naneos
particle solutions gmbh

Partector
Data analysis tool

Quick start guide
English

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Introduction

The java data analysis tool for the partector lets you check your partector data files quickly and easily. Partector data files are plain text, tab-delimited files, which can also be imported into any program of your choice (e.g. Excel, Origin, Igor etc), however, the java tool simplifies many common tasks that you typically would want to perform with your partector data, such as averaging and graphing; furthermore, the java tool also allows you to easily combine partector data with GPS data to generate a Google Earth file plotting air quality as function of location.

The java tool works with partector, partector TEM and partector 2 data files. You can also open SMPS files exported from TSI AIM software.

File operations

The most important file operations are accessed by the first five buttons in the toolbar:

The buttons are, from left to right: **open file**, **save file**, **multifile**, **open previous file**, **open next file**.
To open a file, click on the **open** button, and select the file (or multiple files) you wish to view. If you have organized your files in a single folder (recommended), then you can use the "**previous**" and "**next**" buttons to quickly load the other files in that folder.
When you are done checking your data, you can export it with the **save** button; for example you can export averaged data using this option.
If you activate the multifile option (as shown above), any file that you open is added to those previously opened, so that you can either compare data of multiple devices, or look at a time series trend over multiple data files.

Viewing options

The next group of buttons contains the viewing options.

These buttons are, from left to right: **Averaging button**, **Show all button**, **Zoom out button**.

The **averaging** button allows you to quickly average over different pre-defined time intervals: 1s (no averaging), 10s, 1 minute, 10 minutes or 1 hour. The averaging is done either over the data file as it is, i.e. if the data file starts at 13:15, then the first 1-hour average is taken from 13:15—14:15, or, the data can be aligned over the averaging period by selecting "align averaged values" from the options menu. With this option enabled, the tool will use the time from 14:00-15:00 as first averaged data point.

The **show all** button enables you to display all data points in a partector data file for large files. To speed up the program, the java tool displays a maximum of 100'000 data points by default (i.e. just over 1 day of data). In larger files, it will skip data points, e.g. if a file contains 1 million data points, only every 10th data point will be shown in the graph. This is useful because the program will become rather slow when displaying large files, but sometimes, you might want to see something in detail, and for this purpose you can use the **show all** button.

The **Zoom out** button allows you to zoom out to view the entire data set, if you have zoomed in previously. You can zoom in by simply dragging a rectangle on the graph with your mouse to the extents to which you wish to zoom to.

Sometimes, the zoom out option will not zoom out properly. In this case, just switch to a different graph and back, and the zoom should be ok.

Graph options

The next section contains buttons for the different graphs that can be displayed in the java tool:
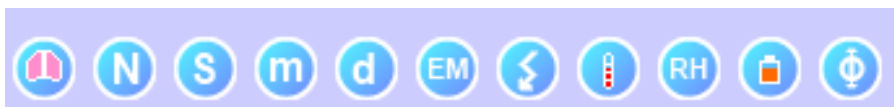
These are, from left to right: **LDSA graph**, **number graph, surface area graph, mass graph, diameter graph**, **electrometer graph**, **corona graph**, **temperature graph**, **humidity graph, battery graph** and **flow graph**

The LDSA graph is the main graph, which displays the lung-deposited surface area – it is displayed when you load a new file. The number,

surface, mass and diameter graphs are only available if you have opened a partector 2 or SMPS data file.

The electrometer graph shows the raw data of the electrometer (or of both electrometers in the partector 2). Pressing the button multiple times will cycle through electrometer raw data and electrometer zero graphs for the partector / partector TEM; if you have opened a partector 2 data file, it will cycle further through electrometer 2 data and zero offset, followed by electrometer amplitudes and electrometer 2/electrometer 1 ratio.

The corona graph displays either the voltage in the corona charger, or the charging current. You can switch between the two views by pressing on the corona button again. Since the corona charger is constantly switching on and off, the values for the on and for the off state of the charger are plotted separately.

The temperature graph shows the internally measured temperature of the instrument. In the partector 2, you can press this button repeatedly to cycly between temperature, ambient pressure and calculated height above sea level graphs. The height above sea level is just an indication of real height, as it is not corrected for barometric pressure variations.

The humidity graph shows the internally measured relative humidity of the instrument. Pressing it multiple times cycles through relative humidity, H_2O partial pressure (absolute humidity) and dewpoint graphs. The battery graph shows the battery voltage.

The flow graph shows a calculated flow in the instrument. There is no physical flow sensor in the partector; and so this value is neither very accurate or calibrated, but can be useful to detect deteriorating pump performance as the pump ages, or a blocked inlet. In the partector 2, there is a flow measurement, so this graph is more accurate for the partector 2.

