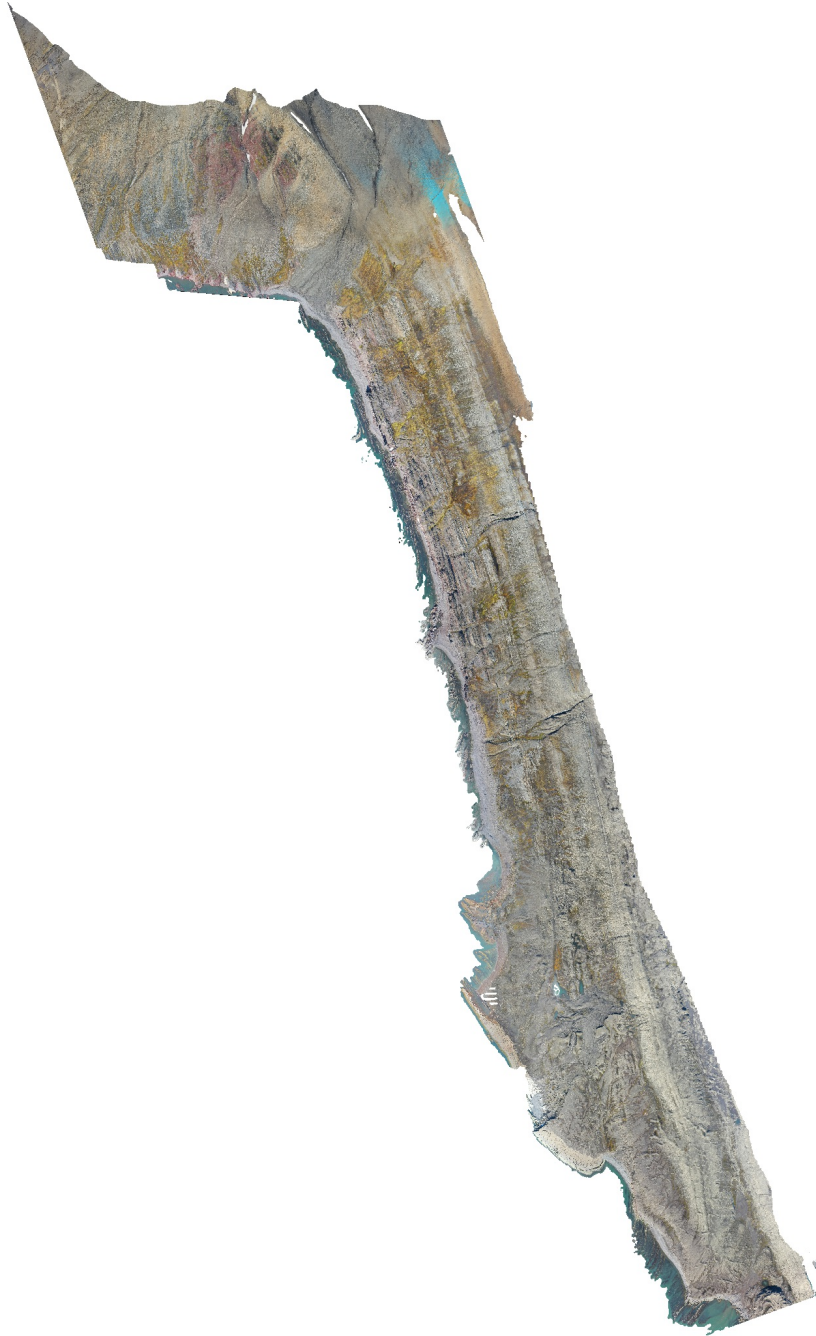


Agisoft Metashape

Processing Report
19 January 2021



Survey Data

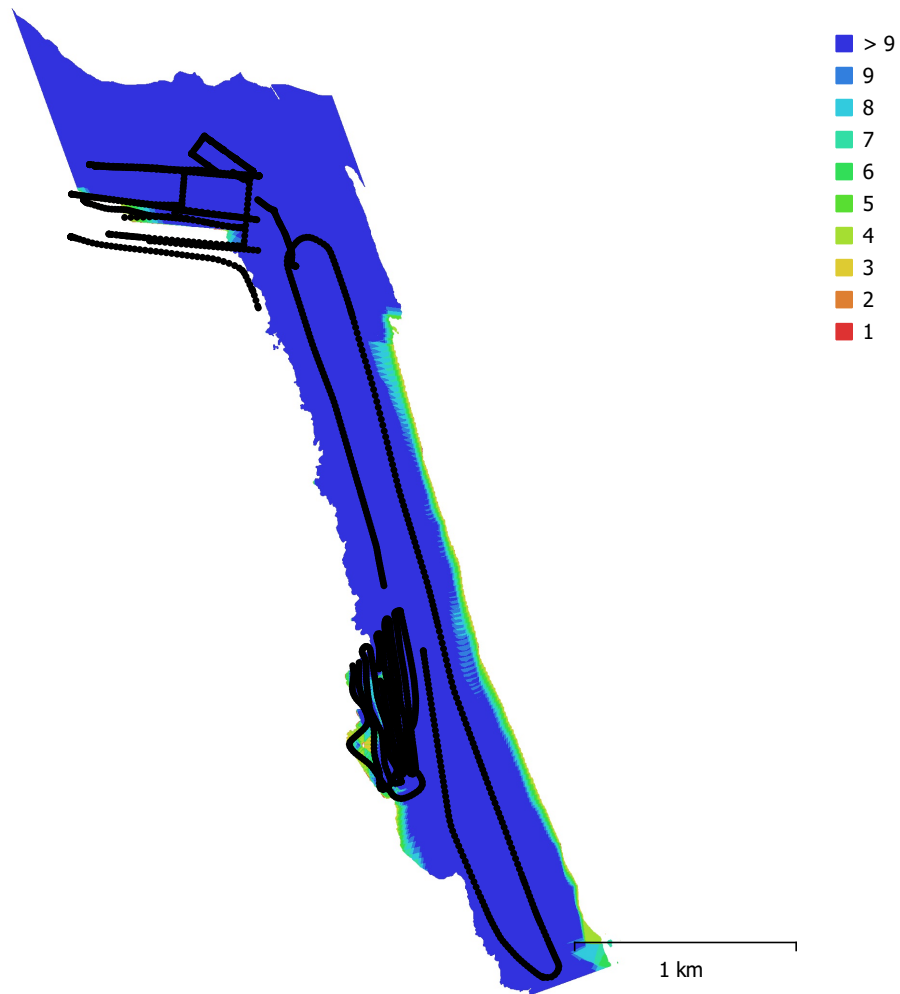


Fig. 1. Camera locations and image overlap.

Number of images:	1,867	Camera stations:	1,827
Flying altitude:	224 m	Tie points:	663,279
Ground resolution:	4.55 cm/pix	Projections:	3,600,688
