


# Empa.QATool

End-User Documentation

 Home QA Tool Quick start Compare live data Export Data Import data Delete Data Logged in as: admin ([Sign out](#))

## Quality Assurance tool

**Render as:**  Stack plot  Scatter plot  
 Use separate Y-Axis per substance

**Select timeseries:** + -

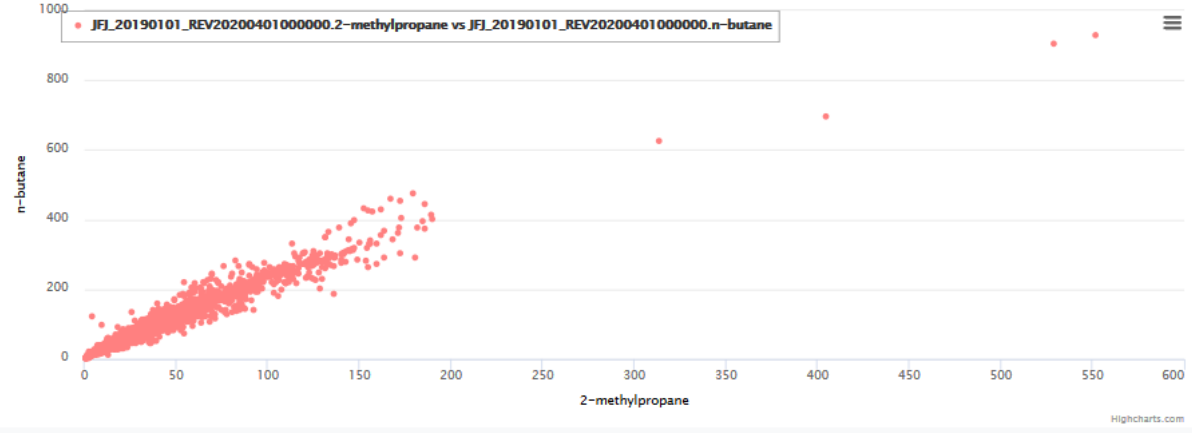
Timeseries	Station	Dataset	Revision	Substance	Color
#1	JFJ	1.1.2019	1.4.2020	2-methylpropane	<span style="color: red;">■</span>
#2	JFJ	1.1.2019	1.4.2020	n-butane	<span style="color: green;">■</span>

[Render Plots](#)

**Actions**

[Flag selected points](#)

[Flag date range](#)



Highcharts.com

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## Introduction

### What is Empa QATool?

Empa QATool is a stack of software that is used for quality assurance (mainly in the ACTRIS, EBAS field) of data. The software stack is made up of different applications. With the "QA Tool" you can compare different substances from the same or from different stations in one plot. In the "Quick Start" you find the most important predefined substance pairs that can be plotted with one click. Under "Compare live data" it is possible to add new data to an existing file of the running year. But it is also possible to export proceeded files or to import other useful data sets for your station like wind speed or carbon monoxide.

### What can Empa QATool do for me?

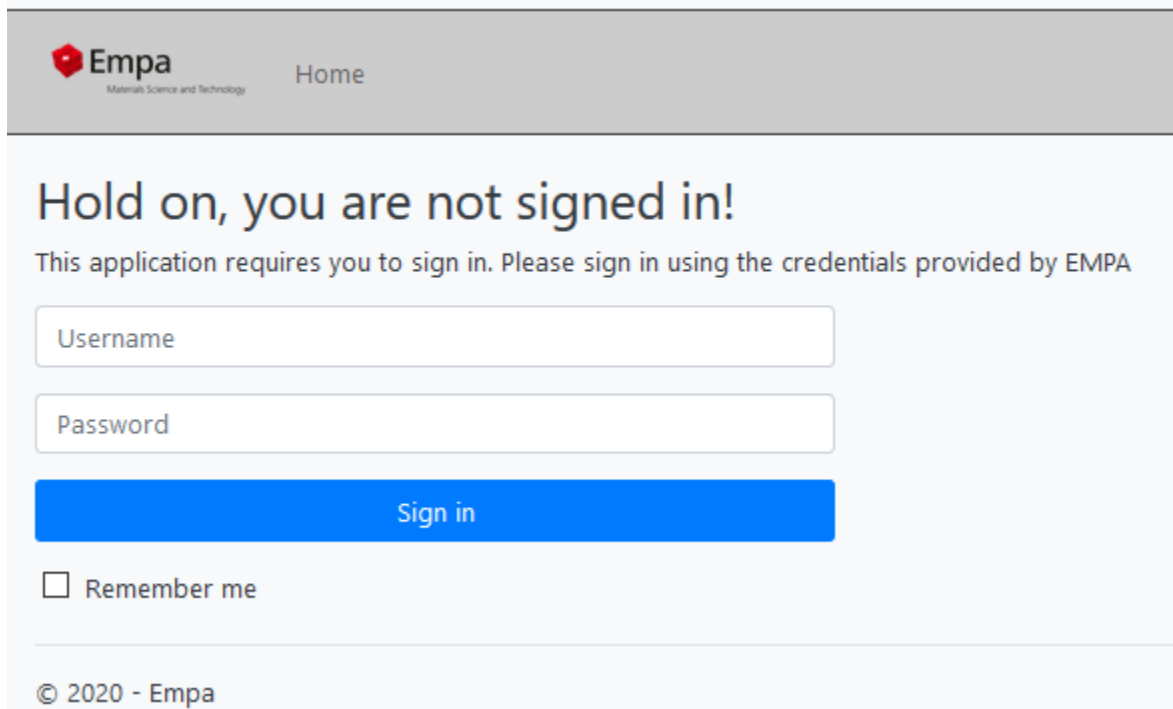
The tool is used to render data in your web-browser interactively and allows you to interact with the data in an efficient way. For example, it allows you to flag data by simply clicking on the point in a scatter or stack plot. It can export flagged data again in different formats, can import custom csv datasets...

