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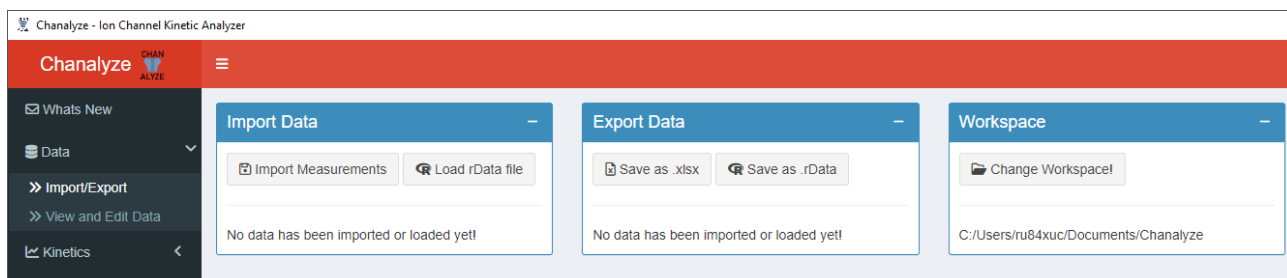
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1_Home.md

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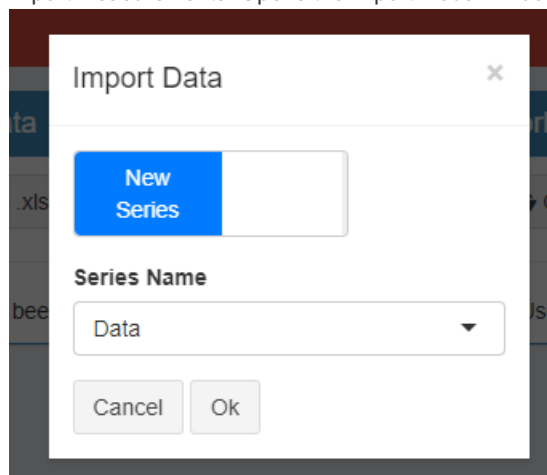
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Data-Import-and-Export.md



Data Import

- Import Measurements: Opens the import modal window.



- The switch changes the import mode between adding data to an already existing series and adding a new series with data.
 - Series Name decides how the data will be labeled later or to which series the data will be added.
 - After pressing the Ok button the data can be selected through a modal file browser window. A popup will inform the user if the import was successful or not. Do not press after selecting the data. Click anywhere outside the modal window to close it.
 - Be sure that your data fits the [import settings](#).
- Load rData file: Opens a modal file browser where an previously written .rData file can be selected.

