



W Y R D
Technologies

WyrD® Analysis Software User's Manual

Version 2.1.0

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Versions

| Date | Version | Author | Change |
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| 03.02.2024 | 0.8.1 | Michael Oswald | Update for pre-release version 0.8.1 |
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New Features

2.1.0

- Added saving of p-values in a json file
- Changed the whole mouse handling (zooming, time ranges etc)
- Added clear button for loaded Z-matrix
- Added time difference display from selected event to the cursor on the left side of the cursor
- Added display of time ranges

2.0.3

- Added zoom-in and zoom-out buttons

2.0.2

- Bug fixes:
 - Adding events saved erroneously the p-scores instead of the z-scores which destroyed the file
 - Selecting the Raw Data Directory did not work correctly on Linux
 - Saving a Chart as SVG without specifying the extension, did omit it. Now it is automatically added.
- Added zoom slider for p-score chart

2.0.1

- Bug fixes for saving charts to an image file

2.0.0

- On data processing, settings from the Wyrld Light or the Wyrdscope-Live can be applied
- New file format for result files (z-matrix files). In version 1.0, the result file was a CSV file and the random data as well as the event file was in a different location, which required handling of multiple files when the data should be transmitted. The new file format is either JSON (human readable) or CBOR (binary, a bit smaller) and all results of the processing (z-matrix, random data and events) are in one file, which can be more easily transmitted. The only exception are audio files, which are still separate (for possible data protection reasons).
- Comparison matrix: a second result file can be loaded and compared against a primary one
- Shuffle data: this is for scientific applications. Shuffles the random data pairs time-wise and then does the processing. This basically should generate baseline data.
- New metadata dialog: shows properties of the result files and allows to enter a longer text as a description of the whole experiment. Also, in a second field shows a list of the events, which can be copy/pasted into a document
- When saving a chart to an image file, the events are not added anymore for each chart. The list of events can be accessed via the metadata dialog.
- An event file can be loaded to apply events to the currently loaded result file. As file format, the event files from the 1.0 version as well as the export from the Timestamp App can be used

- Reverse startpoints: clicking on a startpoint in the startpoint chart displays all data points that have been assigned to this startpoint.

Installation

Linux

The linux version is delivered as a debian package (with the .deb) extension. It can be installed with standard graphical package managers or the dpkg command:

```
sudo dpkg -i wyrd-analysis-software_2.0.1-1_amd64.deb
```

Windows

The software is delivered in a zip file. Just unzip the executable and copy it to a suitable location. Note that the license file must be in the same folder. It then can be started via double click.

MacOS

The software is delivered in a zip file, which contains a MacOS application. The application can either be run locally or copied into the Applications folder.

A Beginners Guide

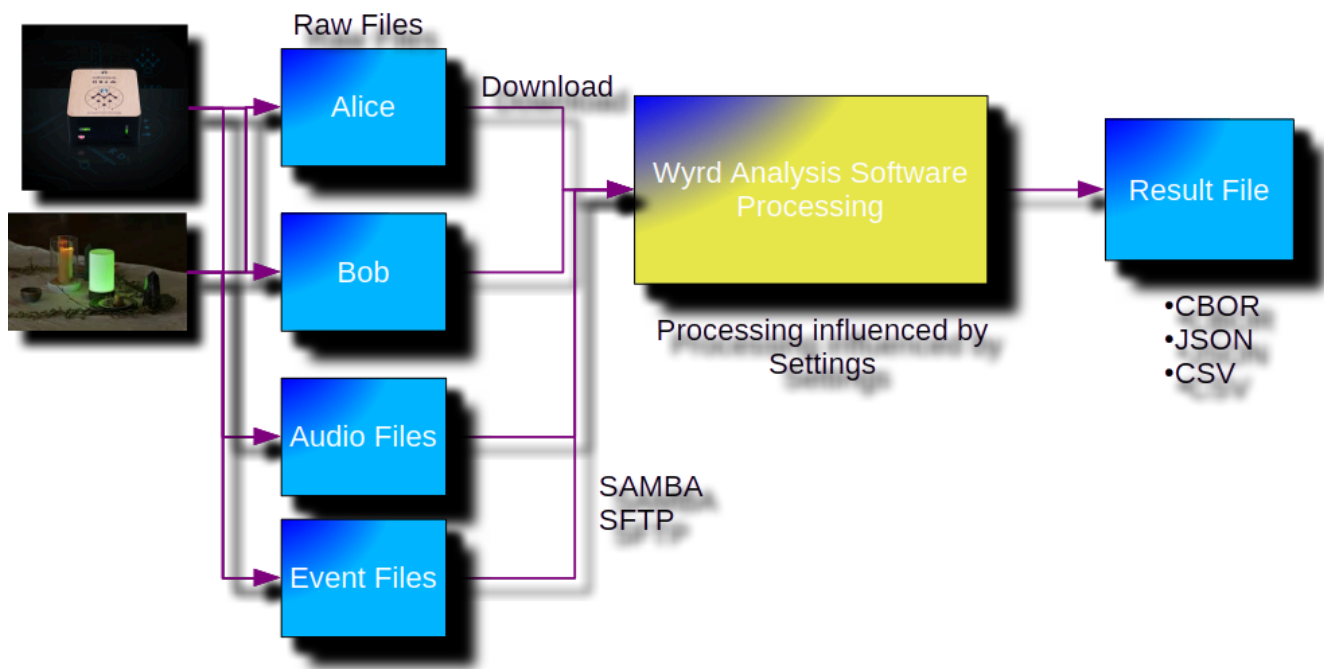
First you need to make sure you have the software! If you have not yet purchased the licence, you can do so at <https://gowyrd.org/wyrdoscope-software-suite/>.

The Wyrd Analysis Software can do an amazing amount of things. It is designed to provide all the possibilities imaginable to academics and data analysts. All these details are contained later on in the handbook so if you want to jump in the deep end, then just skip this Beginners Guide.

In this section we will provide the minimal instructions needed to enable you to 1. get the data from your Wyrdoscope onto your computer, 2. get the data from the folder on your computer into the Wyrd Analysis Software, 3. look for basic initial patterns in the data that might match interesting moments during the event you recorded.

Here is a basic introduction video for Windows users (<https://youtu.be/wqgsiNy8NTg>) and for Mac users (<https://youtu.be/oyxH6-zCcm4>).

The basic process is shown in the figure below:



The Wyrdd devices create so-called raw files, the Alice-, Bob-, Event- and audio files (if used). These can be downloaded via either SAMBA (Windows Shared Drive) or SFTP (secure file transfer protocol) from the device to a local computer. From there, they can be processed with help of the Wyrdd Analysis Software, which generates Result files. The result files contain basically the chart data. If the result files have been generated, the raw files don't need to be reprocessed again, except one wants to process them with different settings. The result files (also called matrix files) can be loaded again from the Wyrdd Analysis Software.

1. How to get the data from your Wyrddoscope or Wyrdd Light onto your computer

(This information is also contained in your Wyrddoscope Device user manual.)

i. Connect your computer to the Wyrddoscope or Wyrdd Light through your Wifi connection

Turn on your Wyrddoscope. Wait until all the lights are lit up - that can take a couple of minutes.

Look in the same place you would on your computer to connect to a local WiFi network. There you should see Wyrddoscope or Wyrddlamp as an option. Select the appropriate Wifi for your device. Enter the password Wyrdd&2023 .

For Windows and Linux

Enter \\192.168.0.1 (do not forget the \\) for the Wyrddoscope and \\192.168.1.1 for the Wyrdd Light in the file search address bar.

For Windows this is in Windows / File Explorer.

On Linux it depends on the distribution. On KDE it is "dolphin" or "thunar" and the address to enter is

smb://192.168.0.1 for the Wyrdoscope or smb://192.168.1.1 for the Wyrd Light. On GNOME it is "Files" or "Nautilus", also with the smb:// prefix. Note that on Linux also the SFTP protocol can be used for downloading the data, so the link would be sftp://192.168.0.1 for the Wyrdoscope or sftp://192.168.1.1 for the Wyrd Light.

When doing this for the first time, a login screen will pop up. Enter username "wyrdo" and the user password "syntropy+2023" . Save your settings for future access.

After logging in you will see in your network folder an entry "192.168.0.1" or "192.168.1.1", which shows three folders: "wyrdo", "Wyrdoscope_controlling software" and "Wyrdoscope_data" (Figure 3b).

Alternatively:

When the Explorer with the smb://192.168.x.x link does not work, it may be that the SMB protocol has been turned off by a security policy. As an alternative, the tool WinSCP can be used, which can be downloaded either from the Microsoft Shop or from <https://winscp.net/eng/download.php>.

For Mac

In Finder, choose Go > Connect to Server. Type `smb://192.168.0.1` for the Wyrdoscope or `smb://192.168.1.1` for the Wyrd Light in the server address field at the top and click Connect. When doing this for the first time, a login screen will pop up. Enter username "wyrdo" and the user password "syntropy+2023". Save your settings for future access.

Once connected, you will see 3 volumes listed. "wyrdo" at the top should be selected. Click OK. You will then see multiple folders listed. Open the "Wyrdoscope" folder, and in that open the "data" folder (it may take a moment for the files to show up).

ii. Get the data files from the Wyrdoscope or Wyrd Light onto your computer

In the "Wyrdoscope_data" folder (or just Data folder on Mac) you can see all your REG data files and audio recordings. The audio recordings are stored in the "Audio_Recordings" folder.

Select all the entries in the data folder and copy or drag them over to your computer, in a folder with a name of your choice. Do not rename any of the files or folders in the Wyrdoscope folder on your computer. It does not matter where you locate these folders and files on your computer.

2. How to get the data from the folder on your computer into the Wyrd Analysis Software

i. Install the Wyrd Analysis Software on your computer

Licence

The Wyrdo Analysis Software can only be operated with your licence file. The licence file is emailed to you after you buy the software. It has the filename `wyrdoscope_license.lic`. After installation of the software, the file should be put into the right location on your computer, where it can be found by the software. Please see the next section.

If the licence file cannot be found by the software, an error will be reported in a message box: *"Error reading licence file: file not found"*. In this case, please make sure the file is placed into the correct location.

Installation on MacOS

The application is delivered as a MacOS application bundle which can either be started from the download location, disk drive or similar, or can be copied with *Finder* into the *Applications* folder from where it is accessible via the normal launcher. The licence file itself has to be placed into the home directory of the user: `/Users/<username>`.

Installation on Windows

The Windows version is created for Windows 10 and above and is delivered as a single executable file. The file may be copied into any suitable location from where it can be run. The licence file `wyrdoscope_license.lic` must be in the same folder.

To start the Wyrd Analysis Software, navigate to this directory and double click the `wyrd-analysis-software.exe` file.

Installation on Linux

The Linux version has been created on Ubuntu 24.04 LTS, but should also run on similar distributions. The Wyrd Analysis Software is delivered as a Debian package, that can be installed with the usual package managers in a Debian-based Linux Distribution (`apt`, `dpkg`, `synaptic`, `qapt` etc).

For installing it from the command line, one can use e.g. the command:

```
sudo dpkg -i wyrd-analysis-software_2.0.0-1_amd64.deb
```

The executable of the software itself is stored in the standard location `/usr/bin` and can be directly executed via command line or the application launchers.

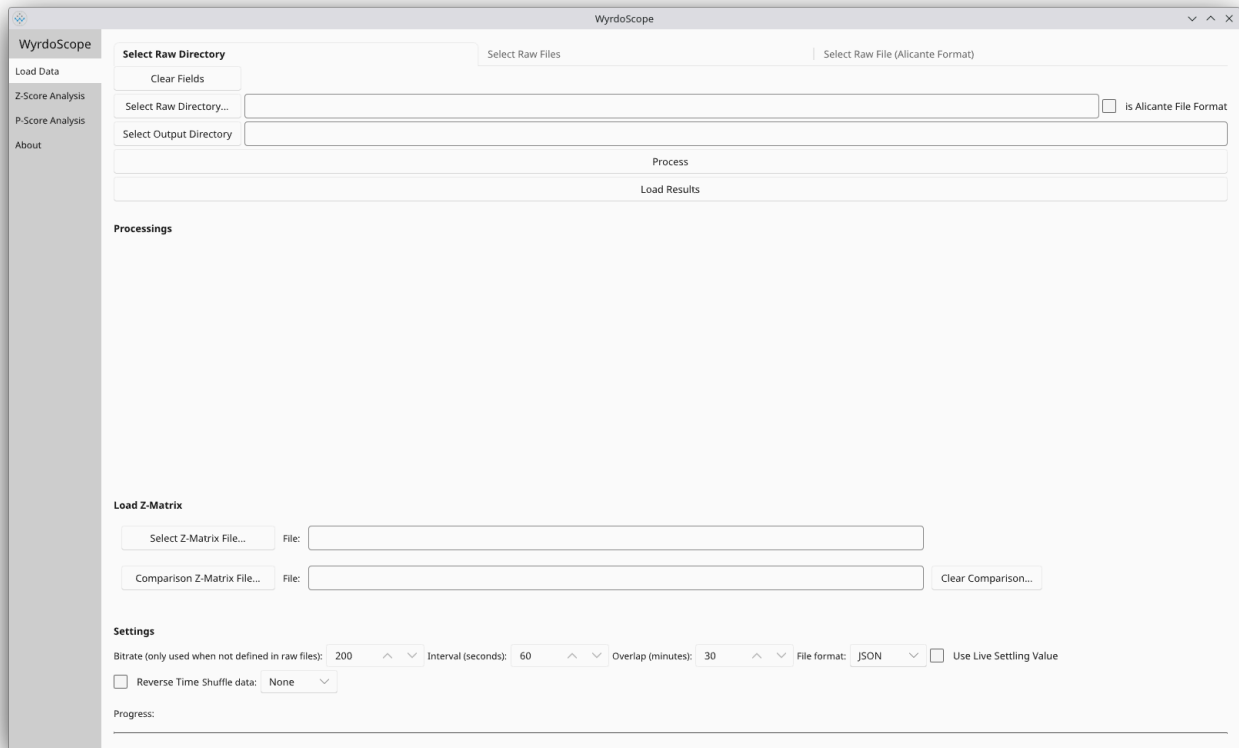
The Linux version of the software looks at two locations to find the licence file:

- It first looks in the directory, from where the application has been started
- If it does not find the file there, it looks under the directory:
`~/ .config/wyrdoscope/wyrdoscope_license.lic`.

The licence file (`wyrdoscope_license.lic`) is emailed to you separately when you order the software and must be placed into the correct location. the same directory where the software is started up in (most usually the user's home directory).

ii. Import your data files into the Wyrd Analysis Software

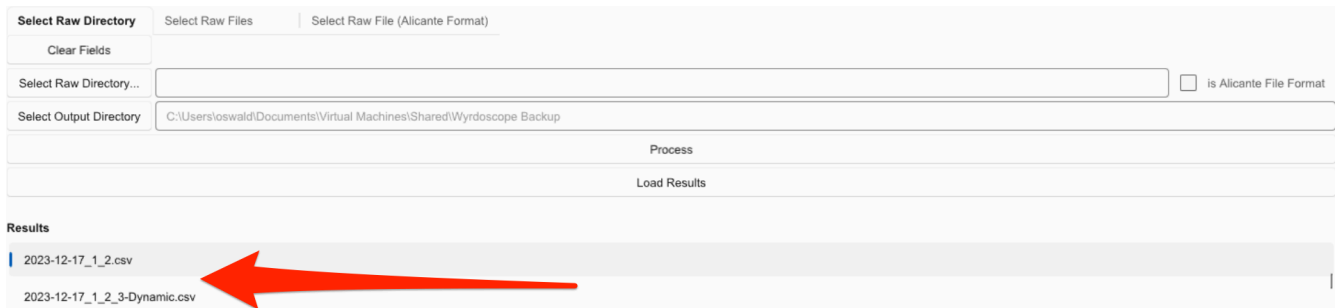
When you open the Wyrd Analysis Software app, it should look like this:



Note that the *Load Data* option is selected on the left and *Select Raw Directory* on the top bar.

Click on the *Select Raw Directory...* button (under the *Clear Files* button). Select the folder with your REG data and the Audio Recordings folder that you created when you imported your data from the WyrdoScope earlier.

Click the *Process* button. You should now see the data files listed under *Results* in the window below the *Process* and *Load Results* bars:



Click on one of the files and it will automatically load all the relevant files including the audio files.

In the sidebar on the left select *P-Score Analysis*. Here you will see the data presented against a height axis of probability that the event happened by chance. The higher the curve, the higher the P-Score and the less likely

and more statistically significant that event was. You can see the exact probability score on the left-hand axis (e.g. 1:2000, which would mean that particular event and result would have to happen 2000 times for it to show up by chance).

