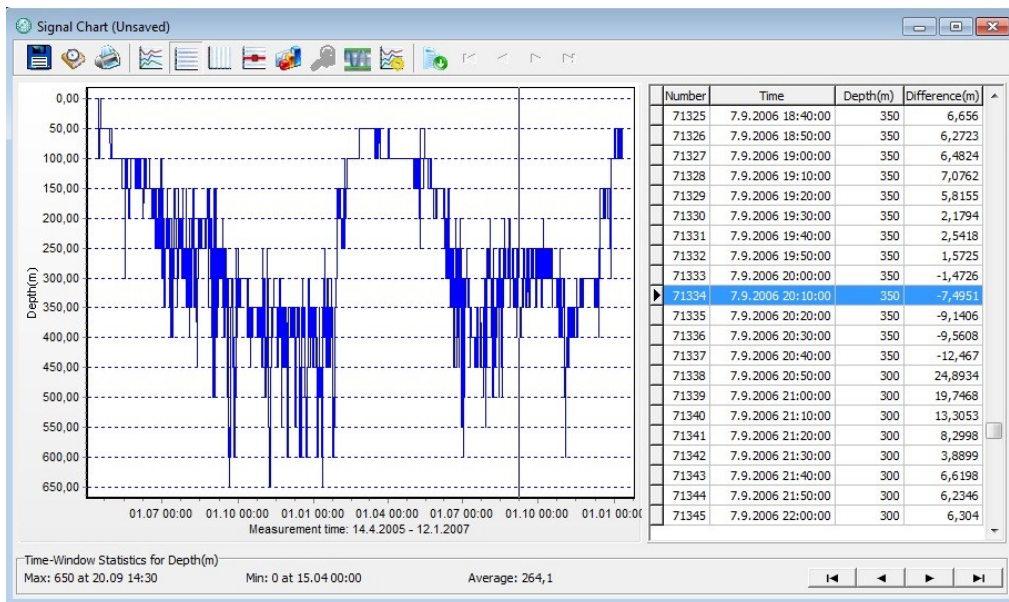


Figure 8.8 Round off: Integer

## Scale

Click the **Filter Signal** button and select **Scale**. The following window appears:

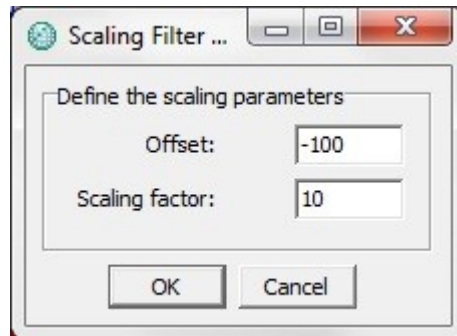


Figure 8.9 Scale

### Offset

Offset values can be used to compensate for a known offset in the measurement signal. You can add or subtract a value by adding a + or – in front of the number. The offset is defined in the unit value of the signal (m, °C, etc.). Note that you can use decimal values.

### Scaling factor:

Scaling factor multiplies the signal after the offset has been applied. Note that you can use decimal values.

Click **OK** and a signal chart appears:

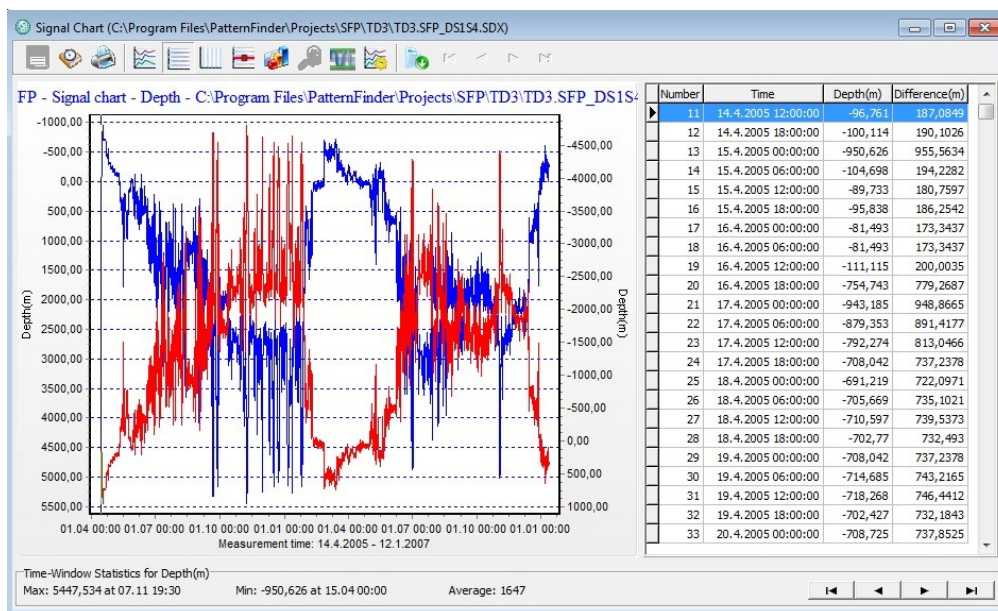


Figure 8.10 Scale

## Smoothing

Data smoothing is primarily used to reduce low-level noise in the measurement. It can also be used to prepare the signal before finding behavioral events and patterns.

Note that **Smoothing** does not distort or time-shift the signal.

Click the **Filter Signal** button and select **Smoothing**. The following window appears:

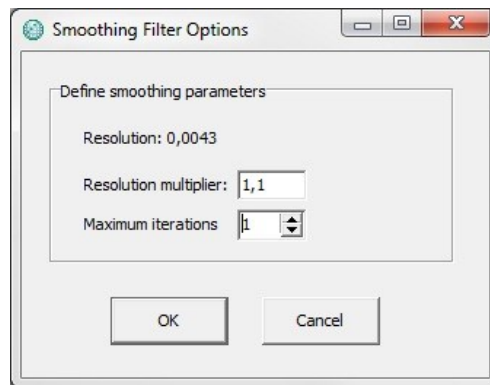


Figure 8.11 Smoothing

Under **Resolution** define the minimum difference between two aligning measurements.

Under **Resolution multiplier** you can multiple the resolution

Under **Maximum iterations** you can define the number of iterations, i.e. how many times the smoothing operation is performed.

Click **OK** and a signal chart appears:

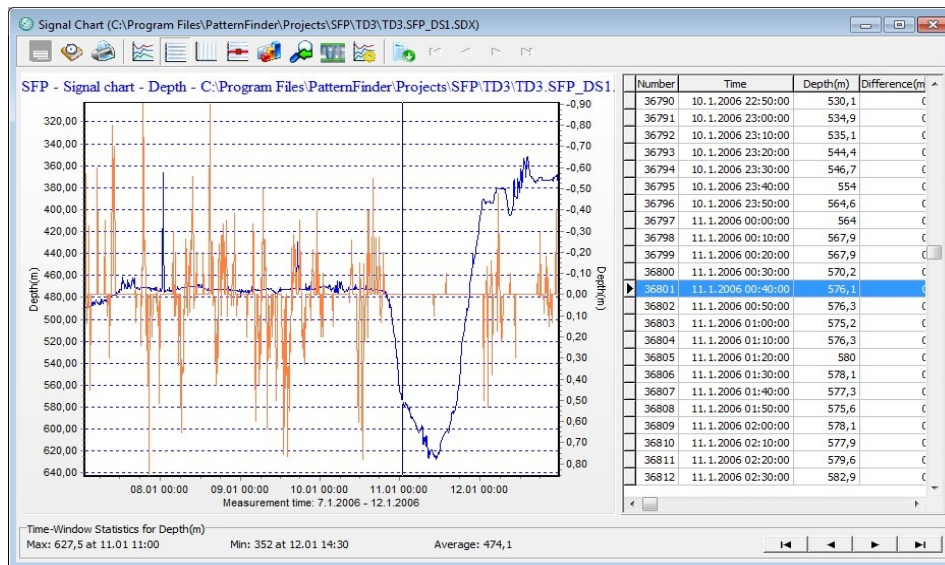


Figure 8.12 Smoothing

### Single Spike Filter

Single Spike Filter is used to remove erroneous spikes in a signal as well as preparing a signal for pattern identification.

Click the **Filter Signal** button and select **Single Spike Filter**. The following window appears:

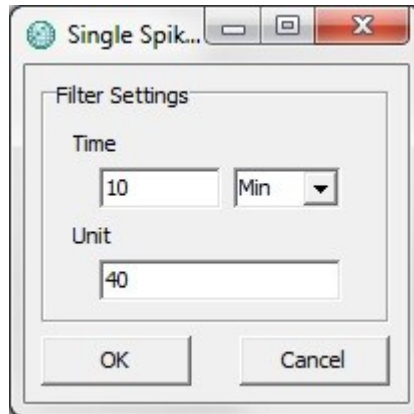


Figure 8.13 Single Spike Filter

Under **Time** define the maximum duration of the spike (sec, min or hours).

Under **Unit** define the minimum amplitude in the signal unit value of the spike.

Both positive and negative spikes are removed.  
Click **OK** and a signal chart appears:

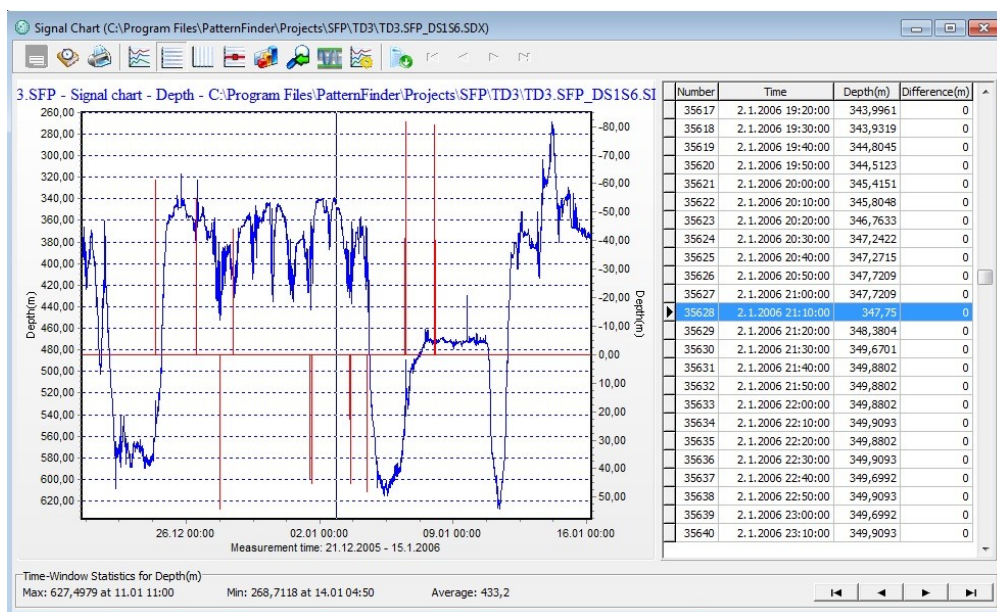


Figure 8.14 Single Spike Filter

The difference signal shows the spikes removed from the original SDX signal.

### Set sampling rate

Click the **Filter Signal** button and select **Set sampling rate**. The following window appears:

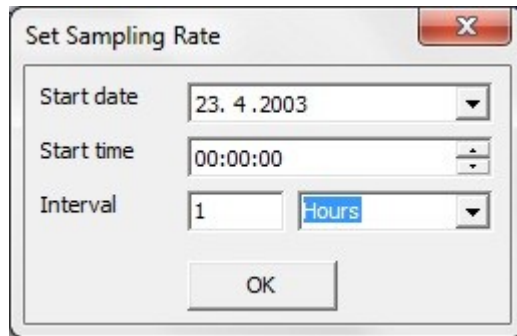


Figure 8.15 Set sampling rate

Set new start date, start time and sampling interval. Click **OK** and a signal chart appears:

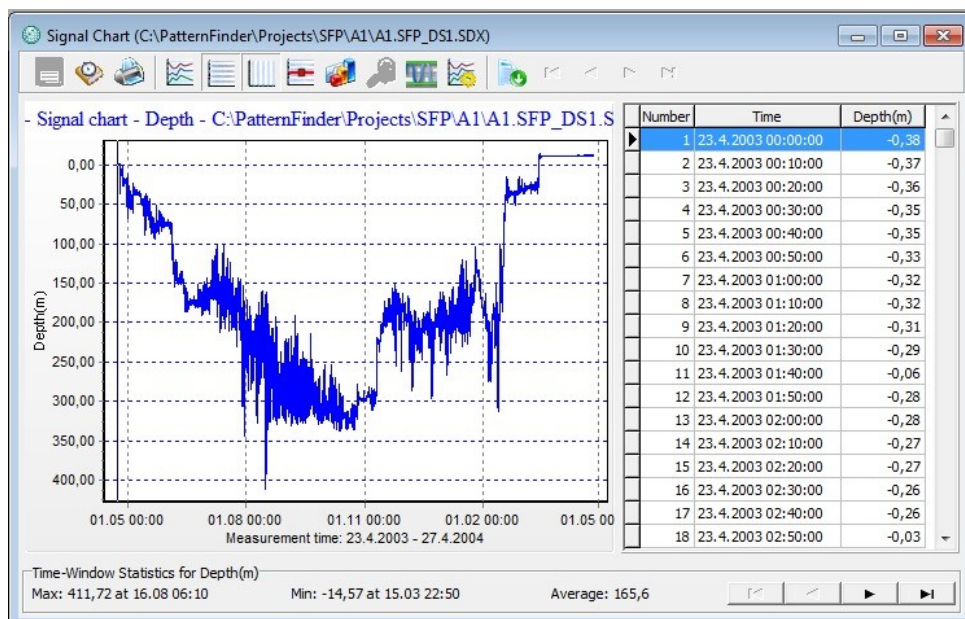


Figure 8.16 Set sampling rate

If the start time is outside the signal the starting value will be zero. Points are added until the signal ends and each point is interpolated.

## Regression Curve Fit

The Regression curve fit can mainly be used to:

- Fit a curve to measurements
- Remove biased trends from signals
- Create normalized signals

All regression curve fits are calculated at once.

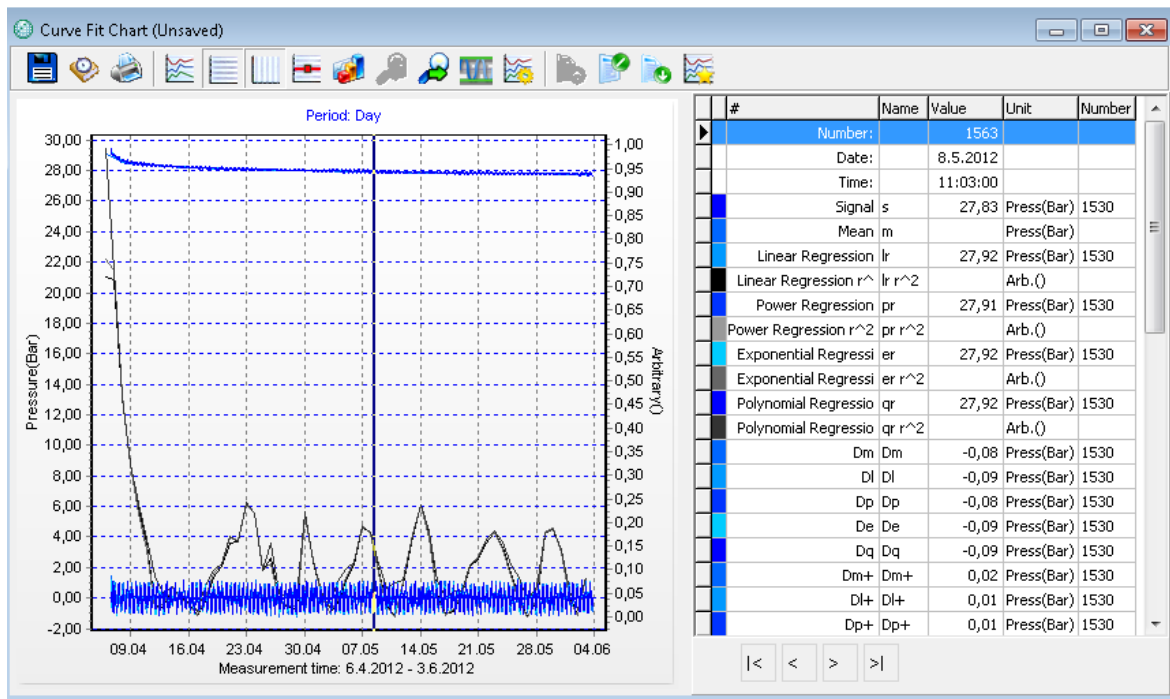


Figure 8.17 Curve fit chart

Available curve fits are:

- m: Mean
- lr: Linear regression
- pr: Power regression
- er: Exponential regression
- q: Polynominal regression (3°)

R squared

(not basically a curve fit)

- lr-r^2
- prR^2
- erR^2
- qrR^2

R-squared value says how well the resulting trend matches the original data points.

### Differential values

By subtracting the fitted curve from the signal, biased values can be removed resulting in an “AC” signal, i.e. an alternating signal around the fitted curve/zero.

- Dm = Signal-[m]
- DI = Signal-[lr]
- Dp = Signal-[pr]
- De = Signal-[er]
- Dq = Signal-[qr]

**Positive (Offseted) differential values**

The subtraction of the minimal differential value from the differential value, provides the offsetted positive values.

$$D_{m+} = D_a - [\text{Min}(D_m)]$$

$$D_{l+} = D_l - [\text{Min}(D_l)]$$

$$D_{p+} = D_p - [\text{Min}(D_p)]$$

$$D_{e+} = D_e - [\text{Min}(D_e)]$$

$$D_{q+} = D_q - [\text{Min}(D_q)]$$

**Normalized values with range from -1 to 1**

Normalized values are good when comparing different signals. This is accomplished by dividing the differential values with half the differential range .

$$S_{nm} = 2D_a / [\text{Range}(D_m)]$$

$$S_{nl} = 2D_l / [\text{Range}(D_l)]$$

$$S_{np} = 2D_p / [\text{Range}(D_p)]$$

$$S_{ne} = 2D_e / [\text{Range}(D_e)]$$

$$S_{nq} = 2D_q / [\text{Range}(D_q)]$$

## 8.2 Signal Operations

### Subtraction

This chapter shows how to subtract one signal from another.

Select the chart you want to work with. Once the chart is active click the **Signal operation** button on the main toolbar and select **Subtract** (see figure 8.18):

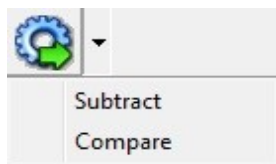


Figure 8.18 Subtract

The following window appears:

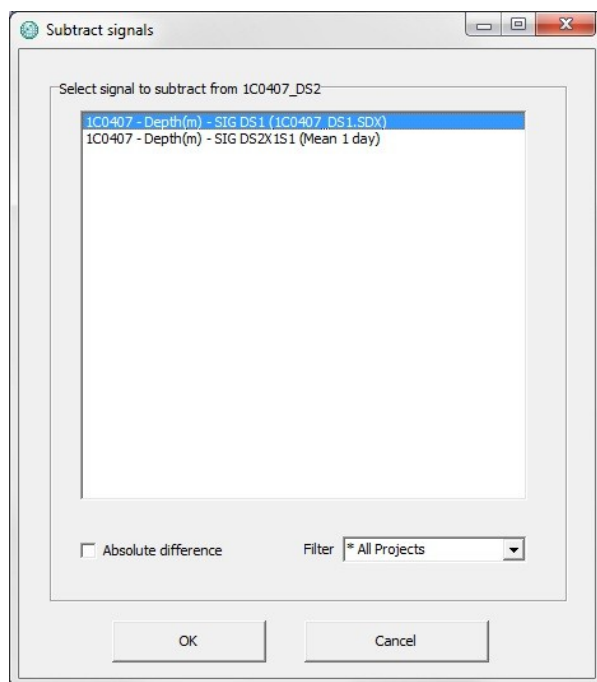


Figure 8.19 Subtract signals

You can filter the signals by selecting one of the options in the drop-down list (see figure 8.19). Note that this option is not available when working with a SFP.

By checking the **Absolute difference** box (see figure 8.19) all resulting negative values are converted to positive values.

Select the signal you want to subtract and click **OK**.



A signal chart appears:

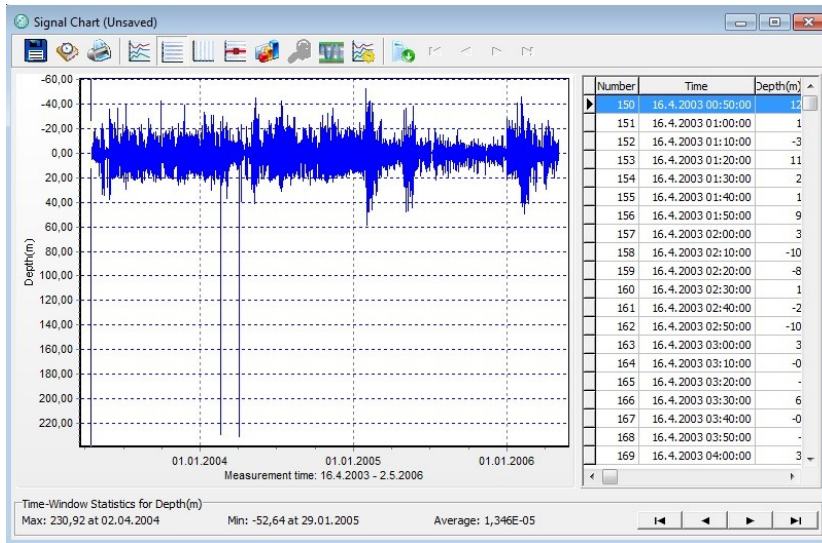


Figure 8.20 Signal Chart

The values in the resulting chart are both negative and positive.

The number of values in the resulting signal is the same as in the original signal.

### Compare

The **Compare** option allows the user to compare two signals to check if their values match.

Click the **Signal operation** button on the main toolbar and select **Compare** (see figure 8.21):

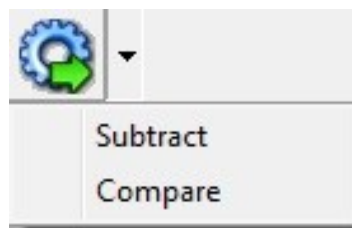


Figure 8.21 Compare

The following window appears:

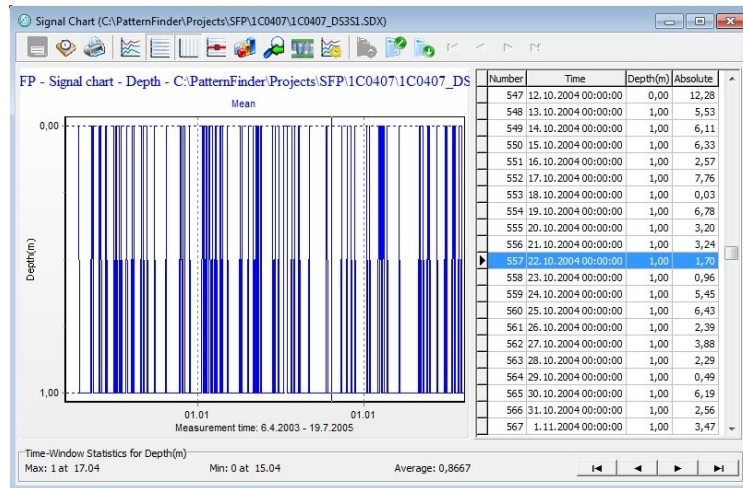


Figure 8.22 Compare signals

**Level:** The level (L) determines the value that each pair is compared with, default is less than one.

**Absolute:** The absolute difference of the pair compared to the level.  
 (If  $|a-b| < L$  then  $c=1$  else  $c=0$ ).

**Relative:** The relative absolute difference of the pair compared to the level. (If  $a \neq 0 \wedge |a-b|/a * 100 < L$  then  $c=1$  else  $c=0$ ).

**Ratio:** The ratio of the pair compared to the level.  
 (If  $a \neq 0 \wedge |b/a| * 100 < L$  then  $c=1$  else  $c=0$ ).

**Discard zeroes:** If either point is zero then the comparison is false (0).

**Larger values defines denominator:** If using Relative or Ratio then the division will use the larger absolute value as denominator, and the smaller as numerator.

Select the signal and click **OK**. A signal chart appears:

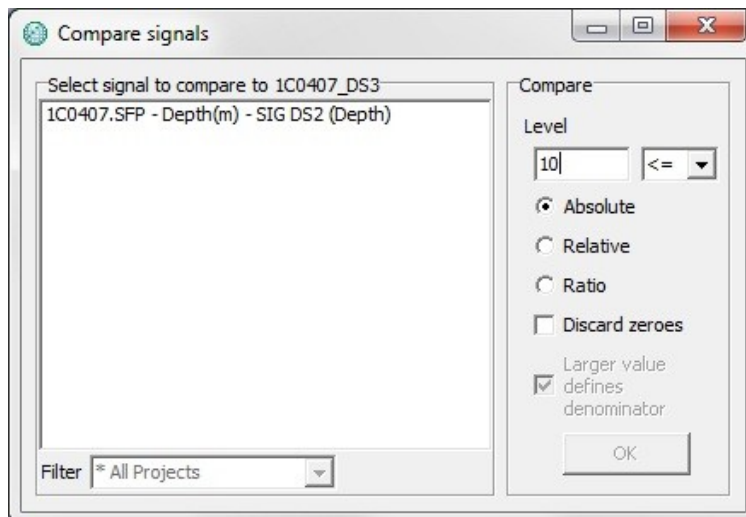


Figure 8.23 Compare

The result is always either zero or one.

## 9. Periodic Statistical Analysis

A periodic function is a function that repeats its values in regular intervals or periods. The periods available in PF are:

- Minutes
- Hours
- Days
- Weeks: Starts on Monday
- Months: Starts on the first day of the month

### 9.1 Performing a Periodic Statistical Analysis

Open or create a project and open the SDX file.

Click the **Signal period statistics** button on the main toolbar and the following window appears:

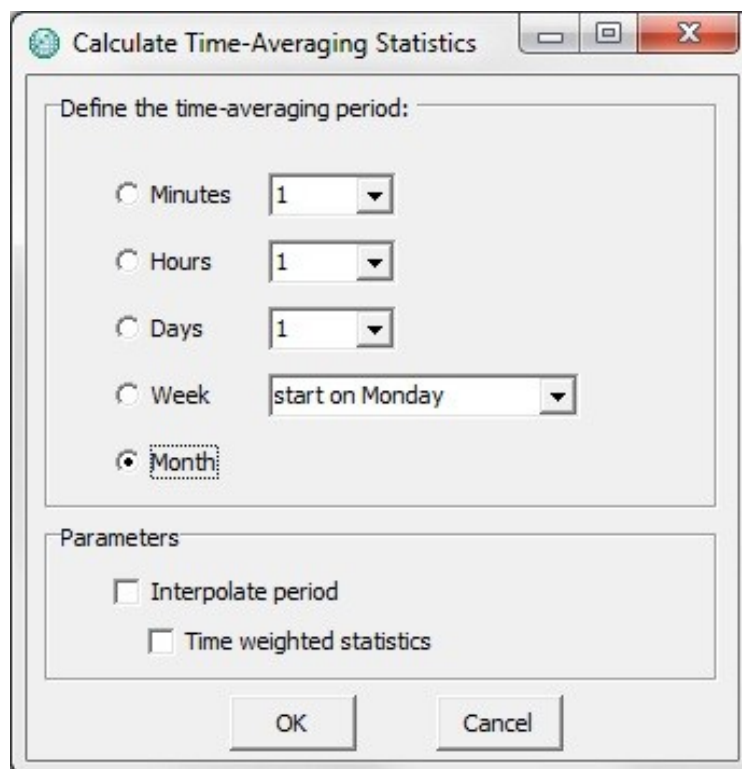


Figure 9.1 Calculate Time-Averaging Statistics

Define the period you want to analyze: minutes, hours, days, week and month (see figure 9.1).

**Interpolate period:** If checked this option will add points at the beginning and the end of the period.

Time weighted statistics: If checked the statistics will be time weighted.

Click OK and a statistics chart appears:

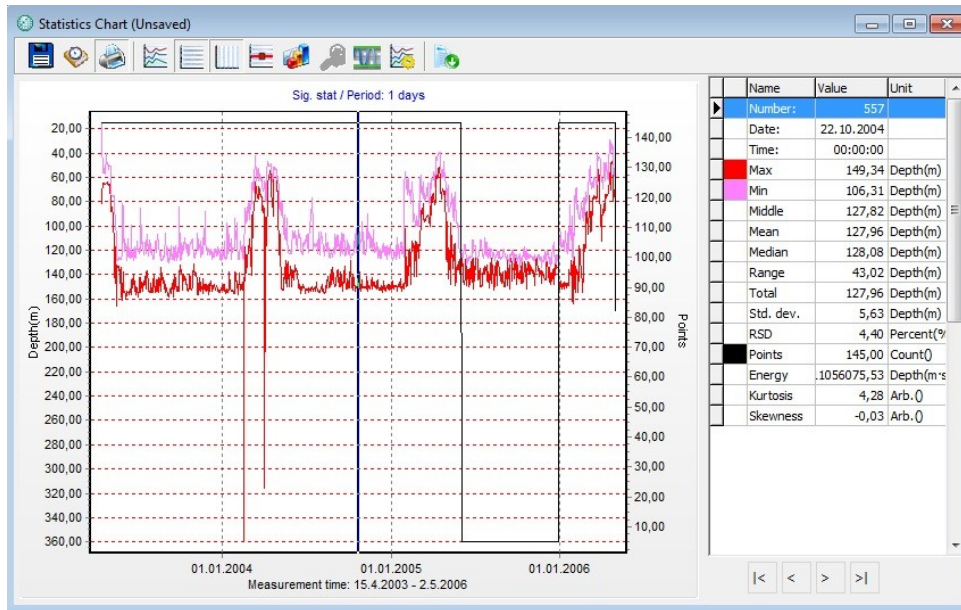


Figure 9.2 Statistics Chart

Each point in the chart represents a statistical value for the selected period. Save the chart and a STA file will be created.