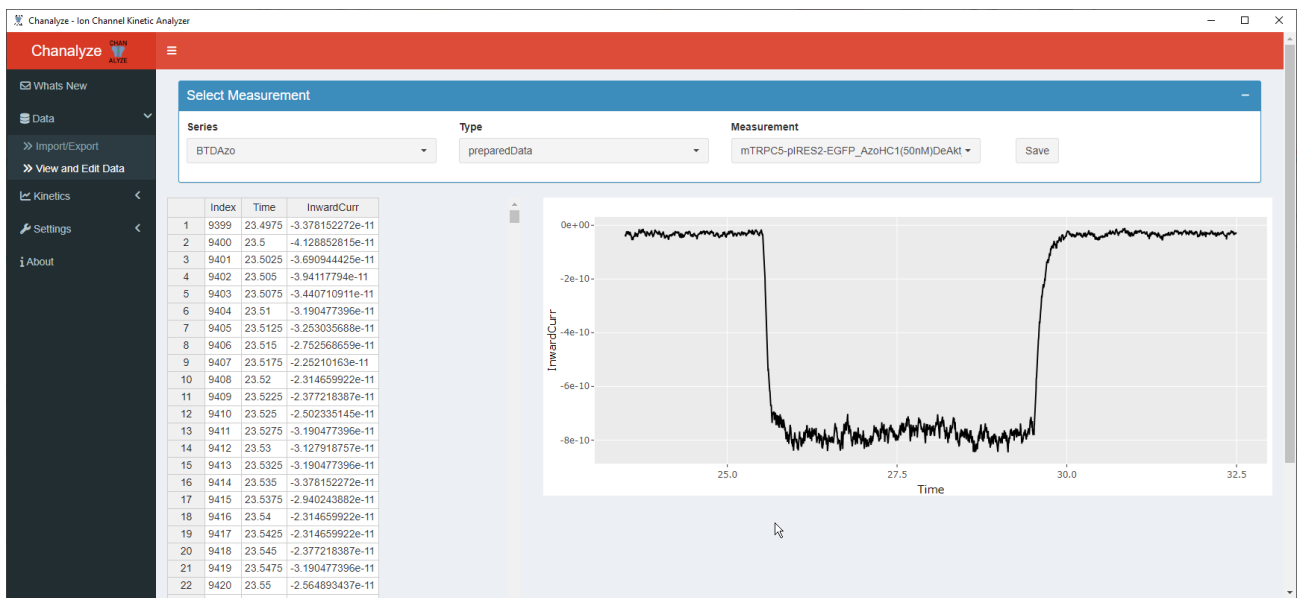
Data Export

- Save as .xlsx: Opens a modal file browser where imported data can be saved as an .xlsx file.
- Save as .rData: Opens a modal file browser where imported data can be saved as an .rData file.

Workspace

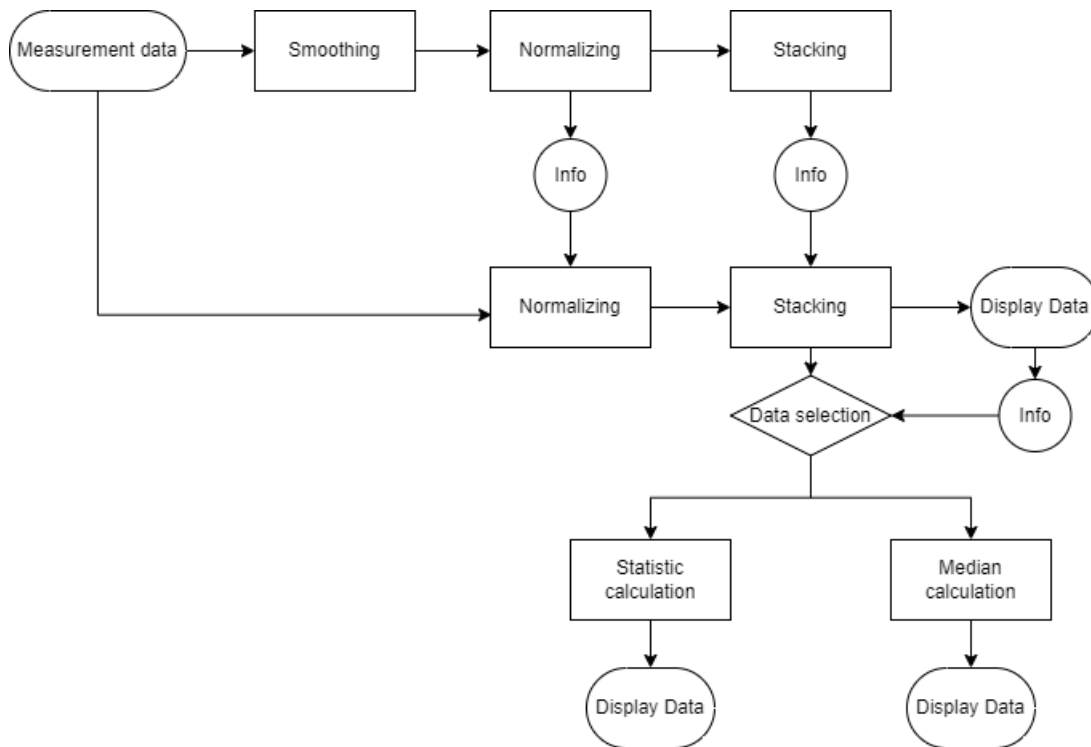
- Change Workspace: The workspace determines the directory where save, import and export directory selection windows start.

Edit Data



- Small unwanted peaks or trailing/following data can be curated here. Press save to save the changes.

Data-Processing.md



Preparation

HEKA EPC10 Patchmaster current time notebook data need to be exported as .asc files.

Internal Workflow

1. Data is being imported
2. A smoothed copy of the data is created to minimize the influence of noise.
3. The smoothed data is normalized between the lowest and highest values. The index of these points is stored.
4. The normalized smoothed data are stacked on top of each other at a specified point of the first activation. The index of these points is stored.
5. Using the information from 3., the original data is normalized.
6. Using the information from 4., the normalized original data is stacked.
7. A median is calculated from the stacked data.
8. Various "time to" values are calculated.

Installation.md

Requirements

Hardware

About 1GB of free space.

Software

R 4.2.3 must be installed. [Download from CRAN](#)

Java 64 bit version must be installed. [Download from Java.com](#)

Installer

Use [Inno Setup](#) to create an executable installer from the R project using the *rInno.R* script followed by the Chanalyze.iss_.
[Node.js](#) might be needed to succesfully create the installer.

