

Point cloud comparisons with CloudCompare

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Data collected with Erin DiMaggio (PSU) and David Feary (ASU)

Tutorial notes
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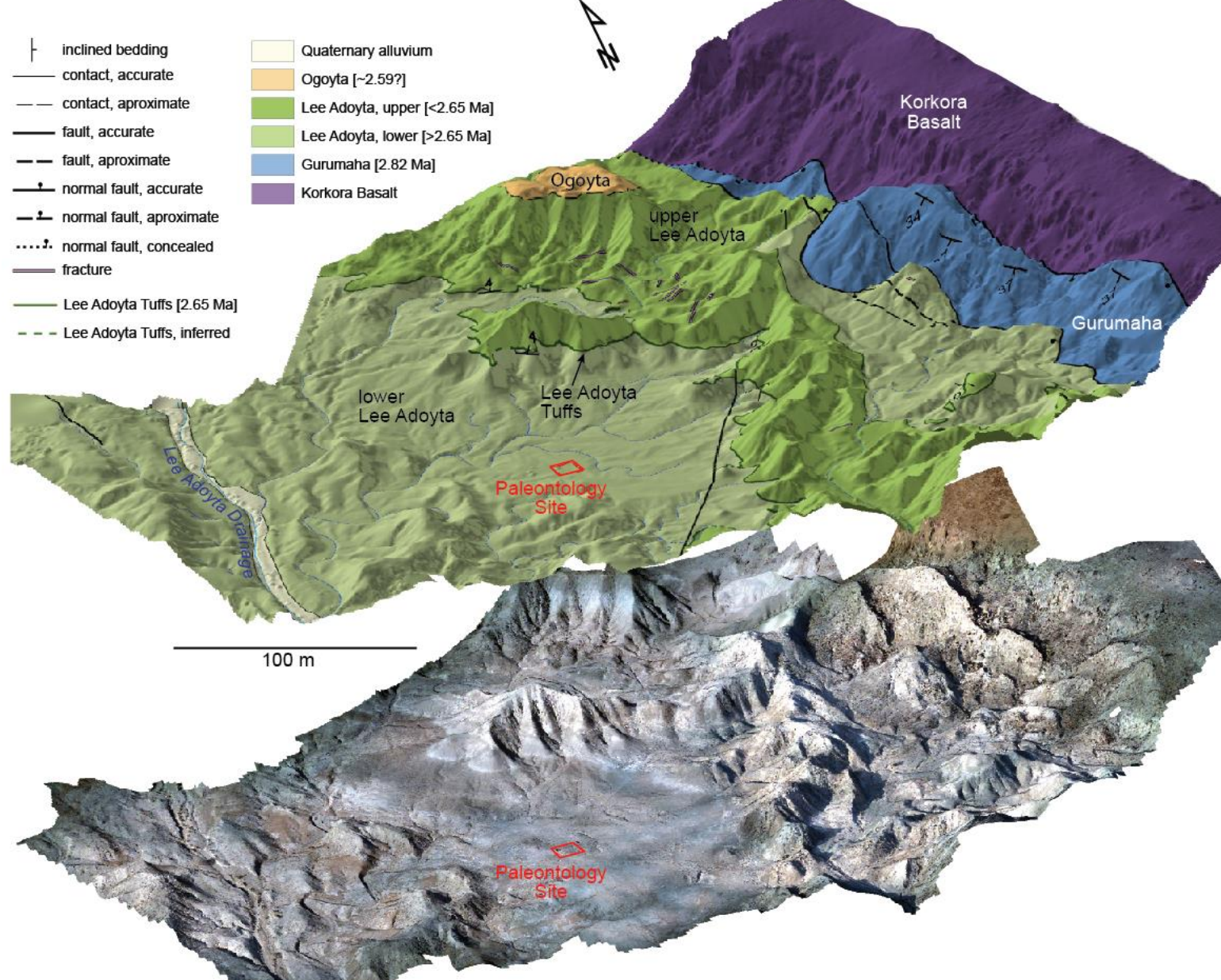
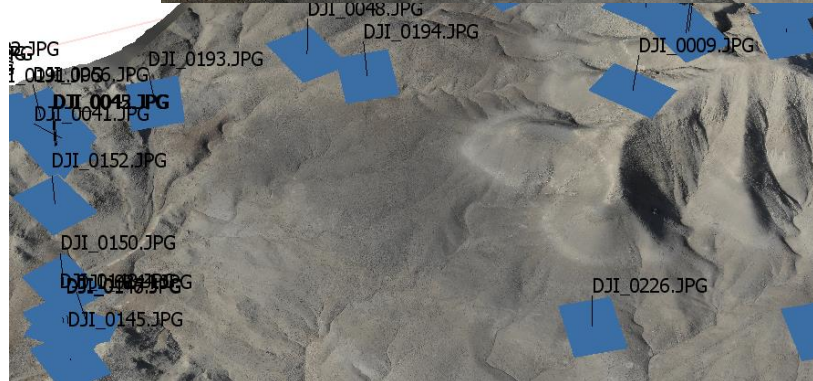