Sounds great, how can I access it?

The web application is hosted under the URL <https://voc-qc.nilu.no>

## User login

When you open the web-application in your browser and are not logged in, you will automatically be greeted with this view:



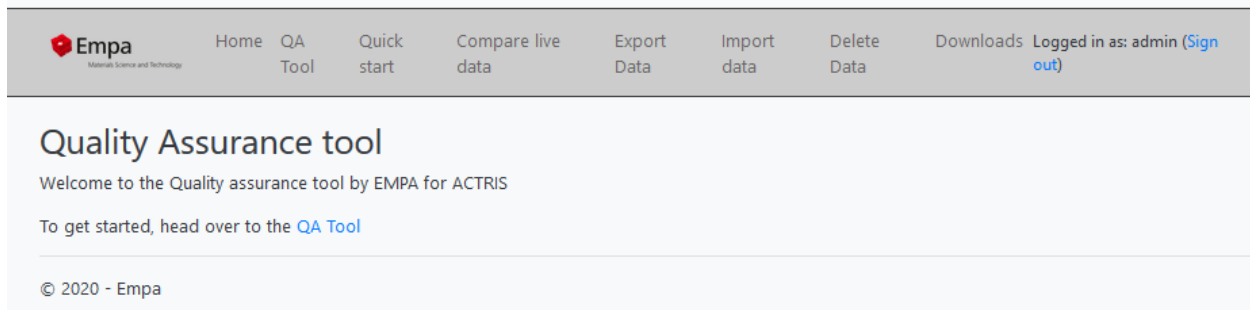
The screenshot shows a web application login page. At the top left is the Empa logo (Materials Science and Technology) and a 'Home' link. The main heading is 'Hold on, you are not signed in!'. Below this is a message: 'This application requires you to sign in. Please sign in using the credentials provided by EMPA'. There are two input fields: 'Username' and 'Password'. A blue 'Sign in' button is positioned below the password field. A 'Remember me' checkbox is located below the button. At the bottom left, the copyright notice '© 2020 - Empa' is visible.

For security reasons, the tool is protected behind a user login. Empa (Stefan Reimann, Matz Hill) should have provided you with a user logon, if not, write a short e-mail to [stefan.reimann@empa.ch](mailto:stefan.reimann@empa.ch) or [matthias.hill@empa.ch](mailto:matthias.hill@empa.ch), they will gladly provide you with a user login.

Depending on your login / user, you will have a different permission set.

## Start page

Once logged in you will be redirected to the start page:



The screenshot shows the top navigation bar of the Empa QA Tool. It includes the Empa logo on the left and a series of menu items: Home, QA Tool, Quick start, Compare live data, Export Data, Import data, Delete Data, and Downloads. On the right side of the bar, it indicates the user is logged in as 'admin' with a 'Sign out' link. Below the navigation bar, the main heading is 'Quality Assurance tool', followed by a welcome message: 'Welcome to the Quality assurance tool by EMPA for ACTRIS'. A link to 'QA Tool' is provided for getting started. At the bottom of the page, the copyright notice '© 2020 - Empa' is visible.

The actions available in the top bar depend on your permission set, also the content of the start page might be different (it is configurable by the administrator).

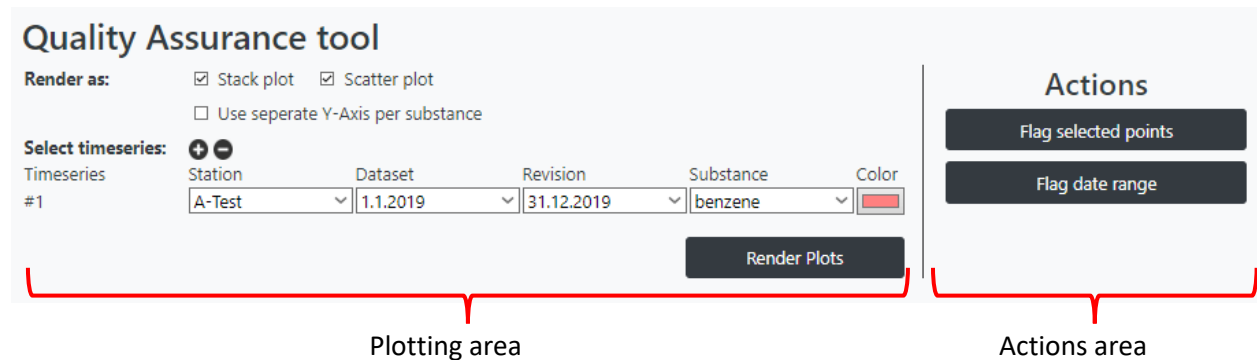
We will go through every action available in this document and explain them in detail.

For a short overview:

- **Home:** Displays the start page
- **QA Tool:** Redirects to the QA Tool, where data can be plotted and flagged. The QA Tool is the heart of the whole application
- **Quick start:** Preconfigured graphs for the major VOCs
- **Compare live data:** This module is used for quality check of near real-time data.
- **Export Data:** Tool that allows one to export modified data as well as a flag report from the internal SQL database again, in NASA AMES, and CSV formats.
- **Import data:** Can be used to import custom datasets that don't go through the validation process of EBAS, like NOX data for example. Can then be used to plot against other data in the QA Tool.
- **Delete Datasets:** This action can be used to delete old datasets from the database. This action is only available to administrators.

