

# DATASTUDIO 3D

## Post-processing software

Preliminary Edition      5<sup>th</sup> of April 2016

## TABLE OF CONTENT

Introduction .....	4
1.1 About this version.....	4
1.2 What can you do with this version (1.5.3.871) of Aanderaa DataStudio 3D.....	4
Getting started .....	5
2.1 Installation.....	5
2.2 Import a New Data Set .....	5
2.3 Setup before plotting.....	7
Plotting and data analysis .....	11
3.1 Line graph configuration.....	13
3.2 Contour plot configuration .....	15
3.3 Surface plots configuration .....	16
3.4 Scatter plot configuration .....	17
3.5 Configuring Progressive Vector Diagrams (PVD) .....	18
Exporting data to csv and importing into Excel.....	20
4.1 Data Export.....	20
4.2 Data import with Mac .....	21
4.3 Import data into Excel with a PC.....	23
APPENDIX 1: Quality Control and data interpretation .....	24

## Introduction

---

This manual describes the use of the Aanderaa DataStudio 3D software, which is a post processing software intended for quality control, data visualization, analyzing and export of data to other formats.

Aanderaa DataStudio 3D has a modular build-up that makes it possible to add new functions and capabilities in the future.

This software is designed to handle and process data from all newest instrument/data loggers from Aanderaa. At this time the software is intended to be used with the SeaGuardII platform and is the only post-processing software able to handle data from the DCPS, the newest Doppler Current Profiler from Aanderaa.

Aanderaa DataStudio 3D is inspired from the RDCP Studio offering additional capabilities, flexibility with improved graphics and modern design.

### 1.1 About this version

- Version: 1.5.3.871
- Works on: Windows 7, 8 and 10
- Instruments: SeaGuardII DCP, Doppler Current Profiler Sensor, RCM Blue, SmarGuard

### 1.2 What can you do with this version (1.5.3.871) of Aanderaa DataStudio 3D

- Import recorded data from a SD card of SeaGuardII or SmartGuard platform. Data only needs to be imported once as DataStudio 3D will create a project
- List the connected sensor
- Include a detailed map of the deployment site
- Limit the graphical presentations of all the data to periods of interest (e.g. when the instrument was in water/on the bottom). This step is fully reversible and can be changed any time during the data analysis process. When changing the selection in time, all produced data will automatically be updated.
- Limit the graphical presentation of data from the Doppler Current Profiling Sensor (DCPS) to depths sections at which the quality is judged to be good. Changing the selection of cells will also automatically update the concerned produced graphs.
- Produce multiparameter, multiscale and multicolor plots of the recorded data. Different graphical options include: Line, Contour, Progressive Vector, Surface and Scatter plots
- All graphs and settings are saved and can be reopened and modified the next time the software is used
- Easy adjustment of existing plots and graphs
- Export data in csv format for further treatment with other software

# Getting started

---

## 2.1 Installation

From the installation folder (downloaded, on CD/USB) click on **AADI.DataStudio3D** or **setup** and follow the instructions for installing new software on your computer.

Depending on the Windows version you use the software might require download of SQL data base software (free).

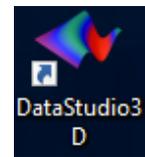
**It is recommended to stay connected to the Internet when the installation is carried out.**

Application Files	2016-03-30 21:43	File folder	
AADI.DataStudio3D	2016-02-19 11:51	Application Manif...	2 KB
setup	2016-02-19 11:51	Application	437 KB

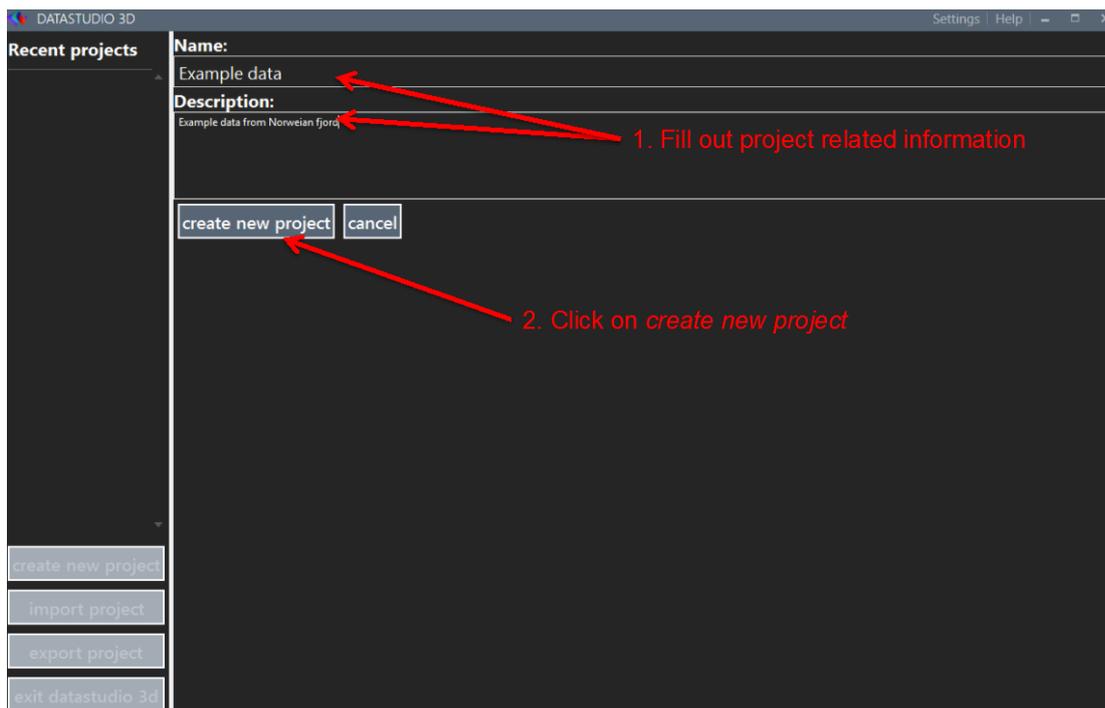
 **Click for installation, leave PC connected to Internet**

## 2.2 Import a New Data Set

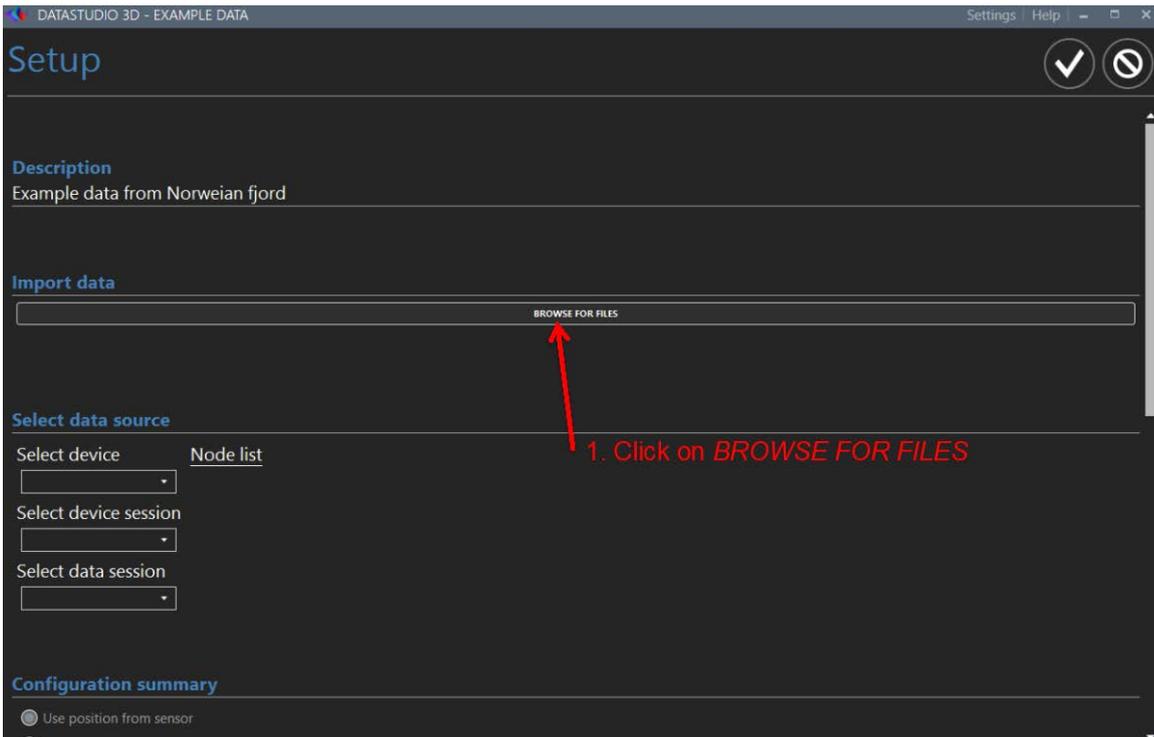
To launch the program double-click on the Datastudio3D symbol in your list of programs or on the shortcut on your desktop.



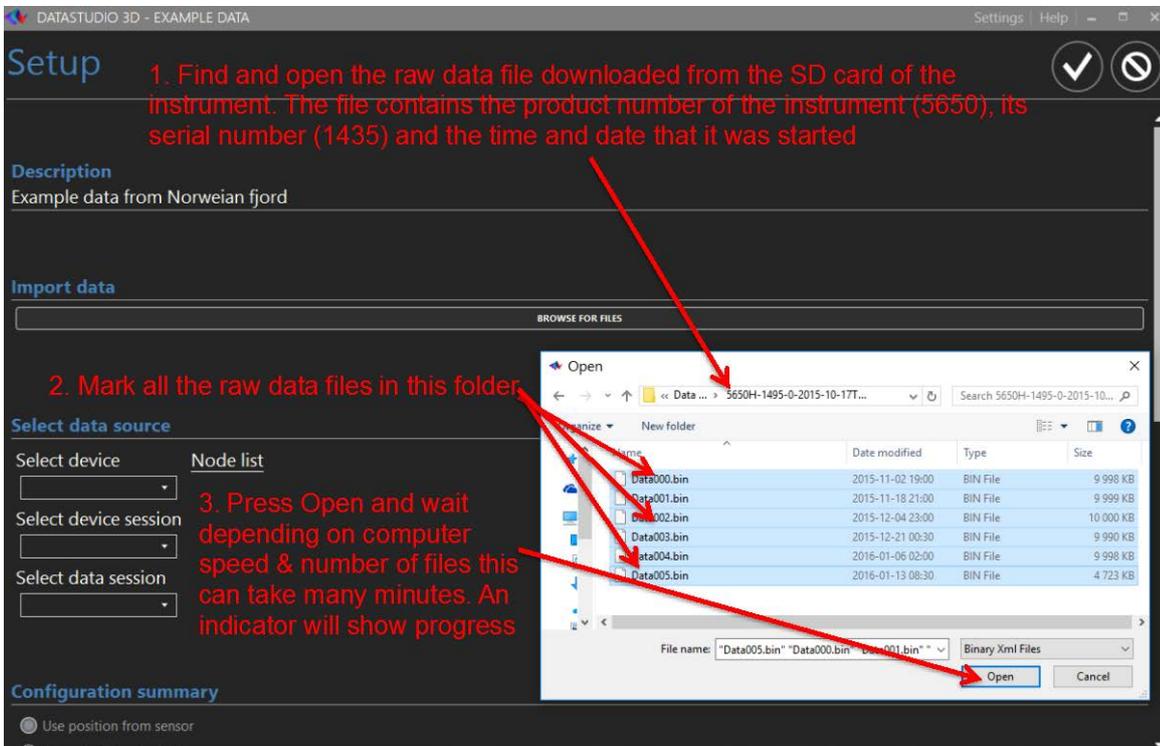
From the start menu click on **create new project** and fill out the name and description (1). Then **click on create new project** (2).