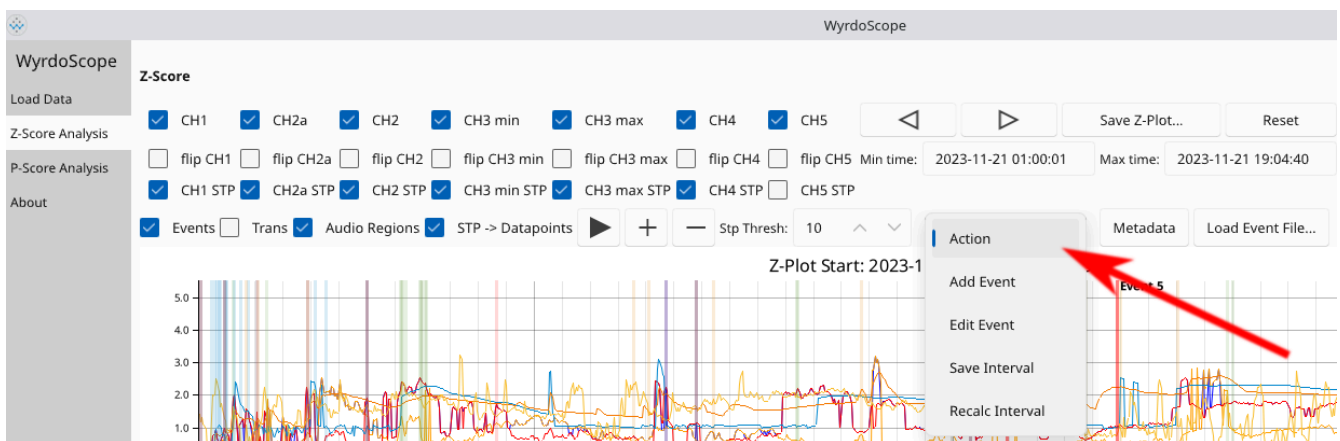
The P-Score is the easiest way to view the data. For information about the Z-Score, see the relevant section below.

For more information on the different channels that you can turn on and off in the check-boxes, see the relevant section below.

3. How to look for basic patterns in the data that might match interesting moments during the event you recorded

i. Events

If you pressed the Event button on the WyrdoScope while you were recording your event, you can see that in the data as a red line labelled Event with a number. You can easily see if there are any peaks in the data at that moment. You can edit that Event label, for example to give it a name that describes what happened at that moment, and you can add a comment with more detail (this is why it is important to keep notes during your event). Select the event label and then click on Edit Event under the Action dropdown menu:



If you missed an important moment then you can add an event by selecting Add Event.

For the other options listed under the Action Menu, see the relevant sections below.

ii. Audio Recordings

To play audio files that you recorded, you click the play button:



When the start of the audio event is the currently selected event, the whole audio is played. For longer audio recordings, you can move the cursor to any position in the audio event area. When the audio play button is then clicked, the audio is played from this position onward. This is useful for longer audio events, when the data show something interesting and you want to check what happened in the audio recording at that time. The audio play button changes to a stop button while playing, so that the playing can be stopped at any time.

iii. Zooming in to interesting events

You may see a narrow peak in your data and want to see in more detail what was happening around that moment. The software allows you to zoom in to a specific time interval in the data. To zoom into the p-score chart with the mouse, hold down the CTRL key on Windows and Linux (Command key on Mac) and click-and-drag across the period you want to see on the p-chart itself. The selected time interval will be highlighted. When the mouse button is released, the selected interval is zoomed in on and the chart displays the contents in this time range. The actual time values of this range are also displayed in the min time and max time fields.

More Detailed Analysis

For more detailed analysis and specialist functions, we suggest you consult the sections below.

Terminology

| Term | Description |
|------------------------------------|---|
| Wyrdoscope® hardware | When there are notions about the Wyrdoscope® hardware, the hardware of all Wyrd devices is referenced. It actually means the Wyrdoscope itself or the Wyrd Light. |
| Alice, Bob | Names of the two random event generators (REG) |
| REG | Random Event Generator |
| Bitrate | How many bits per second the random event generator delivers (default: 200) |
| Interval | Time resolution of the processing. Defaults to 60 seconds (1 minute) |
| Raw Data Files | Files copied over from the hardware. These are the outputs of the REGs and usually are named Alice_<date>_<time>.csv and Bob_<date>_<time>.csv |
| Z-Matrix Files | Result files generated after processing. These files can be loaded much quicker as the processing does not have to be done. |
| Result files, dynamic result files | <p>Result files are z-matrix files, the name is used interchangeably. The result files are generated in 2 flavours, the normal result file, which is a bit more cleaned up, but may miss some short, fast peaks. It also tends to shift start points which it cannot assign to a data point towards the beginning of the file, hence the larger amount of start points in the beginning of normal result files.</p> <p>The dynamic result file (dynamic z-matrix) does catch all peaks, but is also more noisy and reacts more sensitively to events. It does assign the start points correctly and does not tend to shift them to the start of the file.</p> |
| P-Score | <p>Probability Score. Gives the probability against chance. The higher the p-score, the higher the anomaly. Example: a p-score of 70 000 means an anomaly with a by-chance probability of 1:70 000 which is 0.00143%.</p> <p>Anomaly peaks can usually be seen in the p-score in a more user-friendly way</p> |

Z-Score

A z-score describes the position of a raw score in terms of its distance from the mean when measured in standard deviation units.

More simply: the value of a z-score tells you how many standard deviations you are away from the mean.

A z-score of 4.18 means that a value is 4.18 standard deviations away from the mean, which is quite a high deviation. The range from -2 to 2 in the z-score covers 95.44% of random, normal distributed events. A z-score larger than 2 (or less than -2) can be considered as statistically significant.

Usage and the Analysis Software

When the software is started, it presents a screen as in the following figure. The active page at startup is the *Load Data* page.

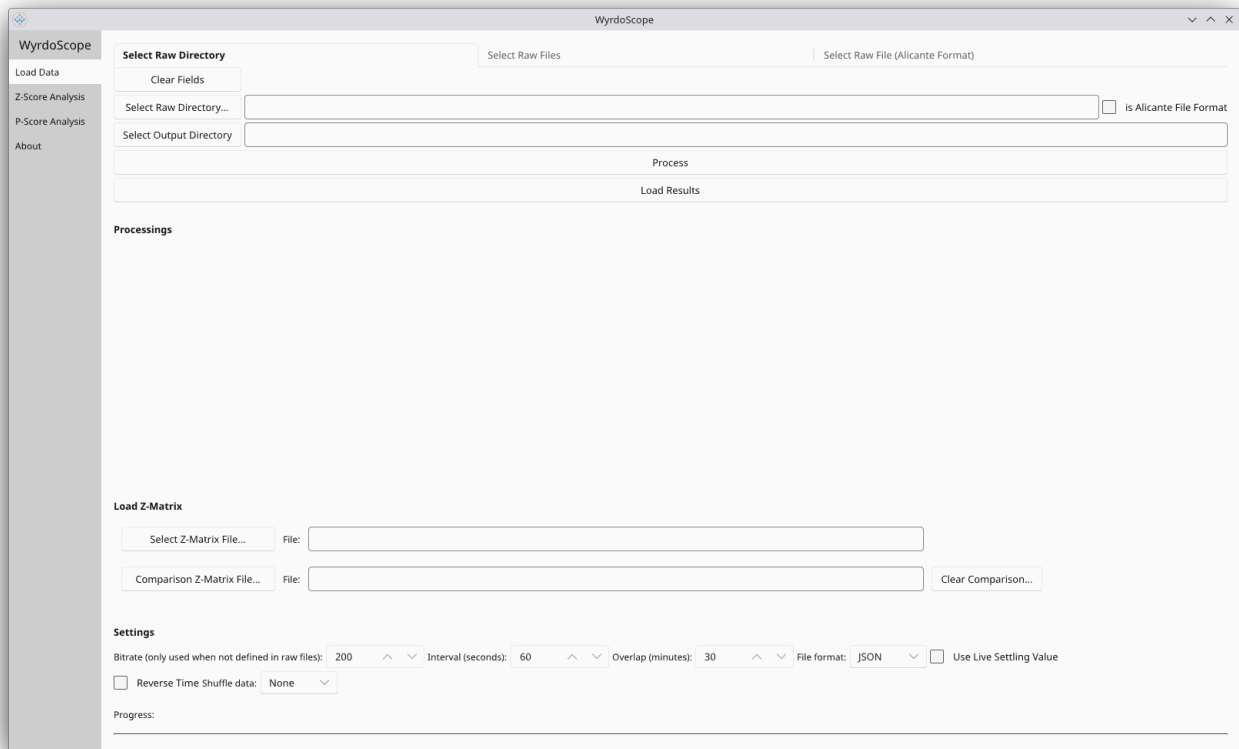


Figure 1: The Load Data Page

Settings

Operating System Settings

The Analysis Software requires a certain screen resolution in order to display the charts. Please note that current laptops (especially with Windows and MacOS) have a resolution scaling setting (e.g. Default on Windows 10 seems to be 150% zoom). It can happen in these cases that the window of the Software does not fully fit onto the screen. Please adjust your display settings. The size of the Analysis Software Window is about 1600×930 pixels.

Wyrdo Analysis Software Settings

On the Load Data page, you can access the settings for processing. The following sections describe the possible settings and what they mean.

Bitrate

The bitrate is not used during normal operations with the Wyrdoscope® hardware, as the generated files all contain the necessary information. The default value is 200, which is also the value used from the Wyrdoscope® hardware device.

The bitrate setting is only needed when older files need to be processed, where the bitrate was still 10 and could not be inferred from the raw data files. This is not the case for files generated by the Wyrdoscope® hardware.

Interval

The interval (default setting: 60 seconds = 1 minute) is the resolution of the calculations when the raw files are processed. The interval setting is stored along with the processed data in the result files and does not need to be taken into account any more after processing. It is only important if you want to recalculate the data with a different resolution.

The default settings for normal files of the Wyrdoscope® hardware are a good compromise of processing duration and resolution. The raw data files from the Wyrdoscope® hardware are slices of 24 hours, so 60 seconds (1 minute) is a good resolution for a day.

In case you want to process a shorter session (e.g. a meditation session of 1 hour), it is recommended to set the resolution to a more fine-grained value such as 6 seconds, for example. The minimum setting is 3 seconds.

Overlap

The overlap setting is not applicable to normal files copied from the Wyrdoscope® hardware. It is only used when files contain more than 24 hours of data. In this case, the large file is sliced into 24 hours plus overlap pieces. For example, let's say a file contains data for 50 hours (2 days and 2 hours). The software takes the first 24 hours from the start time of the files, plus the overlap (which by default is 30 minutes) and processes it as the first result file. The second file is then the original start shifted by 24 hours and takes again 24 hours plus the overlap. The third file is the missing 2 hours.

As a graphical representation:

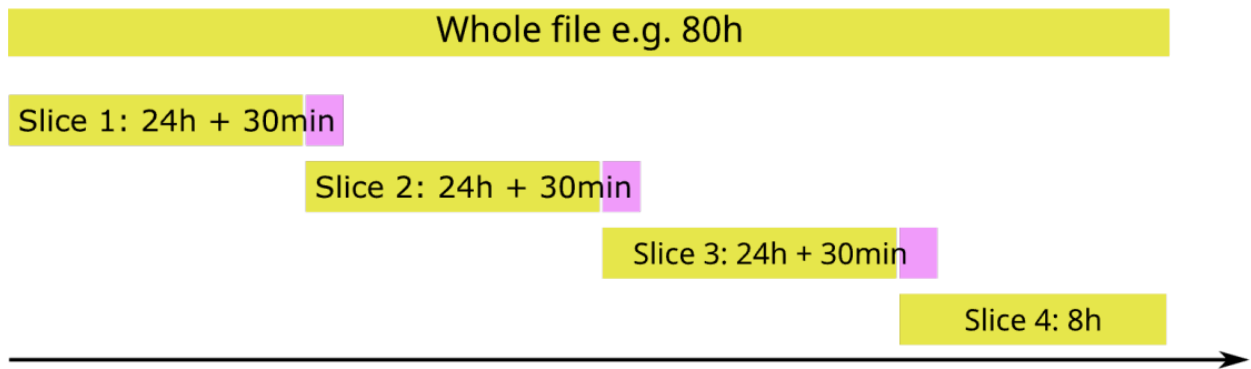


Figure 2: Visualization of the Overlap in Slice-Processing

As can be seen in Figure 2, a file larger than 24 hours is split into slices of 24 hours plus overlap (the pink sections). This is to capture events that are happening at the transition between the files, which otherwise might be missed.

File Format

This setting specifies the format of the result files. In version 1.0, only the CSV format was used, which also meant, that there were actually 5 files created:

- The result matrix
- The dynamic matrix
- The Alice raw file was copied
- The Bob raw file was copied
- The event file, containing all events (button presses and events entered in the user interface)

This had severe limitations when sending data to someone else and also for the extensibility for future versions.

With version 2.0 new formats were introduced additionally to the traditional CSV format: JSON and CBOR. Both new formats contain all data inside one file (with exception of the audio files, which are still stored separately), so that the exchange of result files is much simpler. The difference between the JSON and the CBOR file is, that JSON is a human readable text format, but therefore a bit larger, while CBOR is a binary format which is only machine-readable, but a bit smaller.

The default used from version 2.0 onwards is now CBOR. Of course, also old CSV files can be loaded and generated as well.

The following table shows the properties of the used file formats.

| Format | Data (p-score, z_score) | Random Walk | Metadata | Audio Files | Human Readable |
|--------|-------------------------|-------------|----------|-------------|----------------|
| CBOR | x | x | x | x | No |
| JSON | x | x | x | - | Yes |
| CSV | x | - | - | - | Yes |

Use Live Settling Value

This setting is intended for use with data from the Wyrd Light and the Wyrdscope-Live. Both devices produce live data, which have a bit different properties to the offline generated analysis result files from the analysis software.

In order to get the same results as shown on the Wyrdscope-Live and the values from the Wyrd Light, check this setting to ON and process the raw Alice and Bob files. The output from the dynamic output file is then the same as the one produced by the Wyrdscope-Live or Wyrd Light.

Reverse Time

This setting is for advanced analysis. It works as follows:

- The Alice/Bob files are imported.
- The random data in the file are reversed
- The processing is then done in the reverse time direction
- After processing, the result (standard output matrix and the dynamic matrix) are again reversed so that the time order is restored.

The output files for the reversed processing are all marked with the additional ending -REV in the filename.

Note: since the processing was reversed, this has the consequence that start points are actually in the future, so visualizing a start point for a data point in the charts may be a bit confusing at first.

Shuffle data

This setting is for advanced analysis in a scientific context. What it does: after reading in the raw data from the Alice and Bob files, the raw value pairs are randomly shuffled across the recorded time. This is helpful in scientific analysis as it produces mostly just baseline data, which can be compared with the new compare function.

Processing

By processing we mean the process of applying the statistics calculations to the raw Alice- and Bob-files. This process calculates the z-scores and the probabilities of correlations between the two random event generator outputs, as well as the start points.

The output generated is made up of two files:

- The standard output. These result files are placed in the output directory and have the same name as the Alice/Bob file, but without the Alice/Bob-prefix. These files are calculated with a bit of noise reduction and favor more long-term correlations. Therefore short peaks might be missed in these files, but they are less noisy and provide a first good overview.
- The second file is the result of the full processing without noise reduction, the so-called dynamic output. These files have the same name as the standard output file, but have an added -dynamic in the name. It reacts faster without noise correction and therefore can also show shorter peaks which might be missed in the standard output format. But it therefore is also more dynamic and volatile in nature. It might provide additional insights into data and show some peaks which might be missed in the standard output format.

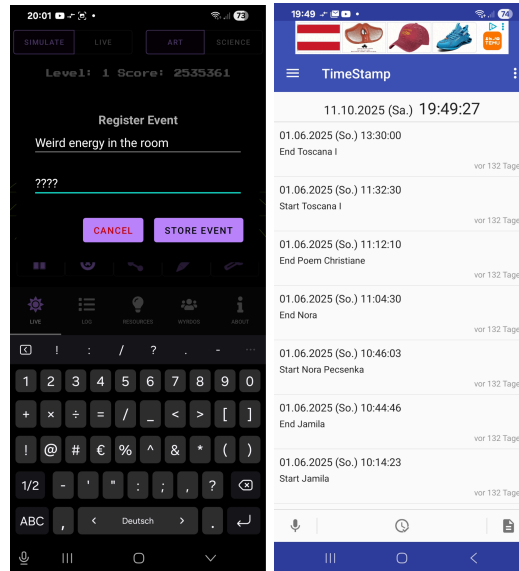
As well as to the result files, an additional directory called RawData is created within the specified output directory, which contains a copy of the Alice and Bob files as raw data and the events. In case the Alicante format is used as raw data, this format will be converted into normal Alice and Bob files in the RawData directory in the processing step to have a unified output. Also, the event file is created (see next section about events) and the audio recordings relevant to the raw Alice/Bob file are copied to the Audio_Recordings folder.

