

CloudCompare notes

Arrowsmith

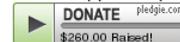
Sept. 20, 2013



CloudCompare

3D point cloud and mesh processing software
Open Source Project

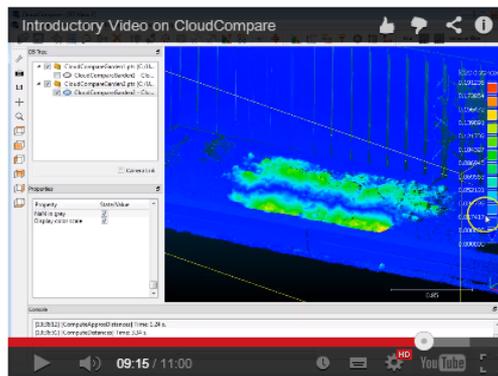
Want to support/help us?



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These great tutorial videos have been made by Eugene Liscio (www.ai2-3d.com, all rights reserved).

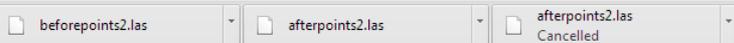
First introductory tutorial video (basic concepts: registration, distance computation, etc.)



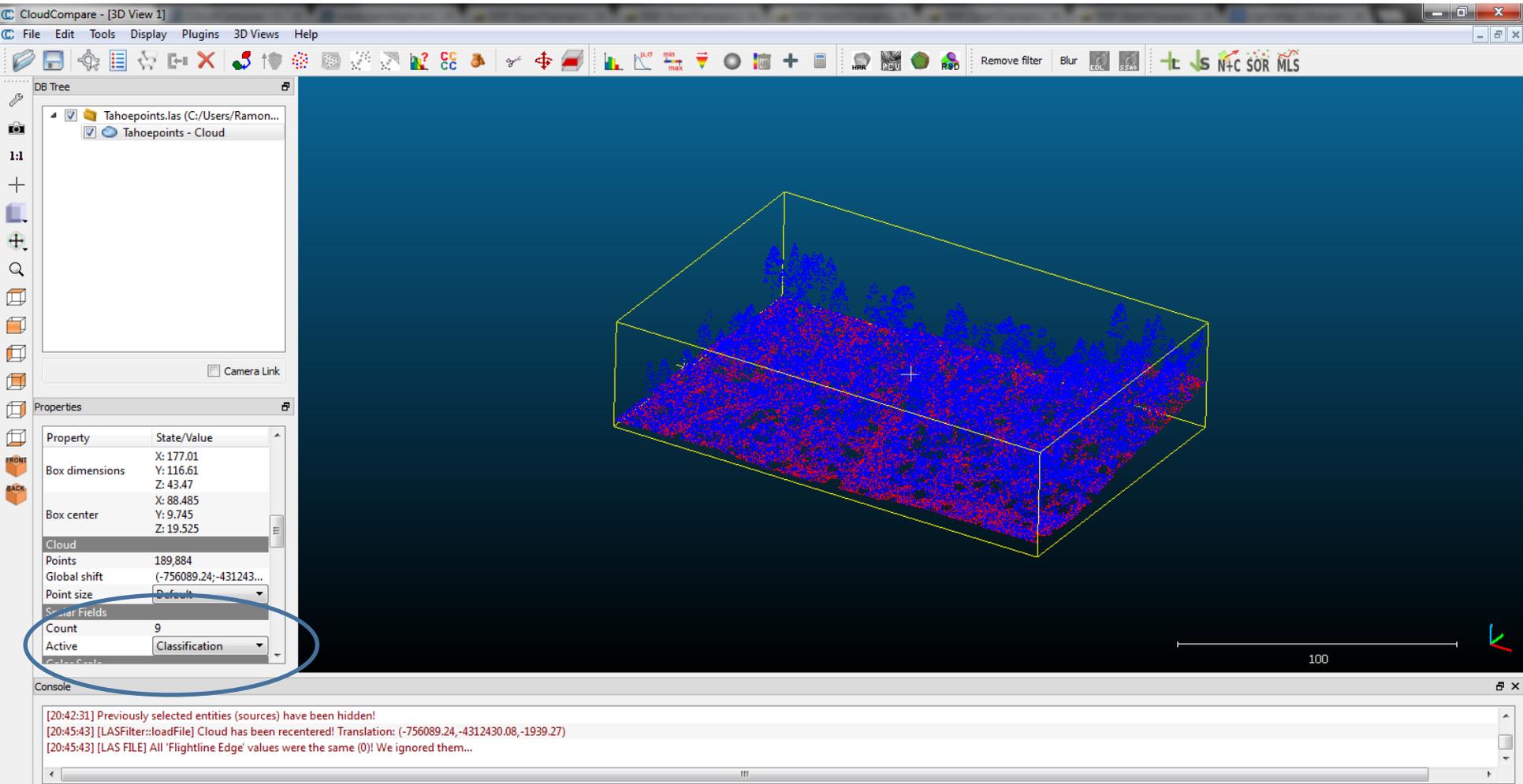
you can download the 2 clouds used in this tutorial [here](#)
(20 Mb **7zip** archive - 2 files @ CloudCompare BIN V2 format inside)

About the (new) interactive alignment tool (by picking - at least - 3 pairs of points)

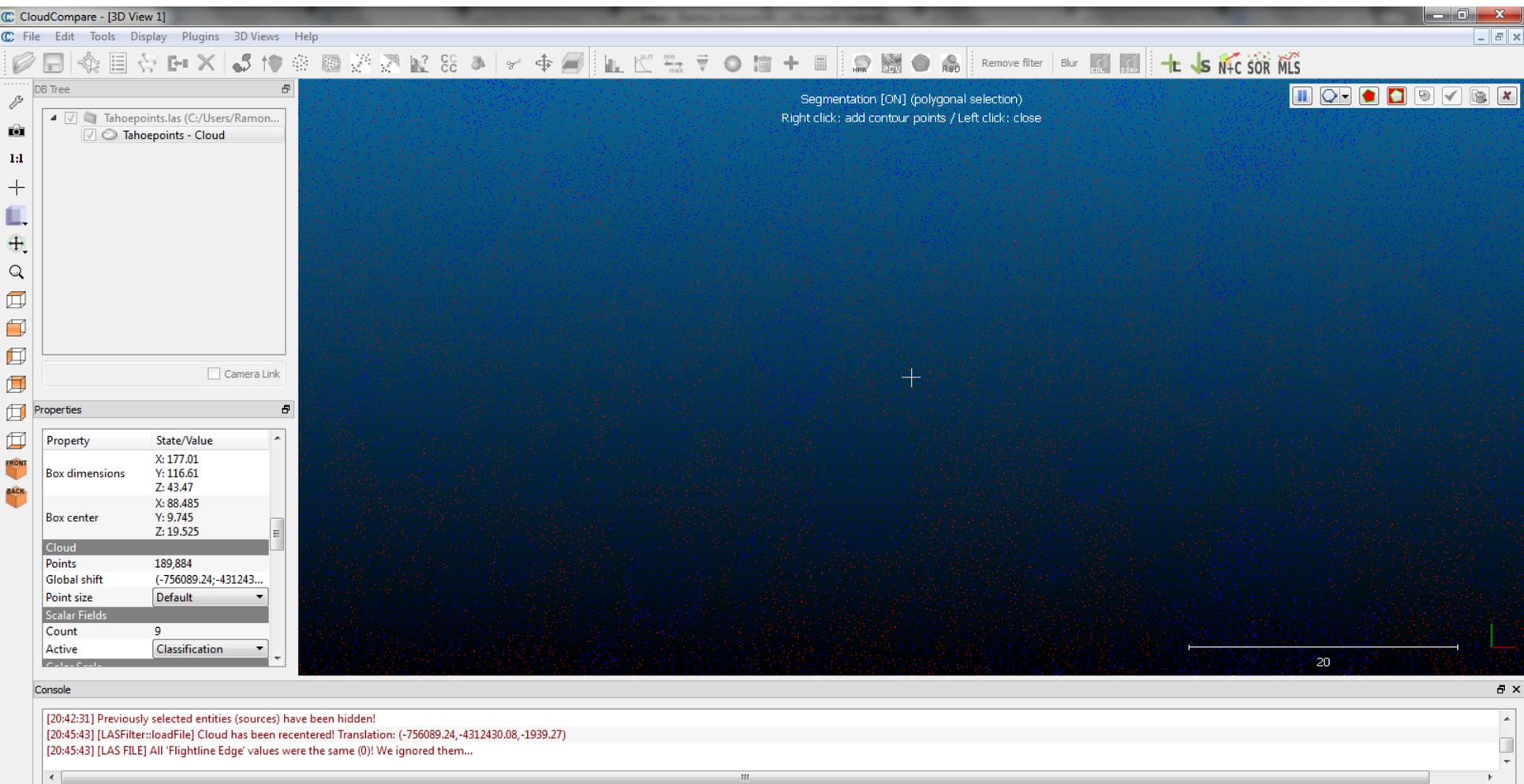
[CloudCompare home](#) - danielgm.net - EDF R&D - [contact](#)



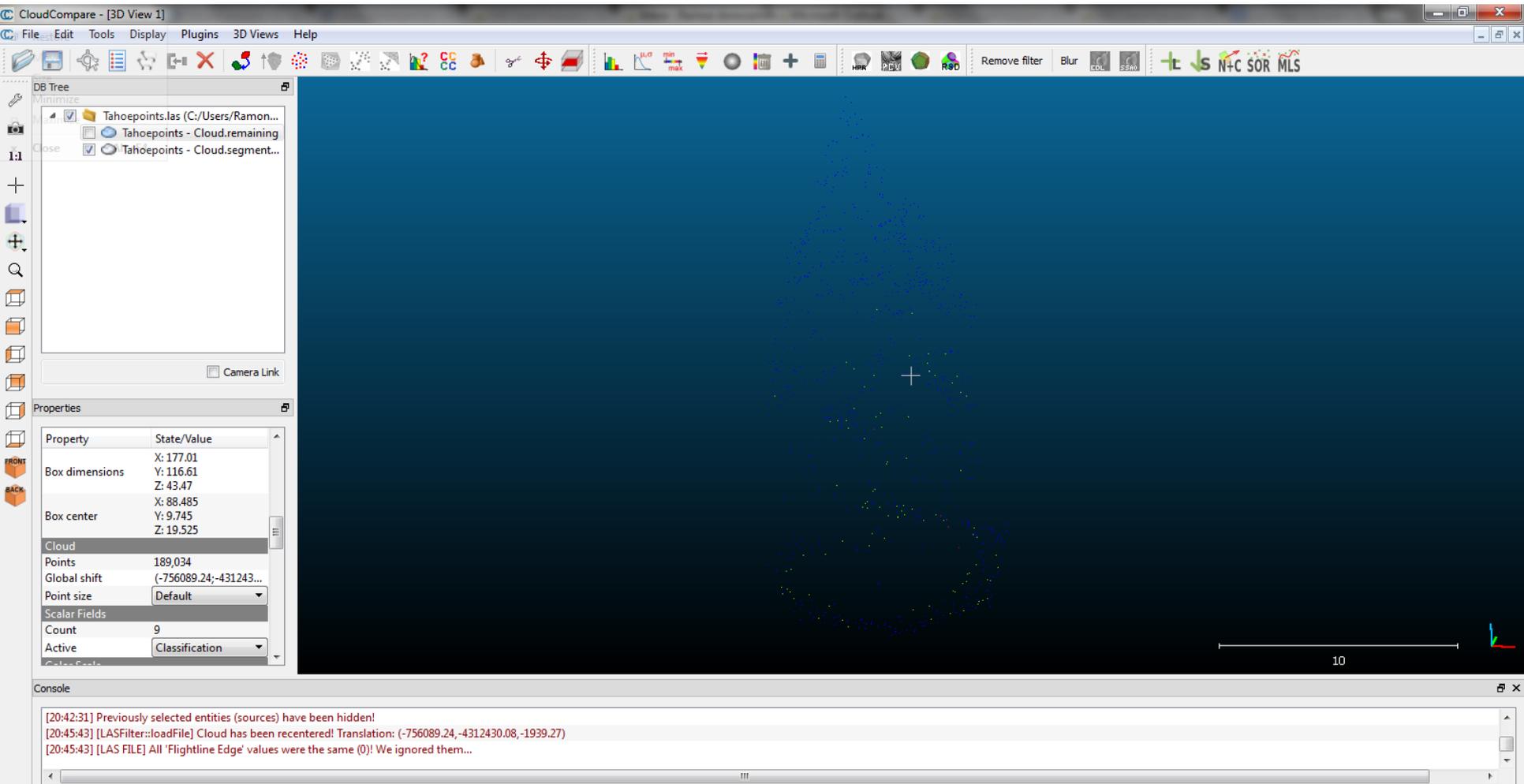
Show all downloads...



