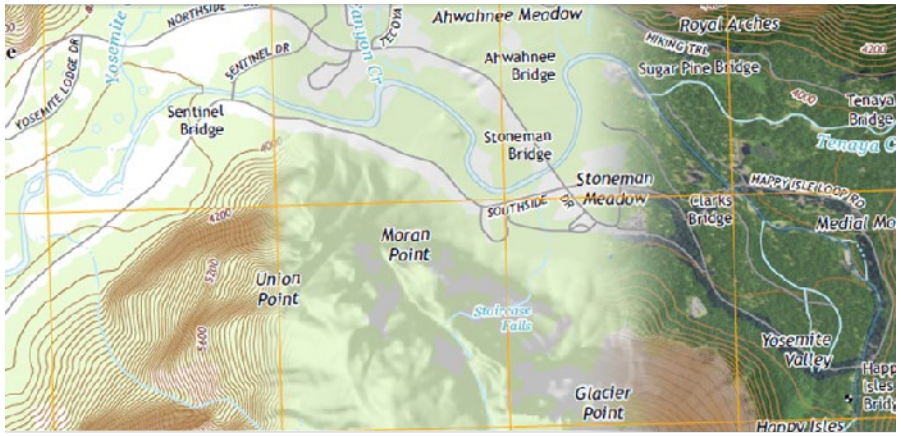
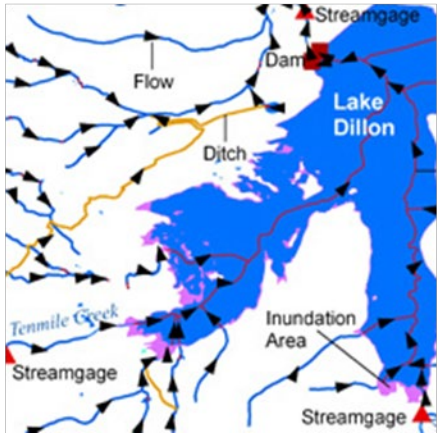
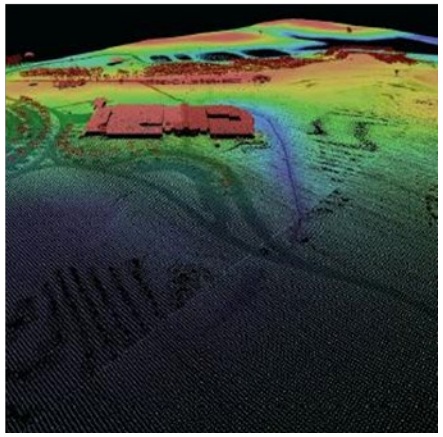
LOWERING THE BAR FOR LIDAR POINT CLOUD EXPLORATION AND USE IN MAPPING







Ethan Shavers[a]*, Lawrence Stanislawski[a], Bradley J Huffman[b], Travis C Adams[b], Jimmy M Clark[b], and Philip T Thiem[a]

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USGS science for a changing world

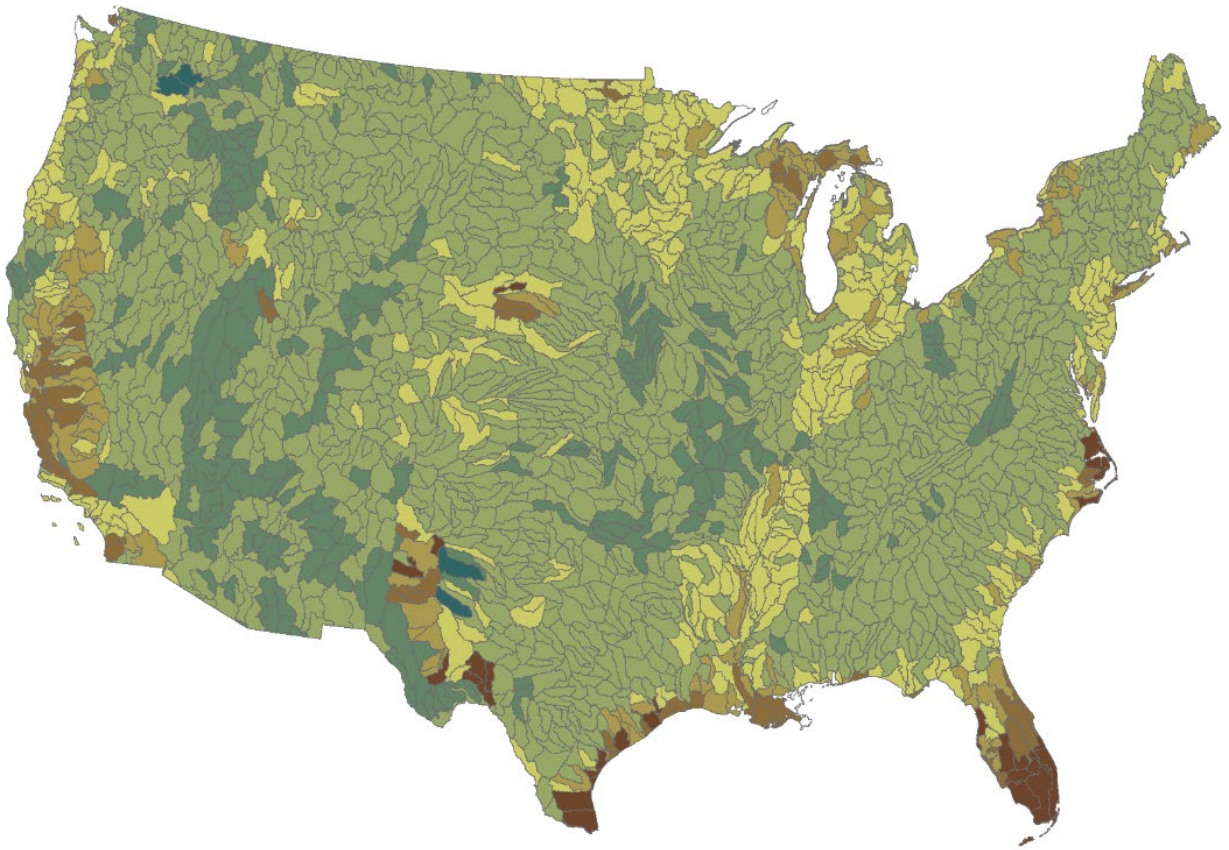
The National Map
Your Source for Topographic Information