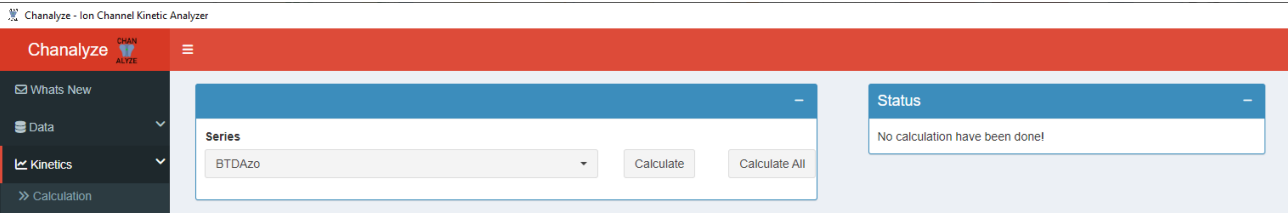
Other

It is recommended to use a local harddrive.

The first startup might take some minutes depending on the used computer

Kinetics.md

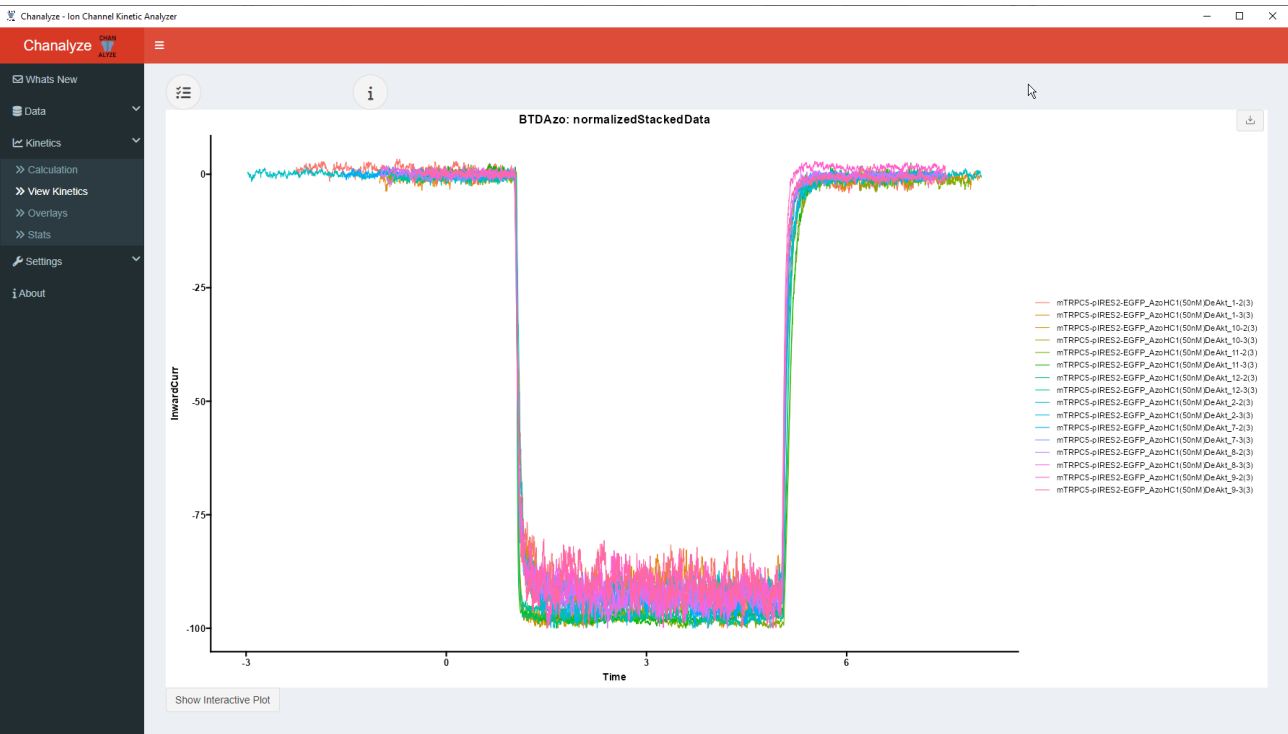
Calculations



- Calculate: Normalize and stack the selected dataset.
- Calculate all: Normalize and stack all datasets.

