

# Point Cloud Section with CloudCompare

*Automated Survey Systems*

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OF TECHNOLOGY AND ECONOMICS**

Faculty of Civil Engineering - Since 1782

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# TASKS TO DO

- Use GUI (Graphical User Interface) and CLI (Command Line interface) of open-source CloudCompare (CC)  
<https://www.danielgm.net/cc/>
- Horizontal and vertical section of a point cloud

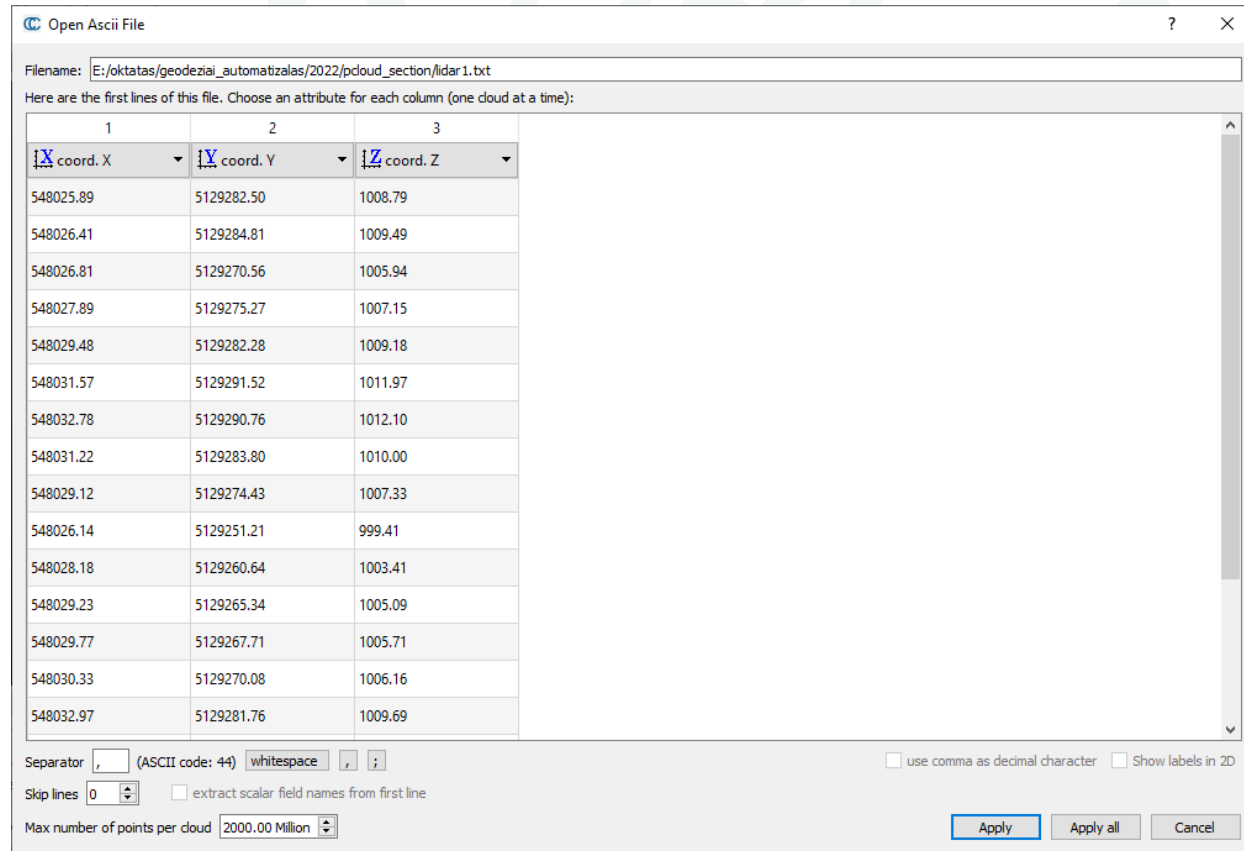


# LOAD A POINT CLOUD INTO CC

- Download lidar.txt from OsGeoLabBp's github:  
[https://github.com/OSGeoLabBp/tutorials/blob/master/english/data\\_processing/lessons/code/lidar.txt](https://github.com/OSGeoLabBp/tutorials/blob/master/english/data_processing/lessons/code/lidar.txt)
- Load into CloudCompare

# LOAD A POINT CLOUD INTO CC

- There are 3 columns in the file (Easting, Northing, Elevation), separated by comma
- Map projection?