There are 13 parameters in total, each with its own color. By moving the cursor on the chart the value for each parameter is shown in the table on the right side of the chart (see figure 9.3).

	Name	Value	Unit
▶	Number:	557	
	Date:	22.10.2004	
	Time:	00:00:00	
	Max	149,34	Depth(m)
	Min	106,31	Depth(m)
	Middle	127,82	Depth(m)
	Mean	127,96	Depth(m)
	Median	128,08	Depth(m)
	Range	43,02	Depth(m)
	Total	127,96	Depth(m)
	Std. dev.	5,63	Depth(m)
	RSD	4,40	Percent(%)
	Points	145,00	Count()
	Energy	.1056075,53	Depth(m*s)
	Kurtosis	4,28	Arb.()
	Skewness	-0,03	Arb.()

Figure 9.3 Table

The table lists the following parameters:

**Number of the period**

**Date of the period**

**Time of the period**

- **Max:** Maximum value of the period
- **Min:** Minimum value of the period
- **Middle:** The average of the max and min value
- **Mean:** The time weighted average value
- **Median:** The mid value in the sequence of measurements arranged by amplitude
- **Range:** The difference between max and min
- **Total:** The total sum of all the values in the period
- **Std. Dev.:** Standard deviation
- **RSD:** Relative standard deviation
- **Points:** Number of points in the period
- **Energy:** An indication of the area the signal defines over time. The energy unit is the signal unit multiplied by the time unit in seconds, for example, a temperature signal ( $^{\circ}\text{C}$ ) has the energy unit  $=^{\circ}\text{C}\cdot\text{s}$
- **Kurtosis:** A measure of the “peakedness” of the distribution and how it varies from the normal distribution. A zero value indicates a normal distribution. A positive value indicates a peaked distribution while a negative value indicates a flat distribution.
- **Skewness:** A measure of the asymmetry of the distribution and how it differs from a normal distribution. A zero value indicates a normal distribution. A positive value indicates a positively skewed distribution while a negative value indicates a negatively skewed distribution.

To select the parameters you want to view in the chart, click the **Active Series** button on the chart bar. The following window appears:

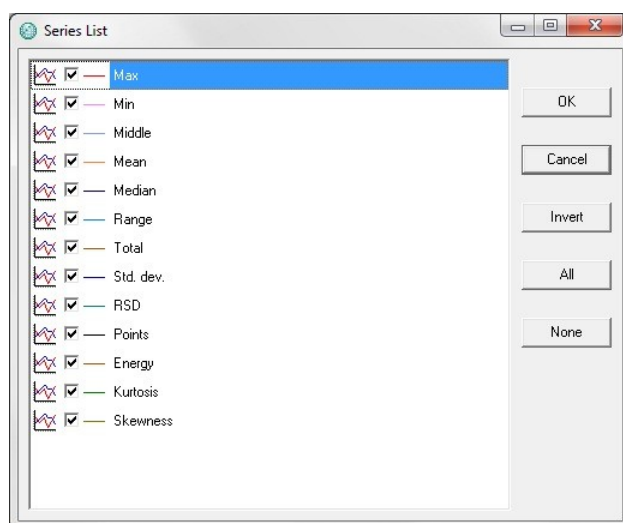


Figure 9.4 Active Series

Select the parameters you want to view and click OK.

In the chart in figure 9.5, all the parameters have been selected.

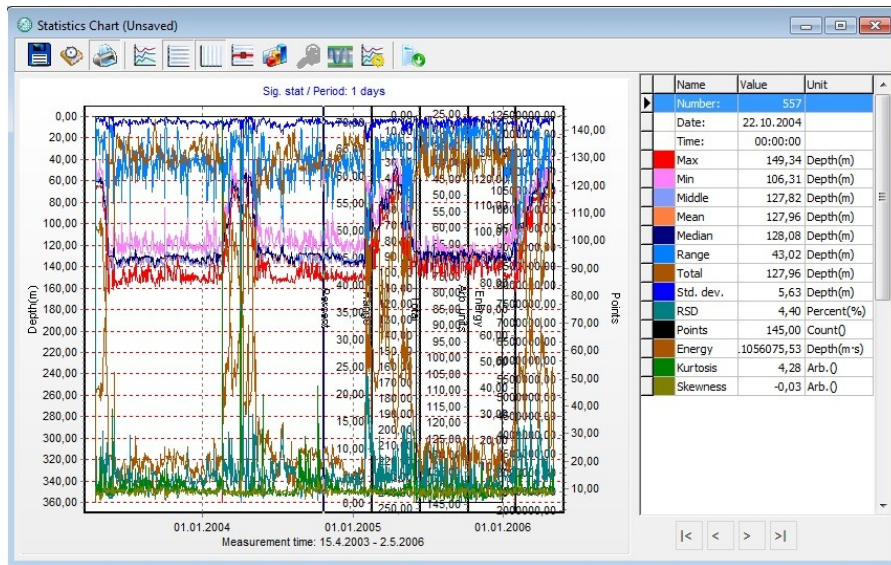


Figure 9.5 Statistics chart

## 9.2 Extract Signal from STA file

To extract a signal from the STA file, click the **Select signal to signal chart** button on the main toolbar

The following window appears:

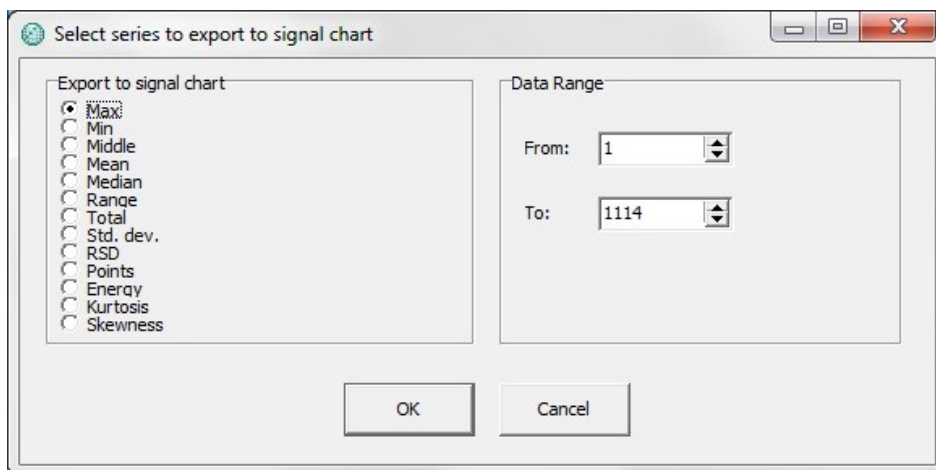


Figure 9.6 Select series to export to signal chart

Select the signal and the range you want to extract. Click **OK** and a chart with the extracted signal appears:

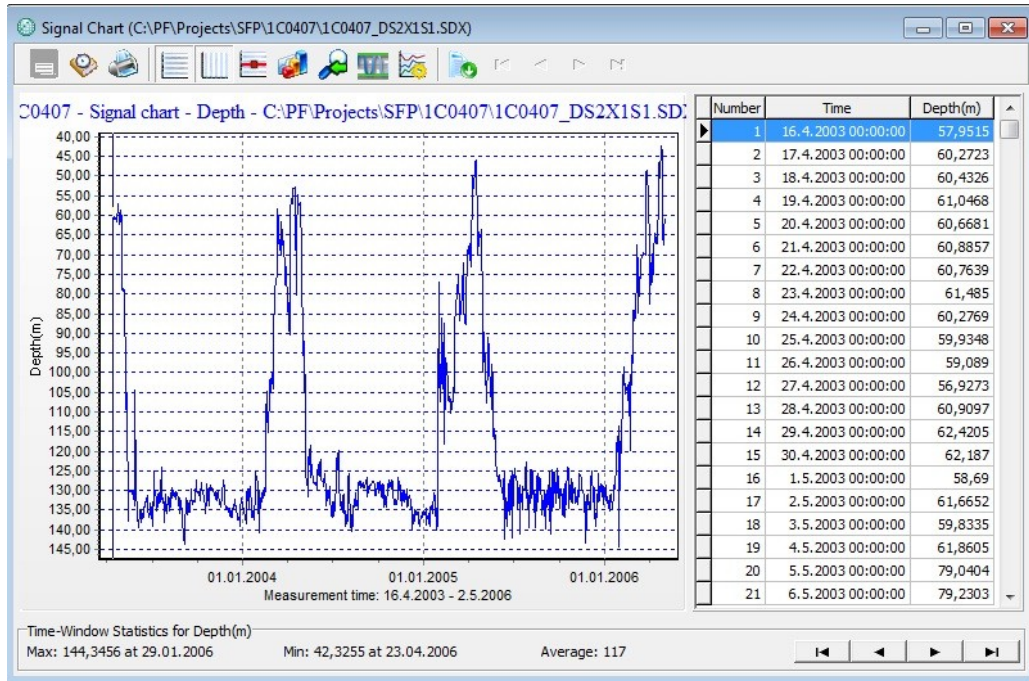


Figure 9.7 Signal Chart

# 10. Overlaying

This chapter shows how to overlay multiple signals.

## 10.1 View multiple signals

Create or open a project.

Click on the **Create Overlay Chart** button on the main toolbar and the following window appears:

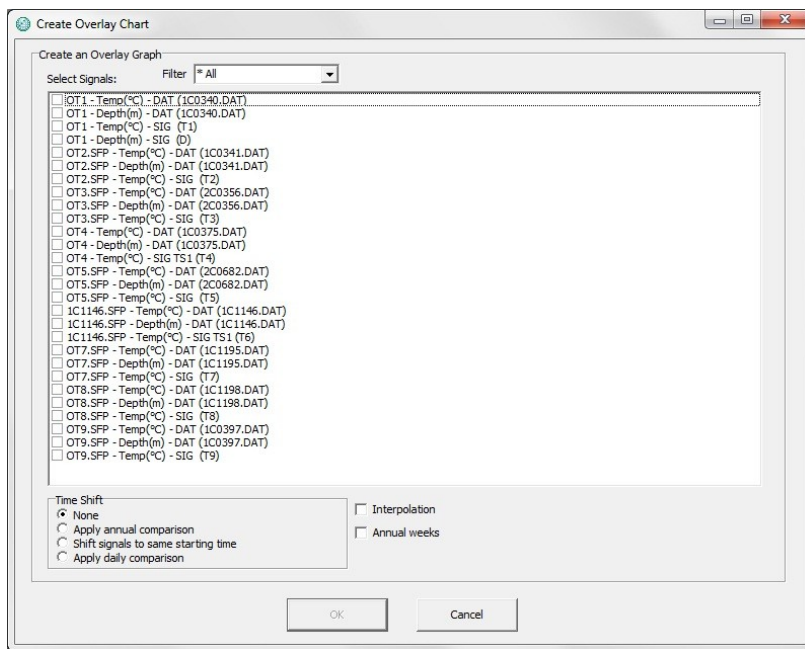


Figure 10.1 Create Overlay Graph

Select the signals you want to overlay. You can filter the signals by selecting one of the options in the drop-down list (see figure 10.2).

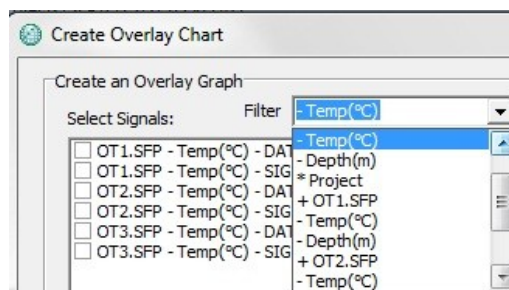


Figure 10.2 Filter



Once the signals have been selected, click OK and an Overlay chart appears:

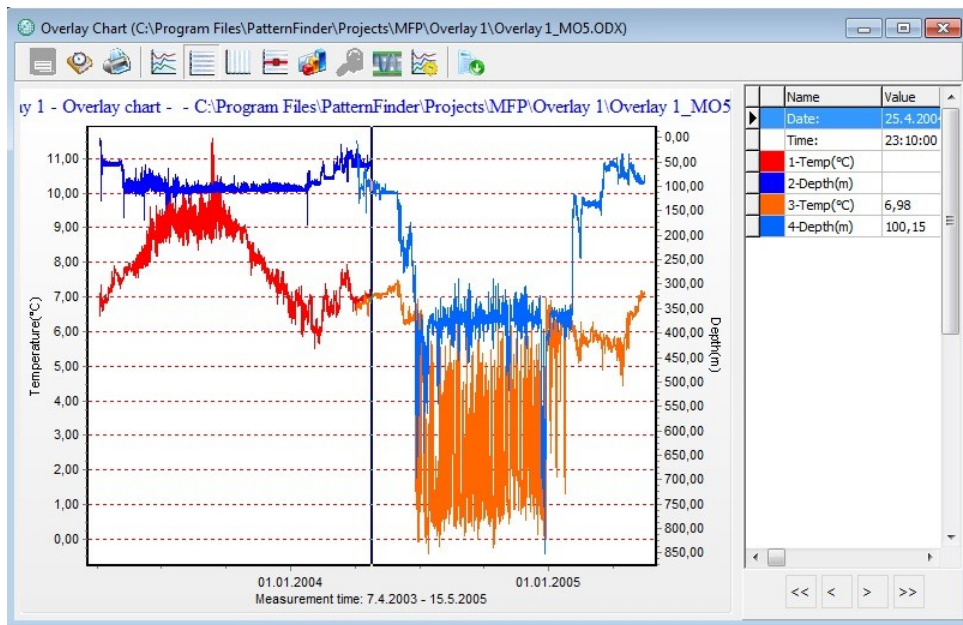


Figure 10.3 Overlay Chart

Each unit has an axis and a different color (see figure 10.3).

Overlays with a single unit use colors outside of unit group colors (see figure 10.4).

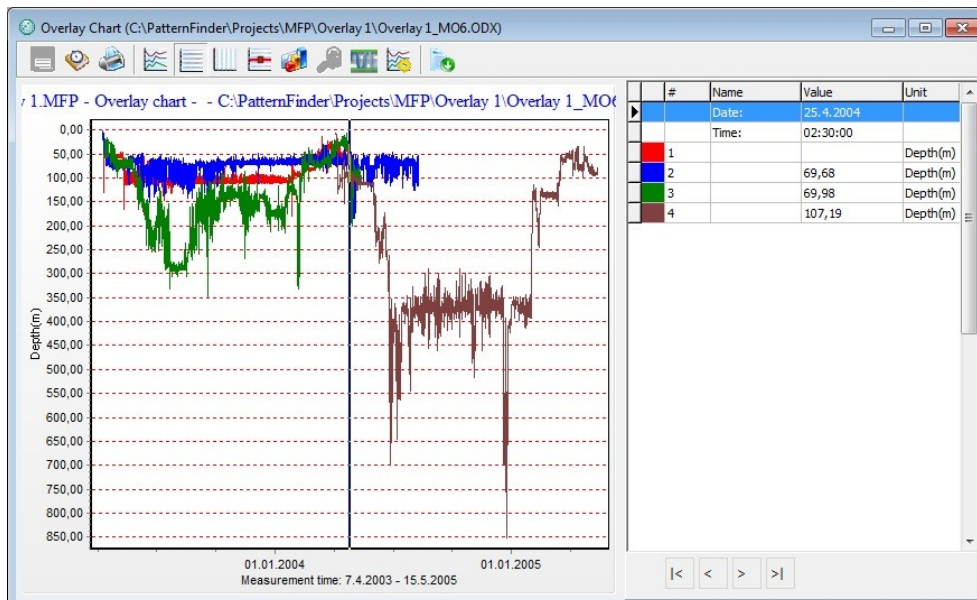


Figure 10.4 Overlay chart: single unit

## 10.2 Time Shifted Data

PF offers the option of shifting two or more signals to the same starting time. This is especially useful when analyzing data from multiple recorders that have been used in similar researches and have the same sampling frequency, but different start times.

### Overlay

Before overlaying the signals, it is recommended to prepare the data by extracting the signal and data range you want to analyze.

Create or open a project.

Click on the **Create Overlay Chart** button and the following window appears:

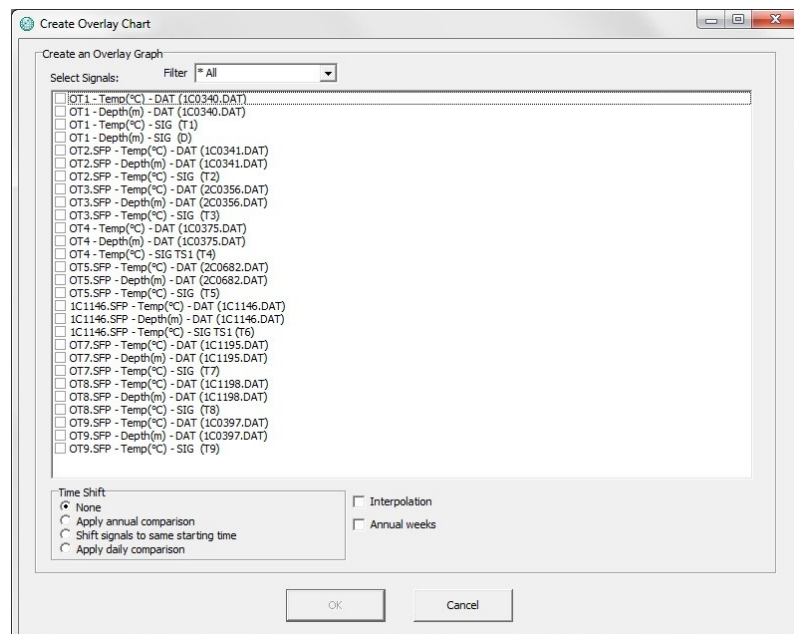


Figure 10.5 Create Overlay Graph

Select the signals you want to overlay. You can filter the signals by selecting one of the options in the drop-down list (see figure 10.6).

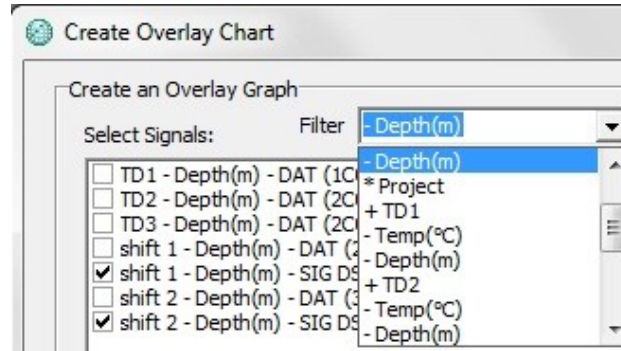


Figure 10.6 Filter

Under Time Shift select Shift signals to same starting time and Interpolation (see figure 10.5).

### Interpolation

Interpolation is necessary when measurements do not match when comparing them in time. Signals that have the same sampling frequency but are shifted in time will display erroneous results in the statistical overlay analysis. With interpolation matching measurement points are created and thus all signals are included in each measurement point.

Once the signals have been selected, click OK and an overlay chart appears:

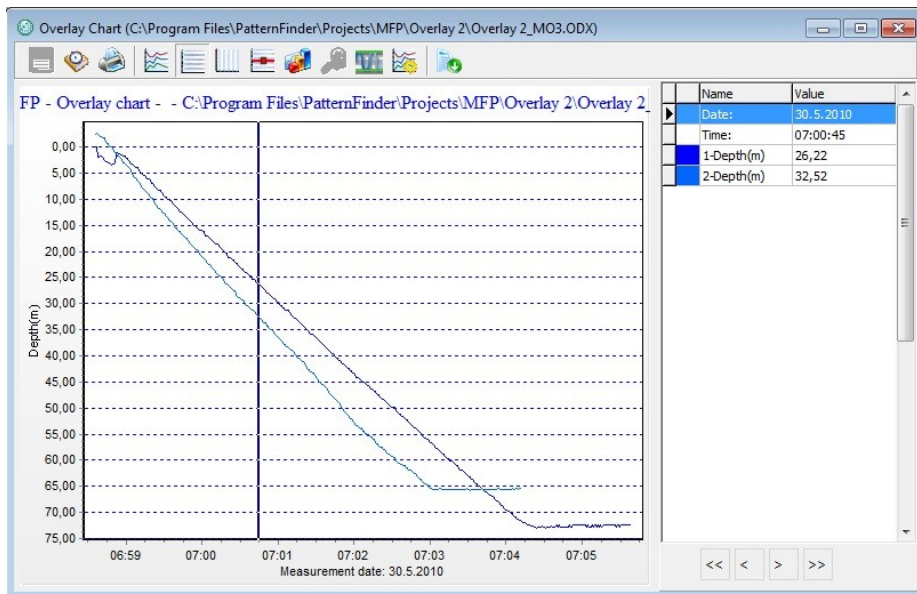


Figure 10.7 Overlay chart

Now both signals have the same start time.

### 10.3 Annual Comparison

When comparing signals on an annual basis, average values for days, weeks or months are often used. In PF any measurement values can be used.

#### Overlay

Create or open a project.

Click on the **Create Overlay Graph** button and the following window appears:

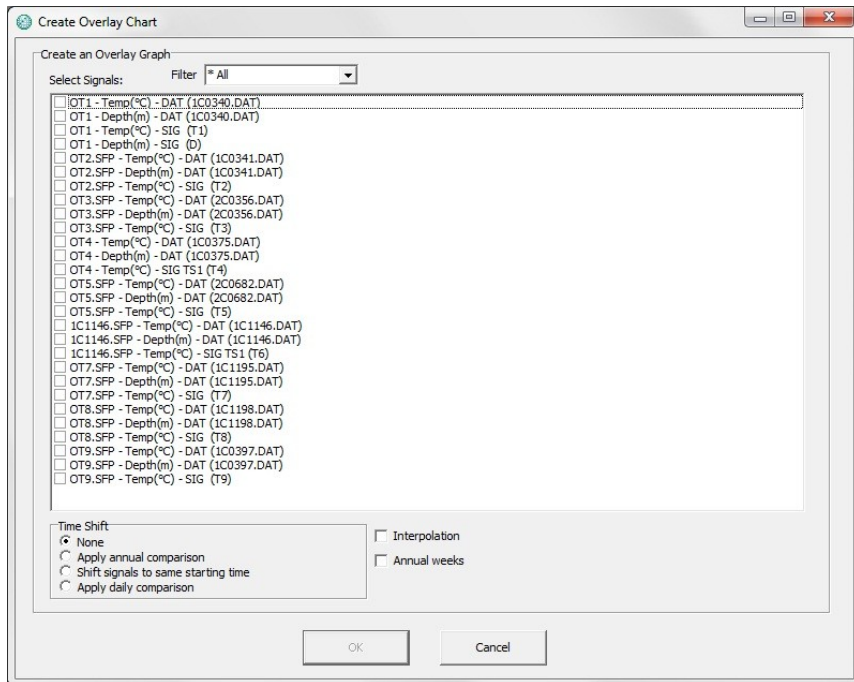


Figure 10.8 Create overlay chart

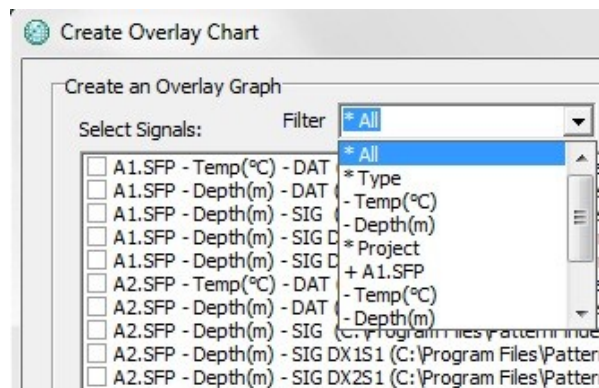


Figure 10.9 Filter

Select the signals you want to overlay. You can filter the signals by selecting one of the options in the drop-down list (see figure 10.9).

Under **Time Shift** select **Apply annual comparison** and **Interpolation** (see figure 10.8).

**Annual weeks:** By selecting this option the values are split up into ISO weeks.

Once the signals have been selected, click **OK** and an overlay chart appears:

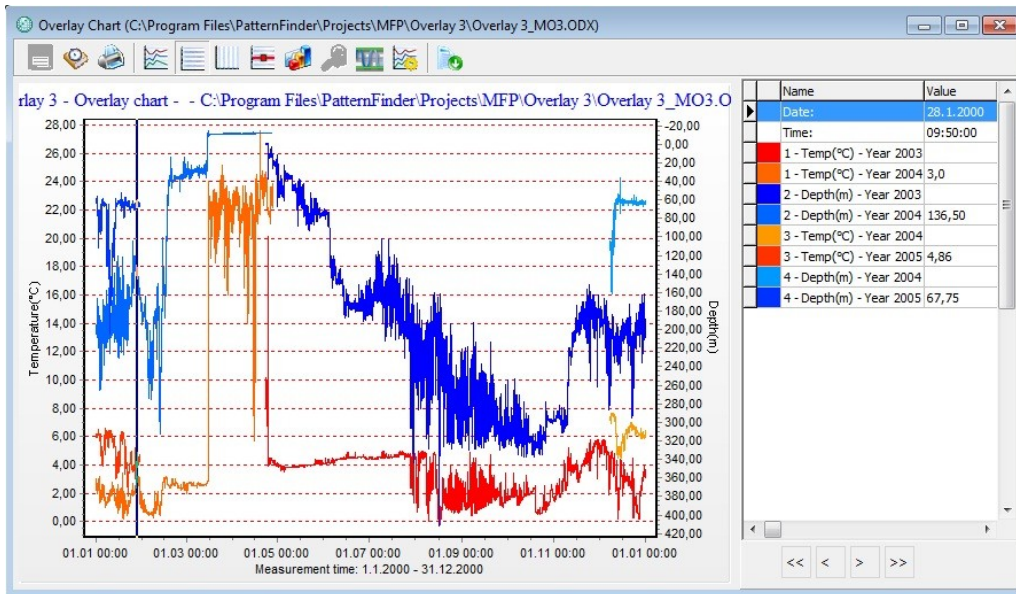


Figure 10.10 Overlay chart

In the chart the signals are divided by years starting with the earliest year found in the signals.

It is also possible to perform an annual analysis using only one signal (see figure 10.11).

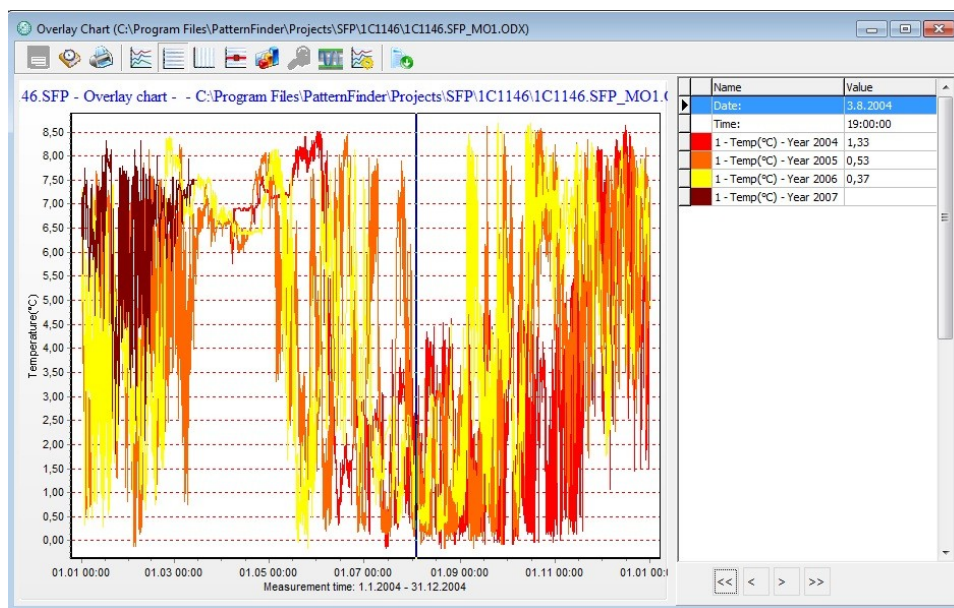


Figure 10.11 Overlay chart 1 signal

## 10.4 Daily comparison

### Overlay

Create or open a project.

Click on the **Create Overlay Chart** button and the following window appears:

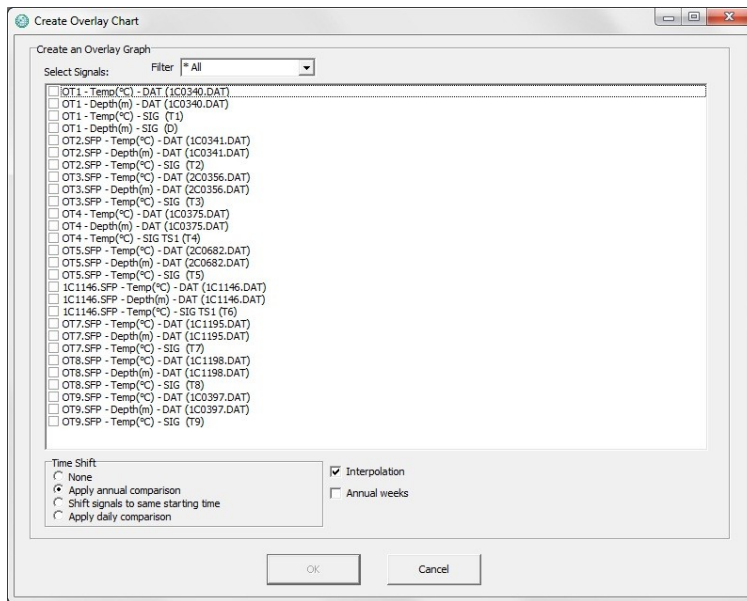


Figure 10.12 Create overlay chart

Select the signals you want to overlay. You can filter the signals by selecting one of the options in the drop-down list (see figure 10.13).