Combining partector data with GPS tracks

To combine partector data with a GPS track, first open the partector data file as usual. Then, export the GPS track from your GPS device as a .gpx (GPS exchange format) file. Import the .gpx file with the "file – import gpx file..." menu option. The .gpx file will normally use UTC time, and therefore not match the partector time; also, the partector's real time clock is not very accurate. To avoid problems with different time, you can stop the partector measurement and the GPS tracking at the same time, and, when prompted by tha java tool, choose to "align ends of file". Once the .gpx file is imported, choose "File – Export KMZ file..." and select a file to save to. The KMZ file (Google Earth file) is opened automatically.

The options menu

In the options menu, there are three further settings that you can select besides the alignment of averages:
Use time since midnight: When this option is selected, the time column of the exported data file will use seconds since midnight instead of seconds since measurement start time.
Export timestamp: When this option is selected, the first column of the data file will contain a time stamp in addition to the time in seconds.
Export auxiliary data: When this option is selected, auxiliary data will be exported into the data file (temperature, humidity, corona charger data).
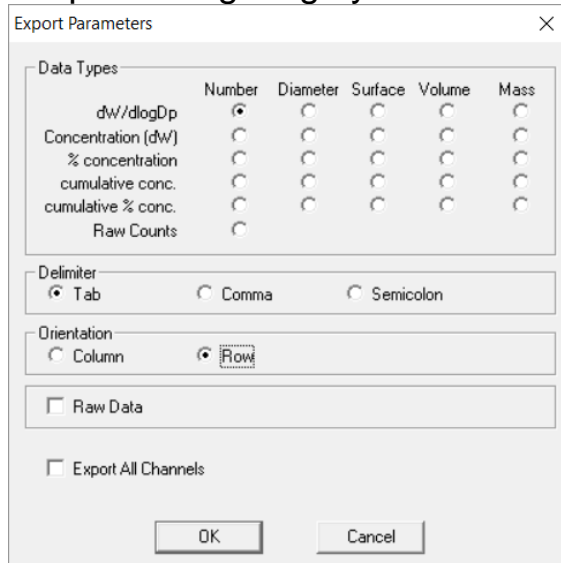
Importing SMPS data

The scanning mobility sizer is the reference instrument for measuring particle size distributions in the submicron size range. You can load data that has been exported by the TSI Aerosol Instrument Manager (AIM) software (version 9, we have not tested with other versioins), so that you can compare your partector data with a reference SMPS. The java tool will calculate the LDSA from the SMPS file (as this is not calculated in the SMPS software).

To look at your SMPS data in our java tool, perform the following steps:
1. IN the AIM software, export the SMPS data by selecting the scans to export in the samples list window (or press ctrl+A to select all), then right-click the samples with the mouse and choose Export.. from the context menu that pops up.
2. In the dialog that opens, change the orientation of the data file from column to row, and leave everything else unchanged, in particular,

keep the weighting by number:

3. Click OK in the above dialog and save the file somewhere where you will find it again
4. Use File->Open in the java tool to open the file you just saved.
5. You can now use the multi-file mode to load your partector data alongside the SMPS data, and also switch to particle number / mass etc. display if desired. Here is an example of how this might look with one SMPS and multiple Partector 2 devices:
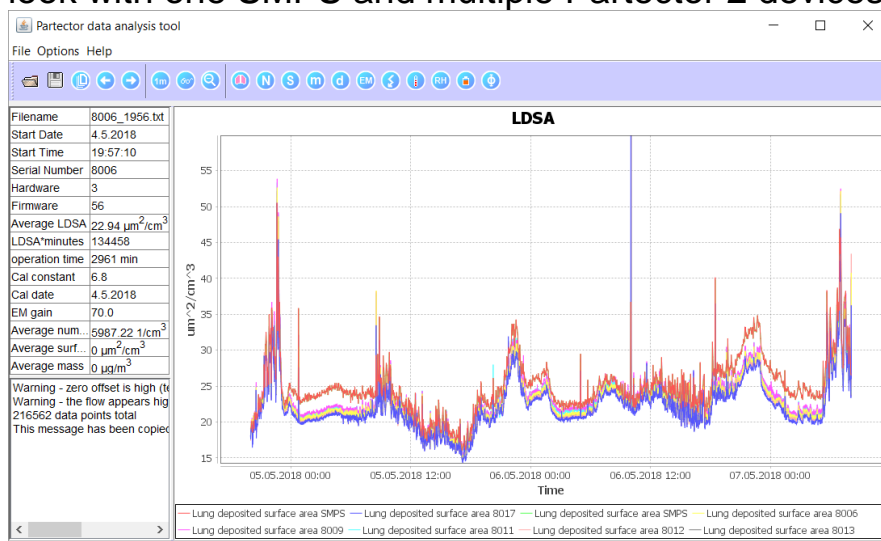
6. Please note that the agreement between SMPS-derived LDSA and Partector LDSA will depend on the size range measured by the SMPS (which depends on flow rates in the DMA and CPC). We usually get quite good agreement, in particular when the SMPS measures about the same size range as the partector 2 (10-300nm).