UAS-Based LiDAR Mapping

Video J

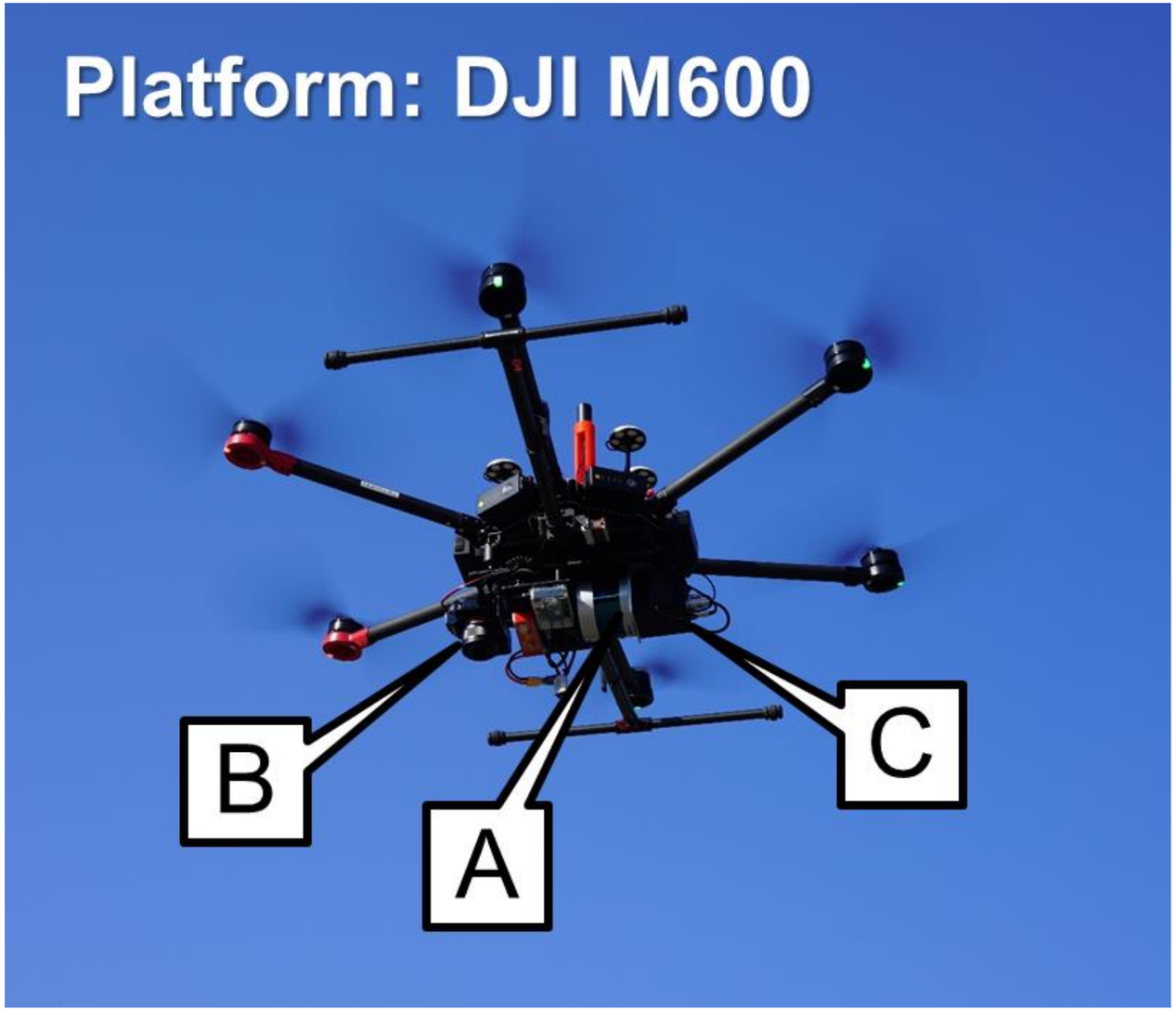
Applications

UAS for Shoreline Monitoring

UAS Data Acquisition for Shoreline Monitoring

Google Earth: Image Acquisition Date (2016/10/13)

UAS Data Acquisition System



A (for May survey)
Velodyne VLP-16 Hi-Res

A (for Nov. and Dec. survey)
Velodyne VLP-32C

B
Sony Alpha 7R

C
Applanix APX-15v2

UAS Data Acquisition Missions

May 17th, 2018
November 7th, 2018
December 5th, 2018
May 10th, 2019

UAS Data Acquisition Missions

May 17th, 2018
November 7th, 2018
December 5th, 2018
May 10th, 2019

UAS Data Acquisition Missions

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November 7th, 2018
December 5th, 2018
May 10th, 2019

UAS Data Acquisition Missions

May 17th, 2018
November 7th, 2018
December 5th, 2018
May 10th, 2019

Survey date: Dec. 5th

UAS Data Acquisition Missions

May 17th, 2018
November 7th, 2018
December 5th, 2018
May 10th, 2019

Survey date: Dec. 5th

UAS Data Acquisition Missions

May 17th, 2018
November 7th, 2018
December 5th, 2018
May 10th, 2019

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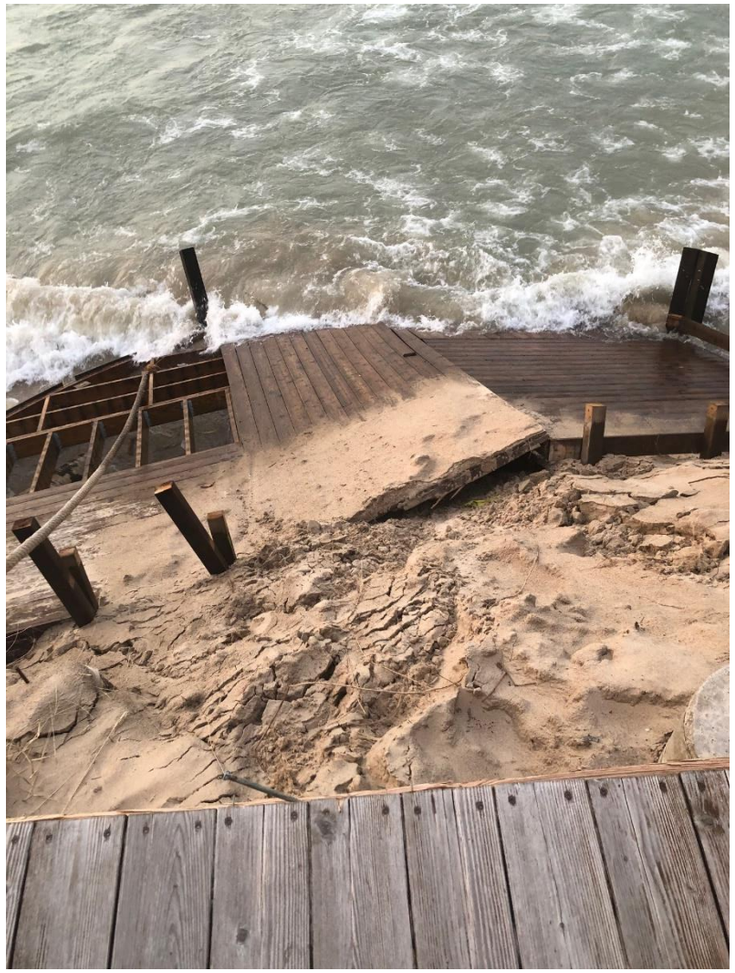
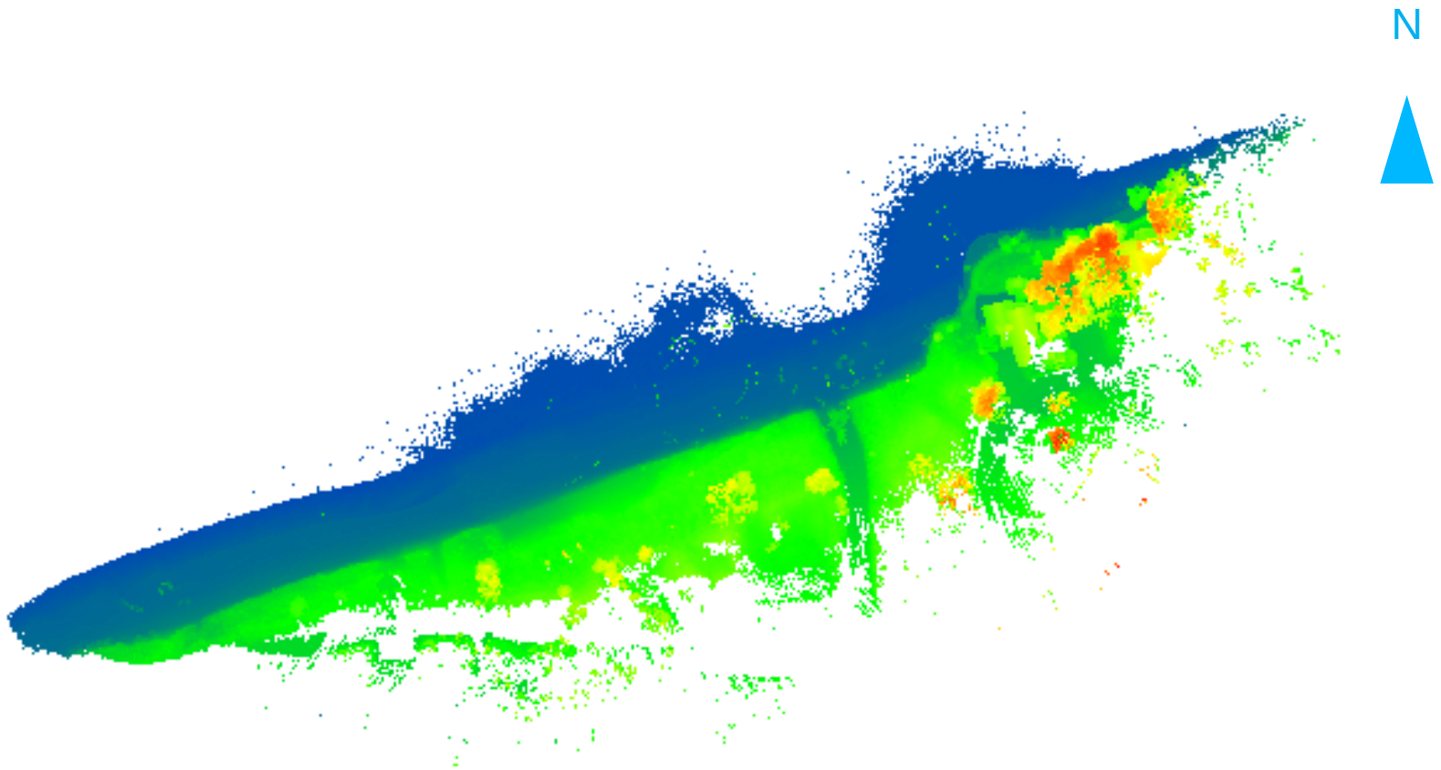
Erosion Damage