OpenTopography
High-Resolution Topography Data and Tools

Ground
control
dGPS



DJI
Mavic
Air
images



Detailed geology of Lee Adoyta, Ledi Geraru Research Project Afar Ethiopia:

Rapid acquisition of imagery of deformed fossiliferous and tuff-bearing sedimentary rocks in the Afar region of Ethiopia provide 3D control for paleontological provenance and environmental reconstruction studies

Multiple acquisitions: how do the results compare?

DJI Mavic Air (Arrowsmith)

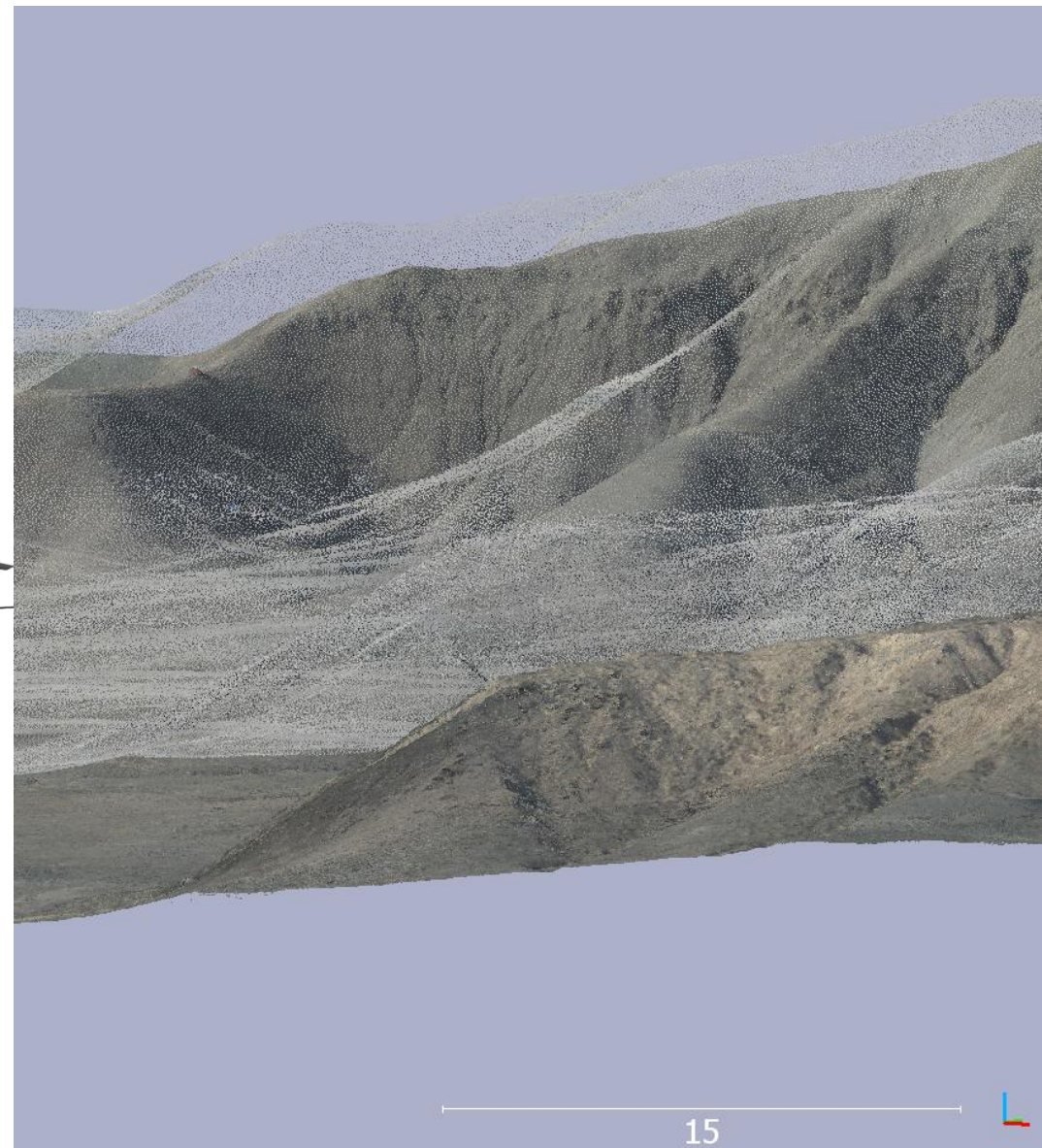


+dGPS georeferencing

DJI Inspire 2 + ZenMuse camera (Feary)



*On board GPS
positioning for cameras*





CloudCompare

3D point cloud and mesh processing software
Open Source Project