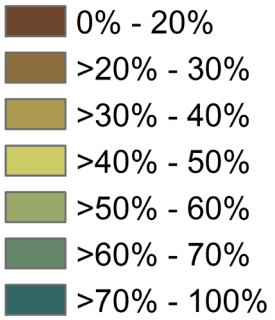
Motivation

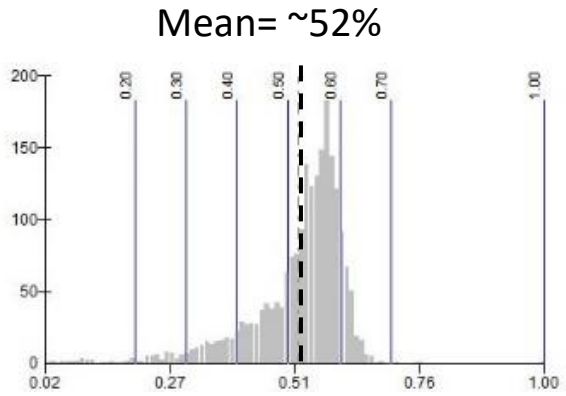
NHD (National Hydrography Dataset)

Headwater Streams

1:24k first-order stream length as percentage of total stream length



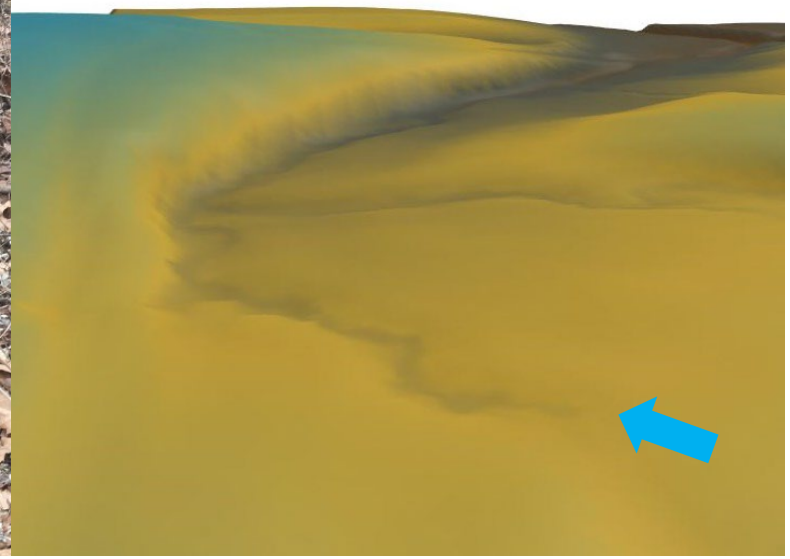




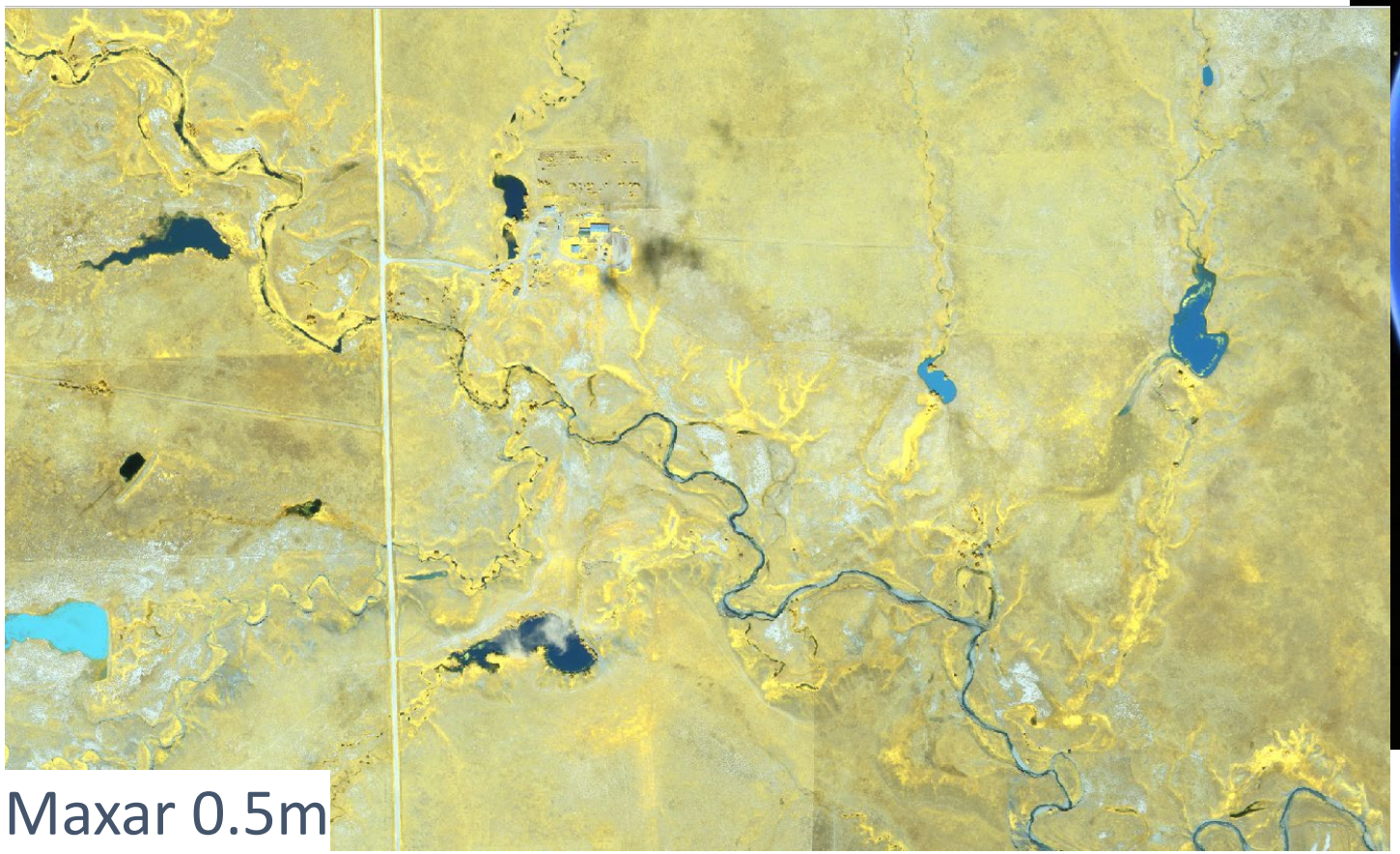
Motivation

Headwater streams

NHD 1:24k first-order stream length as percentage of total stream length



Motivation



Maxar 0.5m

Topography of low vegetation:

Digital surface models of the point cloud with Z values replaced by the height above ground

Lidar above ground height (m)

High : 0.3

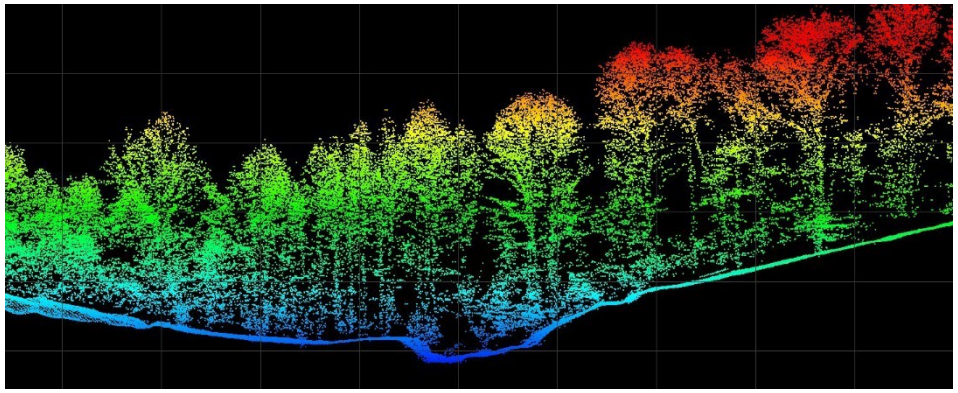
Low : 0

Stream heads

Topography of low vegetation:

Digital surface models of the point cloud with Z values replaced by the height above ground

Topography of low vegetation:



A A’

---- Supervised stream lines

Lidar above ground height (m)