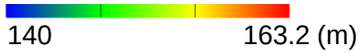
April 1st, 2019



UAS Point Cloud: May 17th, 2018



# of point = 64,013,776



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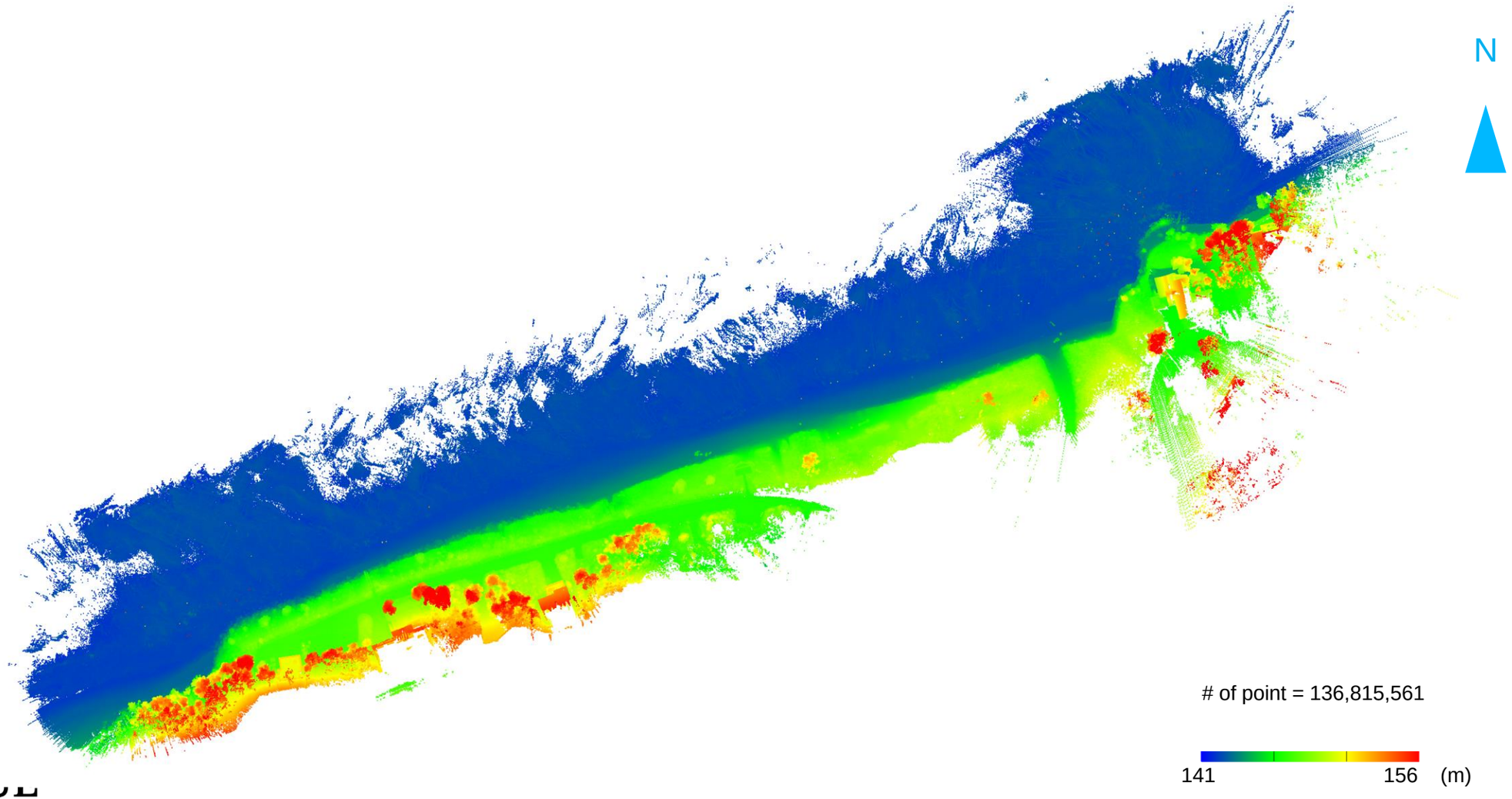
UAS Point Cloud: Nov. 7th, 2018



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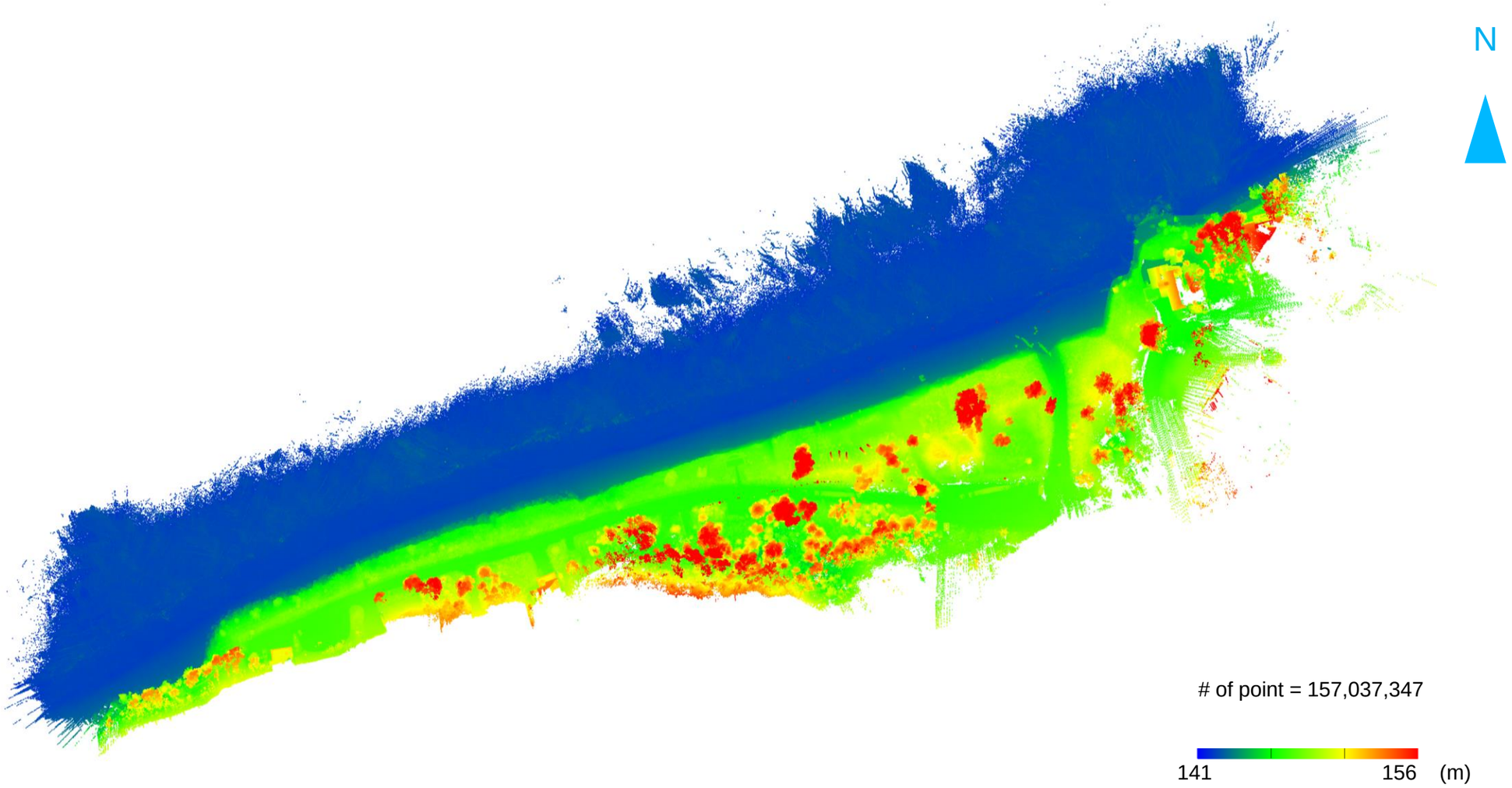
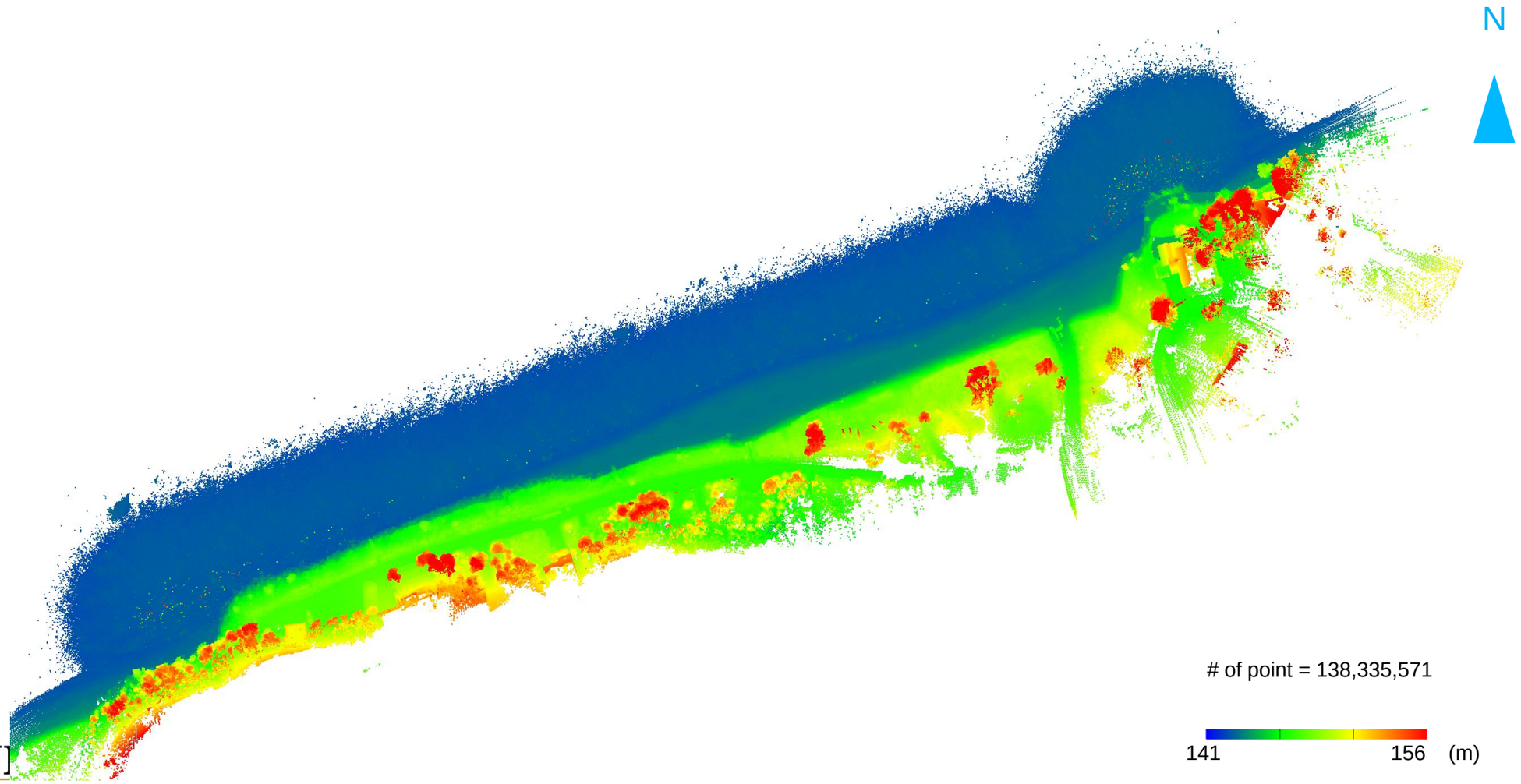
UAS Point Cloud: Dec. 5th, 2018