# LOAD A POINT CLOUD INTO CC

- Shift coordinates to avoid big numbers

Global shift/scale

Coordinates are too big (original precision may be lost)! ?

Do you wish to translate/rescale the entity?  
*shift/scale information is stored and used to restore the original coordinates at export time*

<b>Point in original coordinate system (on disk)</b> x = 548025.890000 y = 5129282.500000 z = 1008.790000		<b>Point in local coordinate system</b> x = 25.8900 y = 82.5000 z = 1008.7900
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+ Shift

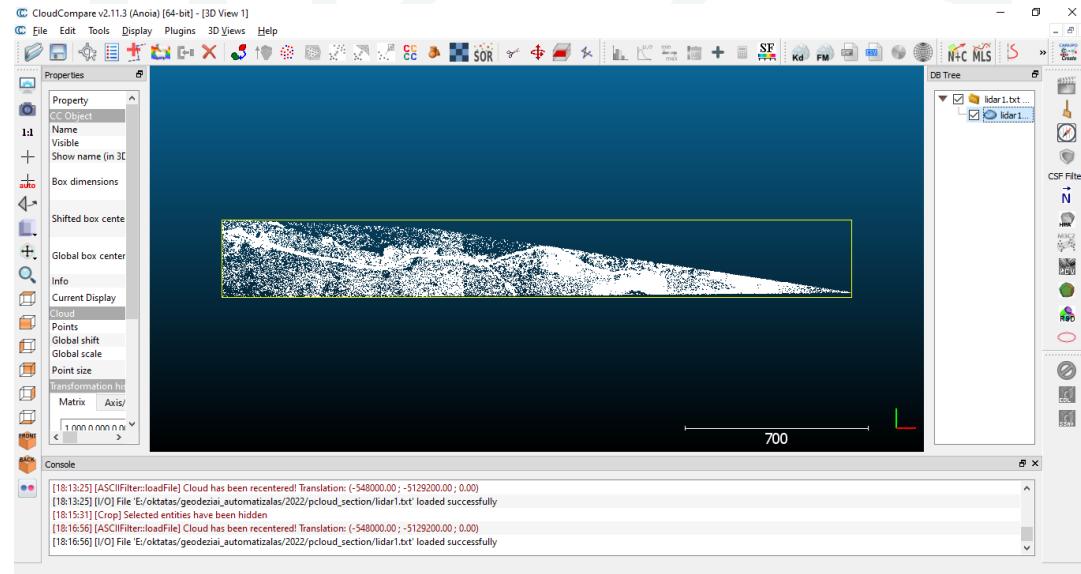
x Scale

Preserve global shift on save

Yes Yes to All No

# LOAD A POINT CLOUD INTO CC

- Top view of the point cloud
- Check out number of points (51150)
- Rotate in space



# HORIZONTAL SECTION

- At the level of 1100 m  $\pm$  1 m
- Use **crop** command

Crop

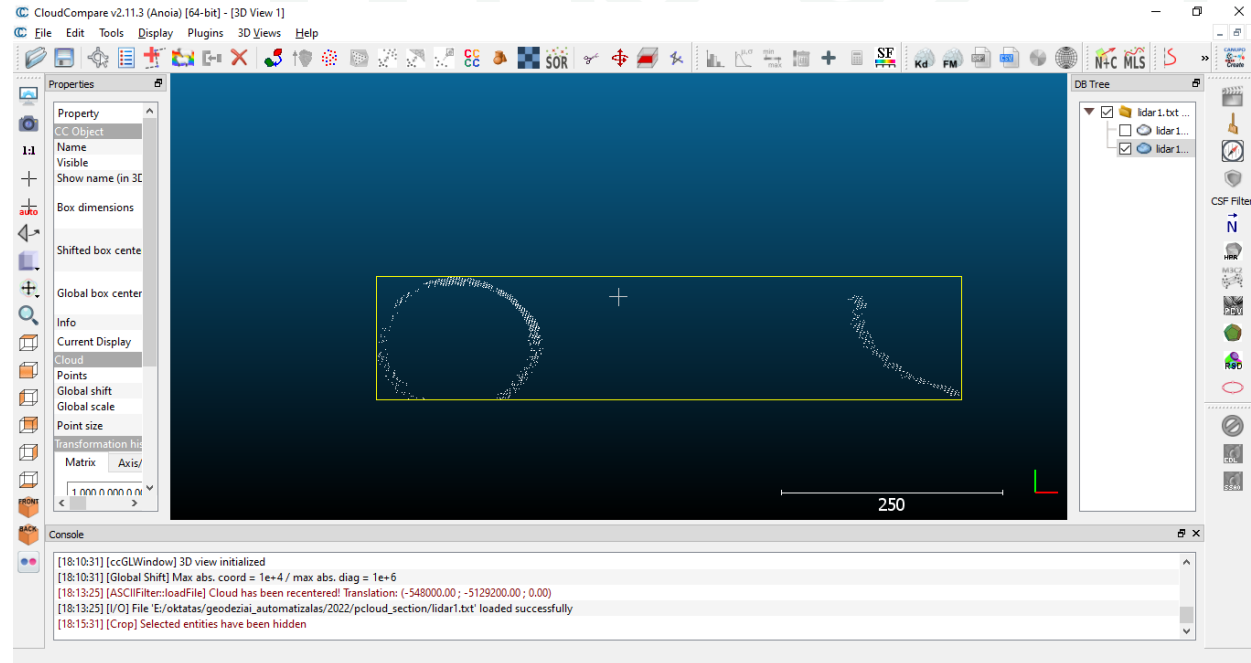
	Center	Width
X	1224.99499512	2398.21020508
Y	-55.21499634	296.58999634
Z	1100.00000000	2.00000000