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Welcome to the official website of the **CloudCompare** project.

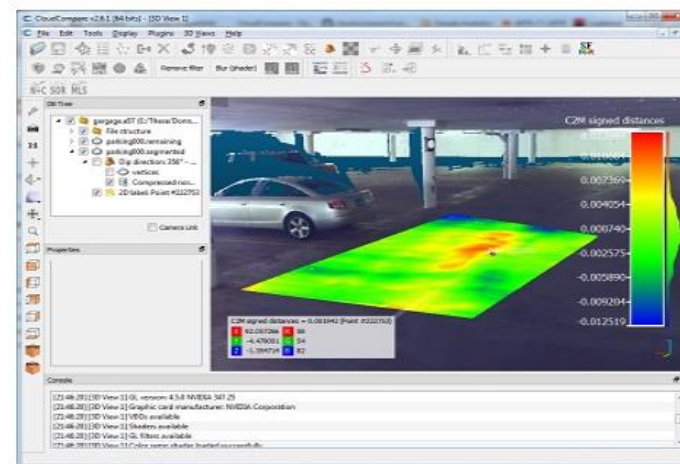
Want to know when a new release comes out? Subscribe to the newsletter

[JOIN](#)

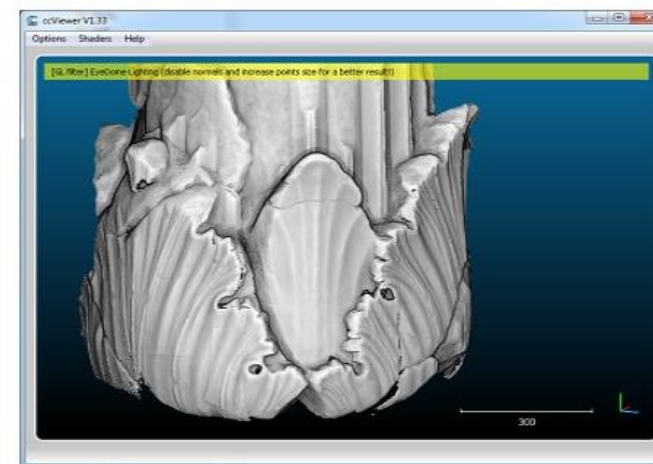
You can now follow us on [twitter](#) 

CloudCompare 2020 Developers training & Workshop: March 11-13 2020

[Visit the event page](#)



CloudCompare (view, edit and process)



ccViewer (light viewer only)

Download the short course presentations of the 2nd Virtual Geoscience Conference 2016 (in English) [here](#)

Télécharger le support de formation du congrès de la SFPT 2018 (in French) [ici](#)