UAS Point Cloud: May 10th, 2019



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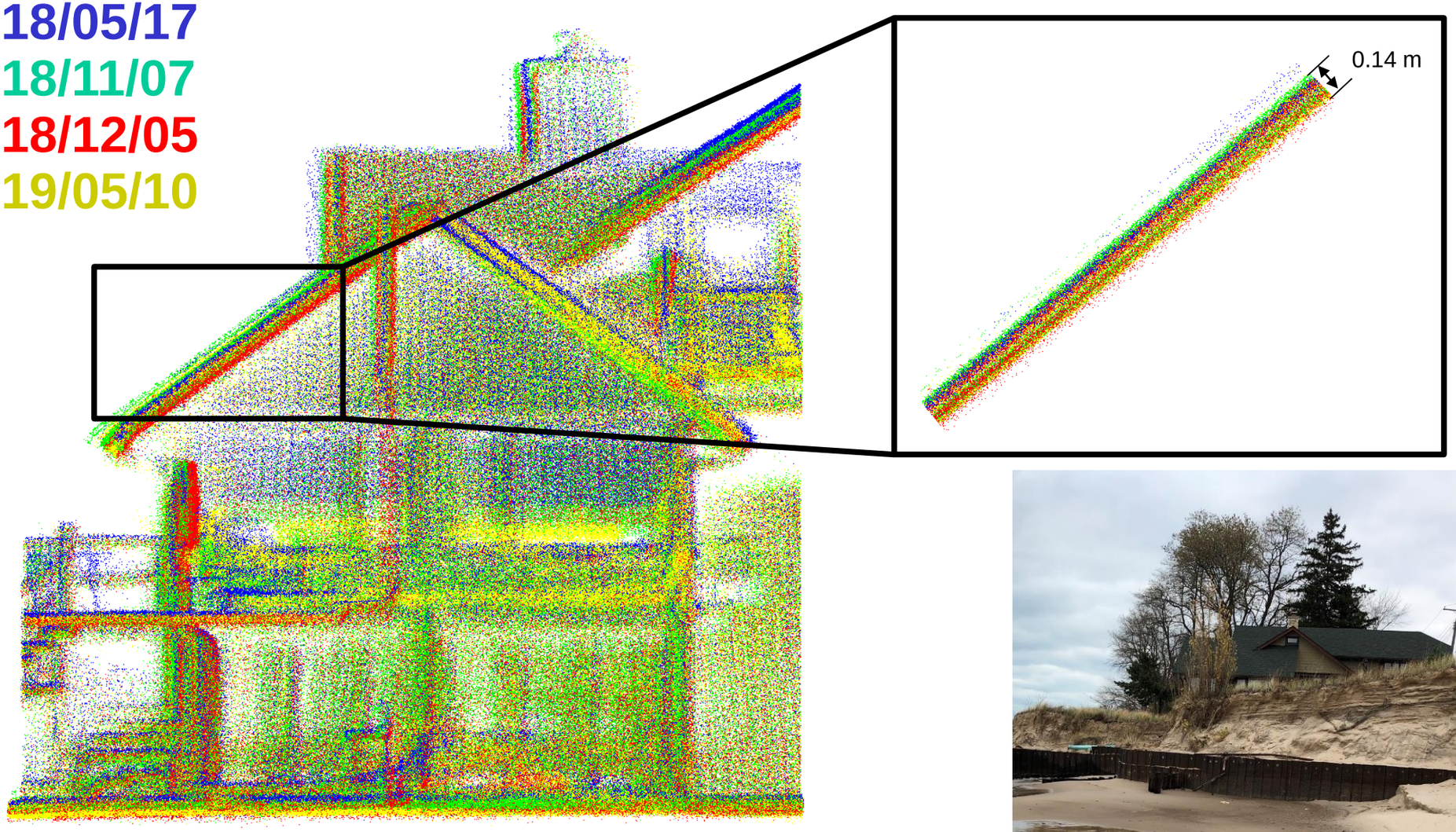
Point Cloud Alignment of Different Epochs

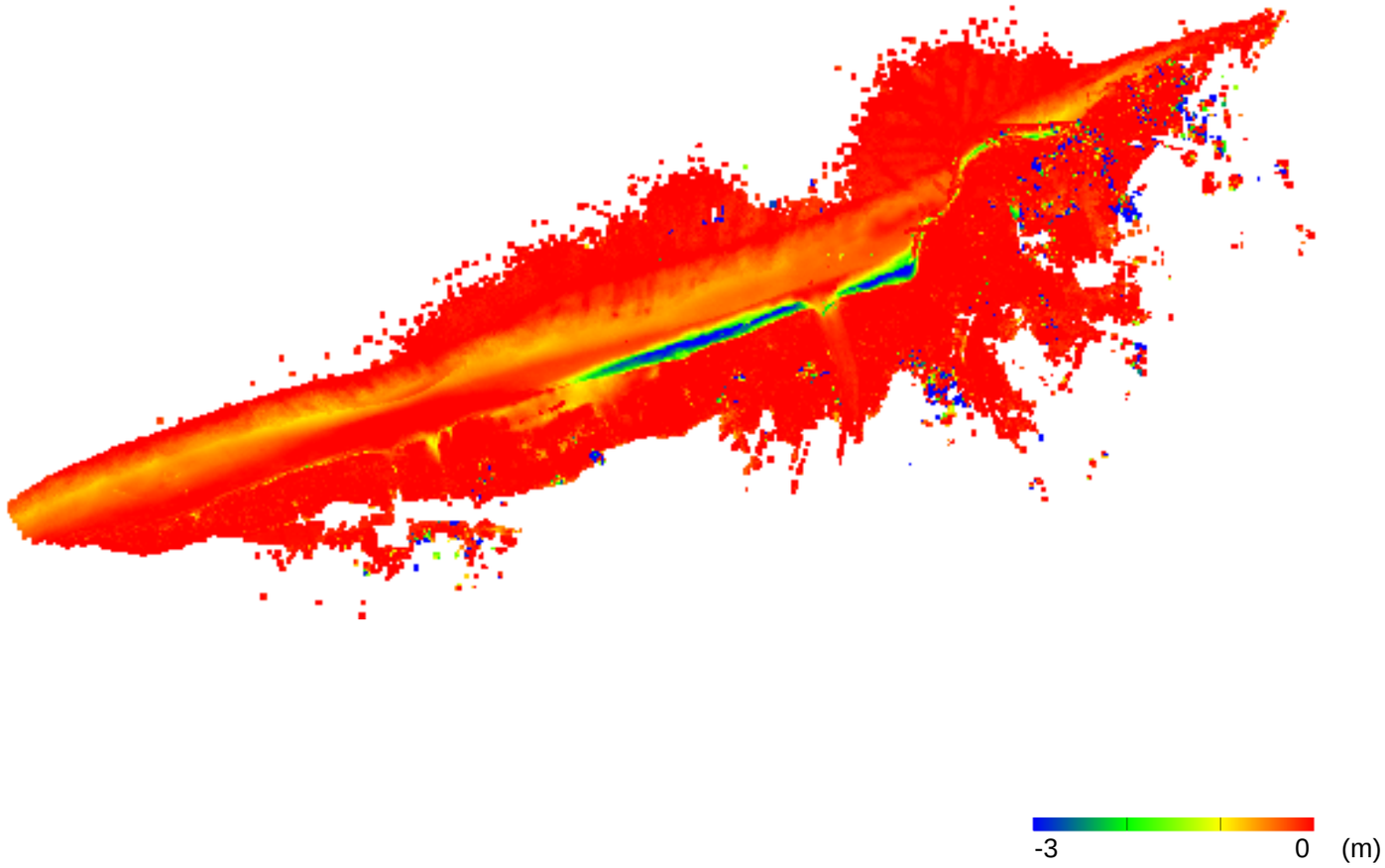
- 2018/05/17
- 2018/11/07
- 2018/12/05
- 2019/05/10



