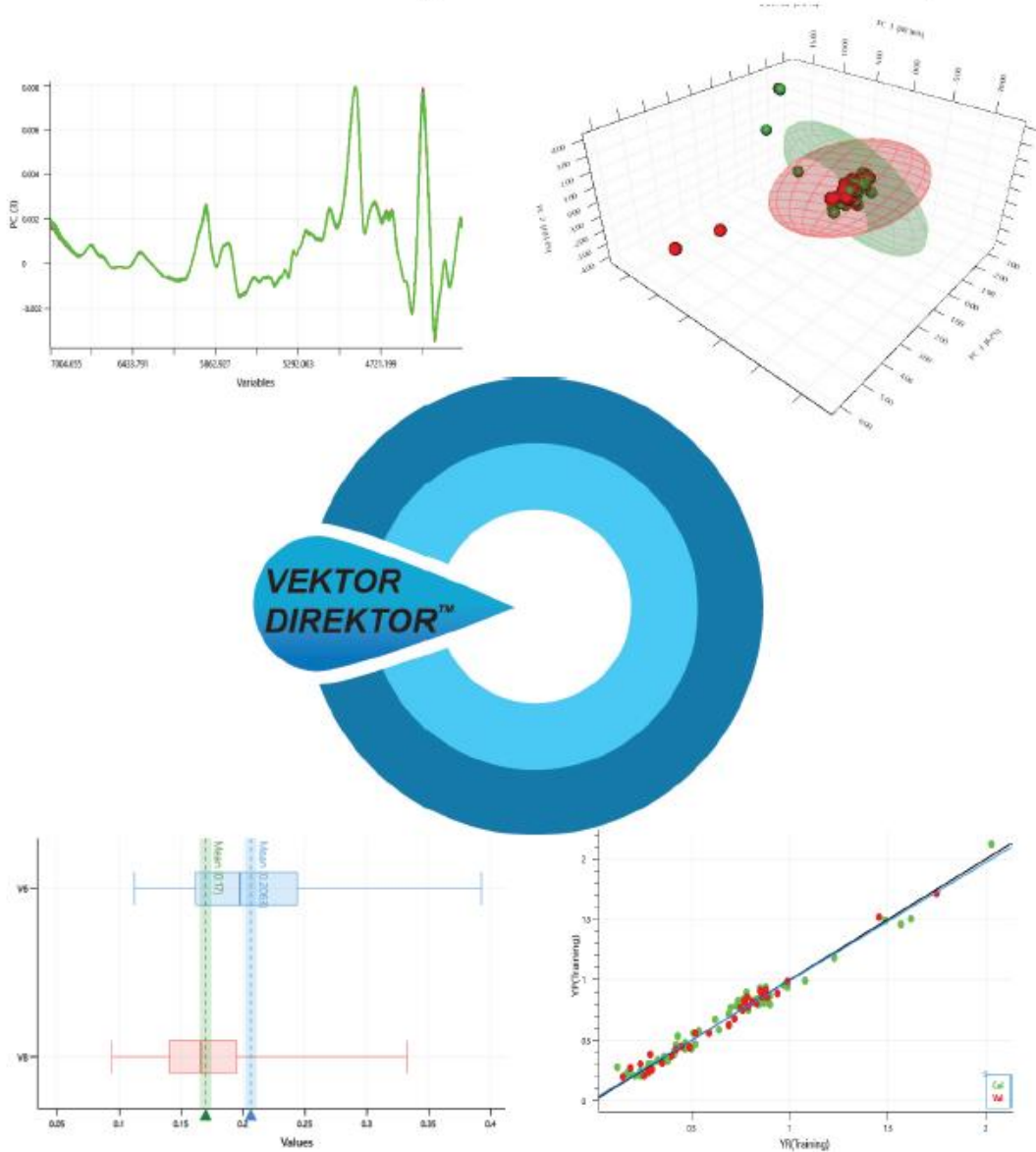


# VEKTOR DIREKTOR™

*Multivariate Analysis with Direction and Purpose*



## VEKTOR DIREKTOR QUICK-START INSTALLATION and BASIC USAGE GUIDE

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## 1. Introduction

Thank you for choosing VEKTOR DIREKTOR as your multivariate data analysis (MVDA) software. At KAX Group (KAXG), we believe we have found the right balance between software useability and data analysis functionality. MVDA is a complex topic and for the best user experience, software tools need to be user friendly and intuitive. VEKTOR DIREKTOR provides the most commonly used exploratory data analysis (EDA) and regression tools (these days known as predictive analytics) for developing models for research or industrial applications.

This quick-start user guide takes you through the steps of installing and starting VEKTOR DIREKTOR for the first time. For more information about the latest developments, technical notes and events, visit our website at [www.kax.group](http://www.kax.group).

## 2. Technical Overview of VEKTOR DIREKTOR software

MVDA software can be computer and memory intensive, particularly if you want to analyse large data sets generated by some spectrometers or chromatographic systems. We therefore suggest you specify your computer according to your data analysis needs. It is noted here that lower specification computers with small RAM and hard drive space will work, however, speed and storage space issues may arise. This is not a trait of VEKTOR DIREKTOR alone, but any software expected to analyse and plot large and complex data sets.

Table 1 provides an overview of the computer specifications required for reliable operation of VEKTOR DIREKTOR software for assessing moderately sized data tables. The KAXG specifications should be consulted if you intend to assess large data tables. Table 2 summarises the general features of VEKTOR DIREKTOR software,

**Table 1: Technical Specifications of VEKTOR DIREKTOR Software.**

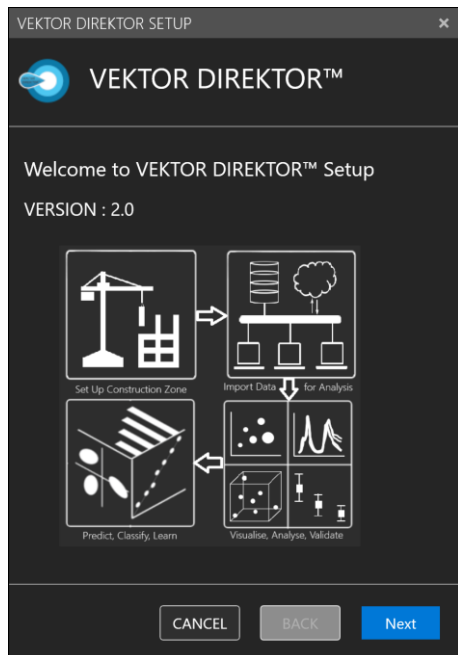
Feature	Specification	KAXG Recommendation*
Supported Operating Systems	Windows 7, 8 and 10 and 11 (32- and 64-bit operating systems)	Windows 10 Professional 64-bit operating system.
Memory (RAM)	8 GB Minimum	Small to Moderate Sized Data: 8-16 GB. Large Data sets: > 16GB.
Processor	Intel i5, i7, i9 and Xeon	Intel i7 preferred for most tasks. Intel i9 or Xeon for data intensive applications.
Hard Disk Space	1GB Minimum	500 GB to 1TB recommended.
Graphics Card	Direct 9 or later.	Direct 9 or equivalent

\*KAX Group only makes recommendations here and it is up to the end user to decide what is best for their needs.

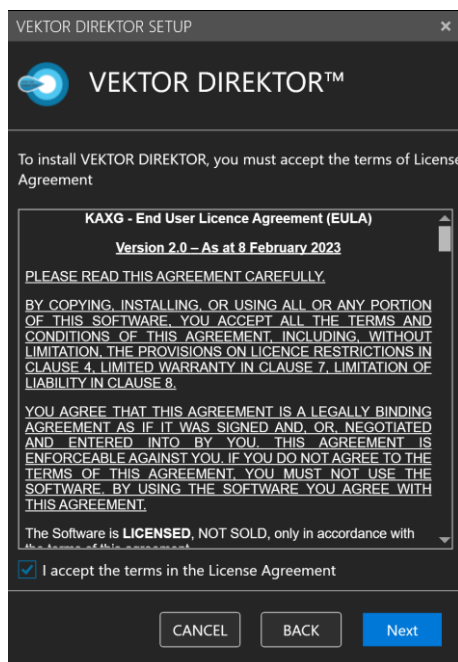
### 3. Installing VEKTOR DIREKTOR Software

When you first receive the VEKTOR DIREKTOR software from KAXG, it is delivered as a self-installing .msi file. Load this file onto the computer it is to be installed on and either double click, or right click and **Run as Administrator**.