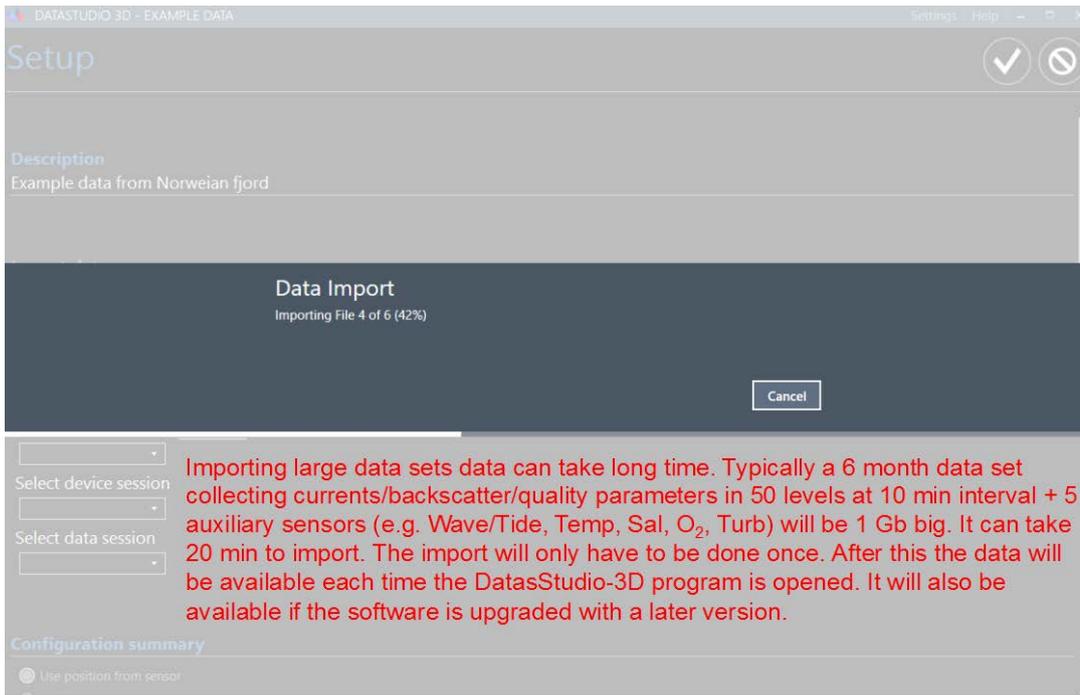
Click on **BROWSE FOR FILES** (1)



**Find and open the raw data folder (1)** that was downloaded from the instrument SD card or from the demo data available under; Documents/Aanderaa/DataStudio3D/TestData. Mark all the raw data files **(2)** and press **Open (3)**.

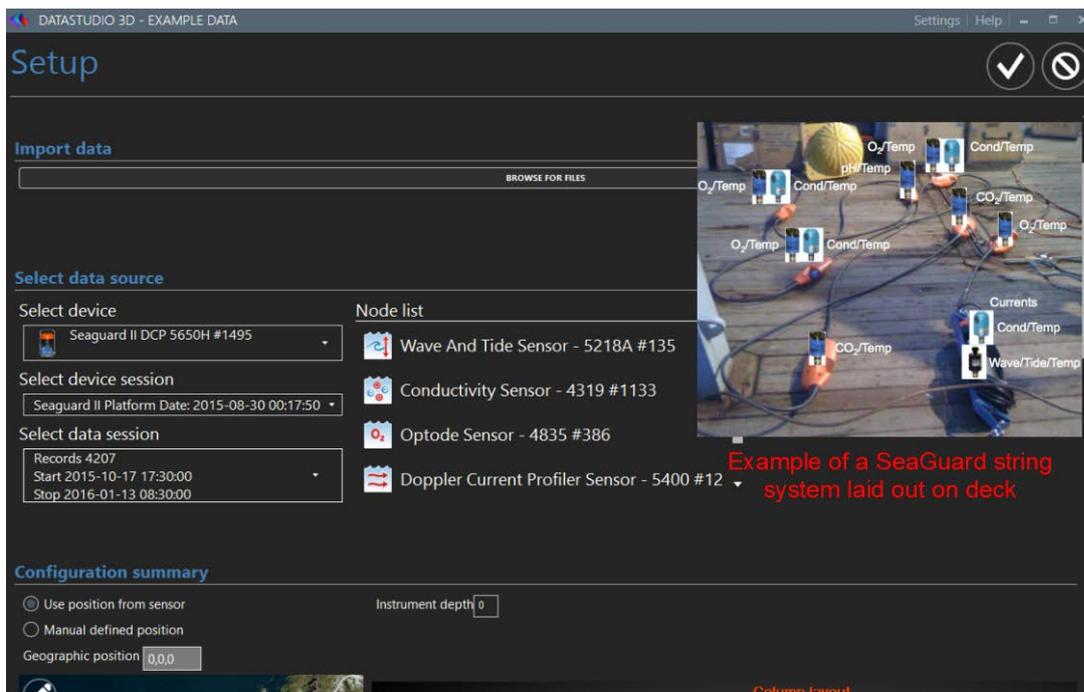


The data will be imported, the progress can be followed on the screen. Large data sets will take time. Data need to be imported only once and will be part of the project.



### 2.3 Setup before plotting

After the data has been imported a summary of the instrument set-up and representative plots will be available by scrolling down. First is the instrument (type, model-and serial number), the list of connected sensors/nodes (type, model- and serial number). Note that Aanderaa platforms are multi-parameter and numerous sensors can be plug-and-play connected (e.g. strings). **Scroll down the Node list** to see all the active sensors.



**Scroll down to see Doppler Current Profiler Sensor set-up and to obtain/add geographical position and/or depth (1,2).** If you had entered the geographical position into the instrument before deployment it will be available for use or you can click and scroll up/down to zoom in/out in the map and select the correct position manually. Please note that to have access to high resolution map the computer should be connected to Internet.

Depth can be obtained by looking at the deployment pressure or by finding the reflexion from the surface if the instrument is upward looking.

1. Geographic position (Lat, Long comma separated): defined when setting up instrument or manually here. Negative values for south of equator & west of Greenwich. Click on pen then position can be "zoomed in" by scrolling in the map (if connected to internet). Marker placed by clicking at the desired location (see next slide).

2. Depth entered manually

3. Graphics provide an overview of the DCPS settings, ref DCPS manual for info on how to program

Upward looking DCPS

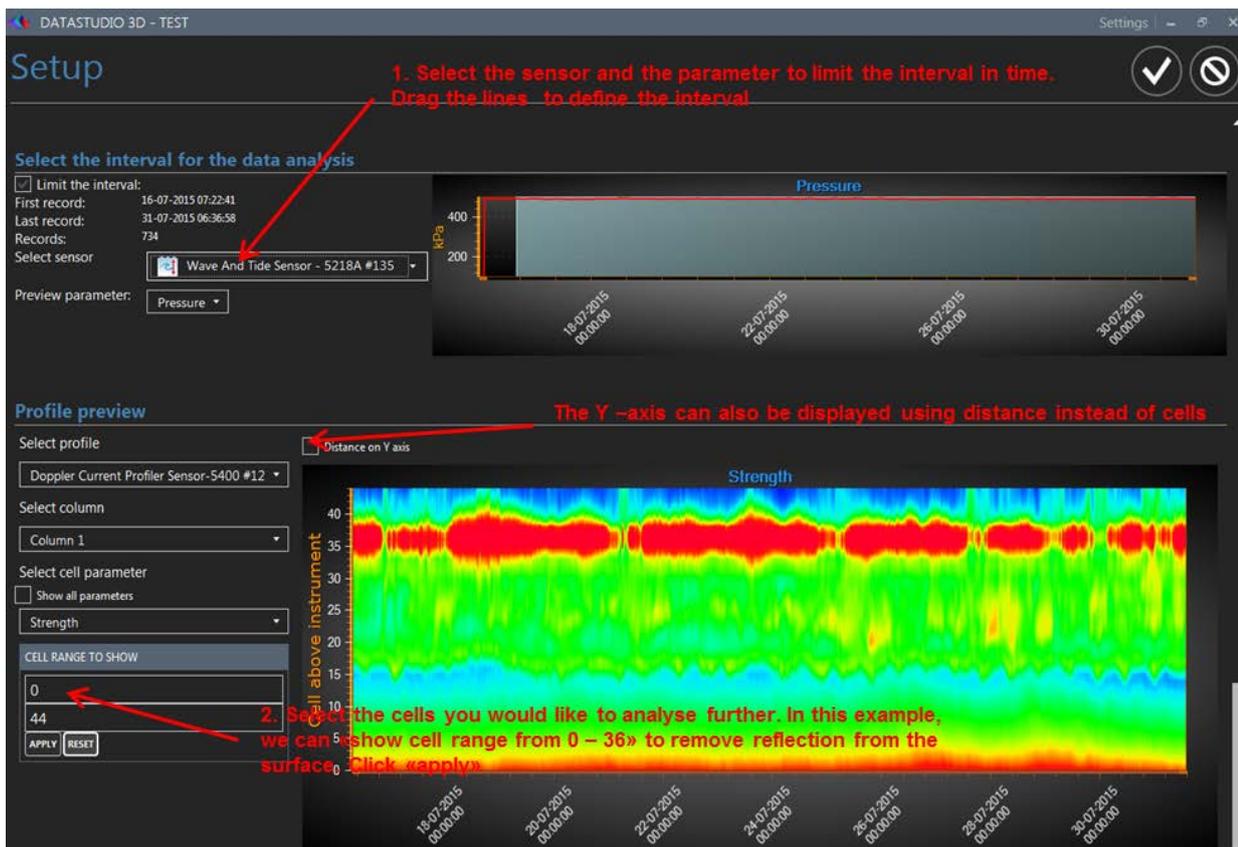
The screenshot shows the 'Setup' window for 'EXAMPLE DATA'. Under 'Configuration summary', 'Manual defined position' is selected. The geographic position is set to 58,229450,8954,11,5746194909835,0. The instrument depth is manually set to 40. A map on the left shows a location in the North Sea. On the right, a 'Column layout' graph shows the instrument at the surface and a column extending to 45 meters depth. The graph includes parameters: 45 Cells, 2 m cell size, 50 % cell overlap, and 2 m distance to column.

Downward looking DCPS

The screenshot shows the 'Setup' window for 'DOVER'. Under 'Configuration summary', 'Manual defined position' is selected. The geographic position is set to 50,4587949563758,0,0341796874999822,0. The instrument depth is manually set to 0. A map on the left shows a location in the English Channel. On the right, a 'Column layout' graph shows the instrument at the surface and a column extending to 20 meters depth. The graph includes parameters: 10 Cells, 2 m cell size, 0 % cell overlap, and 1 m distance to column.