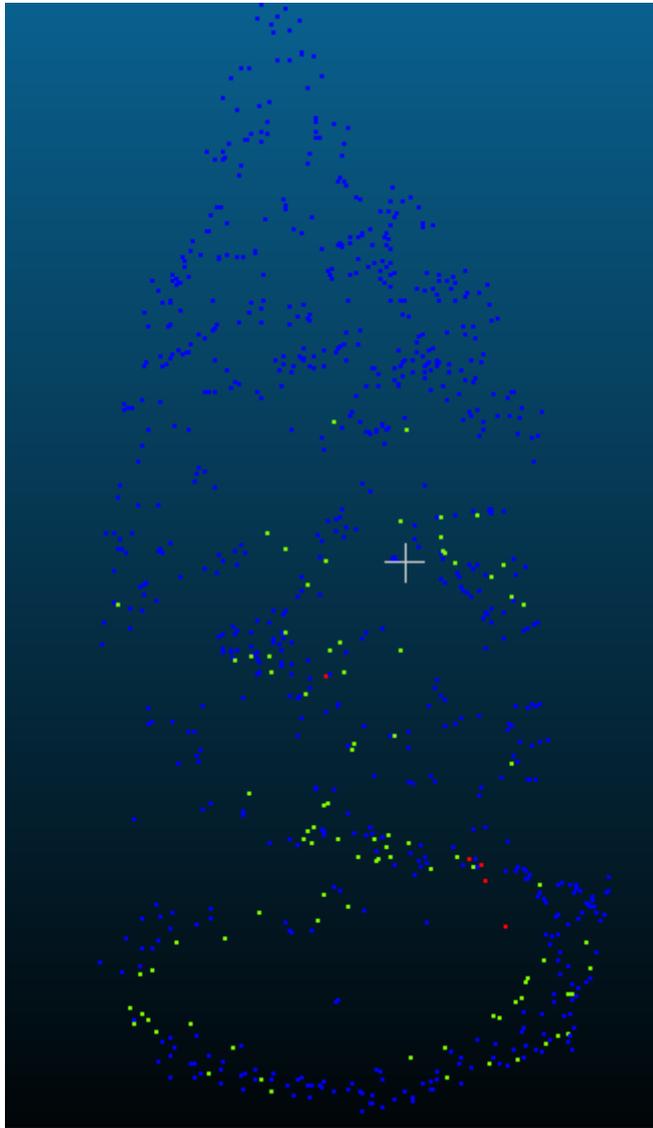
Display by various attributes: classification



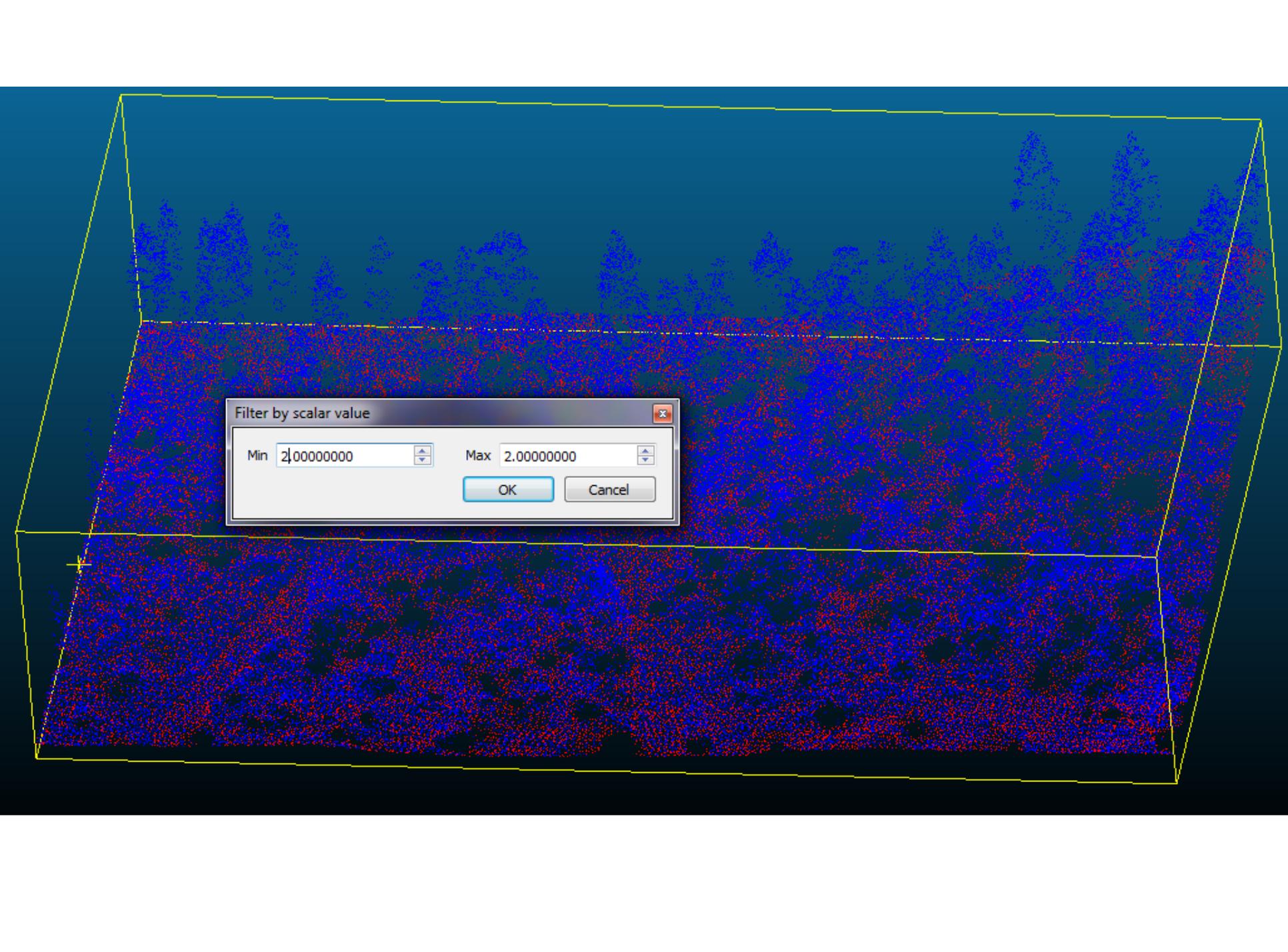
Top view; click on scissors to segment



Single tree by return number



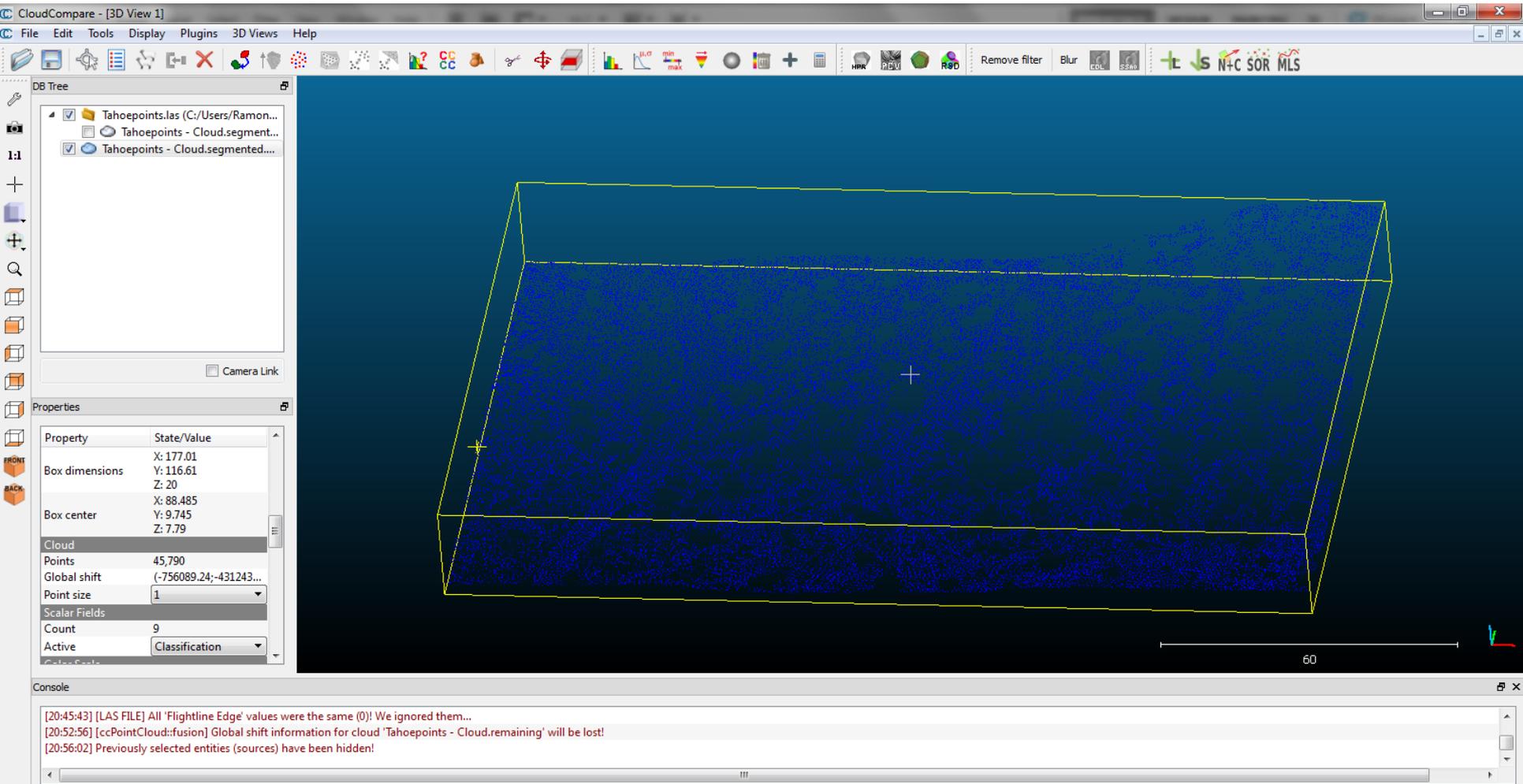
Single tree by return number



Filter by scalar value

Min 2.00000000 Max 2.00000000

OK Cancel



Ground returns only

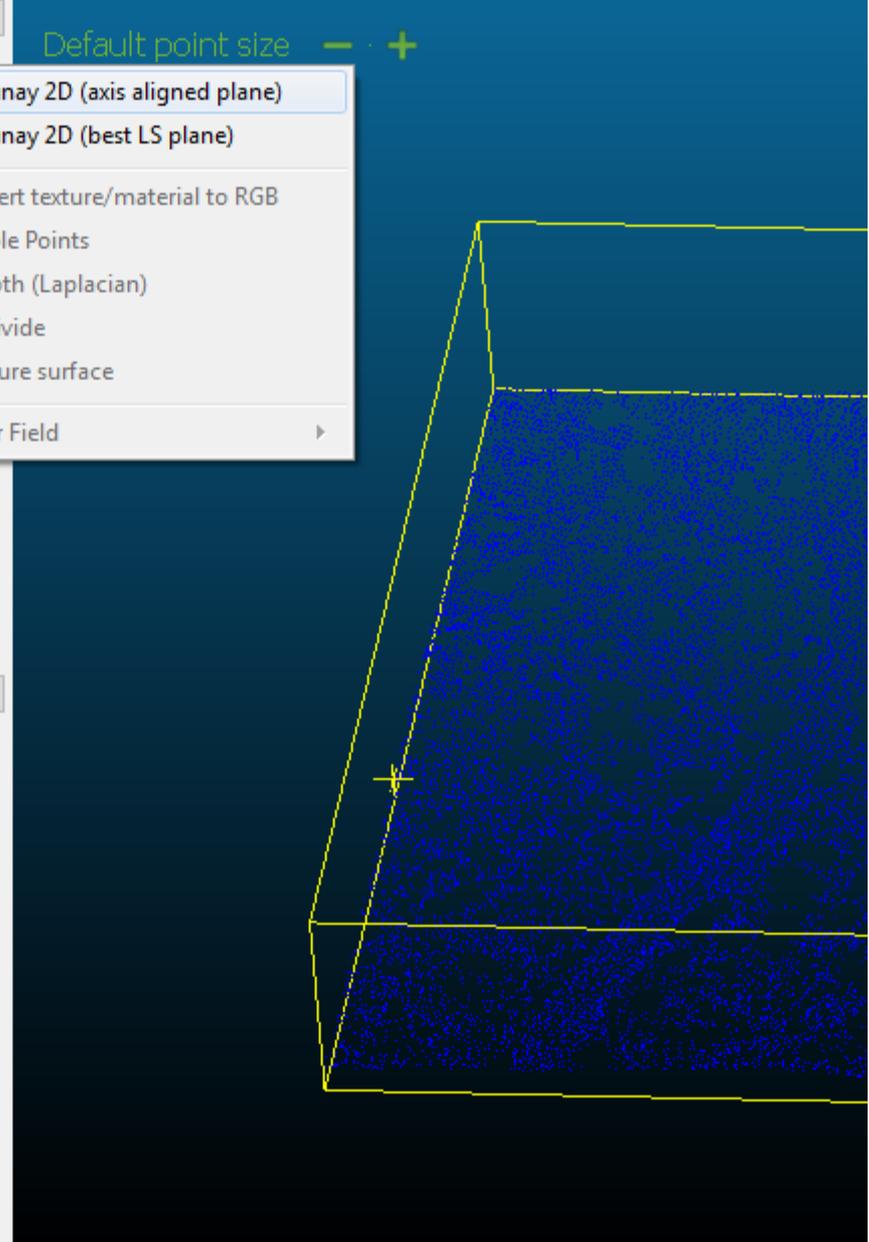


- Colors
- Normals
- Octree
- Mesh
- Sensors
- Scalar fields
- Clone
- Fuse
- Apply transformation
- Multiply/Scale
- Edit global shift
- Subsample
- Synchronize
- Toggle (recursive)
- Delete Del