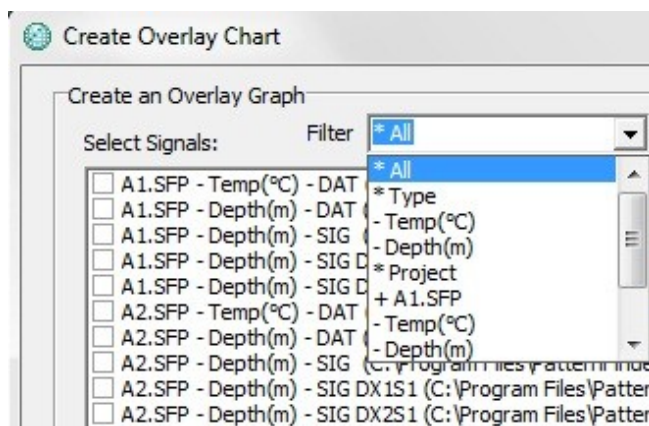


Figure 10.13 Filter

Under **Time Shift** select **Apply daily comparison** and **Interpolation** (see figure 10.12).

Once the signals have been selected, click **OK**

An overlay chart appears:

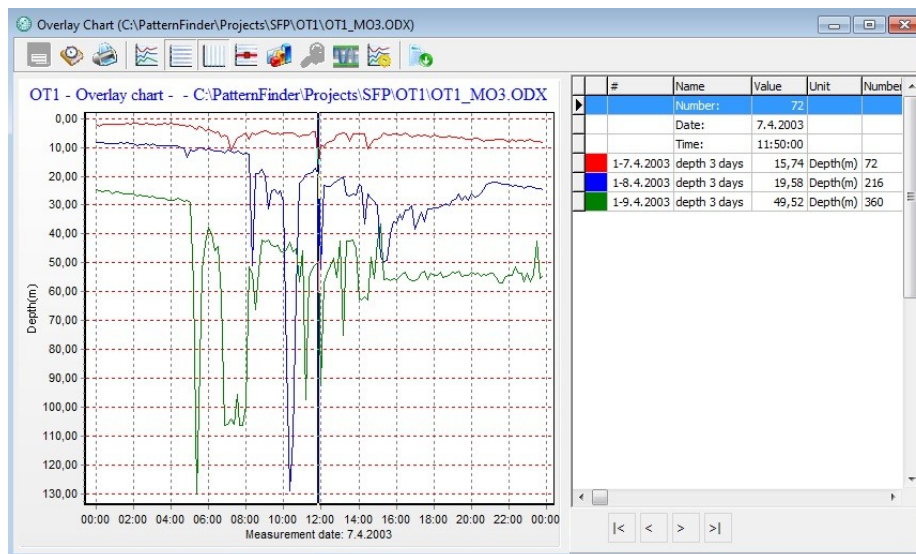


Figure 10.14 Overlay chart

In the chart all the values have been distributed over a one day period.

### 10.5 Overlay Statistics

To do a statistical analysis on the overlaid chart, activate the chart and click the **Overlay statistics** button on the main toolbar.

The following window appears:

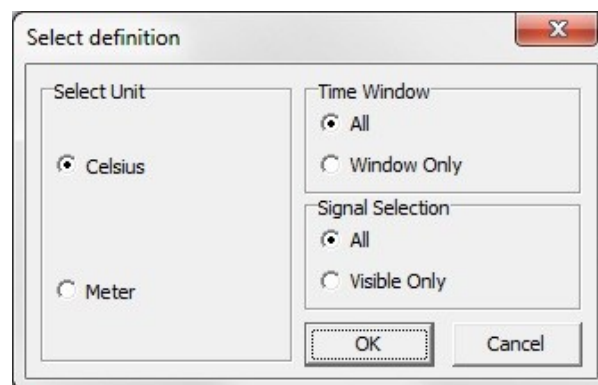


Figure 10.15 Select unit

Select the unit you want to analyze under **Select Unit**. You can analyze the whole data by selecting **All** under **Time Window** or only the zoomed data by selecting **Window Only**.

You can analyze all of the signals by selecting **All** under **Signal Selection** or only the selected signal by checking **Visible Only**.

Click **OK** and a statistics chart appears:

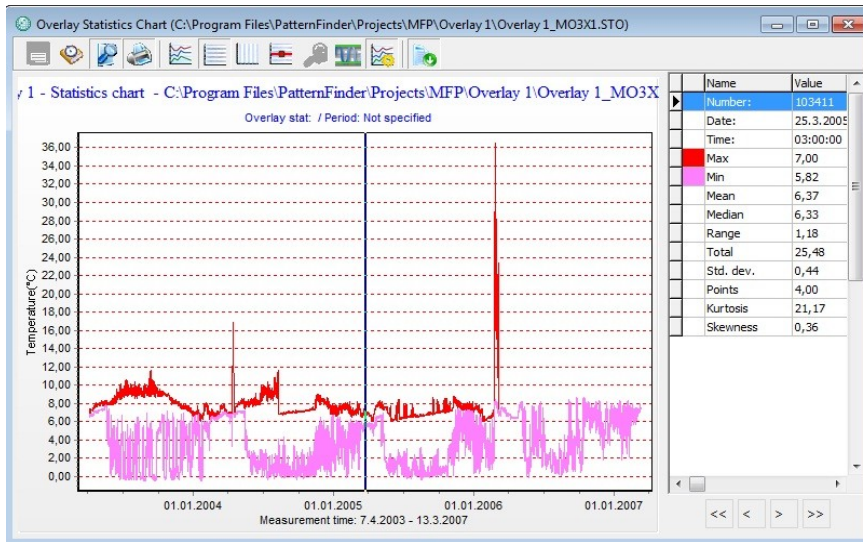


Figure 10.16 Overlay statistics chart

Each point in the chart represents a statistical value for each time stamp in the overlay chart. If points in the overlay chart do not match in time, PF will interpolate the signals.

Save the chart and a STO file will be created.

There are 12 parameters in total, each with its own color. By moving the cursor on the chart the value for each parameter is shown in the table on the right side of the chart (see figure 10.17).

	Name	Value	Unit
▶	Number:	35392	
	Date:	8.12.2003	
	Time:	18:30:00	
	Max	7,75	Temp(°C)
	Min	6,28	Temp(°C)
	Middle	7,02	Temp(°C)
	Mean	7,16	Temp(°C)
	Median	7,44	Temp(°C)
	Range	1,47	Temp(°C)
	Total	21,47	Temp(°C)
	Std. dev.	0,63	Temp(°C)
	RSD	8,84	Percent(%)
	Points	3,00	Count()
	Kurtosis	0,00	Arb.()
	Skewness	-1,43	Arb.()

Figure 10.17 Table



The table lists the following parameters:

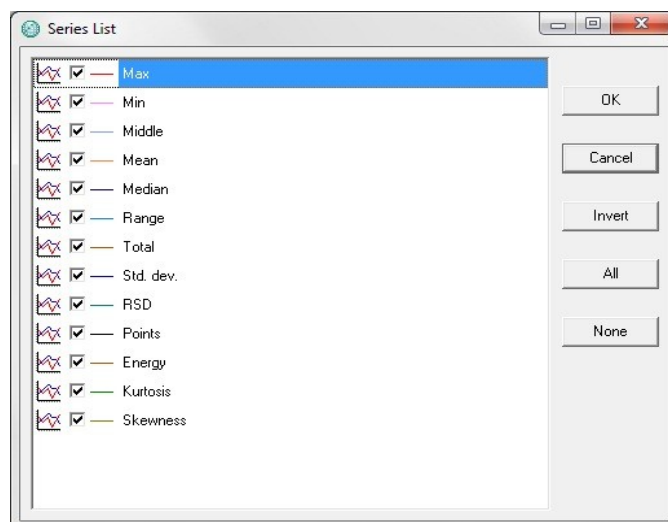
**Number of the period**

**Date of the period**

**Time of the period**

- **Max:** Maximum value
- **Min:** Minimum value
- **Middle:** The average of the max and min value
- **Mean:** The standard average value
- **Median:** The mid value in the sequence of measurements arranged by amplitude
- **Range:** The difference between max and min
- **Total:** The sum of all the signal values in a singular point.
- **Std. Dev.:** Standard deviation
- **RSD:** Relative standard deviation
- **Points:** Number of signal points in the period
- **Kurtosis:** A measure of the “peakedness” of the distribution and how it varies from the normal distribution. A zero value indicates a normal distribution. A positive value indicates a peaked distribution while a negative value indicates a flat distribution.
- **Skewness:** A measure of the asymmetry of the distribution and how it differs from a normal distribution. A zero value indicates a normal distribution. A positive value indicates a positively skewed distribution while a negative value indicates a negatively skewed distribution.

To select the parameters you want to view in the chart, click the **Active Series** button on the chart bar and the following window appears:



*Figure 10.18 Active Series*

In the chart below, all the parameters have been selected.

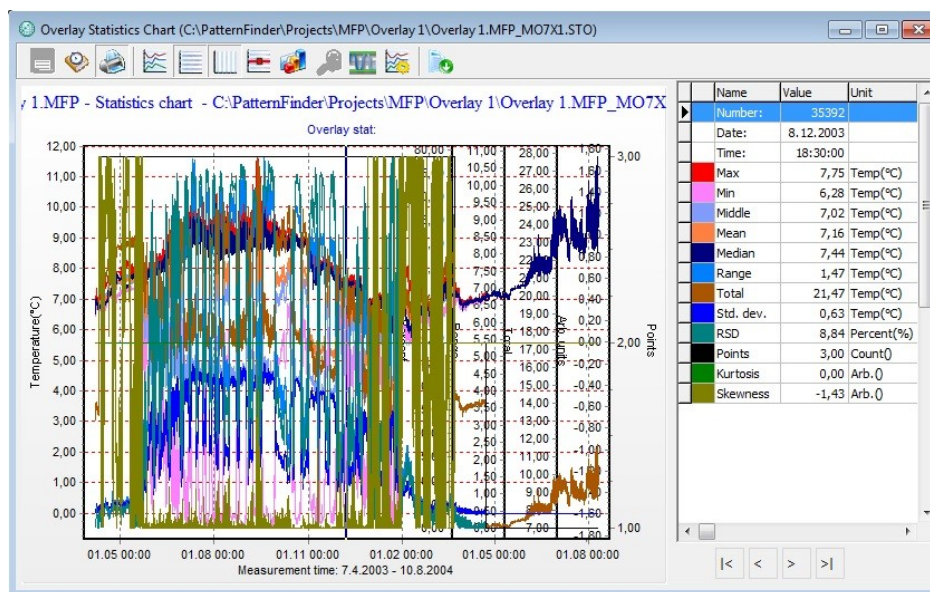


Figure 10.19 Overlay statistics chart

Save the chart and a STO file will be created.

### 10.6 Extract signal from STO file

To extract a signal from the STO file, click the **Select signal to signal chart** button on the main toolbar and the following window appears:

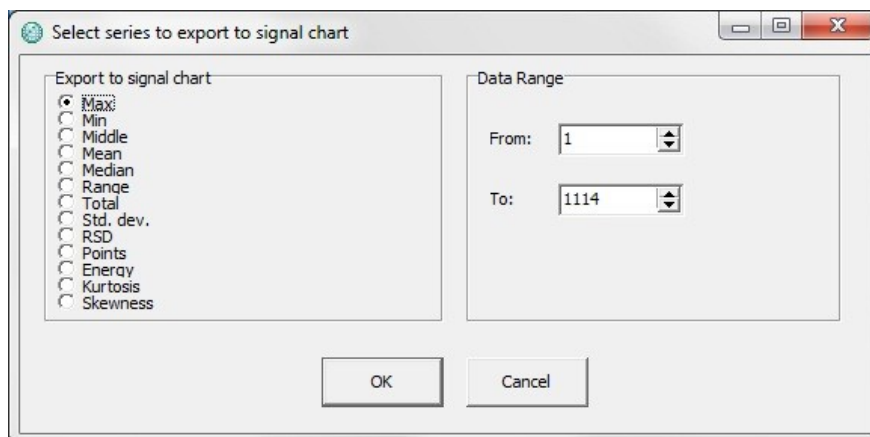


Figure 10.17 Select series to export to signal chart

Select the signal and the data range you want to extract.

Click **OK** and a chart displaying the extracted signal appears:

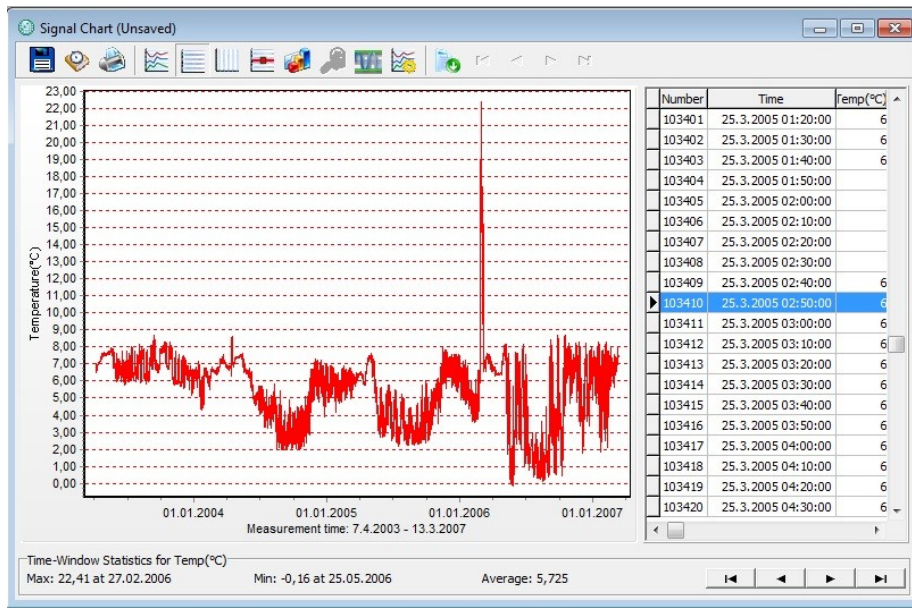


Figure 10.18 Signal chart

## 11. Event Analysis

As the name indicates, events are a state of the signal that has a beginning and an end.

There are four types of events:

1. Manual
2. Ambient/level
3. Behavioral
4. Multiple

### 11.1 Manual events

Open or create a project and click the **Create Event Chart** button on the main toolbar. The following window appears:

The 'Create Event Graph' dialog box is shown with the following configuration:

- 1. Select series for event chart:** Depth(m) is selected.
- 2. Select parameter type:** Manual is selected.
- 3. Set event conditions (behavioral only):**
  - Define minimum event duration: Minimal number of points: 2
  - Define minimum event amplitude: Absolute value (m): 11,576
- 4. Define amplitude levels:**
  - Number of levels: 5
  - Automatic definition: checked
  - Level ranges:
    - L1: from 2,54 to 48,84
    - L2: from 48,84 to 95,15
    - L3: from 95,15 to 141,45
    - L4: from 141,45 to 187,76
    - L5: from 187,76 to 234,06
  - Status: OK

Figure 11.1 Create event graph

To create a manual event, do the following:

1. Select series for event chart
2. Select type of event, in this case **Manual**
3. Click **OK**

An event chart appears:

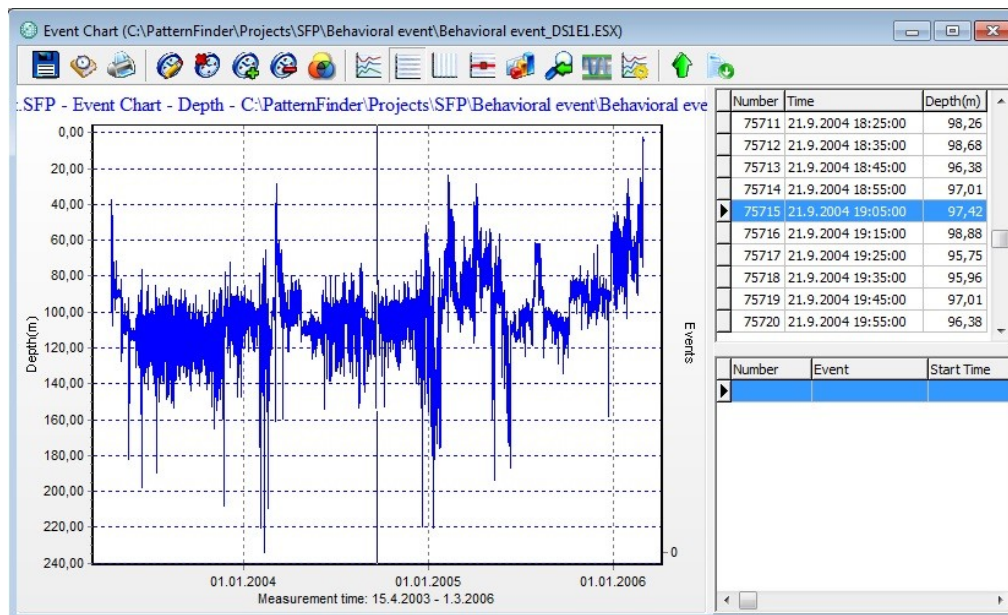


Figure 11.2 Event chart

## Event chart bar

There are five event operation buttons in the event chart (these options are available on every type of events charts: manual, ambient, behavioral, multiple):



### Edit Event Types

Click this button to edit the name, description and color of an event type



### Delete Event Type

Click this button to delete an event type



### Mark an Event

Click this button to create a new event type and mark an event on the chart.



### Remove Selected Event

Click this button to remove an event from the chart

 **Event operations**

 **Disable/show data series**

 **Histogram**

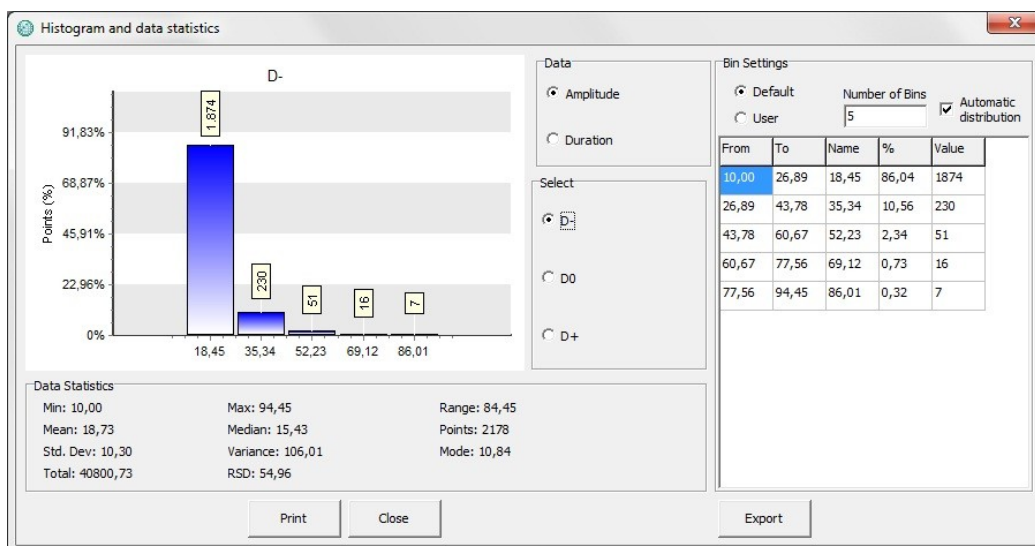


Figure 11.3 Event histogram

The event histogram has the same functions as the DAT histogram except that you can view the data either by **Amplitude** or **Duration**.

 **Export**

The multiple event file can be exported to **Theme** for further analysis. See chapter 14 for further instructions.

**Create an event type**

Before creating an event the user has to create an event type.

Click the **Mark an event** button on the chart bar. The following window appears:

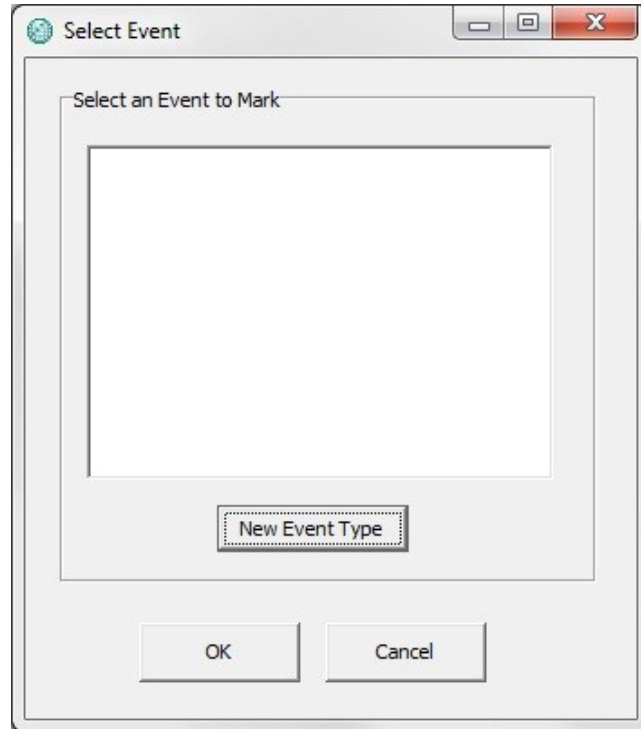


Figure 11.4 New Event Type

Select **New Event Type** and the following window appears:

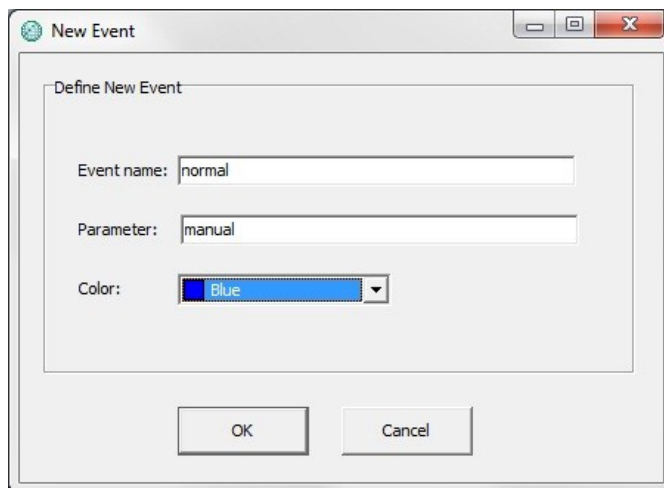


Figure 11.5 New event

Insert the event name and the parameter and choose a color.

The event will be added to the list of event types (see figure 11.6).

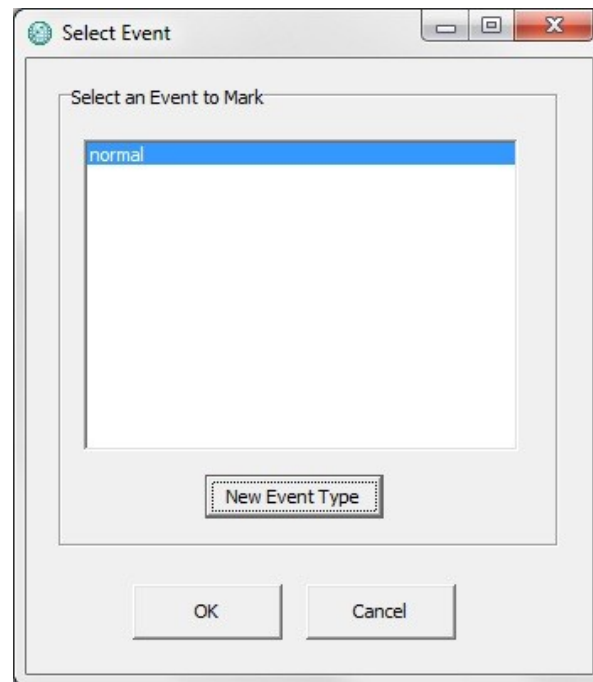


Figure 11.6 New Event Type

## Mark an event

To mark an event on the chart you first need to position the cursor on the point where you want to begin the event and click the **Mark an event** button on the chart bar.

Select an event type from the list (see figure 11.7).

Click **OK** and the following window appears:

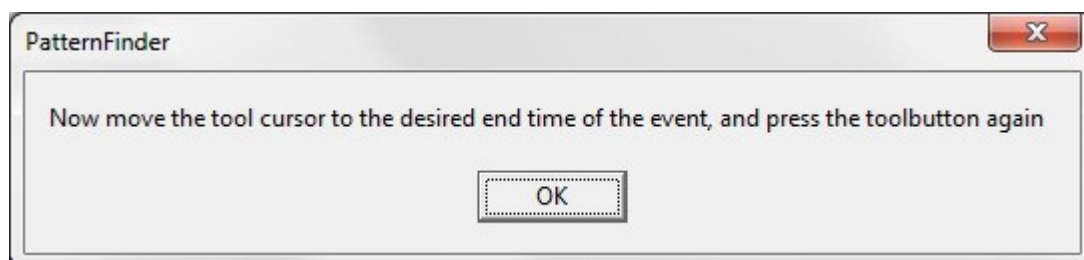


Figure 11.7 PatternFinder

Move the cursor to the point where you want to end the event and click the **Mark an Event** button again.

The event will be marked on the chart as can be seen in figure 11.8.



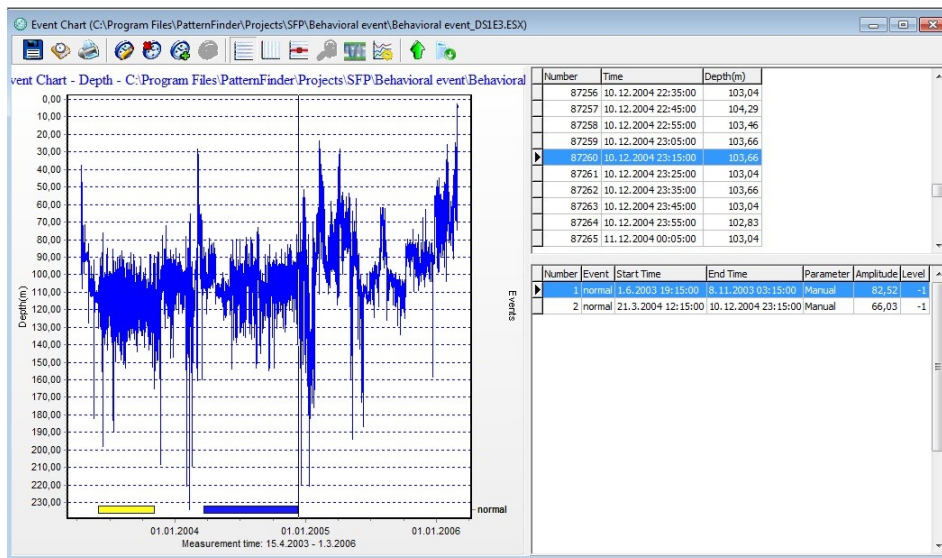


Figure 11.8 Event chart

To remove an event from the chart, highlight the event and click the **Remove Selected Event** button.

You can edit the name, description and color of the event type by clicking the **Edit Event Types** button (see figure 11.9).

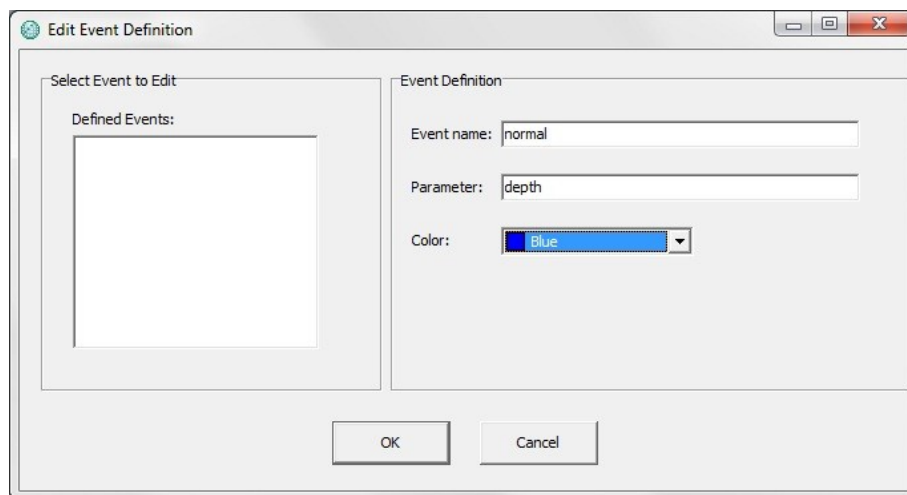


Figure 11.9 Edit Event Definition

You can also delete the event type by clicking the **Delete Event Type** button (see figure 11.10).

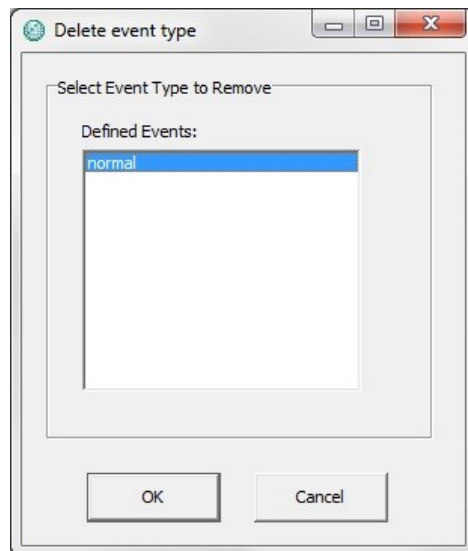


Figure 11.10 Delete event type

## 11.2 Ambient/level events

An ambient event is basically a level event analysis

Open or create a project and click the **Create Event Chart** button.