Events

There are several types of events that can be present in the data:

- Event button presses. These are created when a user presses the event button on the Wyrdoscope® itself. These events are logged directly in the raw random data files (in both Alice- and Bob-files) and are always present there. As these events are generated only through a button push, they have no name, just an associated number that is the number of button pushes since the startup of the Wyrdoscope®. These events cannot be deleted permanently from the generated output in the Analysis Software, so on each reload they will be there again. They can be edited though, to give them a name and add a comment to them to be more descriptive.
- Audio events. These are created when the user presses the audio event button on the Wyrdoscope®, which enables the audio recording. From then on, audio is recorded through the internal microphone of the Wyrdoscope® until the audio event button is pressed again to turn off the recording. The start and end of an audio event is recorded directly in the raw data file. The audio itself is in the format of a mp3 file that can be found in the output directory in the Audio_Recordings folder. The audio events cannot be edited and cannot be deleted in the Analysis software, the only option is to play the audio events (see later sections). The current microphone is suited to making comments into the microphone holes on the Wyrdoscope but is not suitable for recording of general sound further away. For that, the ability to connect an external microphone is being developed.

- User Events. These events can be freely added/edited/removed by the user in the Analysis Software where a time value, a name, a comment and a color can be specified to mark specific time points where events happened. Events can also be stamped in using the Wyrd App. An additional possibility is to use a dedicated timestamp app on a mobile phone, like Timestamp from m_c8bit, which can timestamp events and then export these events in CSV or JSON format, both of which can be imported into the Wyrd Analysis Software.



Wyrd App (left) and TimeStamp app on Android (right)

For version 1.0: after processing, all events are put into an event file that is also present in the output directory in the RawData folder, in parallel to the raw Alice- and Bob-files. It has the same name as the Alice/Bob file, but has the extension .event. This file is in JSON format and can also be edited by hand.

For version 2.0 and onwards: the event data is also present in the generated single JSON or CBOR file.

Automatic Processing of Files

The fully automatic processing of a whole directory is the default recommended method for processing the raw data from the Wyrdoscope® hardware. When copying the data from the Wyrdoscope® hardware to a laptop or other computer, normally the whole directory is copied. This includes the raw files (*Alice*- and *Bob*-files) and the `Audio_Recordings` directory for the audio recordings done via the Wyrdoscope audio event button.

The idea behind the automatic processing is to just select the folder that the files have been copied to, and the software processes all files in the directory at once. The steps to do this are described as follows:

- Copy the raw data directory inclusive the `Audio_Recordings` directory from the Wyrdoscope® hardware to the local computer. See the Beginners Guide at the start for instructions.
- This step is optional: if the raw data recorded on the Wyrdoscope® hardware, which have just been copied over, have been recorded on a different timezone than the local machine for processing is in, it is recommended to set the clock of the local machine to the timezone where the recording was done. Otherwise the timestamps in the processed results will be off. To set the clock, consult the user manual of your local operating systems (typically in the system settings there is an option to set the local clock of the machine)

- Run the Wyrd Analysis Software and on the *Load Data* page, click the *Select Raw Directory* button. A directory selection dialog pops up, where the directory of the raw data files can be selected. This should be the directory where the Alice- and Bob-files can be found.
- To process, click the *Process* button, which goes through all files in the directory and does the processing, with the current settings applied (see section 3.1.2).
- Below the fields, the software displays all files that are processed (for each Alice/Bob pair), each with its own progress bar next to the file names.
- When the processing is finished, the same area in the *Load Data* page shows the result files. For each processed file pair, there will be a normal result file with the name of the Alice/Bob files, but without the Alice/Bob prefixes, and a result-file with the *-dynamic* specifier (see Processing section for an explanation of this). Simply clicking on one of the files loads it onto the charts for further inspection. The associated raw files containing the random walk, as well as the event file and the audio recordings are also loaded with this click, so no further action is necessary.

The following screenshot shows the *Select Raw Directory* page after a processing run:

The screenshot shows the 'Select Raw Directory' interface. At the top, there are three tabs: 'Select Raw Directory', 'Select Raw Files', and 'Select Raw File (Alicante Format)'. The 'Select Raw Directory' tab is active. Below the tabs, there is a 'Clear Fields' button. The 'Select Raw Directory...' field contains the path '/home/oswald/Documents/Research/Pferde' and has a checkbox for 'is Alicante File Format'. The 'Select Output Directory' field contains the path '/home/oswald/Documents/Research/Pferde/Results'. Below these fields are two buttons: 'Process' and 'Load Results'. A 'Results' section is visible below, listing several files with progress bars. The file '2024-08-10.json_interval_2024_08_10_16_57_20_2024_08_10_19_53_18.json' is highlighted.

Processing Raw File by Hand

This functionality is available, when the *Select Raw Files* tab is clicked:

The screenshot shows the 'Select Raw Files' interface. At the top, there are three tabs: 'Select Raw Directory', 'Select Raw Files', and 'Select Raw File (Alicante Format)'. The 'Select Raw Files' tab is active. Below the tabs, there is a 'Clear Fields' button. The 'Select Alice File' field is empty. The 'Select Bob File' field is empty. The 'Select Output Directory' field is empty. Below these fields is a 'Process' button.

This allows for the selection of the Alice- and Bob-raw-files for processing.

- Click the *Select Alice File* button
 - A file open dialog appears
 - Navigate to the folder where the result files from the hardware were copied to on your computer
 - Select the Alice File you want to process
 - Where the field for the Bob File was empty before, the name is automatically generated and filled out. If that doesn't happen then a Bob File needs to be specified analogous to the Alice File.

- Similarly, if you first select the Bob File, the functionality is analogous to selecting the Alice File, the other (Alice) filename is automatically generated when both fields were empty
- Specify an output directory with the *Select Output Directory* button. This is the directory, where the results of the processing will be stored on your computer. The result files are the standard output z-matrix, the dynamic output matrix, a directory called RawData which contains the raw Alice- and Bob-Files and the event file and the Audio_Recordings directory, containing the mp3 audio files which were recorded during the session.. The standard output matrix and dynamic output matrix contain references to the raw files in the RawData directory. This means that if you want to copy the results somewhere else, then you should copy the whole results output directory.
- To start the processing, click the *Process* button. Depending on the file length (usually 24 hours of data) and selected interval setting, this can take up to a second on slow computers. The speed is higher the more CPU cores are available on the computer.
- For convenience, there is also a Clear Fields button, that simply erases the fields again so that other files can be selected more conveniently.
- Using the same File as Alice and Bob is possible. In this case only channel 1 (which in this case is the same as channel 2a) and ch4 give usable information. This option might be interesting to reanalyze historic REG experiments, where only one REG was available or where the outputs of several REGs were added up to one summary plot like in the Global Consciousness Project.

Loading existing Result Files

The standard output matrix and dynamic output matrix files are the end results generated from the processed raw data files (Alice and Bob). They can be loaded for further analysis at a later point in time in the *Load Data* page directly:

Clicking on *Select Z-Matrix File* opens a file open dialog which allows you to select the calculated z-matrix files. As soon as they are loaded, the data is available on the *z-Score Analysis* and *p-Score Analysis* page.

Clicking on *Comparison Z-Matrix File* allows to specify a second file that is displayed 1:1 in the charts to be able to compare two result files. See below in the next sections for a detailed description. Note that the time ranges of the two matrices must overlap. If the time range of the comparison matrix is completely out of range of the loaded z-matrix, it's data will not be displayed.

Alternatively, the output directory can be simply selected on the *Load Data* Page with the *Select Output Directory* button, and then clicking the *Load Results* button:

The available result files in the directory are displayed below the top controls of the *Load Data* page and can be simply selected by clicking on them.

Short description of the channels

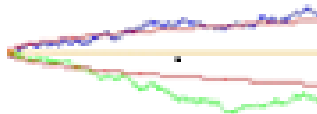
The Wyrd® Analysis Software analyses the data in several so-called channels. Each channel represents a certain pattern that is searched for in the random data.

Ch1 : the absolute z-score of the vertical deviation. It captures the correlated and the anti-correlated patterns:



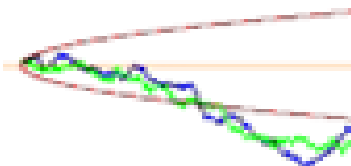
It represents the probability that the absolute average vertical height of Alice and Bob at a certain data (time) point seen from the calculated starting point happened just by chance. So for example if the interval is 60 seconds, it represents the probability of getting one minute at a certain height just by chance.

Ch2 captures only the anti-correlated pattern, so sometimes it will show the same information as channel 1.



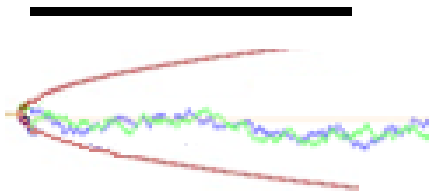
It represents the probability that the vertical maximum distance of Alice and Bob at a certain data (time) point seen from the calculated starting point happened purely by chance. So if the interval is 60 seconds, it represents the probability of getting one minute with a certain distance between them just by chance. Statistically, it can be described on the one hand as a shift of the mean of Alice and Bob in opposite directions and on the other hand as an increase of the variance of Alice and Bob.

Ch2a captures only the correlated pattern, so sometimes it will show the same information as channel 1.



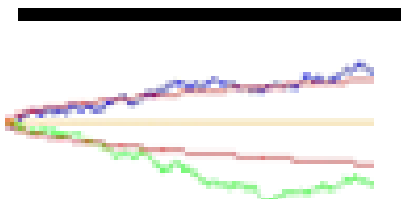
It represents the probability that the average vertical height of Alice and Bob at a certain data (time) point seen from the calculated starting point just happened by chance. The vertical height equals the deviation of the mean value of Alice and Bob from the expectation value. So if the interval is 60 seconds, it represents the probability of getting one minute with a certain height just by chance. Statistically, it can be described as a shift of the mean of Alice and Bob in the same direction.

Ch3 min: This captures the "stick together" anomaly, which represents the probability that the minimum mean distance of Alice and Bob from the starting point found by the software to the chosen data point just happened by chance. The line above the pattern is pointing out that the mean value of the property minimum distance is taken.



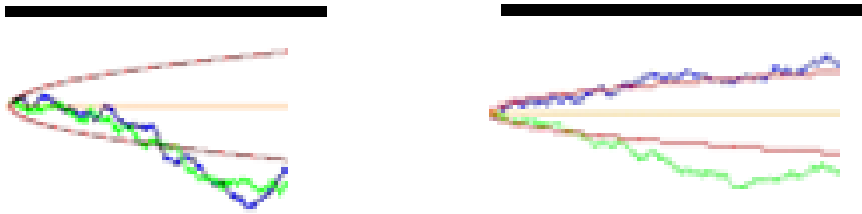
Statistically, it can be described as a decrease of the variance of Alice and Bob.

Ch3 max This captures the mean value of the maximum distance of Alice and Bob. So it represents the probability of the maximum mean distance of Alice and Bob from the starting point found by the software to the chosen data point just happened by chance. The line above the pattern is pointing out that the mean value of the property's maximum distance is taken. This channel is related to channel 2, but captures long lasting rather than spike-like structures.



Ch4

Ch4 represents the mean of the absolute z-score in the vertical direction. So it represents the probability that the mean of the absolute of the average vertical height of Alice and Bob from the starting point found by the software to the chosen data point just happened by chance. The line above the pattern is pointing out that the mean value of the property's absolute z-score of the vertical deviation is taken. This channel is related to channel 1, but captures long lasting rather than spike-like structures.



Ch5

Ch5 is different from all the other channels, as it works with the Pearson correlation of the random numbers, and not with the random walks. So it does not represent a pattern visible in the random walks of Alice and Bob.



Start Points

The Wyrd® Analysis software also tries to determine where a certain anomaly started. This is done for each data point calculated. Certain data points generate the same start point position. If this happens, a counter for this start point position is increased. If this counter is over a threshold (which can be controlled via the graphical user interface), a start point line is drawn in the chart in the same color as the originating channel, but in a transparent style. This means that when start points of several channels fall into the same position, the colors darken a bit and therefore provide a visual indication that start points from different channels are in the same position.

Start points for CH5 are based on the Pearson Correlation and not the probabilities of the random walk data and therefore they cannot be seen as a pattern in the random walks. They show the start time of the Pearson Correlation.

Viewing the P-Score Analysis

The p-score analysis shows the probability of an event against the odds. A peak value of 700000 means that the probability that the peak occurs by chance is 1:700000 or 0,00000143, which is 0,000143%. This is a highly significant anomaly.

(Mac users: Should you not be able to see the colour key box on the right, with the channels listed, go to Settings → Displays and set the resolution to something higher than the default 1440×900.)



Figure 3: The P-Score Analysis Page

The p-score analysis page can be easily selected on the left sidebar. It shows 4 different sections:

1. On the top section there are the controls for the charts. These include selecting which channels are to be displayed, if events should be displayed, which starting points should be displayed, zoom and pan controls, the current time interval displayed, the threshold for the starting points, if the reverse-transformation into normal distribution should be viewed, the event handling controls, the audio event play button and the action menu
2. The p-score chart shows the channels, start points and events (if present)
3. The starting point counter chart shows the values of the start point counter values for each channel (see the section about start points above)
4. The random walk chart shows the original raw data plots from both random generators (Alice and Bob). Also displayed is the parabola, which shows the 95% probability region.

Quick mouse reference:

| Key/Mouse | Action |
|--------------------------|---|
| Left click | Show the cursor on the chart. This displays the exact time of the cursor and in case an event is selected, the time duration between the event and the cursor |
| CTRL-left-click-and-drag | Windows and Linux: Zoom into selected interval |

| | |
|------------------------------------|---|
| ALT-left-click-and-drag | Windows and Linux: Show a time region with the timestamp of where the selection started and the duration. This is useful for measuring durations (e.g. durations of peaks, durations between peaks etc). |
| ALT-left-click | Windows and Linux: <ul style="list-style-type: none"> When an event is already selected and mouse cursor is over another event: select additionally the second event and display the time duration between the two events on the second event When a time range has been selected with ALT-left-click-and-drag: remove the time range again |
| Command-left-click-and-drag | MacOS: Zoom into selected interval |
| SHIFT-left-click | Display the associated start point of the nearest data point to the mouse pointer. A second SHIFT-left-click returns back to normal display |
| Left-click on the startpoint chart | Display, which data points are assigned to the selected start point |

The controls are shown below:

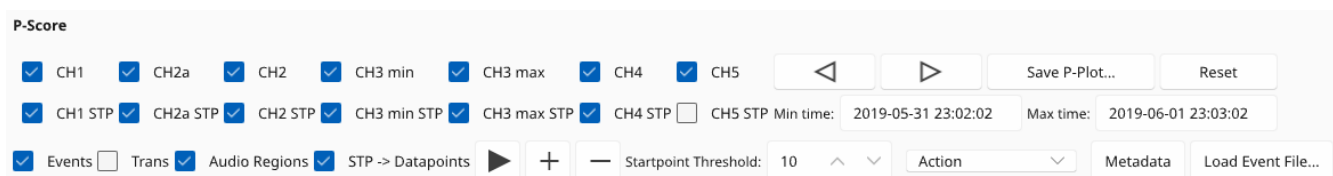


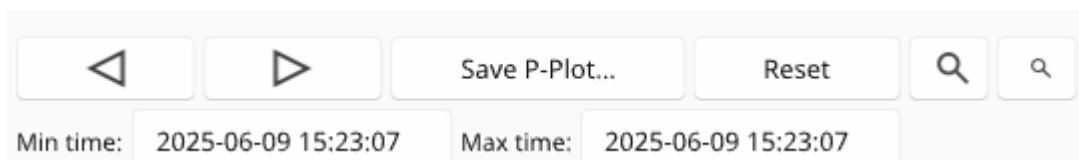
Figure 4: Controls for the P-Score Plot

These are the controls available:

Channel Controls

The channel controls allow you to select which channels are displayed (the first row of checkboxes with CH1 to CH5) and which start points should be displayed (CH1 Stp to CH5 Stp).