Coverage area:	2.8 km ²	Reprojection error:	0.826 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
L1D-20c (10.26mm)	5472 x 3648	10.26 mm	2.41 x 2.41 μm	No

Table 1. Cameras.

Camera Calibration

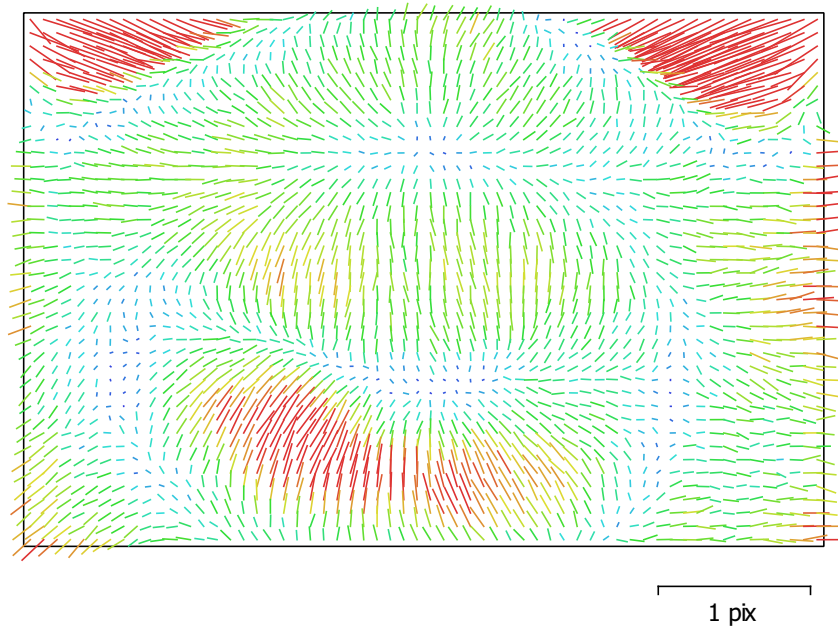


Fig. 2. Image residuals for L1D-20c (10.26mm).