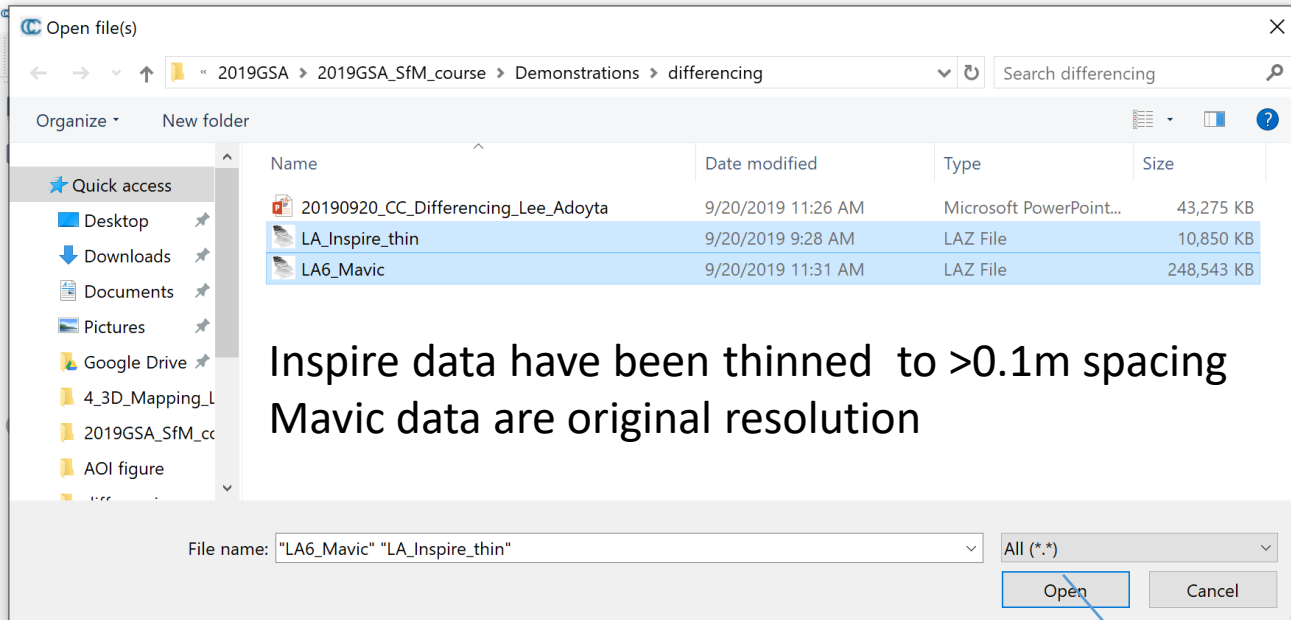
CloudCompare and ccViewer currently run on Windows, MacOS and Linux.

You are free to use them for any purpose, including commercially or for education. This freedom is being defined by the [GNU General Public License \(GPL\)](#).

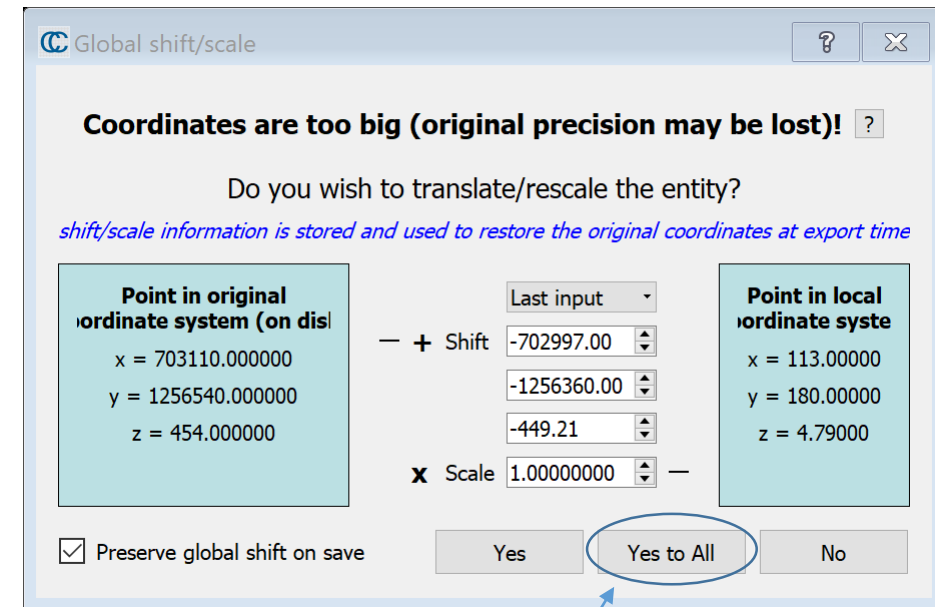
[CloudCompare home](#) - [cloudcompare.org](#) - [EDF R&D](#) - [contact](#)