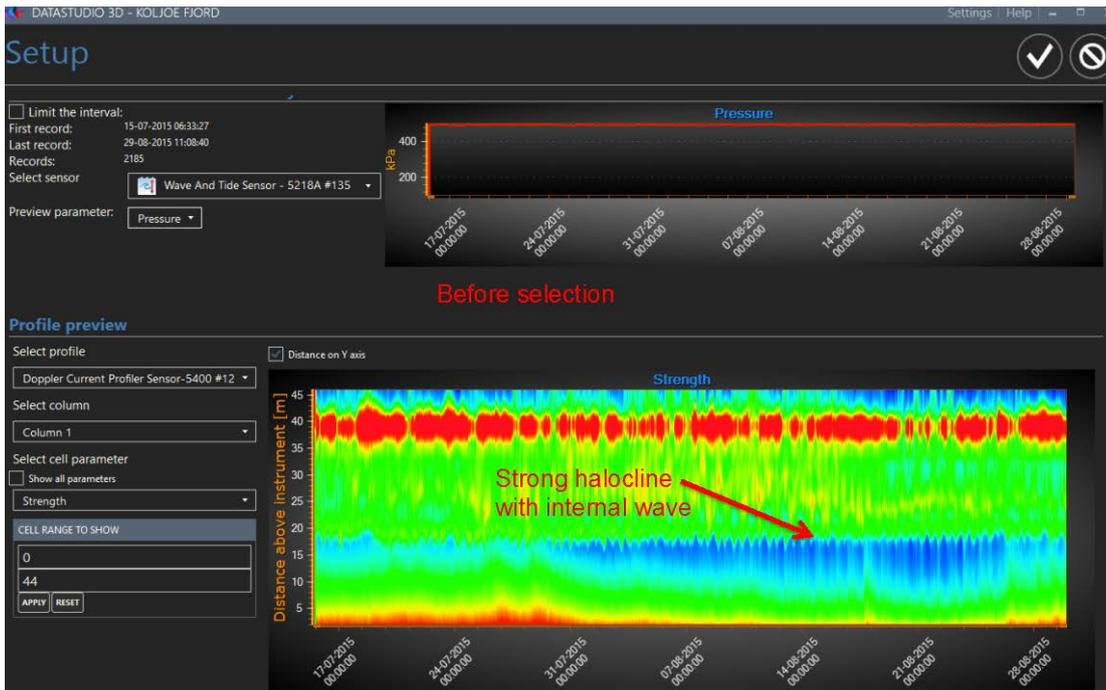
**Scroll further down to the bottom of the page.** A two-step graphical selection is done of which data should be included in graphs and for data export. **Note that this step is fully reversible and the unused data will not be erased.** (1) Make a selection in time based on available data from the instrument as for i.e. Cond, Temp or Pressure data. Click in the figure and drag the shaded marking/lines.

For the profile preview; As default Speed, Signal Strength and/or Speed Standard Deviation is used to select which acoustic profiling data (from the DCPS sensor) should be included (2) by selecting the cell to show further.

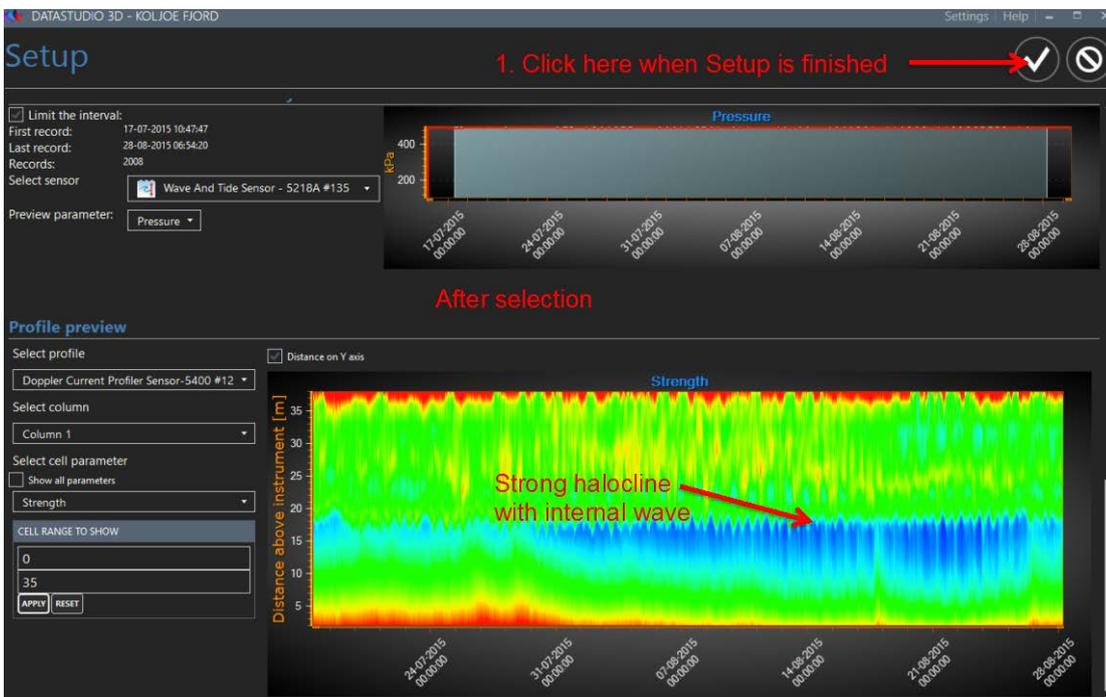


Press ✓ on the right top corner when Setup is finished.

In the example below Pressure and Signal Strength are used as the two criteria to limit the selection of data to be used in the graphical presentations.

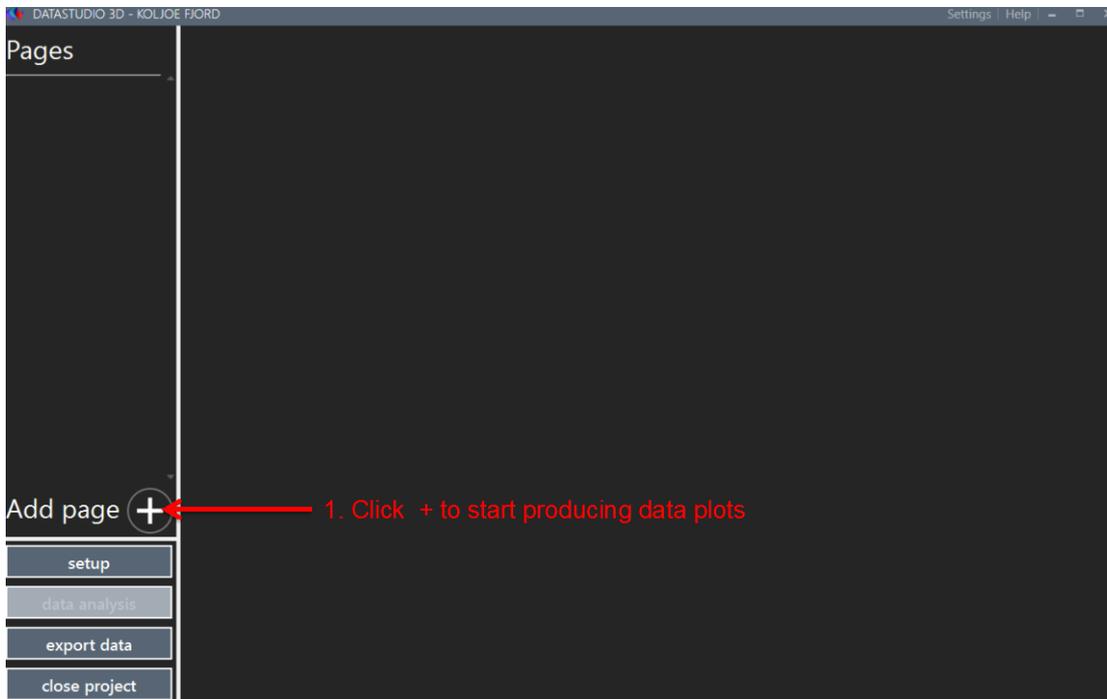


The selected settings will be applied and remembered for the further analysis of the data set. You can always go back and modify the set-up. After saving the Setup you will be directed to a page in which you can start to make graphical presentations or export data.

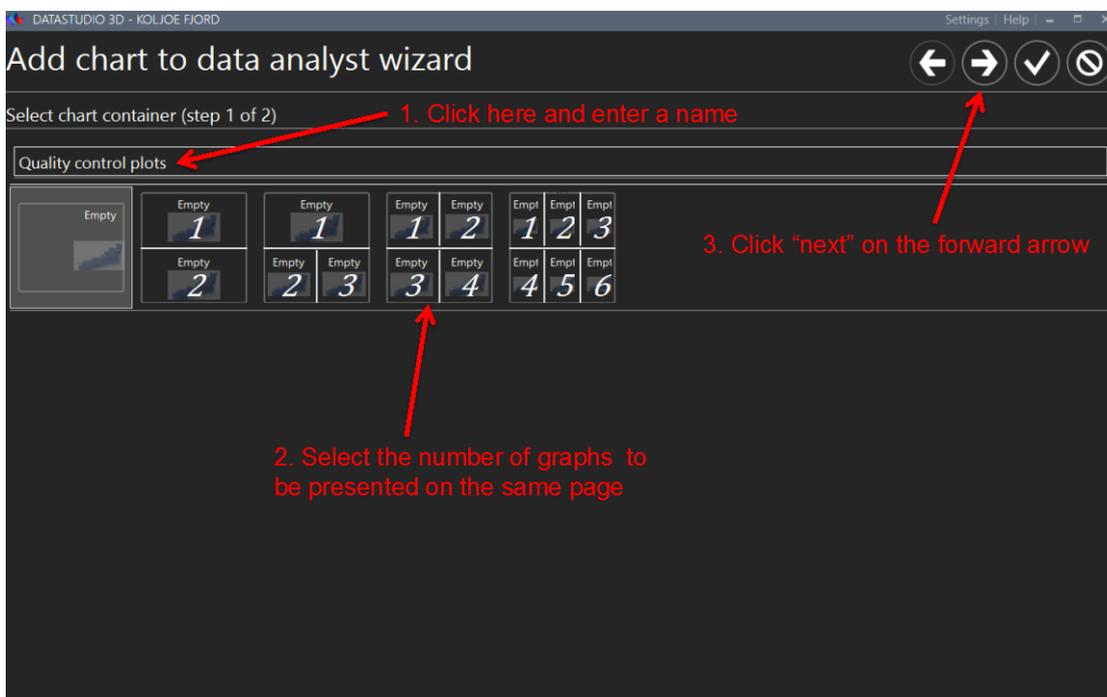


## Plotting and data analysis

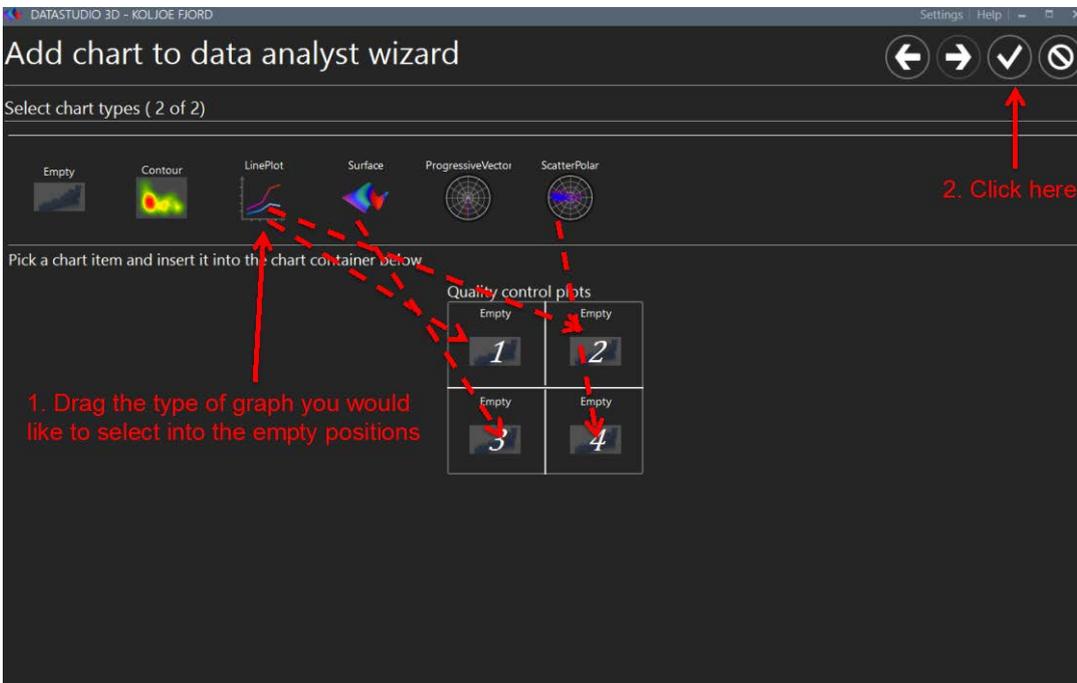
Click **Add page + (1)** to start making plots.