1. The following screen will be displayed.  
Click on **Next** to continue.

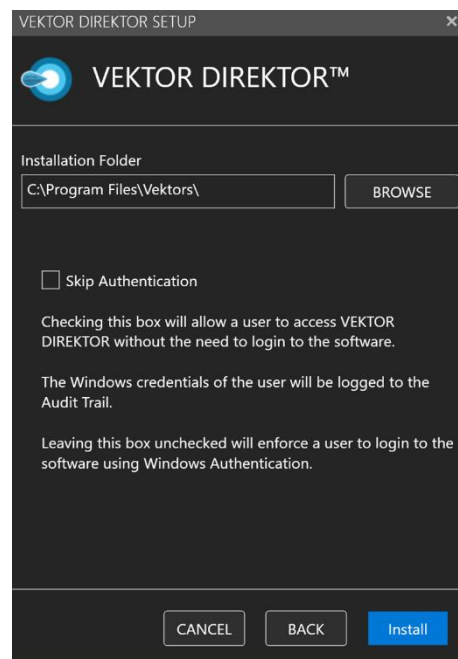


2. Agree to the terms and conditions of the license (known as the End User License Agreement, EULA) then click **Next**.

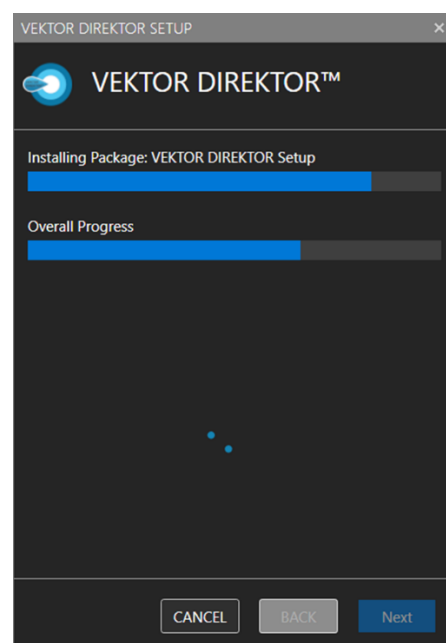


3. Define the path where VEKTOR DIREKTOR will be installed and select **Install**. Also use the Skip Authentication box if access to the software does not require a password.

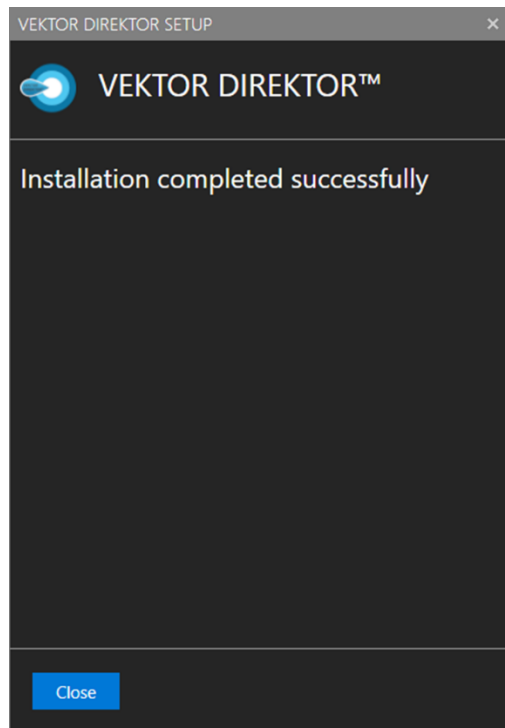
Consult your IT department if you have any doubt.



4. The installation process will begin.



5. When the installation has completed, the following screen will be displayed. Select **Close** to complete the setup.



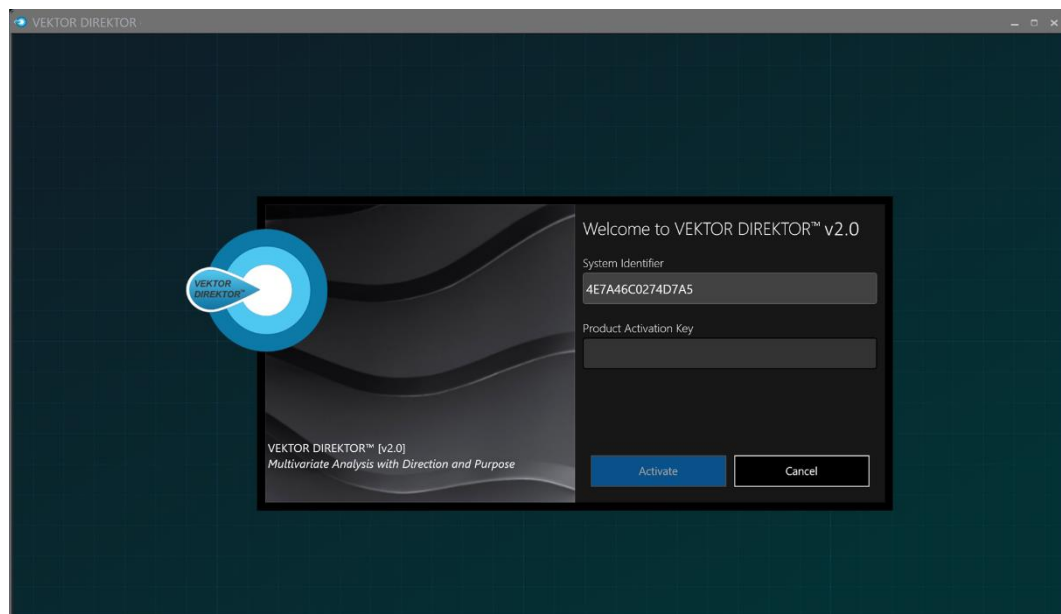
6. A desktop icon will be available to start the software. Double click on the icon and the next section describes how to activate the software.



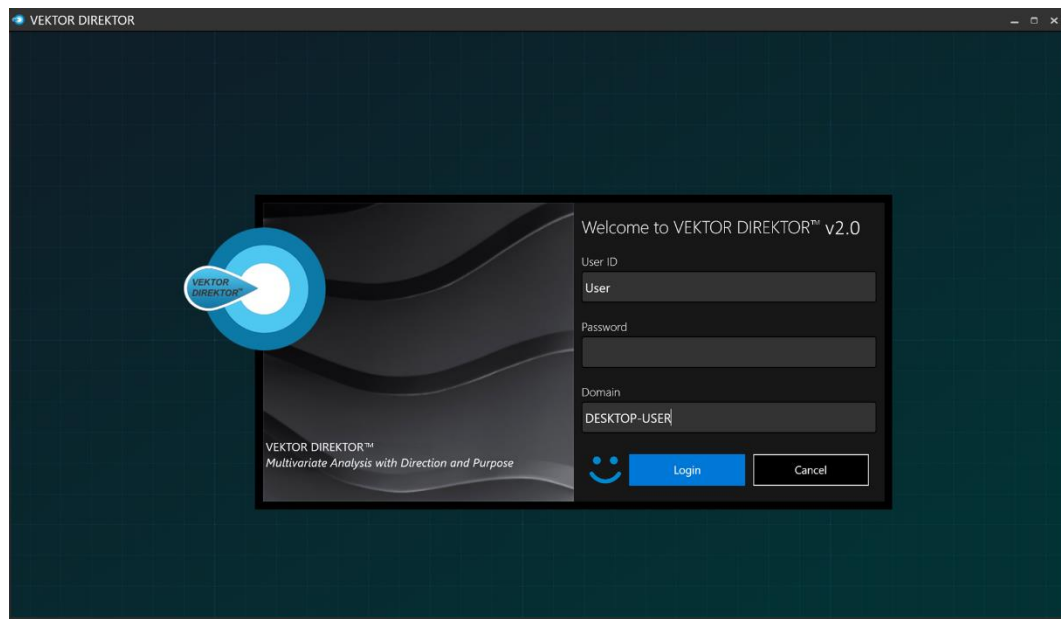
## 4. Starting VEKTOR DIREKTOR Software and Initial Setup

When you start VEKTOR DIREKTOR for the first time, you will be requested to enter an activation code for the software. This can be obtained from KAXG.

Enter the Activation Code provided by KAXG and select **Activate**.

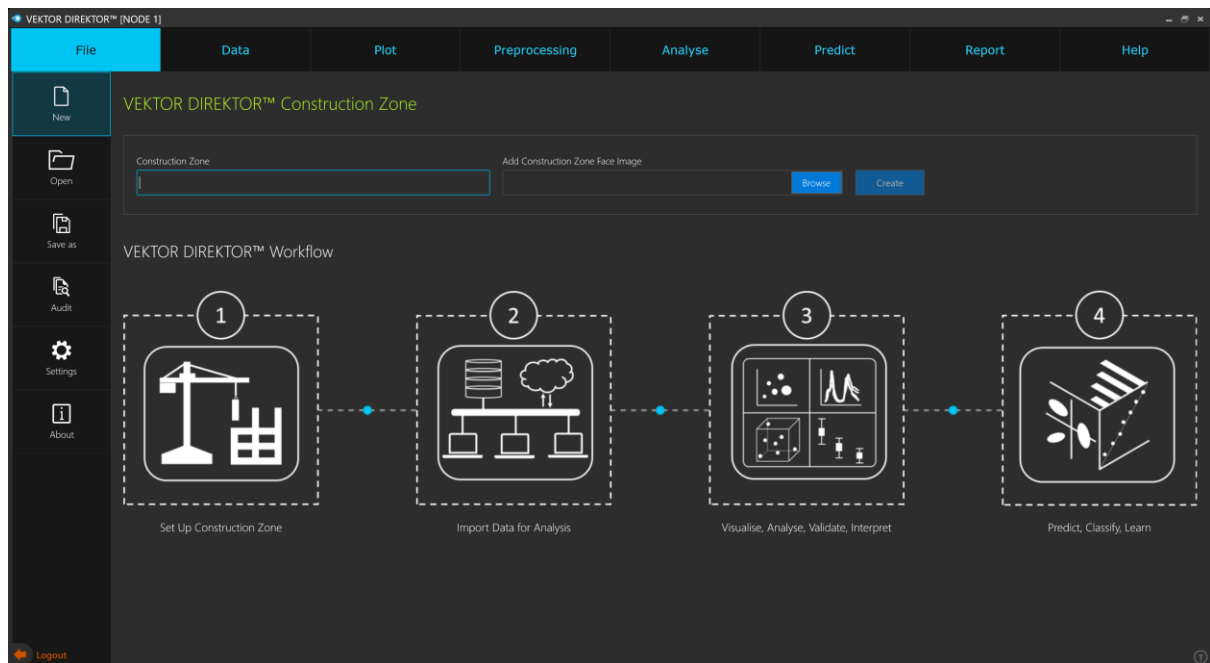


When VEKTOR DIREKTOR has been successfully activated, the main login screen will be displayed.