keep square

Default OK Cancel

# HORIZONTAL SECTION

- Check out the number of cropped points (903)





# HORIZONTAL SECTION IN CLI

- [https://www.cloudcompare.org/doc/wiki/index.php?title=Command\\_line\\_mode](https://www.cloudcompare.org/doc/wiki/index.php?title=Command_line_mode)
- Open a terminal (linux) / Command Prompt (windows)
- Navigate into your folder
  - *cd = change directory*
  - *to switch to „E” drive type E:*
  - *To go your directory type:*  
*E:\oktatas\geodezias\_automatizalas\2022\pcloud\_section*

# USE CROP COMMAND IN CLI

- Type: "C:\Program Files\CloudCompare\CloudCompare.exe" -O lidar.txt -C\_EXPORT\_FMT ASC -PREC 3 -Crop 548025.89:5128996.49:1099:550424.10:5129293.08:1101
- -O lidar.txt = open lidar.txt
- -C\_EXPORT\_FMT ASC = set output file format to asc
- -PREC 3 = precision (number of decimals) in output file
- 548025.89:5128996.49:1099:550424.10:5129293.08:1101 = coordinates of the crop 3D rectangle

# USE CROP COMMAND IN CLI

- You can save the output with a specific filename too!
- First, switch off the CC's autosave function with: **-AUTOSAVE OFF** (You can also switch off the popping up CC window with the **-SILENT** command.)
- After using **-SAVE\_CLOUDS FILE** add your filename!
- "C:\Program Files\CloudCompare\CloudCompare.exe" **-SILENT -AUTO\_SAVE OFF -O lidar.txt -C\_EXPORT\_FMT ASC -PREC 3 -Crop 548025.89:5128996.49:1099:550424.10:5129293.08:1101 -SAVE\_CLOUDS FILE lidar\_hz\_section.asc**