## QATool


This is the heart of the application. It allows users to plot data against each other in scatter and stack plot, and allows to flag data. The view is divided into two sections:



**Quality Assurance tool**

**Render as:**  Stack plot  Scatter plot  
 Use separate Y-Axis per substance

**Select timeseries:** **+** **-**

Timeseries	Station	Dataset	Revision	Substance	Color
#1	A-Test	1.1.2019	31.12.2019	benzene	

**Actions**

Flag selected points

Flag date range

Render Plots

Plotting area

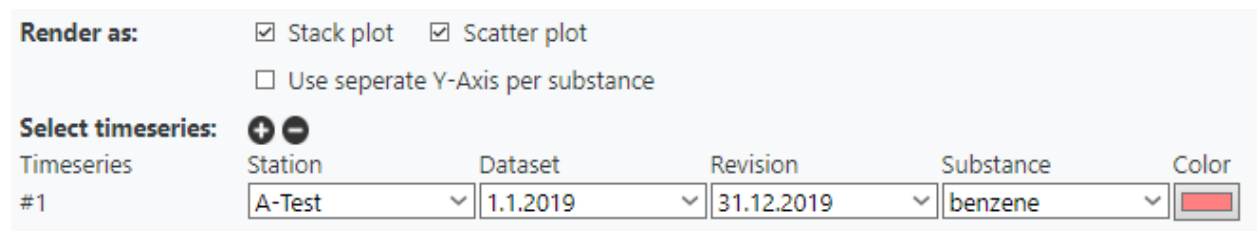
Actions area

We will first focus on the Plotting area

### Plotting area


This area is entirely dedicated to plotting data.

Let us take a closer look:



**Render as:**  Stack plot  Scatter plot  
 Use separate Y-Axis per substance

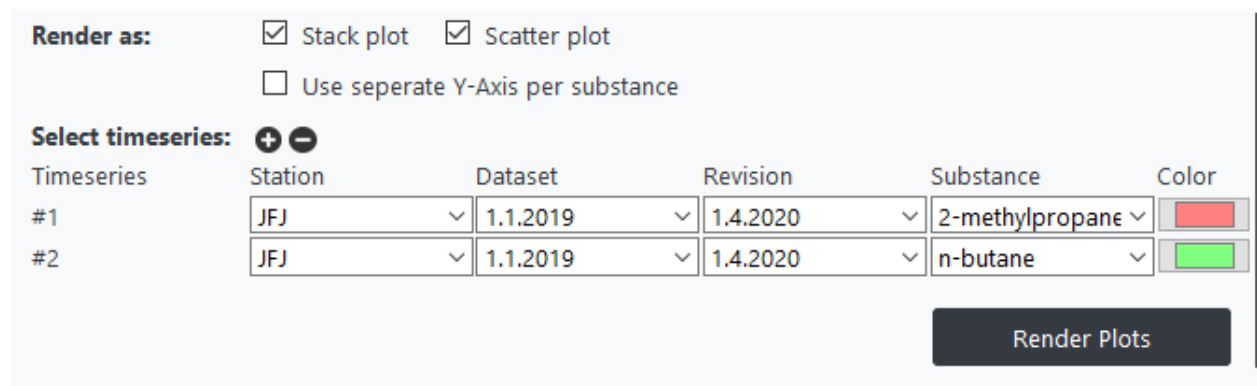
**Select timeseries:** **+** **-**

Timeseries	Station	Dataset	Revision	Substance	Color
#1	A-Test	1.1.2019	31.12.2019	benzene	

In the “**Render as**” section you can define which plot types should be displayed.



The black **plus and minus buttons** are used to add or remove time series from the selection. Generally, performance of the tool should be decent for up to four time series rendered simultaneously. Rendering large numbers of time series at the same time will have a negative impact of your pc / browser.

Press the black plus button once, to get two time series:



**Render as:**  Stack plot  Scatter plot  
 Use separate Y-Axis per substance

**Select timeseries:** **+** **-**

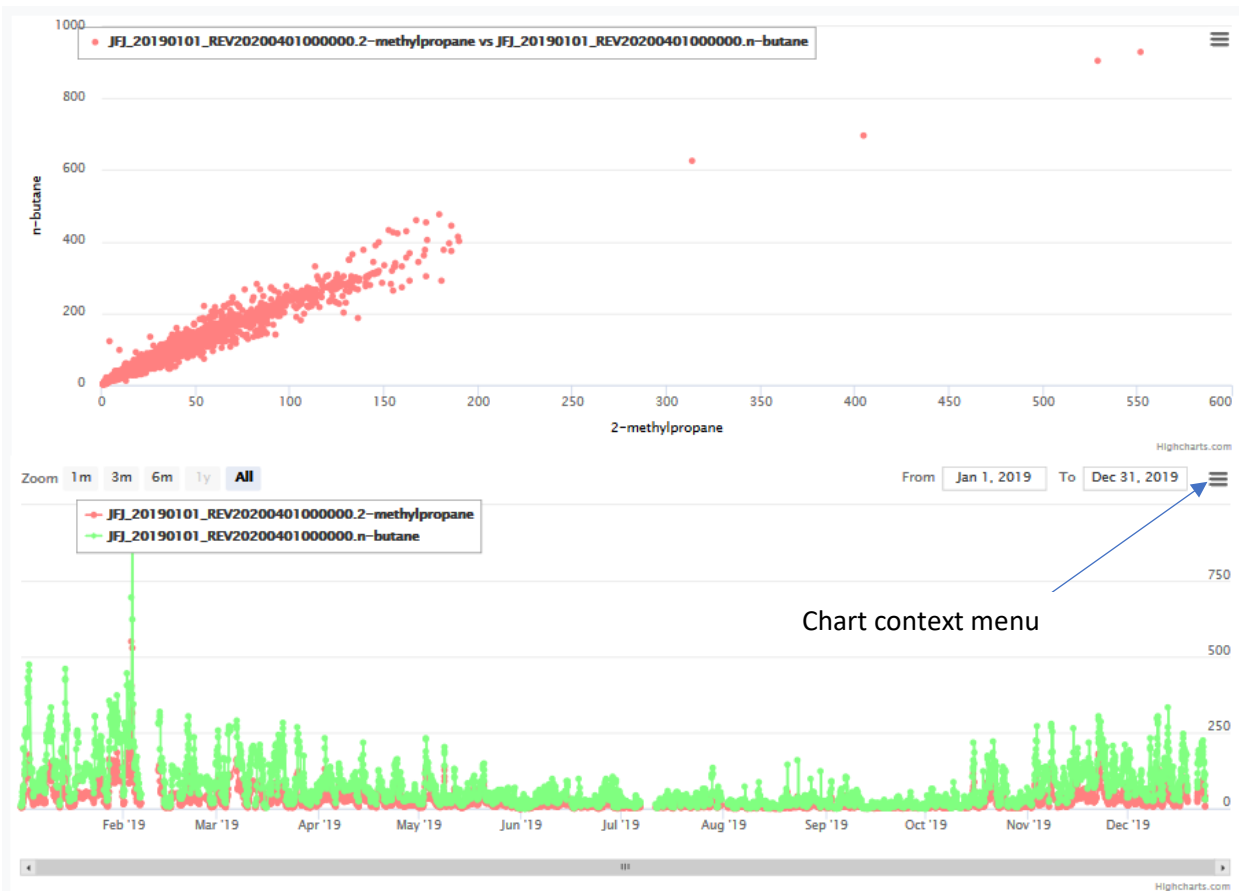
Timeseries	Station	Dataset	Revision	Substance	Color
#1	JFJ	1.1.2019	1.4.2020	2-methylpropane	
#2	JFJ	1.1.2019	1.4.2020	n-butane	

Render Plots

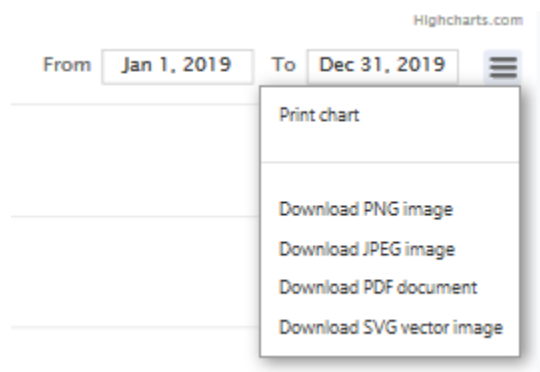
Now select the specific dataset that you want to render / plot and choose what substance(s) you are interested in. The “**Color**” column sets the color that should be used to render the individual time series.

Once the time series is ready to be rendered, simply press "Render Plots". A loading animation will show up and once everything is loaded and rendered the loading animation will disappear.

In this case, both scatter and stack plot were rendered and displayed.