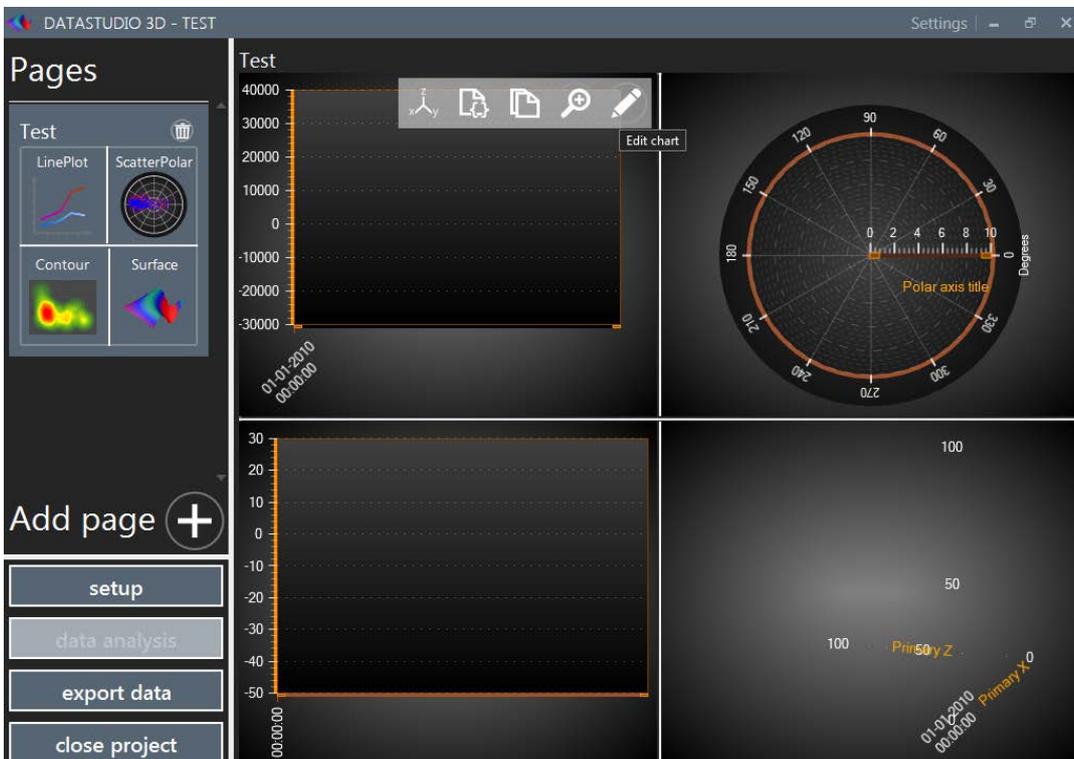
You can now select the number of graphs to be presented on the same page. **Give the new page a name (1).** **Click to select the number of graphs (2).** **Click on the forward arrow (3).**



You have 5 different graph options (Contour, Line, Surface, Progressive Vector and ScatterPolar). **Drag the type of graph you would like to have into empty slots (1). Press ✓ (2) when finished.**



All graphs are configured in the same way by holding the cursor above the graph.



5 options appear:

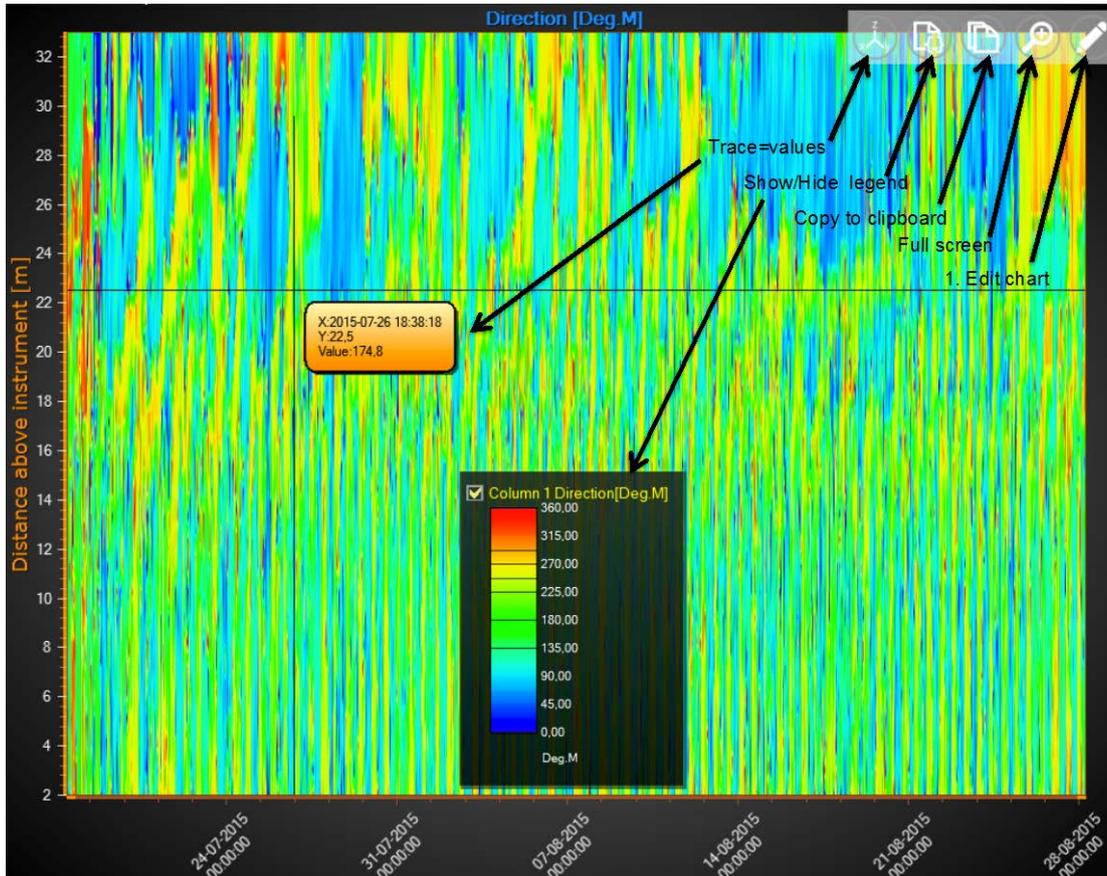
**Trace**=lists values and permits to scroll over plots and line graphs to see individual values (see below),

**Show/Hide legend,**

**Copy to clipboard** for pasting into documents as a picture,

**Full screen** and

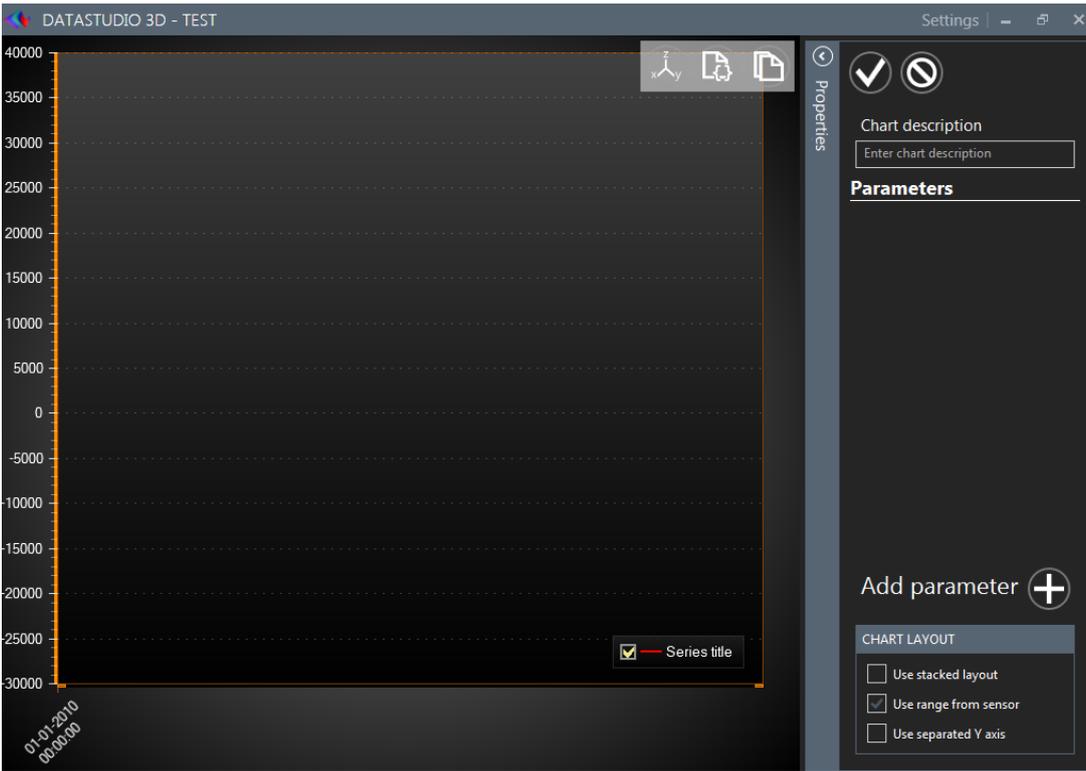
**Edit Chart** (the pen) to edit the Chart settings (see below for detailed instructions on how to set-up the different graphs).



For all graphics type; To zoom in the graph, place the cursor on the graph, click left on the mouse while dragging down to the right. To zoom out, click left while dragging up to the left.

### 3.1 Line graph configuration

Once you have selected the line graph in your page configuration, click on the pen to edit the chart:



You can visualize from one to ten parameters on one chart; follow the steps below to create your chart.

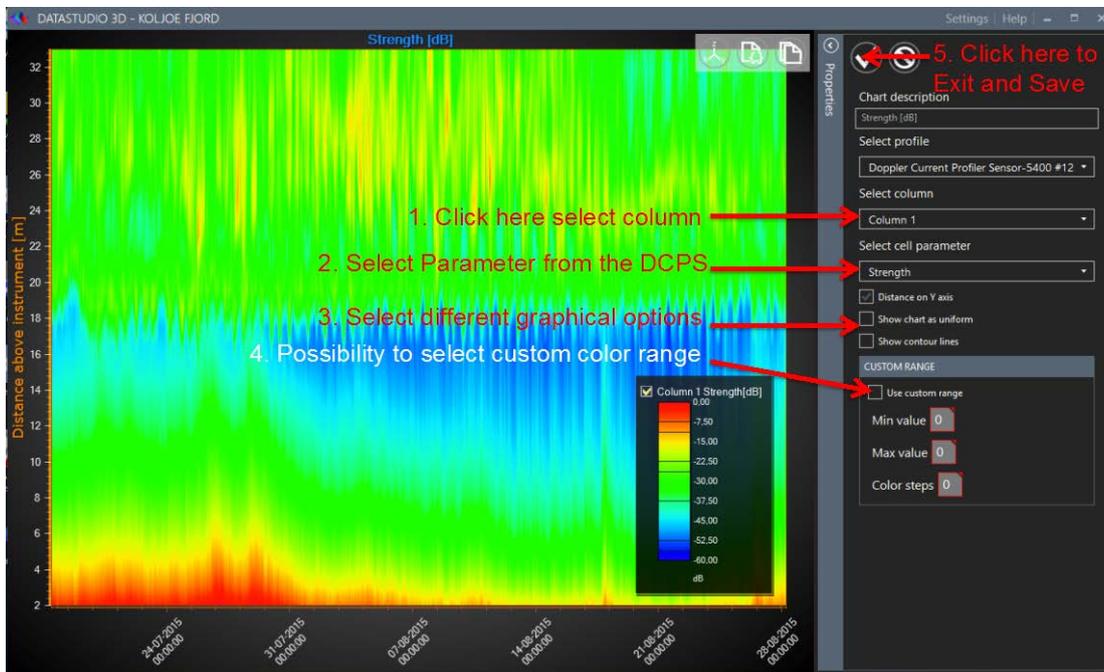


Below is an example of a full screen copy of a Line graph with the Trace function active. Use “Copy graph to Clipboard” symbol and paste into desired document if needed.