View Kinetics

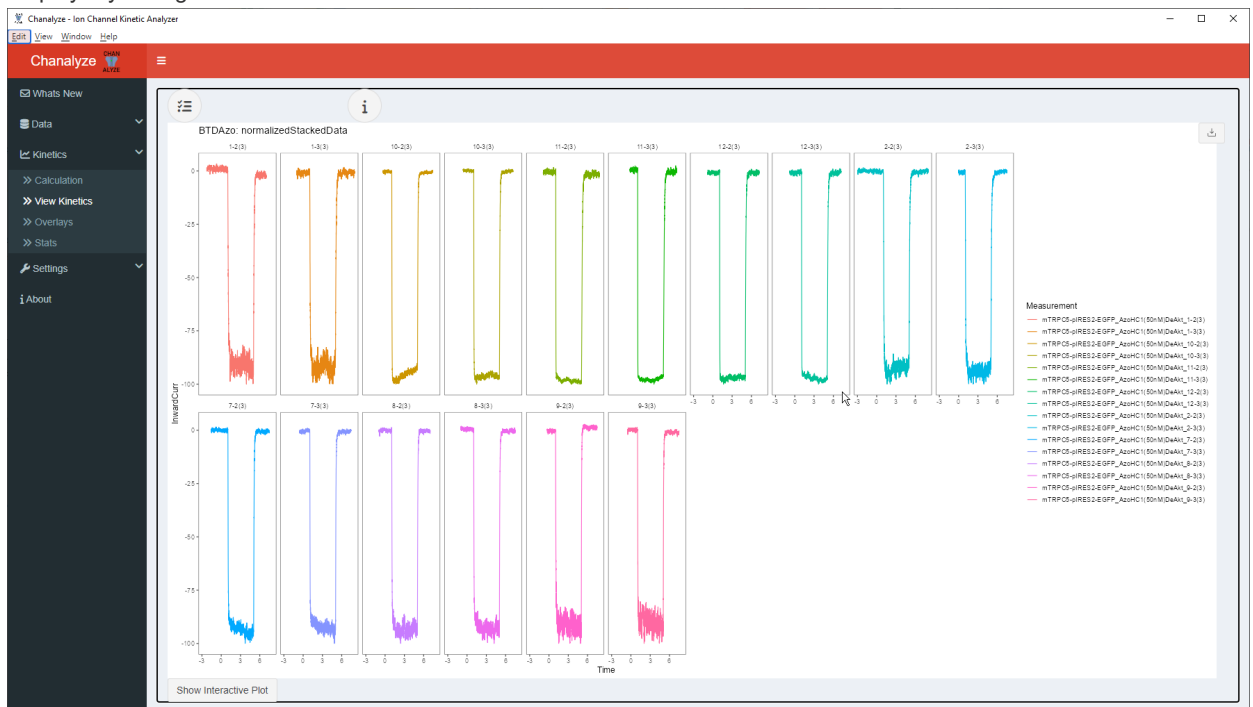
This view can be used to visualize and analyse the channel kinetics.



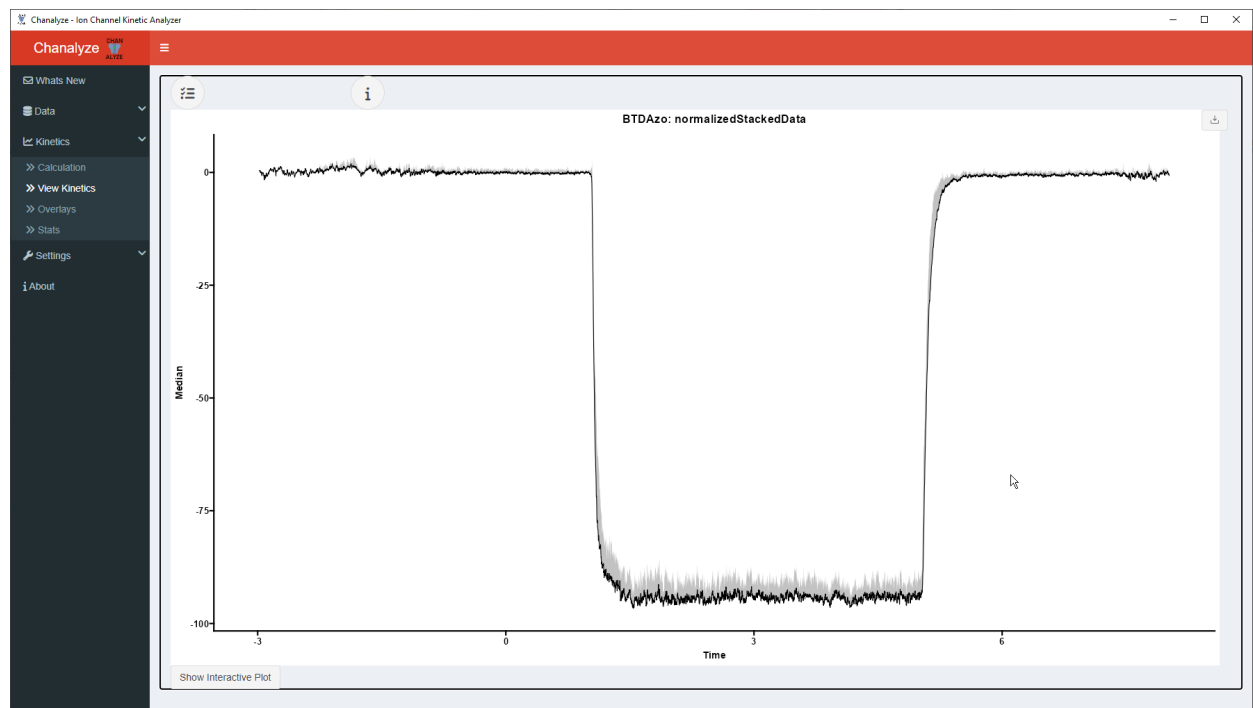
- Through the menu button on the top left the selection menu can be accessed. Through this menu the user can change the series to be displayed aswell as the individual measurements and the display style.