Zoom/Pan Controls



Zooming The Zoom Controls allow you to shift the chart left or right with help of the left- and right-arrow-buttons. The *min time* and *max time* fields below these buttons display the currently displayed time range on the chart. The values can be entered directly, if precise time control is needed. The magnifier icons help to zoom in and out more conveniently. The big magnifying glass zooms in by 20%, the small one zooms out by 20%.

For zooming into the p-chart with the mouse, hold down the CTRL key on Windows and Linux (Command key on Mac) and click-and-drag on the p-chart itself. The currently selected time interval will be highlighted. When the mouse button is released, the selected interval is zoomed in and the chart displays the contents according to this time range. The actual time values of this range are also displayed in the *min time* and *max time* fields.

As the p-plot can have high peaks, which then make lower peaks in relation so small that they are hardly displayed, there is now a vertical zoom slider on the right side of the charts, which allows zooming in. As an example, here is a very high peak which makes the smaller ones indistinguishable:

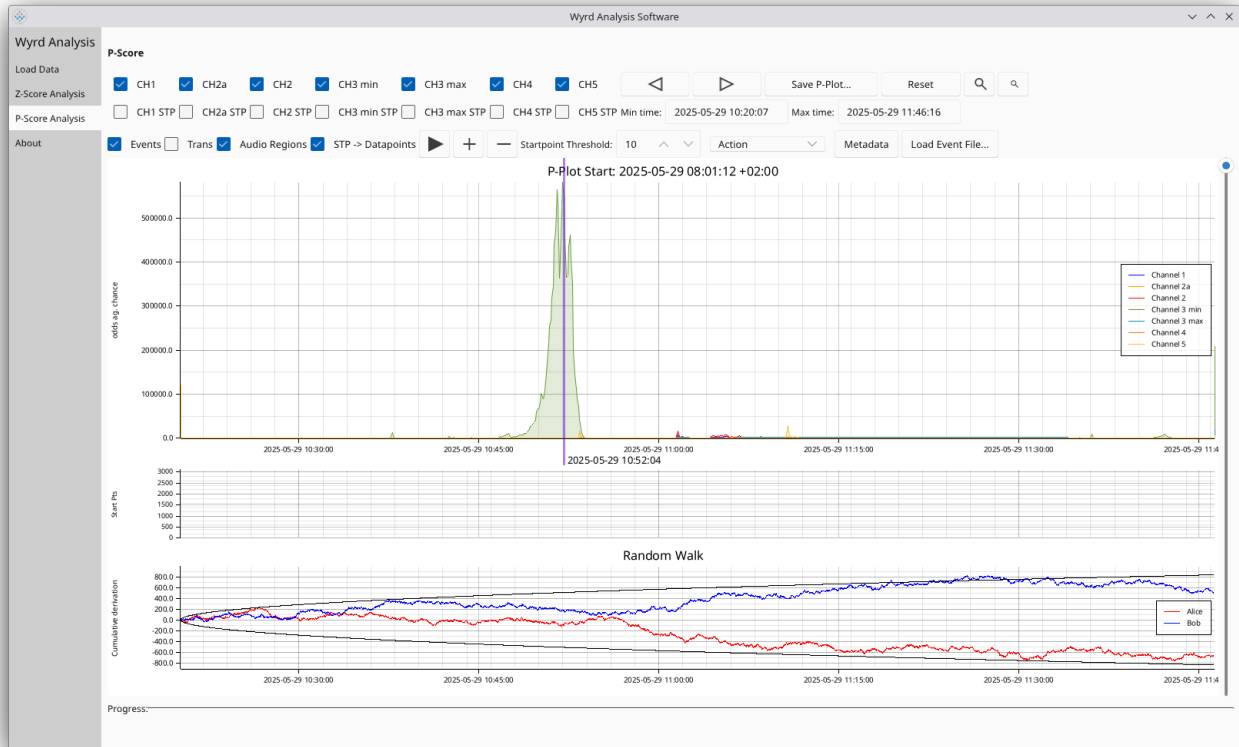


Figure 5: High Peak on the P-Score Plot obscuring lower channel data

The slider on the right side of the chart can be used to zoom in:

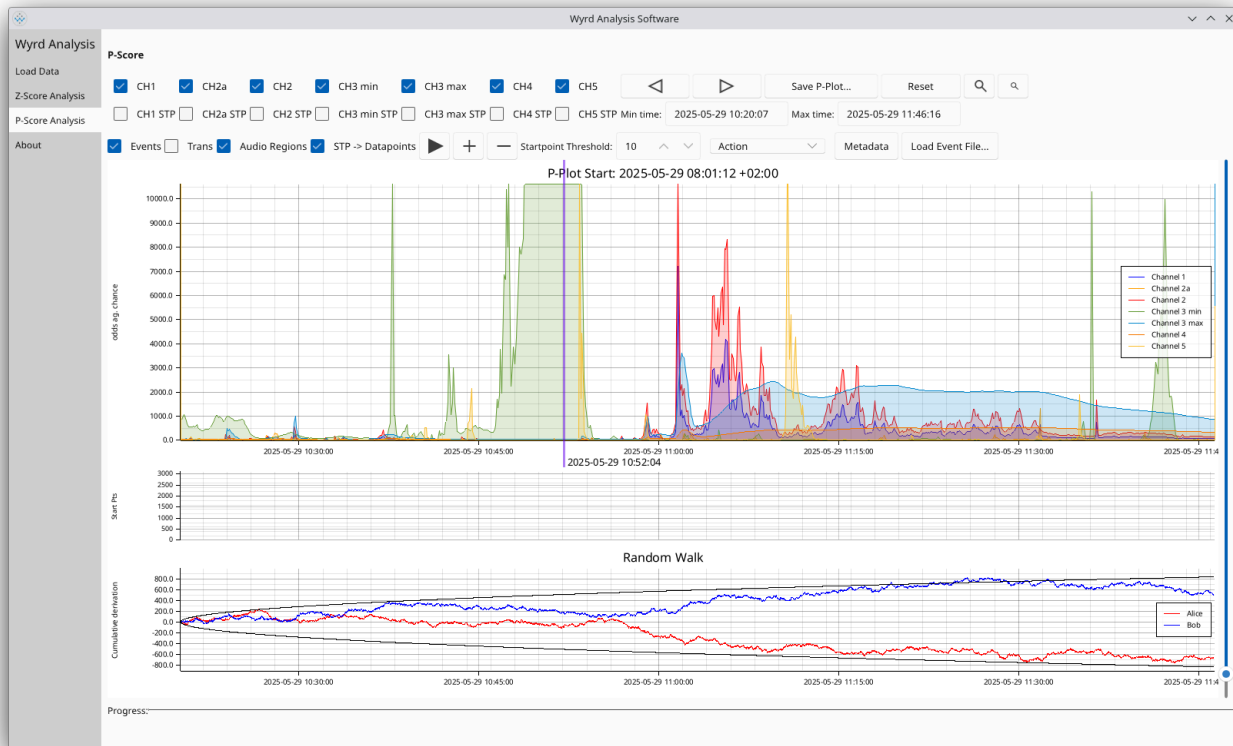


Figure 6: Zoom in on the P-Score Plot using the slider on the right side

Save P-Plot

Save P-Plot can be used for saving the current view of the chart into a file. It brings up a file selector dialog where the filename and the type can be selected. Currently, the two graphics formats supported for saving the chart into a file are SVG (Scalable Vector Graphics) and PNG (Portable Network Graphics) format. The images can then be included into other documents. The charts in the files are the same as shown in the window of the application, but in addition the events are shown in a list under the charts with timestamp, name and comment.

Reset

Reset simply resets the chart zoom values to the whole range. If several zoom operations have been done, this button resets the view to the initial time range, the whole time range of the loaded (or processed) data (typically: 24h), or in case of a re-processing of a selected interval, then to this interval.

Display Controls

Display Controls allow selections of how the data are displayed and which content to display.

- **Events** can be used to show or hide events (see the section about events above). Events are displayed similarly to the start points. A colored line will mark the event and it will be given a label with a number, e.g. "Event 4" would mean that the event button has been pressed the fourth time since the startup of the WyrdoScope. Audio events have a start- and end-time, they are displayed with a coloured range. The following figure shows an Event and an Audio Event which has a specific duration:

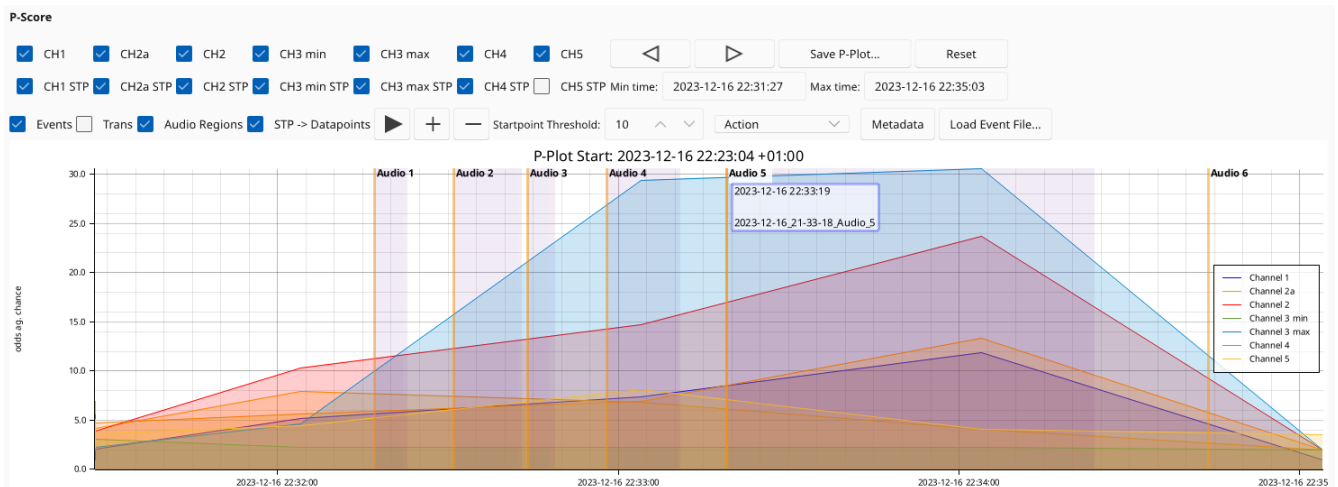


Figure 7: Events/Audio Events displayed in the P-Plot

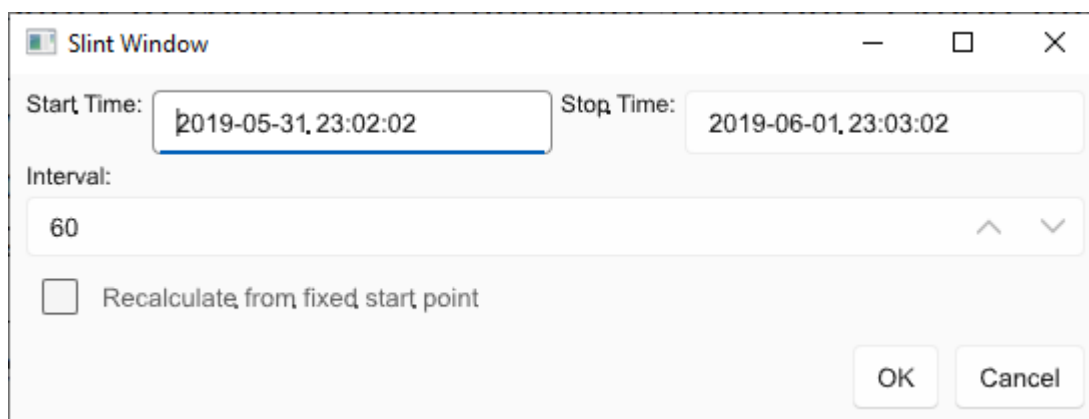
- **Trans** switches the display from the calculated values, to values which have been transformed further into a normal distribution. The main reason this setting exists is that this allows the probabilities of the channels to be compared against each other as all channels are transformed into a normal distribution. This display mode may also allow you to see some anomalies which don't appear in the normal mode, e.g. when channels display a quite uncharacteristic sticking to the baseline, this reverse transformation may show a higher variance and therefore may allow you to detect peaks.
- **Audio Regions** allow the user to enable/disable the viewing of the audio regions themselves. As the audio regions are displayed as a colored range, this may be undesirable in some cases and visually clutter the charts. This setting allows to disable the view of audio regions to clear it up a bit.
- **STP → Datapoints** allows to enable/disable the viewing of data points associated to a specific start point. This is detailed more in the start points chart section below.
- **Audio Play (Play button)** allows you to play the audio recorded in an audio event. When the start of the audio event is the currently selected audio start event, the whole audio is played. The second possibility is for longer audio events (as shown in the figure above). The normal time cursor can be set at any position within the audio event area. When the audio play button is then clicked, the audio is played from this position onward. This is useful for longer audio events, when the data show something interesting and you want to check what happened in the audio recording at that time. The audio play button changes to a stop button while playing, so that the playing can be stopped at any time.
- The **Plus** button allows you to add a new user event at the current location of the cursor (see also figure 7). A dialog pops up, where a name, a comment and a color for this new user event can be entered.
- The **Minus** button allows you to remove the currently selected event. Note that events generated from the Wyrdoscope® itself cannot be removed permanently. They can be temporarily removed from the chart, but on the next load of the output matrices or on reprocessing the data they will appear again. Audio events cannot be edited or removed at all.
- **Startpoint Threshold** allows you to specify at which counter value a start point line will be drawn in the p-plot. The chart below the p-plot chart gives the counter values for the start points per time interval. If this counter value is greater than the value in the *Start point Threshold* field, a line is

drawn in the p-plot, marking the starting point. See also the section about start points. Start point lines have the same color as the channel they are from, but have a high transparency. When multiple start points of multiple channels land on the same time interval, the colors combine and the line gets darker, creating a visual indication if multiple channels have the same start point.

Action Menu

The **Action** menu allows you to select several actions:

- **Add Event:** allows you to add a new user event by specifying a timestamp, name and comment. As the time can be specified exactly, this is the preferred method to add events when you have a written record of events that happened during the Wyrdoscope recording and need them to be visible in the chart.
- **Edit Event:** allows you to edit the selected event. This effectively means that the name, the timestamp, the comment and the color of the event can be changed. Audio Events cannot be edited.
- **Save Interval:** this is an additional analysis function for external tools. This effectively exports the currently visible (e.g. zoomed in) time interval in the charts into files. One can use this functionality to zoom in to anomalies and only export this interval. These files are listed as follows and have the naming convention that they have the same name as the files from which they originated, with the added word "interval" and the time range itself in the format `<year_month_day_hour_minute_second>` (so e.g. the raw file of Alice is `Alice_2023-11-21.csv`, the exported interval file is then:
`Alice_2023-11-21_interval_2023_11_21_15_41_50_2023_11_21_19_24_01.csv`. All filenames follow this template (added `_interval_<start>_<stop>`):
 - Alice and Bob raw files of exactly the time range of the zoom
 - A cutout of the current z-matrix displayed of the time range of the zoom
 - The event file is replicated
- **Recalc Interval:** this functionality allows you to change some settings/properties for the currently selected range of data to be reprocessed. The following dialog pops up:



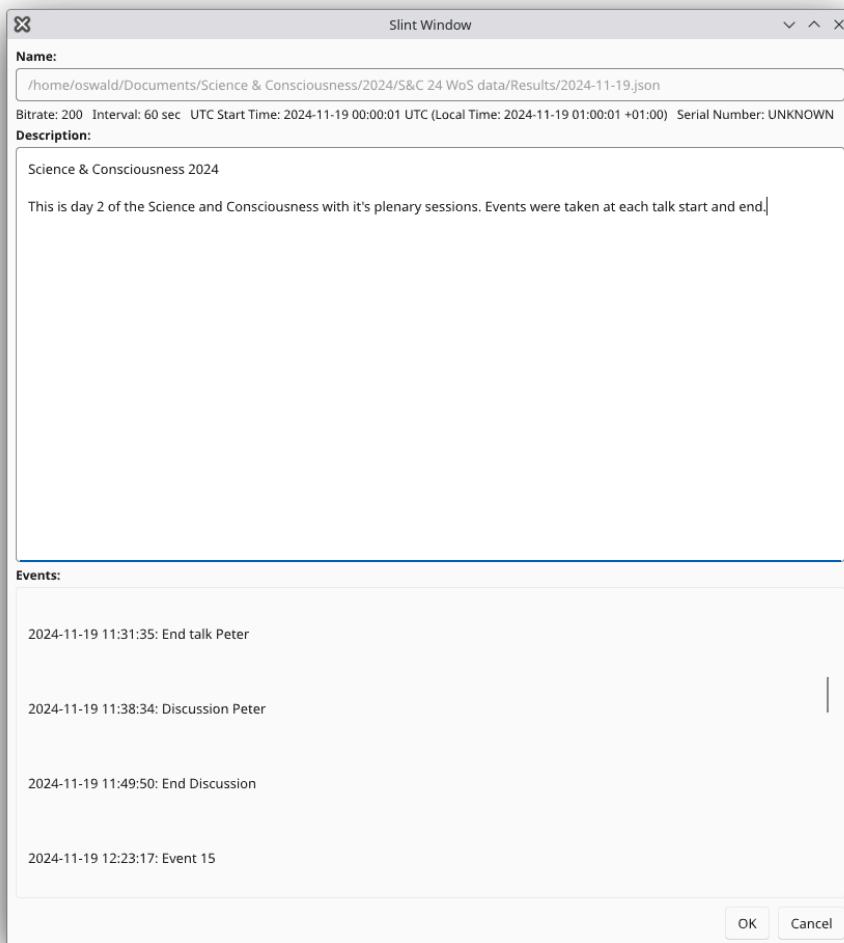
This dialog shows the currently selected (zoomed) time interval with start- and stop-time which can also be edited or manually specified. Below is the setting for the interval setting (default 60 seconds) which can be changed. This is useful if a section of the chart like an interesting peak should be recalculated in a higher resolution. If this is done, please note that it makes much sense to include the start points of this peak in the

selected time interval. As a data point is always calculated relative to a start point, this is necessary, as otherwise the peak might simply disappear.