UAS-DSM Z-difference: 2018/11/07-2018/05/17

N

2018/11/07 - 2018/05/17



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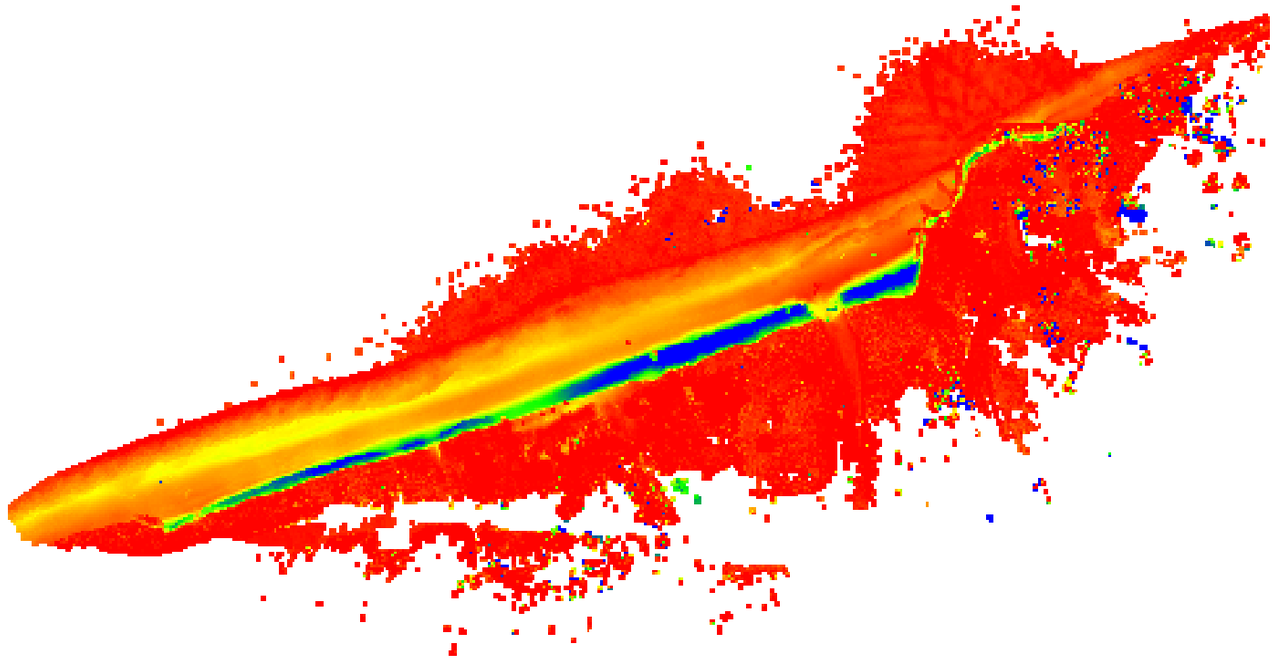
UAS-DSM Z-difference: 2018/12/05-2018/05/17

N

2018/12/05 - 2018/05/17

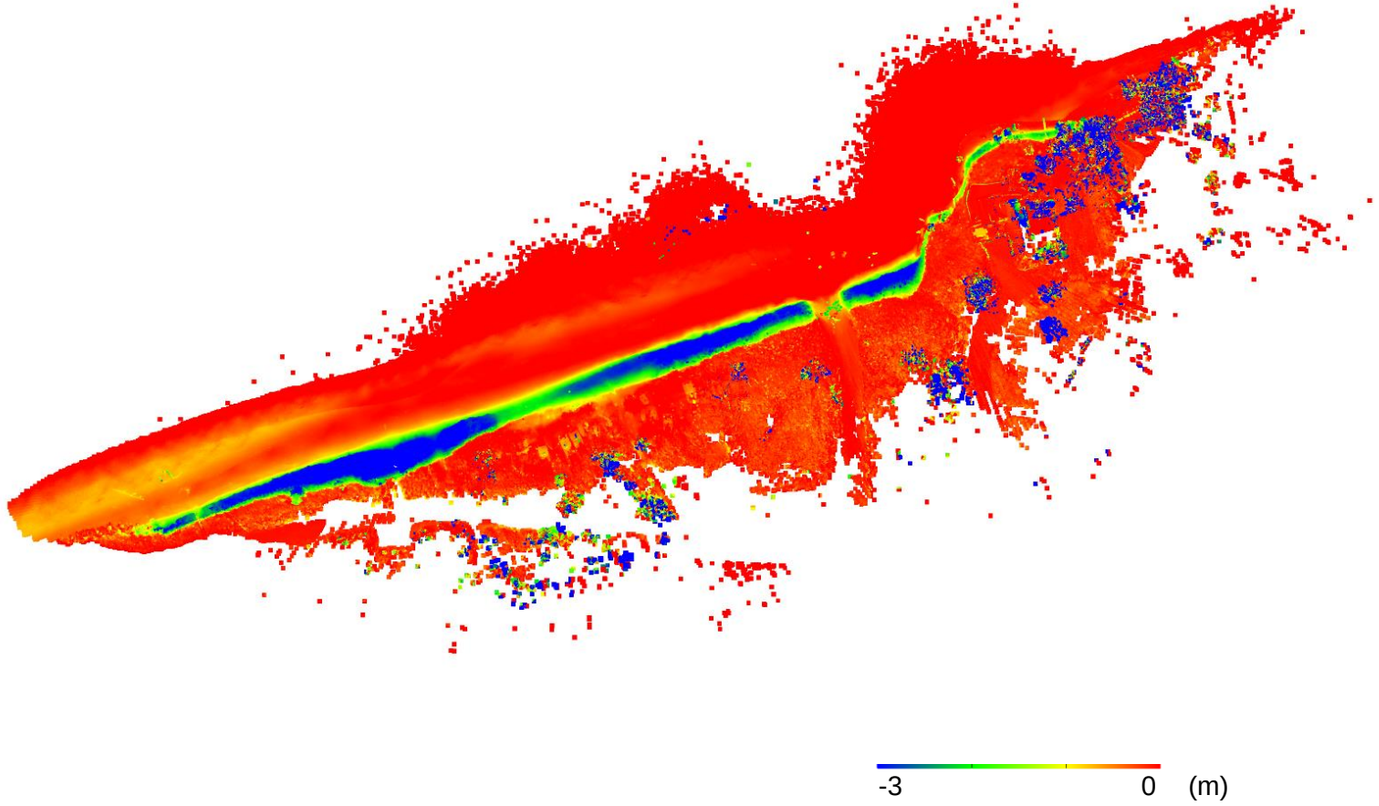


-3 0 (m)

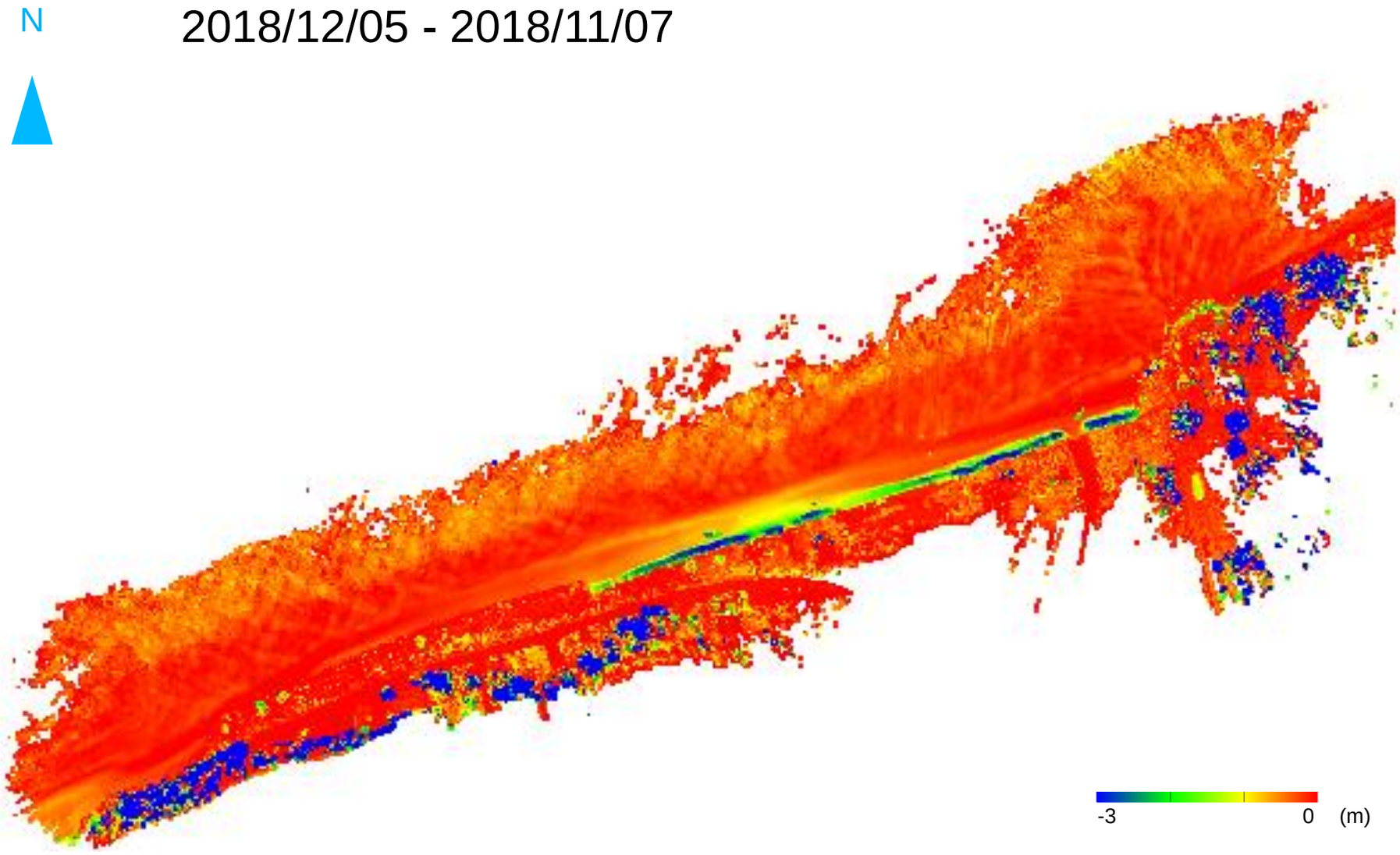
UAS-DSM Z-difference: 2019/05/10-2018/05/17