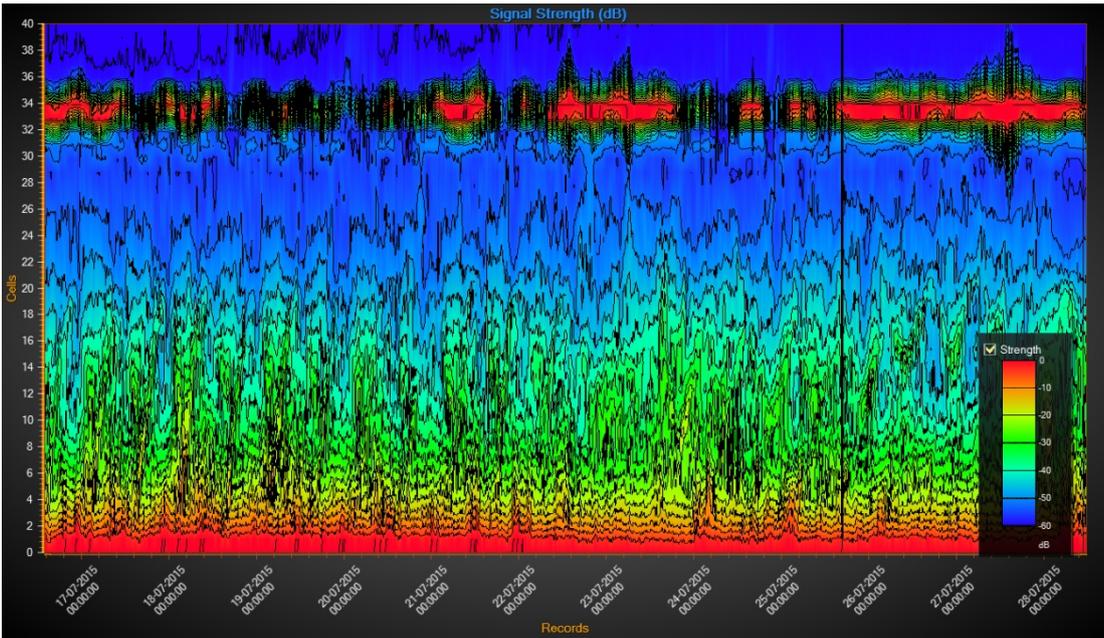


### 3.2 Contour plot configuration

Contour plots are available for multilevel data as from the Doppler Current Profiler Sensor (DCPS). Follow the steps as shows below to create your contour plot chart:



Below is an example of a full screen copy of a Contour plot selecting the option “Show contour lines”. Use “Copy graph to Clipboard” symbol and paste into desired document.

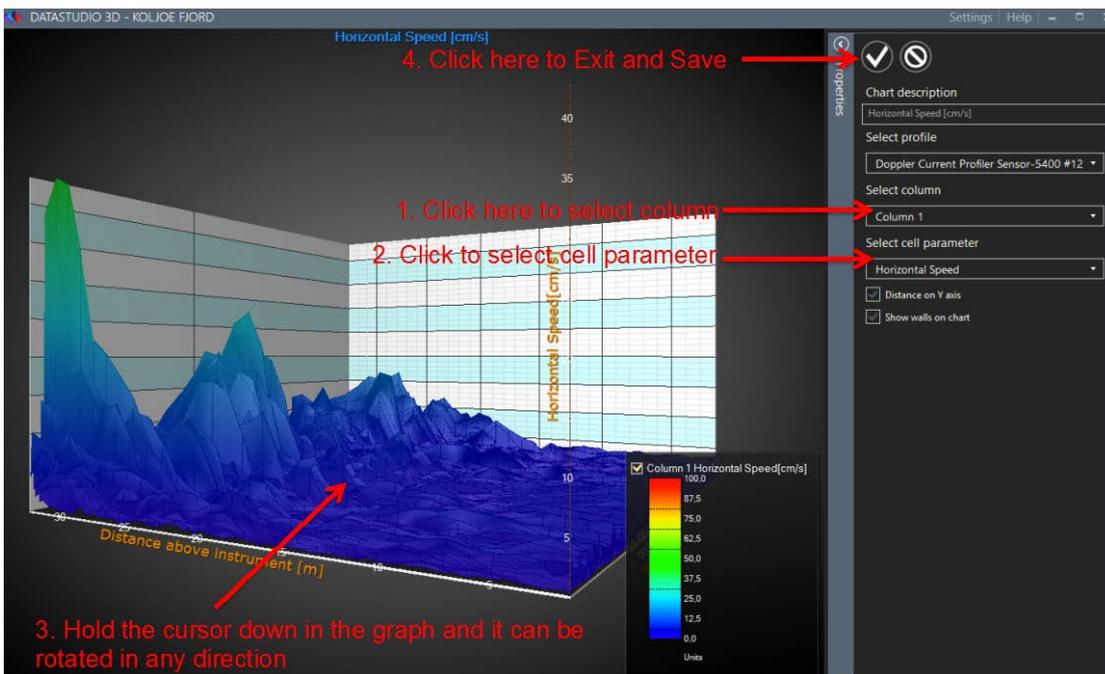


### 3.3 Surface plots configuration

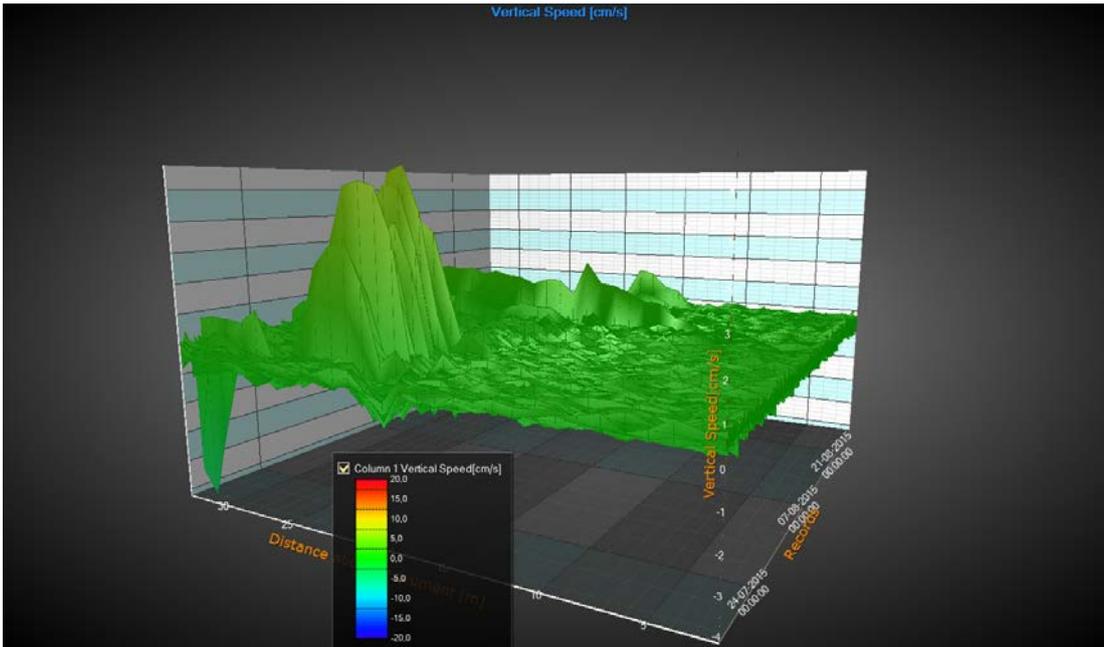
Surface plot is used to get a 3D overview of the multilevel data from the Doppler Current Profiler Sensor (DCPS).

By holding the cursor down in the graph it can be rotated in space. These graphs cannot be zoomed.

To create a surface plot:



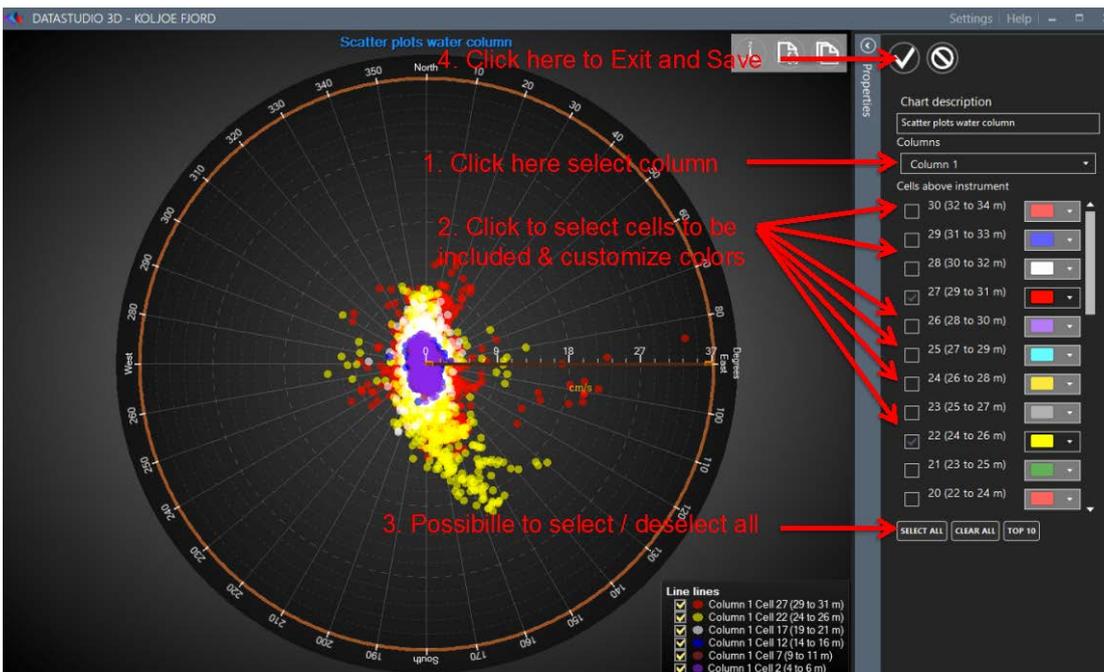
Below is an example of a full screen copy of a Surface plot of vertical currents. Use “Copy graph to Clipboard” symbol and paste into the desired document.



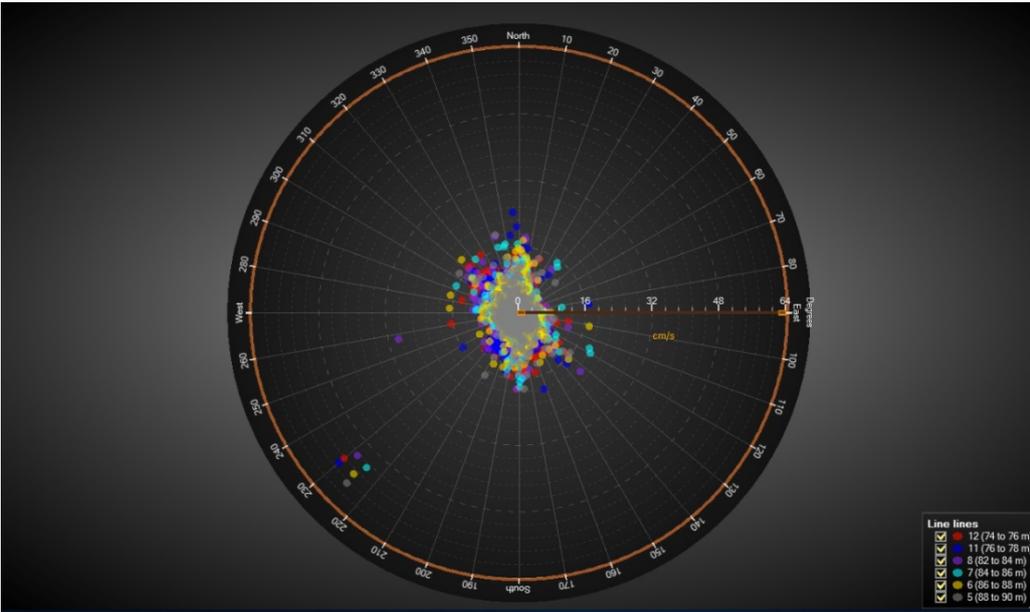
### 3.4 Scatter plot configuration

Scatter plots are available for multilevel current speed and direction data from the Doppler Current Profiler Sensor (DCPS). Each dot is a unique measurement in time of currents speed and direction. These plots can be a useful step in the quality control. Unless measuring in a river with a constant flow in one direction the plot should “pass through” the middle (origin).