The last option is the checkbox for *Recalculate from a fixed start point*. This specifies that the data contained in this time range are calculated assuming that only one start point is taken into account, which is exactly the value from the *Start Time* field. This is analogous to the old Psyleron software, calculating the output from a fixed start point. The file name of the calculated result files is the name of the original output file with the addition of: `_recalc_interval_I<interval>_<start-time>_to_<stop-time>`. The specified new interval settings are included in the filename as well as the time range. If the *Recalculate from fixed start point* is checked additionally, the name also contains `_FXD_STP_` before the time range in the file name.

Metadata

The **Metadata** button shows a dialog which allows viewing and editing the metadata of the result file. This can contain a longer text comment, e.g. describing the whole experiment. In the lower section, the events of this file are listed with timestamp, name and comment of the events:



The metadata displays:

- The name of the file

- It's properties (bitrate, interval, start time in UTC and local time, the serial number of the device the data was record with etc)
- Description: a longer text can be entered here to describe the session in detail
- Events: the events with timestamp, name and comment.

Both the description and the events can be copied with normal Copy/Paste and inserted into another document (e.g. a Word file).

Load Event File

The **Load Event File** button can be used to load events that are generated from a different source. Currently, the following files are accepted as event sources:

- Event files generated from the Wyrd Analysis Software. Event files generated from this software have the file extension .event and can be loaded with this functionality into this result matrix file.
- Events generated from the timestamp app. The timestamp app (TimeStamp from m_c8bit in Google Play) is a mobile phone app (https://play.google.com/store/apps/details?id=jp.m_c8bit.timestamp), that can generate simple timestamps with a textual description, which can be directly entered on the phone or spoken into the microphone of the mobile phone, which will use a speech recognition to convert this into text. The timestamps from this app can be exported in either CSV or JSON format. These files can then be transferred to a computer and imported with this button into a result file. Note, that only events within the time range of the result file are imported.

Clicking the Load Event file button opens a normal file dialog. The filter allows to select the desired format of the timestamp data:

- Event: Wyrd Analysis software event files
- CSV: csv export from the timestamp app
- JSON: json export from the timestamp app

Zoomed in View

The following figure shows a zoomed in view of a detected peak:

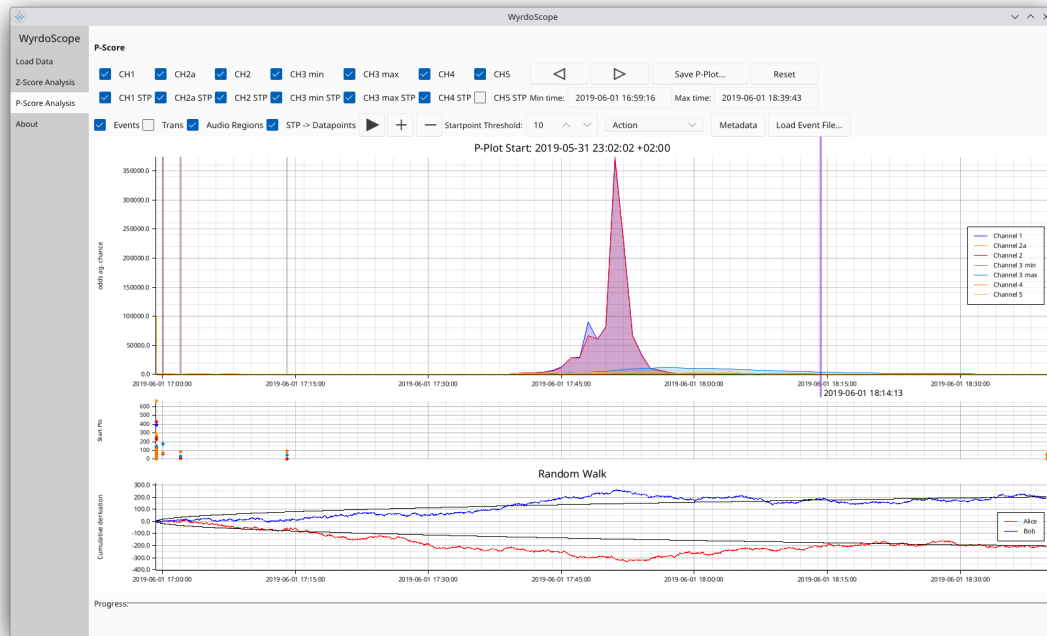


Figure 8: Zoomed Value of a Peak

The figure above shows a zoom to the peak with the starting points also visible, above the random walk. This peak shows a probability of over 1:350000 on channel 1.

Time Cursor

A single click onto the p-chart will display the time cursor, a vertical line and show the exact time of this line at the bottom of the chart:

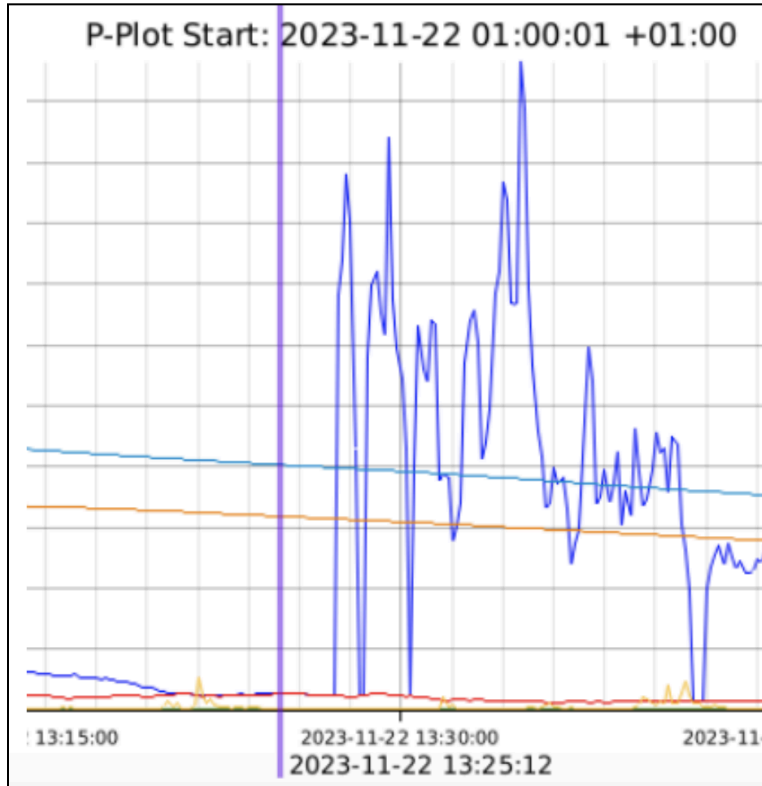


Figure 9: Display of a time marker when clicking on the chart

Note that this is not a permanent marker and will not be in the image when the chart is saved. Its purpose is to help in the analysis to get an exact timestamp of a position in the chart.

Time Measurements

There are several possibilities to measure time distances in the chart. This is useful, e.g. when determining the time point in a video- or audio recording, when a peak happened. There are three possibilities:

- When an event is already selected, and the time cursor is used to click somewhere into the chart, on the left side of the time cursor the time distance to the selected event is displayed in addition to the exact time on the right side of the time cursor.

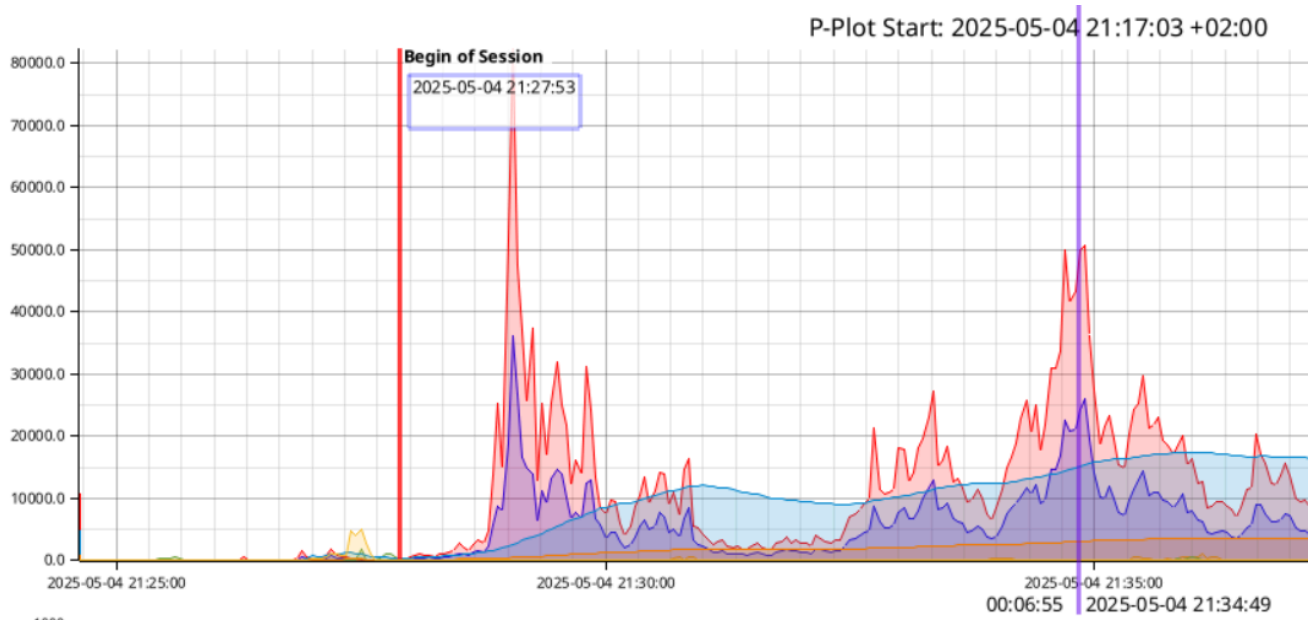


Figure 10: Display of a time distance to an event (06:55 in this case)

In the figure above, the event “Begin of Session” is selected, showing its exact timestamp. The time cursor itself is placed onto a peak and the time from the event to the time cursor is displayed on the left side of the time cursor (06:55).

- When one event is already selected and a second event is selected with ALT-left-click, the time difference between the two events is shown:

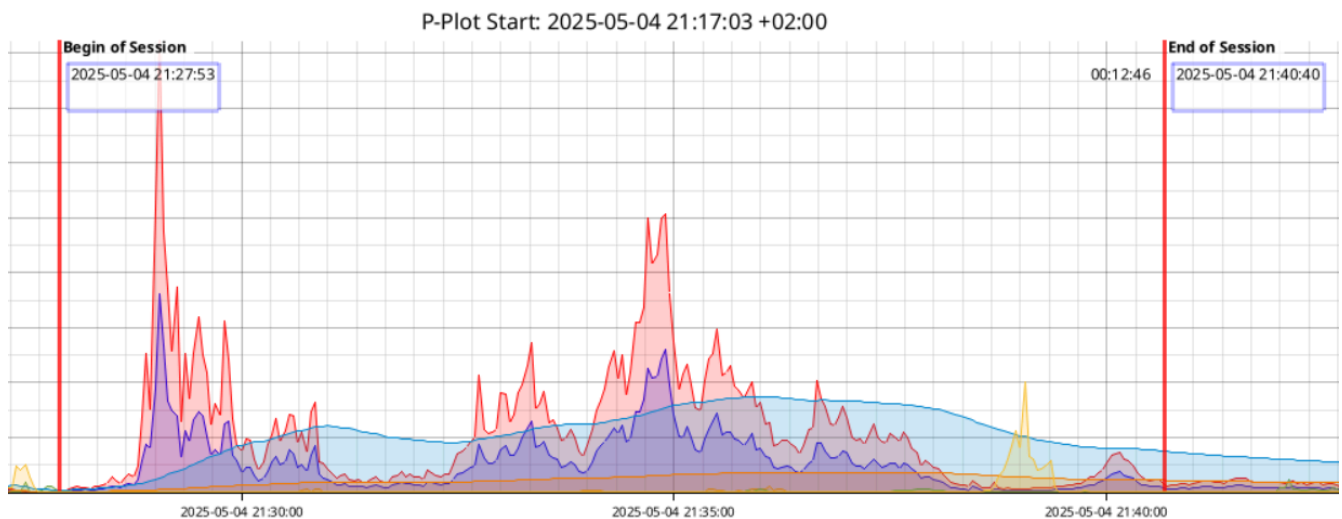


Figure 11: Display of a time distance to an event (06:55 in this case)

The figure shows the time difference between the two events (12:46 in this case).

- When an arbitrary range should be measured, the ALT-left-click-and-drag can be used:

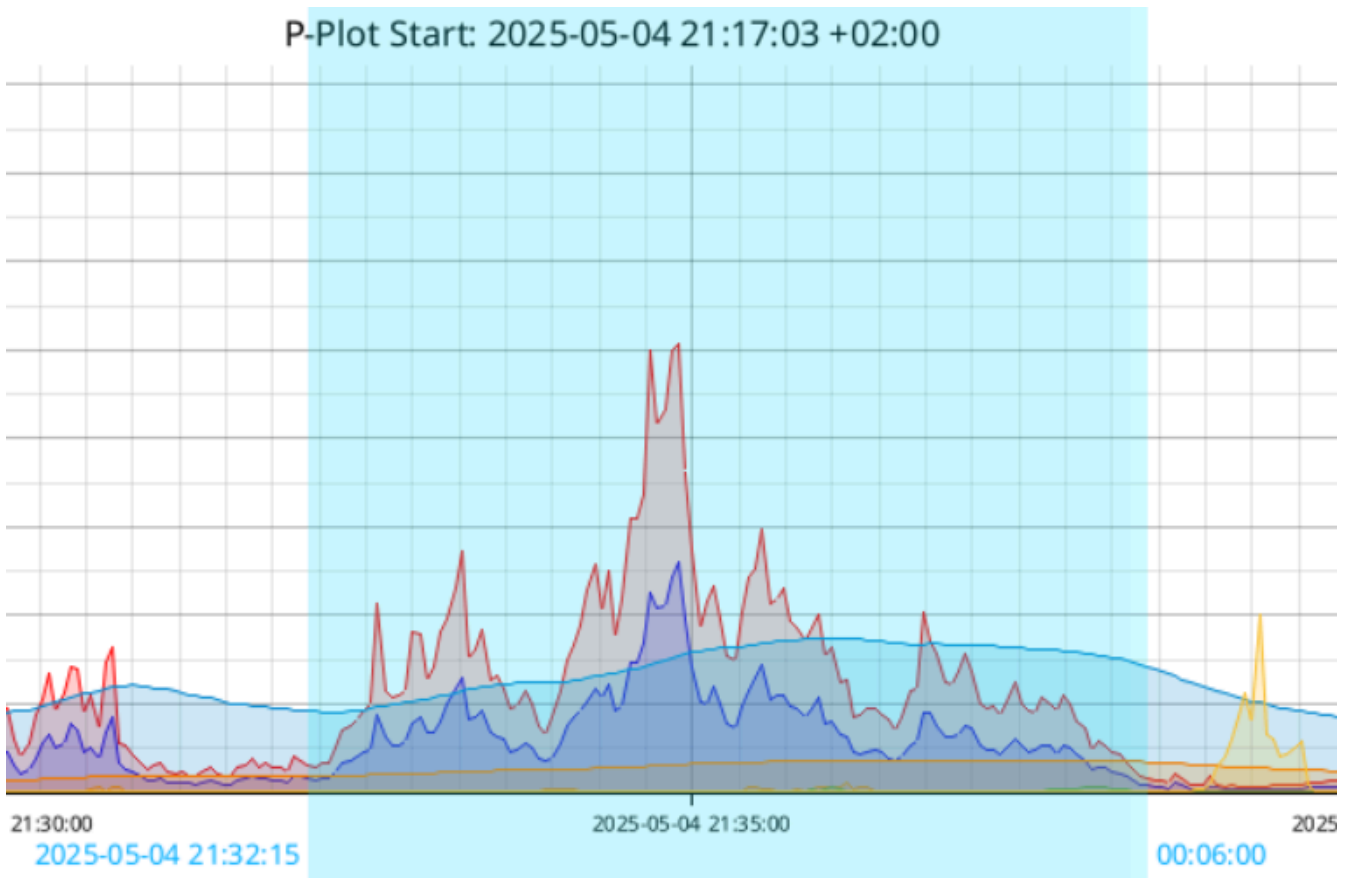


Figure 12: Display of a time distance to an event (06:55 in this case)

The figure shows a time range. On the left side of the time range, the exact start time of the range is displayed (in this case 2025-05-04-21:32:15) and the length of the time range is shown on the right side as 06:00, so these peaks had a time range of 6 minutes.