- Default point size - +
- Delaunay 2D (axis aligned plane)
- Delaunay 2D (best LS plane)
- Convert texture/material to RGB
- Sample Points
- Smooth (Laplacian)
- Subdivide
- Measure surface
- Scalar Field

Properties

Property	State/Value
Box dimensions	X: 177.01 Y: 116.61 Z: 20
Box center	X: 88.485 Y: 9.745 Z: 7.79
Cloud	
Points	45,790
Global shift	(-756089.24;-431243...
Point size	1
Scalar Fields	
Count	9
Active	Classification





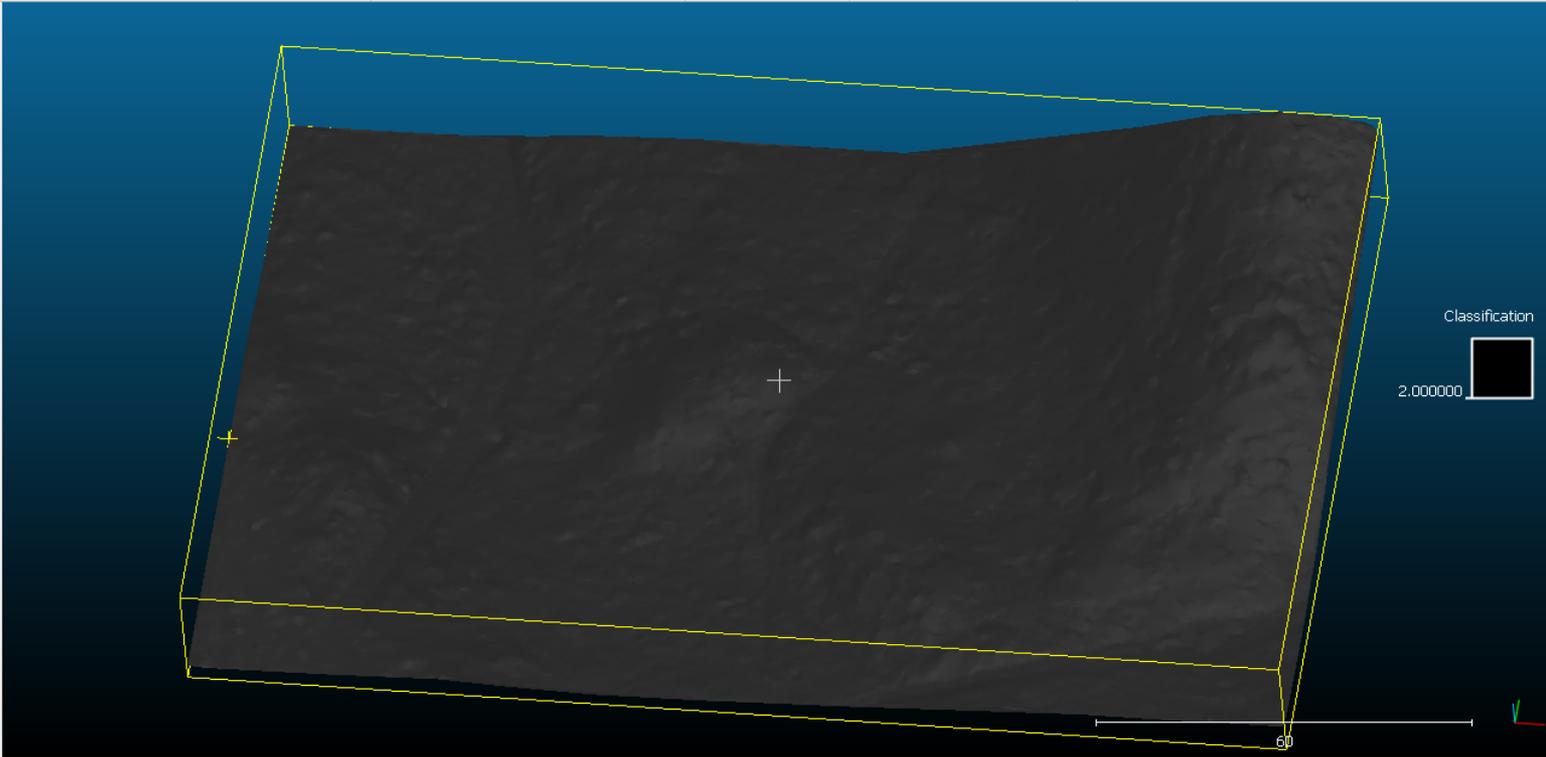
DB Tree

- ✓ Tahoepoints.las (C:/Users/Ramon...
 - ✓ Tahoepoints - Cloud.segment...
 - ✓ Tahoepoints - Cloud.segmented....
 - ✓ Tahoepoints - Cloud.segment...

Camera Link

Properties

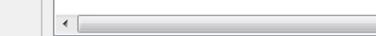
Property	State/Value
Faces	91,545
Wireframe	<input type="checkbox"/>
Stippling	<input type="checkbox"/>
Scalar Fields	
Count	9
Active	Classification
Color Scale	
Current	Grey
Steps	2
Visible	<input type="checkbox"/>
SF display params	
Display ranges	Parameters