To create a scatter plot:



Below is an example of a full screen copy of Scatter plot. Use “Copy graph to Clipboard” and paste into desired document.

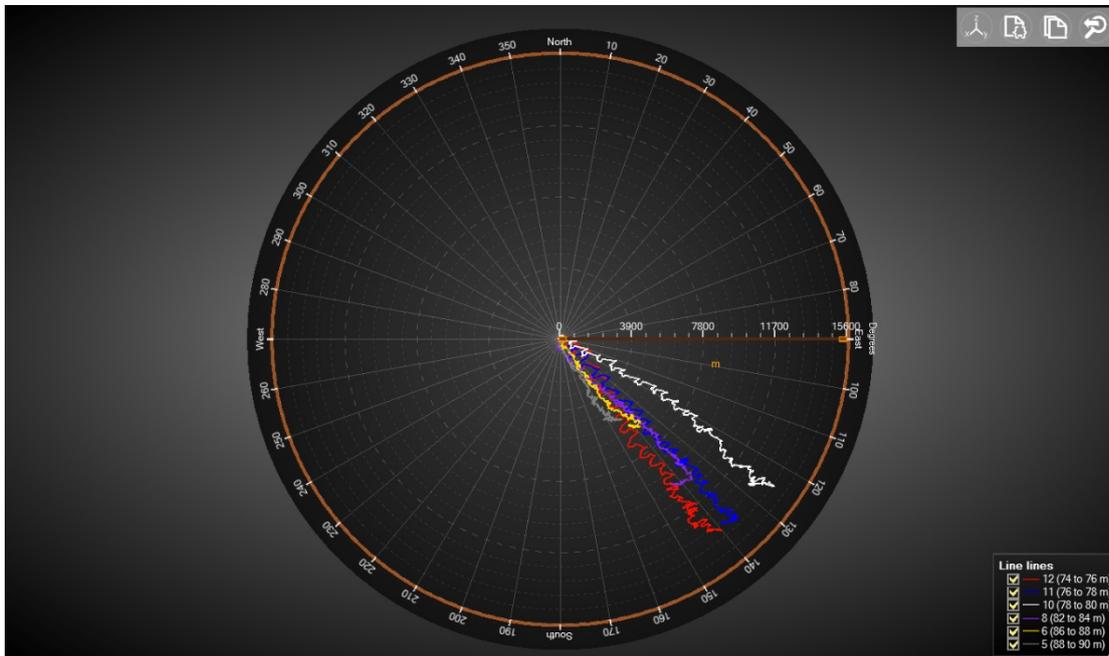


### 3.5 Configuring Progressive Vector Diagrams (PVD)

Progressive Vector Diagrams are available for multilevel current speed and direction data from the Doppler Current Profiler Sensor (DCPS). Each line is a consecutive continuation of a unique speed and direction measurement. The PVD shows how water has been flowing past the instrument. If the site is influenced by tidal movements these are often visible as ellipses.

To create a PVD plot:

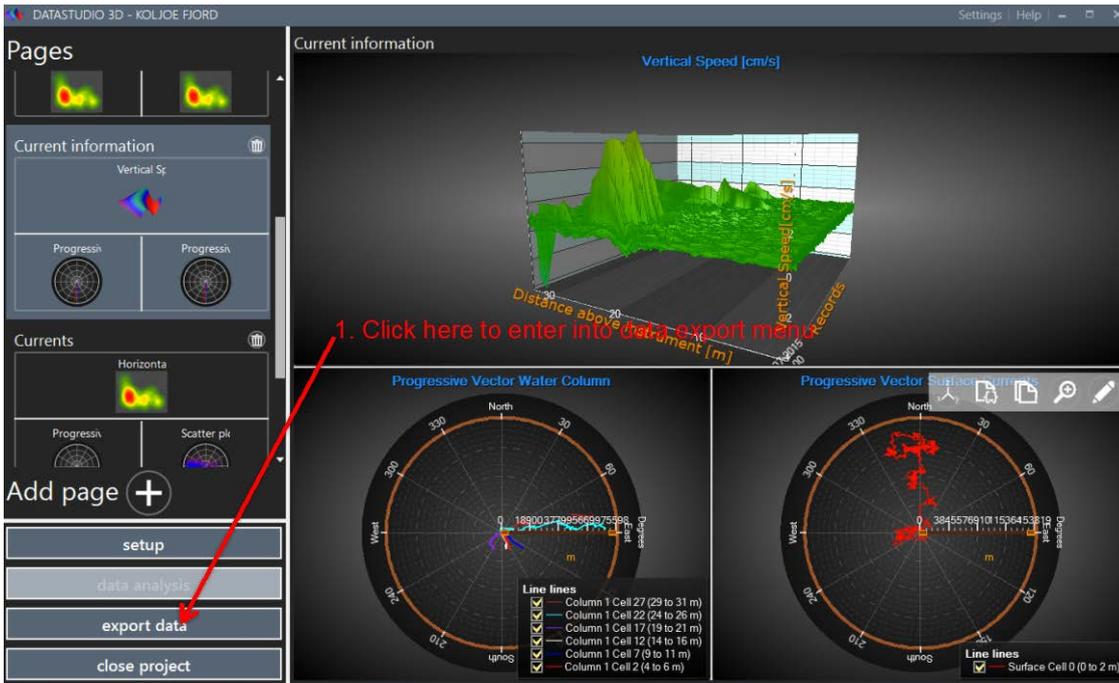
Below is an example of a full screen copy of Scatter plot. Use “Copy graph to Clipboard” and paste into desired document.



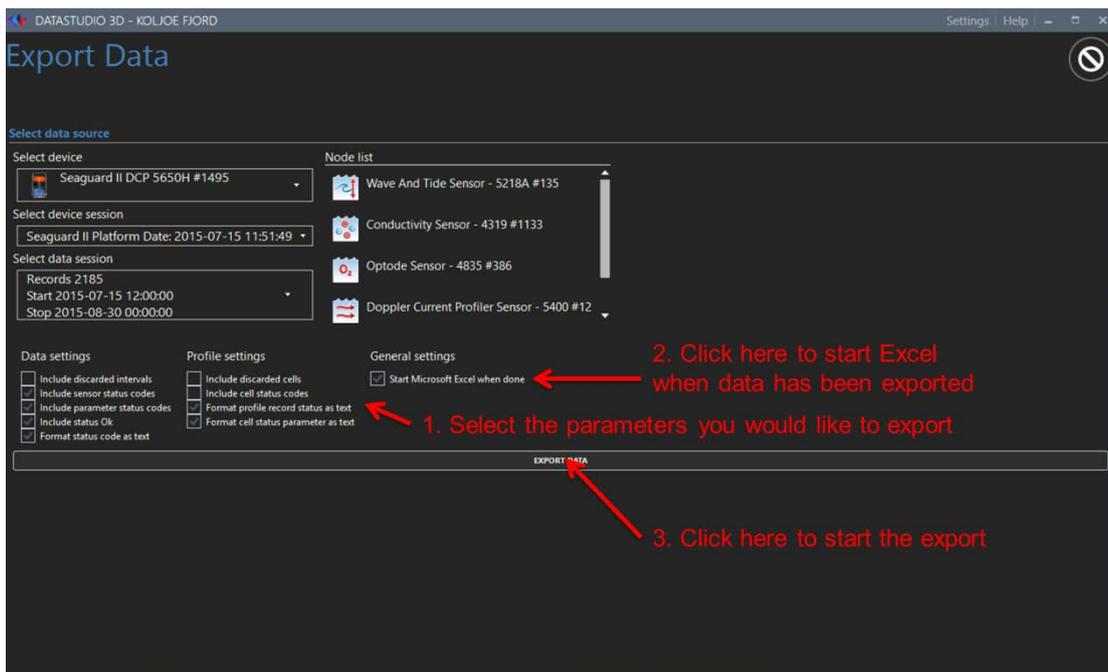
# Exporting data to csv and importing into Excel

## 4.1 Data Export

Data can be exported for use by other software. The exporting format is semicolon separated csv. From main data page **Click on export data (1).**



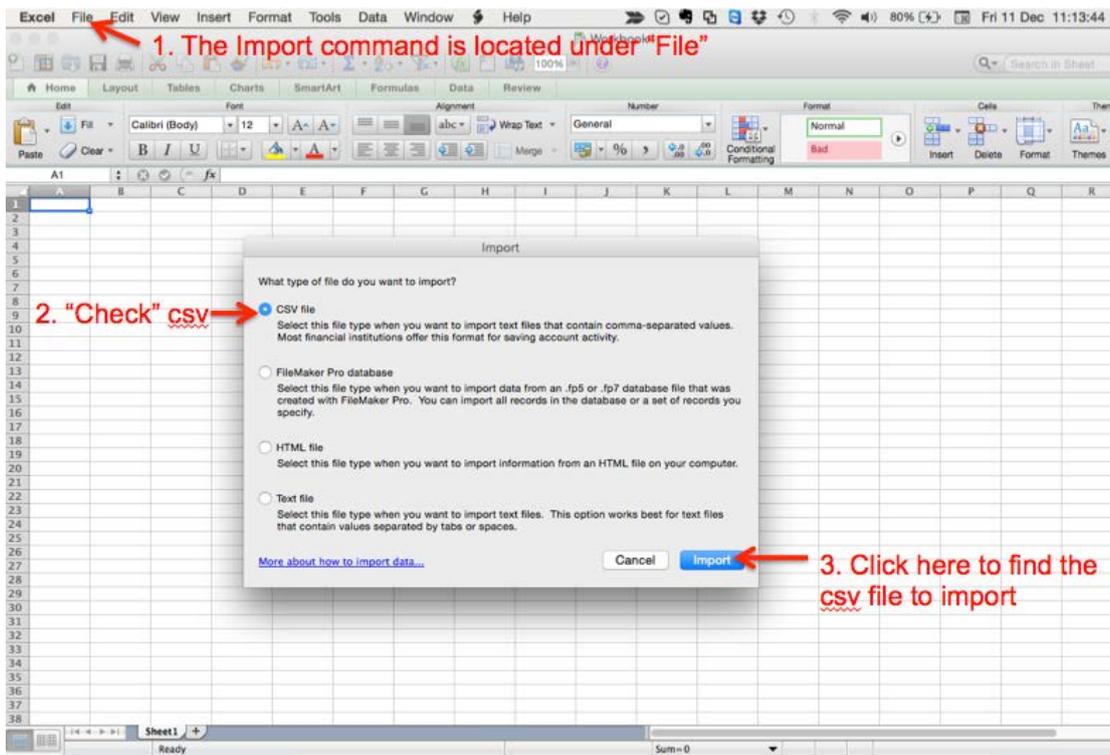
From the export menu select what you would like to export and click export. In the export menu, you can select or not status code, discarded cells, etc:



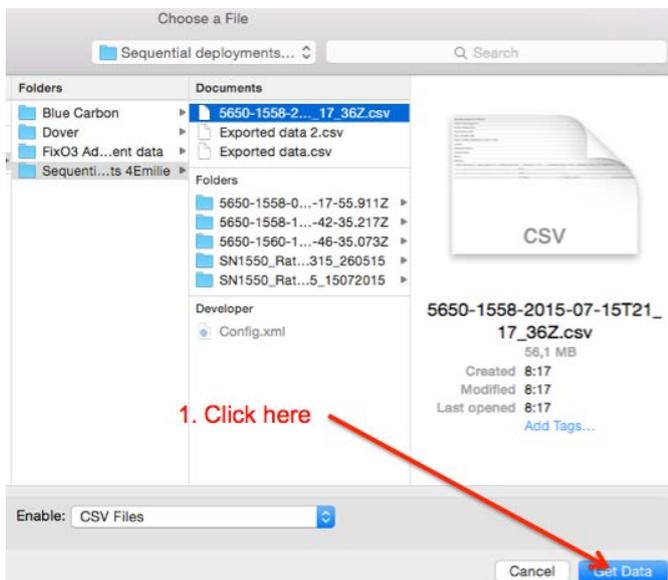
For i.e.: if your data record has about 3000 recordings (125 days deployment at 1 h interval) with 5 single point sensors and a Doppler Current Profiler Sensor (DCPS) set up to record in 50 cells the exported csv file will be around 100 Mb if you export everything. If you exclude the status parameter, the size will be about 60 Mb.