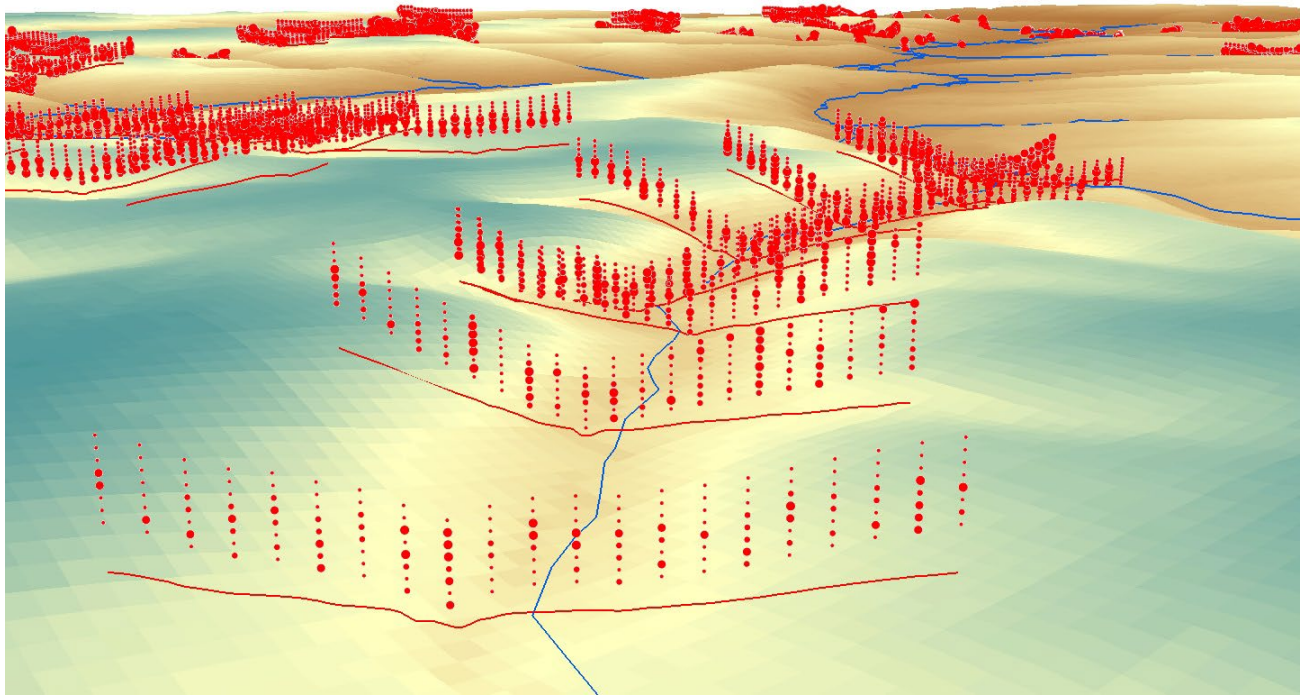
High : 0.3

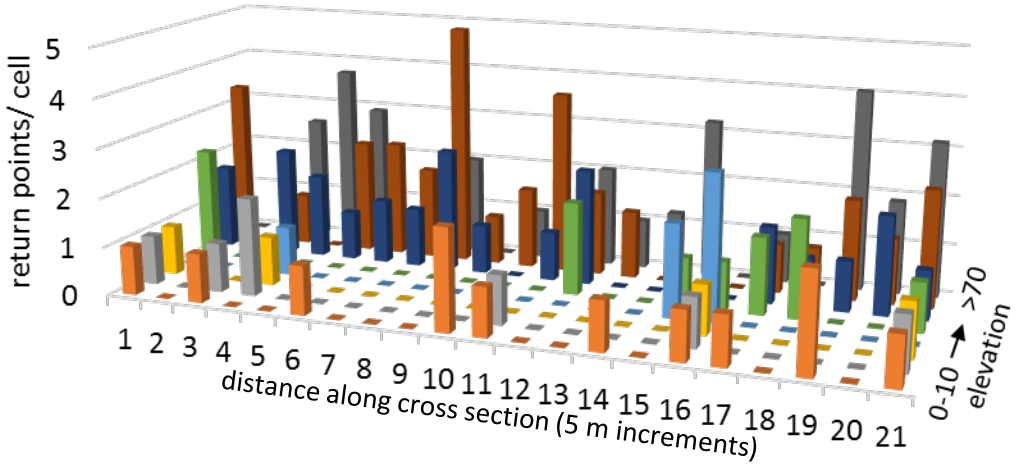
Low : 0

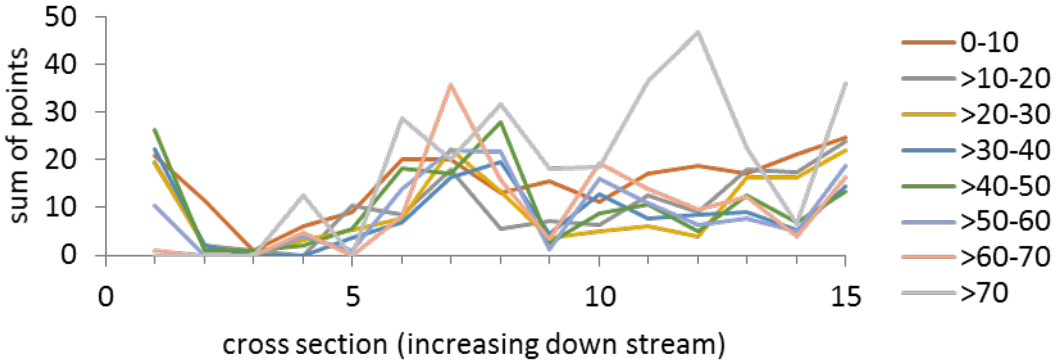
Stream heads

Vegetation density modeling

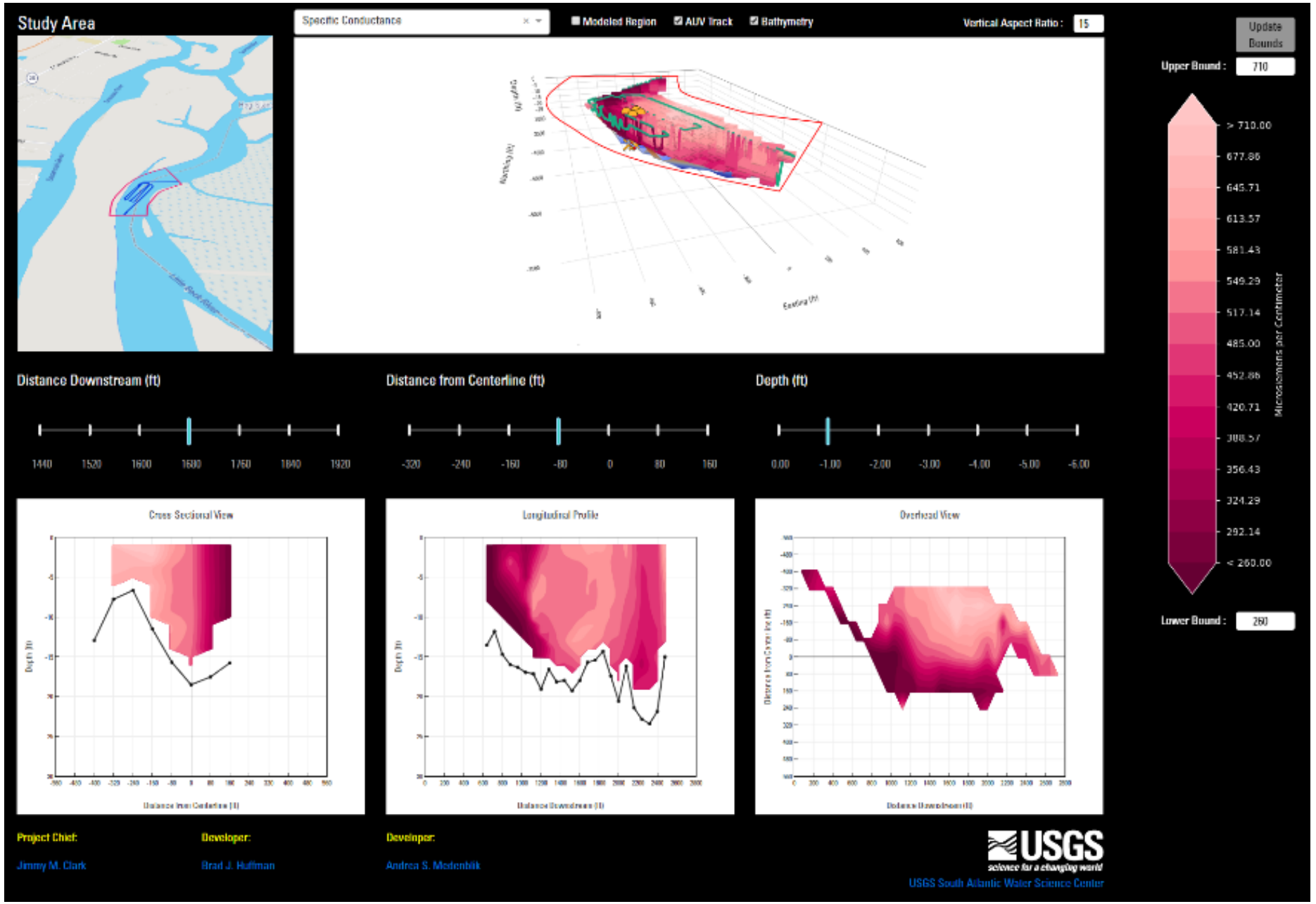
- Point return density along channels
- Voxels calculated in vertical increments







WaterRAT:
FY20 CDI
Medenblick
Proposal



Huffman, B.J., and Medenblik, A.S., 2019. Waterbody Rapid Assessment Tool (WaterRAT) 1.0.0. Preliminary software release, https://github.com/bhuffman-usgs/waterrat.