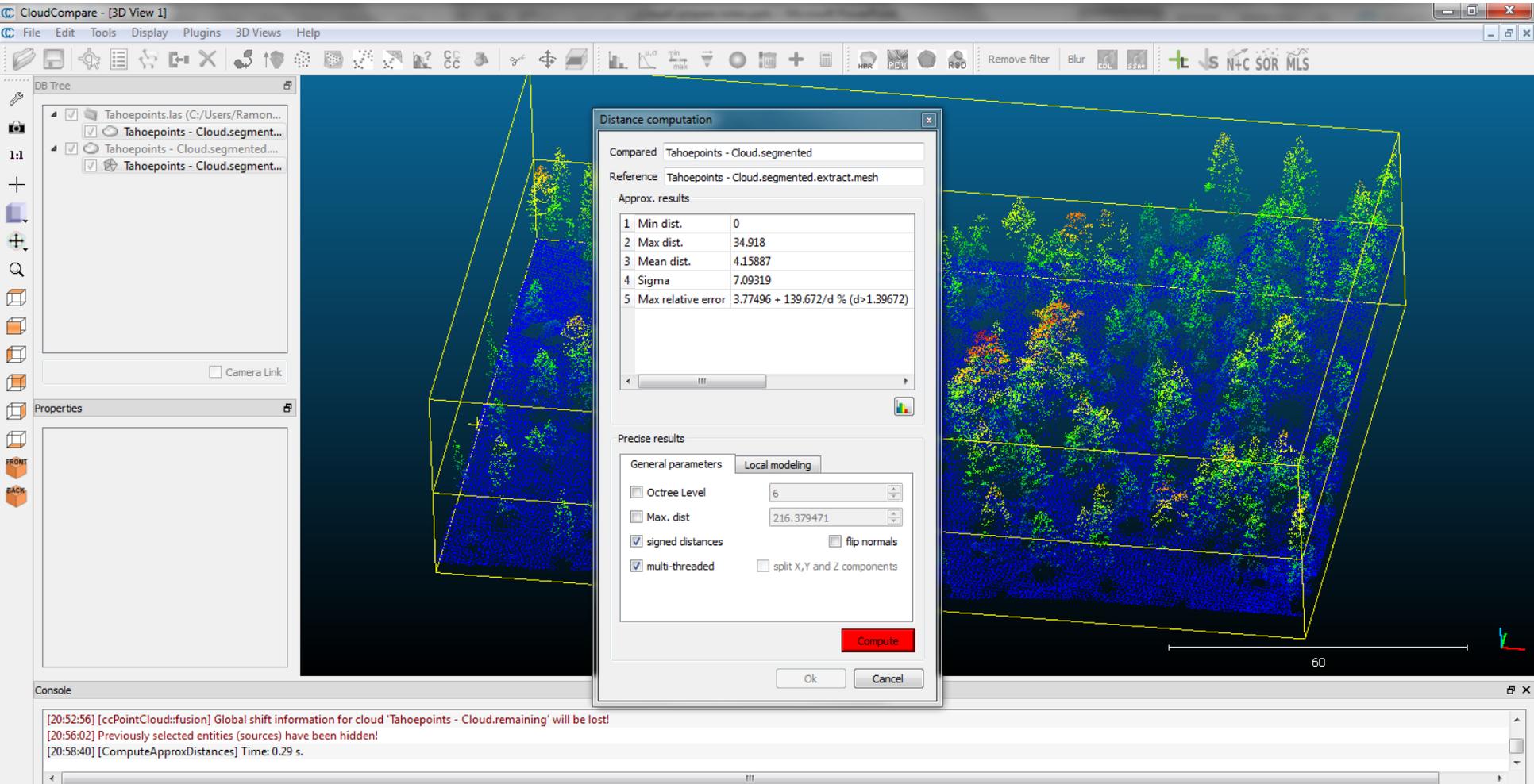


Classification

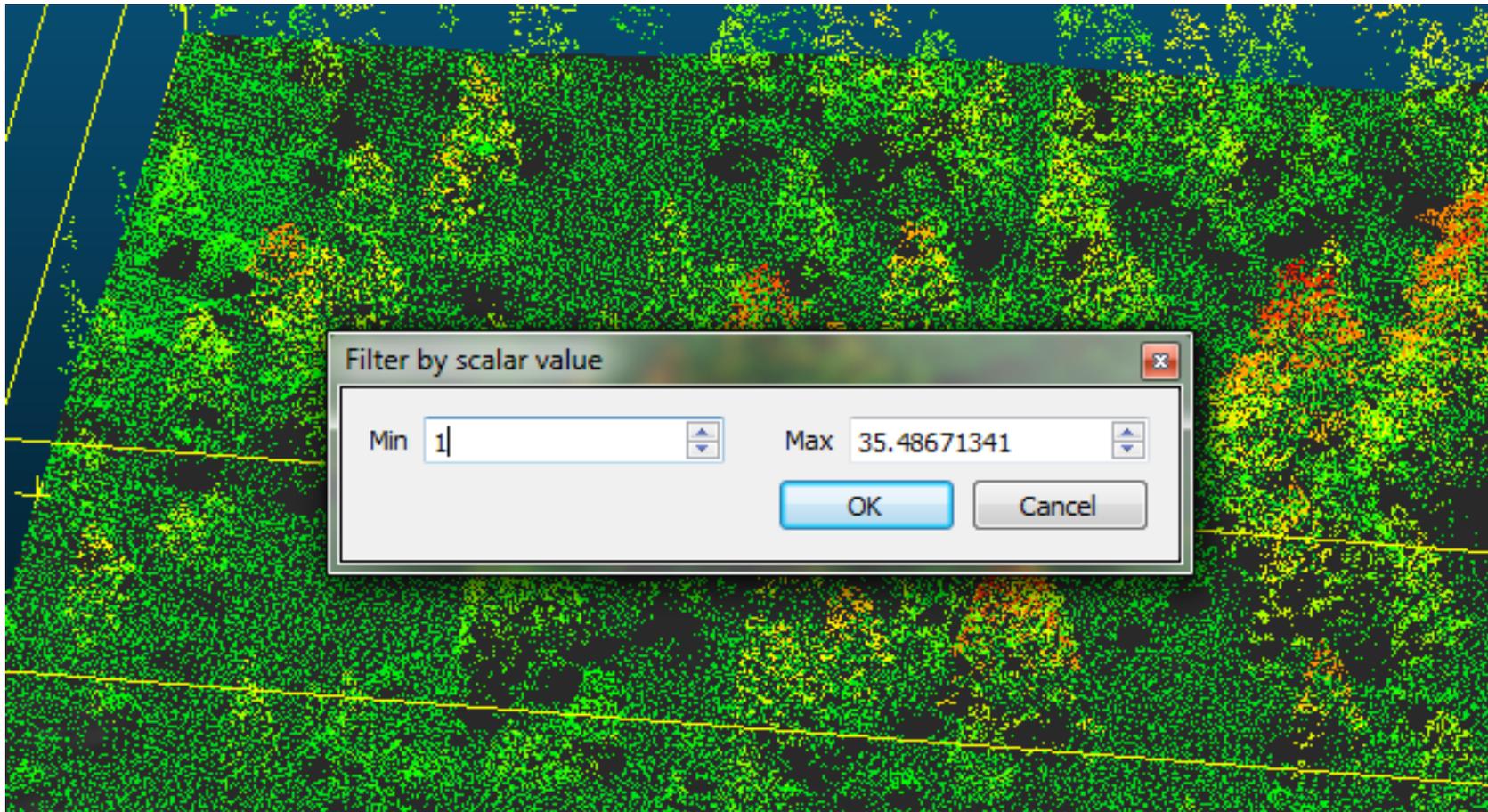
2.000000

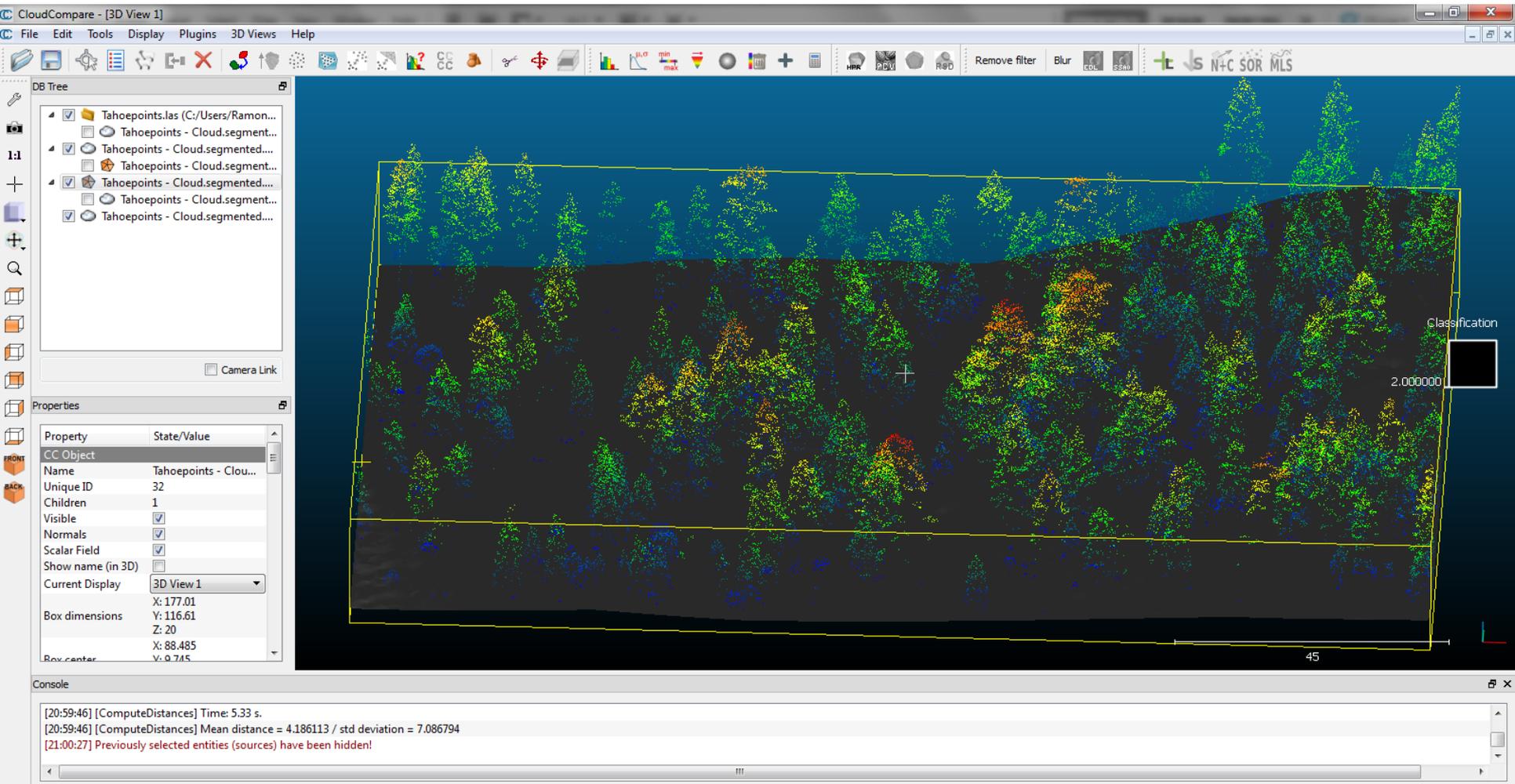
```
[20:45:43] [LAS FILE] All 'Flightline Edge' values were the same (0)! We ignored them...  
[20:52:56] [ccPointCloud:fusion] Global shift information for cloud 'Tahoepoints - Cloud.remaining' will be lost!  
[20:56:02] Previously selected entities (sources) have been hidden!
```