The following window appears:

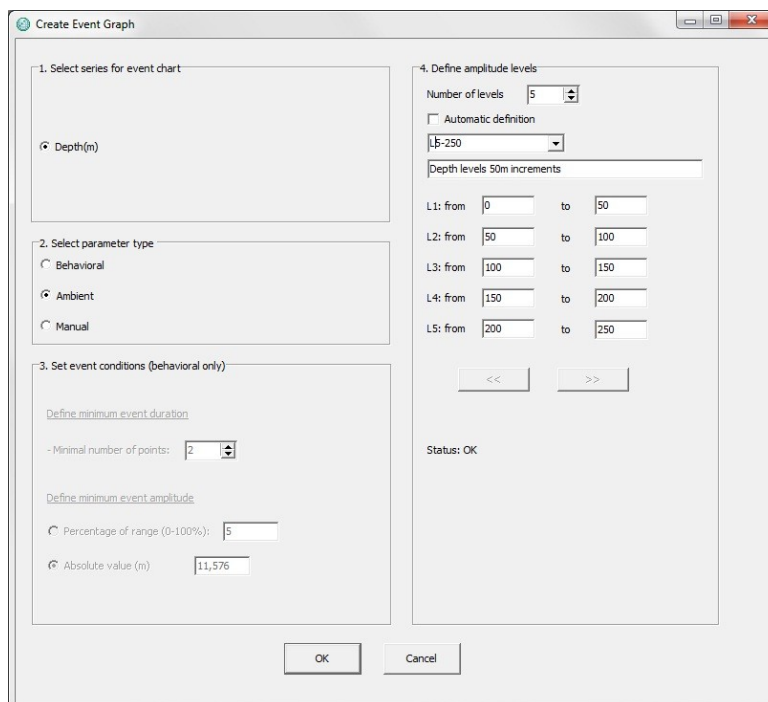


Figure 11.11 Create Event Graph

To create an ambient/level event, do the following:

1. Select series for event chart
2. Select type of event, in this case **Ambient**.
3. Define amplitude levels

Define the number of levels and the range of each level. You can either insert the levels manually or check the **Automatic definition** box and let PF automatically define the levels based on the range of the signal.

The level definition can be saved as a template so when comparing multiple signals you can have the same reference for all the signals. The user inserts a name and description of the template. The template is saved when the event analysis is activated. If the template already exists the user will be asked if he wants to overwrite the template.

If the template has already been saved the user can reuse it by selecting it from the drop-down list (see figure 11.11).

Once you have defined the levels click **OK** and an event chart appears:

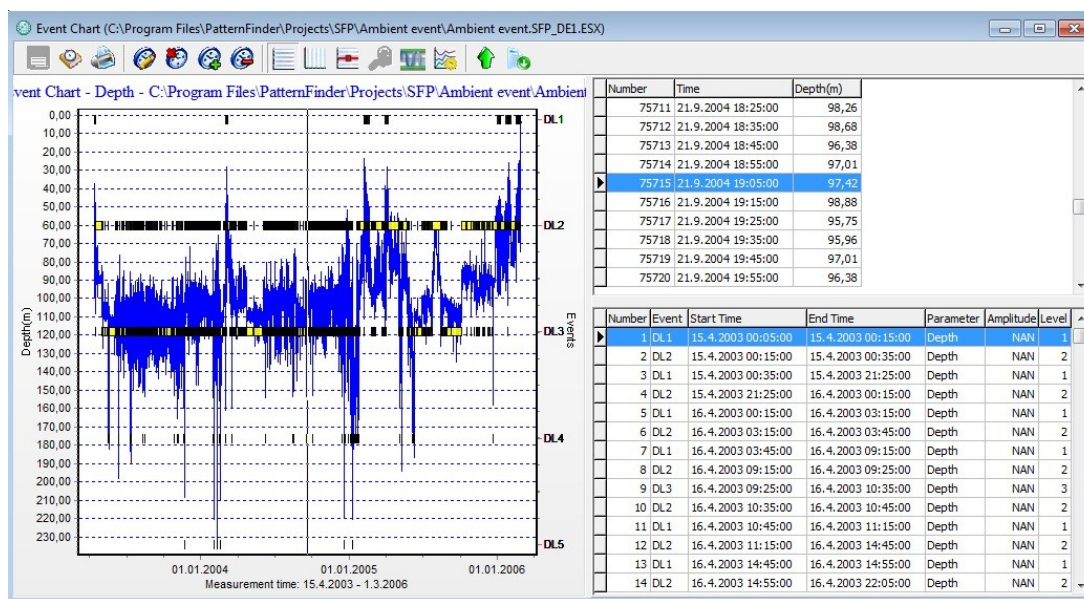


Figure 11.12 Event chart: ambient

The event chart is divided into two, the graphical view and the table section.

The events are displayed in a Gantt diagram fashion in the graphical view. The levels are visible on the right axis of the chart. The number of events and levels is the same.

The table section is also divided into two parts, the signal view and the event table. The signal view is similar to the ones found in the DAT and SDX charts. In the event table, every occurrence of the level events is represented in a chronological order. Each level event has a number, description, start time and end time. No two events can overlap.

By zooming in on the chart and clicking on a particular event, the event is highlighted in the event table (see figure 11.13).

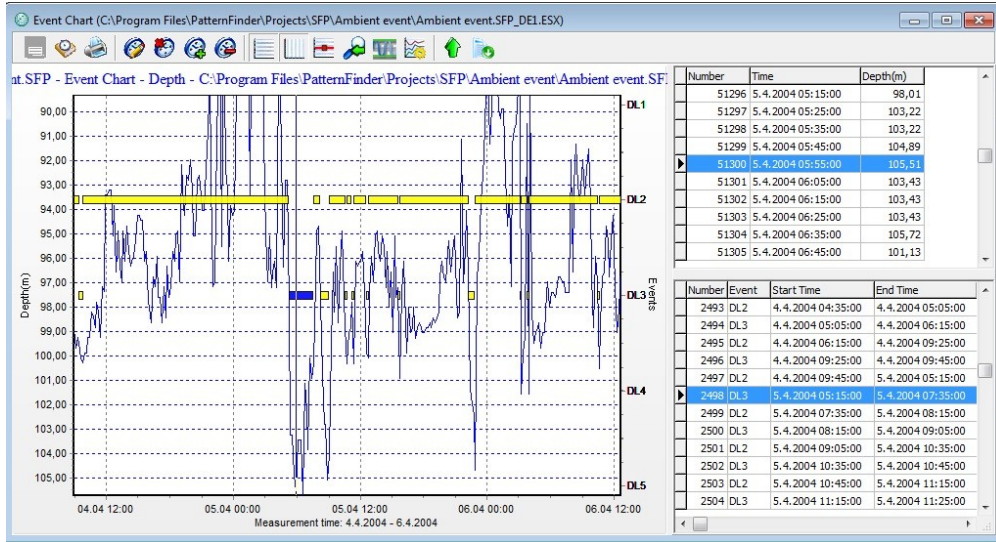


Figure 11.13 Event chart: zoom

### 11.3 Behavioral Event Analysis

Open or create a project and click the **Create Event Chart** button.

The following window appears:

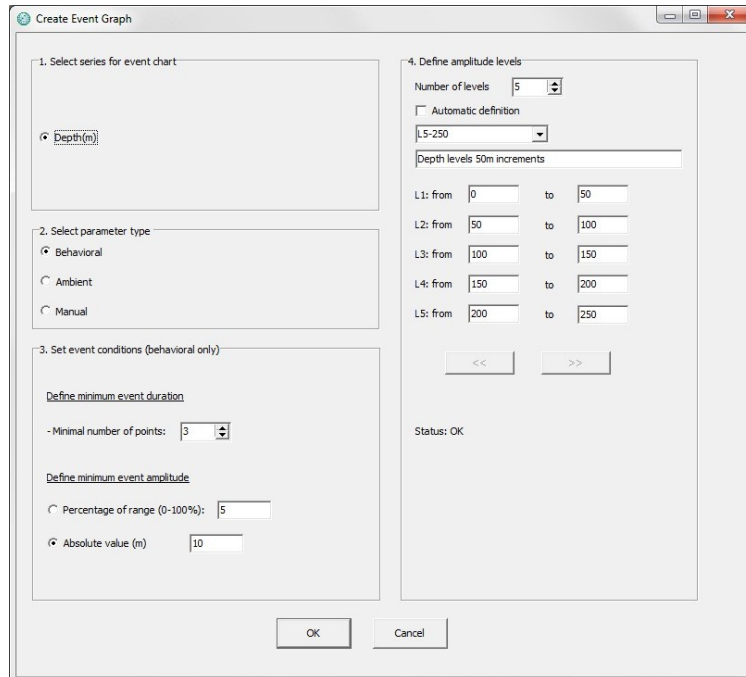


Figure 11.14 Create event chart

To create a behavioral event, do the following:

- 1 Select series for the event chart
- 2 Select type of event, in this case **Behavioral**.
- 3 Set event conditions
  - Define minimum event duration (in points) and minimum event amplitude.
- 4 Define the amplitude levels

Click **OK** and an event chart appears:

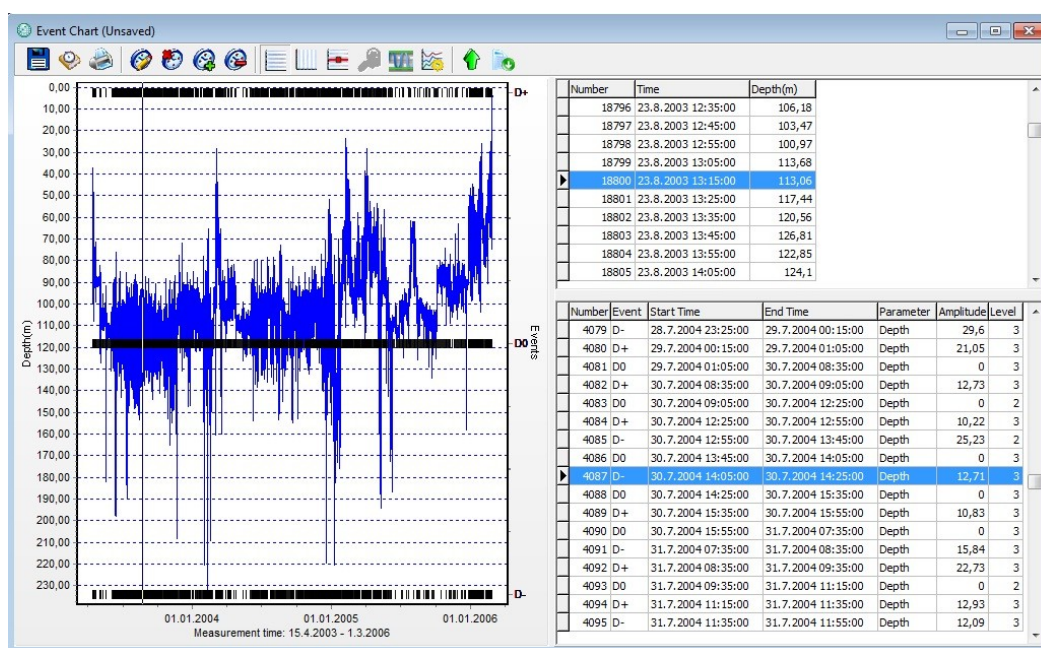


Figure 11.15 Event chart: behavioral

In figure 11.15, there are three events, (D stands for Depth):

1. D+ = upwards movement,
2. D- = downwards movement
3. D0 = no movement, which can be seen as a interval between events

## 11.4 Multiple Event Analysis

All types of events can be used in multiple events analysis: manual, ambient and/or behavioral.

To create a multi event chart, click the **Create Multi Event Chart** button

A window listing the events appears:

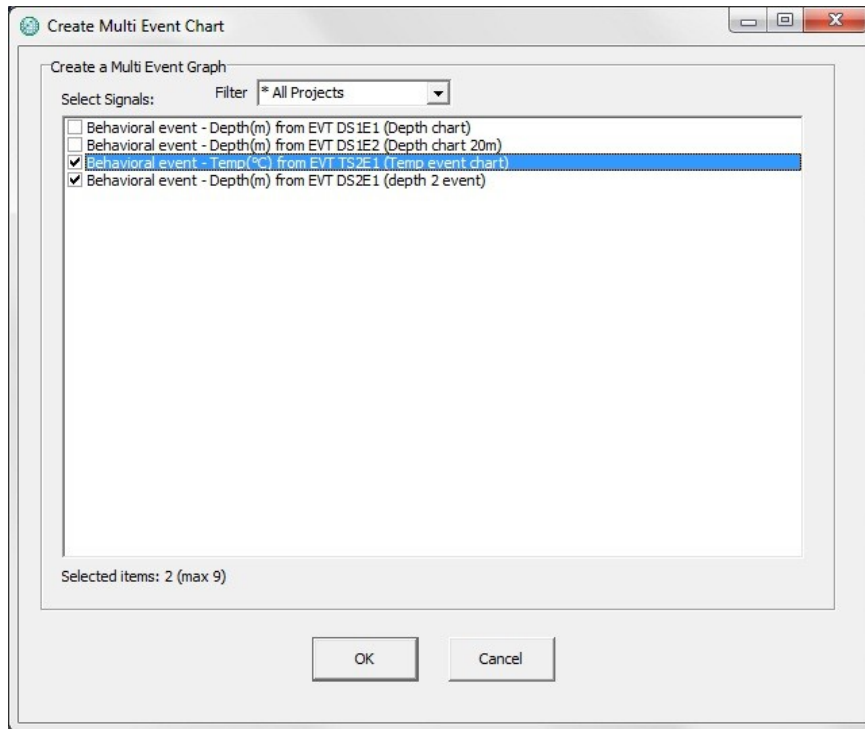


Figure 11.16 Create multi event chart

You can filter the signals by selecting one of the options in the drop-down list (see figure 11.17).

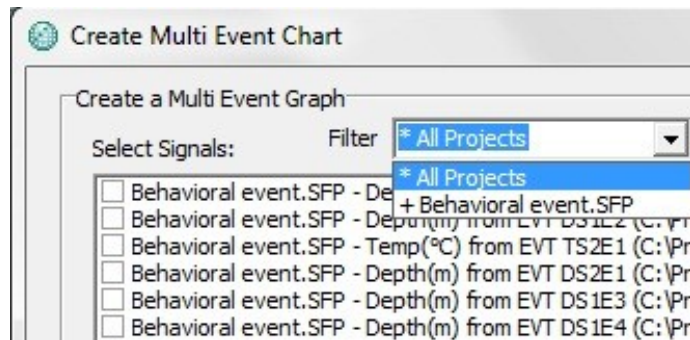


Figure 11.17 Filter

Select the events you want to include in the chart and click **OK**. A Multi Event Chart appears:

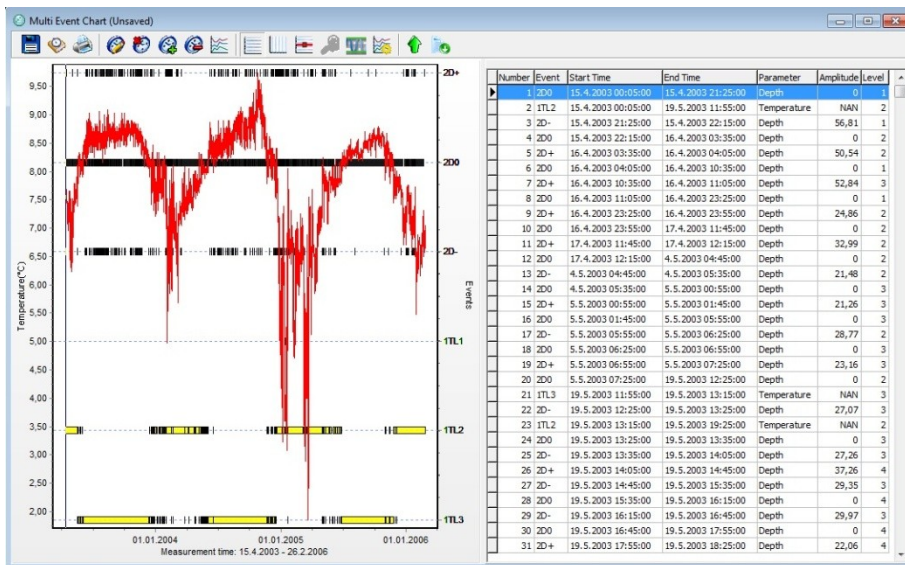


Figure 11.18 Multi event chart

You can only view one signal at a time. To switch between signals click the **Active series** button on the chart bar.

The following window appears:

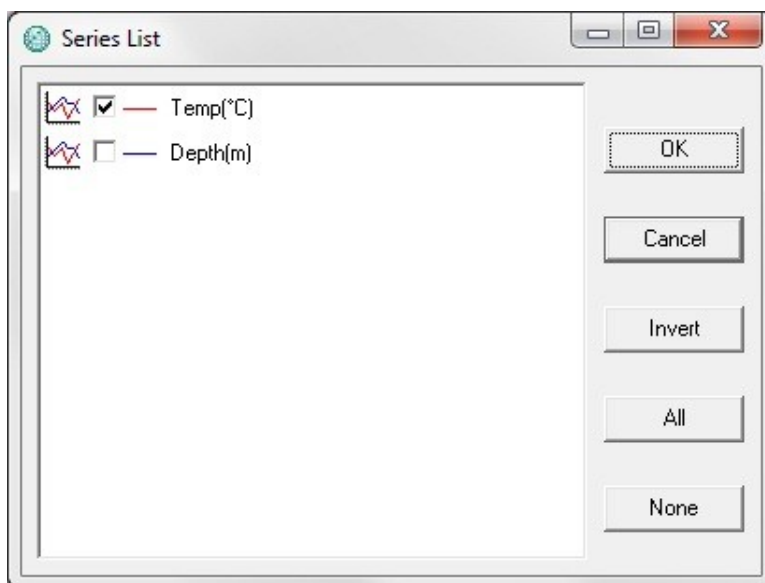


Figure 11.19 Series list

Select the signal you want to view on the chart and click **OK**.

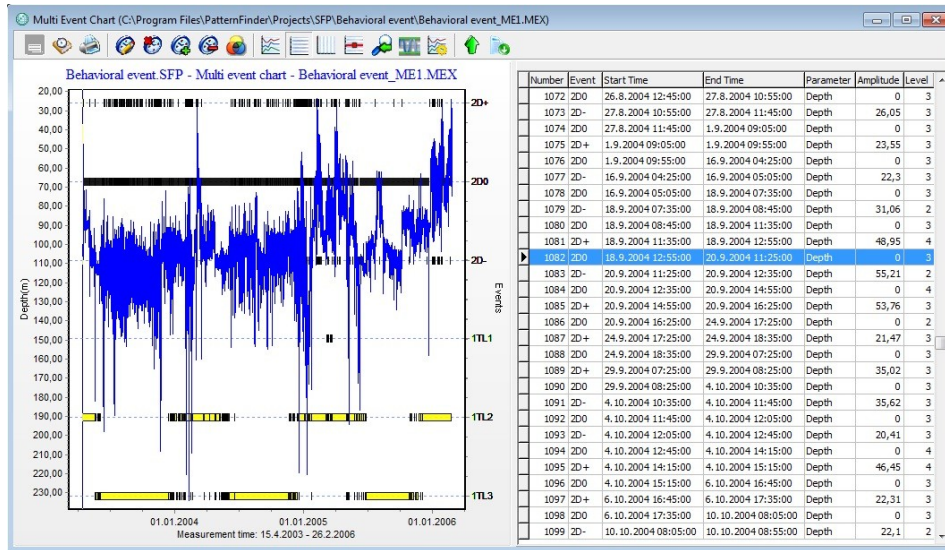


Figure 11.20 Multi event chart

## 11.5 Event operations

Click the Event operations button on the event chart bar and the following window appears:

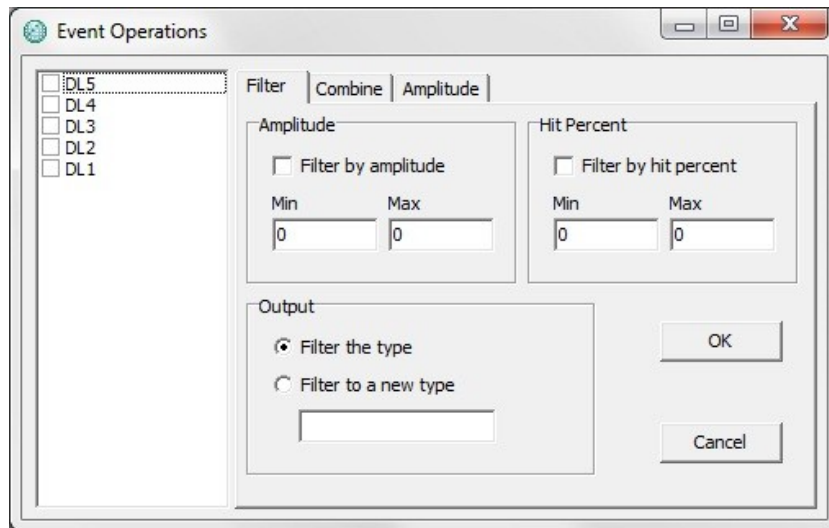


Figure 11.21 Event operations

The window on the left lists the event types. Only the checked events will be used.



## Filter

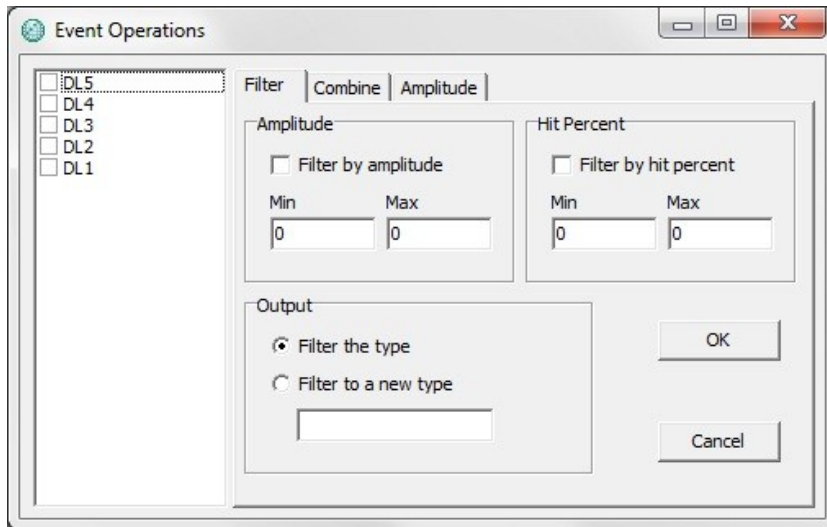


Figure 11.22 Filter

**Amplitude:** Check **Filter by amplitude** to use this option. The values must be within the defined range.

**Hit percent:** Check **Filter by hit percent** to use this option. The values must be within the defined range.

### Output

**Filter the type:** All event occurrences outside the filter are removed.

**Filter to a new type:** All event occurrences within the range are included in a new event type. Insert a name for the new type.

## Combine

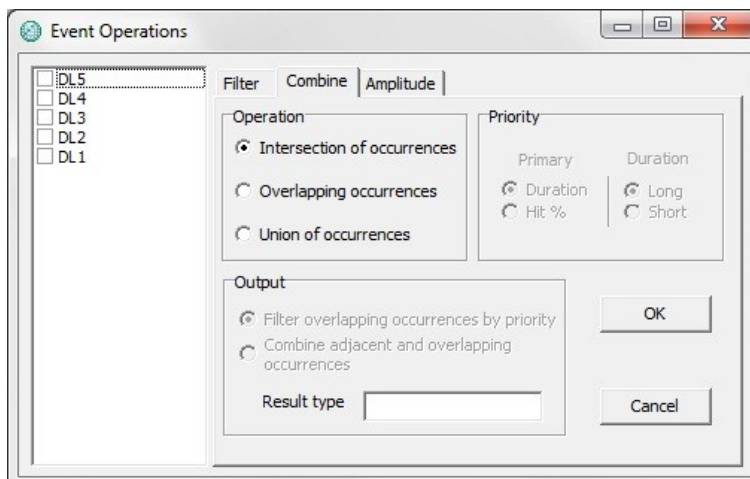


Figure 11.23 Combine: Intersection of occurrences

### Operation

**Intersection of occurrences:** Check this option to find intersecting occurrences. A new event type with all the intersecting occurrences is created (see figure 11.23).

**Overlapping occurrences:** Check this option to find overlapping occurrences (see figure 11.24). The resulting pattern types cannot intersect.

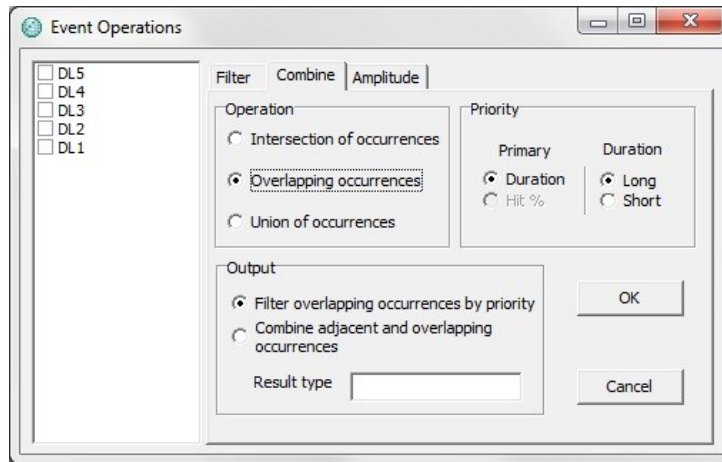


Figure 11.24 Overlapping occurrences

**Priority:** There are two filters. The user needs to select which one is primary. **Duration** filters the overlapping event occurrences by length. **Hit %** filters the overlapping event occurrences with the higher hit percentage.

Check **Filter overlapping occurrences by priority** in **Output** to activate the **Priority** option.

By checking **Combine adjacent and overlapping occurrences** in **Output** all the overlapping occurrences will be combined into a single occurrence.

**Union of occurrences:** Finds all occurrences (see figure 11.25). The resulting event types cannot intersect. **Priority** works the same.

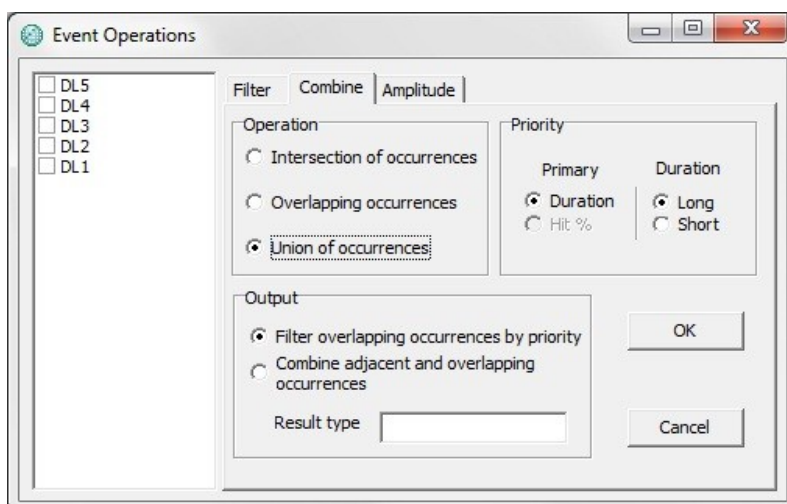


Figure 11.25 Union of occurrences

## Amplitude

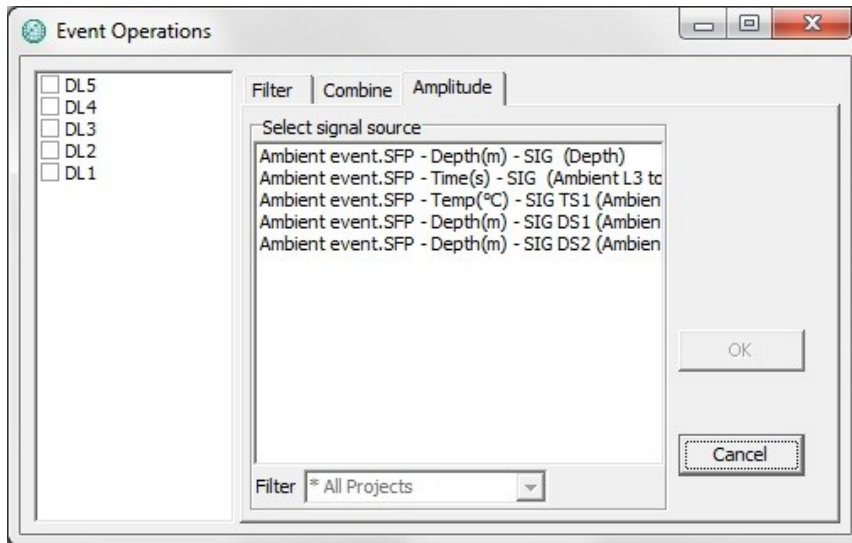


Figure 11.26 Amplitude

**Amplitude** recalculates the amplitude using a new source. Select the event types you want to recalculate and choose the signal source. Note that only overlapping values are recalculated.

Figure 11.27 shows the final results after all the operations have been performed.