Community for Data Integration (CDI)

Connect and collaborate

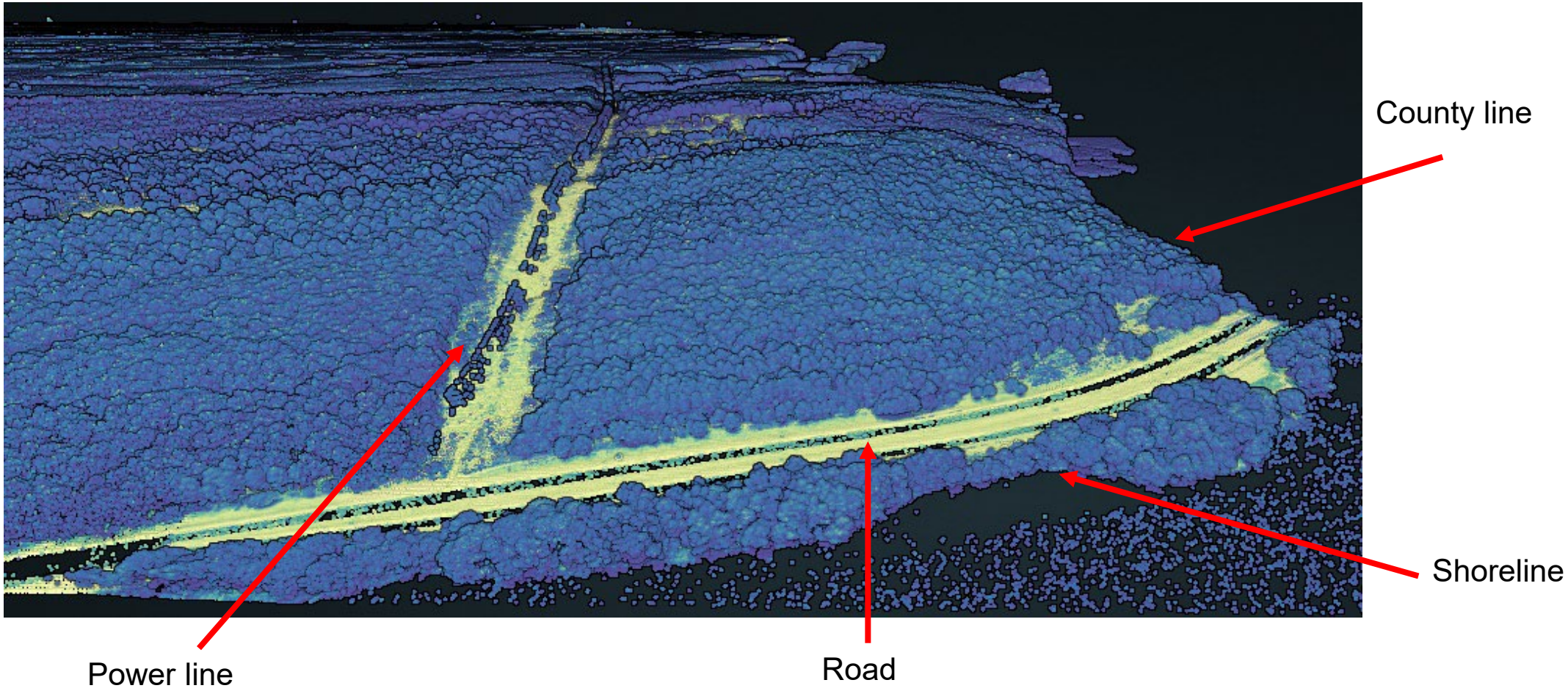
The Community for Data Integration (CDI) is a dynamic community of practice working together to grow USGS knowledge and capacity in scientific data and information management and integration.

FY22 CDI Full Proposal

CorVis: A lidar point cloud tool for visualization and analysis of corridors such as hydrologic, energy, and transportation networks

Corridor visualization (CorVis)

Corridor= migration route, stream, shoreline, road, power line, administrative boundary, …

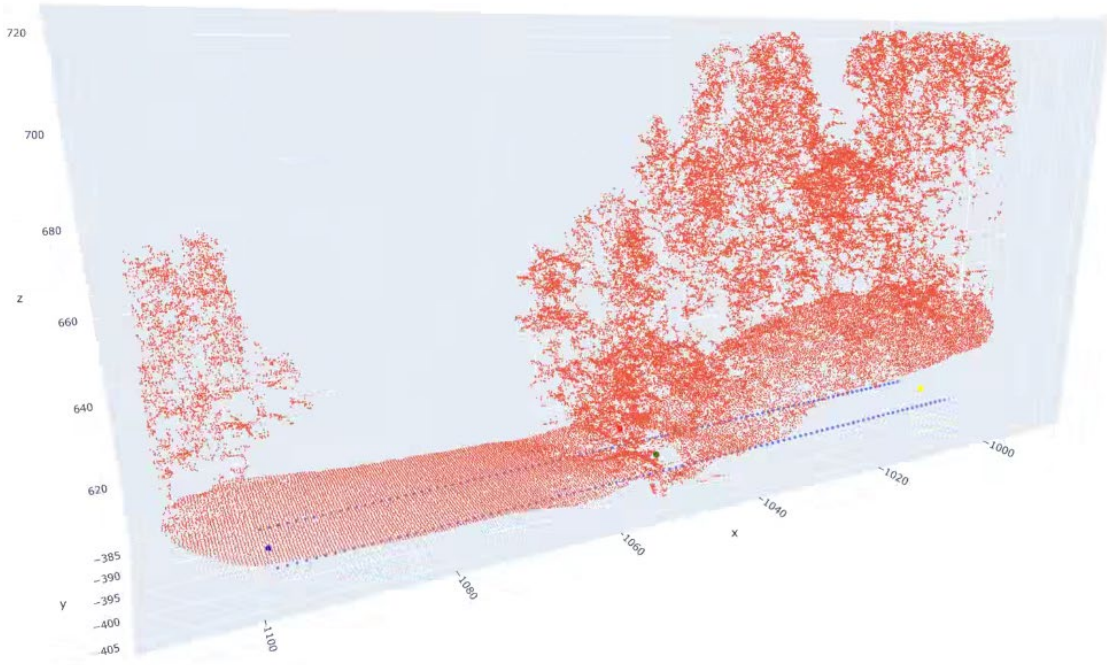


usgs.entwine.io

Corridor visualization (CorVis)