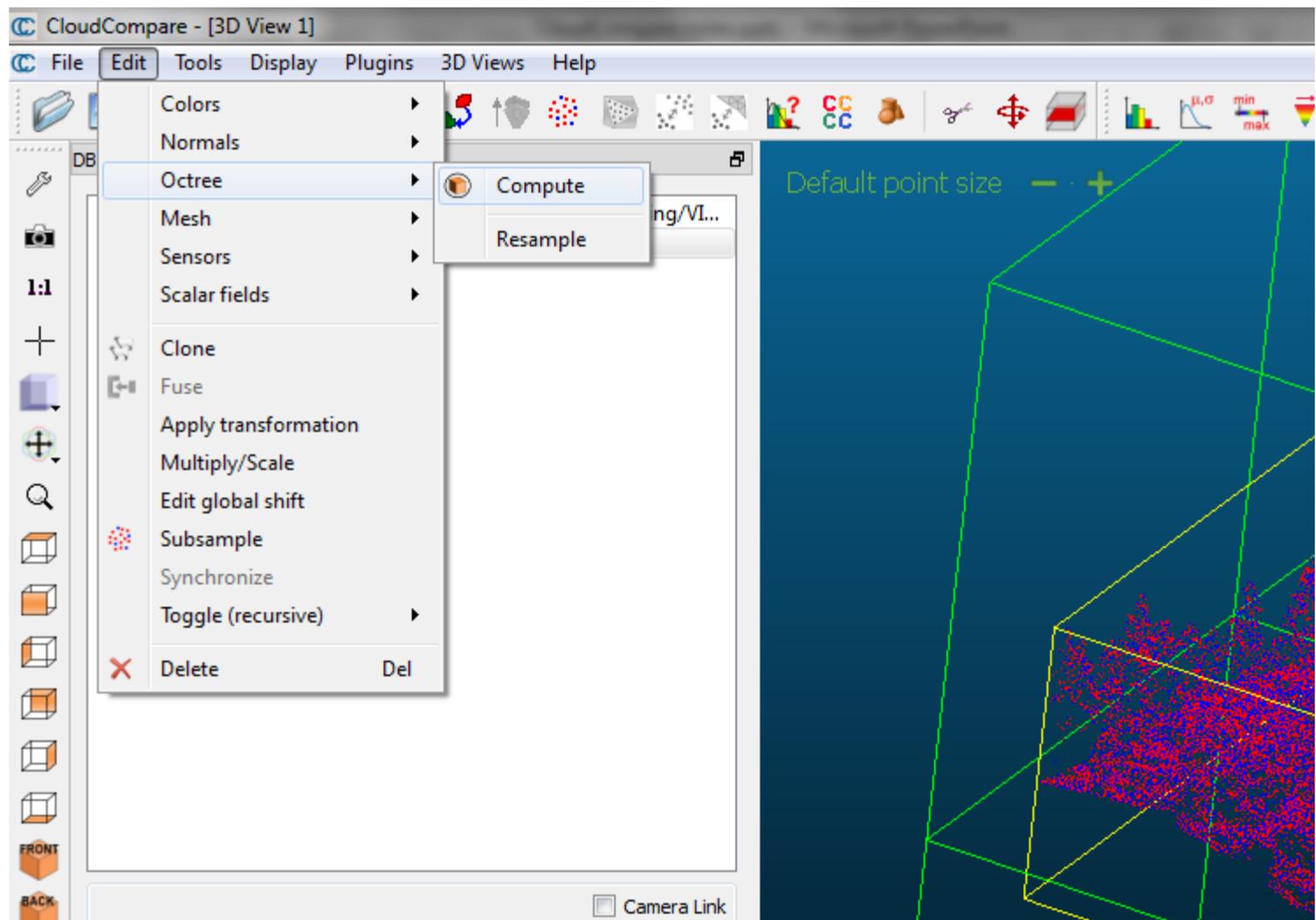


Cloud mesh distance

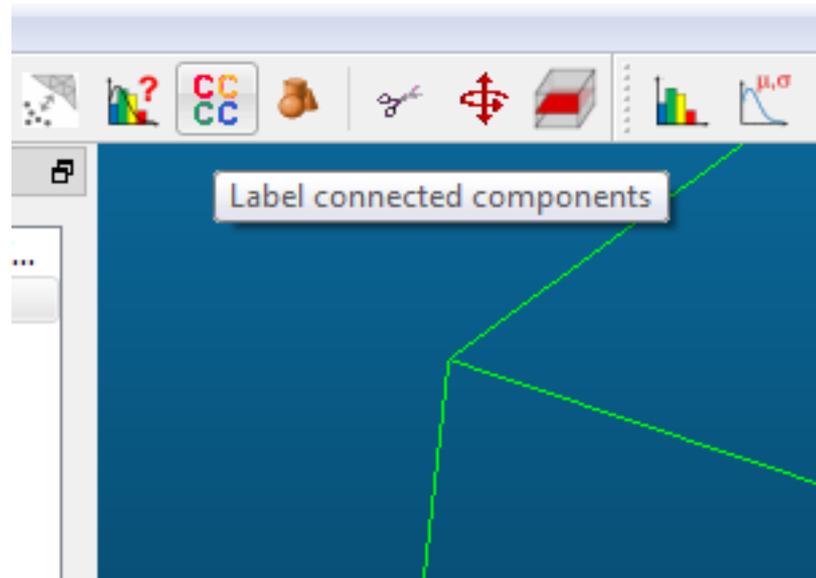




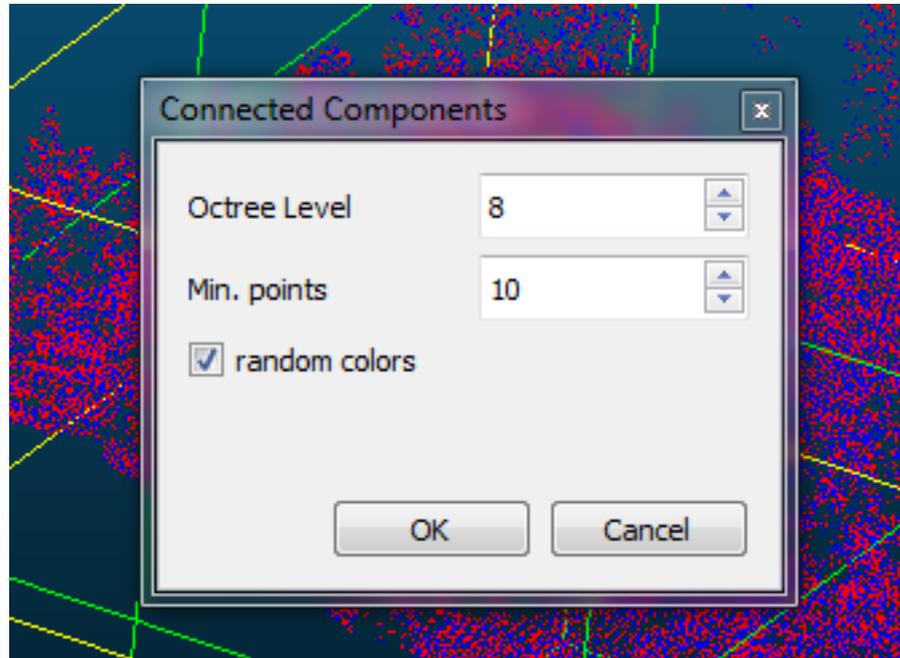
Tree height > 1 m over ground mesh

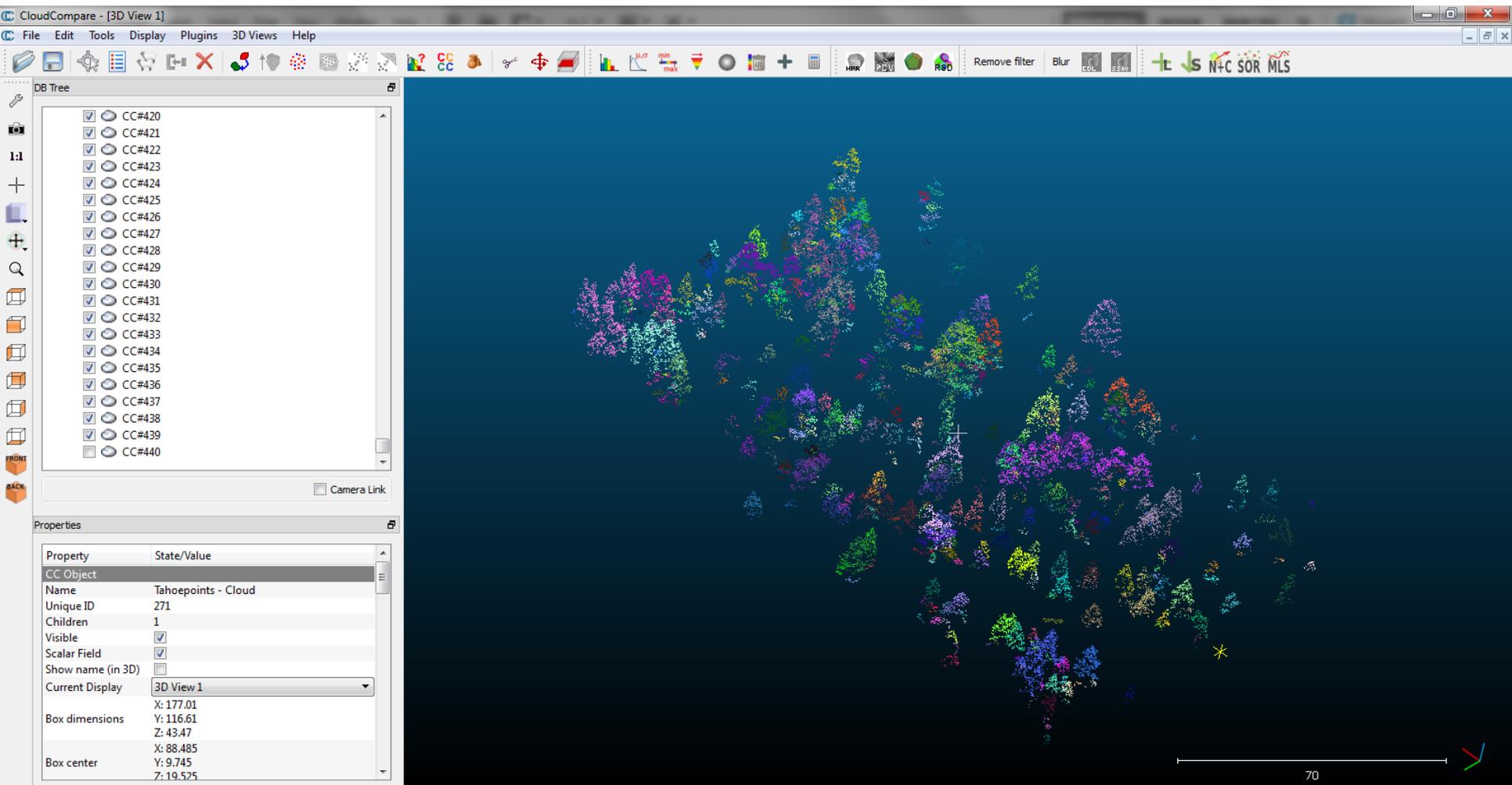


Octree

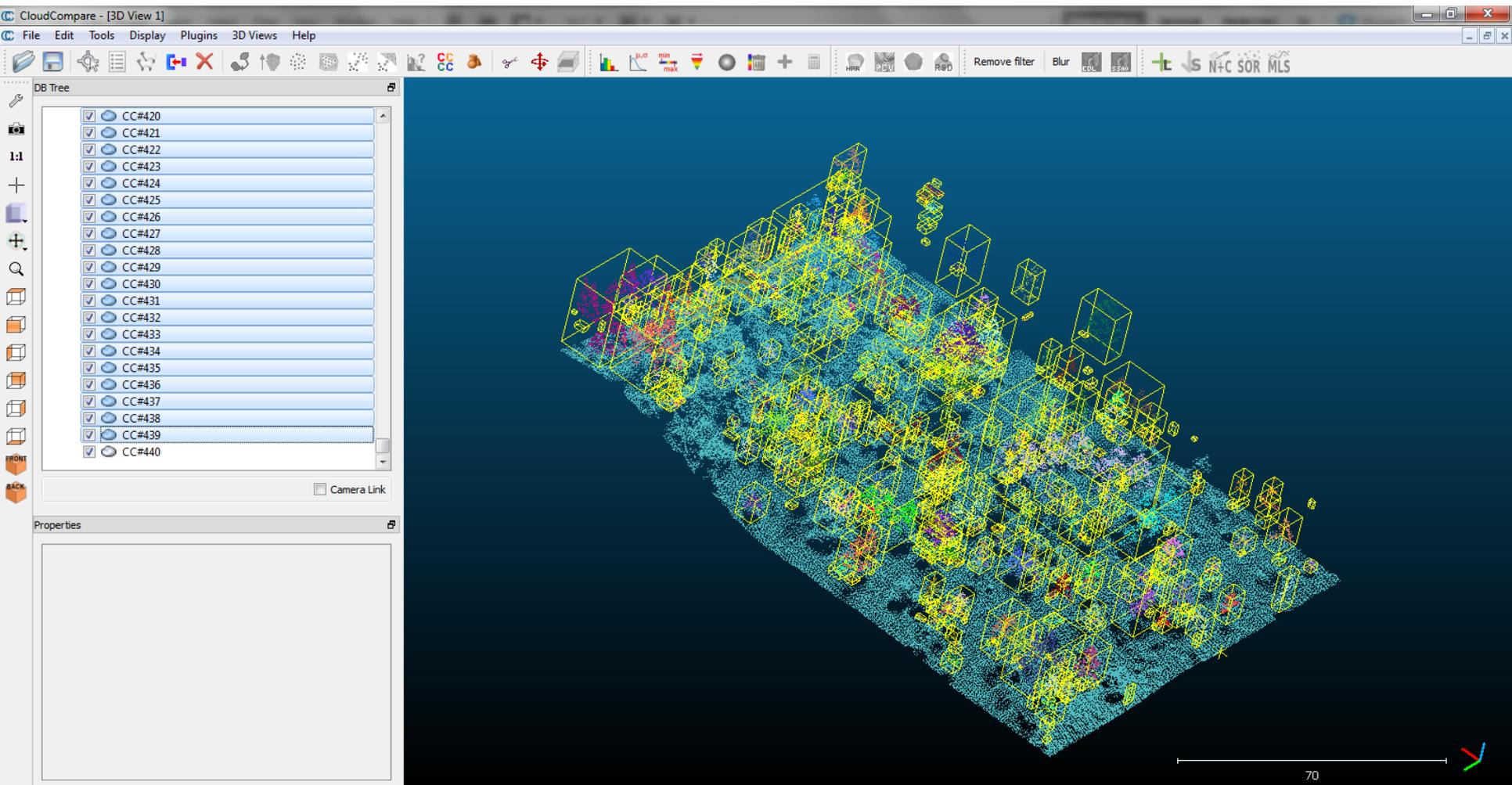


Octree





Octree level 8 connected points



Octree level 8 connected points

Switch to Cloud Comparison for garden with excavation (see demo on web site with video)



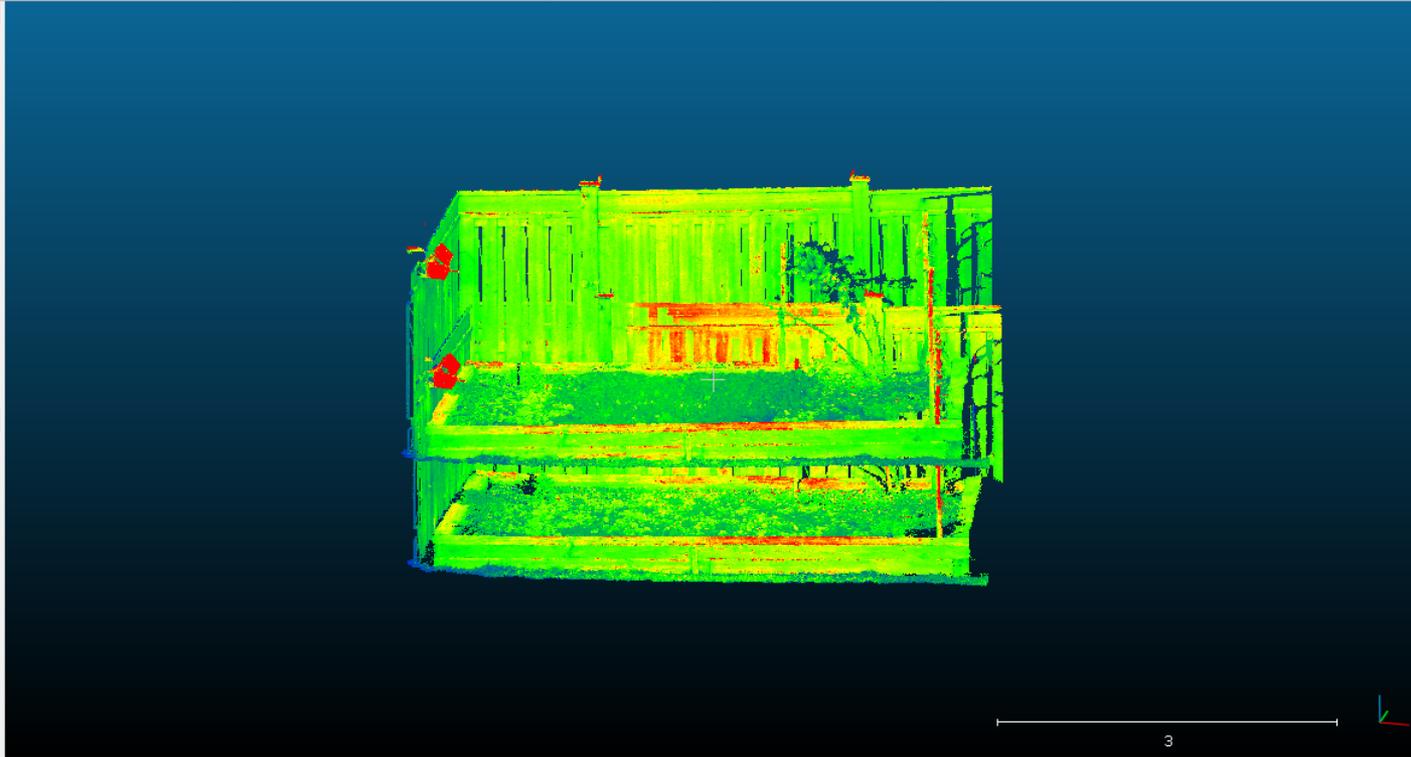
DB Tree

- CloudCompareGarden1.bin (C:/Users/Ramon/Desktop...)
 - CloudCompareGarden1 - Cloud
- CloudCompareGarden2.bin (C:/Users/Ramon/Desktop...)
 - CloudCompareGarden2 - Cloud

Camera Link

Properties

Empty area for object properties.



```
[22:00:30] [BIN] Version 2.2  
[22:00:30] [BIN] Opening file 'C:\Users\Ramon\Desktop\working\VISES\garden\CloudCompareGarden2.bin'...  
[22:00:30] [BIN] Version 2.2
```