VEKTOR DIREKTOR uses the Windows login credentials for the user of the computer to login to the software. Enter the Windows password and select **Login**.

**Note:** If **Skip Authentication** was checked during installation, the above screen will not be displayed and only the main VEKTOR DIREKTOR landing page will be displayed.



## 5. Changing a License Key from Trial to a Full Activation Key

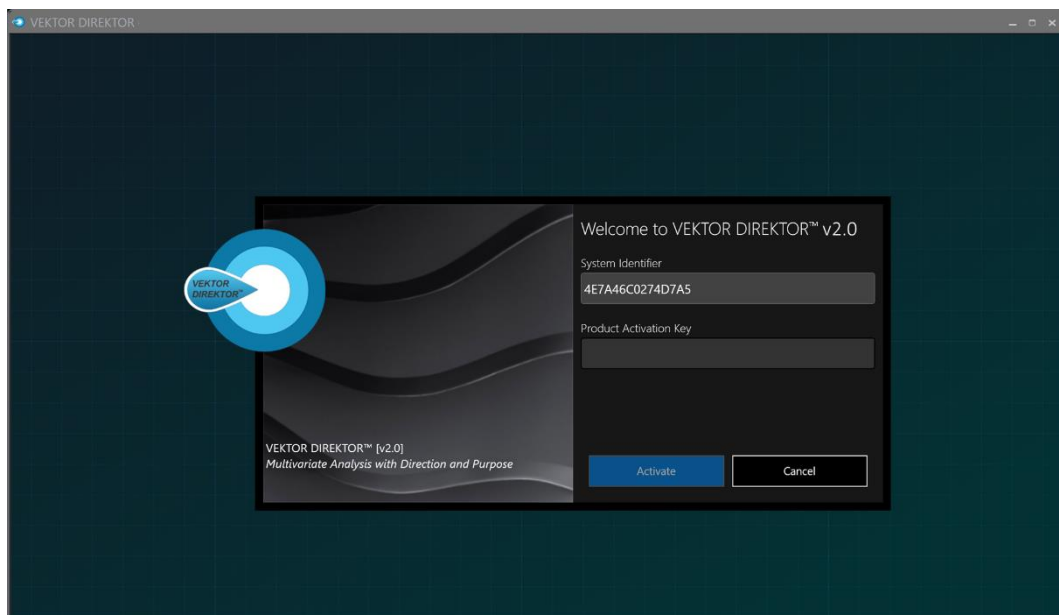
Sometimes users want to try the software before purchasing a license. Typically, KAX Group will send a trial activation key for a defined period of time and when that license key expires, VEKTOR DIREKTOR will request a new key to be entered.

If, however, a user wants to purchase before the trial key expires, then, when KAX Groups sends the full activation key, the following process should be followed to update the license key.

1. Navigate to the Microsoft **Start** menu and locate the VEKTOR DIREKTOR folder.
2. Open this folder and select the **Change License** option.



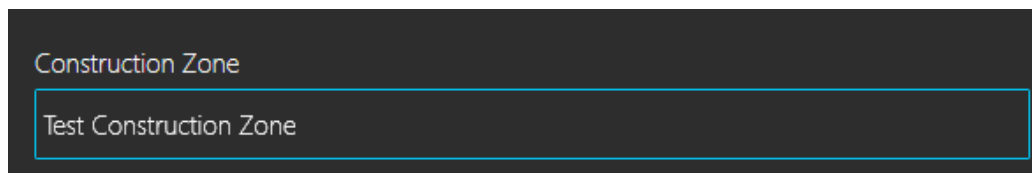
3. Enter the **Product Activation Key** provided that corresponds to the **System Identifier** and the **Activate** button will become active.



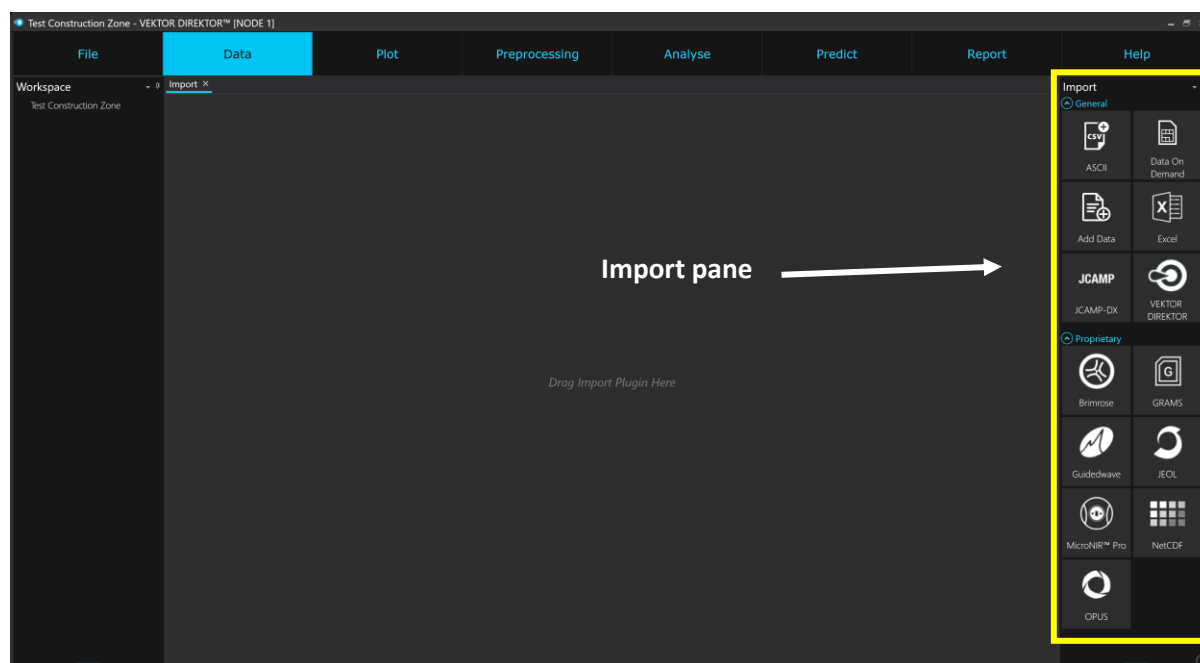
4. Select **Activate** and the license will be updated to a full license

## 6. Quick Start Data Import Guide

Getting data into a software can be one of the hardest challenges in many chemometrics software packages. VEKTOR DIREKTOR makes this simple. VEKTOR DIREKTOR requires the definition of a Construction Zone to enter data into. This is done to promote good practice in data table setup. From the **File – New** option, enter a name for the construction zone.



An image can also be added to the construction zone if desired. Select the **Create** button and you will be taken to the **Data** main page. On this page, a palette of data import types will be displayed in the **Import** pane.



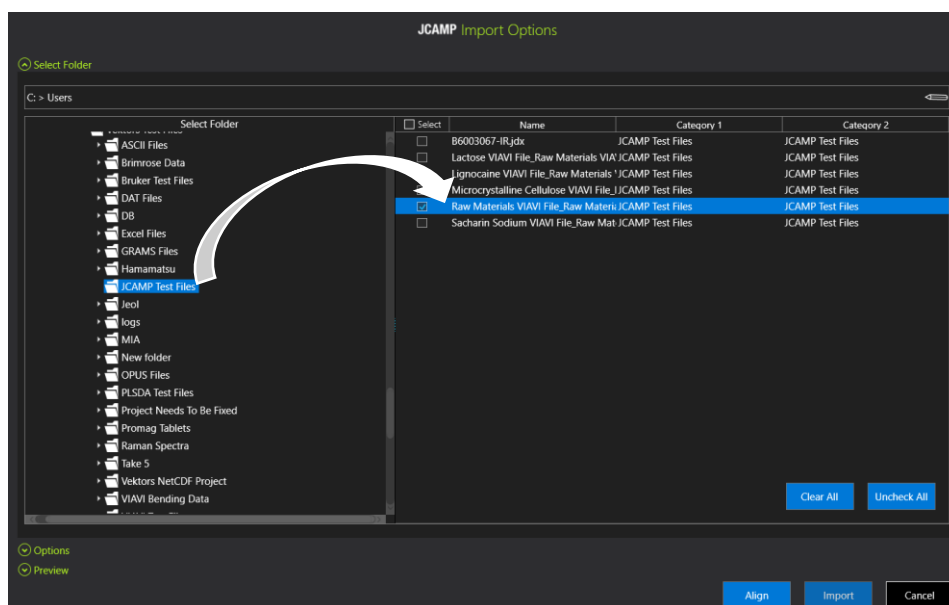
Select the **Data Type** to be imported by either double clicking on the icon, or drag'n'drop it into the **Drag Import Plugin Here** page.