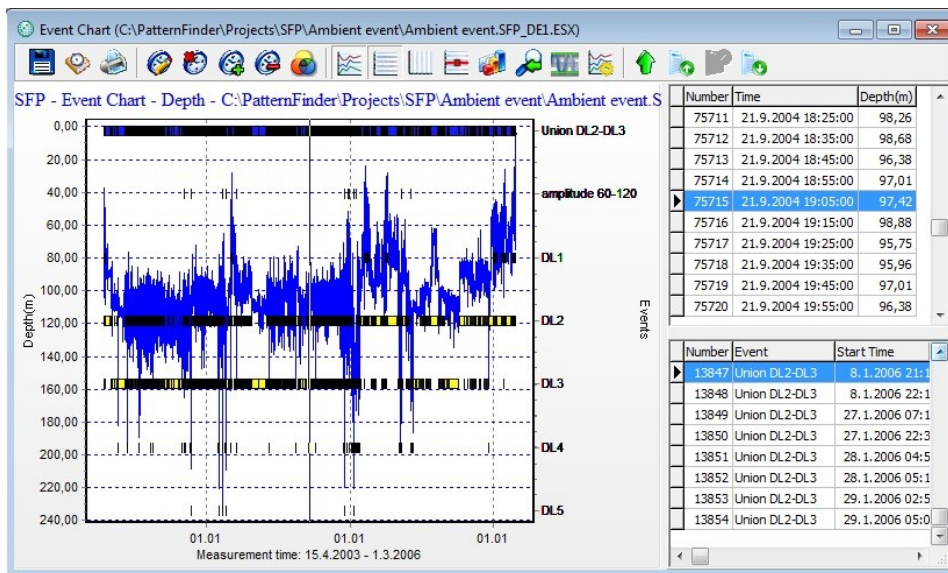


Figure 11.27 Event operations

## 11.6 Event periodic statistics

To perform an event periodic statistics analysis, open an event chart and click the **Event period statistics** button on the main toolbar.

The following window appears:

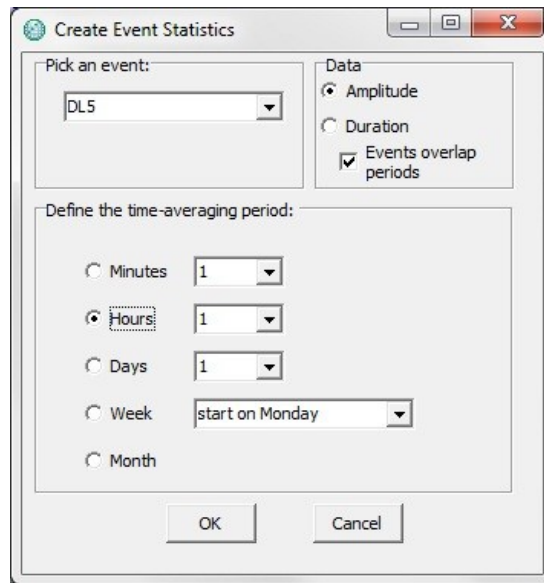


Figure 11.28 Create event statistics

Select the event and the time-averaging period you want to analyze.

The user can choose to perform a statistical analysis either by **Amplitude** or **Duration**. By checking **Events overlap periods** events that extend over two or more periods are split between periods.

Click **OK** and then an Event periodic statistics chart appears:

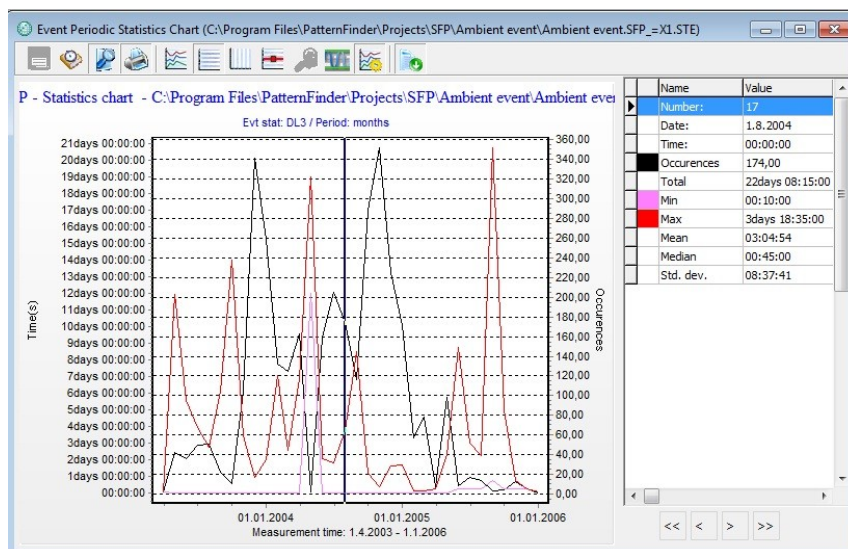


Figure 11.29 Event periodic statistics chart

There are ten different parameters, each with its own color. By moving the cursor on the chart the value for each parameter is shown in the table on the right side of the chart (see figure 11.30).

	Name	Value	Unit
▶	Number:	18	
	Date:	1.9.2004	
	Time:	00:00:00	
	Max	734400,00	Time(s)
	Min	600,00	Time(s)
	Middle	367500,00	Time(s)
	Occurrences	116,00	Count()
	Total	2037600,00	Time(s)
	Mean	17565,52	Time(s)
	Median	1800,00	Time(s)
	Std. dev.	79013,04	Time(s)
	RSD	449,82	Percent(%)
	Rel. Dur.	78,61	Percent(%)

Figure 11.30 Table

The table lists the following parameters:

**Number:** The number of the period

**Date:** The date of the period

**Time:** The time of the period

- **Max:** Maximum duration of an event
- **Min:** Minimum duration of a event
- **Middle:** The average of max and min
- **Occurrences:** Number of event occurrences
- **Total:** The combined total duration of all the events
- **Mean:** The standard average event duration
- **Median:** The mid value in the sequence of events arranged by duration
- **Std. dev.:** The Standard deviation of the events' duration
- **RSD:** The relative standard deviation
- **Rel. Dur.:** The relative duration

Save the chart and a STE file will be created.

To select the parameters you want to view in the chart, click the **Active Series** button on the chart bar. The following window appears:

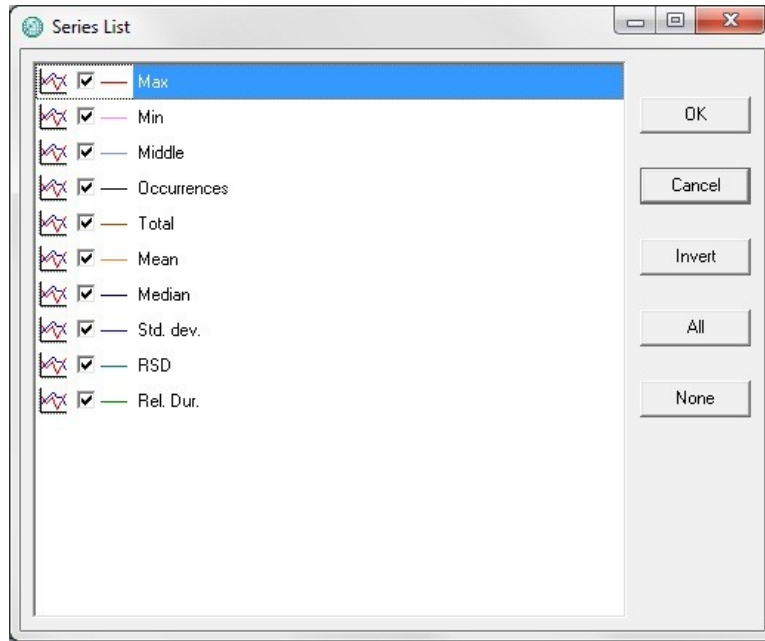


Figure 11.31 Series list

Select the parameters you want to view and click OK.

In figure 11.32 all the parameters have been selected

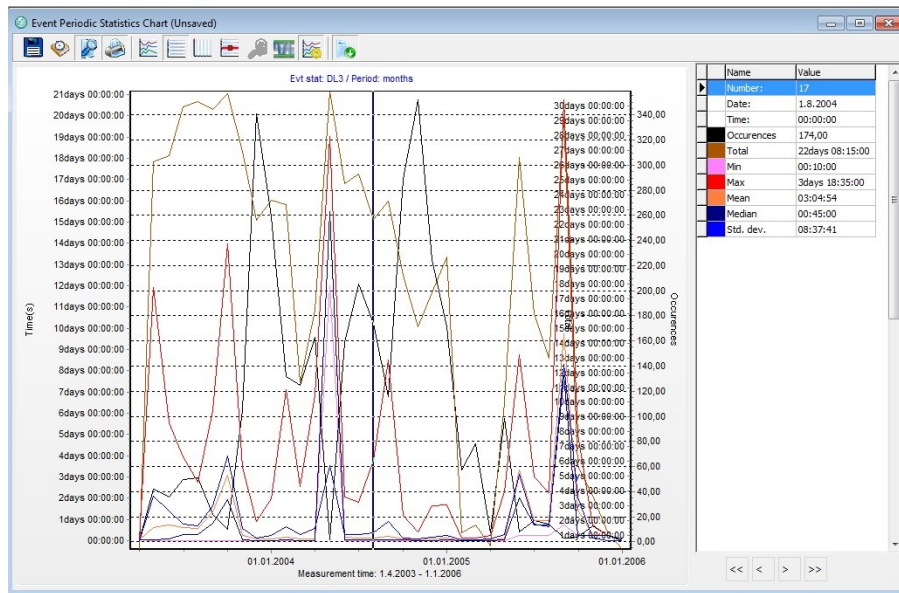


Figure 11.32 Event periodic statistics chart

## 11.7 Extract signal from STE file

To extract a signal from the STE file, click the **Select signal to signal chart** button on the main toolbar and the following window appears:

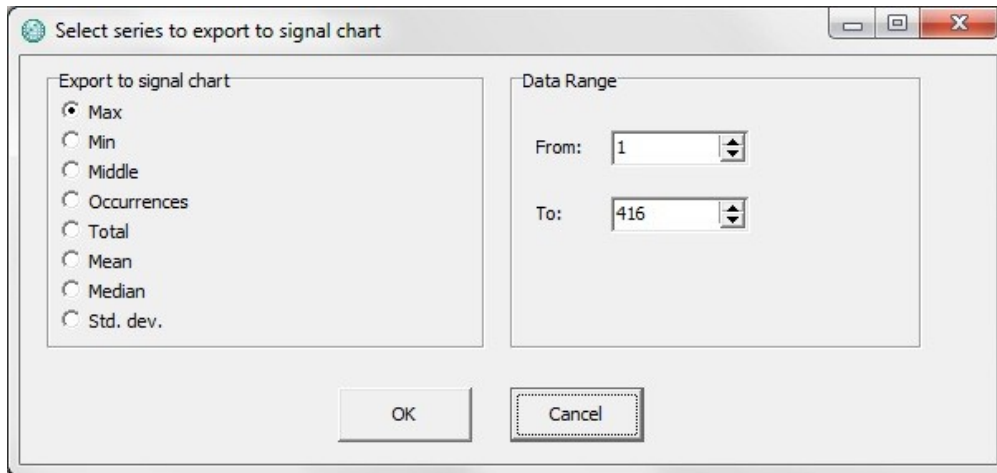


Figure 11.33 Select series to export to signal chart

Select the signal and the data range you want to extract. Click **OK** and a chart displaying the extracted signal appears:

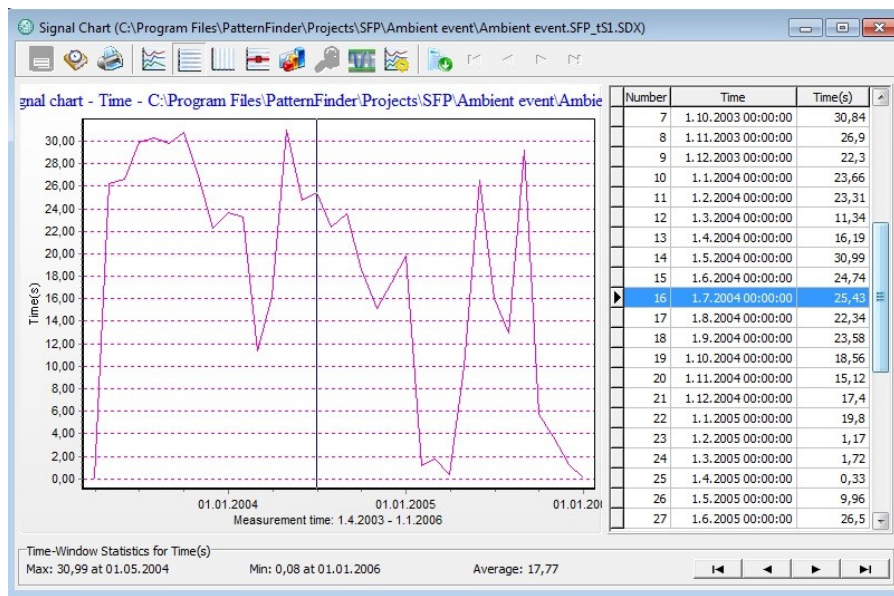


Figure 11.34 Signal chart

## 12. Pattern analysis

Pattern analysis is based on user defined patterns that can be saved as templates and used repeatedly

### 12.1 Manual patterns

Open a PSX or a MPX file.

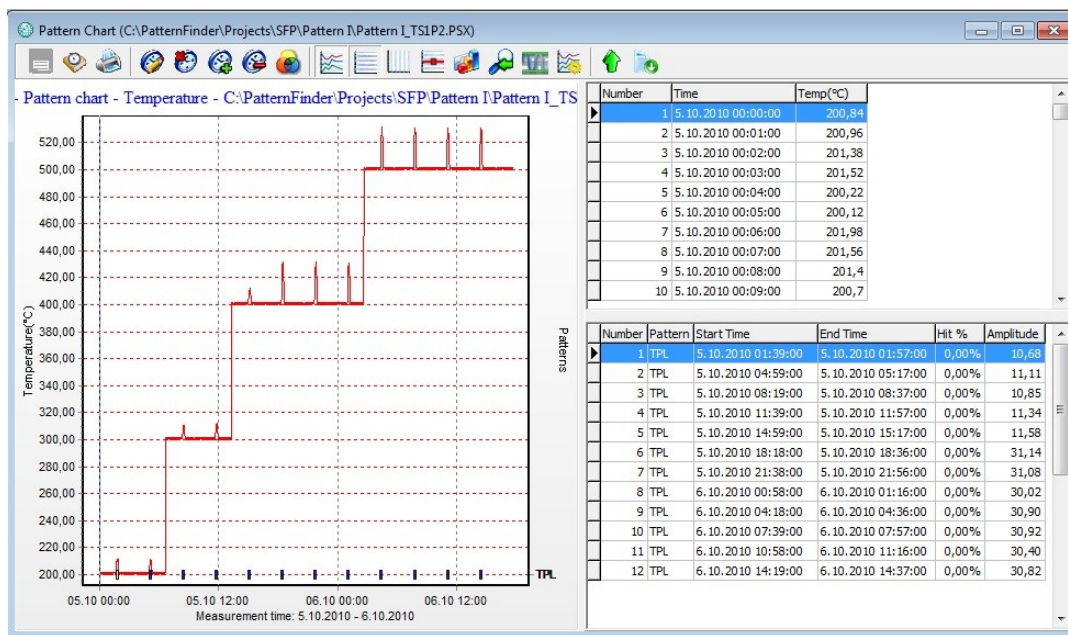


Figure 12.1 Pattern chart

There are five pattern operation buttons in the pattern chart:



**Edit pattern types**



**Delete pattern type**



**Add pattern occurrence**



**Remove selected pattern occurrence**



**Pattern operations**





### Disable/show data series



### Histogram

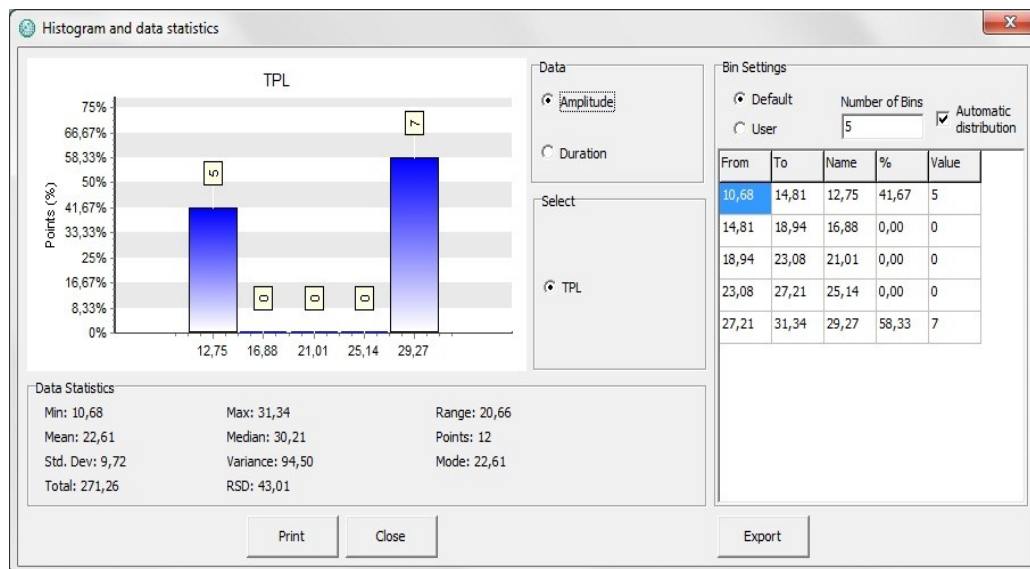


Figure 12.2 Pattern histogram

The pattern histogram has the same functions as the DAT histogram except that you can view the data either by **Amplitude** or **Duration**.

### Add pattern occurrence

To mark a pattern on the chart you first need to position the cursor on the point where you want to place the pattern and click the **Add pattern occurrence** button on the chart bar.

A drop-down menu appears. Select the pattern type.



Figure 12.3 Add pattern occurrence

The pattern will be marked on the chart as can be seen in figure 12.4.

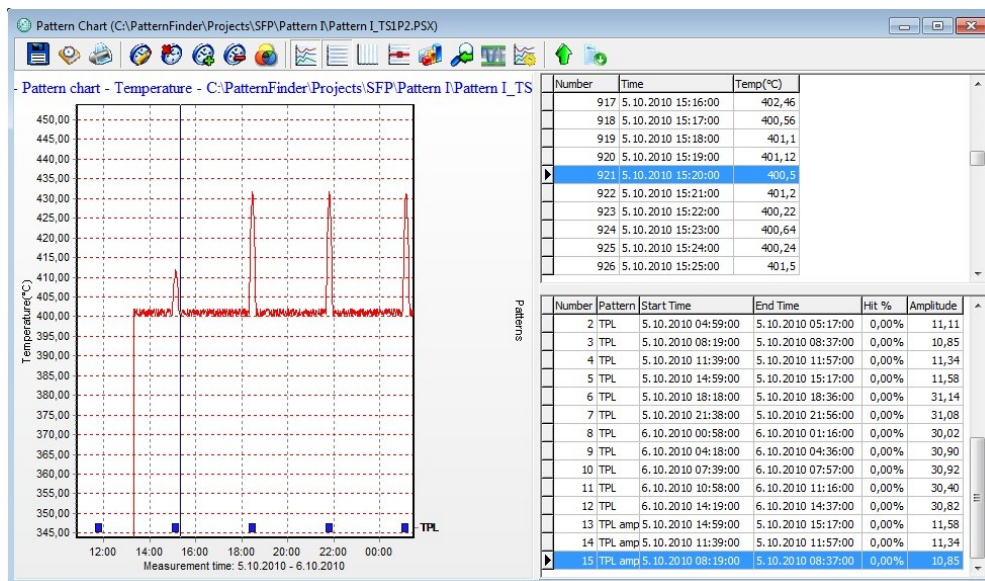


Figure 12.4 Add pattern occurrence

### Remove selected pattern occurrence

To remove a pattern from the chart, highlight the pattern and click the **Remove selected pattern occurrence** button.

You can edit the name, description and color of the pattern type by clicking the **Edit pattern types** button (see figure 12.5).

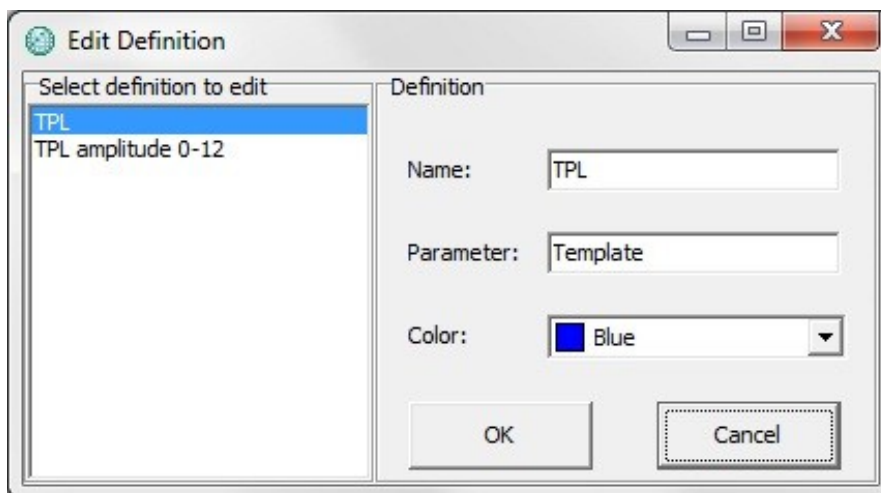


Figure 12.5 Edit pattern types

You can also delete the pattern type by clicking the **Delete pattern type** button.

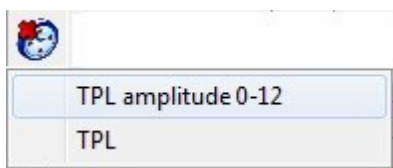


Figure 12.6 Delete pattern type

A drop-down menu appears. Select the pattern type you want to delete (see figure 12.6).

## 12.2 Creating user defined patterns

Create or open a project and click the **Create Pattern Chart** button on the toolbar

The following window appears:

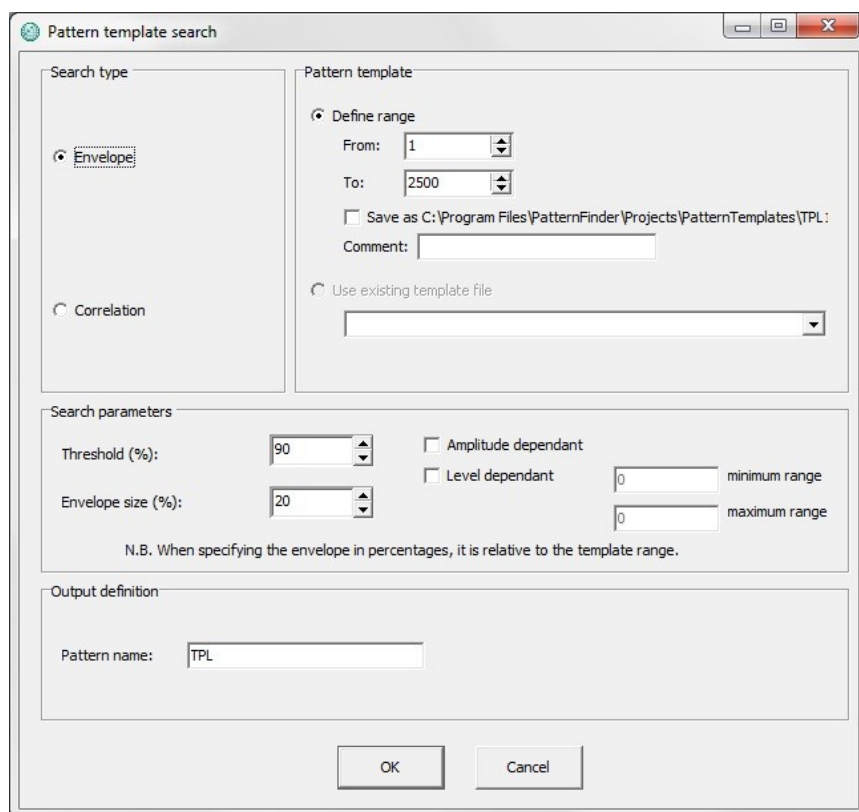


Figure 12.7 Pattern template search

There are two main options when performing a pattern search:

## Correlation:

This method is based on cross-correlation. It finds patterns independent of level and amplitude.

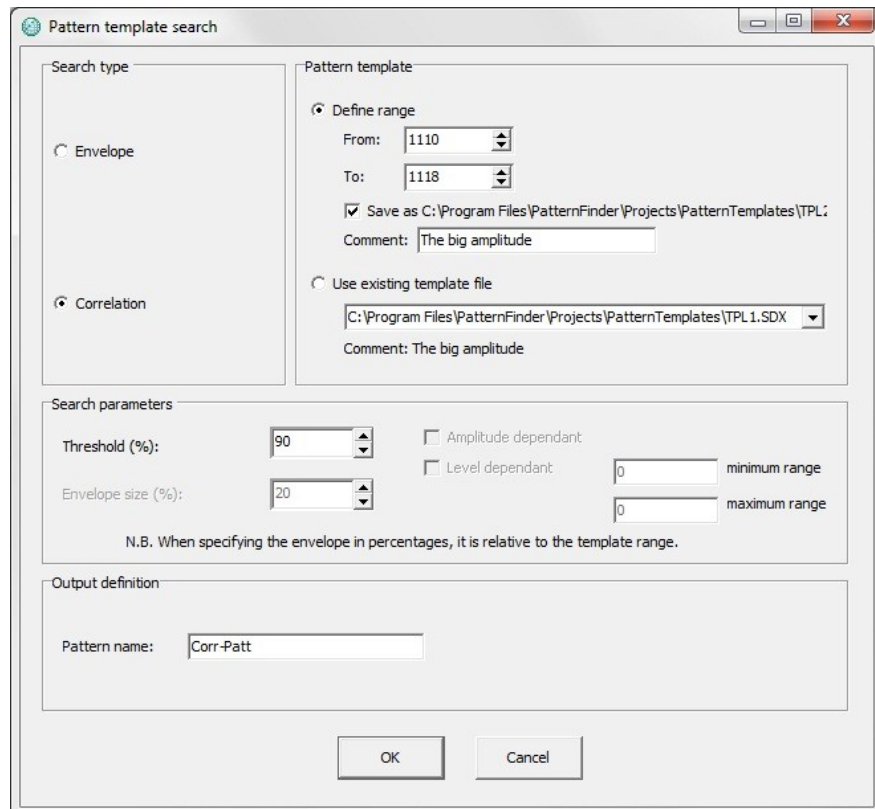


Figure 12.8 Pattern template search: correlation

1. Under **Search type** select **Correlation**
2. Under **Pattern template** you can create a pattern template by defining the range you want to use. Check the **Save as** box if you want to save the template and add a comment about the template. The template is always saved in: Projects\PatternTemplates\TPL (next available number).SDX. If the template already exists, check **Use existing template file** and select a template from the drop-down list.
3. Under **Search parameters** define the **Threshold**. The **Threshold** is the definition of how well the signal matches the template in percentages.
4. Under **Output definition/Pattern name** enter a name for the pattern in the chart.

Click OK and a pattern chart appears:

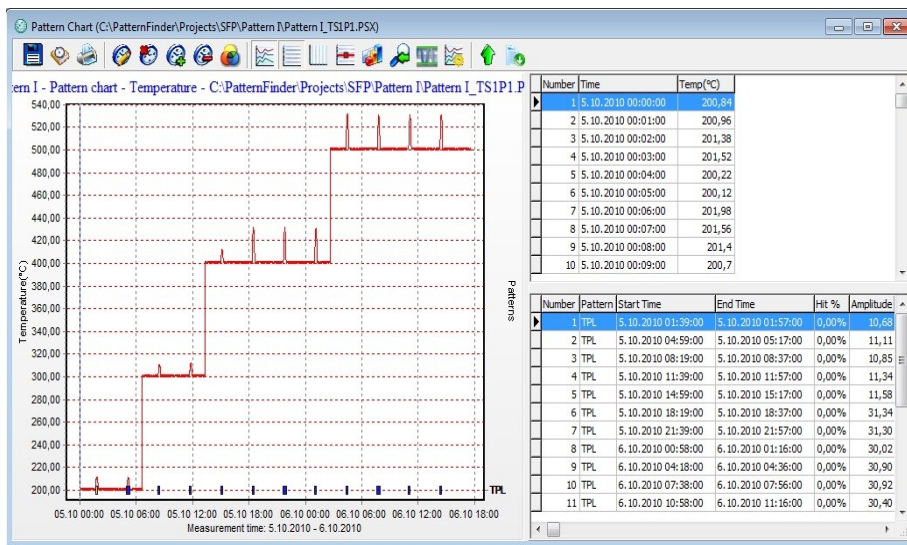


Figure 12.9 Pattern chart: correlation

### Remove selected pattern

To remove a selected pattern from the chart click on the pattern you want to remove on the chart or on the pattern table and click the **Remove selected pattern** button



on the chart bar.

### Envelope

This method is based on creating a user defined window/envelope around the pattern template. The user can choose to have the search level-dependent and/or amplitude-dependent.

The screenshot shows the "Pattern template search" dialog box. The "Search type" section has "Envelope" selected. The "Pattern template" section has "Define range" selected, with "From:" set to 1 and "To:" set to 2500. There are checkboxes for "Save as C:\Program Files\PatternFinder\Projects\PatternTemplates\TPL\*" and "Use existing template file". The "Search parameters" section has "Threshold (%)" set to 100, "Envelope size (%)" set to 50, and checkboxes for "Amplitude dependant" (unchecked) and "Level dependant" (checked). The "Level dependant" section has "minimum range" set to 250 and "maximum range" set to 350. The "Output definition" section has "Pattern name:" set to TPL. There are "OK" and "Cancel" buttons at the bottom.

Figure 12.10 Pattern template search: envelope

1. Under **Search type** select **Envelope**
2. Under **Pattern template** you can create a pattern template by defining the range you want to use. Click the **save as** box if you want to save the template and add a comment. The template is always saved in the Projects\PatternTemplates\TPL (next available number).SDX. If the template already exists, check **Use existing template file** and select a template from the drop-down list.
3. Under **Search parameters** define the **Threshold** and the **Envelope size**. The **Envelope size** determines the size of the envelope/window around the pattern template.
4. Select whether the search is to be **Amplitude** and/or **Level dependant**. If you select **Level dependent** you need to define the minimum and maximum range.