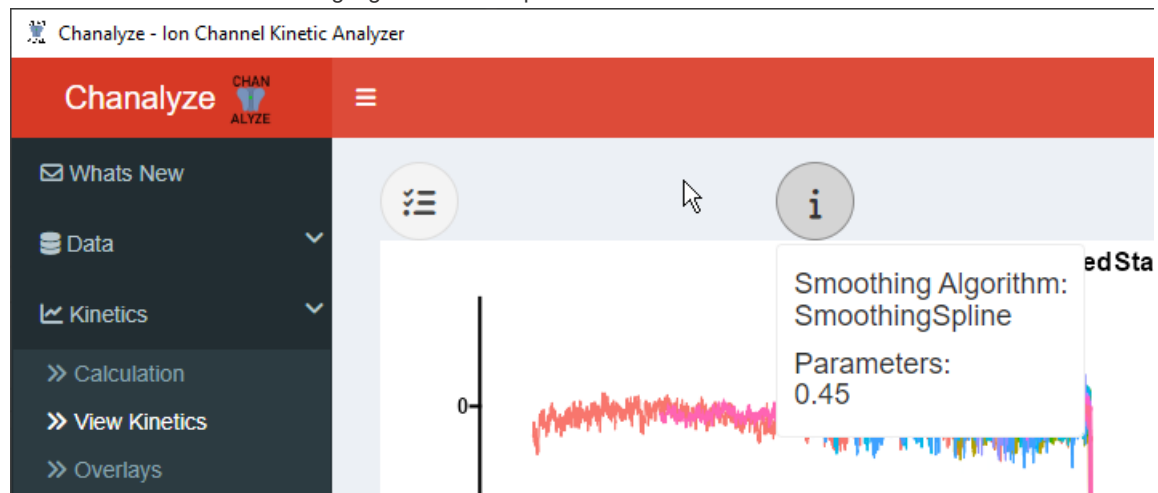
- Display Style Single:



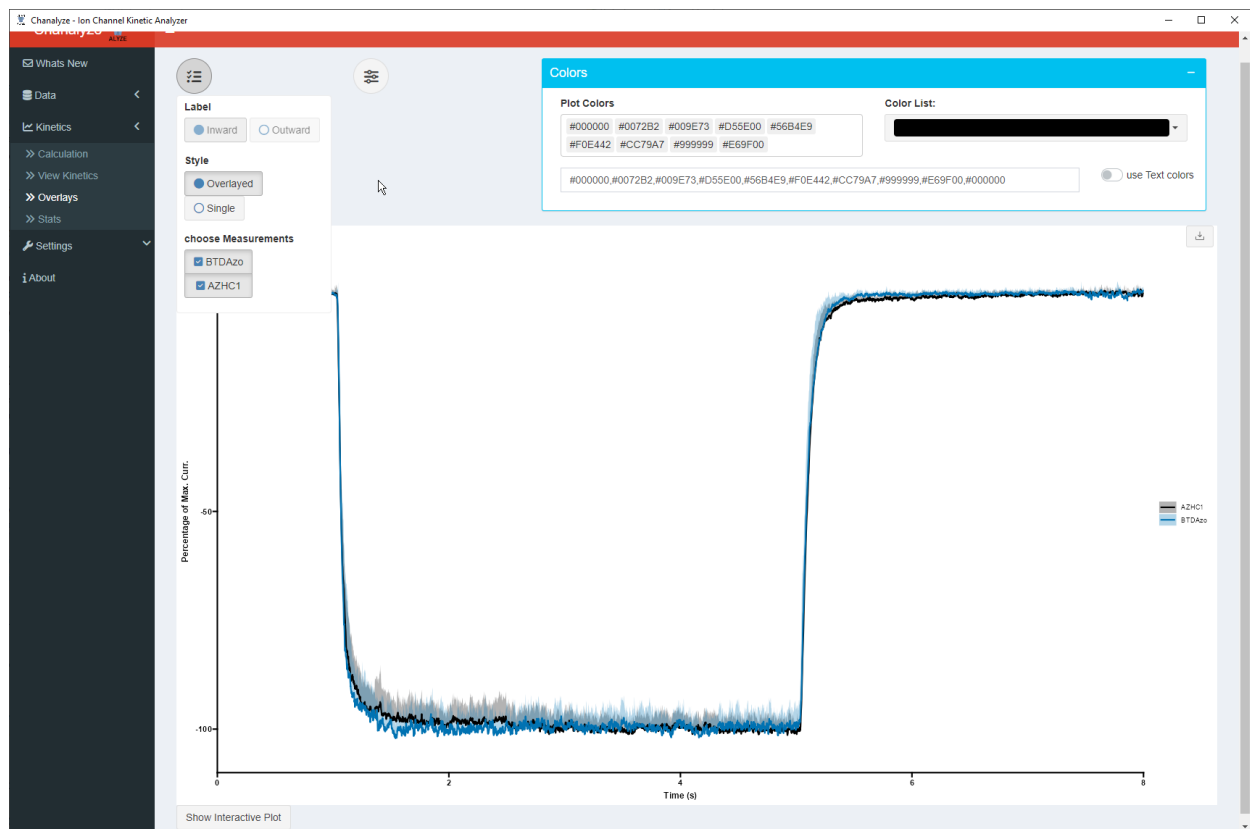
- Display Style Median:



- Info button: Shows the smoothing algorithm and its parameters.