Goals:

- Use any line shapefile for navigation and sampling
- Las file point-cloud compatible
- Visualize point data
- Output standard sampling of PC data along a line
- Detailed metadata



Column description	
cid	cross-section id
latlon	list of coordinates from left to right, across the cross-section
elev	list of elevations from left to right, at corresponding lat lon coordiantes
hag	list of heights above ground in the cross-section matrix, from bottom to top
intensity, sd_intensity, num_returns, density, perc_class	matrix of statistics for lidar points in each matrix cell. Matrix cell nodes correspond to the elevation and HAG list values.

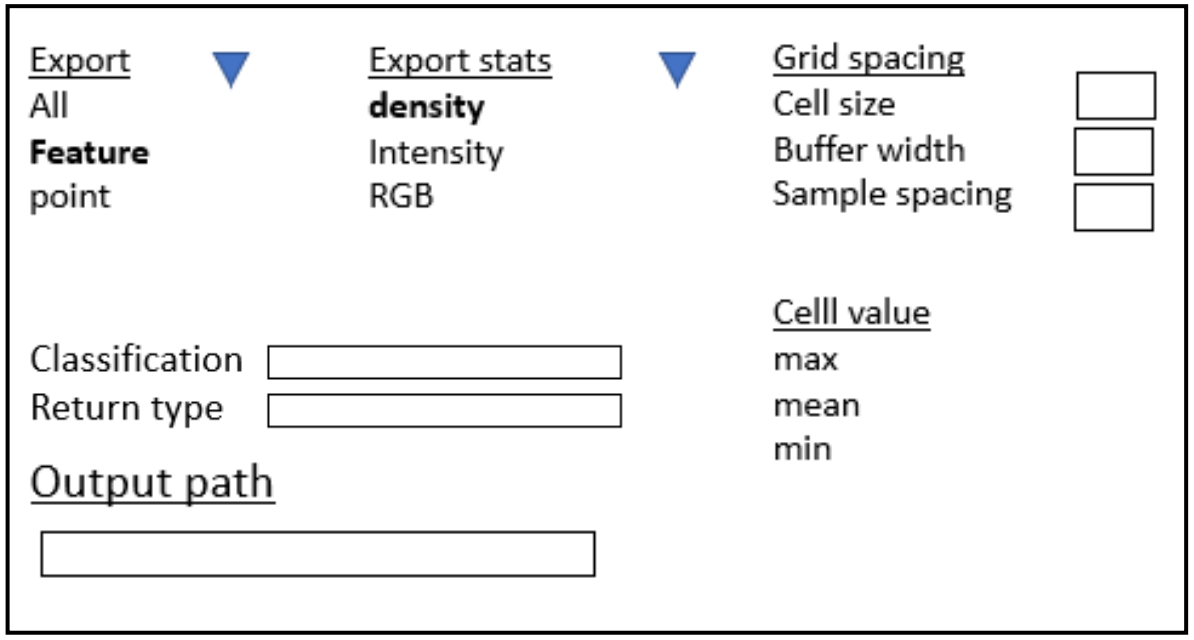
Draft Output Statistics Format

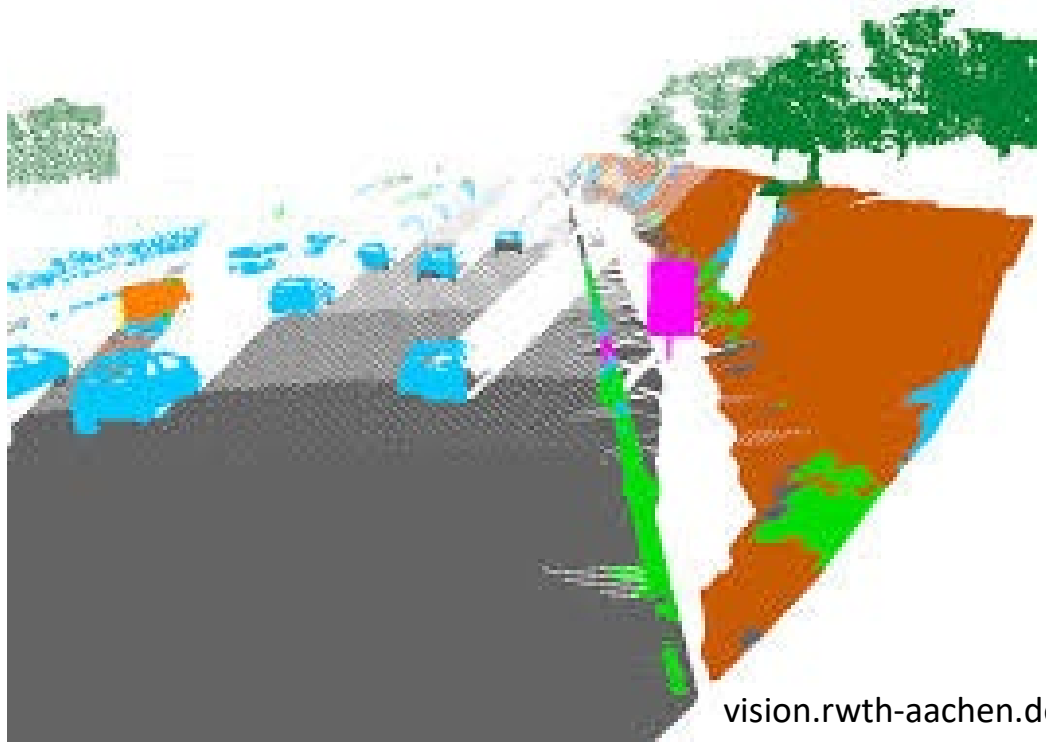
list of length **list of** **list of length** **matrices of**