A similar process to the one below is used to import most data types into VEKTOR DIREKTOR,

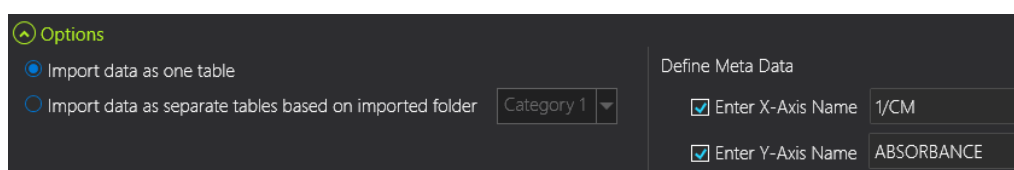
1. A network folder tree will be displayed. Navigate to the directory with the selected file types.



2. Drag'n'drop the folder(s) with the data into the main page. Multiple files can be selected using the check boxes under Select. Checking the box next to the **Select** button will select all files in the list.

**Note:** The dimensions of the files must be the same in order to import multiple files simultaneously.

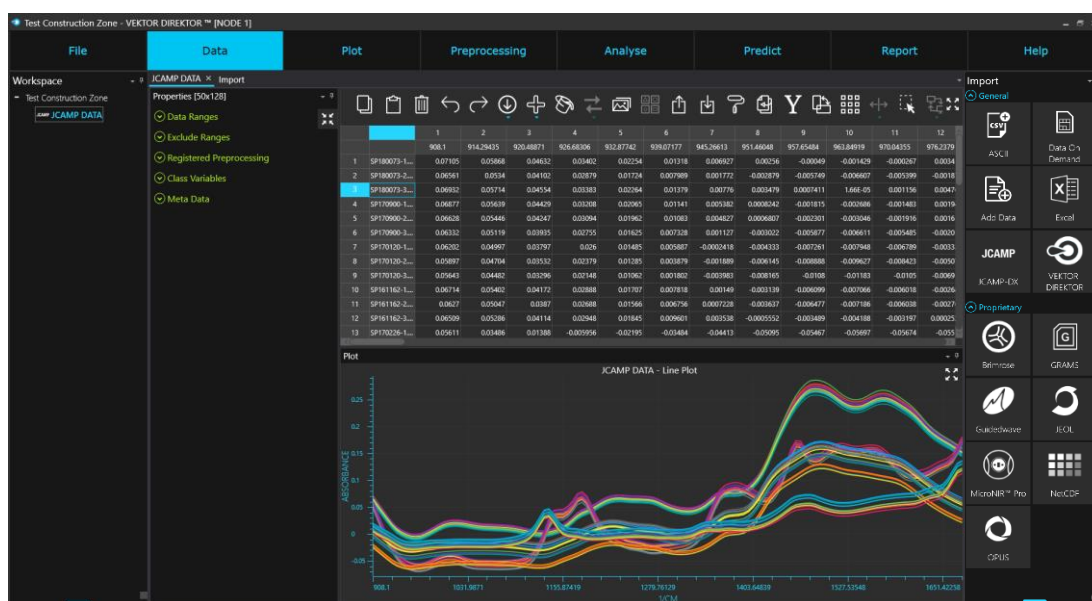
3. Select the **Options** tab. Data can be imported as one table or as separate tables. You can also define the metadata of the X- and Y-Axes before import. Proprietary formats will already have these fields populated before import.



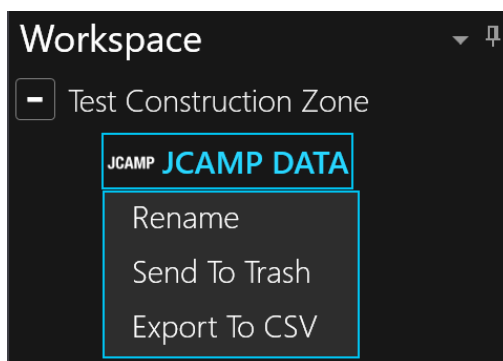
4. Use the **Preview** button to display a tabular or graphic display of the data before import. Select the **Import** button to import the data into VEKTOR DIREKTOR.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		908.1	914.29435	920.48871	926.68306	932.87742	939.07177	945.26613	951.46048	957.65484	963.84919	970.04355	976.2379	982.43226	988.62661	994.82097	1001.01532
1	SP180073-1....	0.07105	0.05868	0.04632	0.03402	0.02254	0.01318	0.006927	0.00256	-0.00049	-0.001429	-0.000267	0.003457	0.007923	0.01315	0.01831	0.02347
2	SP180073-2....	0.06561	0.0534	0.04102	0.02879	0.01724	0.007989	0.001772	-0.002879	-0.005749	-0.006607	-0.005399	-0.001874	0.002602	0.007772	0.01272	0.01777
3	SP180073-3....	0.06932	0.05714	0.04554	0.03383	0.02264	0.01379	0.00776	0.003479	0.0007411	1.6E-05	0.001156	0.004761	0.009253	0.0144	0.0194	0.0244
4	SP170900-1....	0.06877	0.05639	0.04429	0.03208	0.02065	0.01141	0.005382	0.0008242	-0.001815	-0.002686	-0.001483	0.001946	0.006318	0.01113	0.0159	0.0207
5	SP170900-2....	0.06628	0.05446	0.04247	0.03094	0.01962	0.01083	0.004827	0.0006807	-0.002301	-0.003046	-0.001916	0.001616	0.005931	0.01073	0.0156	0.0204
6	SP170900-3....	0.06332	0.05119	0.03935	0.02755	0.01625	0.007328	0.001127	-0.003022	-0.005877	-0.006611	-0.005485	-0.002059	0.002264	0.007003	0.01181	0.0166
7	SP170170-1....	0.06202	0.04947	0.03797	0.026	0.01485	0.005887	-0.0002418	-0.004333	-0.007761	-0.007948	-0.006789	-0.003334	0.001187	0.006163	0.01111	0.0158

The data is now imported as a spreadsheet format for plotting, preprocessing and analysis.



The imported data will be displayed as a node in the **Workspace** pane. Right clicking on a data node allows you to change the name of the table, send it to the Trash Bin or export the data as a text file (.csv).



At the bottom left part of the main view, click on the blue bar to show the **Trash Bin** and the **Save** button.



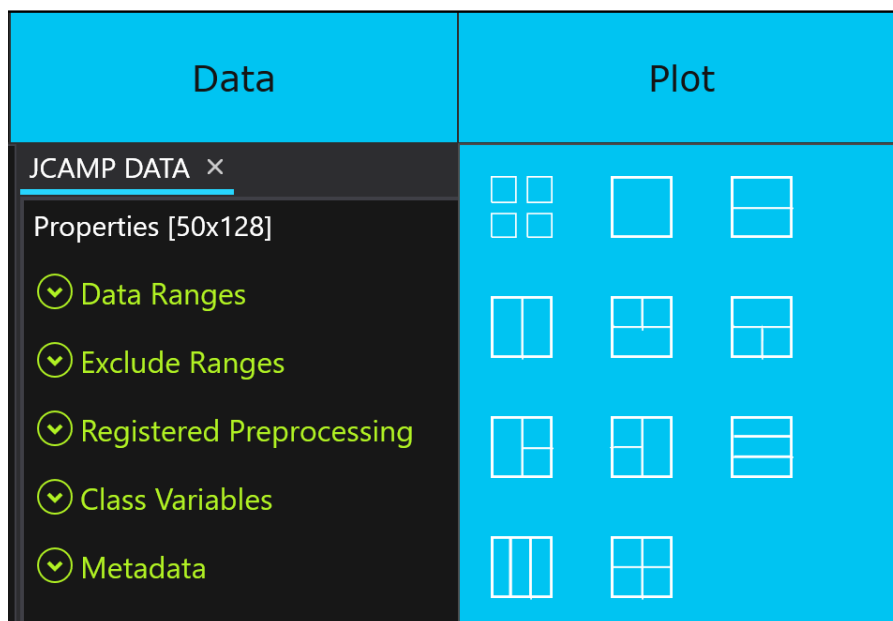
Drag'n'drop single or multiple nodes into the **Trash Bin** to remove them from the workspace.

The **Save** button is the Save As option the first time it is selected and will require you to save the Construction Zone to a specific location. Once the location has been defined, the **Save** button will then update the Construction Zone each time it is selected.