Tip: if you have a recording of a video or audio (external to a Wyrdscope), establish a sync point that is easily to see:

- e.g. A clock in the field of view of the camera at the beginning
- Use timecode within videos
- External audio recordings: say out the time loud

In the Wyrd Analysis Software then put an event at this location and then the exact timing between the charts and the video can be easily determined with these time measurements.

Start Points

The counters of the starting point values are displayed in the second chart:

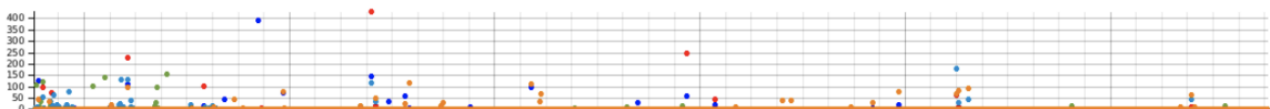


Figure 10: Startpoint Counters

For the analysis, it is often useful to know which actual start point is associated with a data point in the chart. To show this, simply SHIFT-click onto the p-chart and the nearest time point is selected and the start points are drawn as lines across all three charts and, additionally, the p-chart shows a colored range between the data point and its start point (in this example, only the start points for CH1 are viewed, as can be seen that only CH1 STP is checked):

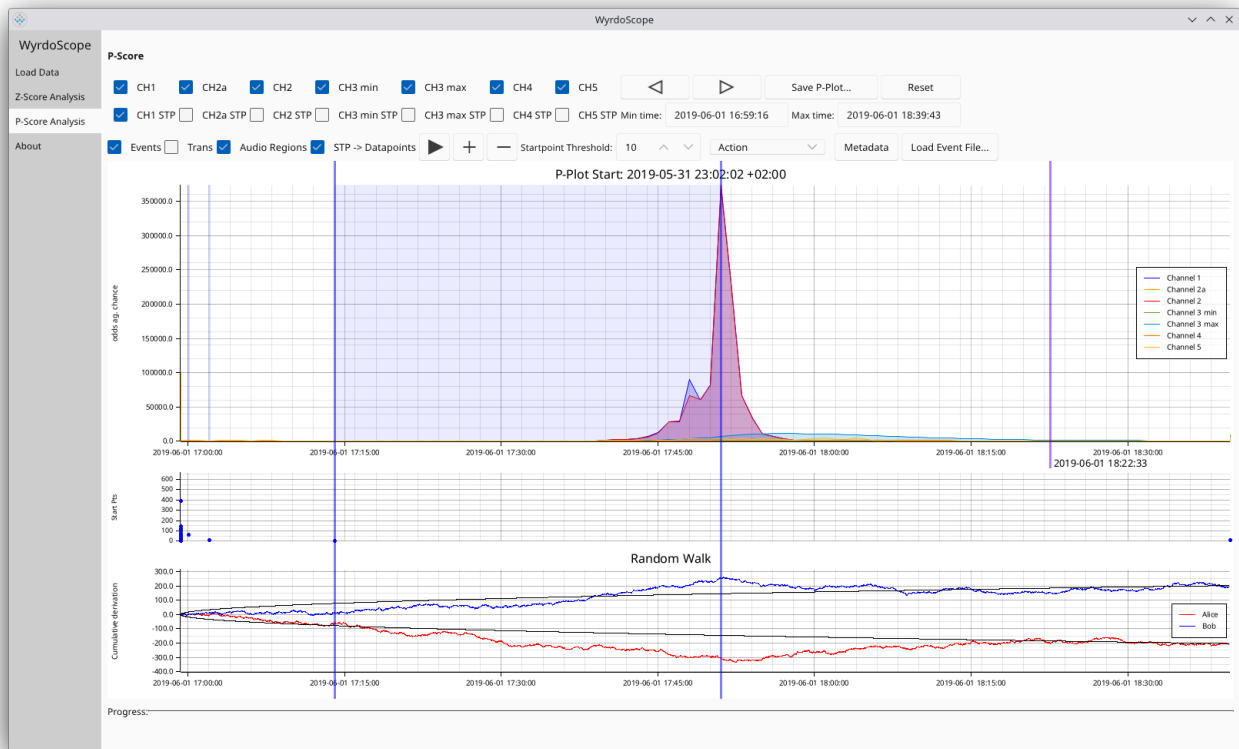


Figure 11: Showing the start point associated with the peak of the anomaly on channel 1 (SHIFT-click)

Another shift-click removes the display of the starting points again. The check boxes which determine which start points for which channel should be displayed are taken into account in this functionality.

The reverse is also possible. When left-clicking on the start-point chart, the data points associated to this start point are shown in the chart as round points and the selected start point is viewed with a black thin line in the start-point chart:

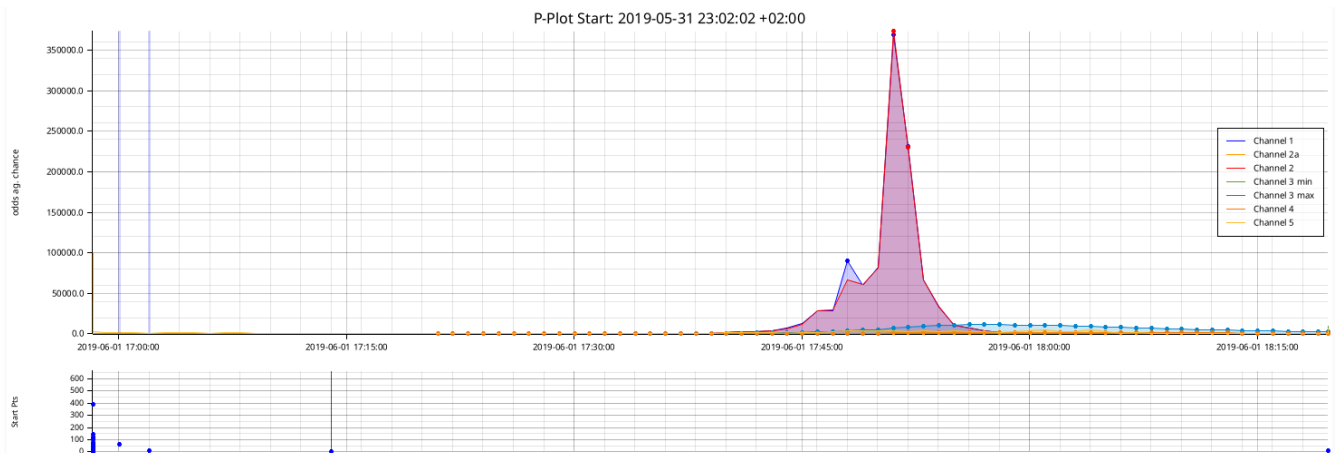


Figure 12: Showing the data points associated with the start point (left-click on the start-point chart, shown by the black line)

To hide the display of the highlighted data points, simply uncheck the **STP → Datapoints** checkbox in the Display Controls above the charts.

Random Walk

Below the start point chart you can see the random walk:



Figure 13: Random Walk of Alice and Bob over the whole range

When zoomed in, the parabola is recalculated to the interval you are viewing:

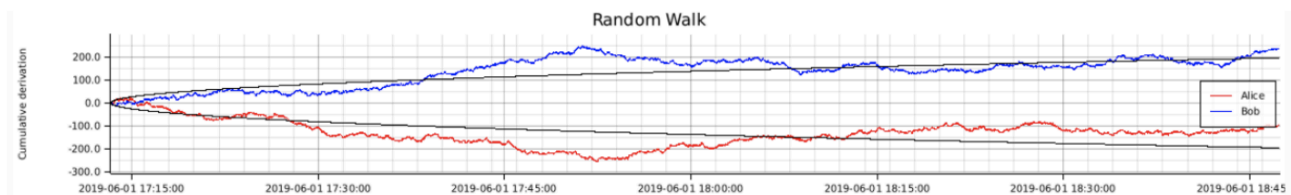


Figure 14: Random Walk the zoom of the peak shown above

This zoom-in shows the anomaly from the peak in the figures above. As can be seen, both Alice and Bob are outside the parabola, showing the anomaly.

Event Handling

Selecting *Add Event* from the action menu, pops up a window where the event can be added manually:

The image shows a dialog box titled "Slint Window" with a close button (X) and window control buttons (minimize, maximize, close). The dialog contains the following fields:

- Time:** A text input field containing "2024-11-19 12:20:55".
- Name:** A text input field containing "Start of the ritual".
- Color:** A text input field containing "#FF0000".
- Comment:** A larger text area containing "After preparation, the ritual is started here.".

At the bottom right of the dialog are two buttons: "OK" and "Cancel".

Figure 15: Add Event Window

The exact time, the name of the event, the color of the event and a longer comment can be entered. The color is in standard Web-Color format with #RRGGBB, where the values are red, green and blue component in hexadecimal between 00 (0) and FF (255). #FF0000 would be pure red, #00FF00 would be pure green and

#0000FF would be pure blue. Future versions may include a color picker for more comfort in selecting the colours.

When the OK button of this window has been clicked, the event appears in the chart at the specified time point. An additional method is by first clicking into the chart (which displays the time cursor) and then clicking the "+" button. The same dialog opens, but the time cannot be entered manually, as it is taken from the cursor. The following figure shows the chart with the events:

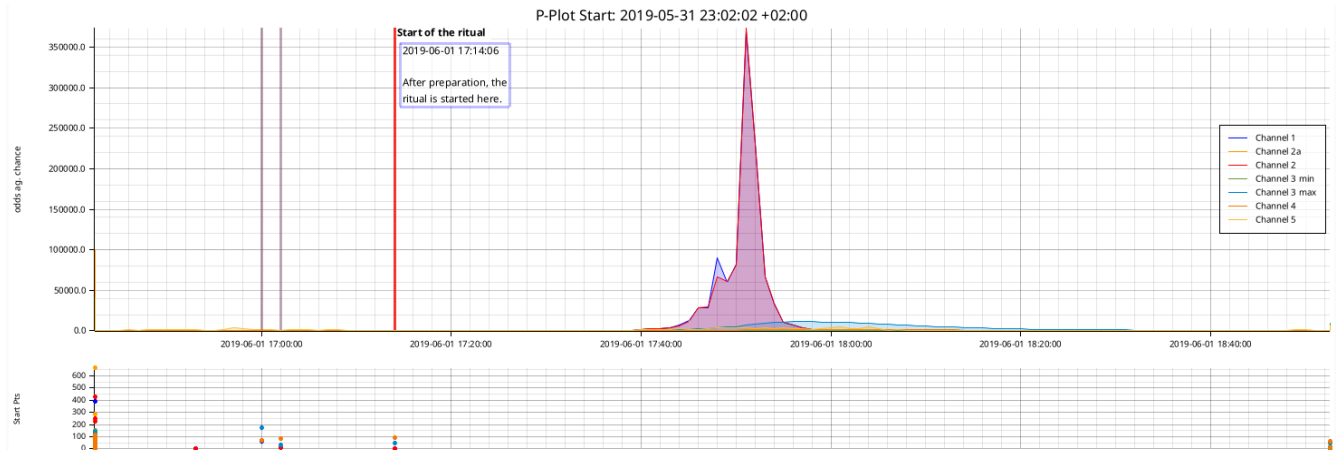
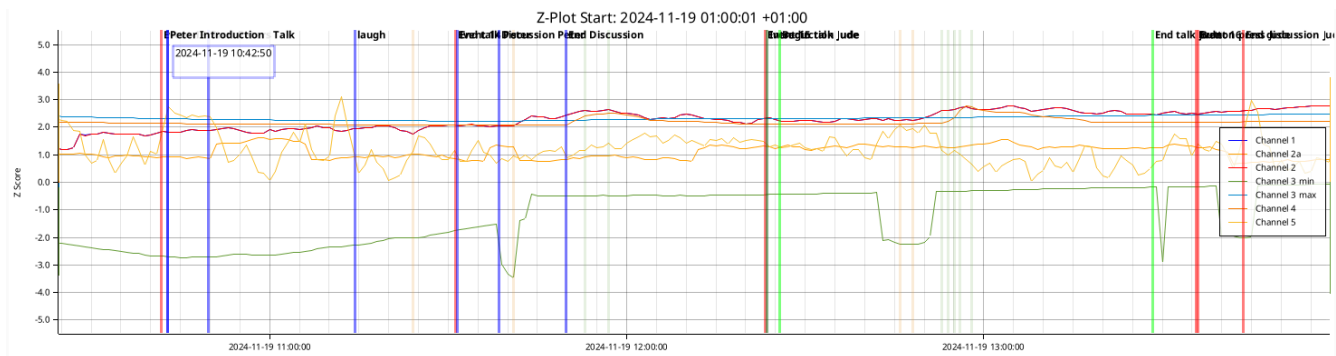


Figure 16: Events in the chart

Figure 13 shows the newly entered event, which is displayed with the name *Start of the ritual* and the comment "After preparation, the ritual is started here".

Events can be given different colors. This can be useful in different situations, e.g. when multiple persons provided timestamps which are close to each other, which normally makes the chart visually noisy.



The figure above shows differently colored events, blue used for Peter's talk and green used for Jude's talk.

Saving a Plot as an Image File

When clicking *Save P-Plot* and selecting a filename, the charts are saved as an image file. The file save dialog pops up to specify a file name. The type of image file can be selected by either selecting the extension in the file dialog (available are *.svg and *.png), or by directly entering the extension to the filename.

SVG stands for scalable vector graphics and is a resolution independent vector graphics format, which is not subject to pixelation as the graphics are stored as drawing instructions of lines and curves. Also the text itself is present as text in the image. This means that with a suitable program like Inkscape, the lines, text etc can be

edited without compromising the image quality, annotations other than events can be easily added to the charts etc. The disadvantage is that on opening the file in different operating systems or computers, it can result in changes in positions and size of the text as the exact font might not be available on another computer.

PNG is for portable network graphics, which is a bitmap format, meaning that on zoom in, the pixels can be seen and is therefore resolution dependent. If the image should be post-processed, then all the issues with pixel-based images apply.