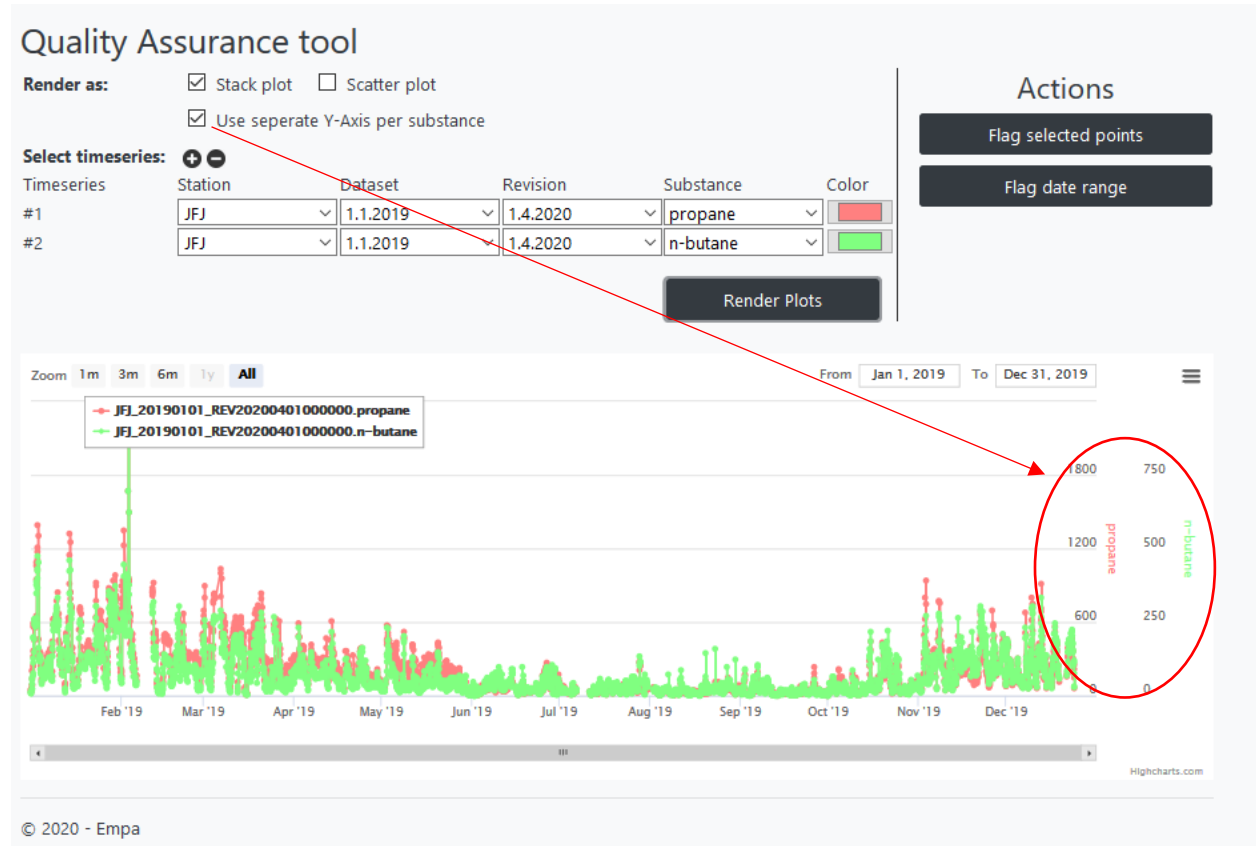


By clicking on the 'Chart context menu' the image can be downloaded in different formats



**Note:** The scatter plot has a few limitations. For example, it can only render data when both time series have the same dimensions (usually meaning are from the same dataset). Further, it will always pick two time series together to be render (meaning it requires an even number of time series selected). If one has selected four time series, it will plot #1 vs #2 and #3 vs #4 and produce two scatter plots. The color is taken from the first time series rendered (#1, #3, ...).

For a better visualization, it is sometimes helpful to have separate y-axis. If you click on 'Use separate Y-axis per substance', and then on render plots, two different Y-axes are displayed.





### Miscellaneous symbols

Colored dot: Valid data with the flag "0".

Big colored dot: Selected data point

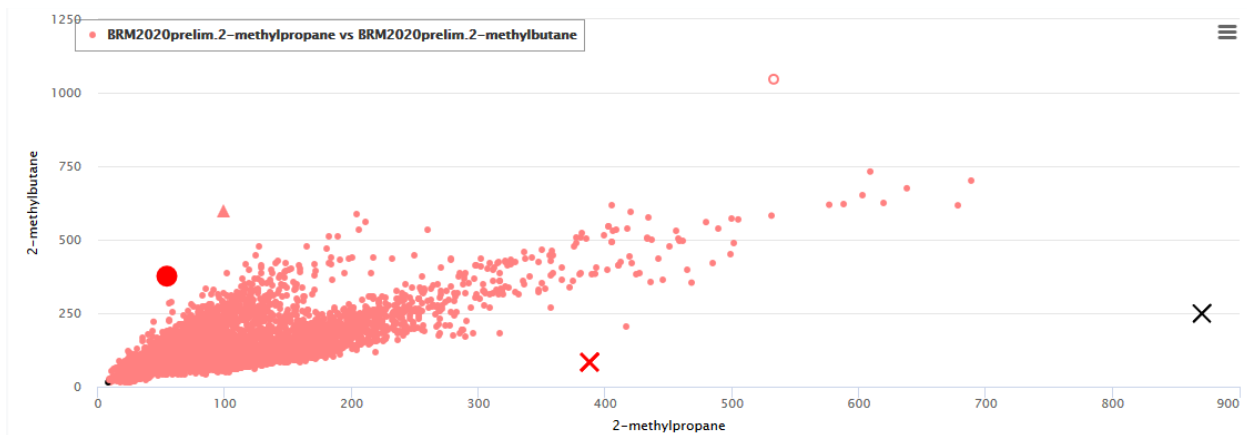
Black dot: Value below detection limit (valid) with the flag "0.147".

Colored triangle: Valid value with a flag (except the 0.147 flag).

Colored cross: data point has to be checked (flagged by the user as 2.000, see "Flag selected points").

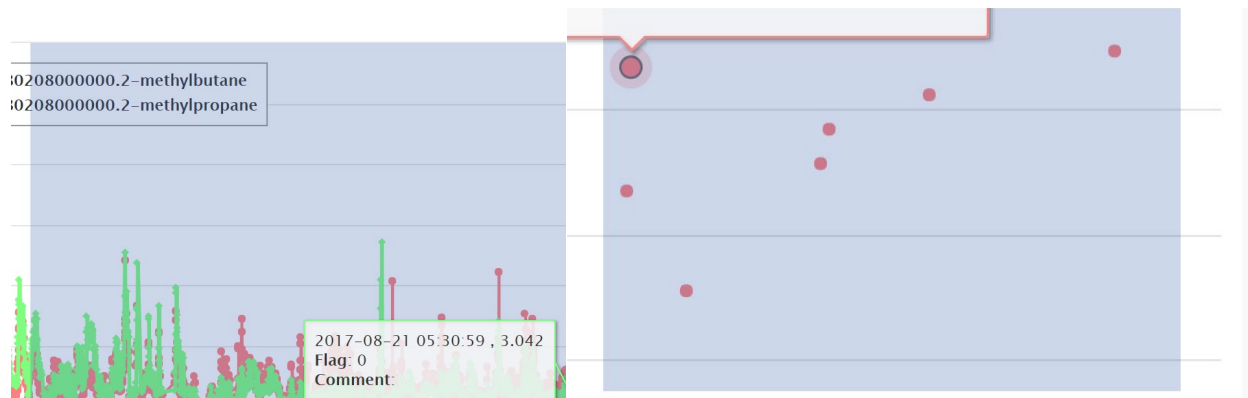
Black cross: Invalid value (flagged by the user as 1.999 see "Flag selected points").