Click **OK** and a pattern chart appears:

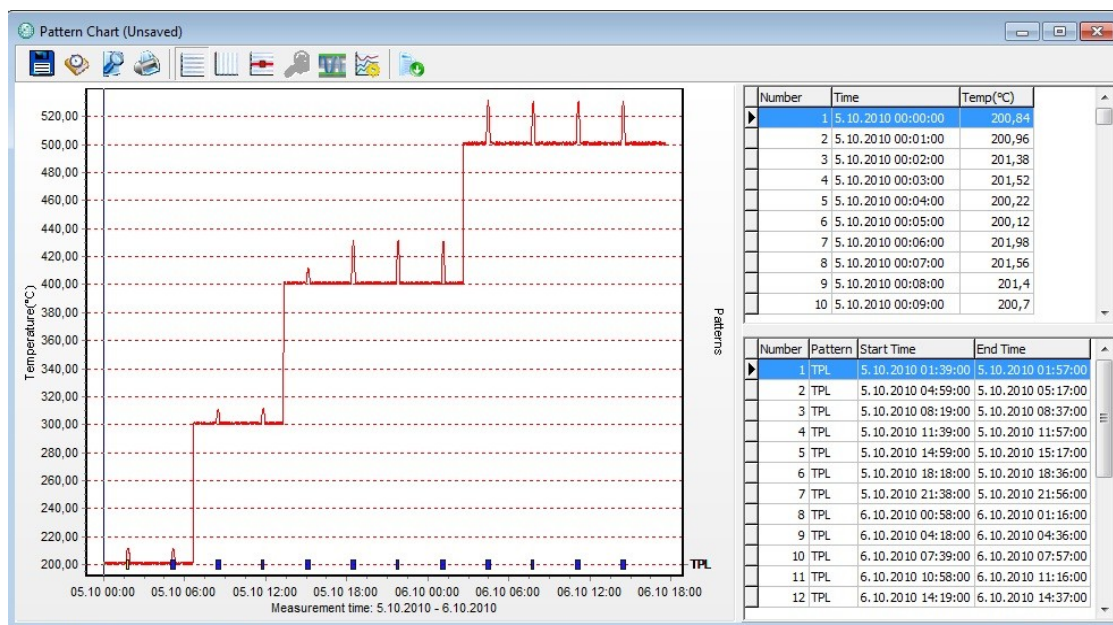


Figure 12.11 Pattern chart: envelope

## 12.3 Scanning data for patterns

Create or open a project and click the **Create Event Chart** button on the main toolbar or open an already created event chart. For further instructions on how to create an event chart see chapter 11.

The event can be manual, ambient, behavioral or multiple.

Once the event chart has been opened, click the **Create Pattern Chart** button on the main toolbar and the following window appears:

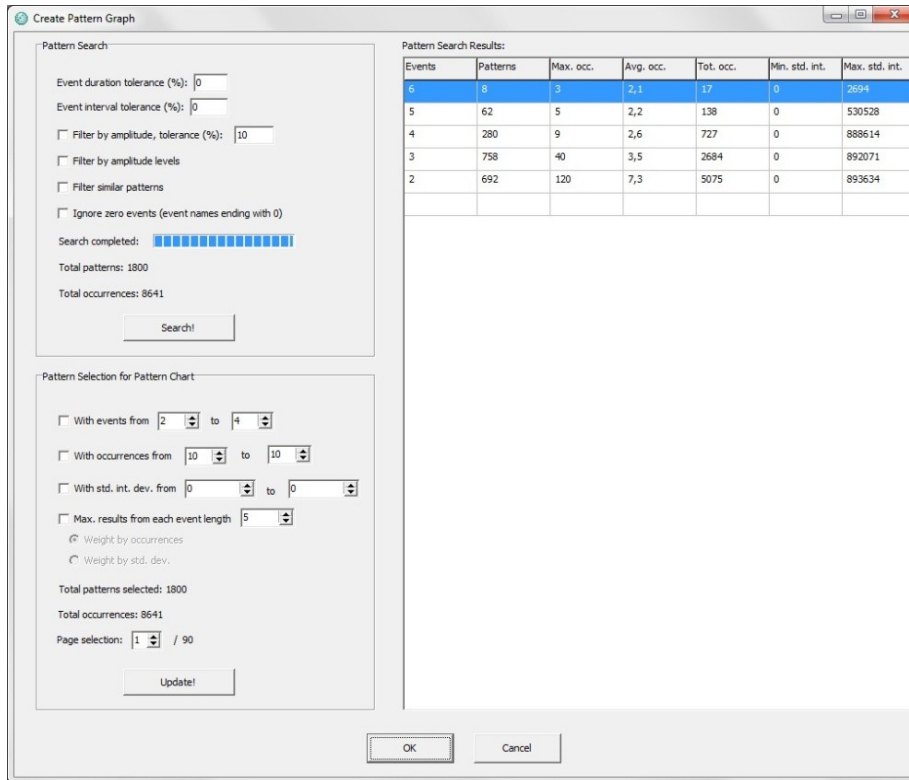


Figure 12.12 Create pattern chart

The Create Pattern Chart window consists of:

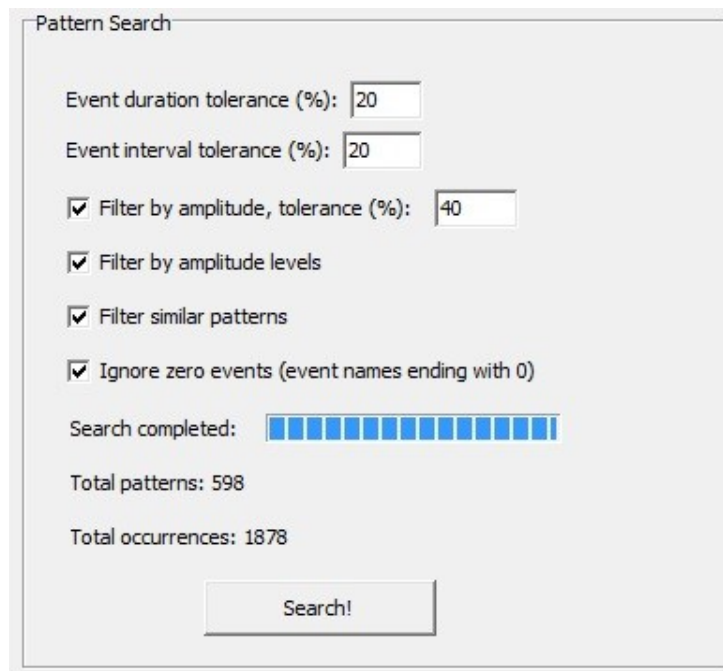
### Pattern Search Results

Pattern Search Results:						
Events	Patterns	Max. occ.	Avg. occ.	Tot. occ.	Min. std. int.	Max. std. int.
6	8	3	2,1	17	0	2694
5	65	5	2,2	145	0	530528
4	293	9	2,6	759	0	888614
3	775	40	3,6	2755	0	892071
2	694	123	7,4	5127	0	893634

Figure 12.13 Pattern Search Results

- Number of events in a pattern
- Number of pattern types
- Maximum number of occurrences of a singular pattern
- Average number of occurrences of a singular pattern
- Total occurrences of all the patterns
- Minimum standard deviation interval
- Maximum standard deviation interval

## Pattern Search:



Pattern Search

Event duration tolerance (%): 20


Event interval tolerance (%): 20

Filter by amplitude, tolerance (%): 40

Filter by amplitude levels

Filter similar patterns

Ignore zero events (event names ending with 0)

Search completed: 

Total patterns: 598

Total occurrences: 1878

Search!

Figure 12.14 Pattern Search

### Event duration tolerance:

Define how far the pattern search should deviate from the length of the event.

### Event interval tolerance:

Define how far the pattern search should deviate from the interval between each event.

### Filter by amplitude:

The amplitude parameter associated with the behavioral event is taken into account when performing a pattern search. If the amplitude is outside the tolerance (%), it is removed.

### Filter by level:

The behavioral events also have a level parameter associated with them. By checking this option you can restrict the pattern search to the levels found in the behavioral event analysis.

### Filter similar patterns:

If occurrences of the same pattern intersect, the shorter occurrence is removed. This means that patterns that have the same events where one pattern is a subset of another, the subset occurrence is removed.

### Ignore zero events:

In behavioral event analysis, zero events signify very little movement which can be interpreted as a non-action event. By checking this option the zero events will not be included in the pattern search.



## Pattern Selection for Pattern Chart

Pattern Selection for Pattern Chart

With events from 2 to 2

With occurrences from 10 to 2

With std. int. dev. from 0 to 0

Max. results from each event length 5

Weight by occurrences

Weight by std. dev.

Total patterns selected: 1835

Total occurrences: 8803

Page selection: 1 / 92

Update!

Figure 12.15 Pattern Selection for Pattern Chart

**With events from/to:** The patterns are categorized by the number of events they contain. Select the number of events you want to include in the pattern.

**With occurrences from/to:** Define the range of occurrences. For example, if you choose occurrences from 5 to 6 this will restrict the selection of patterns to patterns that have 5 or 6 occurrences

**With standard interval deviation from/to:** Select pattern types with limited interval standard deviation, for example, ranging from 2 hours to 5 hours.

**Maximum results from each event length:** Results from each event length is weighted either by occurrences or standard interval deviation.

**Maximum patterns:** Define the maximum number of patterns per page.

**Total patterns selected:** The total number of found pattern types

**Total occurrences:** Total occurrences of all the patterns

**Page selection:** The user can define which page to view.

**Page selection:** The user can define which page of the chart to view.

### Scanning data

PatternFinder performs an automatic scan of all possible patterns. As can be seen in figure 12.14 this will usually produce many patterns.

Under **Pattern Search**, the user can filter the patterns and see how the total number of patterns and occurrences reduces by clicking **Search**. You can perform the pattern search as often as you want.

Under **Pattern Selection for Pattern Chart** the user can also limit the number of selected patterns by filling in the definitions and clicking **Update**.

Once the number of patterns has been reduced to a manageable number, click **OK** and a multi pattern chart appears:

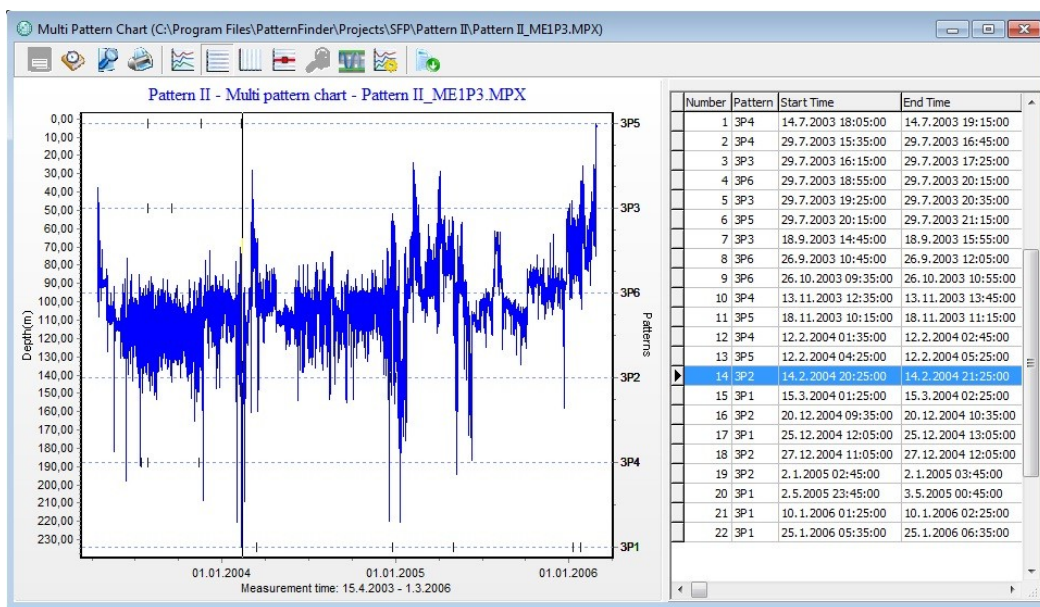


Figure 12.16 Multi Pattern Chart

The user can zoom in on the chart to get a better view of each pattern (see figure 12.17).

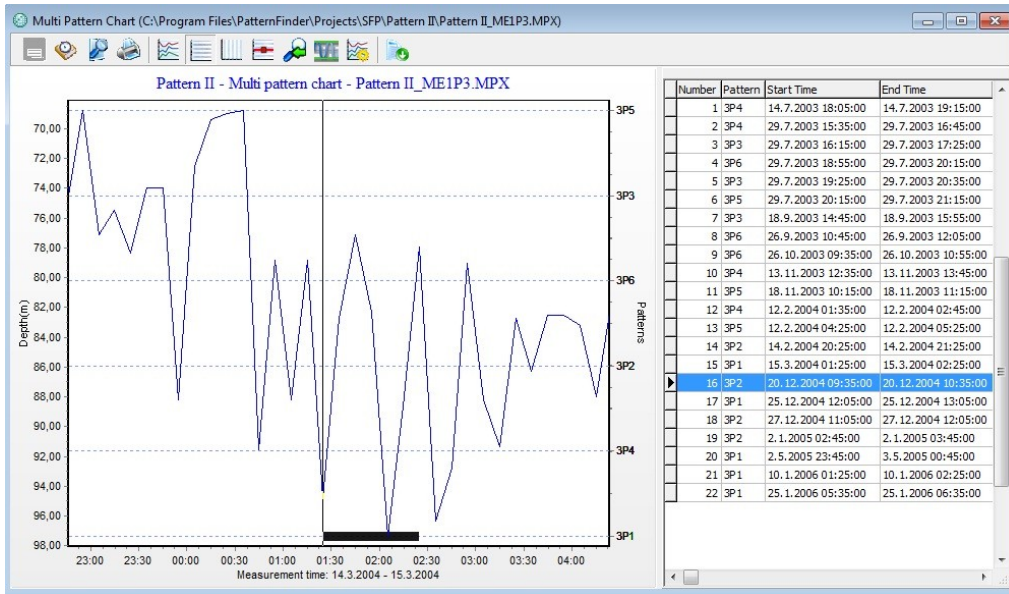


Figure 12.17 Multi Pattern Chart: Zoom

## 12.4 Multiple patterns

To create a multi pattern chart, click the **Create Multi Pattern Chart** button



A window listing the patterns appears:

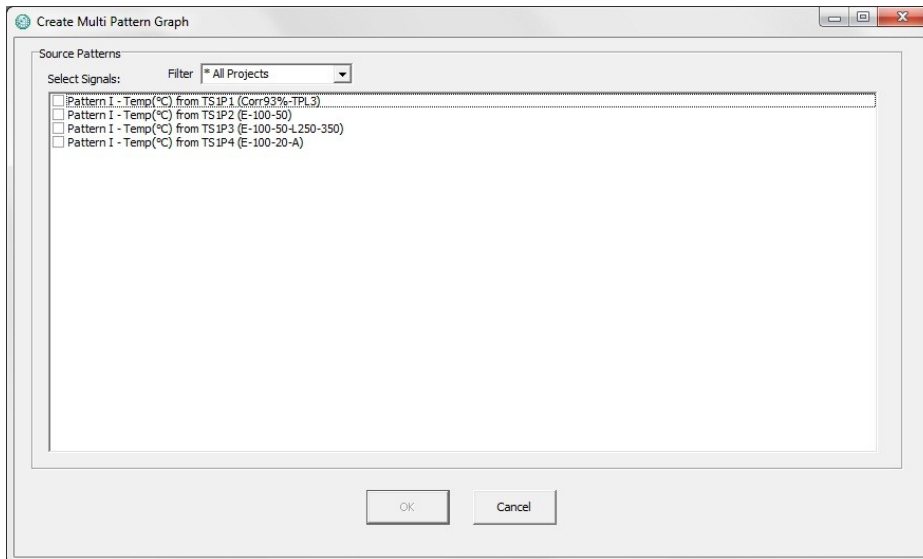


Figure 12.18 Create multi pattern chart

You can filter the signals by selecting one of the options in the drop-down list (see figure 12.19).

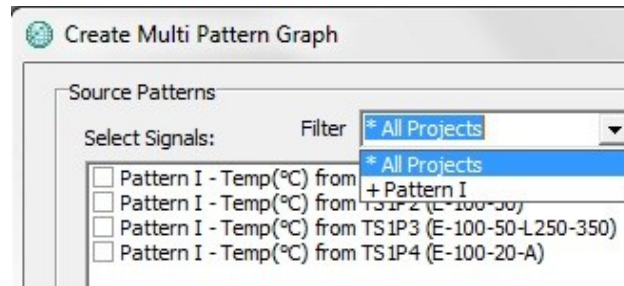


Figure 12 19 Filter

Select the patterns you want to include in the chart and click **OK**. The following window appears:

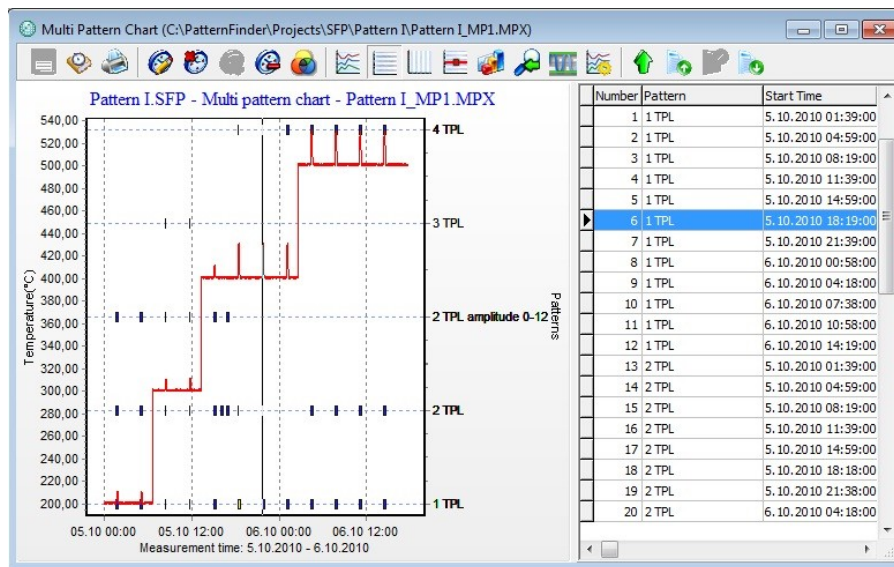


Figure 12.20 Multi pattern chart

You can only view one signal at a time. To switch between signals click the **Select active series** button on the chart bar.

The following window appears:

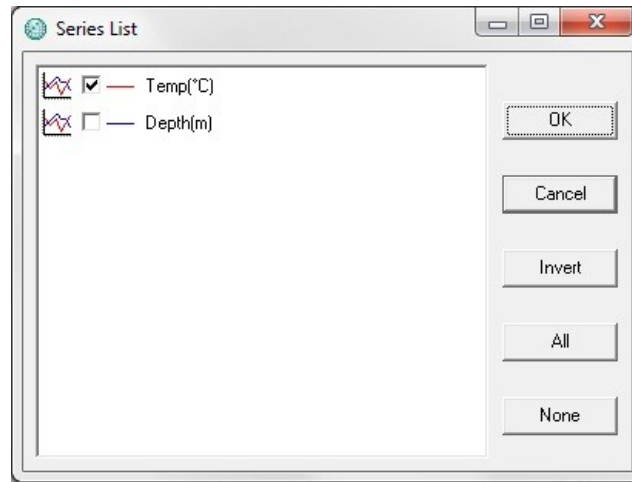


Figure 12.21 Series list

Select the signal you want to view on the chart and click **OK**.

## 12.5 Pattern operations

Click the Pattern operation button  and the following window appears:

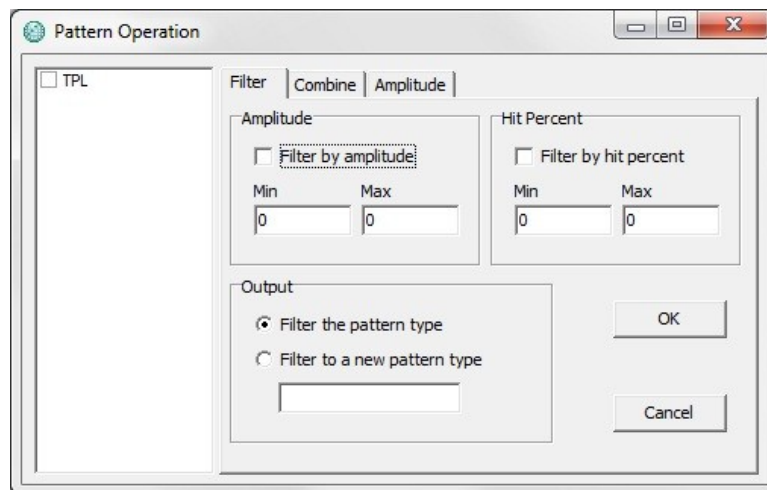


Figure 12.22 Pattern Operation

The window on the left lists the Pattern types. Only the checked patterns will be used.

## Filter

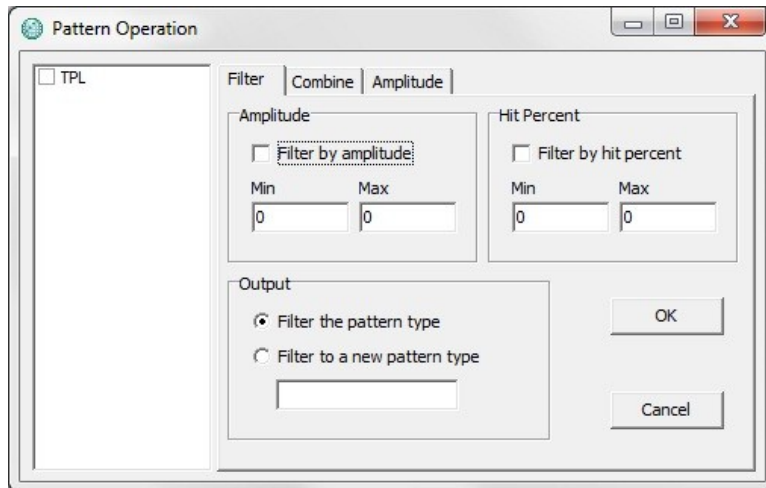


Figure 12.23 Filter

**Amplitude:** Check **Filter by amplitude** to use this option. The values must be within the defined range.

**Hit percent:** Check **Filter by hit percent** to use this option. The values must be within the defined range.

### Output

**Filter the pattern type:** All pattern occurrences outside the filter are removed.

**Filter to a new pattern type:** All pattern occurrences within the range are included in a new pattern type. Insert a name for the new type.

## Combine

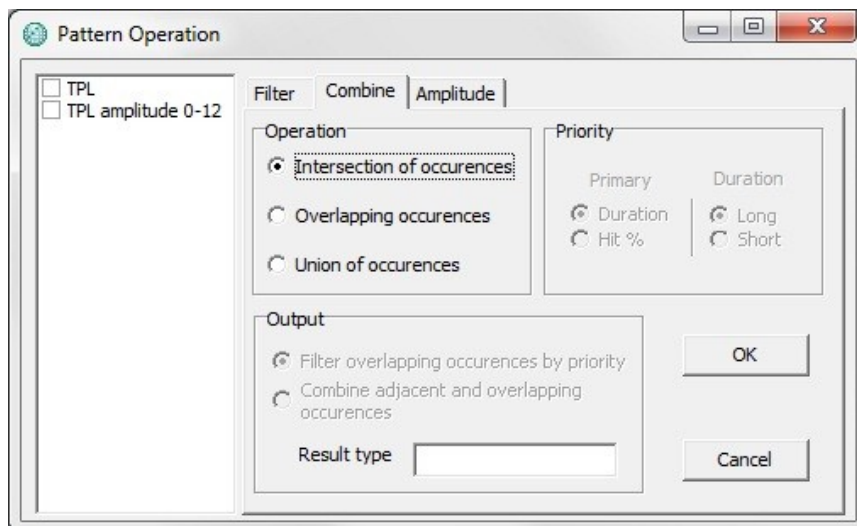


Figure 12.24 Combine: Intersection of occurrences

### Operation

**Intersection of occurrences:** Check this option to find intersecting occurrences. A new pattern type with all the intersecting occurrences is created.

**Overlapping occurrences:** Check this option to find overlapping occurrences. The resulting pattern types cannot intersect.

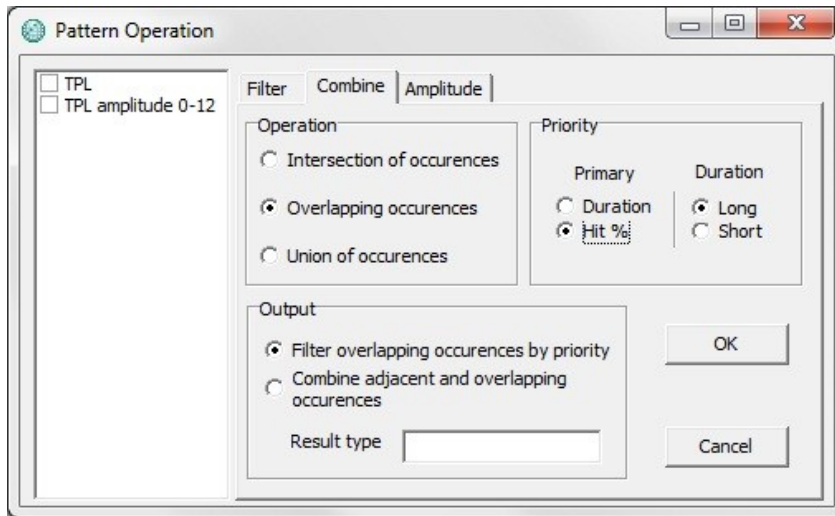


Figure 12.25 Overlapping of occurrences

**Priority:** There are two filters. The user needs to select which one is primary. **Duration** filters the overlapping pattern occurrences by length. **Hit %** filters the overlapping pattern occurrences with the higher hit percentage.

Check **Filter overlapping occurrences by priority** in **Output** to activate the **Priority** option.

By checking **Combine adjacent and overlapping occurrences** in **Output** all the overlapping occurrences will be combined into a single occurrence.

**Union of occurrences:** Finds all occurrences. The resulting pattern types cannot intersect. **Priority** works the same.

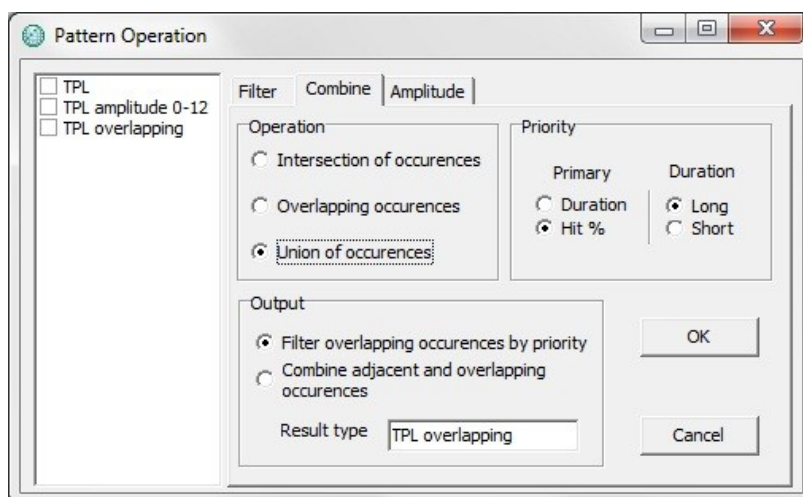


Figure 12.26 Union of occurrences

## 12.6 Amplitude

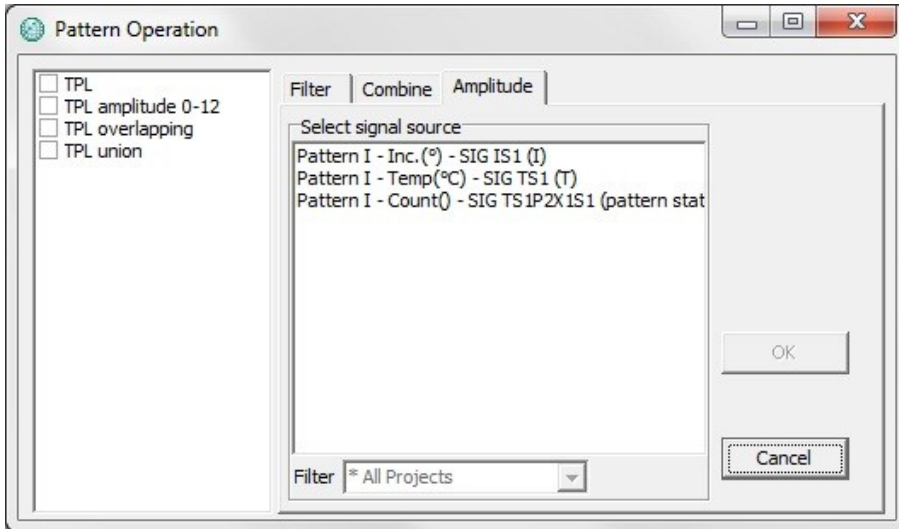


Figure 12.27 Amplitude

**Amplitude** recalculates the amplitude using a new source. Select the pattern types you want to recalculate and choose the signal source. Note that only overlapping values are recalculated.

Figure 12.28 shows the final results after all the operations have been performed.