Both formats have their strengths and weaknesses, but both can be used well to add the image to a document. The result from the chart above is shown as follows (this is for version 1.0 of the software):

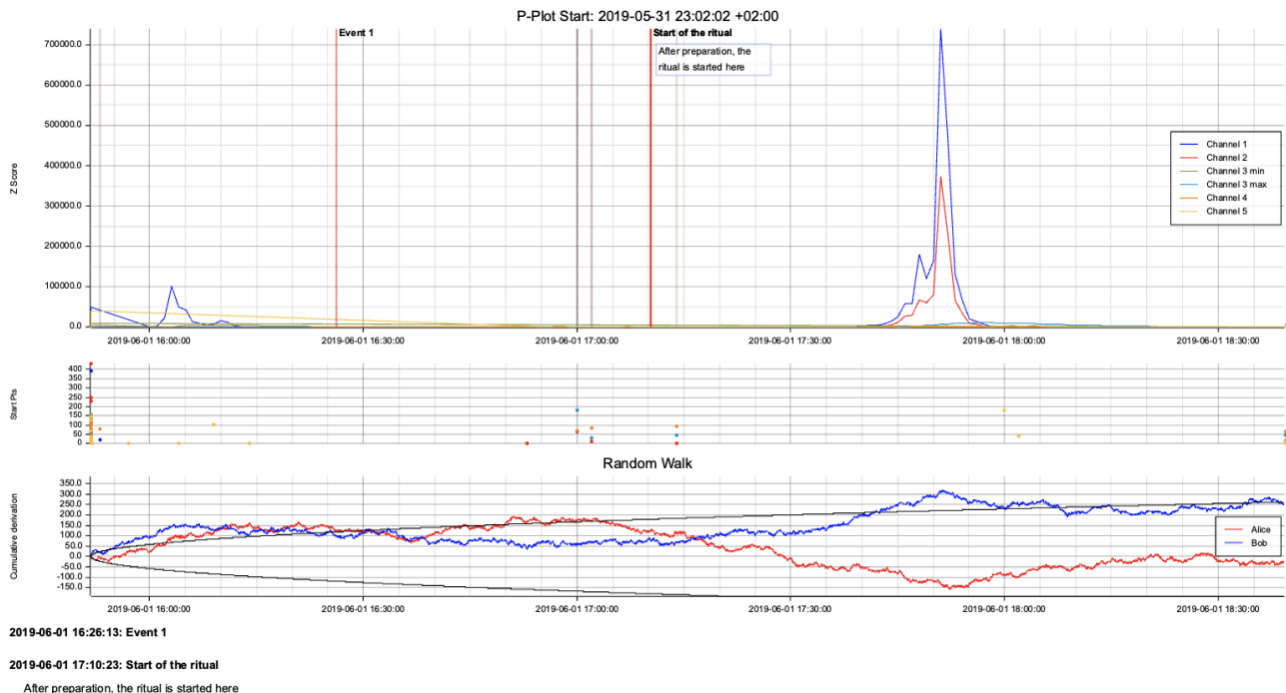


Figure 17: P-plot saved as a PNG file (old V1.0 version)

As can be seen in figure 14, in version 1.0 the events were listed below the charts, ready to be included in a document of any format.

As of version 2.0, the charts are exported without the events listed, as they simply did take up too much space and were probably repeated for every saved plot from the same session. When the events are needed in a document, open the meta-data dialog by clicking the **Metadata** button and copy the events in the lower half of the dialog with normal Copy/Paste methods.

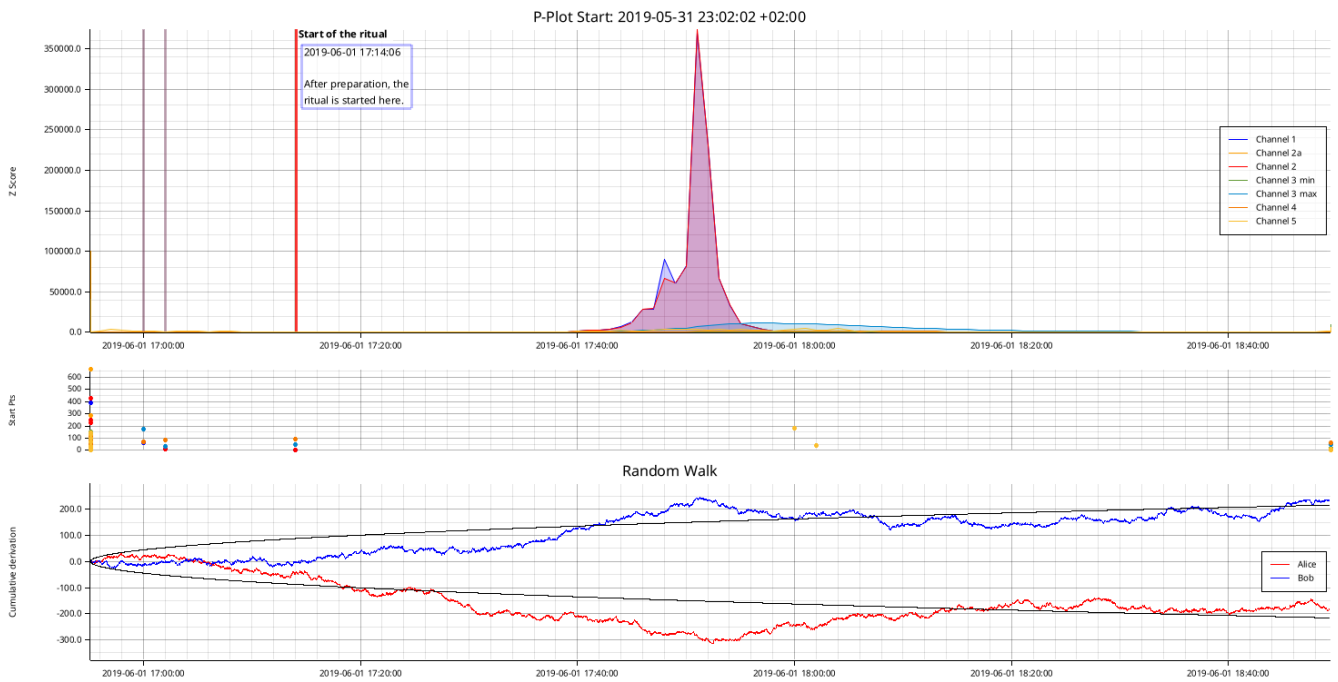


Figure 18: P-plot saved as a PNG file (version V2.0 and onwards)

Playing Audio Events

The following figure shows a selected audio event:

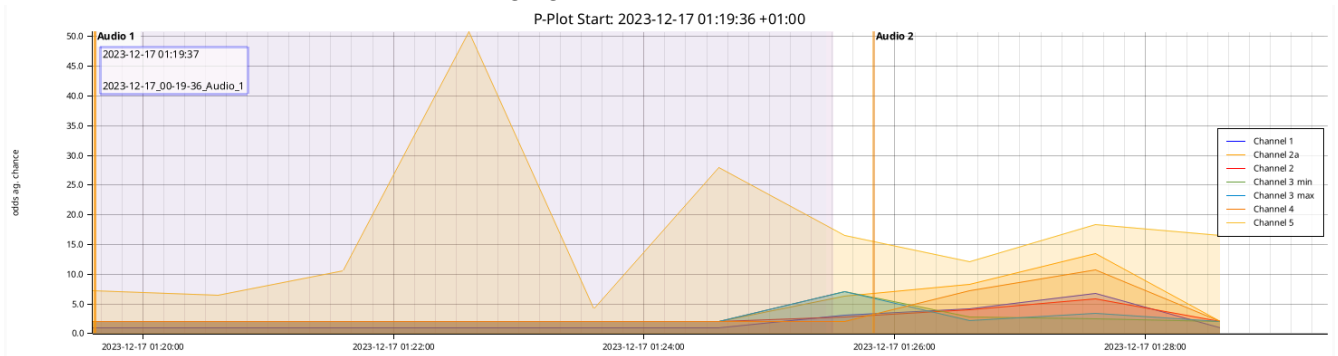


Figure 19: Selected audio event

When an audio start event is selected, the audio can be played by clicking the *audio play* button (to the right of the *Trans* checkbox). The audio will then be played back via the audio system of the current operating system. While playing, the audio play button will change into a *Stop* button to be able to also stop the audio playing.

As can be seen in the figure above, the audio event is quite long, so it may make sense to be able to play the audio not only from the start, but from a specific moment. This can be useful when the audio of a whole session is recorded and one wants to check what was happening when an interesting peak can be seen in the chart. To support this, audio can also be played from the time cursor onward if the time cursor is in the range of an audio event:

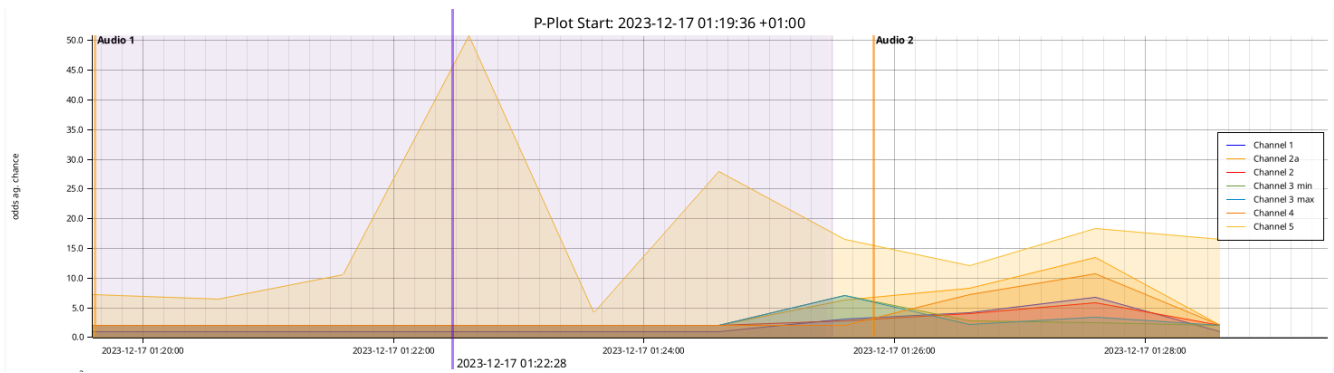


Figure 20: Play audio from the time cursor

In the case of Figure 16, when clicking the audio button, the audio will be played from the time cursor onward and not from the start of the audio event, in this concrete case shortly before the peak in the data, to see what happened around that time.

Viewing the Z-Score Analysis

The page for the z-score analysis is very similar to the view of the p-score analysis, it just offers a few more controls.

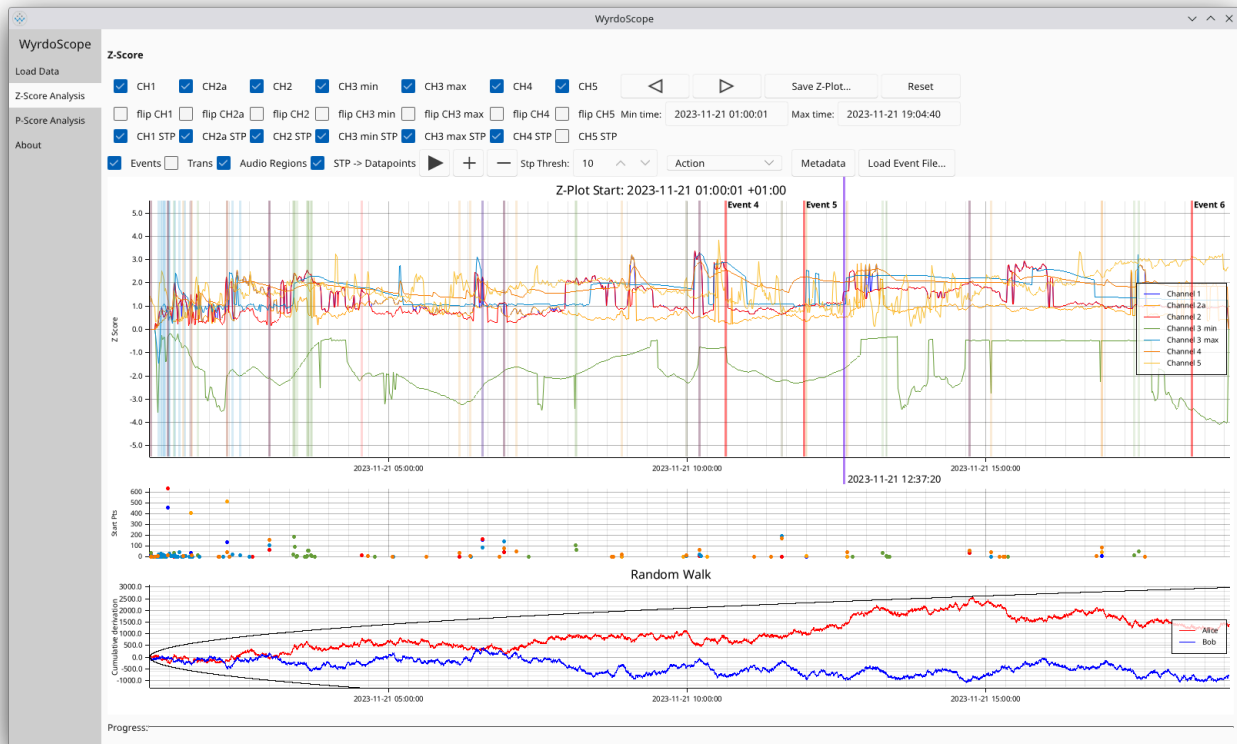


Figure 21: Z-Score Analysis Page

The control elements are the same as for the P-Score Analysis. The only difference is that there are controls to flip the channels:



Figure 22: Flip Channels Controls

Flipping the channel effectively mirrors them from positive to negative or the other way round. This can be useful for viewing relationships between the channels, especially as e.g. ch3 min is often negative.

Comparison of Data

The Wyrd Analysis allows for comparing two result files to check for a difference between them. This can be used for example to compare a shuffled result file against a normal result file, or a dynamic result file against the normal result file.

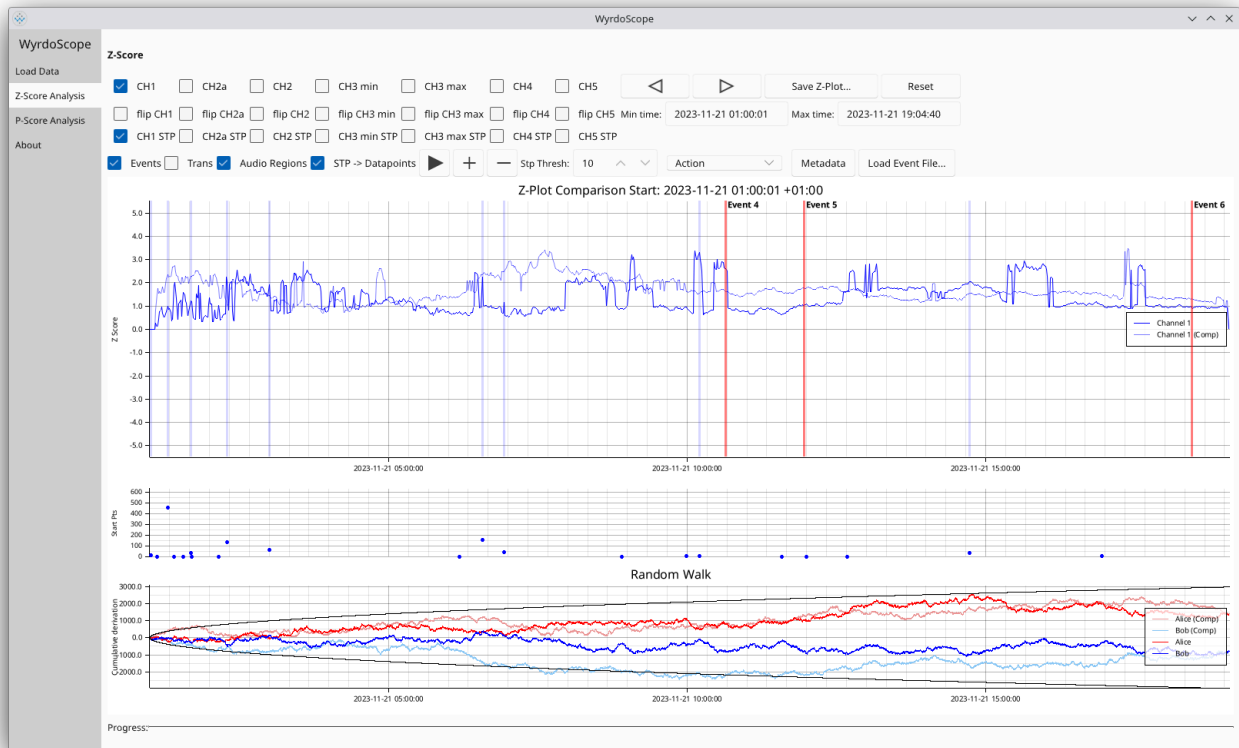
To be noted is, that the displayed main matrix is the actual one that all user interactions operate on, the comparison matrix is displayed only additionally to the main matrix. This also means, that if there is no time overlap in the time ranges of these two matrices, nothing from the comparison matrix will be displayed.