L1D-20c (10.26mm)

1867 images

Type	Resolution	Focal Length	Pixel Size
Frame	5472 x 3648	10.26 mm	2.41 x 2.41 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	4334.84	0.036	1.00	0.05	-0.53	0.03	0.09	-0.10	0.06	-0.19
Cx	22.693	0.021		1.00	0.08	-0.02	0.00	0.01	0.72	0.03
Cy	-45.2822	0.031			1.00	-0.14	0.04	-0.02	0.10	0.58
K1	0.00133599	1.4e-05				1.00	-0.93	0.87	-0.02	-0.21
K2	0.0125133	5.4e-05					1.00	-0.98	0.02	0.06
K3	-0.0205998	6.5e-05						1.00	-0.01	-0.05
P1	0.00156046	1.2e-06							1.00	0.08
P2	-0.00210504	1.7e-06								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Locations

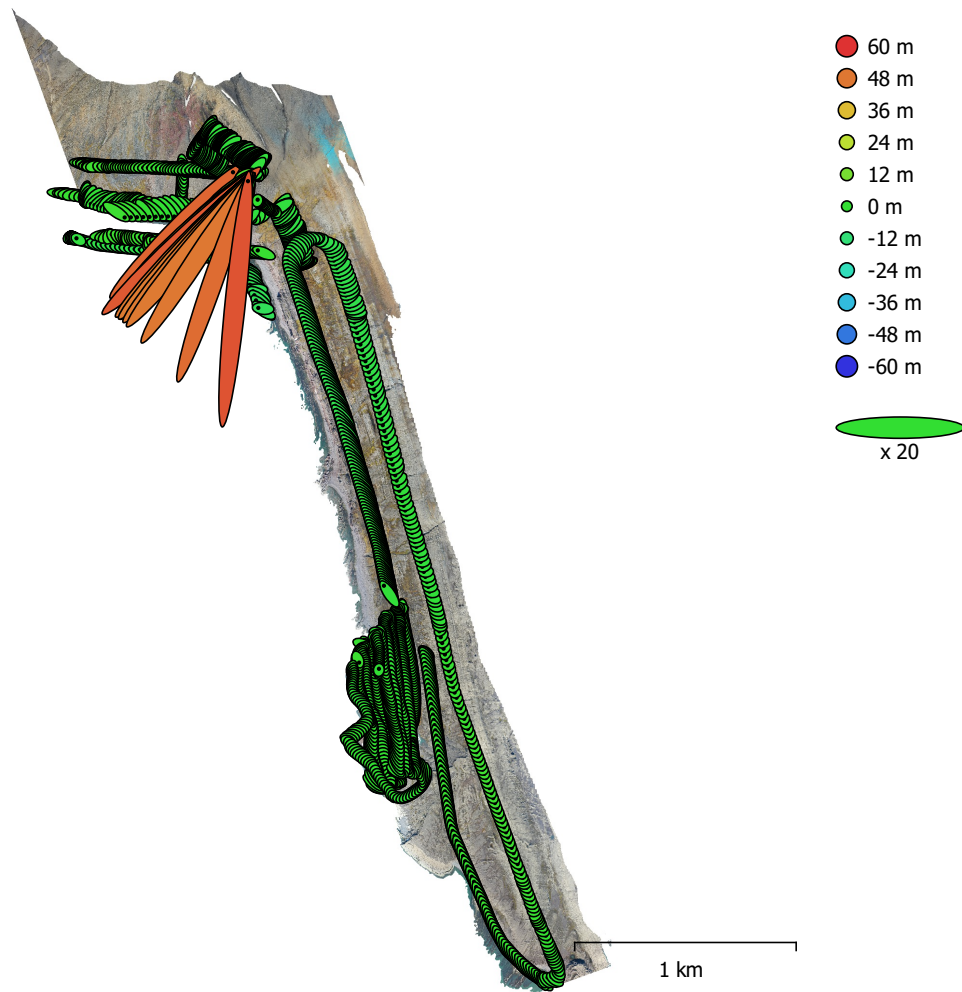


Fig. 3. Camera locations and error estimates.

Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
 Estimated camera locations are marked with a black dot.

X error (m)	Y error (m)	Z error (m)	XY error (m)	Total error (m)
3.62714	4.16718	6.27015	5.52463	8.35681

Table 3. Average camera location error.
 X - Longitude, Y - Latitude, Z - Altitude.