### 4.2 Data import with Mac

To import a csv file into Excel (Excel 2011) open a new workbook and **click on *Import...*(1)**, **“check” CSV(2)** and **click on *Import* (3)** to find the csv file to import.

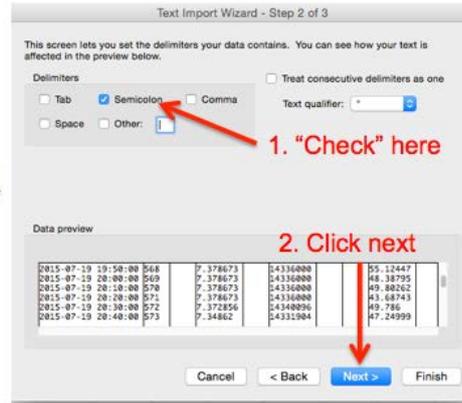
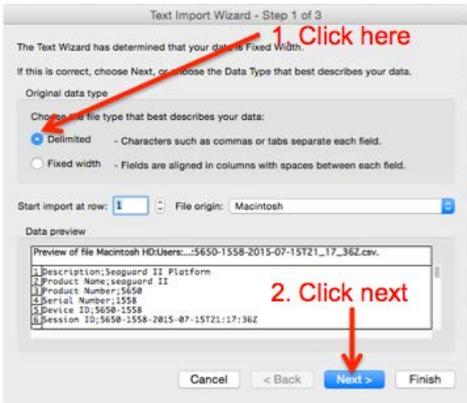


### Click on *Get Data* (1)

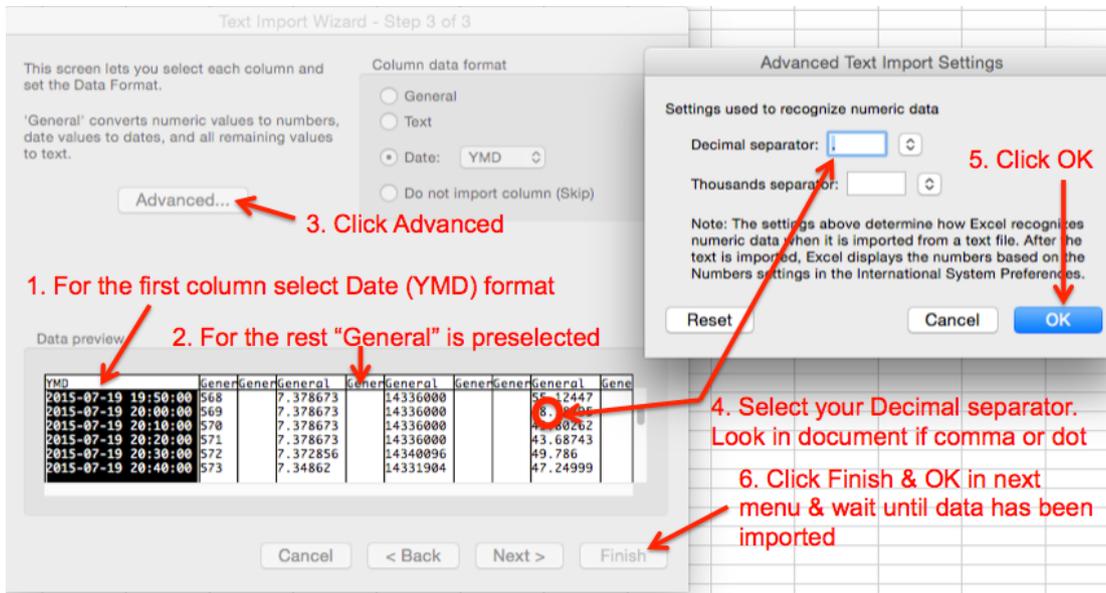


Click on *Delimited* (1) & Next (2)

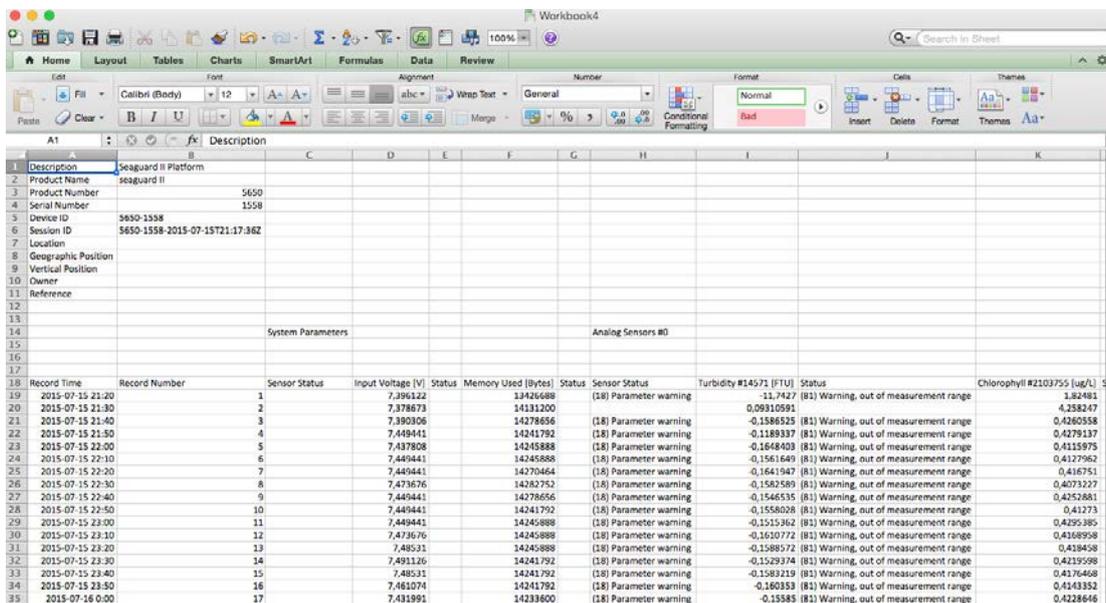
Check *Semicolon* (1) & Click Next (2)



Follow the steps describe below (1-6) to finish importing data.

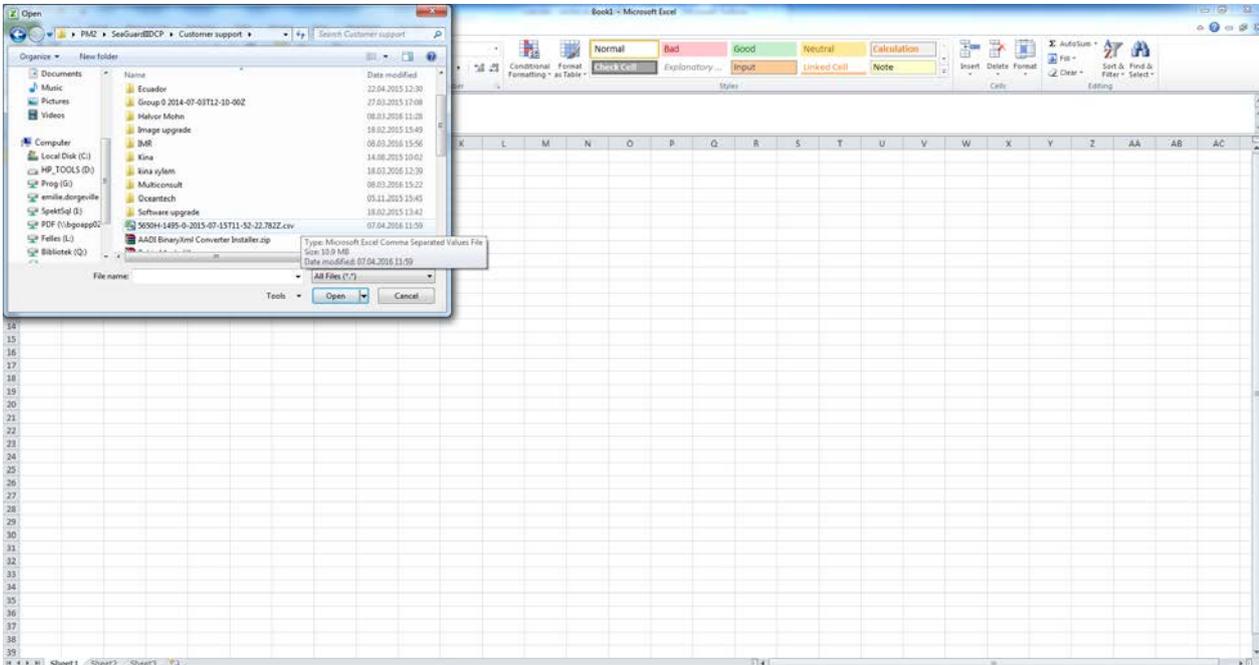


Below data has been imported into Excel. Remember to save as an Excel file.

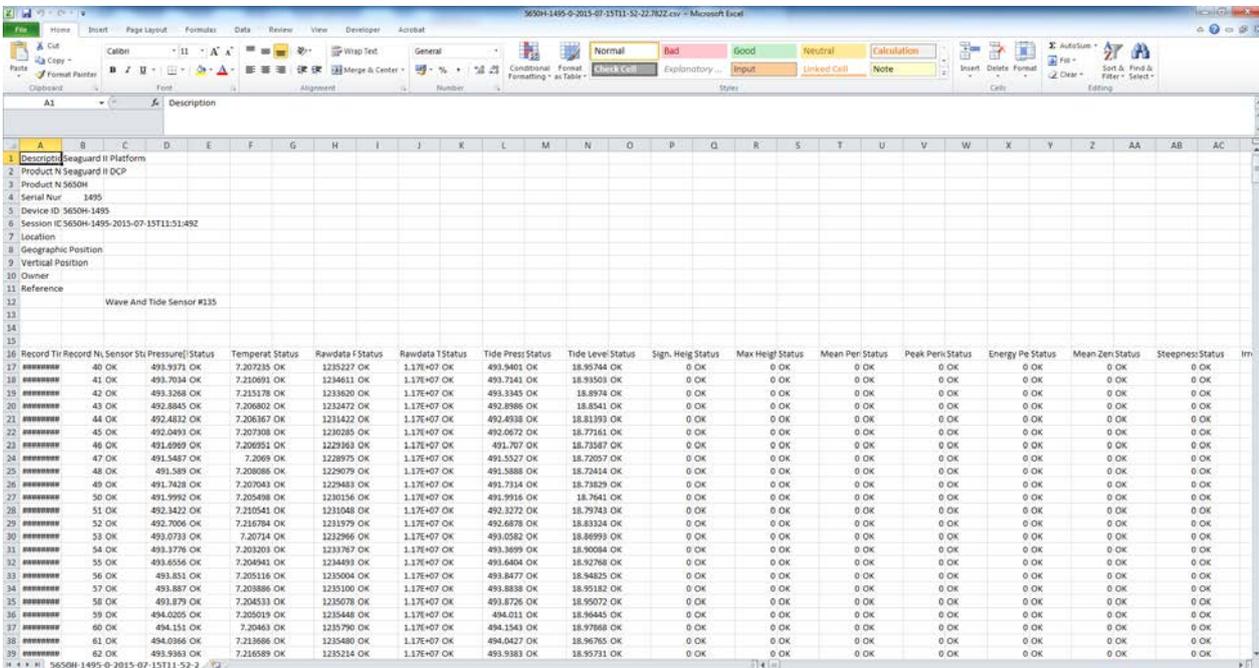


### 4.3 Import data into Excel with a PC

Open Excel, click on file, Open and select the \*.csv file where previously saved. Select open.