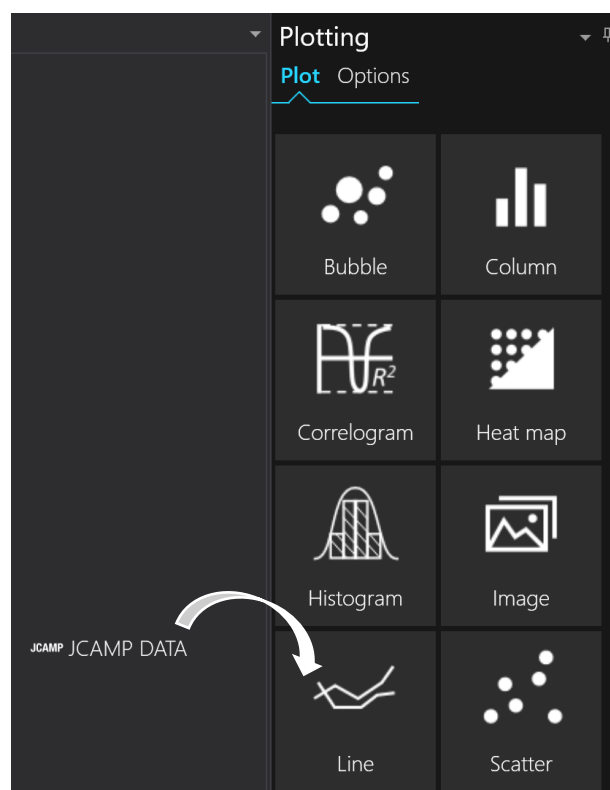
## 7. Quick Start Plotting of Data

The process for plotting data in VEKTOR DIREKTOR is similar for all types of plots.

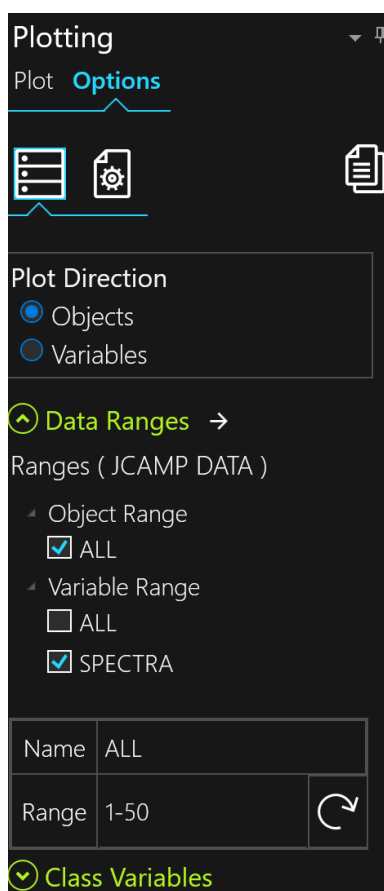
Select the plot layout by hovering the mouse over the **Plot** button.



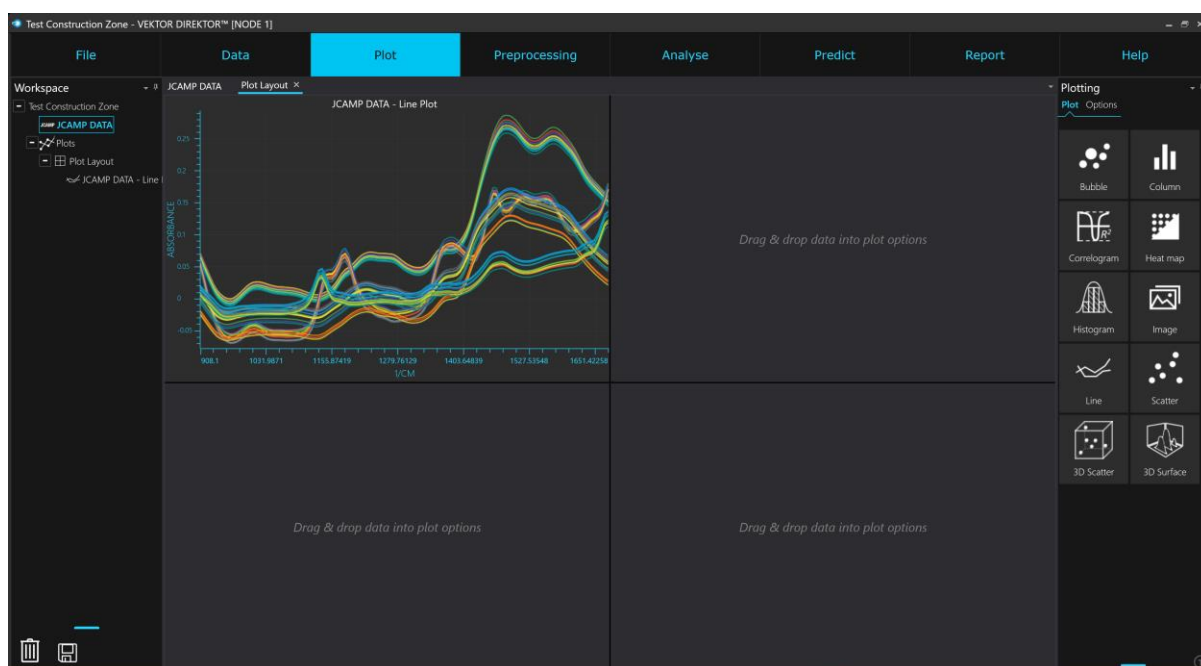
After defining the layout, drag'n'drop the data table to be plotted onto the plot button type in the **Plotting** pane.



The options for the selected plot type will be displayed. Define the **Plot Direction**, **Data Ranges** and whether to use a **Class Variable**, then select the **Apply** button.



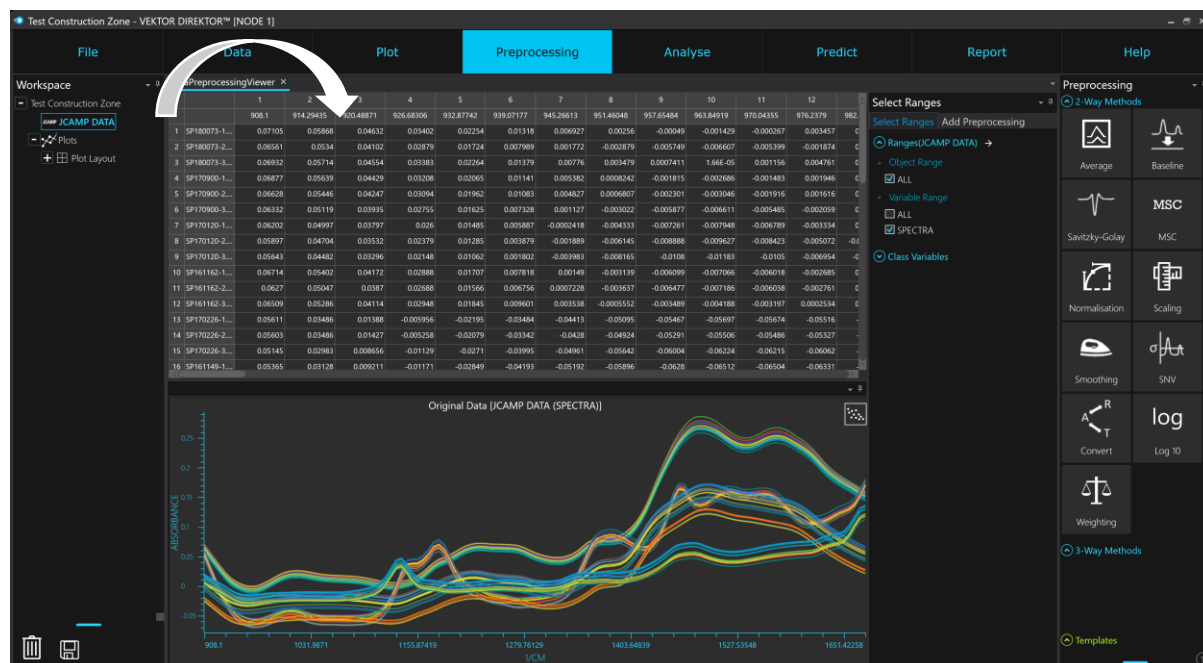
The data will be displayed in one of the defined panes in the **Plot Layout**.



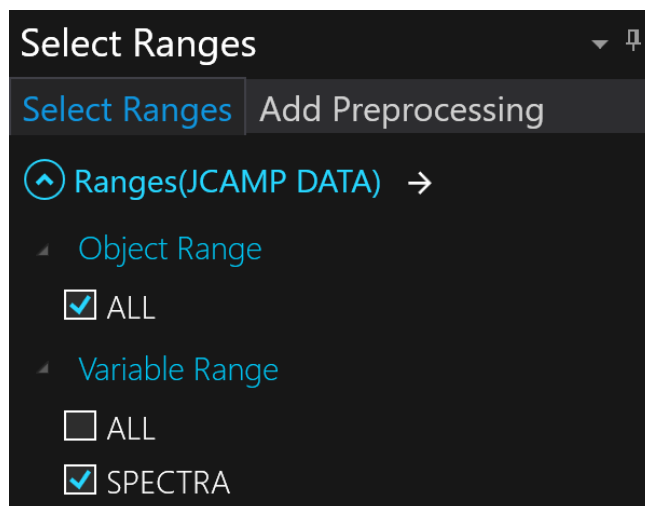
## 8. Quick Start Data Preprocessing

Preprocessing in VEKTOR DIREKTOR is performed by defining **Templates** that can be used on similar data and ranges in the future. To make a preprocessing template,

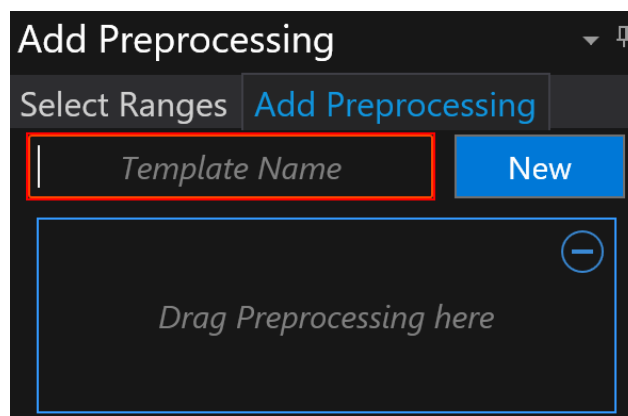
1. Drag'n'drop the data to be preprocessed into the viewer. A tabular and graphical view of the data will be displayed.