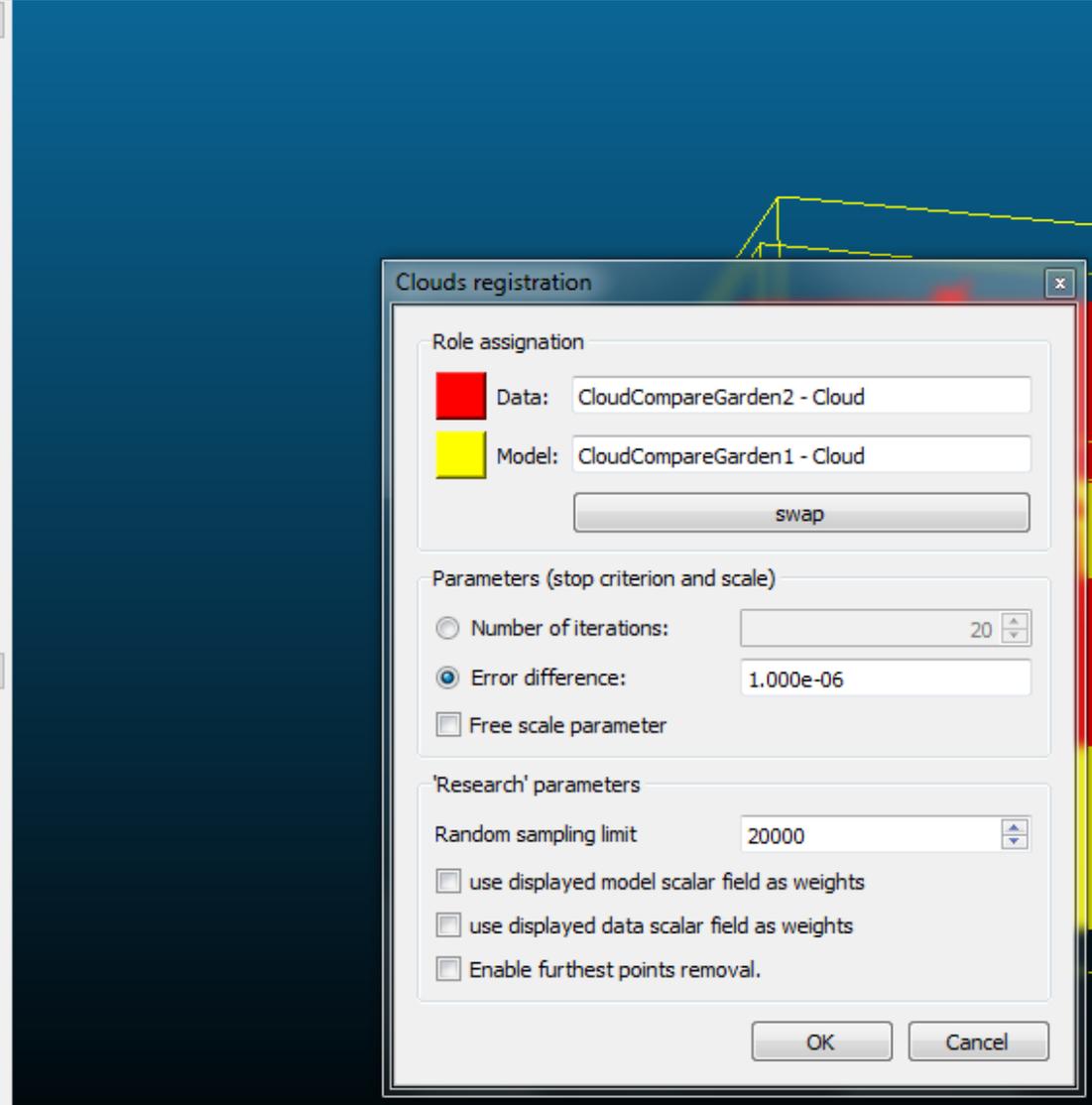
DB Tree

- CloudCompareGarden1.bin (C:/Users/Ramon/Desktop...)
 - CloudCompareGarden1 - Cloud
- CloudCompareGarden2.bin (C:/Users/Ramon/Desktop...)
 - CloudCompareGarden2 - Cloud

Camera Link

Properties

FRONT
BACK



Clouds registration

Role assignment

Data: CloudCompareGarden2 - Cloud

Model: CloudCompareGarden1 - Cloud

swap

Parameters (stop criterion and scale)

Number of iterations: 20

Error difference: 1.000e-06

Free scale parameter

'Research' parameters

Random sampling limit: 20000

use displayed model scalar field as weights

use displayed data scalar field as weights

Enable furthest points removal.

OK Cancel



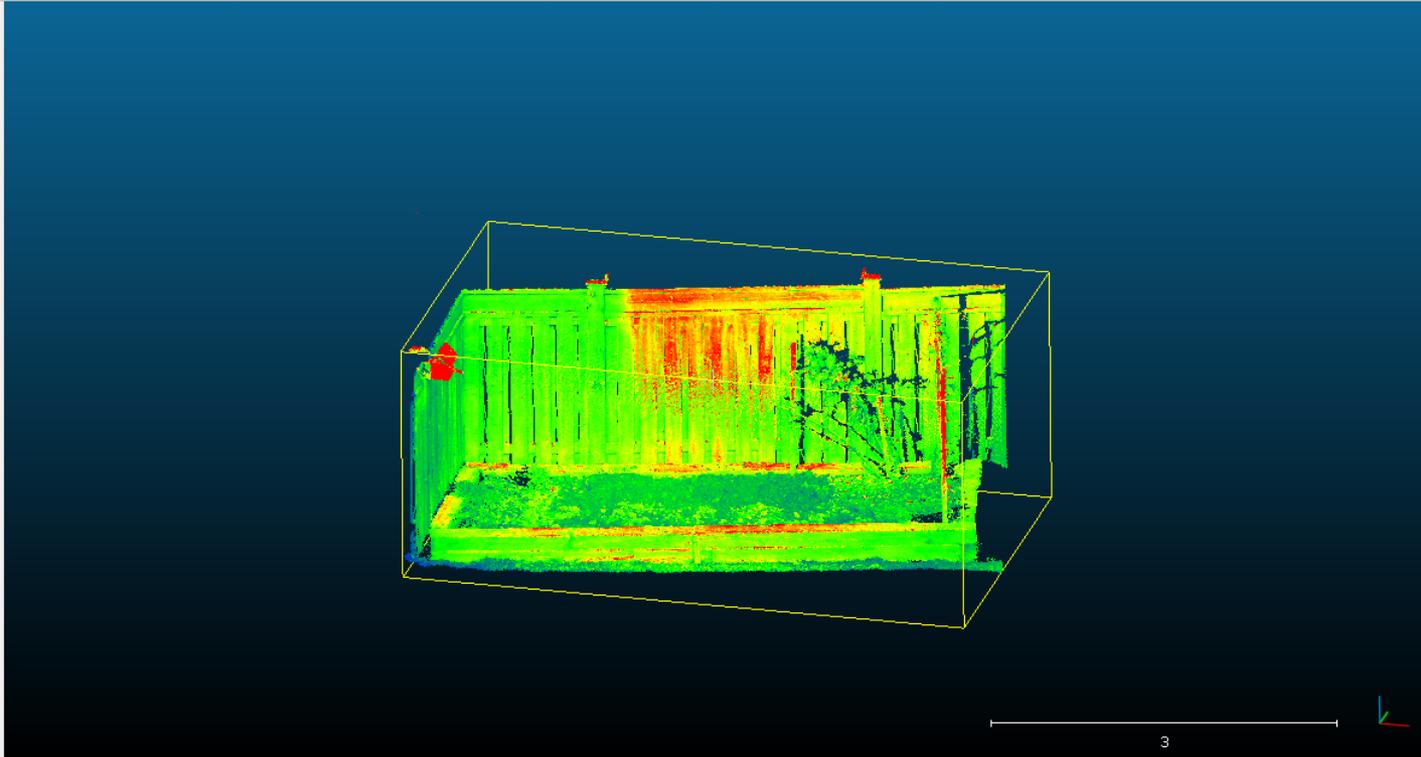
DB Tree

- CloudCompareGarden1.bin (C:/Users/Ramon/Desktop...)
 - CloudCompareGarden1 - Cloud.registered
- CloudCompareGarden2.bin (C:/Users/Ramon/Desktop...)
 - CloudCompareGarden2 - Cloud