Ground Control Points

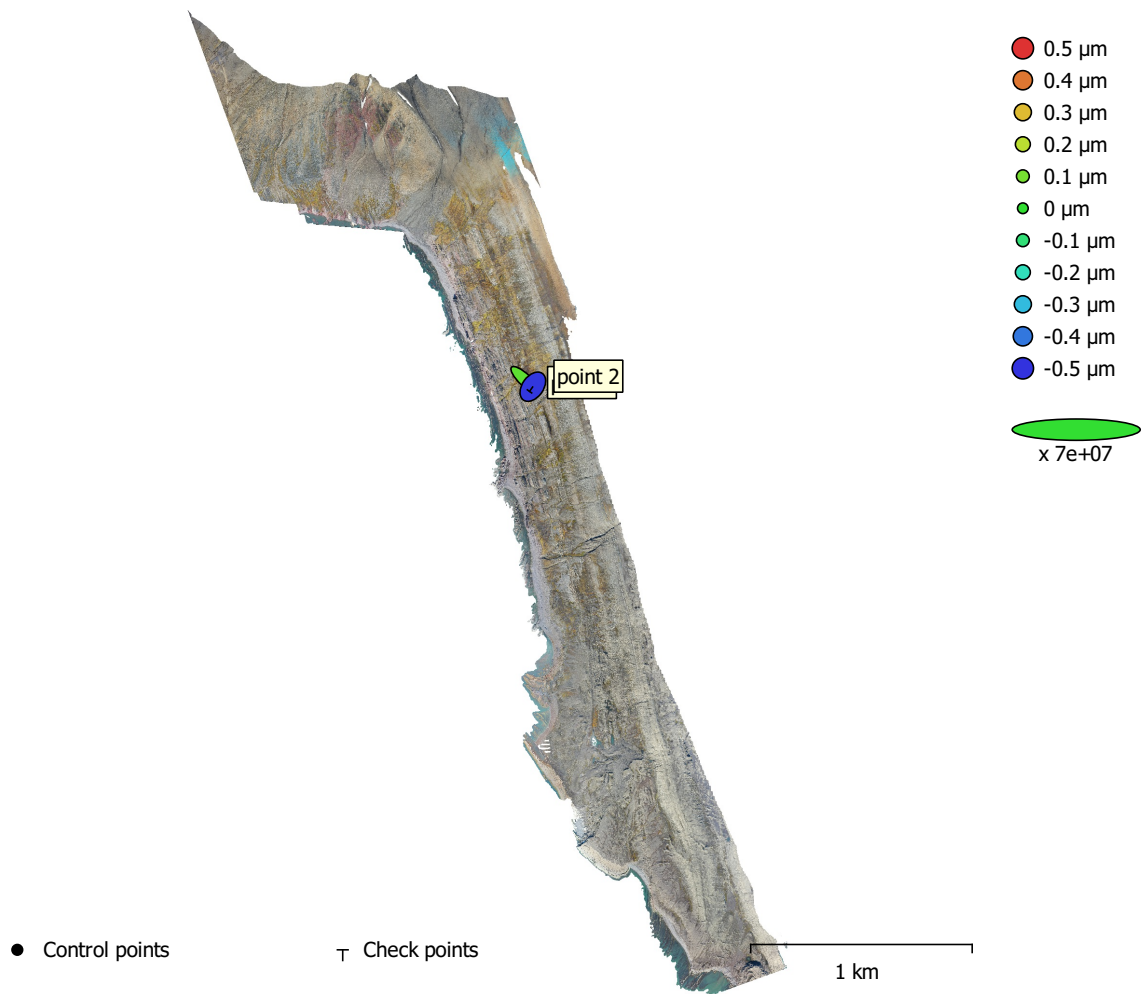


Fig. 4. GCP locations and error estimates.

Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.

Estimated GCP locations are marked with a dot or crossing.

Count	X error (μm)	Y error (μm)	Z error (μm)	XY error (μm)	Total (μm)
2	0.909389	0.918236	0.351636	1.29234	1.33933

Table 4. Check points RMSE.

X - Longitude, Y - Latitude, Z - Altitude.

Label	X error (μm)	Y error (μm)	Z error (μm)	Total (μm)	Image (pix)
point 1	1.2125	-1.15116	0.063791	1.67314	0.000 (28)
point 2	-0.428756	-0.600951	-0.49318	0.887806	0.000 (29)
Total	0.909389	0.918236	0.351636	1.33933	0.000

Table 5. Check points.
X - Longitude, Y - Latitude, Z - Altitude.