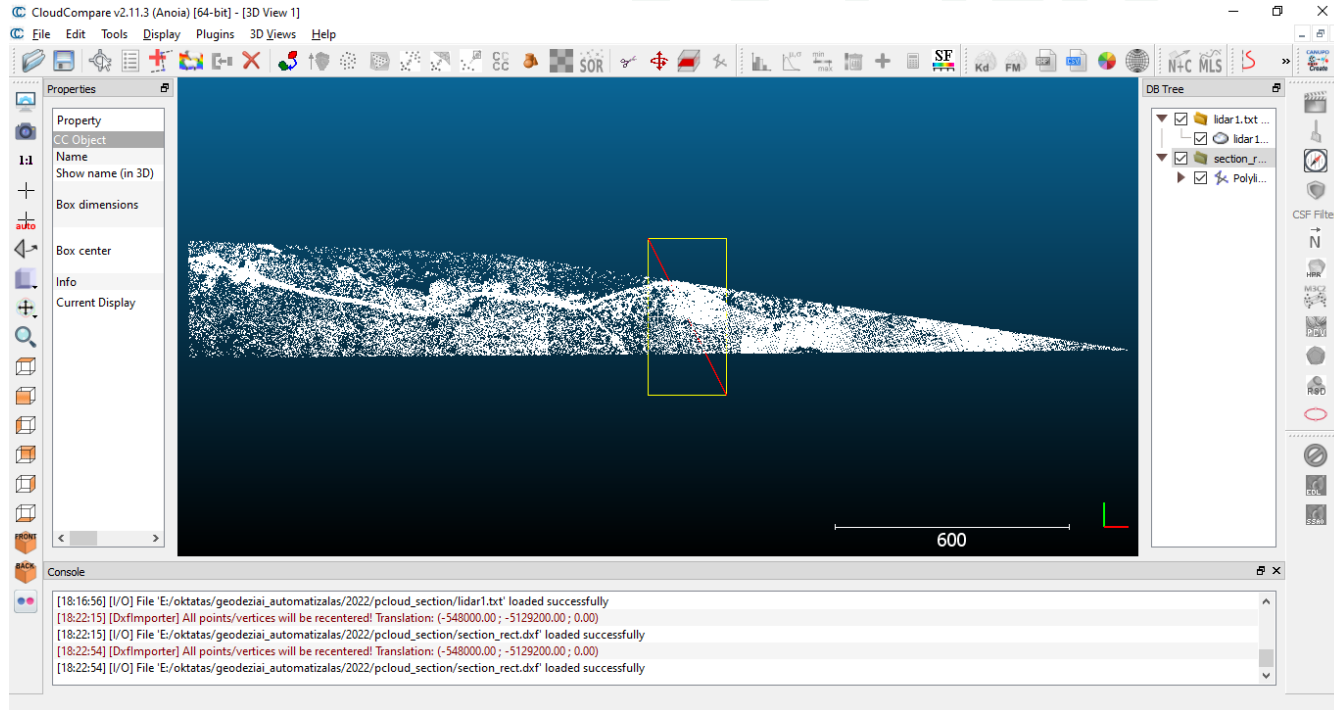
# USE CROP COMMAND IN CLI

- Check and load the output file
- E.g. lidar\_CROPPED\_2022-01-30\_18h37\_00\_216.asc
- Copy the command into a shell script / batch file
- Use a python script, subprocess module, add parameters (e.g. point cloud file name, elevation, tolerance)
- an example:
- Adjust your python script to get horizontal sections at every 1/10/100 meters

# VERTICAL SECTION

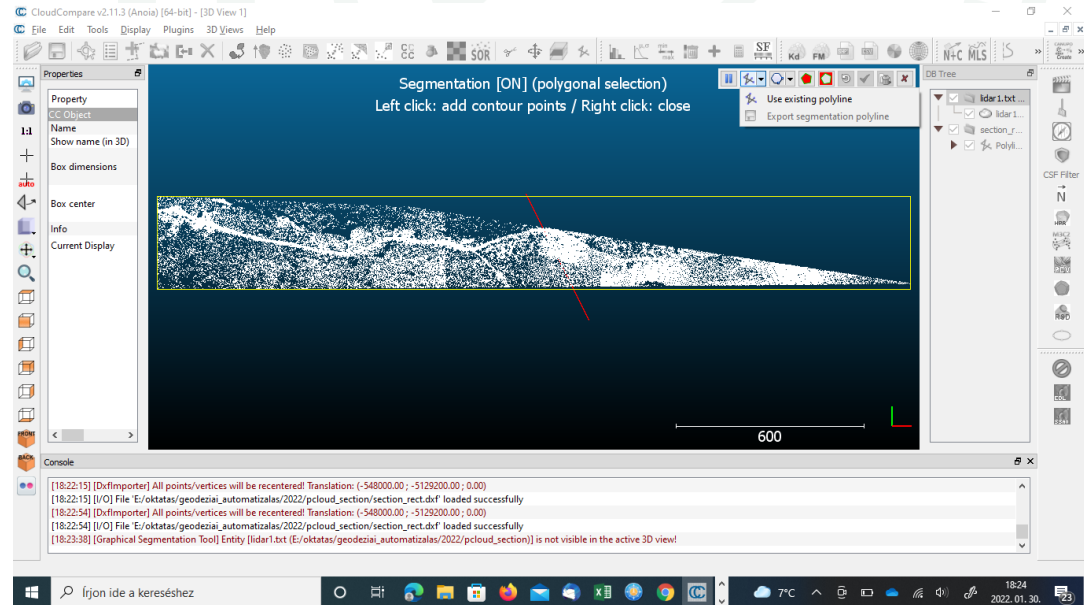
- Section line is defined by:
  - $e1 = 549400; n1 = 5128900$
  - $e2 = 549200; n2 = 5129300$
- Have a tolerance of 1 m
- Draw the section line and the section rectangle in CAD. Make sure to have a closed polygon. Save as in dxf format.
- Load the point cloud as well as the dxf in CC.