N

2019/05/10 - 2018/05/17



UAS-DSM Z-difference: 2018/12/05-2018/11/07



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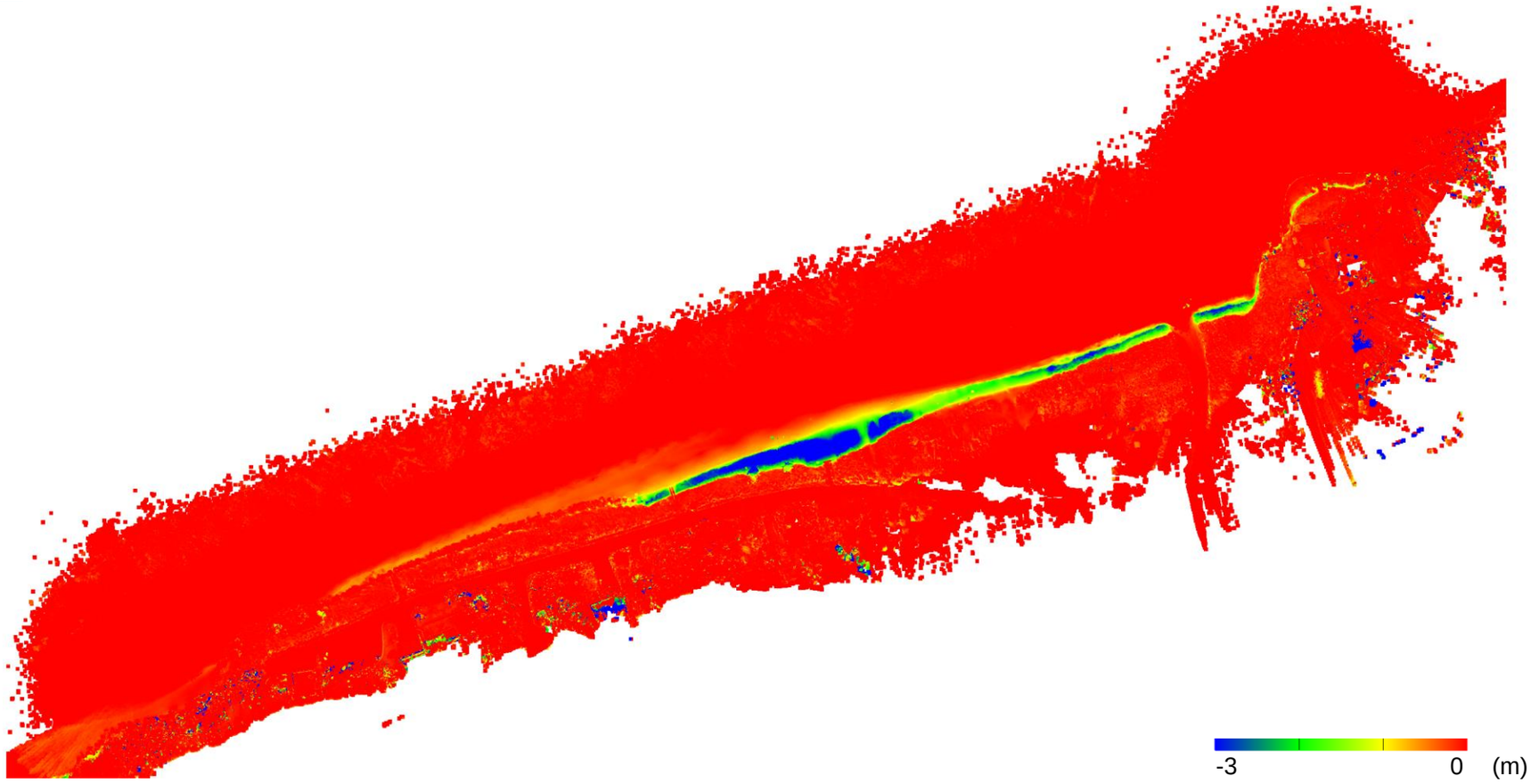
UAS-DSM Z-difference: 2019/05/10-2018/11/07

N

2019/05/10 - 2018/11/07



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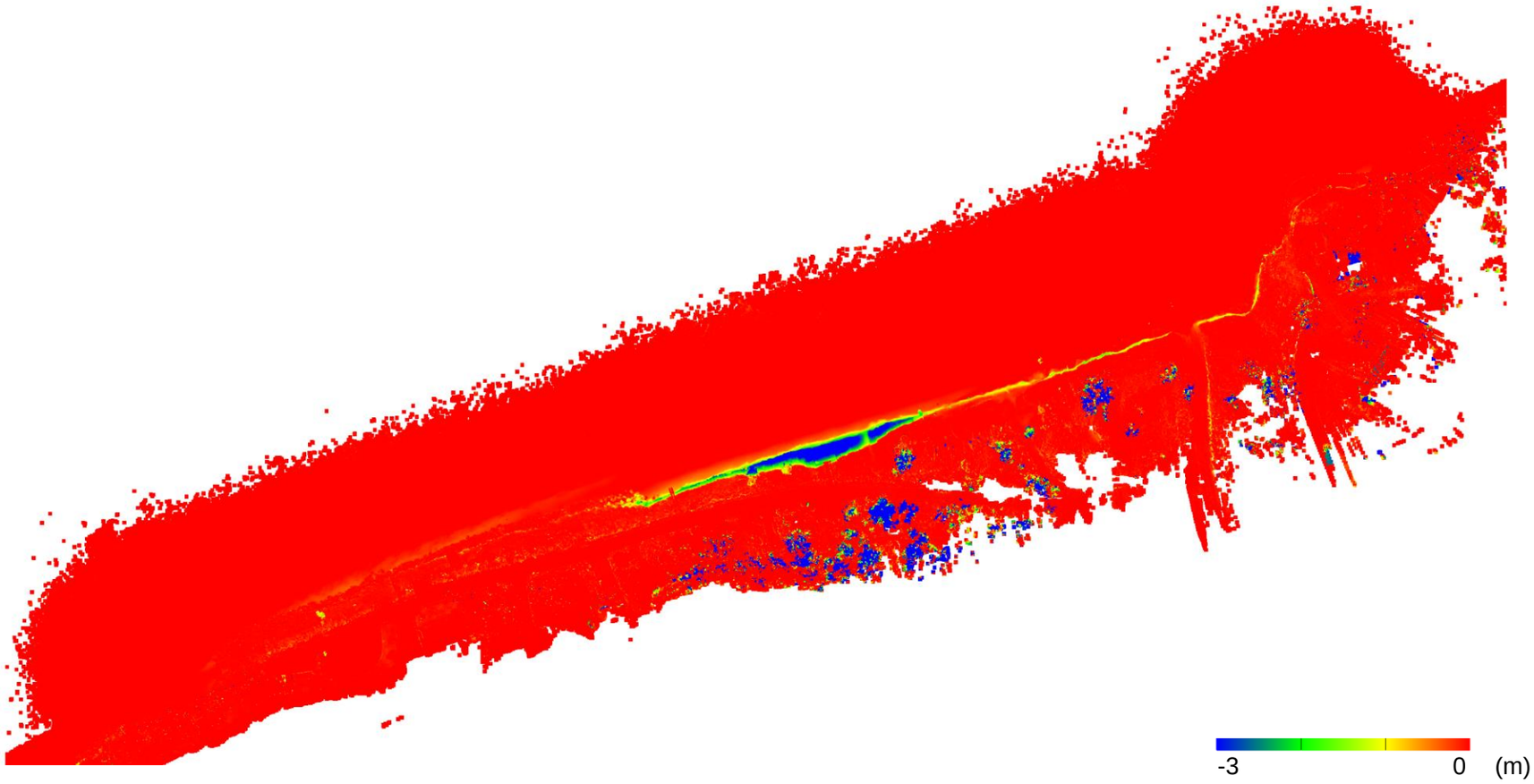
UAS-DSM Z-difference: 2019/05/10-2018/12/05

N

2019/05/10 - 2018/12/05



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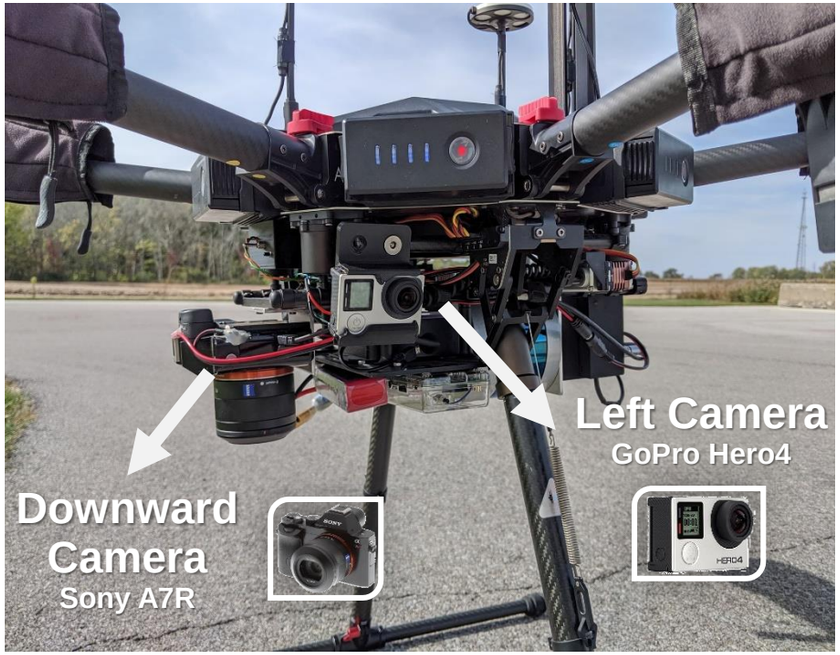
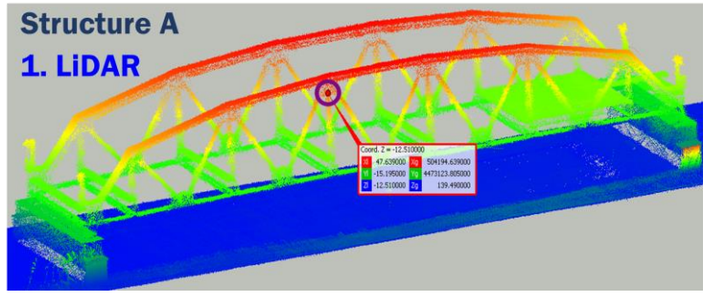
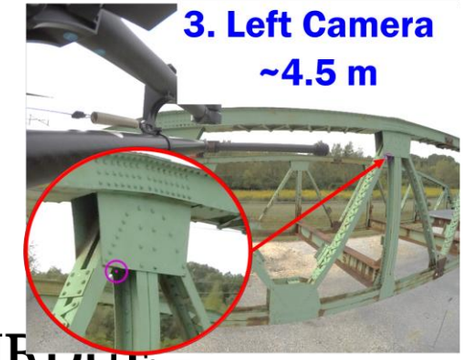
Infrastructure Monitoring