Below data has been imported into Excel. Remember to save as an Excel file.



## APPENDIX 1: Quality Control and data interpretation

The below suggested combination of graphs and parameters is a possible first step of quality control (QC) for SeaGuardII data sets. Short comments about the data and quality control are written in the graphs and in the text.

OBS: If instrument is redeployed at the same site and depth shortly after recovery a continuation in the values from before recovery is expected. If this is not the case it could be attributed to e.g. fouling or a sensor problem.

Optical sensors (turbidity, chlorophyll, F-DOM, PAH) are the most fouling sensitive but can be protected with copper tape, wiper or UV light.

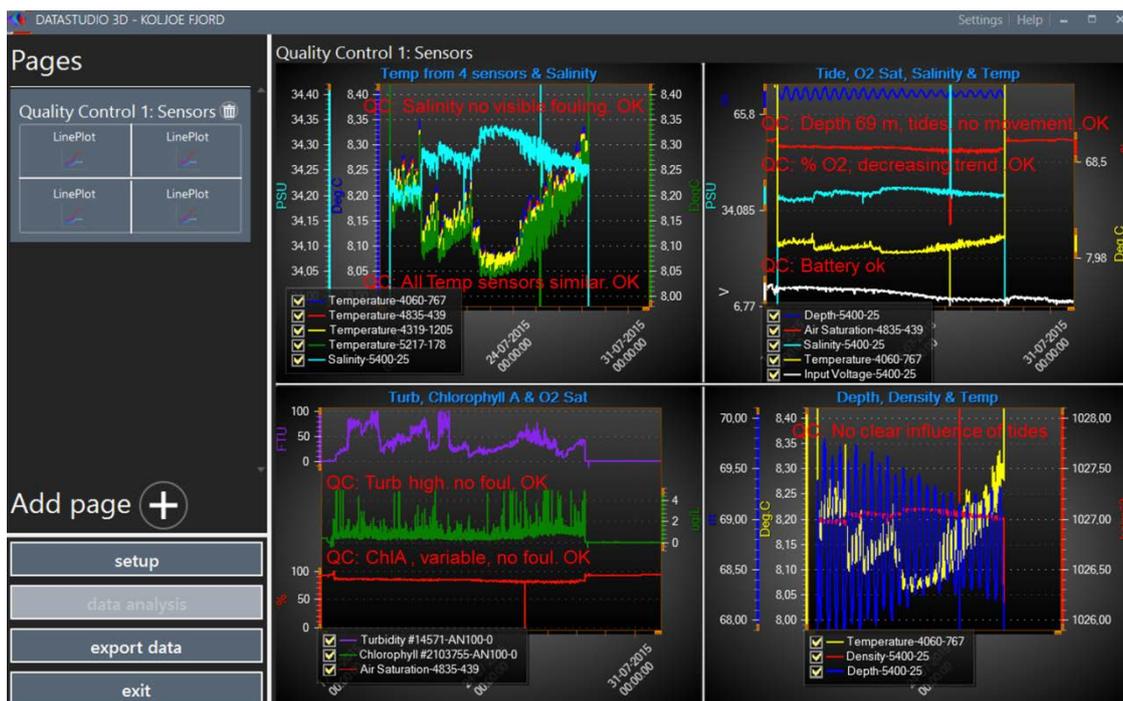
Cond sensors are moderately resistant to fouling. They normally drift low when affected. They can be antifouling protected with UV light. The correct functioning of Aanderaa sensors can be checked in air with resistor loops between deployments.

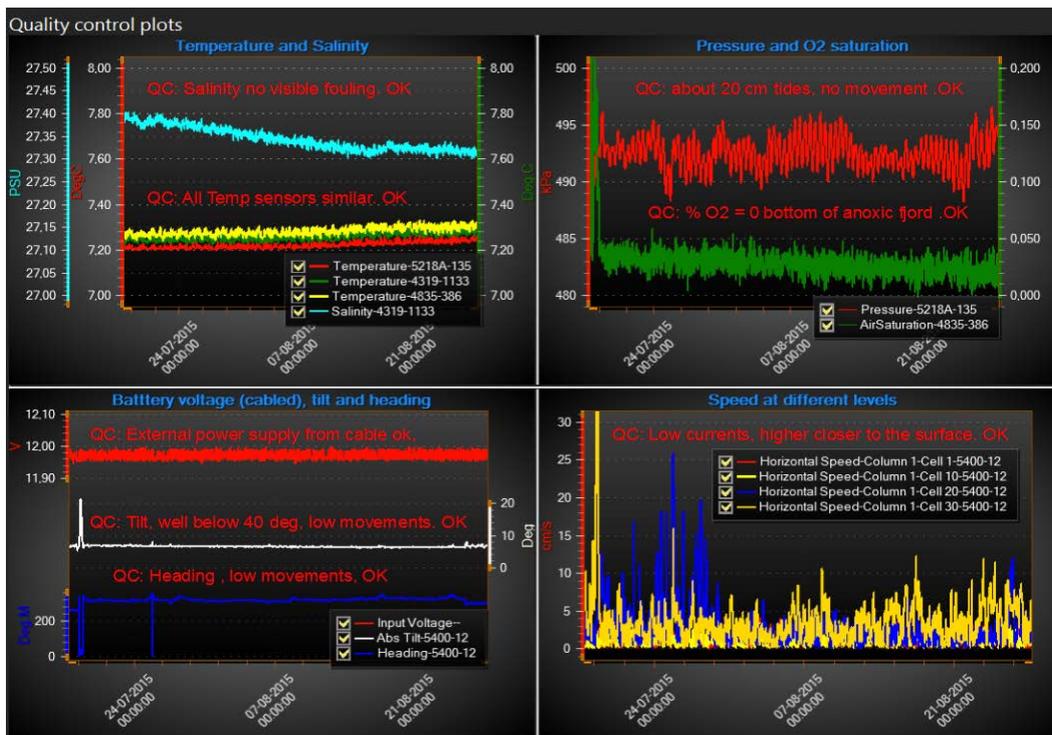
O<sub>2</sub> optodes are relatively resistant to fouling and can be protected with copper tape around the sensor, except in front of the foil. They normally drift low when affected by fouling. Letting them log in air can check the correct functioning of the sensor at saturation. They should show around 100 % at sea level and 1013 mbar of air pressure.

Pressure sensor have low fouling sensitivity and can be protected with Copper tape around the sensor and the black plastic multi-hole inlet, do not tape over the pressure inlet holes. Start sensor in air before and let it log in air before and after the deployment. It should show approximately atmospheric pressure at both occasions.

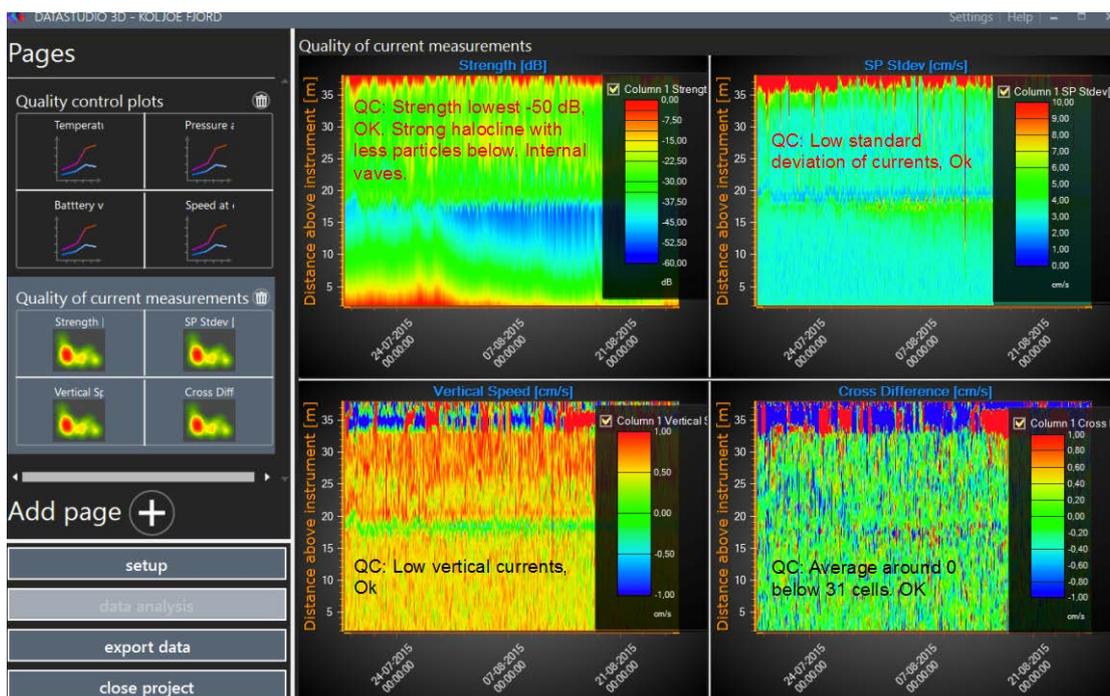
Doppler Current and Temperature sensors are normally not affected by fouling.

Below are two examples of line plots for quality control. Aanderaa smart sensors are equipped with high quality temperature sensors (accuracy ±0.03-0.1° C, sensor dependent) for compensation. All Temp sensors at the same levels should show the same values, within specifications:





The graphs below are for quality control of the Doppler Current Profiling Sensor (DCPS). If the signal strength (**Strength**) is low, normally further away from the sensor, and approaching -60 dB in combination with high standard deviation (**Sp Stdev**), noisy vertical currents (**Vertical Speed**) and high and noisy **Cross Difference** (CD = speed beam 1 – speed beam 3 + speed beam 2 – speed beam 4) this indicates that the instrument is measuring at the limit of its range. The standard deviation of currents (**Sp Stdev**) indicates turbulence and is typically higher close to the surface where there is waves and close to the bottom because of friction against the bottom. The magnitude of vertical currents (**Vertical Speed**) is typically about 10 times lower than for horizontal. Higher vertical currents could indicate up/down-welling of water and/or migration of fauna, e.g. fish and zooplankton. A Cross Difference of high amplitude could indicate that there is disturbance in one or several of the beams. In this case the unique possibilities of the DCPS to use 3-beams instead of 4 to do the current calculations could be utilized.



**Aanderaa Data Instruments AS**

P.O.Box 103 Midtun, Sanddalsringen 5b, N-5828 Bergen, Norway

Tel: +47 55 60 48 00 Fax: +47 55 60 48 01

email: [aanderaa.info@xylem.com](mailto:aanderaa.info@xylem.com) - [www.aanderaa.com](http://www.aanderaa.com)

Aanderaa Data Instruments AS is a trademark of Xylem Inc. or one of its subsidiaries.

© 2011 Xylem, Inc. July 2015