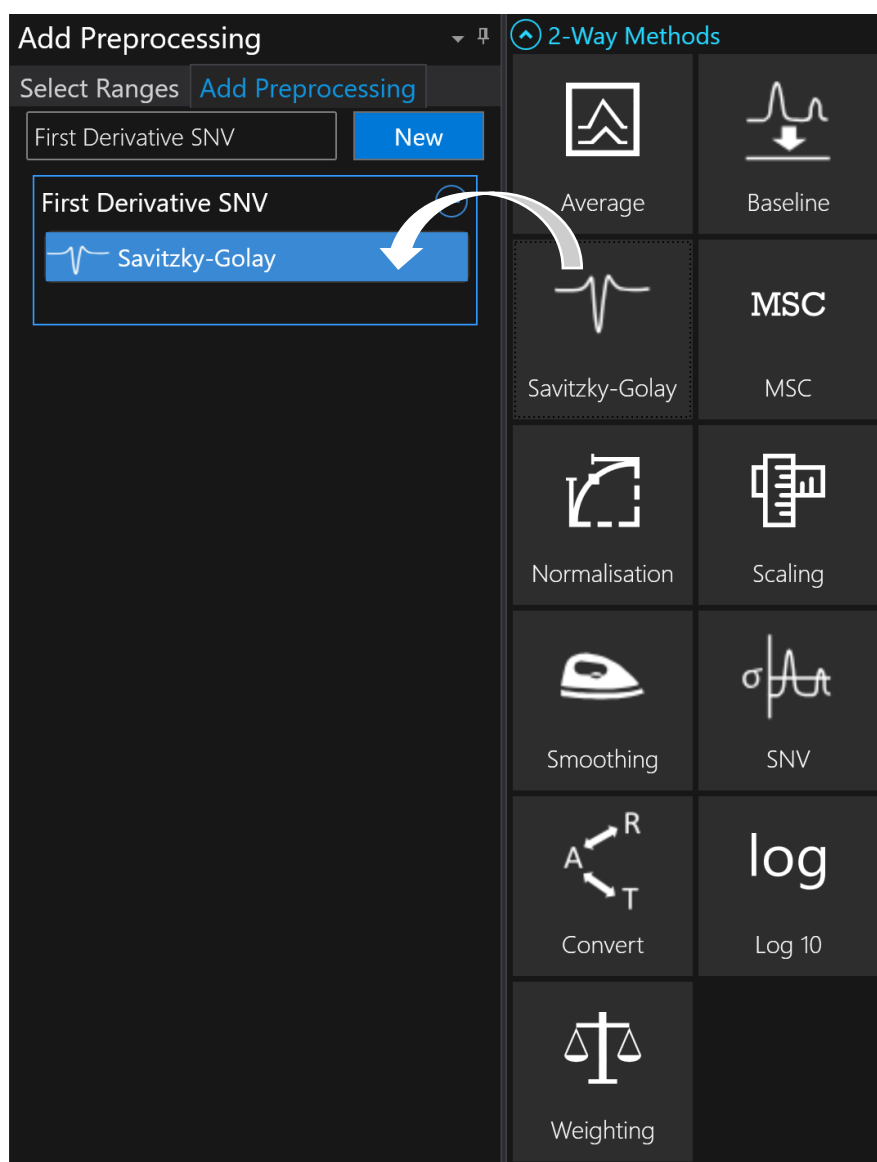
2. In the **Select Ranges** tab, define the **Object** and **Variable Ranges** to apply the preprocessing.



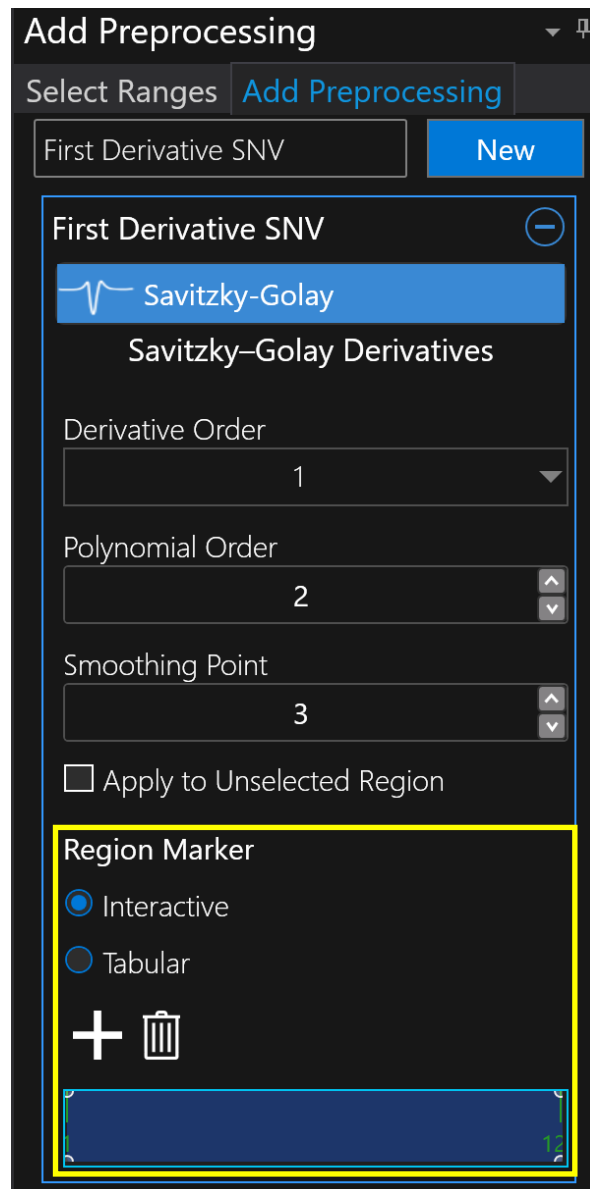
3. Select the **Add Preprocessing** tab and select the **New** button. A red border will be placed around the **Template Name** box. A name must be provided in order to continue. Add a name to reflect the preprocessing method to be applied.



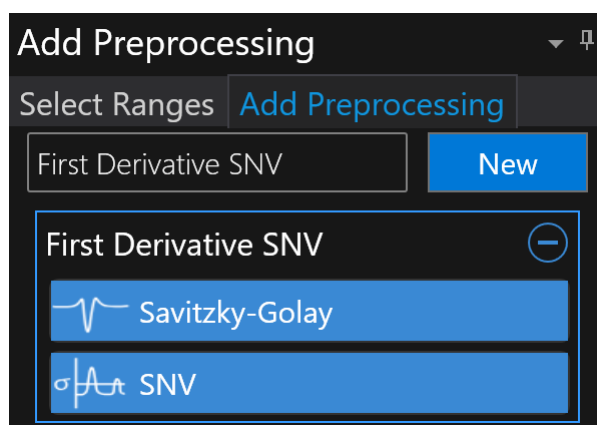
4. Preprocessing templates can be a single or a combination of preprocessing methods. Drag'n'Drop the first method into the **Drag Preprocessing** method here and it will be displayed in the list.



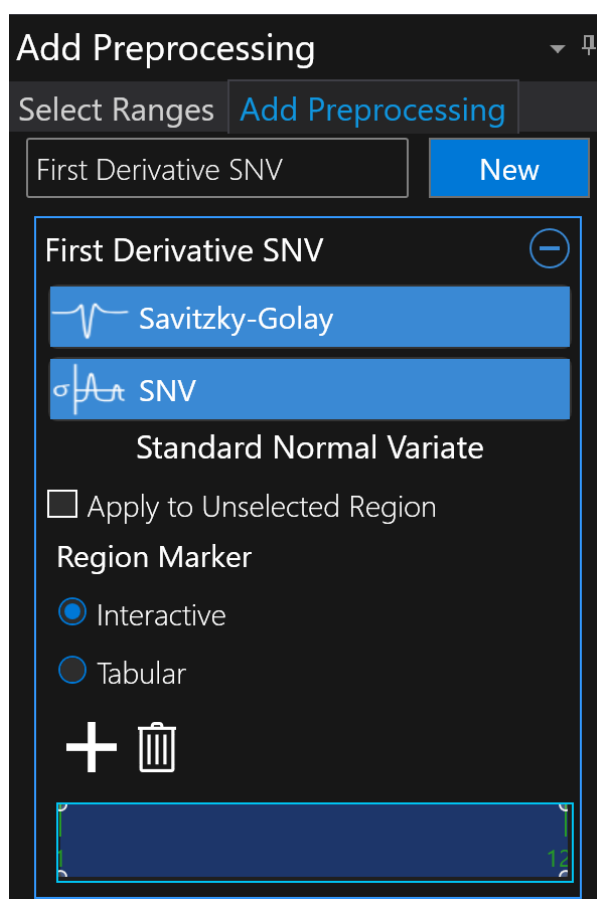
Select the preprocessing method in the list to expand its options and define the parameters for the preprocessing method.