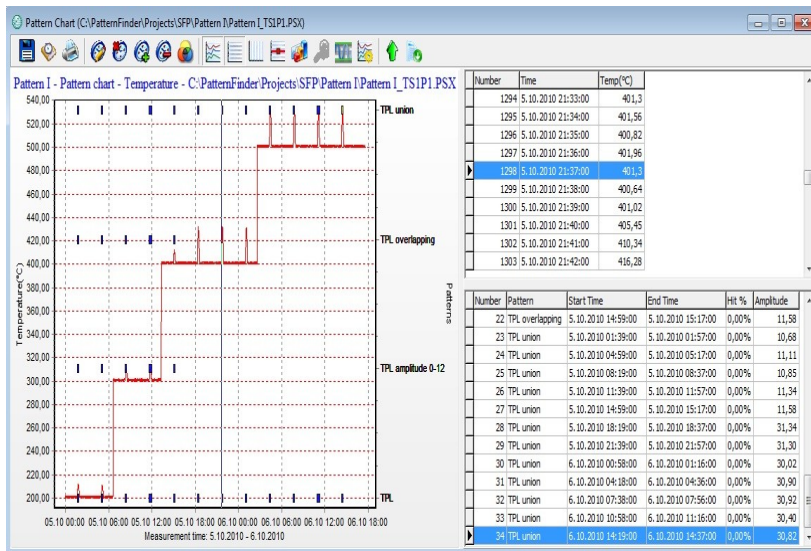


Figure 12.28 Final chart



## 12.7 Periodic pattern statistics

Open a pattern chart and click the **Pattern period statistics** button on the main toolbar.

The following window appears:

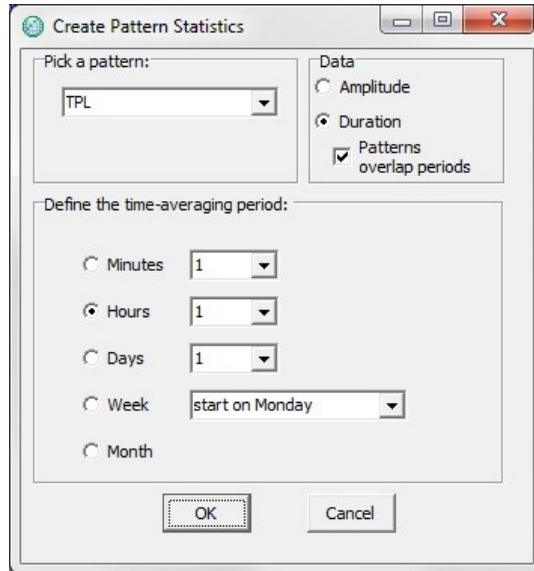


Figure 12.29 Create pattern statistics

Select a pattern template and define the time-averaging period you want to analyze.

The user can choose to perform a statistical analysis either by **Amplitude** or **Duration**. By checking **Patterns overlap periods** patterns that extend over two or more periods are split between periods.

Click **OK** and a pattern periodic statistics chart appears:

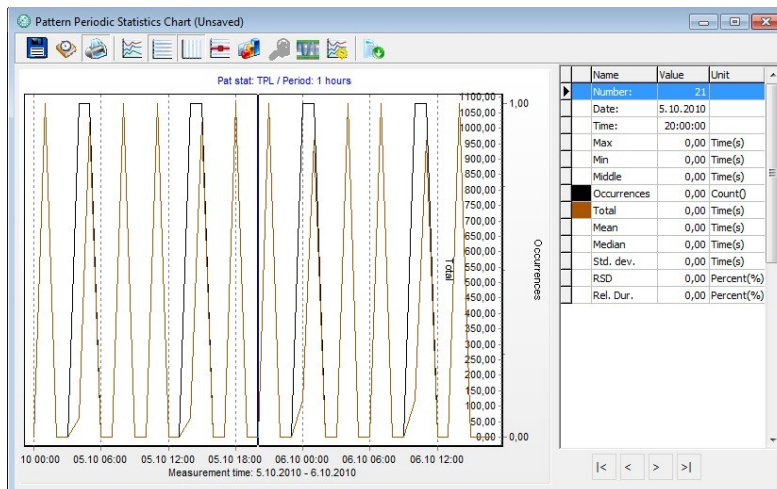


Figure 12.30 Pattern Periodic Statistics Chart

Save the chart and a STP file will be created.

There are ten different parameters, each with its own color. By moving the cursor on the chart the value for each parameter is shown in the table on the right side of the chart (see figure 12.31).

	Name	Value	Unit
▶	Number:	21	
	Date:	5. 10. 2010	
	Time:	20:00:00	
	Max	0,00	Time(s)
	Min	0,00	Time(s)
	Middle	0,00	Time(s)
	Occurrences	0,00	Count()
	Total	0,00	Time(s)
	Mean	0,00	Time(s)
	Median	0,00	Time(s)
	Std. dev.	0,00	Time(s)
	RSD	0,00	Percent(%)
	Rel. Dur.	0,00	Percent(%)

Figure 12.31 Table

The table lists the following parameters:

**Number:** The number of the period

**Date:** The date of the period

**Time:** The time of the period

- **Max:** Maximum duration of a pattern
- **Min:** Minimum duration of a pattern
- **Middle:** The average of max and min
- **Occurrences:** Number of pattern occurrences
- **Total:** The combined total duration of all the patterns
- **Mean:** The standard average pattern duration
- **Median:** The mid value in the sequence of patterns arranged by duration
- **Std. dev.:** The Standard deviation of the patterns' duration
- **RSD:** The relative standard deviation
- **Rel. Dur.:** The relative duration
- 

To select the parameters you want to view in the chart, click the **Active Series** button on the chart bar. The following window appears:

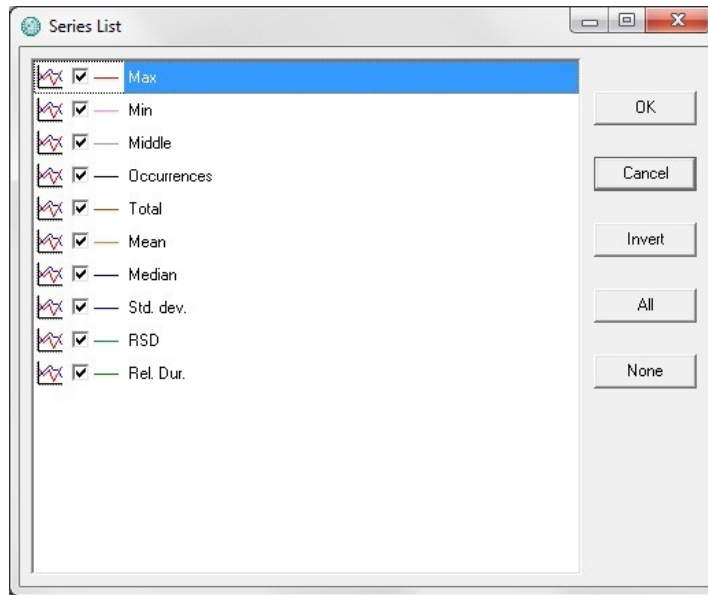


Figure 12.32 Series list

Select the parameters you want to view and click **OK**.

In figure 12.33, all the parameters have been selected.

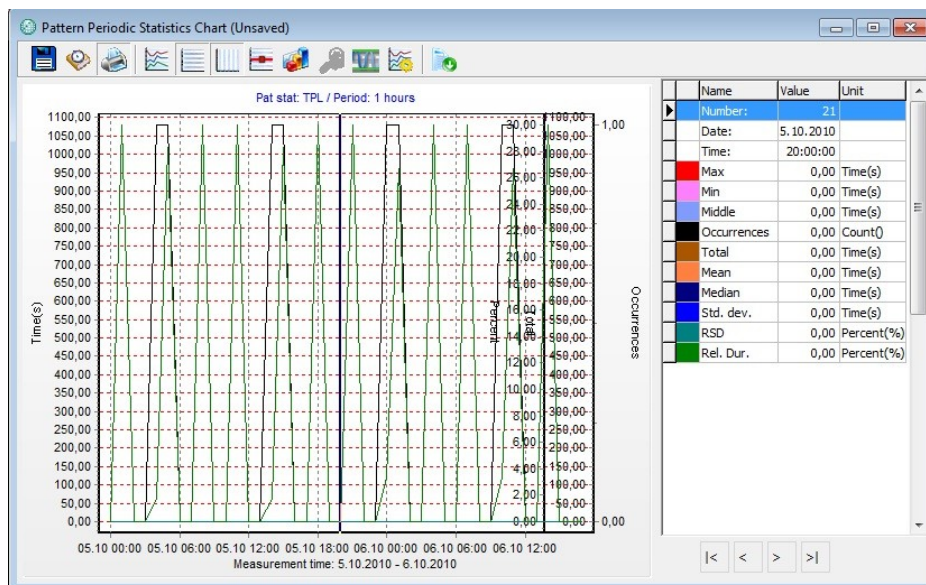


Figure 12.33 Pattern Periodic Statistics Chart

## 12.8 Extracting signal from STP file

To extract a signal from the STP file, click the **Select signal to signal chart** button on the main toolbar and the following window appears:



Figure 12.34 Select series to export to signal chart

Select the signal and the data range you want to extract. Click **OK** and a chart displaying the extracted signal appears:

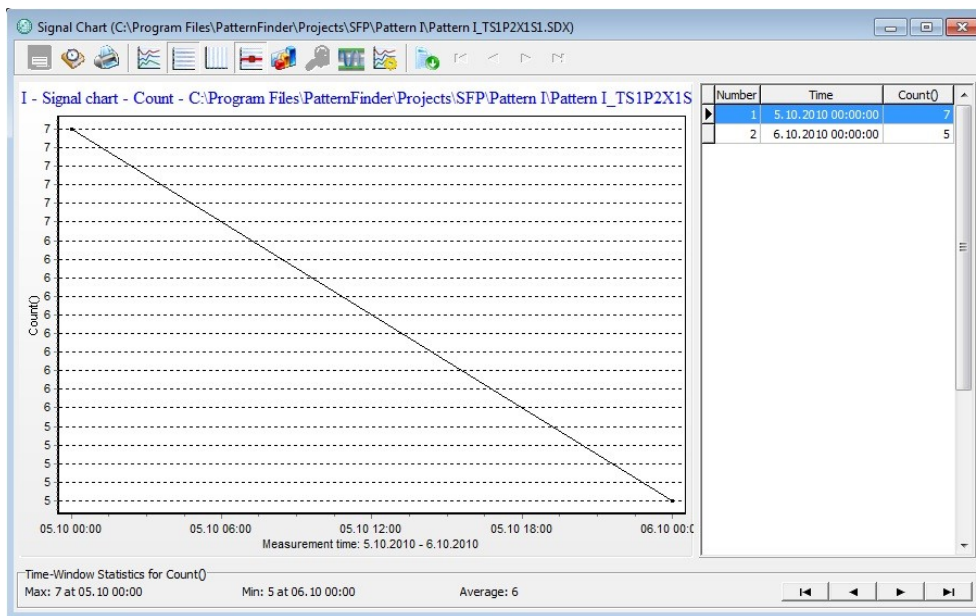


Figure 12.35 Signal chart



- 3. No header is included in the file. The user defines the start date, time and the sampling frequency in the import window (see figure 13.4).

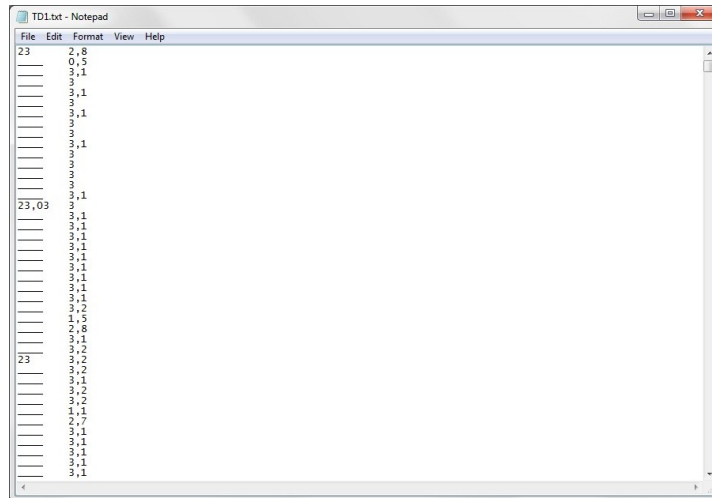


Figure 13.3 Option 3

### 13.1 Importing files

To import data from other systems into PF, click on the **Import file to new SFP** button on the main toolbar

The following window appears:

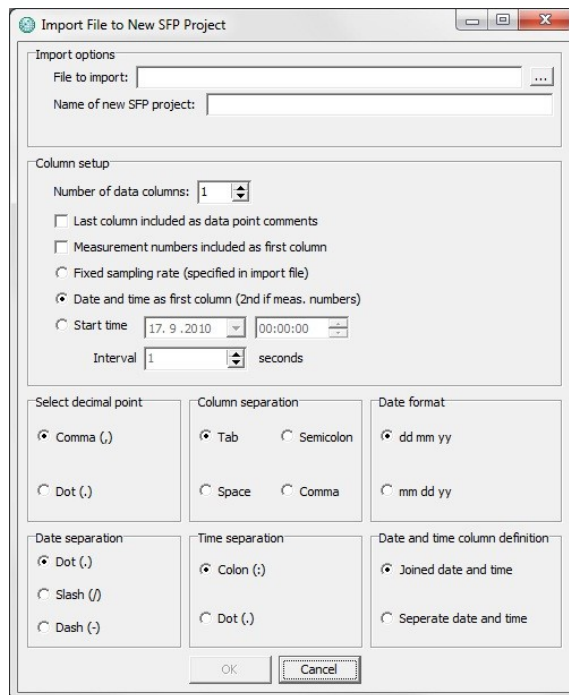


Figure 13.4 Import file to new SFP project

Browse for the file you want to import and name the project (see figure 13.4).

## Column Setup

1. Define the number of data columns
2. Define the organization of data in the file
3. Set **Start time** and **Interval** if it is not included in the file
4. Fill in the definitions on how the data is organized in the imported file:

**Decimal point:** Comma/Dot

**Column separation:** Tab/Semicolon/Space/Comma

**Date format:** dd mm yy/mm dd yy

**Date separation:** Dot/Slash/Dash

**Time separation:** Colon/Dot

**Date and time column definition:** Joined data and time/Separate data and time

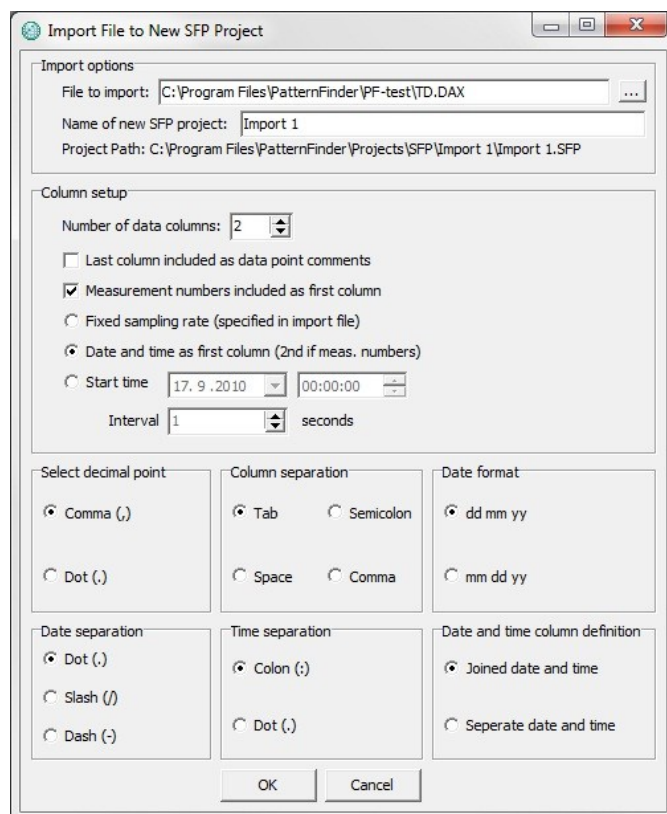


Figure 13.5 Import file to new SFP project

Once the definition has been filled out, click **OK** and the window in figure 13.6 appears:

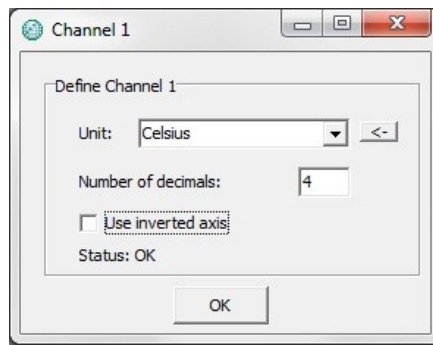


Figure 13.6 Channel 1

For each data channel the user needs to define the signal unit and the number of decimals.

The Unit Settings (figure 13.7) can be changed by clicking on the arrow on the right side of the **Unit** column (see figure 13.6).

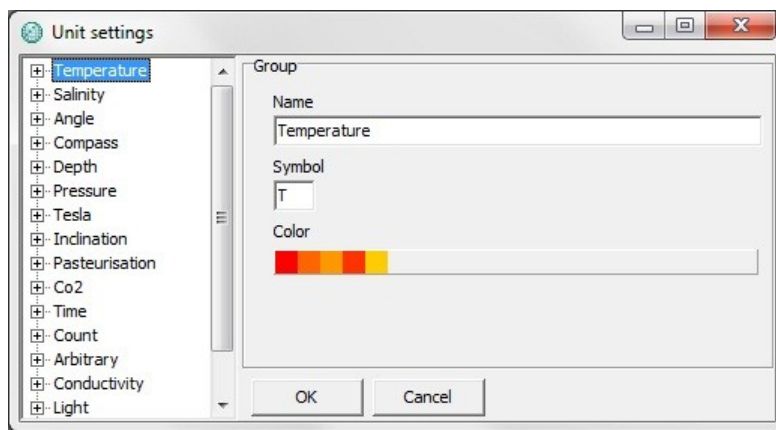


Figure 13.7 Unit Settings

Once the user has defined the data, click **OK** and the data will be imported into PF as a SFP (see figure 13.8).

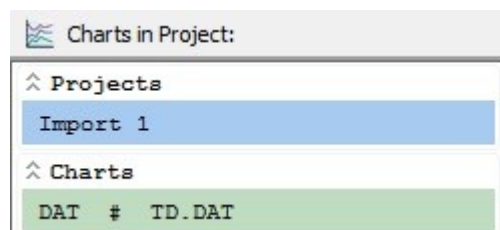


Figure 13.8 Overview Pane

To see if a file has been imported to PF select **Project-Properties** and the following window appears:



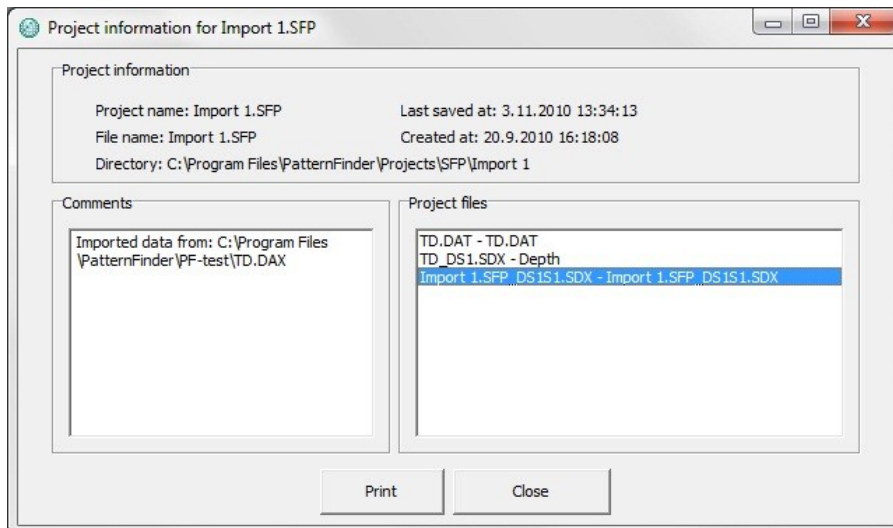


Figure 13.9 Project information

In **Project Information** the user can view information on the project files and add comments about the project (see figure 13.9). Select **Print** to print out the information (see figure 13.10).

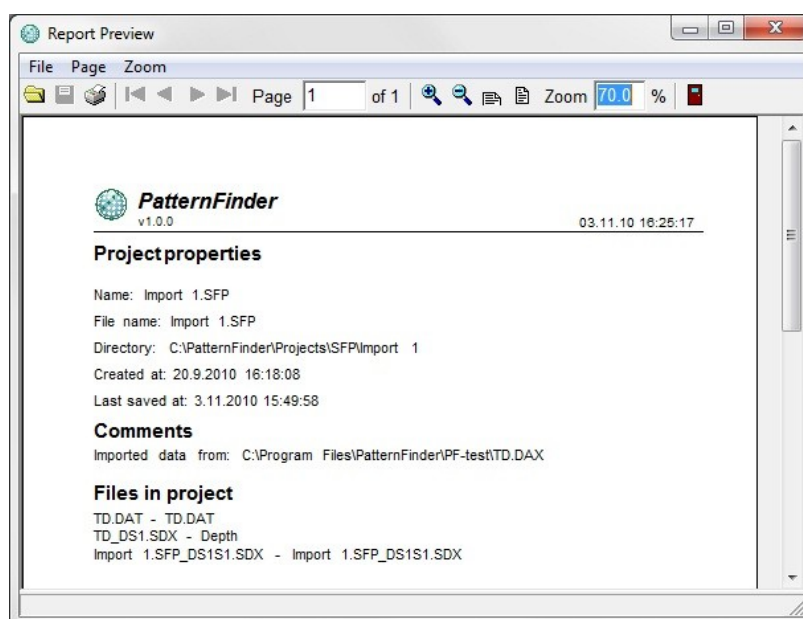


Figure 13.10 Report Preview

## 14. Export

### 14.1 Export via Edit chart

Click the **Edit chart** button on the chart bar. Under the **Export** menu, there are three options:

- Pictures
- Native (data)
- Data (file)

#### Picture

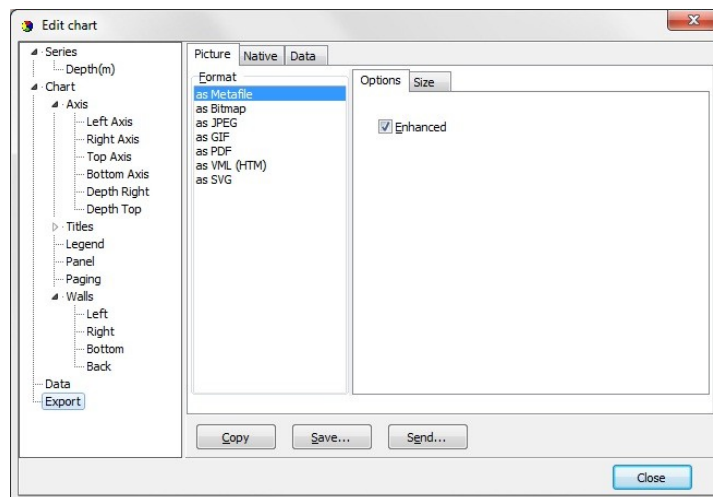


Figure 14.1 Export Menu: Picture

Under **Picture**, the user can **Copy**, **Save** and **Send** the chart as a picture in the following formats:

- Metafile
- Bitmap
- JPEG
- GIF
- PDF
- VML (HTM)
- SVG

## Native

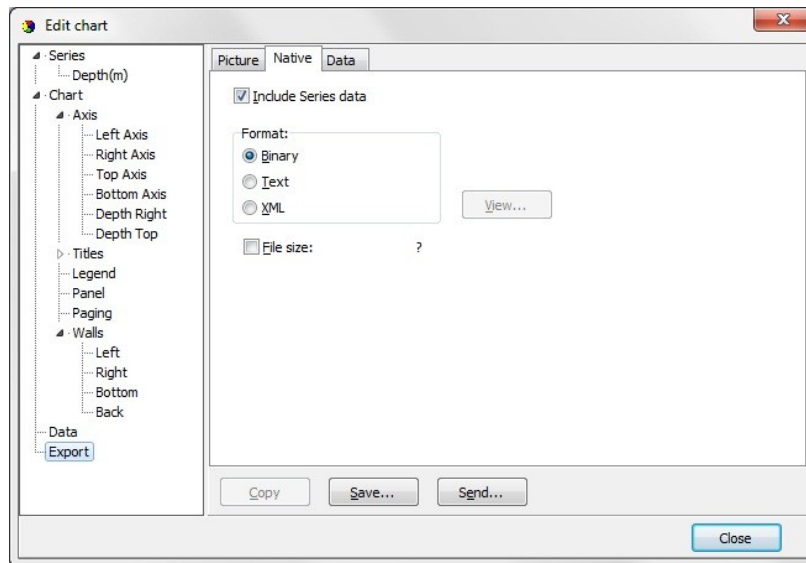


Figure 14.2 Export Menu: Native

Under **Native** the user can **Copy**, **Save** and **Send** the data and chart settings in the following formats:

- TEE (Binary)
- TXT
- XML

## Data

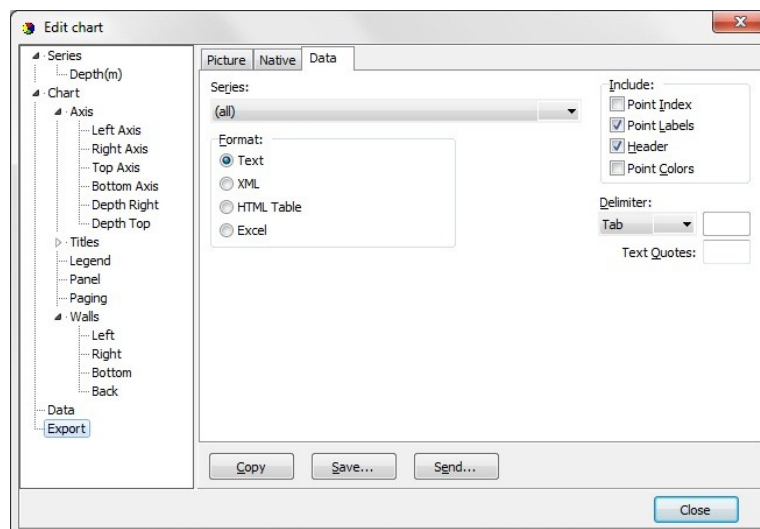


Figure 14.3 Export Menu: Data

Under Data, the user can Copy, Save and Send the chart file in four formats:

- Text file (.txt) (see figure 14.4)
- XML (.xml)
- HTML (.html)
- Excel (.xls) (see figure 14.5). Note that there is a 65.534 row limit

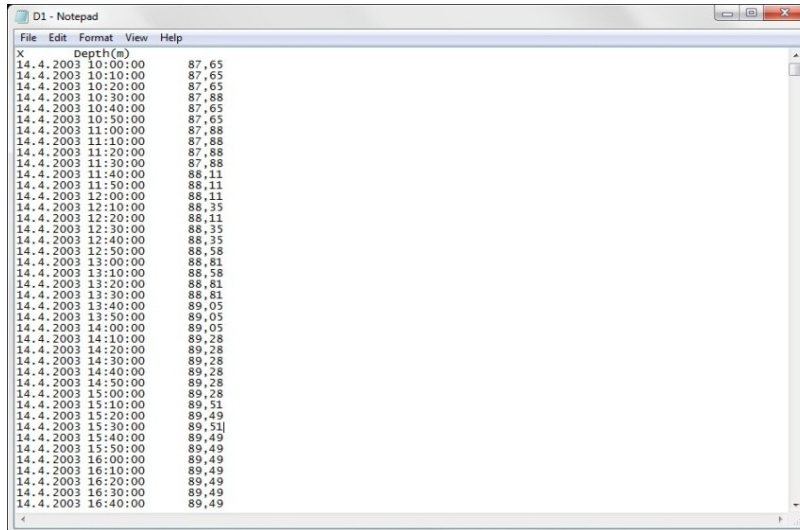


Figure 14.4 Text file

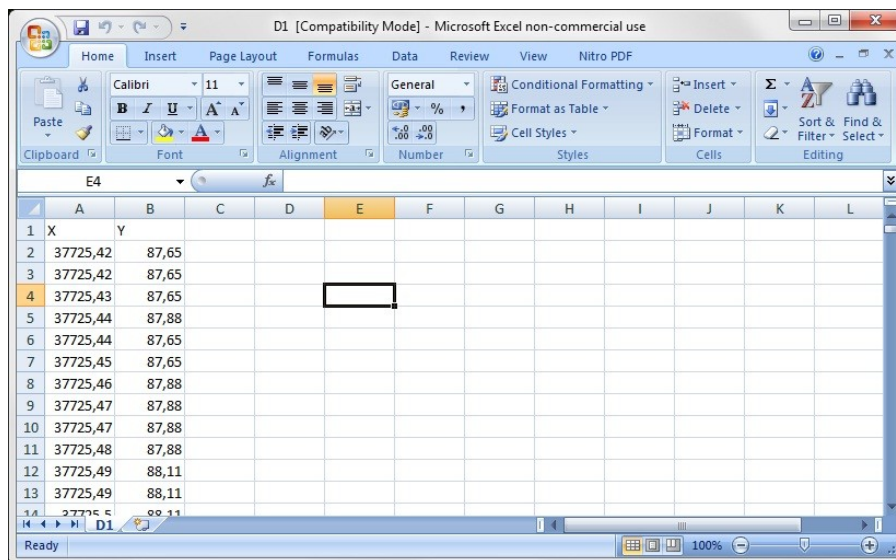


Figure 14.5 Excel

There are four Include options:

**1. Point Index**

The point index is the same as the measurement number, but offset by -1, as it starts in 0 instead of 1.

**2. Point Labels**

If the user has added text labels to points in the Data menu, these can be included.

**3. Header**

The same headers as are in the Data menu.


**4. Point Colors**

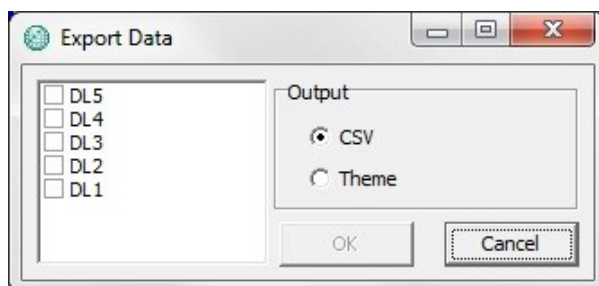
This option is not relevant in PF.