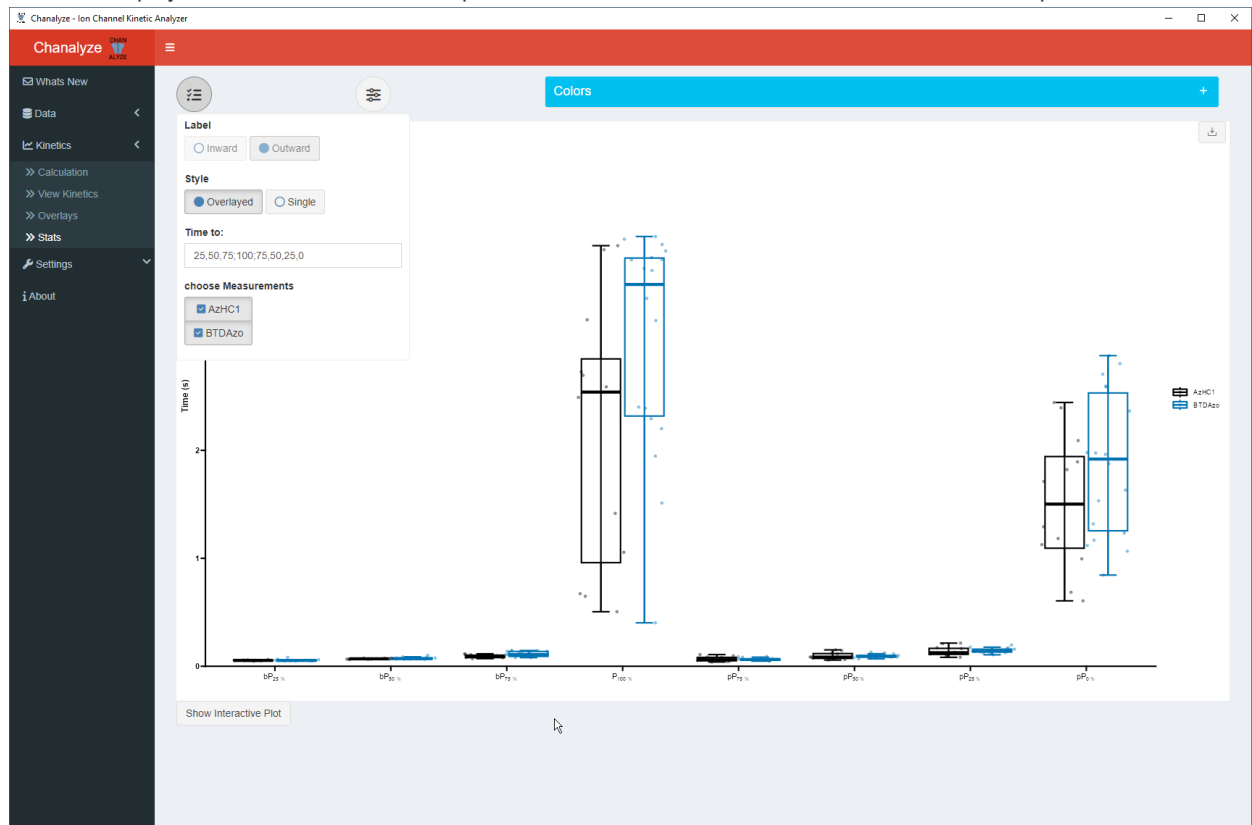
Overlays



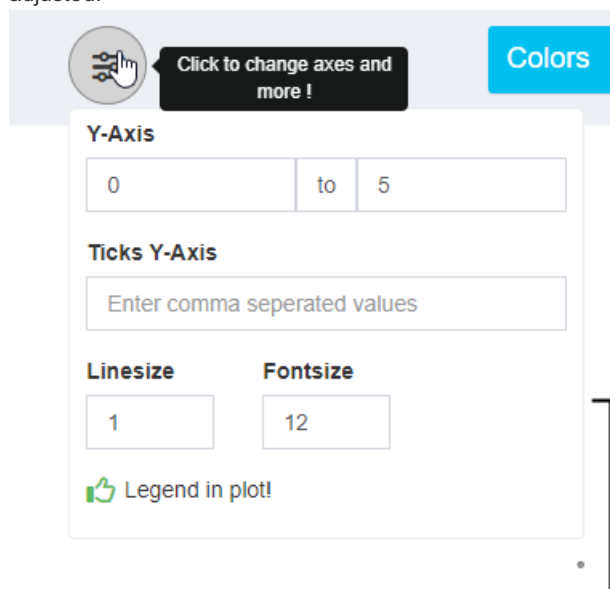
- The Colors box sets up the colors for the different plot elements. Colors are given as HTML color codes or hexadecimal codes. Either individually or as text separated by semicolons. Different color inputs can be viewed and chosen through the color list. The switch is used to change between the different color inputs. Hexcodes for different colors can be found on websites such as [htmlcolorcodes](http://htmlcolorcodes.com).
- The menu button opens a menu where the displayed medians can be selected.
- The settings button opens a menu where the axes limits and tickmarks can be changed. Font- and linesize can also be adjusted. If selected the medians can be normalized again between the selected values.

Stats

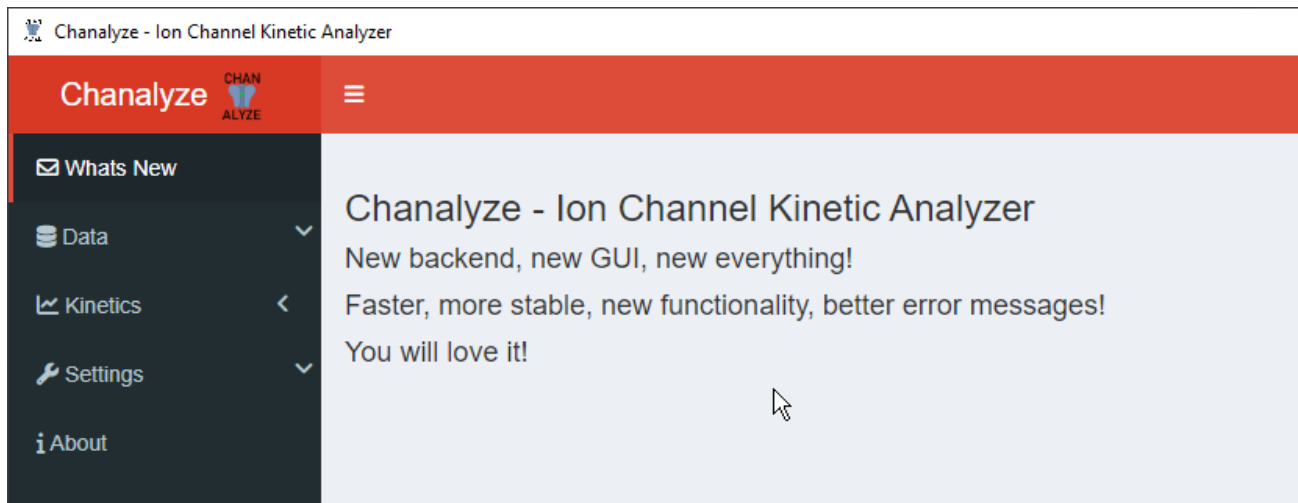
This view displays the time to reach different preselected activation and deactivation thresholds as boxplots.