Use the interactive **Region Marker** options to define the region to apply the preprocessing method. You can use the Update button to show the effects of the preprocessing method interactively or you can drag'n'drop a second preprocessing method into the list.



Click on the newly added preprocessing method to expand its options and define the parameters to use for this method.

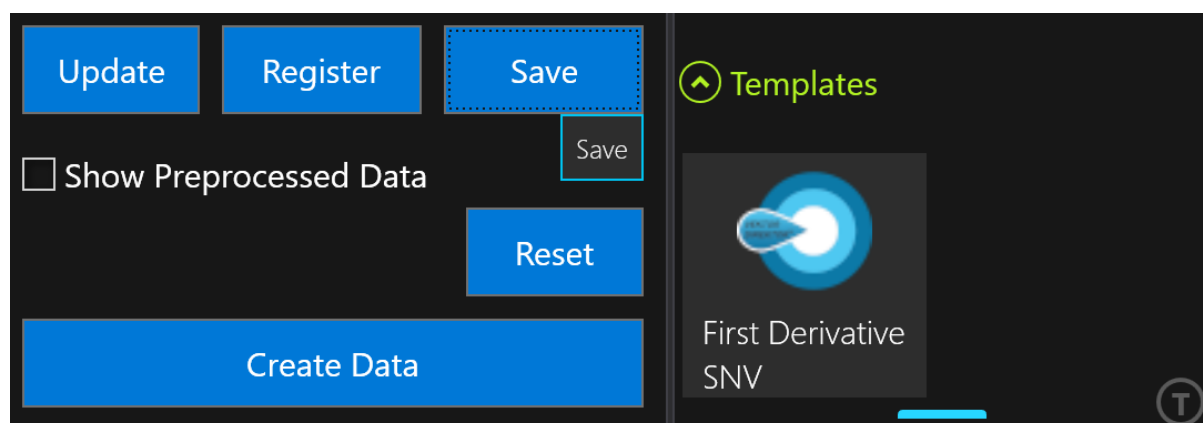


Select the Update button to view the effects of the preprocessing method(s) on the selected data.





Use the **Save** button to save the **Template** to the **Template Repository**.



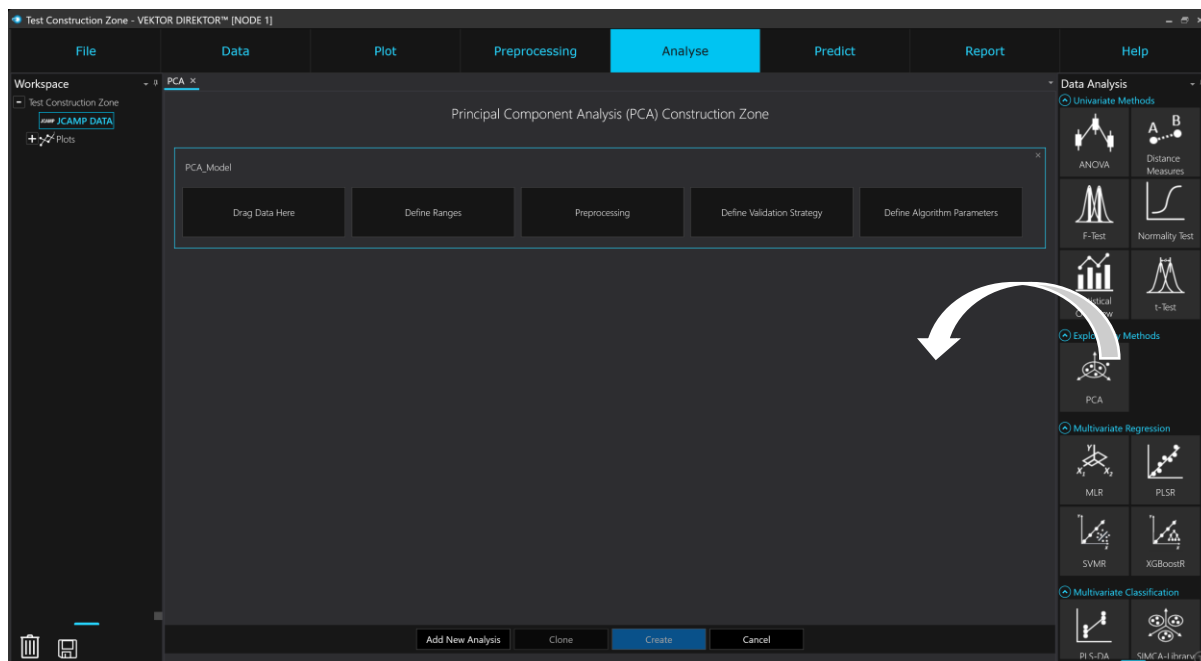
This template can be used to preprocess new and similar data without having to perform the setup each time. Templates are also used in the **Analysis** methods.

The **Create Data** button will generate a table of preprocessed data in the **Workspace** for plotting and further assessment.

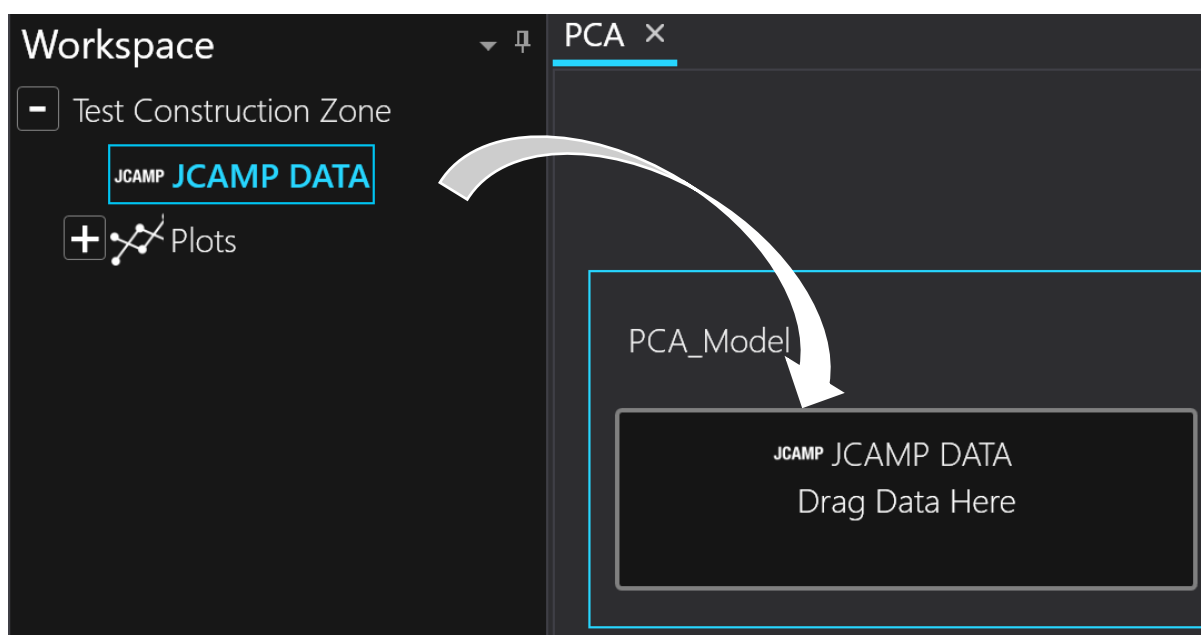
## 9. Quick Start Data Analysis

VEKTOR DIREKTOR provides you with the ability to perform univariate and multivariate data analysis (MVDA). All analysis methods follow a similar setup.

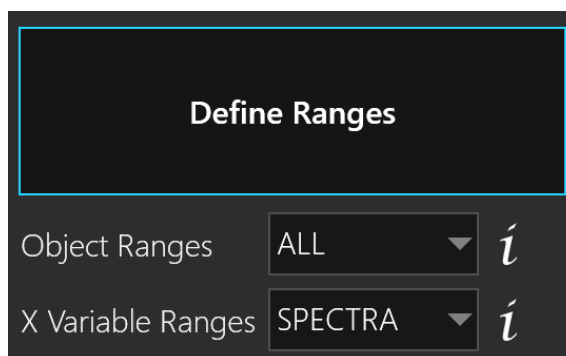
1. In the Analyse page, drag'n'drop the analysis method to apply to a data table into the viewer. The workflow of the method is displayed and proceeds from left to right.