Step 1: Open the two point clouds in CloudCompare

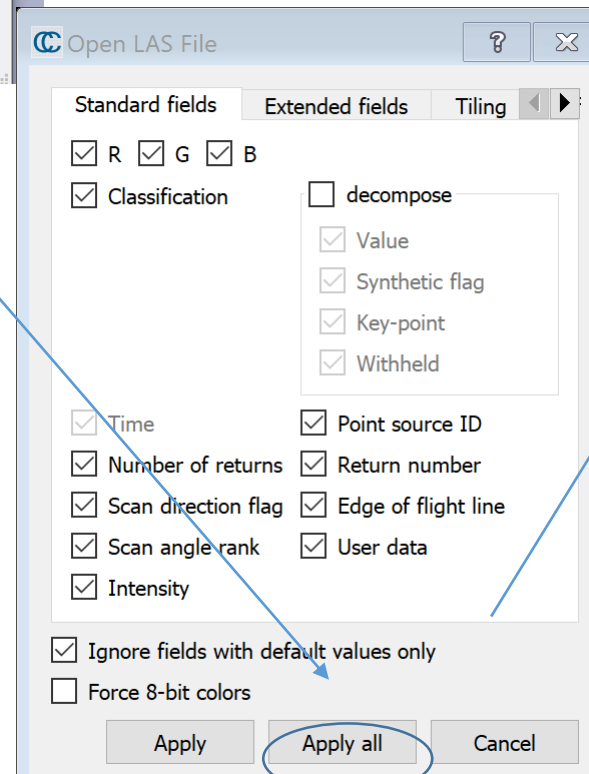
CloudCompare v2.10 (Zephyrus) [64-bit] - [3D View 1]



It is built for opening lidar-derived point clouds which may have many attributes with each point.



More accurate computations with a temporary local origin



Step 2: explore the data and interface

The screenshot displays a 3D point cloud visualization of a crater-like terrain. The interface includes a top toolbar with various icons for file operations, viewing, and analysis. On the left, there is a 'DB Tree' panel showing a hierarchy of data layers: 'LA_Inspire_thin.laz' and 'LA6_Mavic.laz', each with a 'Cloud' sub-layer. A text box within the DB Tree panel states: 'Make sure to make the right data set active'. Below the DB Tree is a 'Properties' panel for the selected 'LA6_Mavic - Cloud' object, showing settings for visibility, colors (RGB), and box dimensions/center. At the bottom is a 'Console' panel with log messages: '[11:42:09] New point size: 2' and '[11:42:13] New point size: 3'. The main 3D view shows a dark, textured crater floor with a small red and blue object in the center. A scale bar labeled '10' is visible in the bottom right corner of the 3D view.

DB Tree

- LA_Inspire_thin.laz (C:/Users/...)
 - LA_Inspire_thin - Cloud
- LA6_Mavic.laz (C:/Users/ram...)
 - LA6_Mavic - Cloud

Make sure to make the right data set active

Properties

Property	State/Value
CC Object	
Name	LA6_Mavic - Cloud
Visible	<input checked="" type="checkbox"/>
Show n...	<input type="checkbox"/>
Colors	RGB
Box dim...	X: 206.538 Y: 176.462 Z: 16.135
Box cen...	X: 103.746 Y: 87.485 Z: 8.0655
Info	Object ID: 10 - Children...

Console

```
[11:42:09] New point size: 2  
[11:42:13] New point size: 3
```

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Step 3: Cut out the hill from both datasets (do each separately)

The screenshot shows a 3D visualization software interface. The main view displays a terrain dataset with a green polygonal selection. The interface includes a DB Tree on the left, a Properties panel, and a Console at the bottom.

DB Tree:

- LA_Inspire_thin.laz (C:/Users/ram...)
- LA_Inspire_thin - Cloud
- LA6_Mavic.laz (C:/Users/ram...)
- LA6_Mavic - Cloud

Properties:

Property	State/Value
CC Object	
Name	LA6_Mavic - Cloud
Visible	<input checked="" type="checkbox"/>
Show n...	<input type="checkbox"/>
Colors	RGB
Box dim...	X: 206.538 Y: 176.462 Z: 16.135
Box cen...	X: 103.746 Y: 87.485 Z: 8.0655
Info	Object ID: 10 - Children...