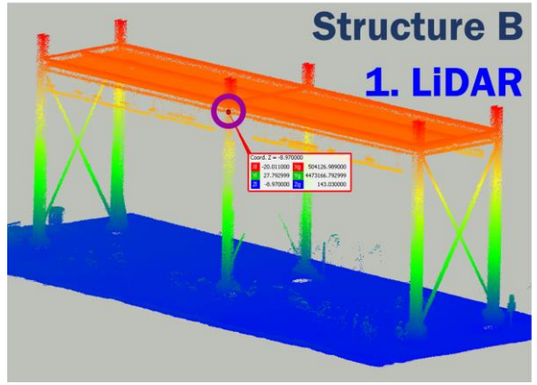
Traditional vs Modern Platforms



Infrastructure Monitoring: Bridge Inspection







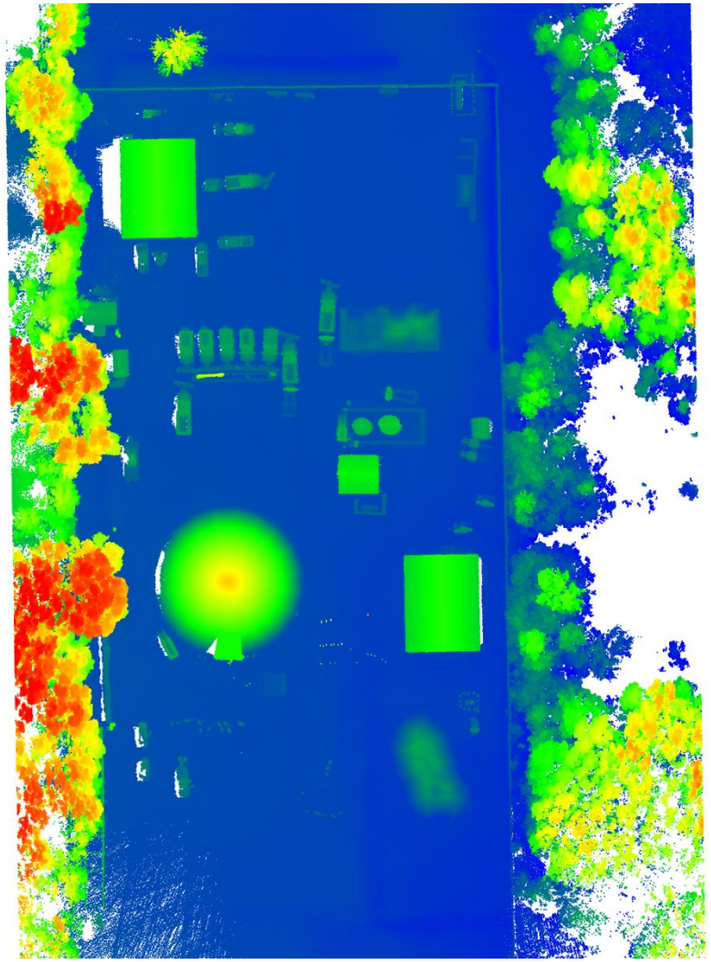
UAS for Resource Management

Area of Interest

UAS photos

Point Cloud and DSM

- **UAV-based MMS products**



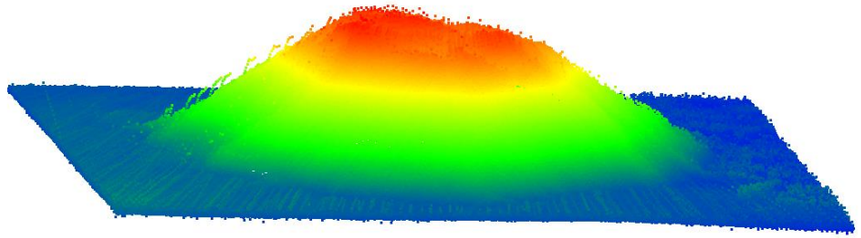
LiDAR point cloud
colored by height

Color-coded LiDAR DSM

Stockpile Volume Estimation

Stockpile
Volume = 206 m^3

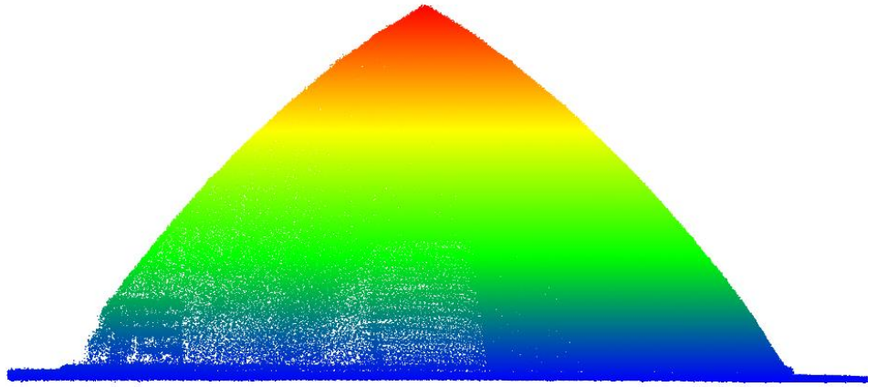
LiDAR point cloud
colored by height