As a simple use case, we first show the shuffling. Take a look at the *Load Data* page:

The screenshot shows the 'Load Z-Matrix' interface. It features two file selection fields: 'Select Z-Matrix File...' with the path '/home/oswald/Projects/REG/wyrdoscope/test-data/Results/2023-11-21.json' and 'Comparison Z-Matrix File...' with the path '/home/oswald/Projects/REG/wyrdoscope/test-data/Results/2023-11-21-SHUFFLE.json'. A 'Clear Comparison...' button is located to the right of the second field. Below the fields, matrix properties are displayed: 'Bitrate: 200 Interval: 60 sec UTC Start Time: 2023-11-21 00:00:01 UTC (Local Time: 2023-11-21 01:00:01 +01:00) Serial Number: UNKNOWN' and 'Compare Matrix: Bitrate: 200 Interval: 60 sec UTC Start Time: 2023-11-21 00:00:01 UTC (Local Time: 2023-11-21 01:00:01 +01:00) Serial Number: UNKNOWN'. A 'Settings' section includes: 'Bitrate (only used when not defined in raw files): 200', 'Interval (seconds): 60', 'Overlap (minutes): 30', 'File format: JSON', and a checkbox for 'Use Live Settling Value'. At the bottom, there is a checkbox for 'Reverse Time Shuffle data:' set to 'Simple'.

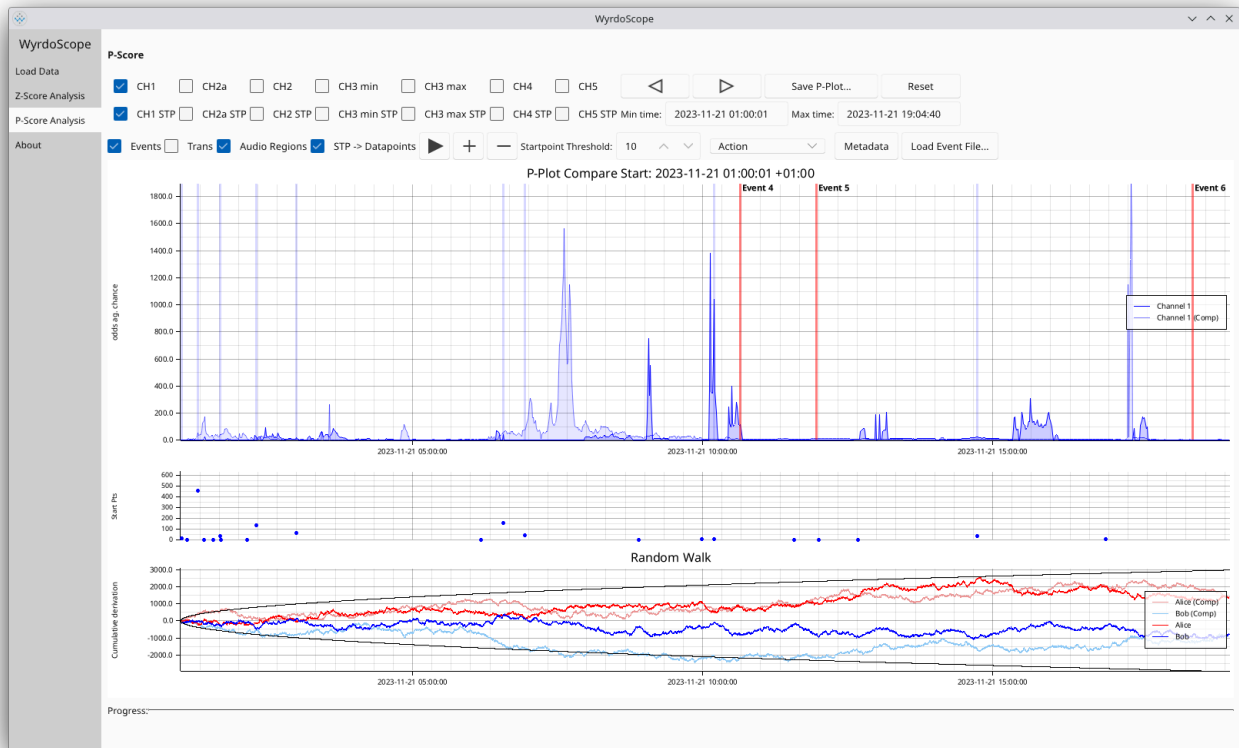
Note, that the *Shuffle data* was set to *Simple* on the processing. Afterwards, the result matrix and the Comparison matrix were selected via the *Select Z-Matrix File* and *Comparison Matrix File* buttons. Below the fields for the filenames, the properties of the matrices can be seen.

When switching to the Z-Plot view and focusing only on channel 1, the differences between the two matrices can be seen:



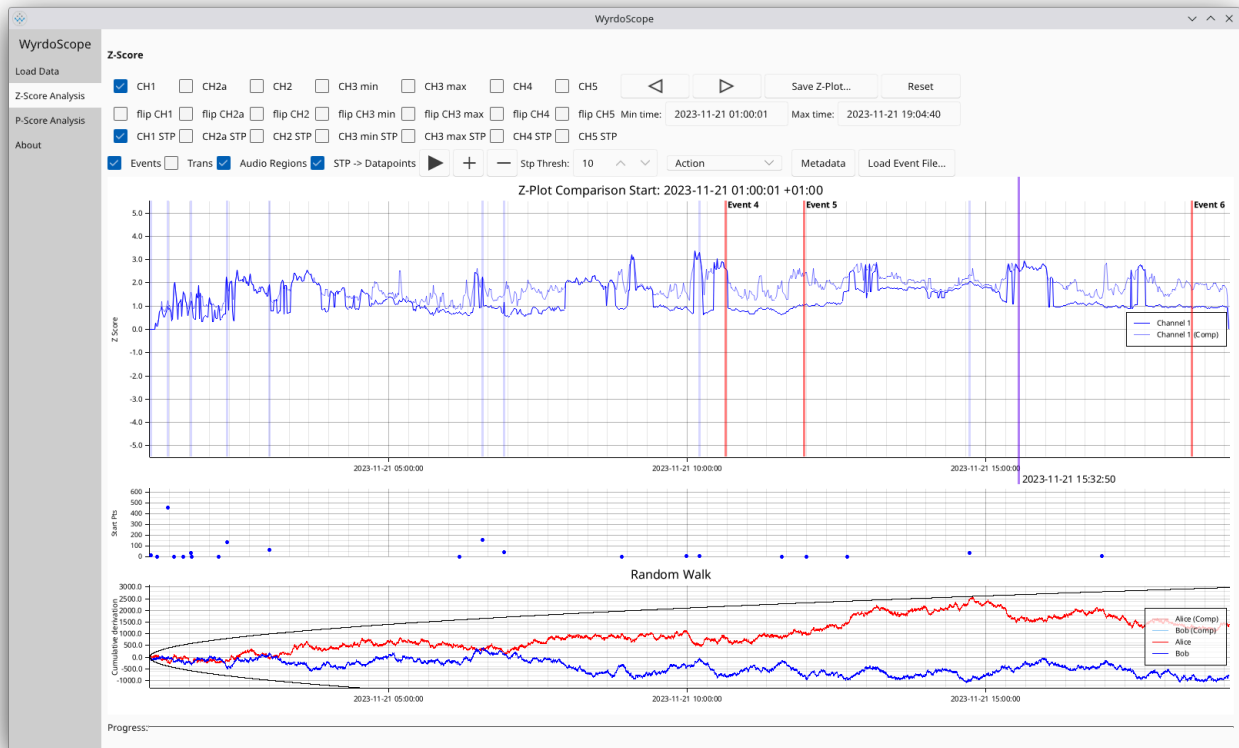
Channel 1 from the main matrix is displayed normally while channel 1 from the comparison matrix is displayed in a more transparent color. Note also, that both random walks from both matrices are displayed, again with the random walk from the comparison matrix with a more transparent color.

On the p-plot, the result is quite similar:



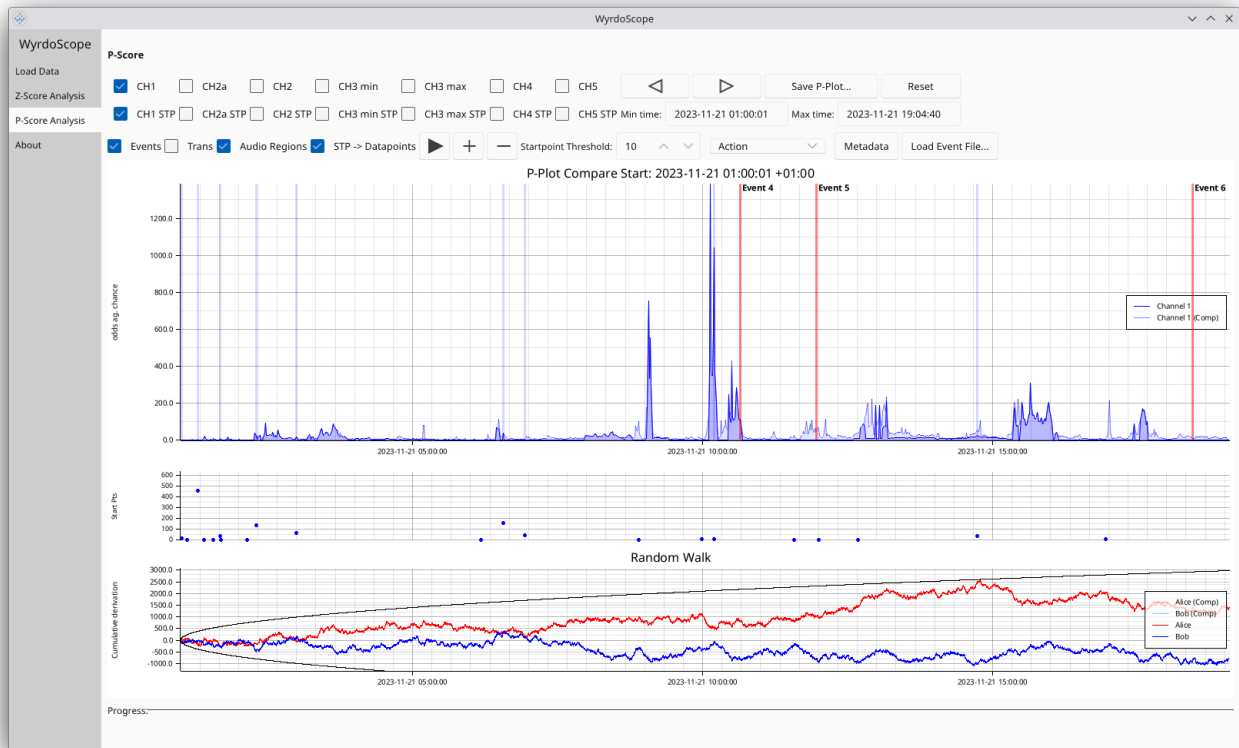
The channel 1 values of both matrices are displayed, the value of the comparison matrix in a more transparent color.

As a second example, the differences between a normal result file and a dynamic result file are shown here, first the z-plot:



While in the z-plot chart the differences can be seen perfectly clear, the random walk shows no differences, as the raw data which generated both comparison matrices are the same.

The p-plot looks like this:



Again, the differences of channel 1 can be seen and compared, while the random walks are the same.

Tips and Tricks

Time Zones

As already noted, if the recording with the Wyrdoscope® was done in a different timezone, it is necessary to change the current time of the computer running the software to the timezone the recording was done. This needs to be done:

- Before the processing (though not strictly necessary, all processing itself is done in UTC time), but as the results after processing are displayed directly, it is helpful
- Before loading a result file (standard output matrix or dynamic matrix). The conversion to local time is done on the fly when loading the data. This makes it necessary to set the clock before loading a result file.

If this is not done, the time values in the charts will be shifted, determined by the timezone relative to UTC time (including possible daylight saving time switches).

Setup

The Wyrdoscope® itself works by finding correlations between the two random event generators. The correlations are established by entanglement, based on the Generalized Quantum Theory (GQT). For the entanglement to happen, there needs to be an organizational closure in the event, and the Wyrdoscope® needs to be a part of this closure.

An organizationally closed system is a system which has a clear boundary defining it from the rest of the world and with the ability to self-organize within its borders. A group doing a meditation, a mother with her child, two people in love, a church, a haunted house, Skinwalker Ranch etc are examples of organizational closures. Although it is possible to get a Wyrdoscope® into an organizational closure remotely, this can be tricky with respect to other, concurrent organizational closures which are more local to the Wyrdoscope®. It is easier to get good data by having the Wyrdoscope® locally as part of the closure, to exclude outside interferences.

There are experiments ongoing so we can develop a better idea of remote operation of a Wyrdoscope®. Until there is better data available, we recommend having it locally at an event.

Protocol

It is recommended to start the Wyrdoscope® itself earlier, about 20-30 minutes, before the event you want to record. The start of the session can then be recorded via an event button press, or noted down in a written record. Also possible is to use timestamp apps on e.g. a smart phone. There are various apps available to record time data and assign comments to them.

As the event button presses only contain the time and a number, you'll either need to remember or note down what each event button presses signified (e.g. event press 1 was the start of a session with an introduction, event press 2 was when an active session started, event press 3 was when the session was finished). After processing the raw data, the simple names like "Event 1" can then be edited to more descriptive names and comments can be added within the Wyrd® Analysis Software.

A second option is audio events. These can be kept either quite short, with just a few words describing the actual time point, or a long session with recording the whole event also via audio (note that this will require an external microphone). Please bear in mind that recording audio does take up a lot of memory as the data is recorded first uncompressed and then, after finishing the recording of the audio event, is compressed into mp3 format. So recording of whole sessions is only recommended for shorter events e.g. one hour.

A third option is noting down the events in written form, as done for example in the ICU experiments by the nurses and doctors. The events then need to be manually entered in the Wyrd® Analysis Software.

Another option is to use timestamping apps on phones, which, depending on the app, provide more or less sophisticated functionality. Of course, also then the events need to be manually added to the Wyrd® Analysis Software.

When should events be noted down/recorded? It is best not to overdo this (e.g. recording an event every 3 seconds is far too much), but note remarkable moments, interesting events in a session etc.

Also, during transitions from one phase to another it is good to have an event marker.

Overview and Detail

When recording longer time periods with the Wyrdoscope®, e.g. whole weeks, when processing the data it is advisable to first get a good overview of the data. The default interval of 60 seconds is a good compromise between precision and computational effort.

When interesting areas are identified, these areas can be recalculated with a higher resolution, e.g. setting the interval for a zoomed in peak to 6 seconds gives a better precision, with possibly higher, but shorter peaks.

Sometimes it is also interesting to have a look at the dynamic result file, to see if some peaks were missed on the standard output.

For shorter sessions (e.g. a group session of 1 hour), the analysis benefits from already doing the processing with a higher precision (e.g. 6 seconds interval instead of 60).

When in the z-score analysis you would expect to see some peaks but nothing seems to be happening (below a z-score of 2 or even 1), switching the *Trans* checkbox on might reveal some things. Sometimes, longer periods of baseline data (non-significant) are suspicious. The *Trans* checkbox might show some more significant values in these cases.

Troubleshooting and Error Reporting

Known Issues

File overwrite bug on Windows

In the Windows version of the software, when saving a file with a Save File Dialog, and selecting an already existing file, a warning message appears, asking if the file should be overwritten or not. Unfortunately, this message box does not appear at the front and the application seems blocked, only beeping when you click somewhere.

To mitigate this, press Alt-Tab to switch to another application, and then again switch back to the Wyrld® Analysis Software (again with Alt-Tab). This brings the message box up and the option to overwrite can now be selected.

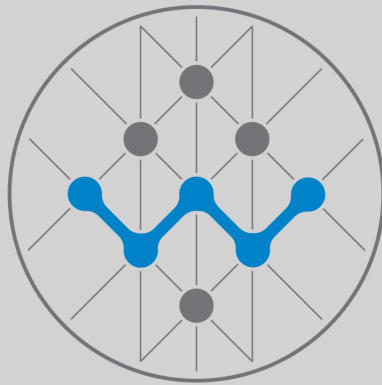
This is a bug that is not directly a bug of the Wyrld® Analysis Software itself, but needs to be fixed in the library for the user interface that is used. This bug will disappear, when the library maintainers release a new version of the user interface library, where this is fixed.

Bug Reporting

Should you encounter an error that looks like a bug, it would be important to report this to Wyrld Technologies, so that it can be fixed. An error report can be filed on the website. Login first (under the About menu) and then under the About menu, select Submit Ticket.

A few tips on how to report an error:

- Use a descriptive title about what does not work as intended
- A detailed description of the problem, including the steps to reproduce it is important. Be Specific and to the point. Try to summarize the problem in minimum words yet in an effective way. Do not combine multiple problems even if they seem to be similar. Write different reports for each problem.
- Always specify the used operating system (Windows, Linux, MacOS).
- Always specify the used version and git version. This information can be obtained on the *About* page:
- In the bug report, specify the information from the *Version* and the *GIT Version* fields of the about dialog.



W Y R D
Technologies

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