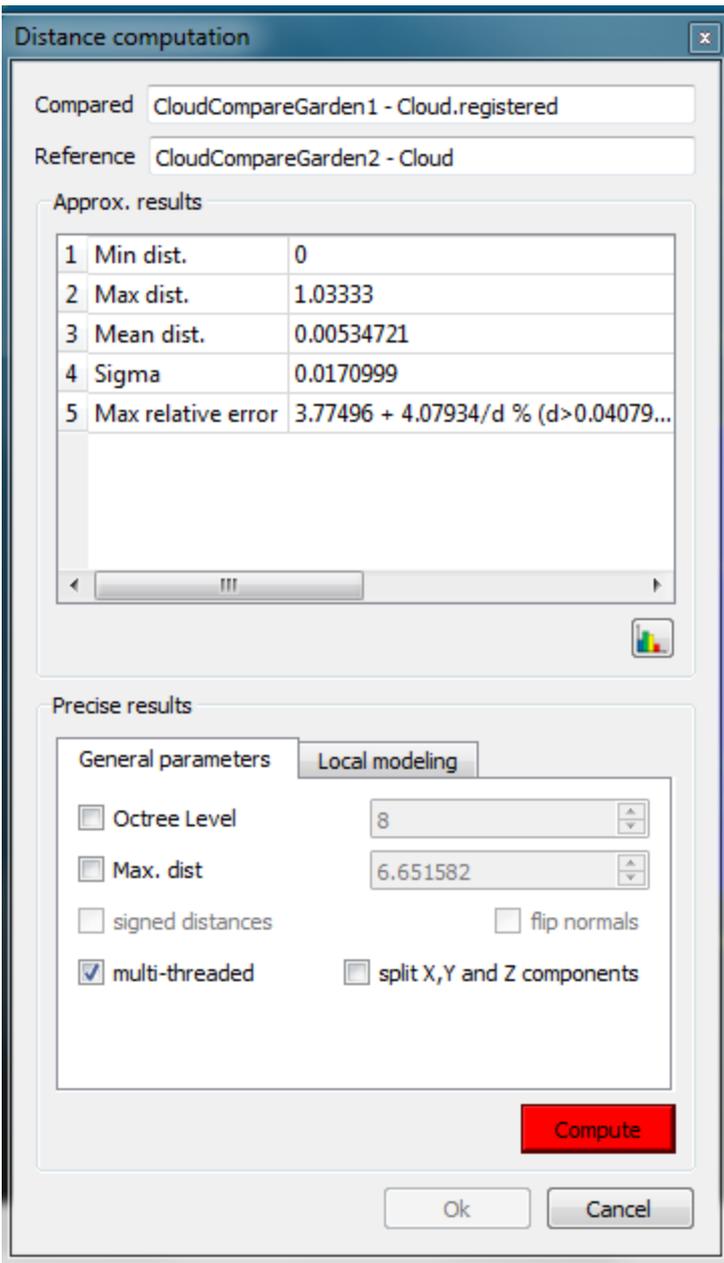
Camera Link

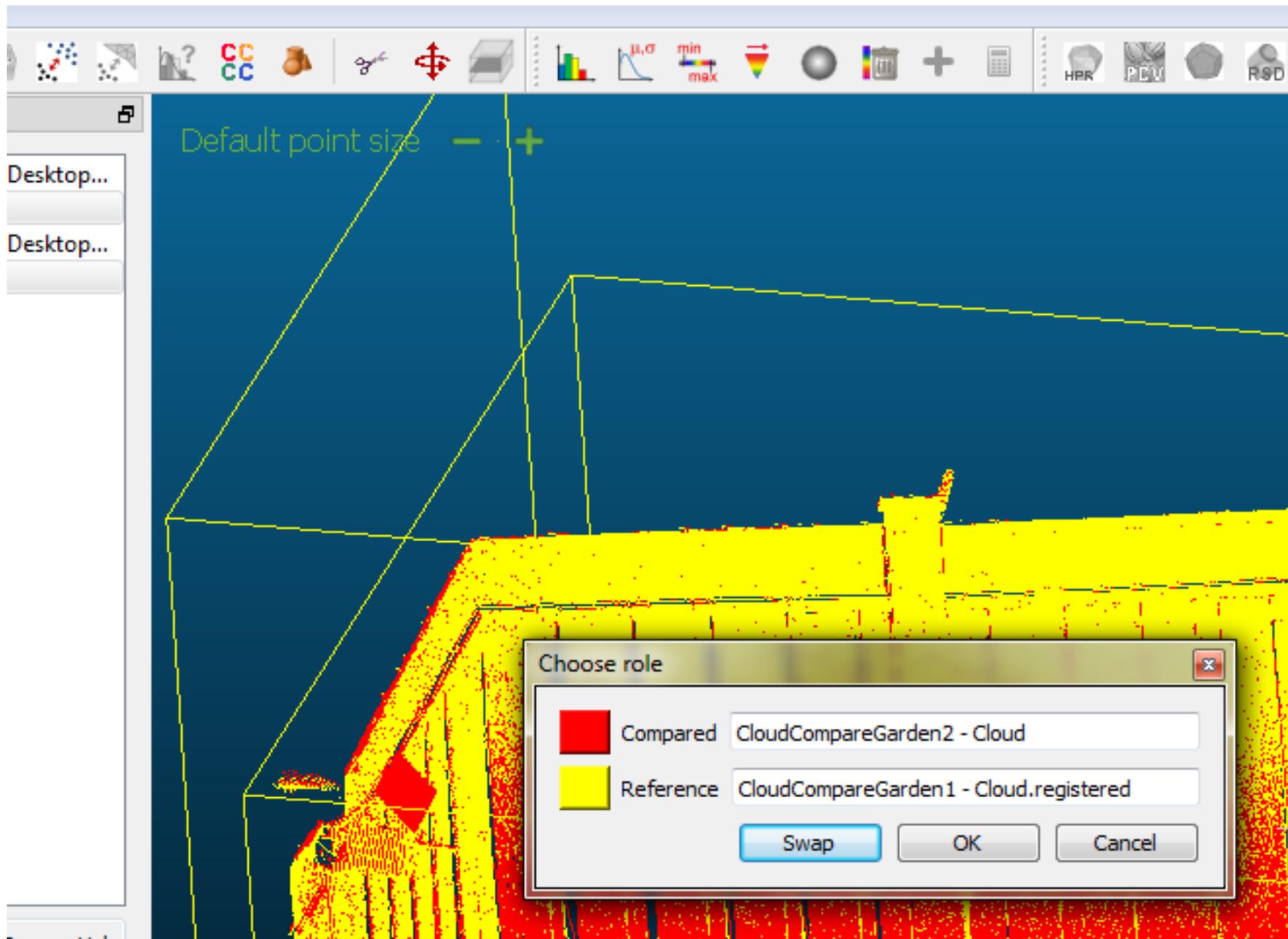
Properties

Property	State/Value
CC Object	
Name	CloudCompareGarden2 - Cloud
Unique ID	265
Children	0
Visible	<input checked="" type="checkbox"/>
Colors	<input checked="" type="checkbox"/>
Scalar Field	<input checked="" type="checkbox"/>
Show name (in 3D)	<input type="checkbox"/>
Current Display	3D View 1
Box dimensions	X: 5.0214 Y: 3.0212 Z: 2.14771
Box center	X: -0.086 Y: 1.9074



[22:03:36] Hint: copy it (CTRL+C) and apply it - or its inverse - on any entity with the 'Edit > Apply transformation' tool







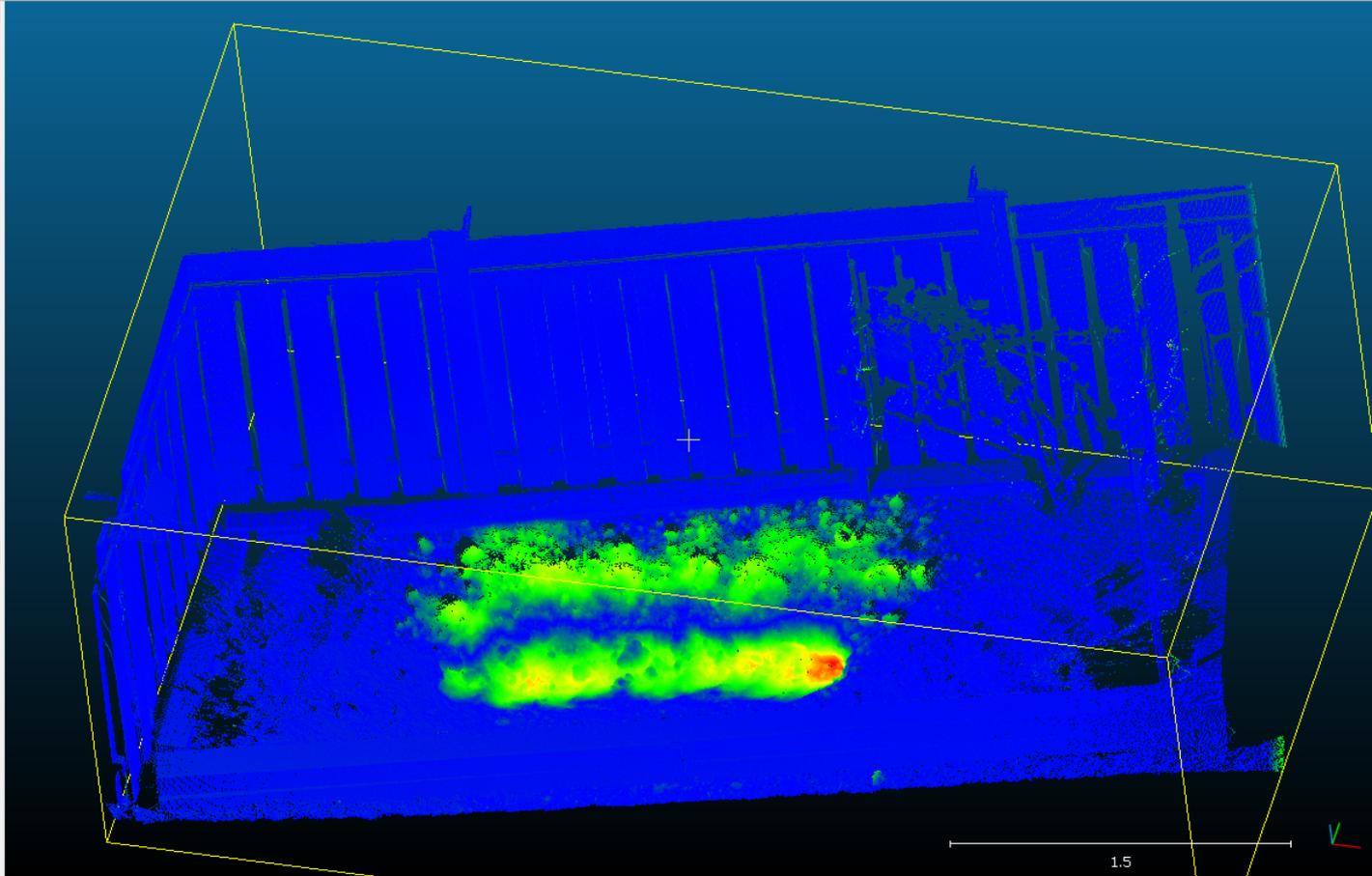
DB Tree

- CloudCompareGarden1.bin (C:/Users/Ramon/Desktop/...)
 - CloudCompareGarden1 - Cloud.registered
- CloudCompareGarden2.bin (C:/Users/Ramon/Desktop/...)
 - CloudCompareGarden2 - Cloud

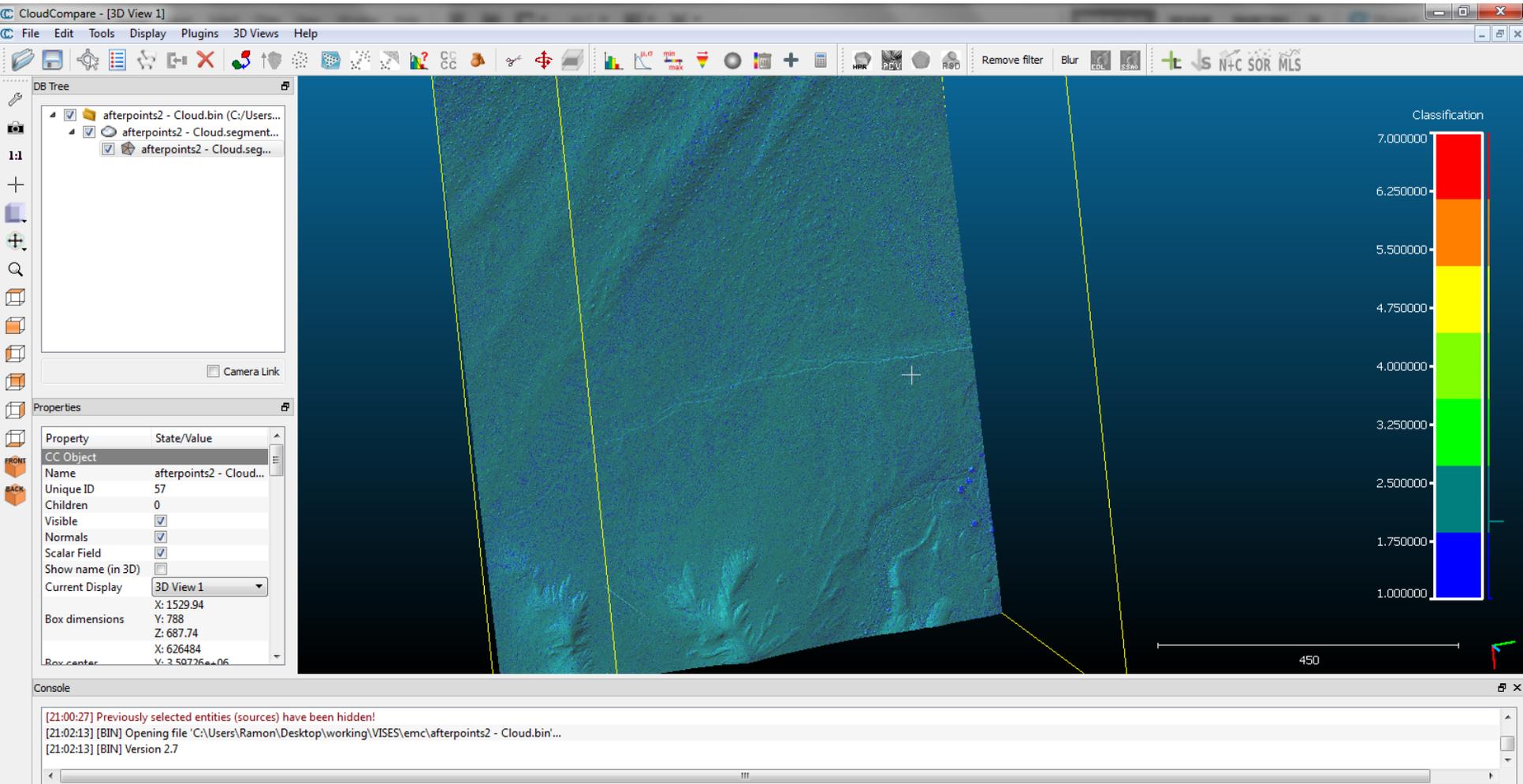
Camera Link

Properties

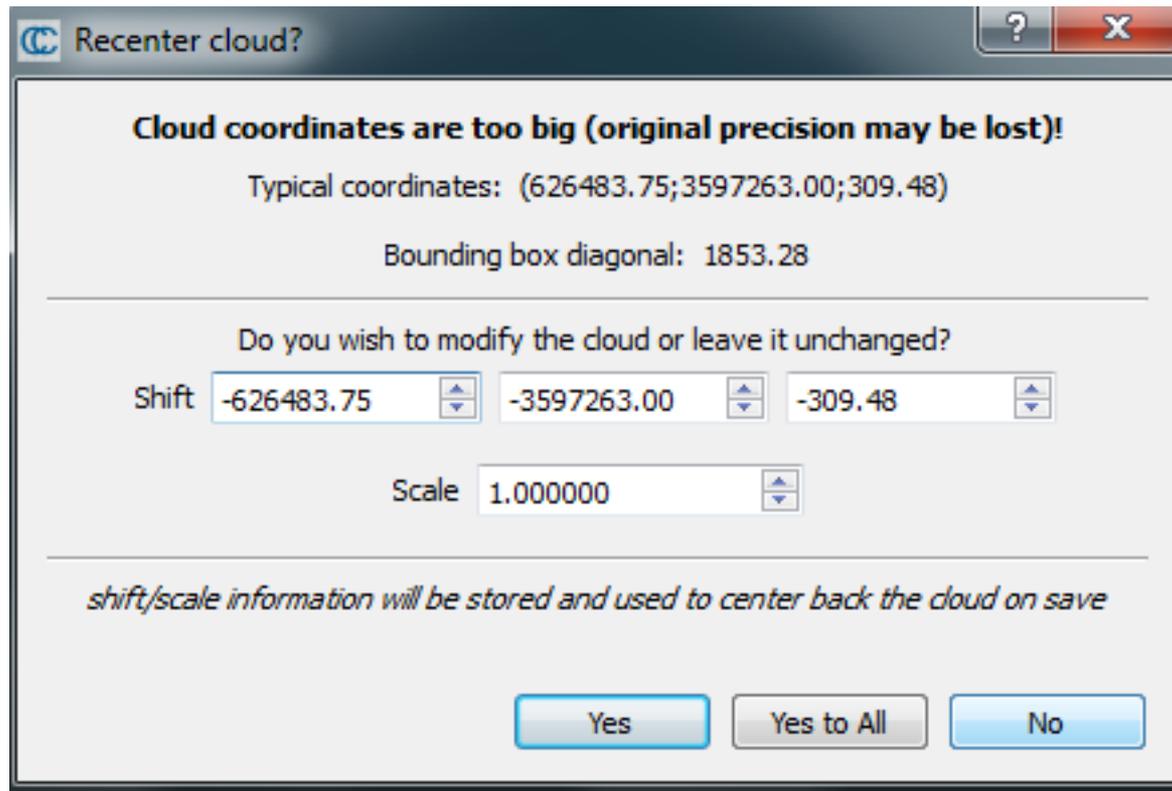
Property	State/Value
Steps	256
Visible	<input type="checkbox"/>
SF display params	
Display ranges Parameters	
0.00003026	displayed 0.19529627
0.00003026	saturation 0.19529627