cid	latlon	elev	hag	intensity	sd_intensity	num_returns	density	perc_class
0	[[34,-81], [34.1,-81.1],[34,-80.9]]	[200,201,202]	[0,10,20]	[[[],[],[]], [[],[],[]], [[],[],[]]	[[[],[],[]], [[],[],[]], [[],[],[]]	[[[],[],[]], [[],[],[]], [[],[],[]]	[[[],[],[]], [[],[],[]], [[],[],[]]	[[[],[],[]], [[],[],[]], [[],[],[]]
1	[[34,-81], [34.1,-81.1],[34,-80.9]]	[200,201,202]	[0,10,20]	[[[],[],[]], [[],[],[]], [[],[],[]]	[[[],[],[]], [[],[],[]], [[],[],[]]	[[[],[],[]], [[],[],[]], [[],[],[]]	[[[],[],[]], [[],[],[]], [[],[],[]]	[[[],[],[]], [[],[],[]], [[],[],[]]
2	[[34,-81], [34.1,-81.1],[34,-80.9]]	[200,201,202]	[0,10,20]	[[[],[],[]], [[],[],[]], [[],[],[]]	[[[],[],[]], [[],[],[]], [[],[],[]]	[[[],[],[]], [[],[],[]], [[],[],[]]	[[[],[],[]], [[],[],[]], [[],[],[]]	[[[],[],[]], [[],[],[]], [[],[],[]]