Colored circle: Flagged by the user as 1.000 see "Flag selected points".



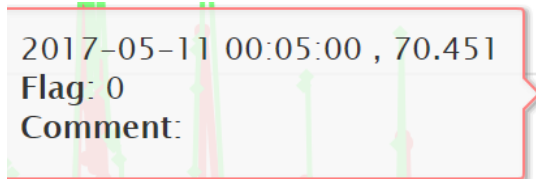
### Zooming

Inside the plot, one can zoom in by holding the left mouse button and selecting the area that he wants to zoom in:



## Tooltips

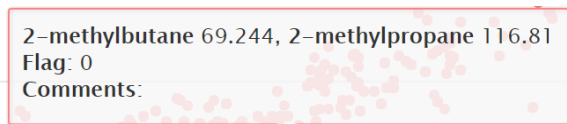
In the stack plot, tooltips are displayed as following:



In the first line the date and value is displayed, then the flag (if any) and the comment. Flagged data will be rendered as an X:



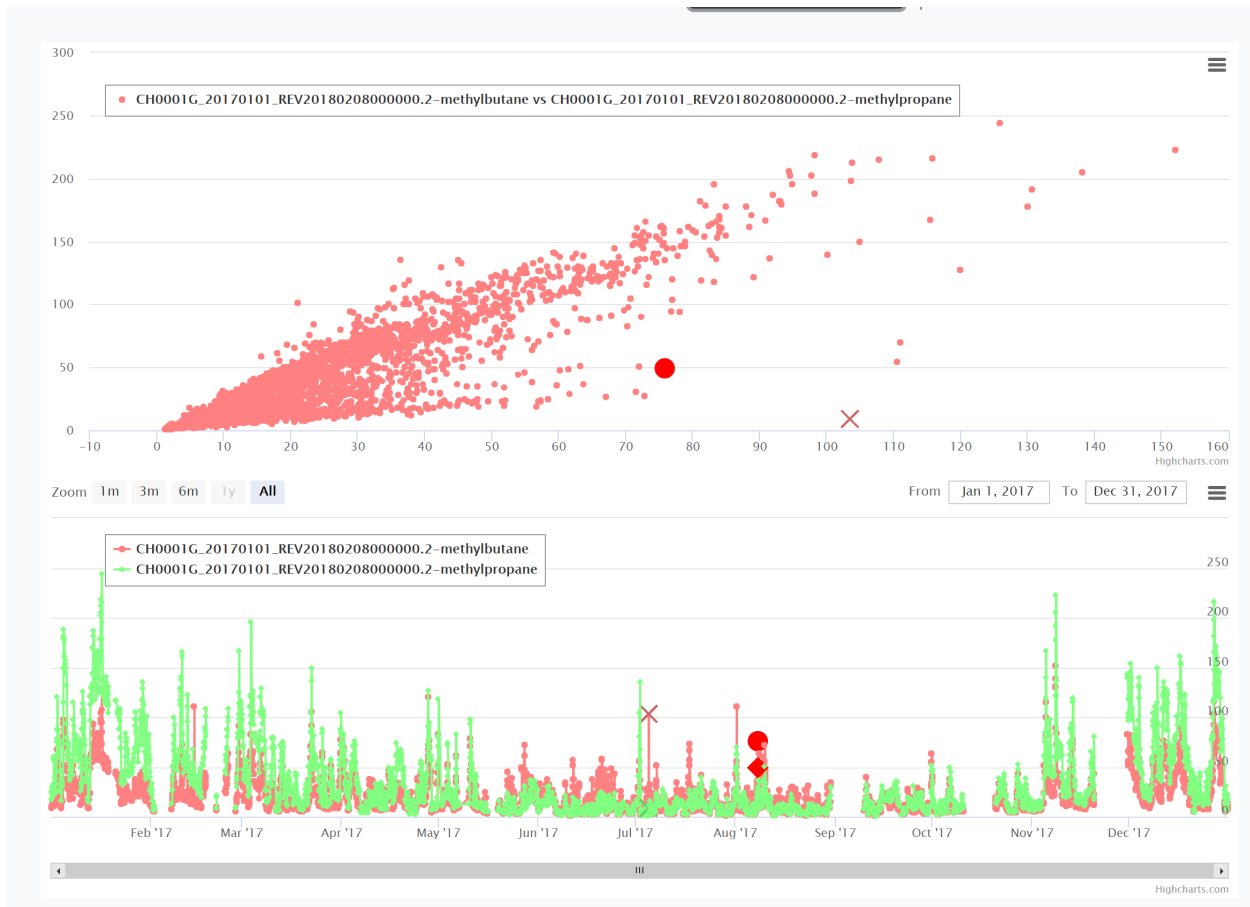
On the scatter plot the tooltip looks a bit different:



It shows us the value of both time series, the flag (if one of the time series is flagged in this point it will display that flag), and the comments (will show comments of both time series ).