- The menu button opens a menu where the displayed times can be selected.
- The settings button opens a menu where the axes limits and tickmarks can be changed. Font- and linesize can also be adjusted.



Main-Menu.md



The main menu can be accessed through the sidebar and be used to select the wanted functionalities.

- Data: Import/Export, edit and view the data
- Kinetics: Overlay the kinetics and calculate means and statistic
- Settings: Change the settings for data import and overlay

Settings.md

Import

The screenshot shows the 'Chanalyze - Ion Channel Kinetic Analyzer' window. The 'Edit' menu is active. The left sidebar shows 'Data Import' selected. The main panel displays two specification boxes: 'File specifications' and 'Column specifications'. In 'File specifications', 'File Separator' is set to '.' and 'First Column Name' is 'Index'. In 'Column specifications', 'Current' is 'Inward', 'Column Time' is '2', and 'Columns' is '3'.

- File specifications
 - File Separator: Specify how the data is separated in the .asc file.
 - First Column Name: Select the name of the first column in the .asc file.
- Current specifications
 - Current: Which currents are stored in the .asc file, which currents are to be analyzed.
 - Columns: Select the index of the column where the current values are stored.
 - Column Time: Select the index of the column where the time values are stored.

Manipulation

The screenshot shows the 'Chanalyze - Ion Channel Kinetic Analyzer' window with the 'Data Manipulation' menu selected. The main panel displays several manipulation options: 'Smoothing Algorithm' (set to 'SmoothingSpline'), 'Smoothing Options' (with sub-sections for Smoothing Spline, Gaussian, Gaussian Kernel, LOESS, LOWESS, and Fourier), 'Up/Downsampling' (Factor Up/downsampling set to 10, Type set to 'Upsampling'), 'Kinetic Stacking' (Stackpoint set to 10, Stacktime set to 1, Time Until Stacking set to 0, Duration Photoswitch set to 0), and 'Norming' (Norm data between: 0 to 100).

- Smoothing Algorithm
 - Smoothing Spline: Fits a smoothing spline to the data, allowing for flexible, non-linear fits with automatic selection of the smoothing parameter.
 - Gaussian: Applies Gaussian smoothing using a Gaussian kernel to produce a smooth estimate of the data.
 - Gaussian Kernel: Performs kernel smoothing using a kernel function to create a smoothed estimate of the relationship between variables.
 - LOESS: Fits a local polynomial regression to the data, providing a smooth curve that can handle complex, non-linear

relationships.

- LOWESS: Similar to loess, performs locally weighted regression to smooth data points.
- Fourier: Uses the Fast Fourier Transform to smooth data by transforming it to the frequency domain, filtering, and then transforming it back to the time domain.
- Up/Downsampling
 - Factor Upsampling: Increasing the resolution of the dataset by adding new data points through interpolation to create a smoother or more detailed representation but at the cost of larger data and slower calculations
 - Factor Downsampling: Reducing the resolution of the dataset by removing data points to reduce computational load, while retaining the overall structure and important information.
 - Type: Select if upsampling and downsampling will be used.
- Kinetic Stacking
 - Stackpoint: At which value will the data be stacked on top of each other. (If set to 10, all kinetics will be stacked at the first time the normalized smoothed current is 10)
 - Stacktime: At which time will the stacking occur. (If set to 1, the stacked kinetics will be shiften so that the stackpoint will occur at 1 second)
 - Time Until Stacking: A correction value (for time-to statistic) representing the time from the start of activation to the stackpoint.
 - Duration Photoswitch: A correction value (for time-to statistic) representing the time where a pharmacon stays in the active form.
- Norming
 - Norm data between: Determines between which values the kinetics are normalized

Other

The screenshot shows the 'Chanalyze - Ion Channel Kinetic Analyzer' software interface. On the left is a dark sidebar with navigation options: 'Whats New', 'Data', 'Kinetics', 'Settings', and 'Data Import'. The main area has a red header with the 'Chanalyze' logo and a hamburger menu icon. Below the header, a blue 'Other' panel is open, containing two sections: 'Kinetic has:' and 'Kinetic is:'. Under 'Kinetic has:', 'Activation & Inactivation' is selected with a checkmark, and 'Activation' is deselected with an 'X'. Under 'Kinetic is:', 'Normal' is selected with a checkmark, and 'with a very sharp and steep peak' is deselected with an 'X'.

- Kinetic has: Select if the calculation takes into account that the kinetic has no in/deactivation
- Kinetic is: Select if the calculation takes into account that there is a very sharp and steep peak which normally would not get recognized due to the smoothing