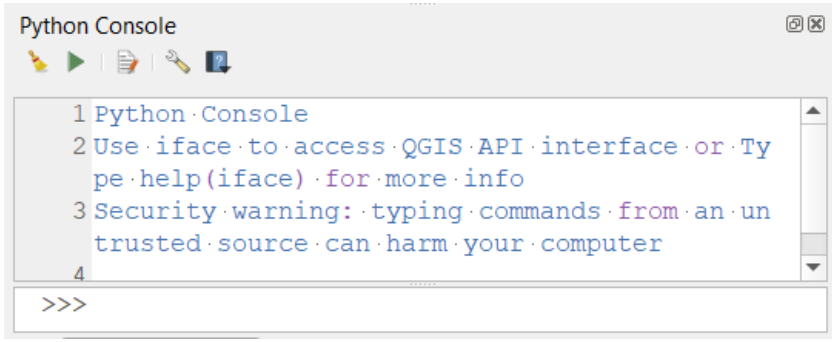
Moving forward

In development: output corridor statistics



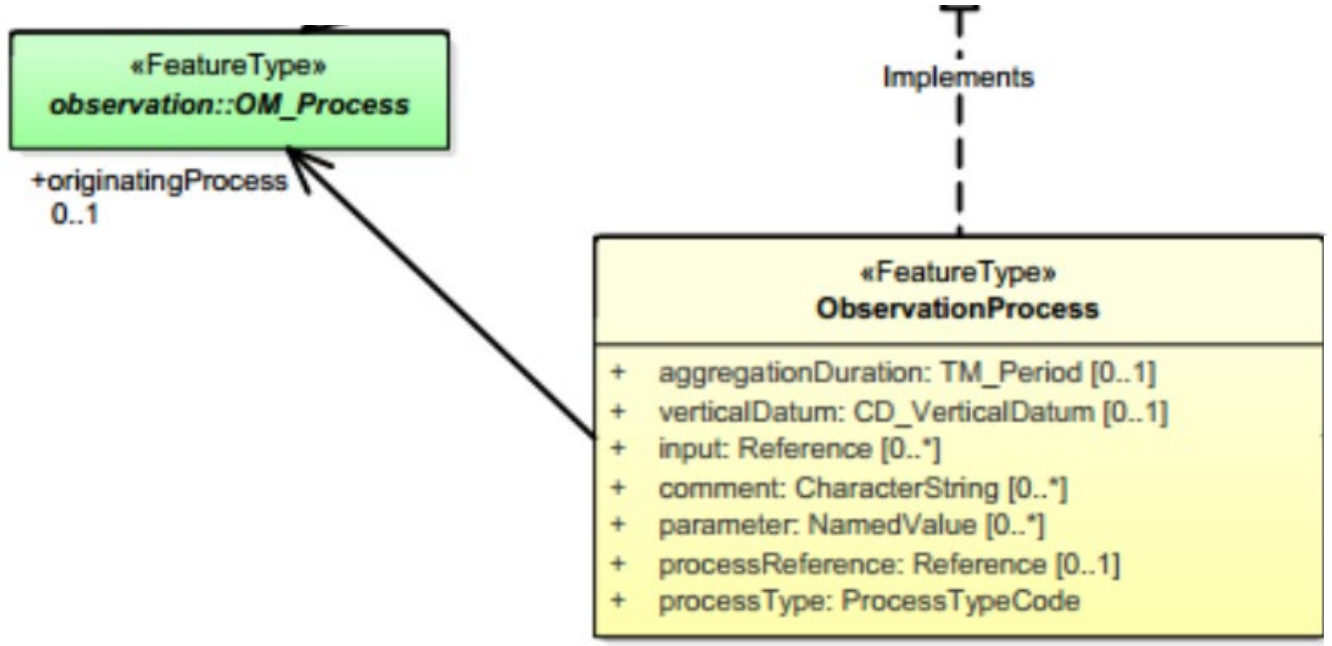


vision.rwth-aachen.de



Wish-list: Point-cloud segmentation

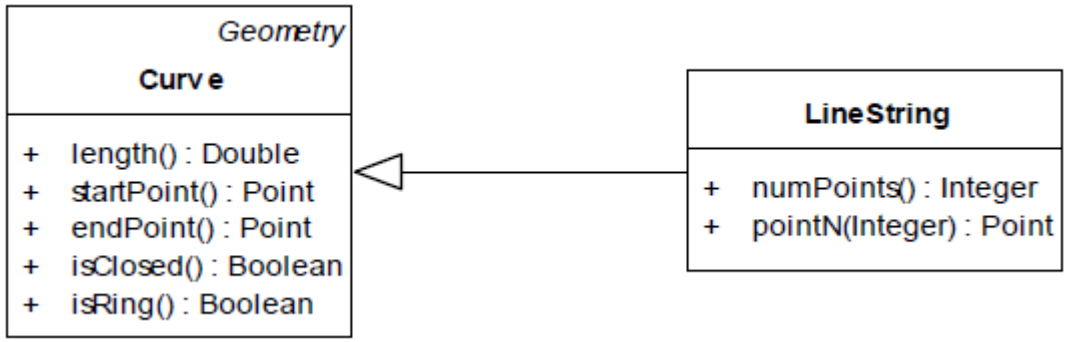
Moving forward



http://www.opengis.net/doc/IS/tsml/1.2

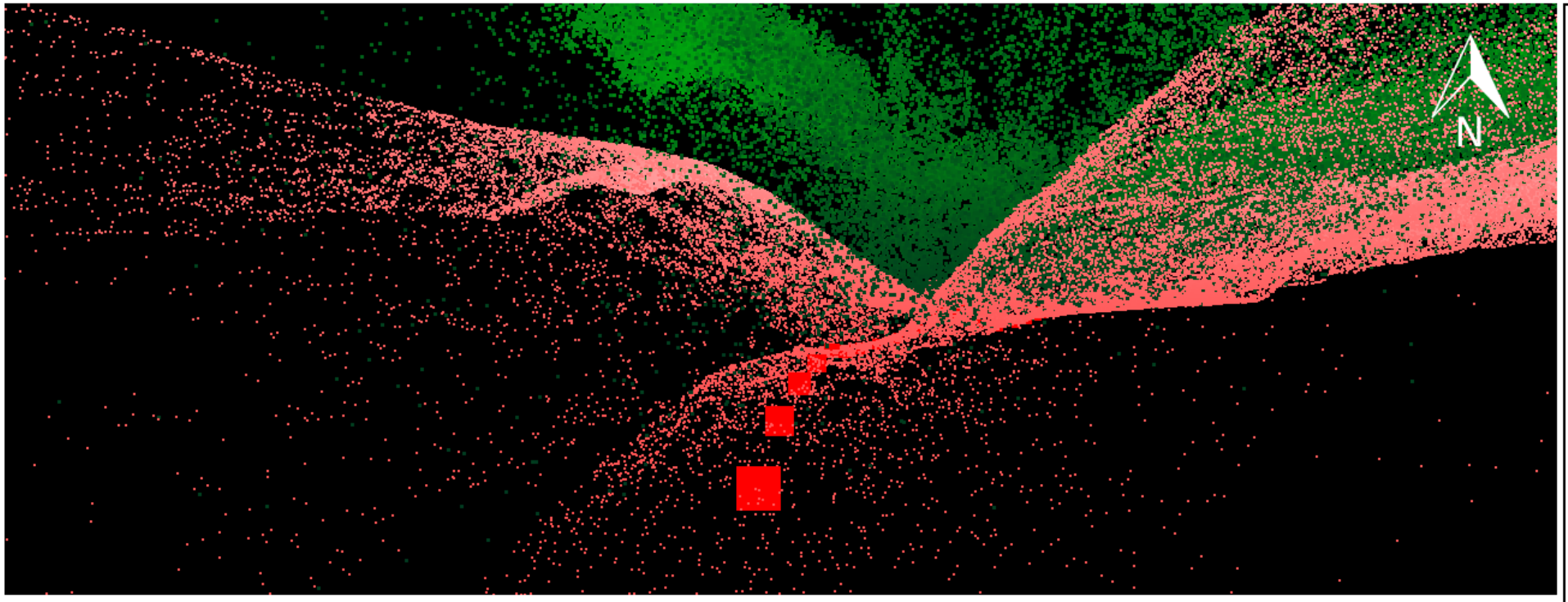
Observation Process Schema

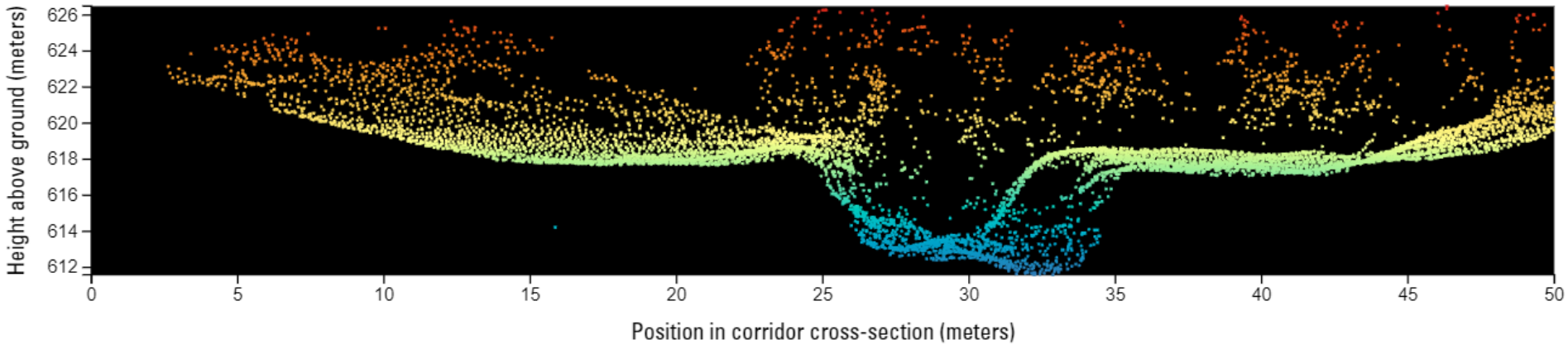
Simple Feature Attributes



http://www.opengis.net/doc/is/sfa/1.2.1

Thanks





View Controls

Shapefile (.shp, .shx, .dbf, and .prj)

Choose Files No file chosen

Lidar file(s) (.las)

Choose Files No file chosen

Reset Upload Files

Download Modified Shapefile

Forward Backward

Up Down