Color-coded LiDAR DSM

Dome
Volume = 5021 m^3

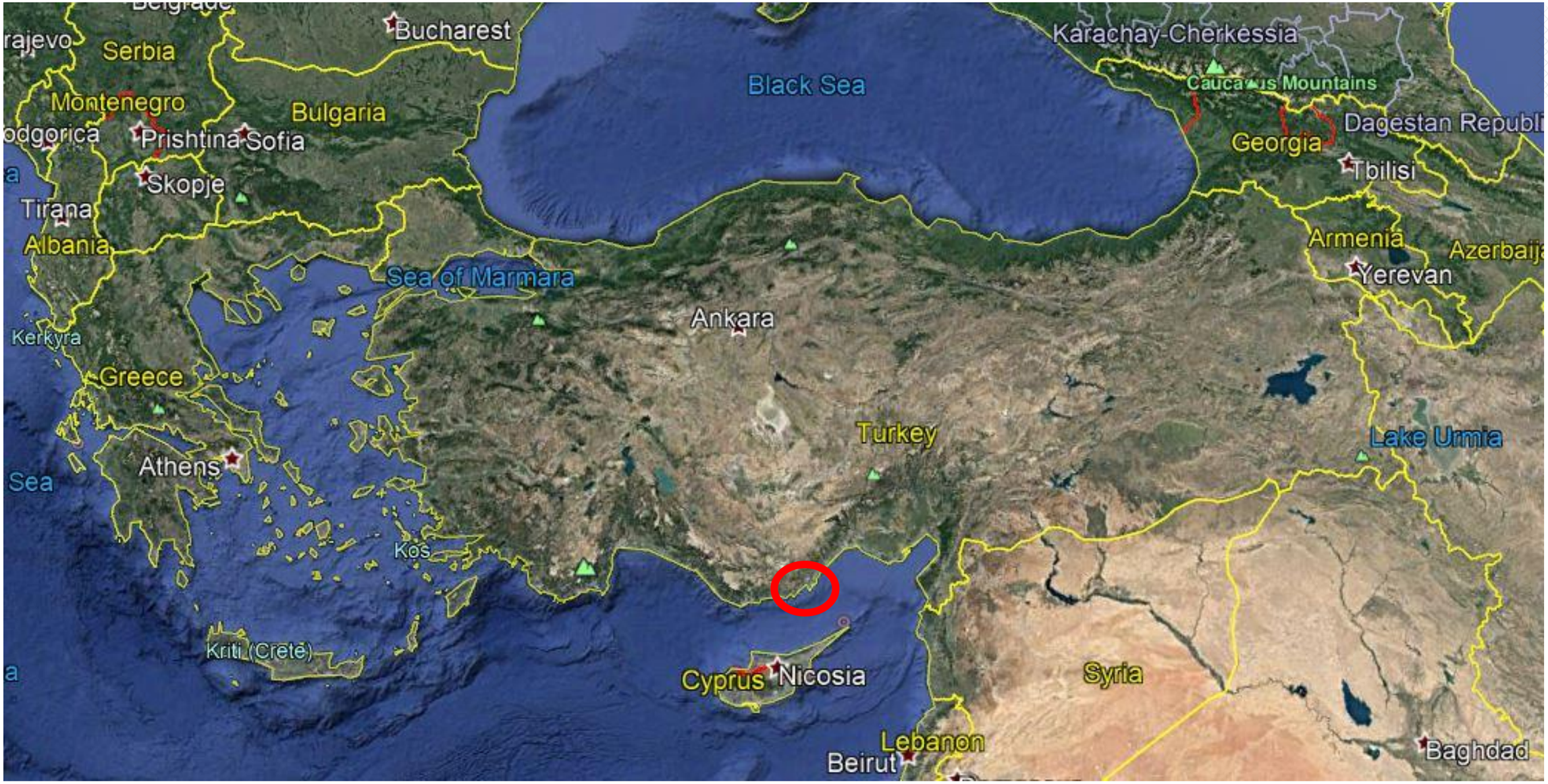
LiDAR point cloud
colored by height



Color-coded LiDAR DSM

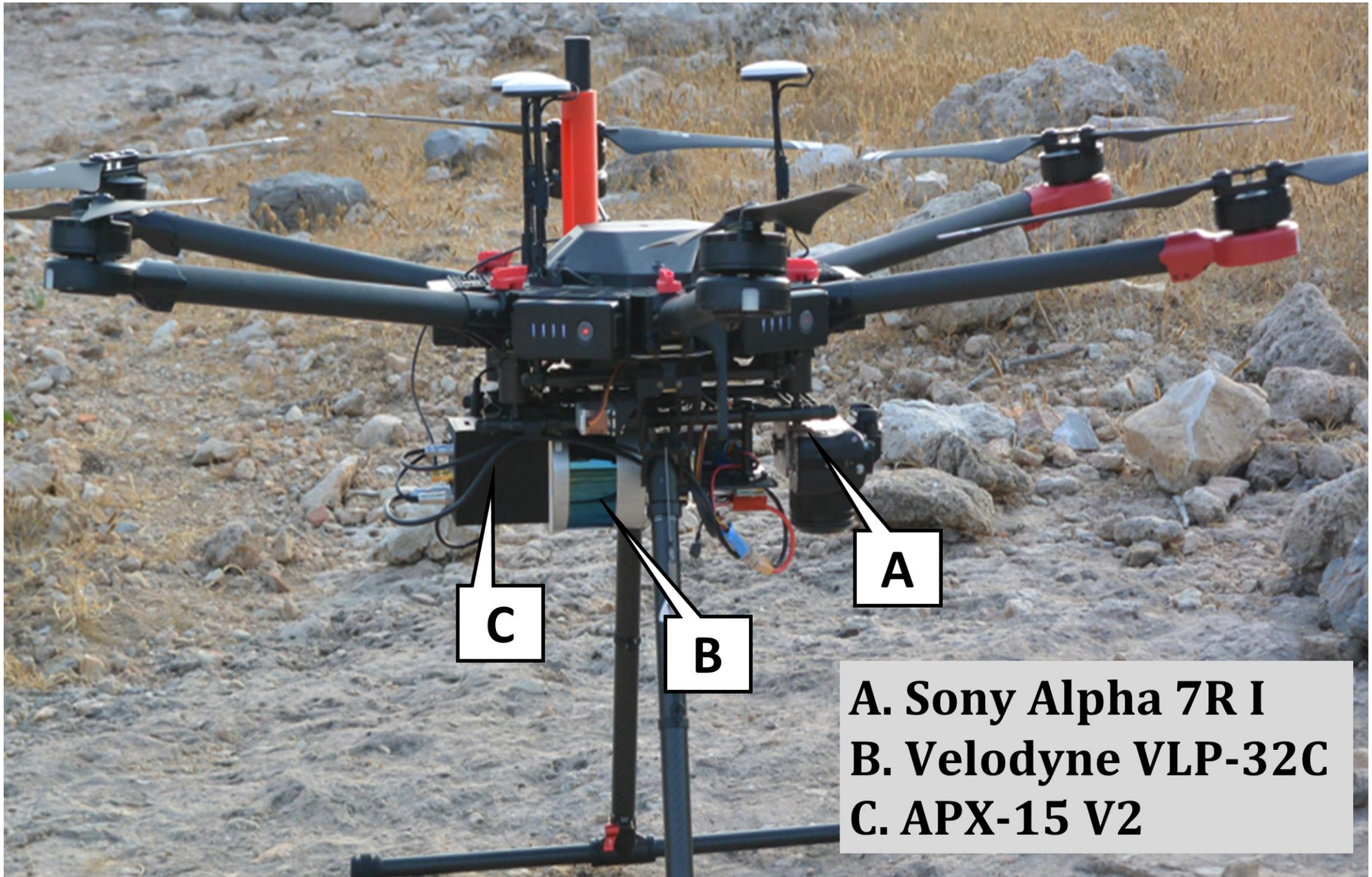
UAS for Archeological Documentation

Bogsak Archeological Survey Project: Dana Island



Bogsak Archeological Survey Project: Dana Island

Data Acquisition Platform



Data Collection

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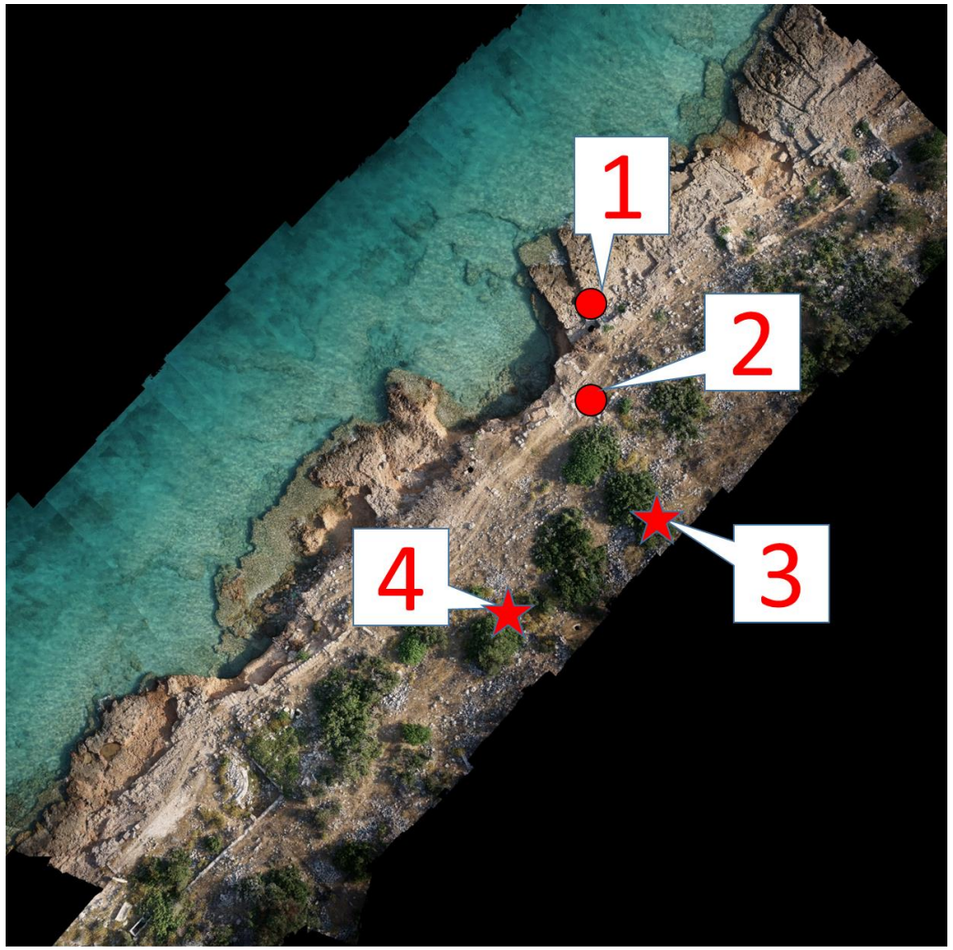
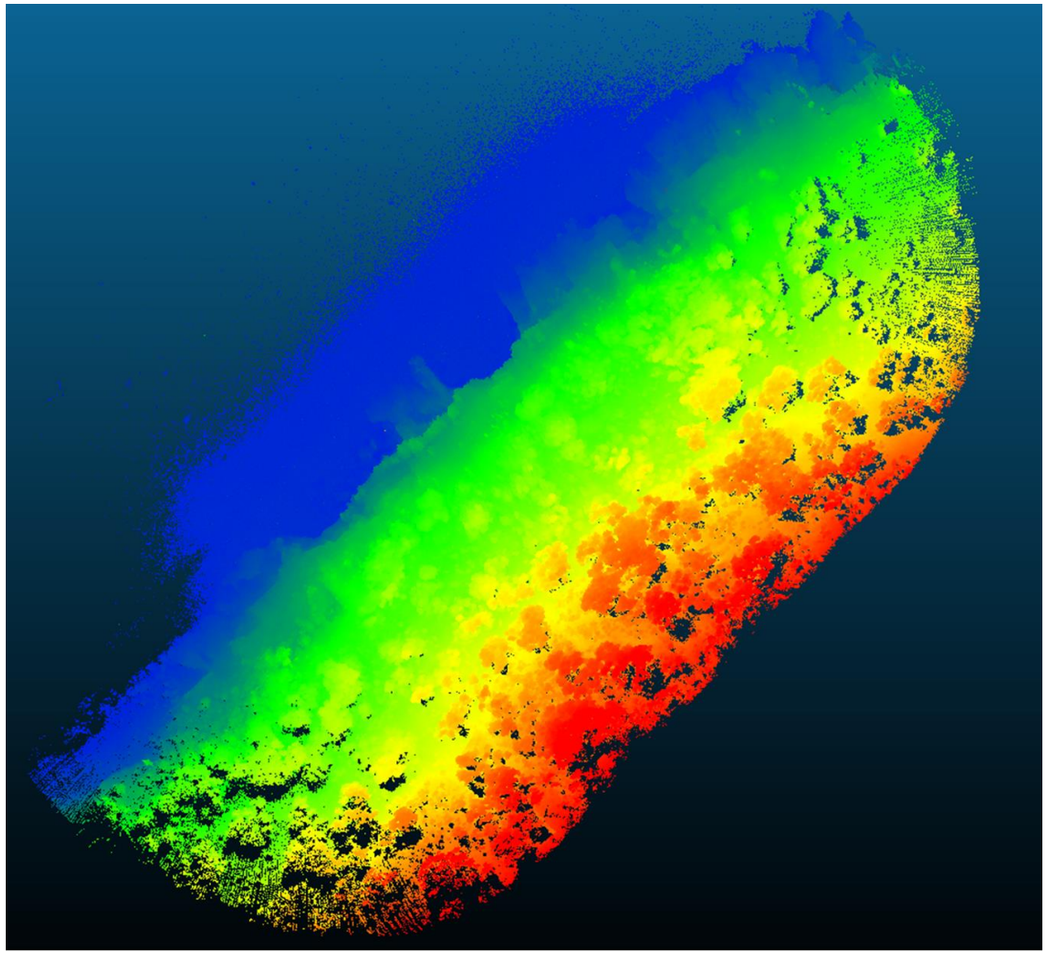
LiDAR/Image Data