# VERTICAL SECTION

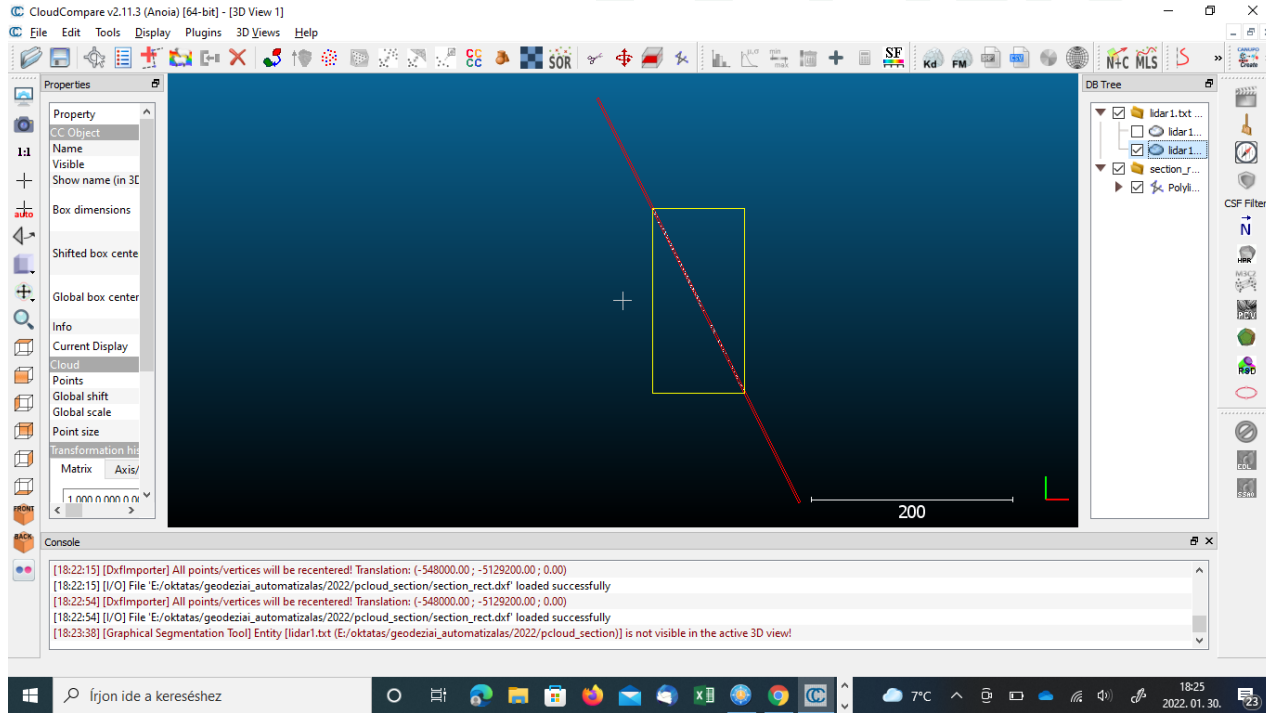


# VERTICAL SECTION

- Use segment command
  - *Existing polyline*
  - *Segment in*
- Check out the number of points in the section (96)