## Selecting data

Data points can be selected when clicking on them. Multiple data points can be selected when pressing on them while holding shift. Selected points are synchronized between the plots, which makes it easy to spot for example a certain point in the scatter plot on the stack plot:



## Actions area

The actions area contains two actions:

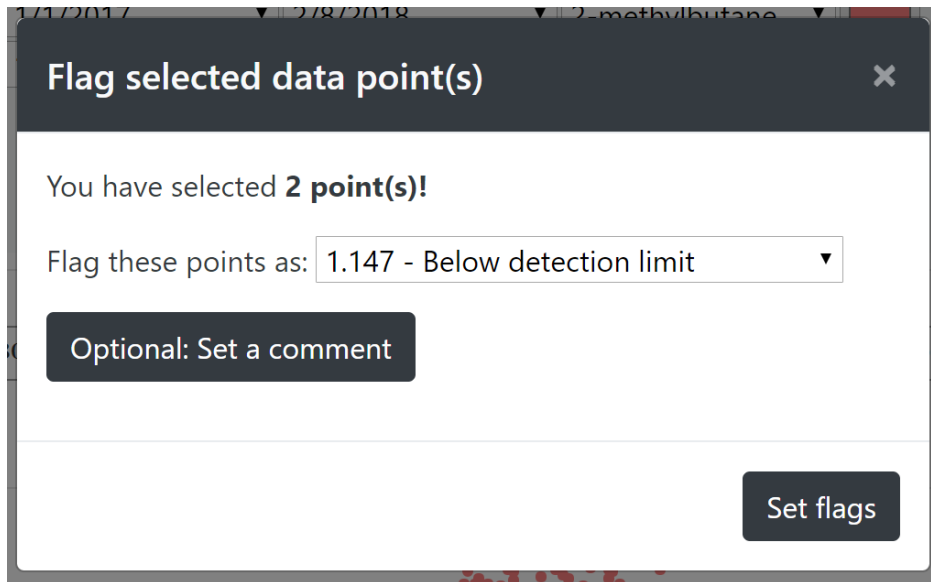
## Actions

Flag selected points

Flag date range

### Flag selected points

This action only works when plots are rendered and at least 1 point is selected in the graphs. If no points are selected, it will display an error message.

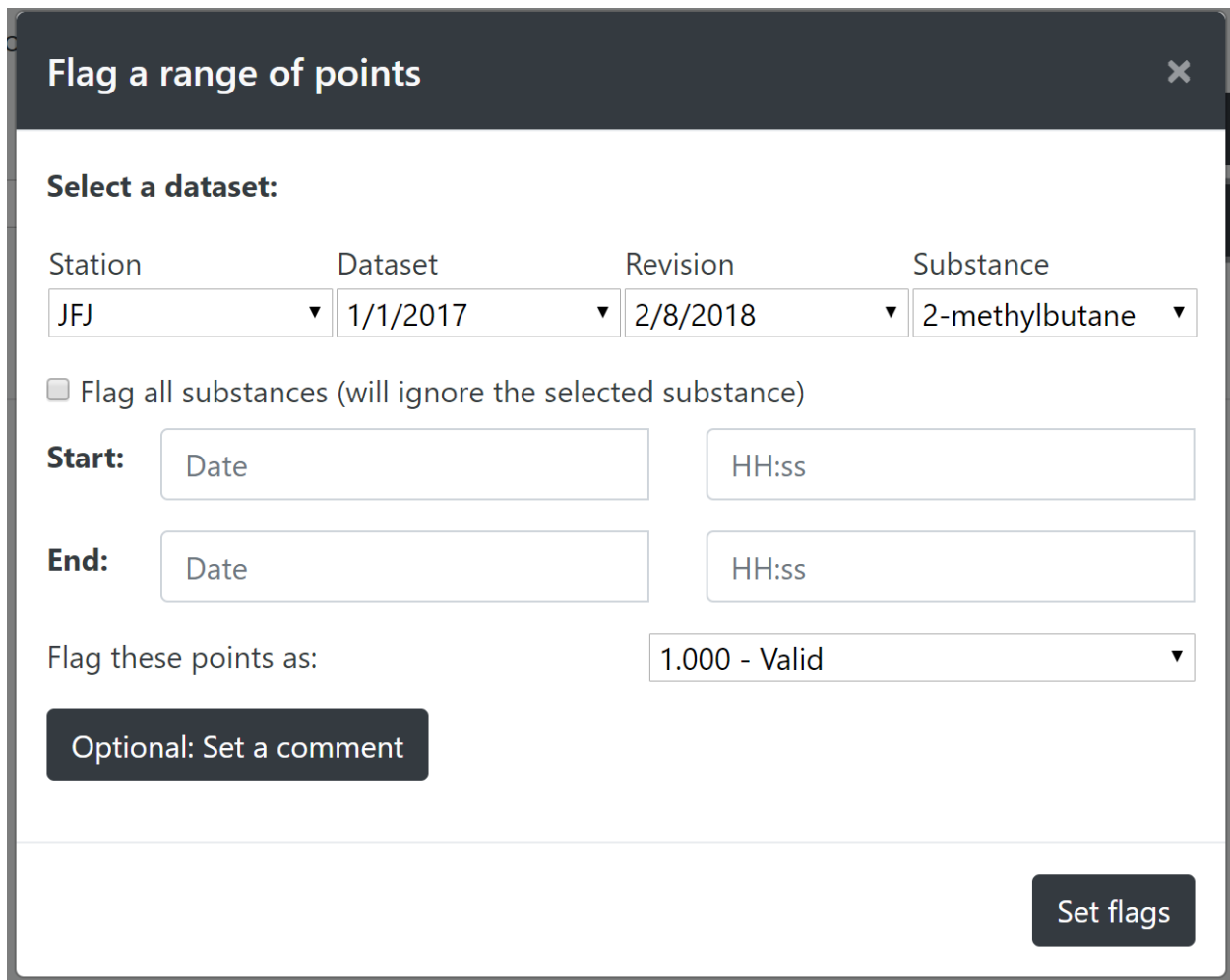


After choosing a flag to set we can optionally set a comment that will be saved on all the selected points. To set a comment simply click on the “Optional: Set a comment” button and a text area will show where you can enter the comment.