Console:

```
[11:42:13] New point size: 3  
[11:45:18] [Graphical Segmentation Tool] Entity [Octree] is not visible in the active 3D view!
```

Annotations:

- 1) Make sure to make the right data set active
- 2) Click the scissors tool
- 3) Left click: add contour points / Right click: close
- 4) Click the red hexagon and then the green check

Segmentation [ON] (polygonal selection)

Step 4: Measure the distance between two common locations

1) Shift click the two cut pieces

2) Select the point picking tool

3) Click on the two matching points

Distance: 2.066255
 ΔX 0.945000 ΔXY 1.231717
 ΔY -0.790001 ΔXZ 1.909269
 ΔZ -1.659000 ΔZY 1.837494

[11:51:44] New point size: 4
[11:51:45] New point size: 5

Step 5: Merge the data back together (do each separately)

The screenshot displays the CloudCompare v2.12.1 interface. The main 3D view shows a point cloud of a landscape with a yellow rectangular selection box. The left sidebar contains the 'DB Tree' and 'Properties' panels. The 'DB Tree' panel shows a hierarchy of data sources: 'LA_Inspire_thin.laz' (checked) and 'LA6_Mavic.laz' (unchecked). Under 'LA_Inspire_thin.laz', there are two checked items: 'LA_Inspire_thin - Cloud.r...' and 'LA_Inspire_thin - Cloud.r...'. Under 'LA6_Mavic.laz', there is one checked item: 'LA6_Mavic - Cloud.segm...'. The 'Properties' panel is empty. The 'Console' panel at the bottom shows two log entries: '[11:54:09] [Picked] - [shifted] (96.324997;117.708000;8.856000)' and '[11:54:09] [Picked] - [original] (703093.324997;1256477.708000;458.066000)'. A scale bar in the bottom right of the 3D view indicates a distance of 5.5 units.

2) Select the merge tool

1) Shift click the two pieces

5.5

[11:54:09] [Picked] - [shifted] (96.324997;117.708000;8.856000)
[11:54:09] [Picked] - [original] (703093.324997;1256477.708000;458.066000)

Step 6: Thin the Mavic data

1) Select the Mavic data

2) Select the subsample tool

default point size --+
default line width - +

Cloud sub sampling

Sampling parameters

method

Space

large

small

min. space between points

0.1000

☐ Use active SF

SF value

Spacing value

min 0

0.100000

max 1

0.100000

OK

Cancel

Property State/Value

CC Object

Name LA6_Mavic - Cloud.rem...

Visible ☒

Show n... ☐

Colors RGB

X: 206.538

Box dim... Y: 176.462

Z: 16.135

X: 103.746

Box cen... Y: 87.485

Z: 8.0655

Info Object ID: 10 - Children...

Console

[11:59:24] [LoD][pass 2] Level 10: 710291 cells (+390614)

[11:59:24] [LoD] Acceleration structure ready for cloud 'LA6_Mavic - Cloud.remaining' (max level: 10 / mem. = 57.45 Mb / duration: 10.9 s.)

Step 7: Cloud to cloud distance between the two datasets

1) Select the two datasets

2) Select the cloud to cloud distance tool

Choose role

<input checked="" type="checkbox"/>	Compared	ic - Cloud.remaining.subsampled
<input checked="" type="checkbox"/>	Reference	in - Cloud.remaining.segmented

Swap OK Cancel

Distance computation

Compared LA6_Mavic - Cloud.remaining.subsampled

Reference A_Inspire_thin - Cloud.remaining.segmented

Precise results

General parameters Local modeling

Ocree level AUTO

☐ max. distance 5.421421

☐ signed distances ☐ flip normals

☒ split X,Y and Z components

☐ use reference sensor to filter hidden points

☒ multi-threaded max thread count 4 / 4

Compute

Ok Cancel

25

Console

[11:59:24] [LoD] Acceleration structure ready for cloud 'LA6_Mavic - Cloud.remaining' (max level: 10 / mem. = 57.45 Mb / duration: 10.9 s.)
[12:02:07] [Subsampling] Timing: 23.454 s.

Step 7: Cloud to cloud distance between the two datasets