# VERTICAL SECTION



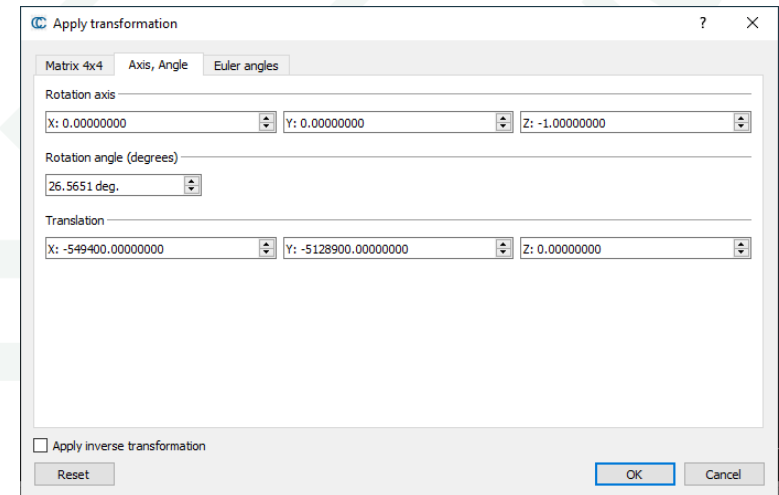


# VERTICAL SECTION IN CLI

- Open a command prompt / terminal, navigate to your folder
- Type: "C:\Program Files\CloudCompare\CloudCompare.exe" -O lidar.txt -C\_EXPORT\_FMT ASC -PREC 3 -Crop2d Z 4 549200.89 5129300.45 549199.11 5129299.55 549399.11 5128899.55 549400.89 5128900.45
- Copy the command into a shell script / batch file
- Use a python script, subprocess module, add parameters (e.g. section line coordinates, tolerance)

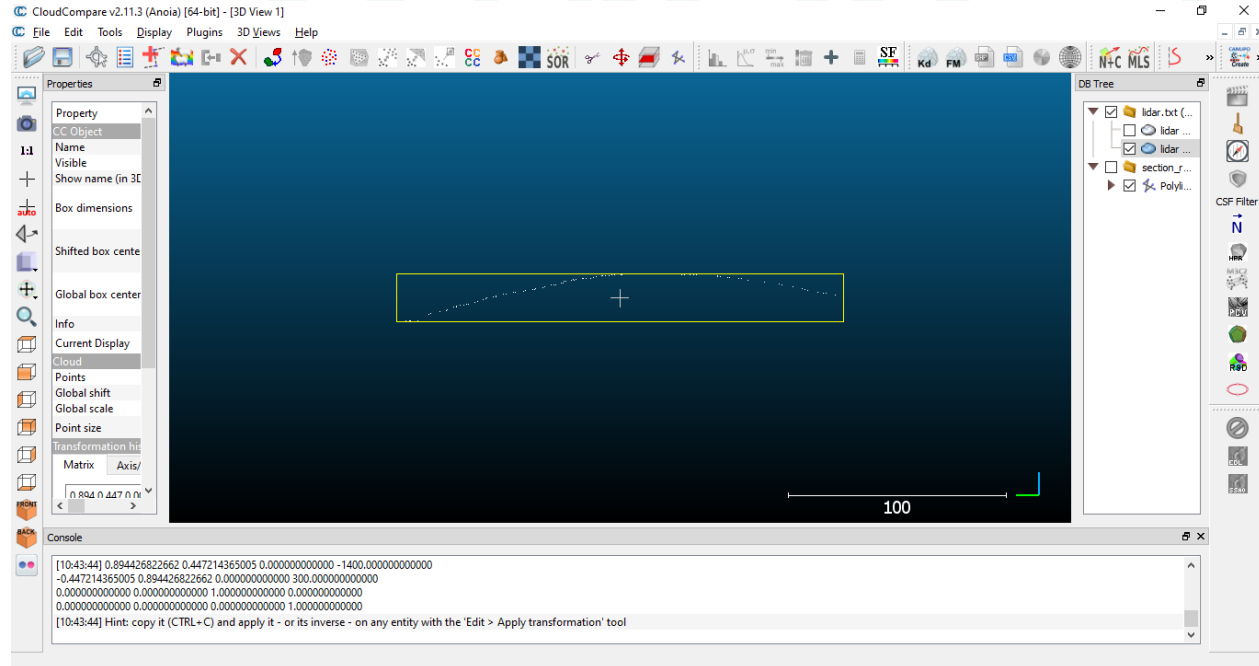
# APPLY A TRANSFORMATION

- Translate by 549400, 549200 (coordinates of the first point of the section line)
- Rotate by -26.5651 (whole circle bearing of the section line)



# SECTION VIEW

- Take a top and a left side view



# TRANSFORMATION IN CLI

- 4x4 transformation matrix, save it in file
- Type "C:\Program Files\CloudCompare\CloudCompare.exe" -O vert\_section.asc -C\_EXPORT\_FMT ASC -PREC 3 -APPLY\_TRANS transf.txt