Another method of exporting data is by clicking **Alt + PrintScreen** on the keyboard to copy an image of the **PF** window to the clipboard. The image can be pasted to another Windows application.

## 14.2 Export events

Events can be exported for further analysis.

Click the **Export Events** button  on the event chart bar and the following window appears:



*Figure 14.6 Export data*

Select the event definition and the output format.

### CSV

The data will be exported into one file organized in comma separated values.

## Theme

Two files are created that contain all the events as well as information about time, amplitude and level associated with each event (see figures 14.7 and 14.8).

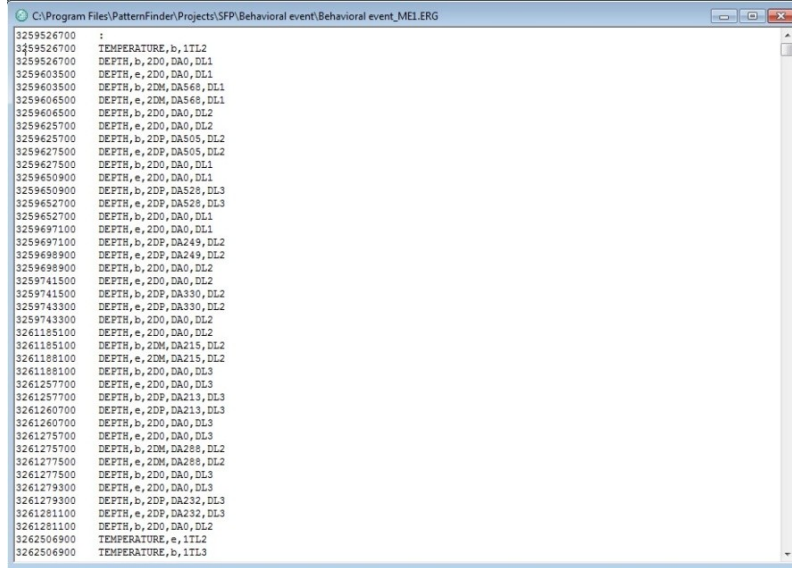


Figure 14.7 Export to Theme

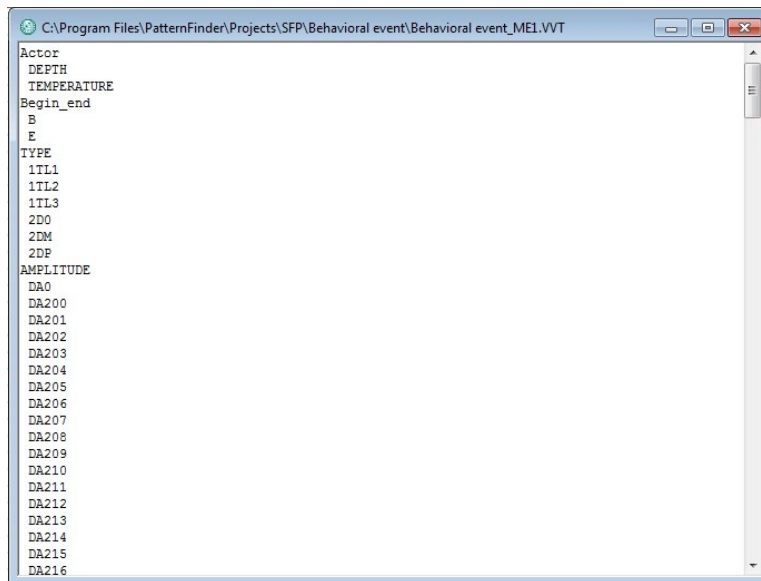
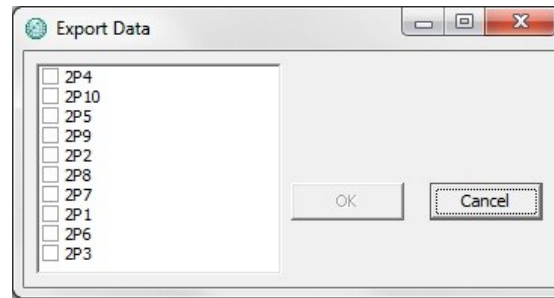


Figure 14.8 Export to Theme

## 14.3 Export patterns

Patterns can be exported for further analysis.

Click the **Export Patterns** button  on the pattern chart bar and the following window appears:



*Figure 14.9 Export data*

Select the pattern definition. The data will be exported into one file organized in comma separated values.

## 15. Printing

### 15.1 Charts

There are two ways to print out a chart:

Open the chart you want to print out and select **File-Print** on the menu bar. The following window appears:

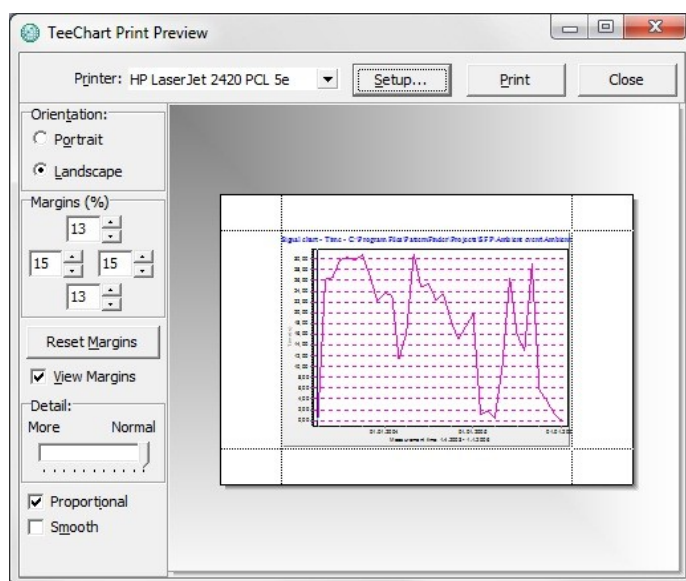


Figure 15.1 Print preview

#### Orientation

The chart can be printed in either portrait or landscape format.

#### Margins

By changing the margins, the chart's length and width can be re-scaled. The margins can be varied by either changing the numbers given for the left, right, top and bottom margins, or by moving the margin lines with the mouse by pressing and holding the left button as the lines are dragged.

#### Move

When the cursor is located on the chart, a hand becomes visible. By clicking on the chart and holding down the left button of the mouse, the graph can be moved around the page to a desired position.

#### Details

The size of horizontal and vertical gridlines as well as the text on the X and Y-axis can be re-scaled by using the scroll bar. The number of gridlines is increased when the bar is moved to the left.

Another way of printing out a chart is opening the chart you want to print out and clicking the **Print chart** button on the chart bar (see figure 15.2).



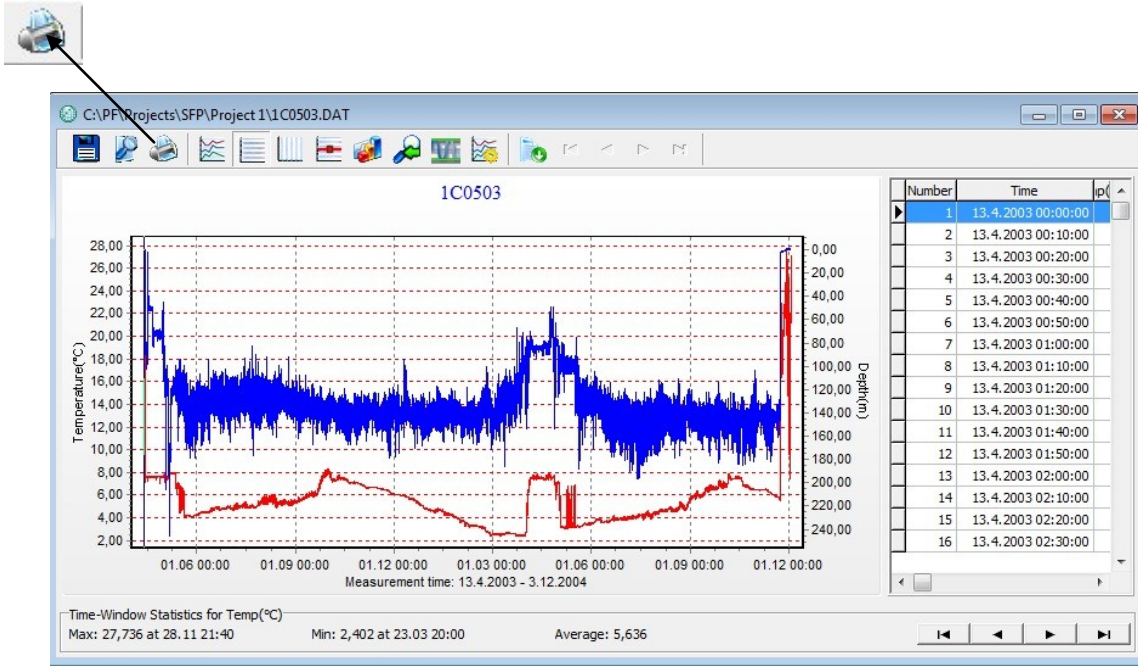


Figure 15.2 Print chart

The following window appears:

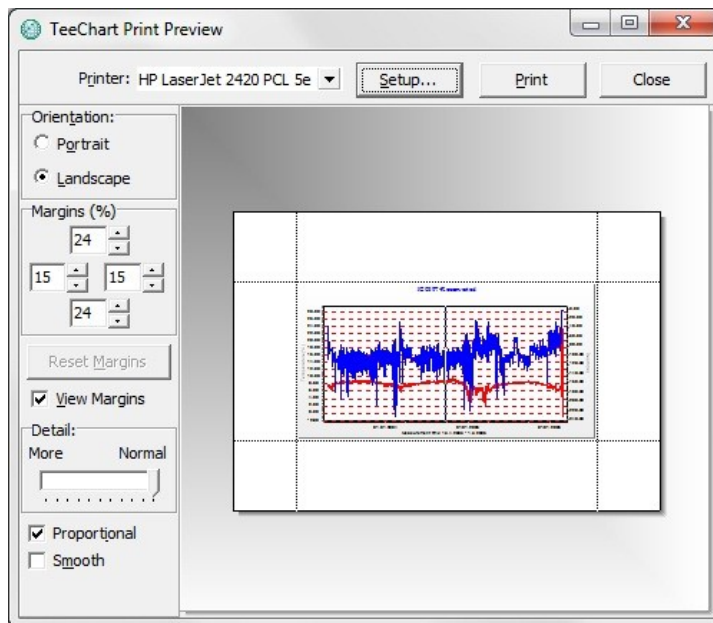


Figure 15.3 Print chart

The dialog window in figure 15.3 has the functions as the one in figure 15.1.

## 15.2 History

Open the chart which operation history you want to print out and click the History button on the chart bar.

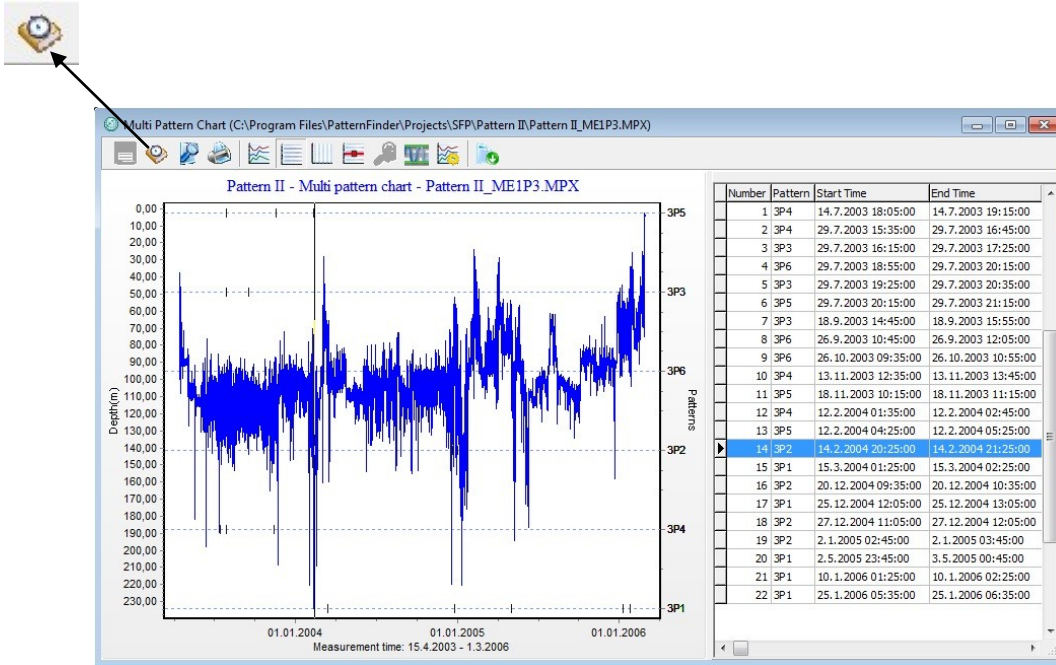


Figure 15.4 History button

The window in figure 15.5 appears:

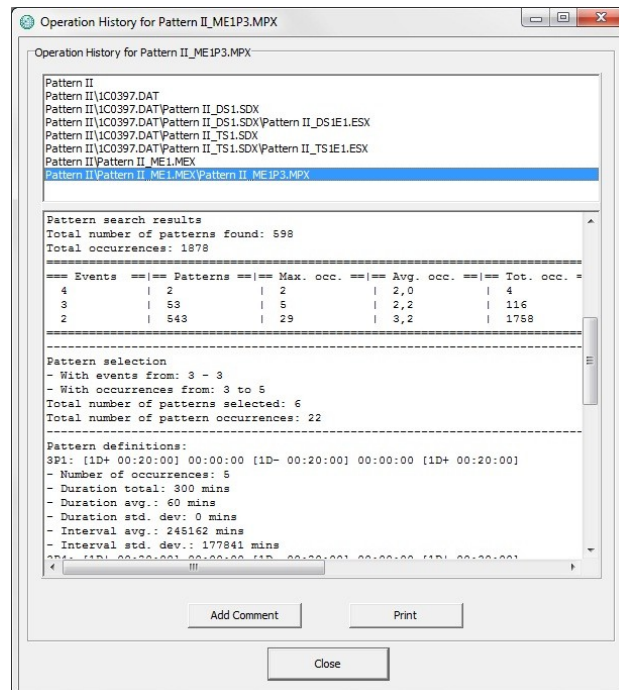


Figure 15.5 History

Click on the **Print** button and the following window appears:

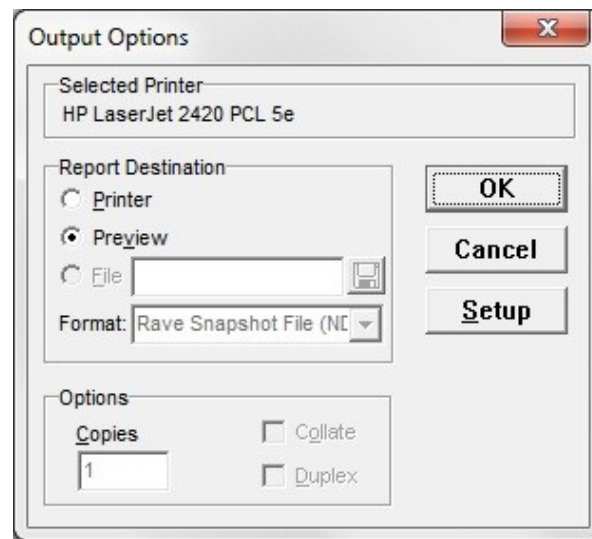


Figure 15.6 Output options

To change the selected printer, click **Setup** and select another printer.

To see a preview of the print out, select **Preview** under **Report Destination** and click **OK** (see figure 15.6 and 15.7).

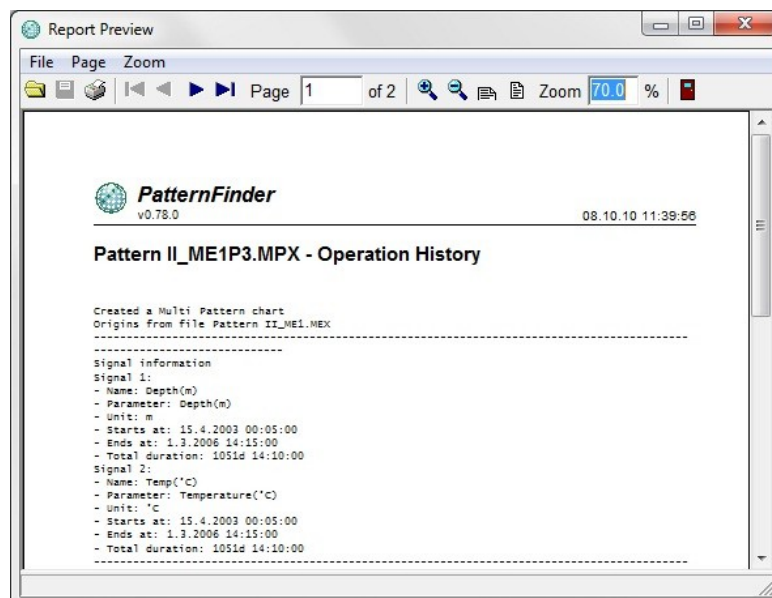


Figure 15.7 Print preview

## 15.3 Histogram

To print out a histogram, open the chart which histogram you want to print out and click on the **Histogram** button (see figure 15.8).

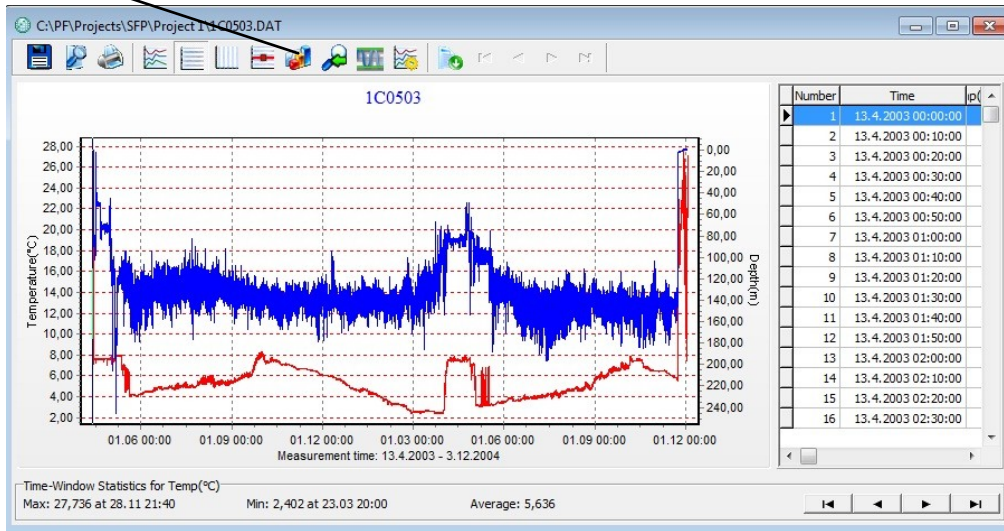


Figure 15.8 Histogram button

The following window appears:

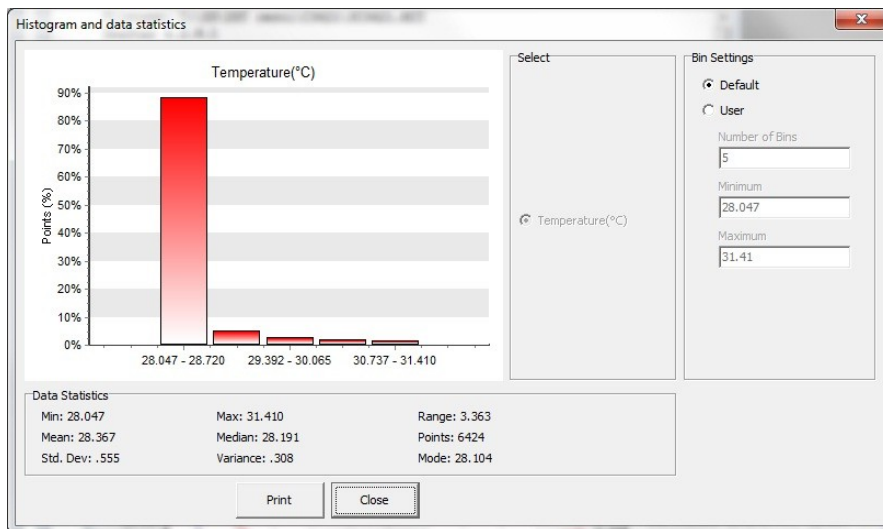


Figure 15.9 Histogram

Click Print and the following window appears:

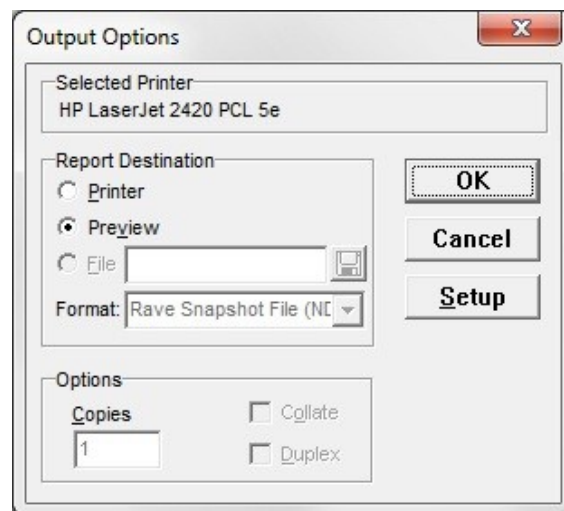


Figure 15.10 Output Options

The dialog window in figure 15.10 has the same functions as the one in figure 15.6.

Select **Preview** and **OK** to see a preview of the histogram:

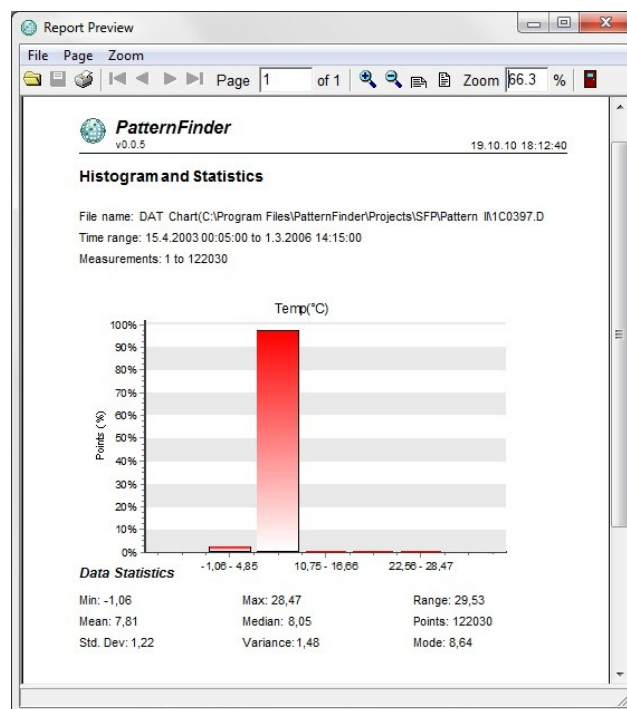


Figure 15.11 Report preview

## 15.4 Data list files (only in DAT)

Open a project and activate the DAT chart. Click the **View File Data** button on the chart bar (see figure 15.12).

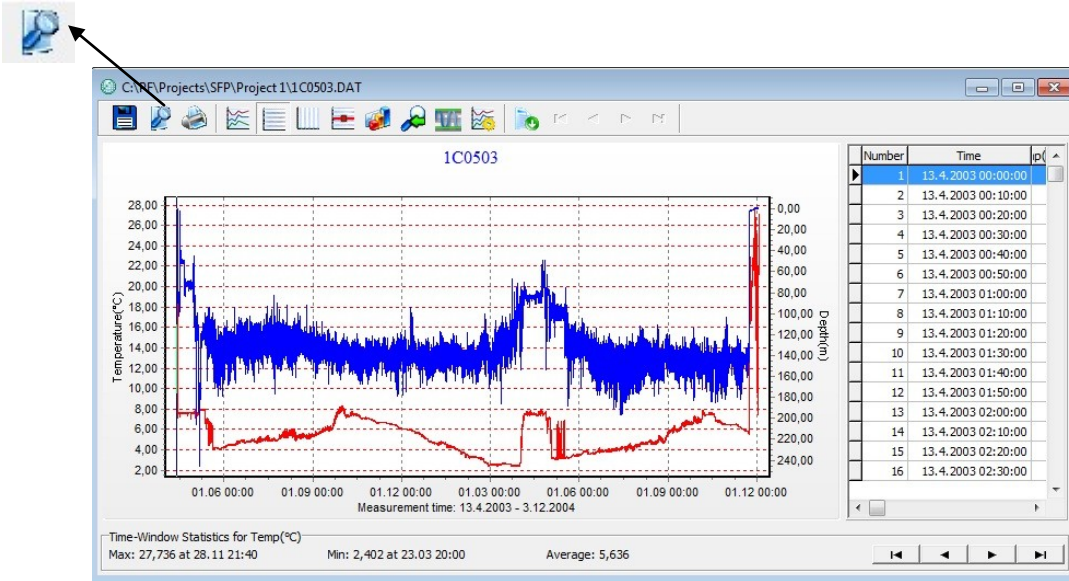


Figure 15.12 View File Data

A window with the data file appears (see figure 15.13).

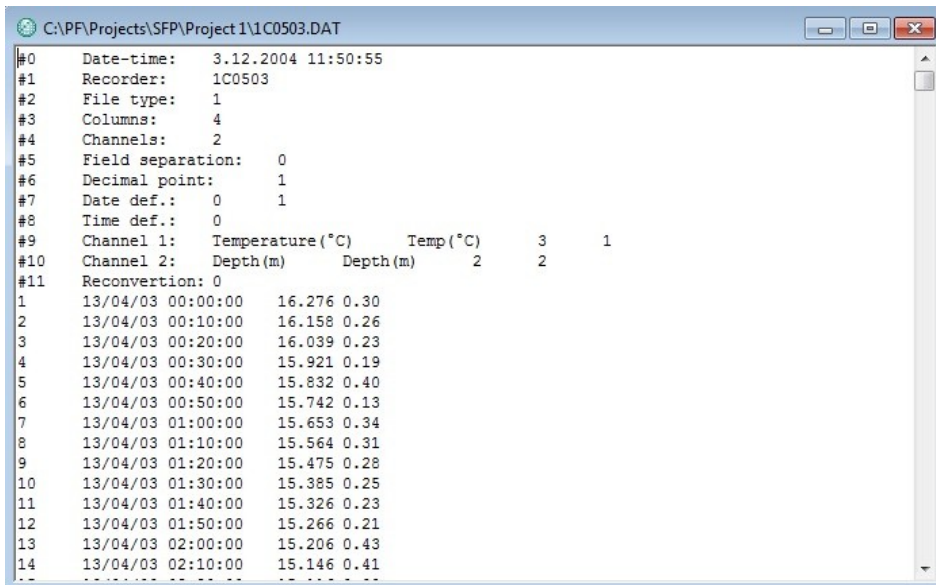


Figure 15.13 Data file

To print out the file select **File-Print** on the menu bar and the following window appears:

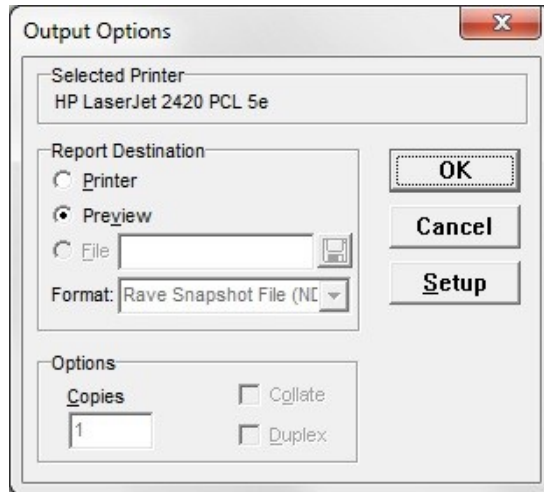


Figure 15.14 Output Options

To see a preview of the file, highlight the data you want to view, select **Preview** and click **OK** (see figure 15.15).

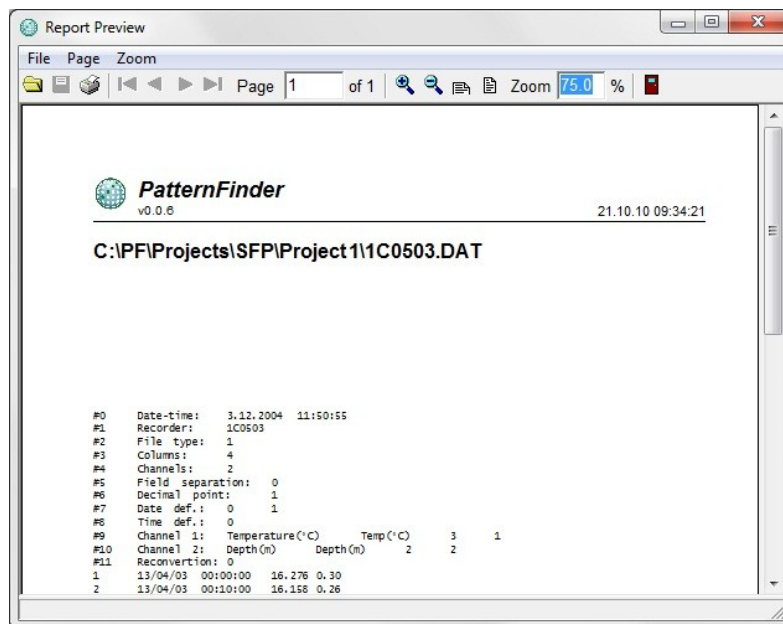


Figure 15.15 Report Preview