**Note** that the flags are between 1.000 and 2.000, this is to allow the code and the users to identify, which data points were flagged by source (flag 0.000 – 0.999) or through the QATool.

## Flag data range

This action can be run / used without any data being rendered or points selected. A click on the “Flag data range” button will open this window:



The dialog box titled "Flag a range of points" contains the following elements:

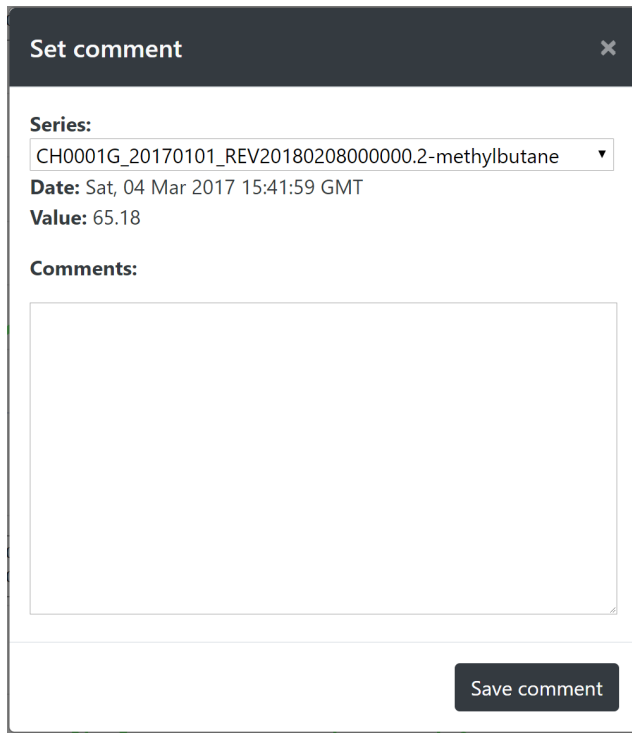
- Select a dataset:** A section with four dropdown menus: Station (JFJ), Dataset (1/1/2017), Revision (2/8/2018), and Substance (2-methylbutane).
- Flag all substances (will ignore the selected substance)
- Start:** Two input fields for Date and HH:ss.
- End:** Two input fields for Date and HH:ss.
- Flag these points as: A dropdown menu showing "1.000 - Valid".
- Optional: Set a comment (A dark button with white text).
- Set flags (A dark button with white text at the bottom right).

At the top, we can select which dataset / substance (or time series) we want to flag the data on. Alternatively, we can check the checkbox “Flag all substances”, which will ignore the selected substance and flag every data point inside that dataset matching the criteria’s. We can define a start and end date time to define the range that should get flagged.

Further, the flag can be selected in the dropdown and like the “flag selected points” dialog an optional comment can be set (which will overwrite any already existing comments).

### Set comment on selected point

A slightly more “hidden” feature is, if one right clicks on a selected point on the rendered plot the following window opens:



**Set comment** [X]

**Series:**  
CH0001G\_20170101\_REV20180208000000.2-methylbutane

**Date:** Sat, 04 Mar 2017 15:41:59 GMT  
**Value:** 65.18

**Comments:**

Save comment

As the title suggest, this is used to set comments on the point we just right clicked on. The dropdown is used when we right click on a point inside the scatter plot. Since in the scatter plot it is unclear which point / time series is meant.

The button “Save comment” will save the entered comment for the chosen point (doesn’t affect the other points, if more than one point is selectable in the dropdown).

## Quick start

Reference station: HPB Change

Station	Dataset	Revision
CVO	1.1.2019	31.3.2020

ethane vs propane

ethane vs n-butane

propane vs n-butane

2-methylpropane vs n-butane

2-methylpropane vs 2-methylbutane

2-methylbutane vs n-pentane

ethene vs propene

ethene vs ethyne

benzene vs ethyne

benzene vs toluene

In "Quick start" you will find preconfigured diagrams. Select the desired station and the revision date. @VOC@ automatically finds the correct graphs from the selected data set. Additionally you can select a reference station. It is recommended to compare the data not only against other stations but also against your own data set from last year. This way you can see immediately if the slope in the XY-plot has changed.

If you click on the desired substance pair you will be forwarded to the QA Tool page. Here you can now edit the data set as described in the chapter QA Tool. When you are done with the substances, you don't have to search for new pairs, just click on Quick Start and select the next substance pair.

### Compare live data

This module is used for quality check of near real-time data. For this special part please read the manual [CSVImport\\_and\\_Compare\\_live\\_data.pdf](#)

### Export Data

In this section you can you can export your data as .csv file or, if you have imported your data in NASA AMES format into the QA tool, export it again.

[CSVImport\\_and\\_Compare\\_live\\_data.pdf](#)

### Import Data

Here you can read a data set into @VOC@. Please read the manual [CSVImport\\_FormatSpecifications.pdf](#)