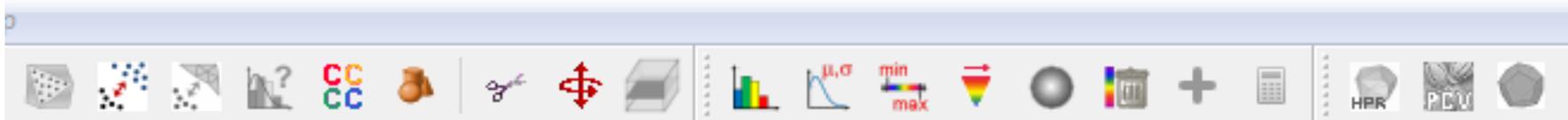
Switch to El Mayor Cucupah earthquake pre and post data analysis



Mesh the post event data

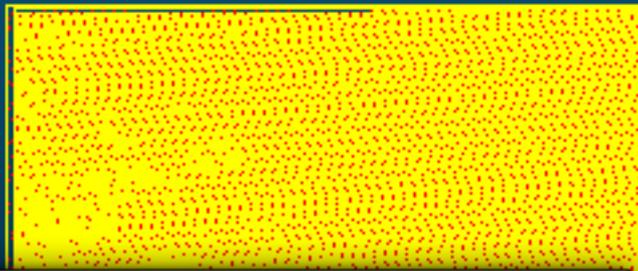


Import but do not recenter



File explorer sidebar with a tree view showing folders like "/Desktop/wo..." and "on/Desktop/...". At the bottom, there is a checkbox labeled "Camera Link" which is currently unchecked.

Default point size - · +



Choose role dialog box with a close button (X) in the top right corner.

	Compared	<input type="text" value="beforepoints2 - Cloud.segmented"/>
	Reference	<input type="text" value="afterpoints2 - Cloud.segmented"/>

Buttons:

Distance computation x

Compared beforepoints2 - Cloud.segmented

Reference afterpoints2 - Cloud.segmented

Approx. results

1	Min dist.	0
2	Max dist.	16.2803
3	Mean dist.	1.00077
4	Sigma	3.35676
5	Max relative error	$3.77496 + 1221.14/d$ % ($d > 12.2114$)



Precise results

General parameters Local modeling

Octree Level 8

Max. dist 1738.839111

signed distances flip normals

multi-threaded split X,Y and Z components

Compute

Ok Cancel



DB Tree

- afterpoints2 - Cloud.bin (C:/Users/Ramon/Desktop/wo...
 - afterpoints2 - Cloud.segmented
- beforepoints2 - Cloud.bin (C:/Users/Ramon/Desktop/...
 - beforepoints2 - Cloud.segmented

Camera Link

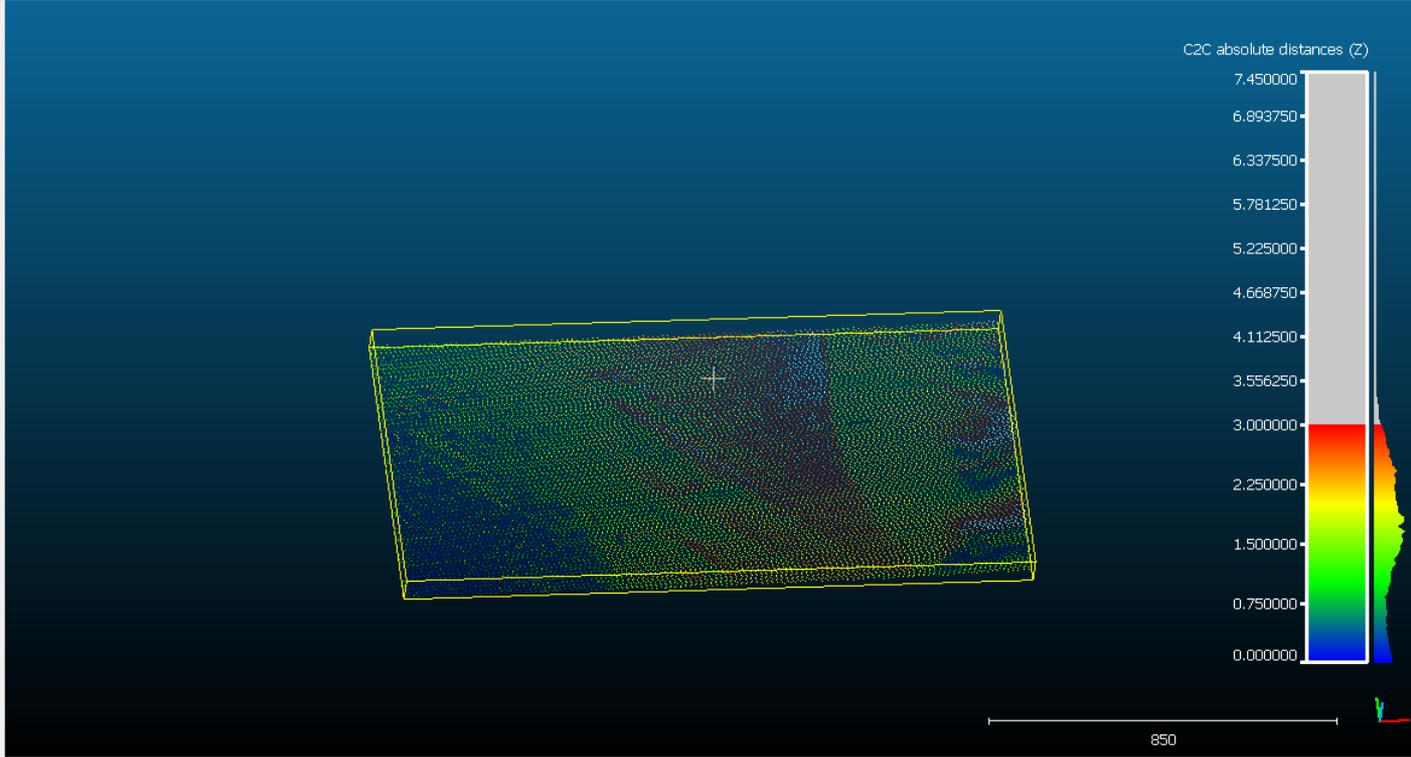
Properties

Property	State/Value
Steps	256
Visible	<input checked="" type="checkbox"/>

SF display params

Display ranges Parameters

0.00000000	displayed	3.00000000
<input type="text"/>		<input type="text"/>
0.00000000	saturation	3.00000000
<input type="text"/>		<input type="text"/>



Console

```
[21:13:58] [ComputeDistances] Time: 2.19 s.  
[21:13:58] [ComputeDistances] Mean distance = 1.749681 / std deviation = 0.974910  
[21:13:58] [ComputeDistances] Result has been split along each dimension (check the 3 other scalar fields with '_X', '_Y' and '_Z' suffix!)
```



DB Tree

- afterpoints2 - Cloud.bin (C:/Users/Ramon/Desktop/wo...
 - afterpoints2 - Cloud.segmented
- beforepoints2 - Cloud.bin (C:/Users/Ramon/Desktop/...
 - beforepoints2 - Cloud.segmented

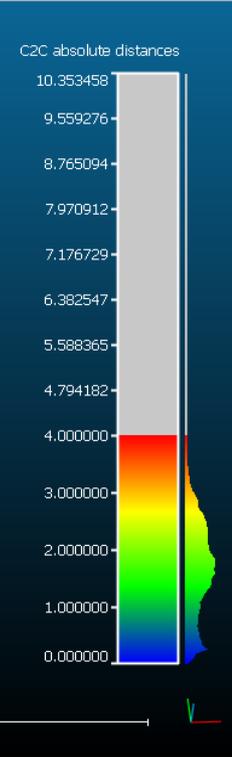
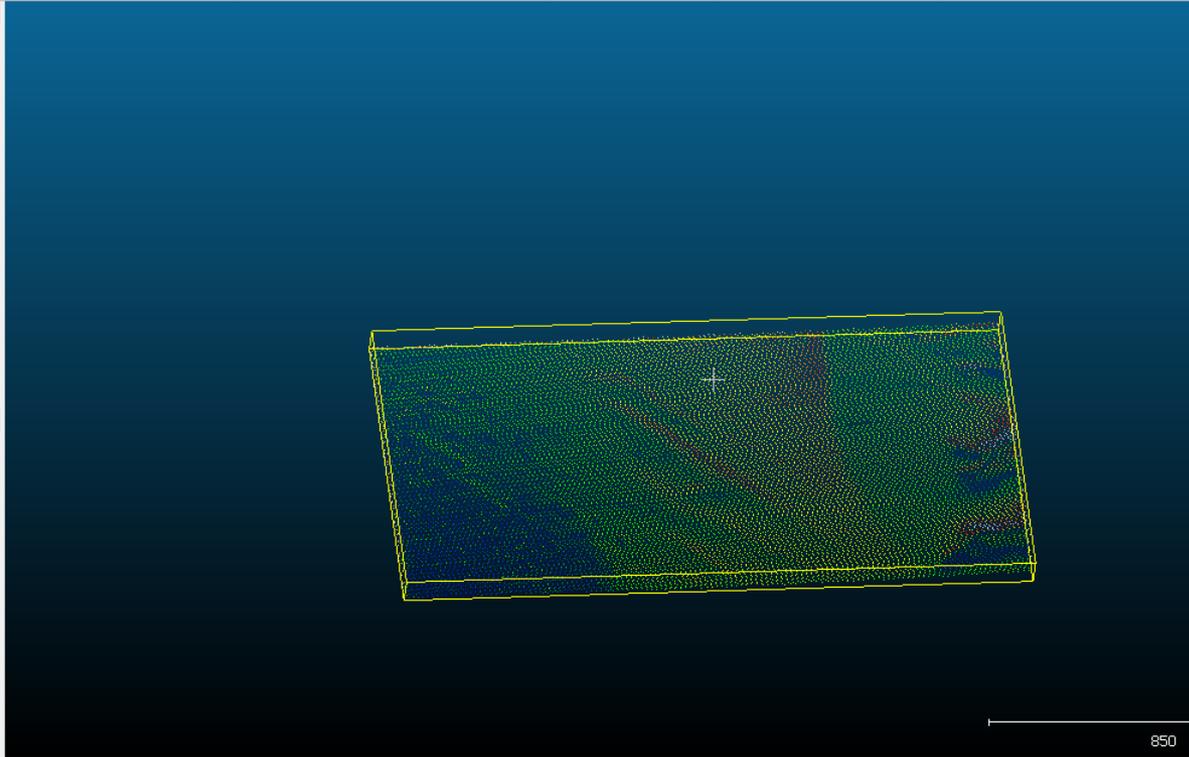
Camera Link

Properties

Property	State/Value
Steps	256
Visible	<input checked="" type="checkbox"/>

SF display params

Display ranges	Parameters
0.00000000	displayed 4.00000000
0.00000000	saturation 4.00000000



```
[21:10:03] [ComputeApproxDistances] Time: 2.16 s.  
[21:10:09] [ComputeDistances] Time: 2.18 s.  
[21:10:09] [ComputeDistances] Mean distance = 1.749681 / std deviation = 0.974910
```