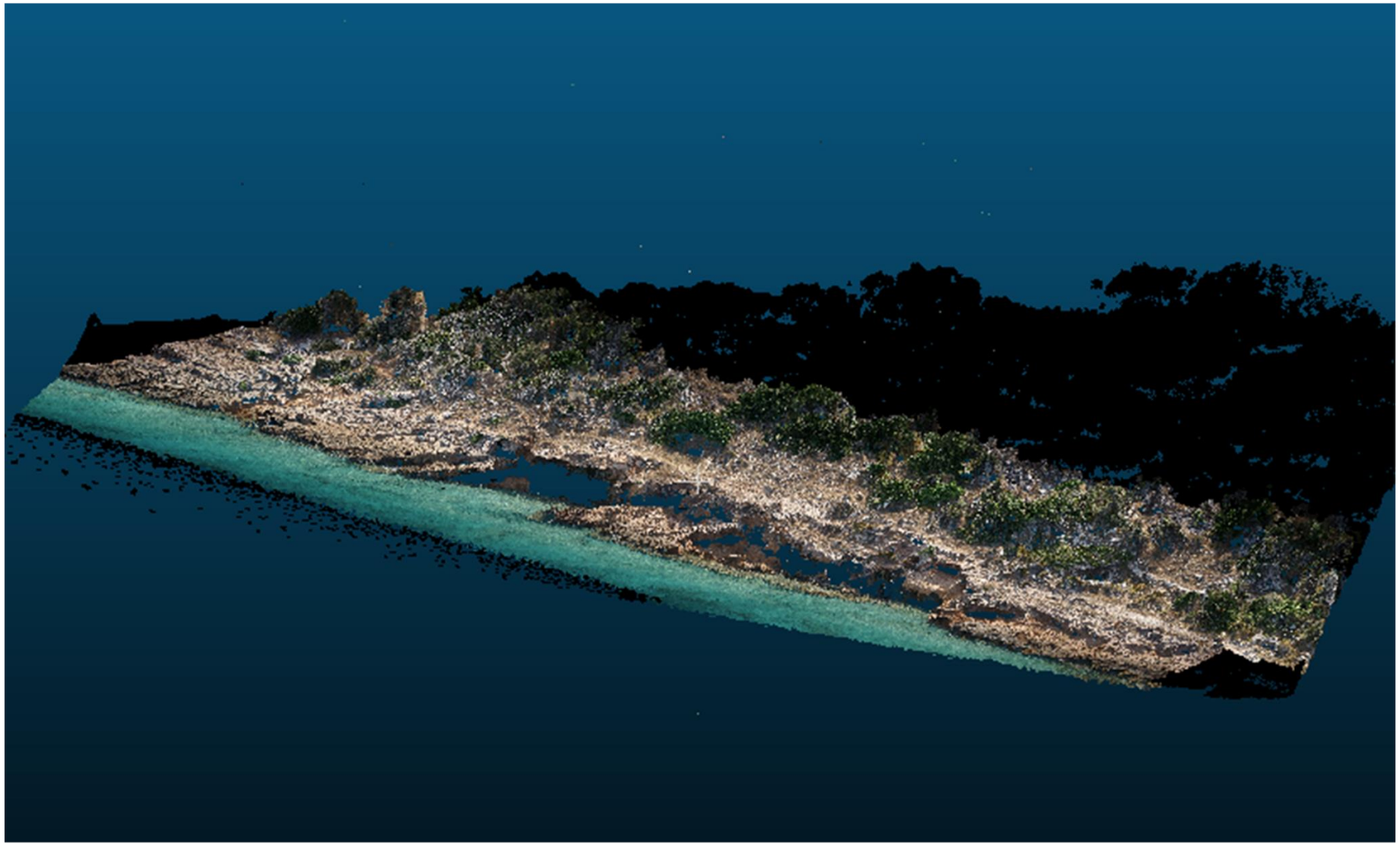


Orthophoto



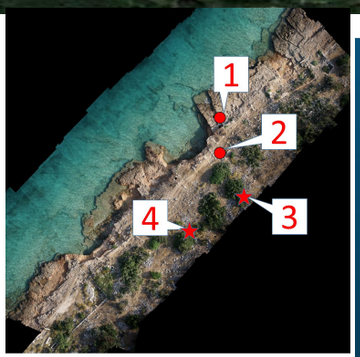
LiDAR Point Cloud
Colored by Height

LiDAR/Image Data

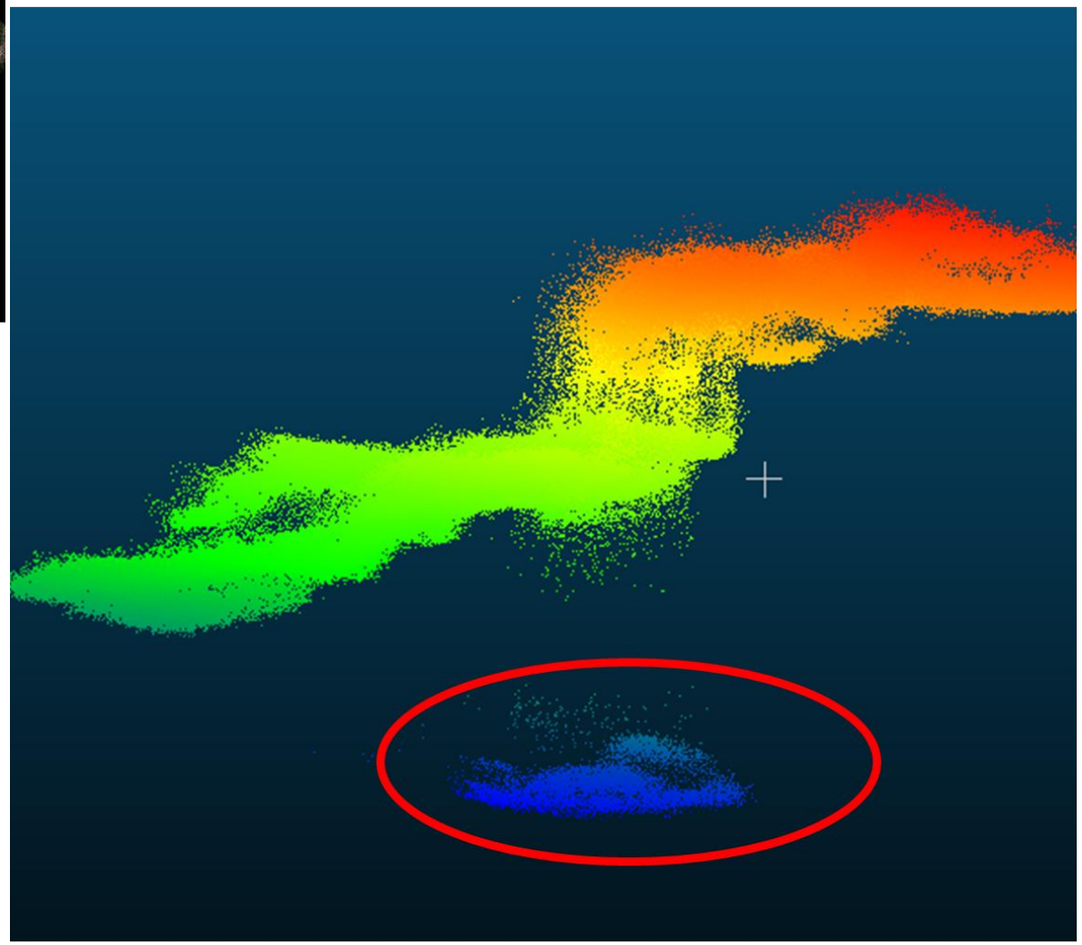


LiDAR DSM Colored by RGB
(Perspective view)

LiDAR/Image Data

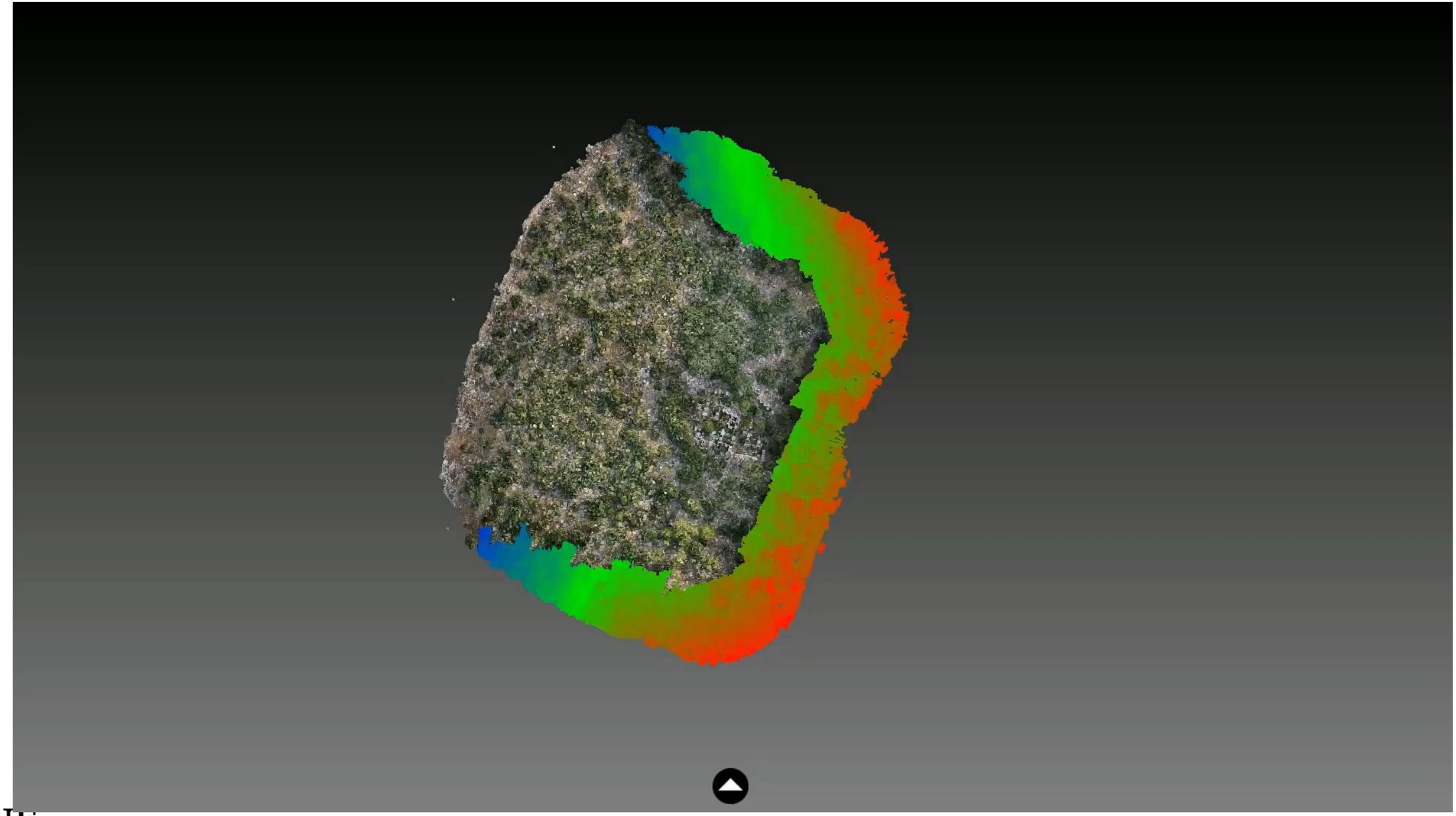


Orthophoto



LiDAR (side view)

Corresponding Image

Cistern 1

Archaeological Documentation: Dana Island, Turkey