2. Drag'n'drop the data table to be analysed into the **Drag Data Here** box.



- Define the ranges of the data to be analysed in the **Define Ranges** box.

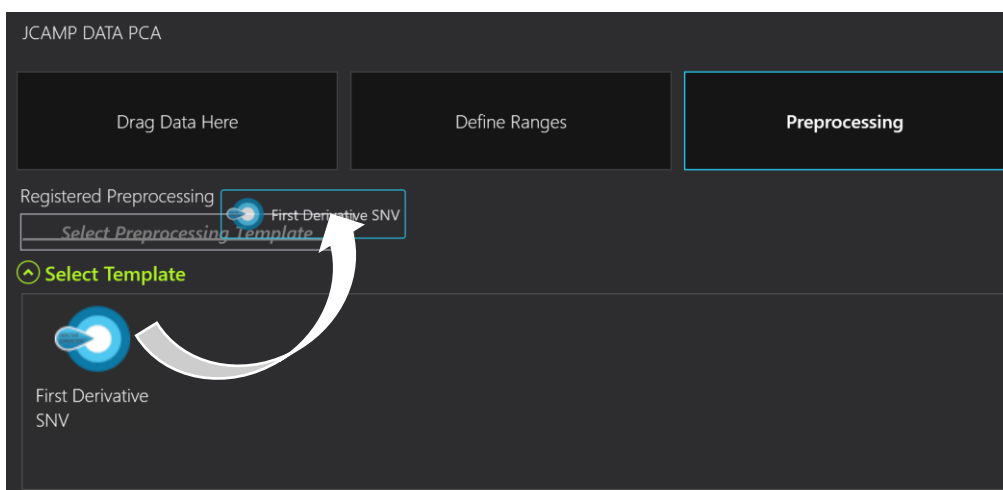


**Define Ranges**

Object Ranges ALL *i*

X Variable Ranges SPECTRA *i*

- Define the **Preprocessing** template to be used in the analysis by drag'n'dropping the template into the **Select Preprocessing Template** field.



JCAMP DATA PCA

Drag Data Here Define Ranges Preprocessing

Registered Preprocessing

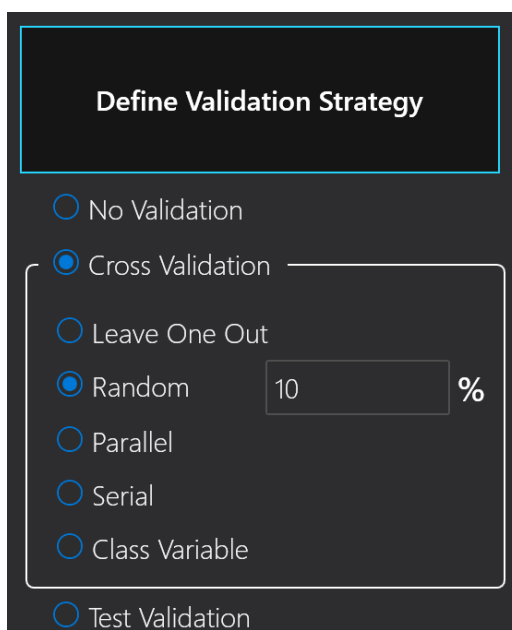
Select Preprocessing Template

First Derivative SNV

Select Template

First Derivative SNV

- Define the **Validation Strategy** to use for model development from the **Define Validation Strategy** box.



**Define Validation Strategy**

☐ No Validation

☒ Cross Validation

☐ Leave One Out

☒ Random 10 %

☐ Parallel

☐ Serial

☐ Class Variable

☐ Test Validation

- Define the **Algorithm Parameters** from the **Define Algorithm Parameters** box. A suggested starting point is to use the default parameters.

**Define Algorithm Parameters**

Number of iterations

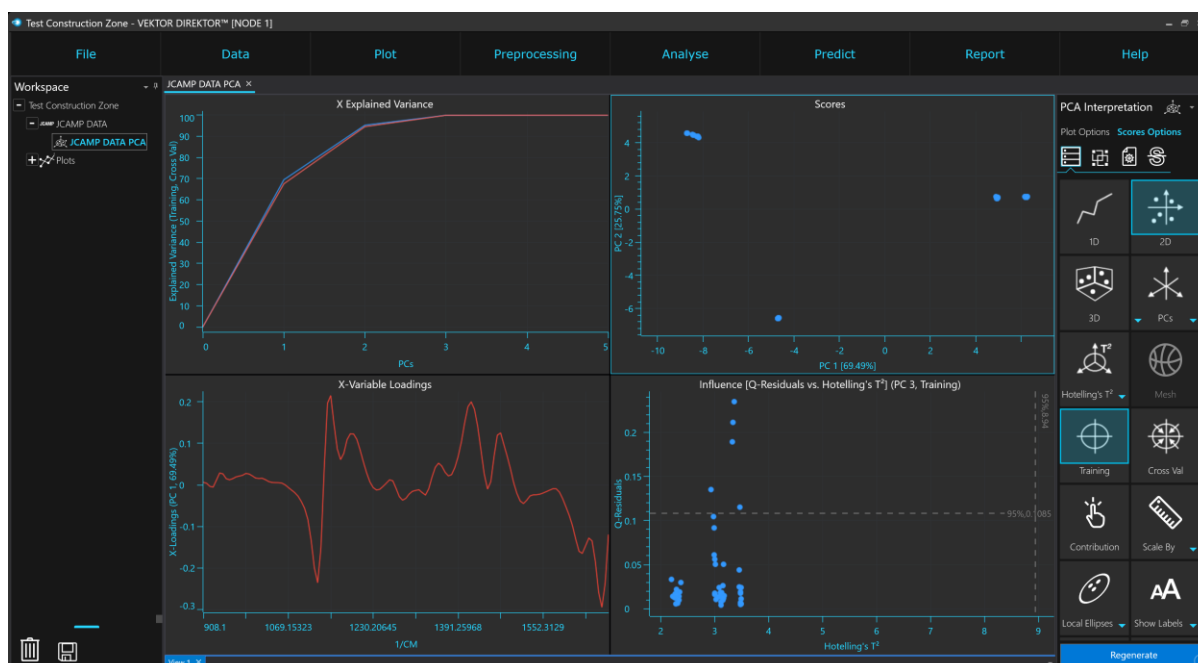
1000

Number of Components

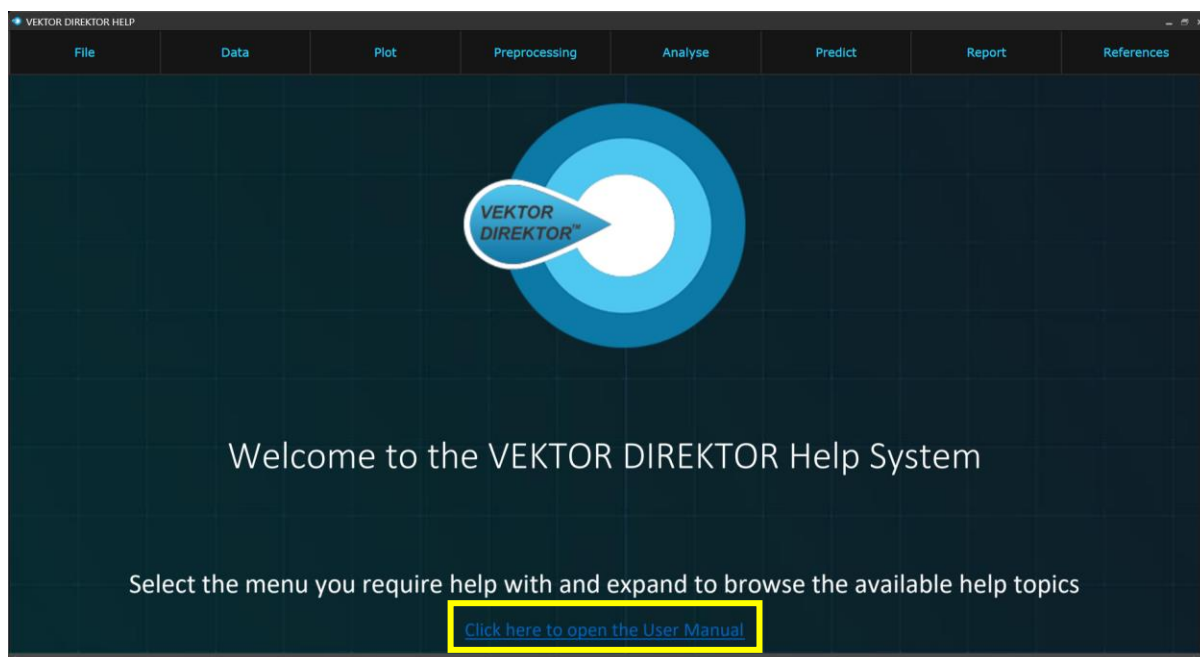
5

☒ Mean Centre

- Select the **Create** button at the bottom of the page to start the analysis. The results can now be assessed using the plotting tools specific to the analysis method chosen.



For more details on the methods described in this quick start guide, please refer to the user manual that can be found in the **Help System**, or use the specific **Help** topics for a particular function.



Other resources can be found on the KAX Group webpage, [www.kax.group](http://www.kax.group)



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