Digital Elevation Model

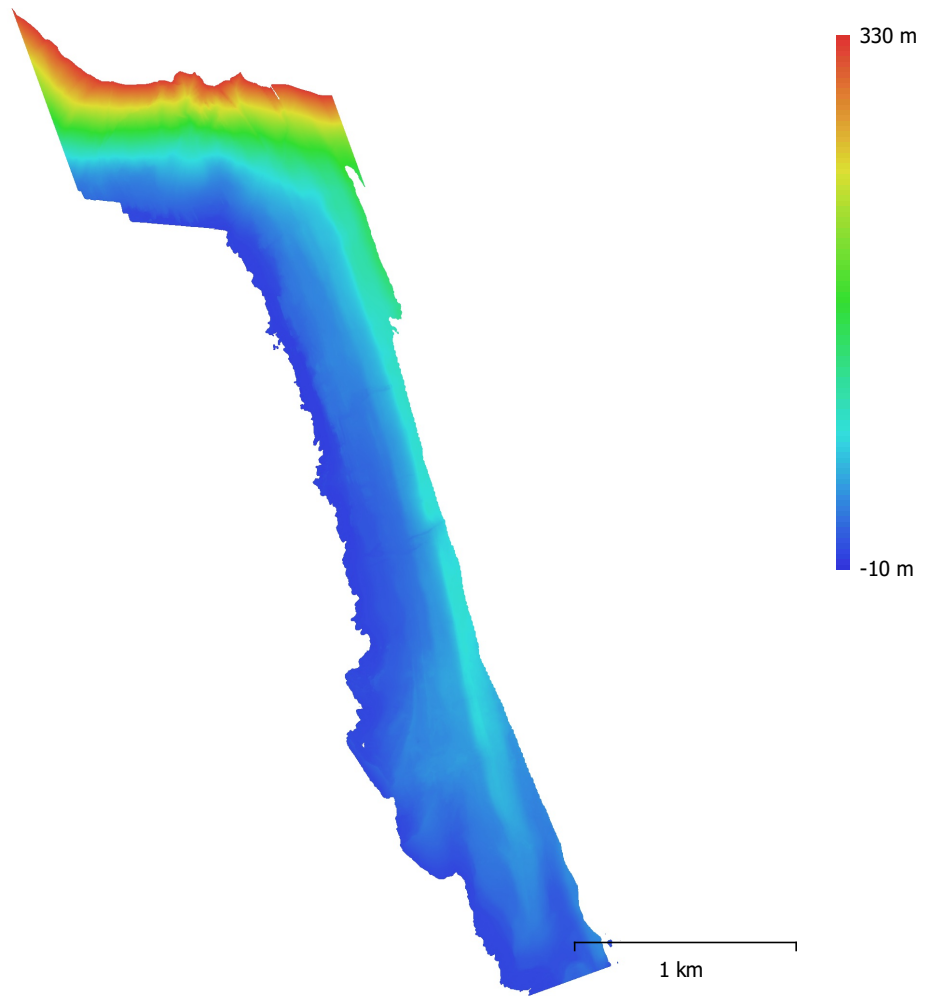


Fig. 5. Reconstructed digital elevation model.

Resolution: 15.7 cm/pix
Point density: 40.8 points/m²

Processing Parameters

General

Cameras	1867
Aligned cameras	1827
Markers	2
Scale bars	1

Shapes

Polylines	111
Polygons	1
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	663,279 of 980,412
RMS reprojection error	0.29064 (0.826377 pix)
Max reprojection error	7.74536 (41.912 pix)
Mean key point size	2.24841 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	9.50893

Alignment parameters

Accuracy	Highest
Generic preselection	No
Reference preselection	No
Key point limit	40,000
Tie point limit	4,000
Guided image matching	No
Adaptive camera model fitting	No
Matching time	1 days 10 hours
Matching memory usage	9.94 GB
Alignment time	46 minutes 11 seconds
Alignment memory usage	1.26 GB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	1 minutes 58 seconds
Software version	1.6.5.11249
File size	160.48 MB

Depth Maps

Count	1737
-------	------

Depth maps generation parameters

Quality	High
Filtering mode	Mild
Processing time	4 hours 55 minutes
Memory usage	8.07 GB
Software version	1.6.5.11249
File size	8.85 GB

Dense Point Cloud

Points	404,291,851
Point colors	3 bands, uint8

Depth maps generation parameters

Quality	High
---------	------

Filtering mode	Mild
Processing time	4 hours 55 minutes
Memory usage	8.07 GB
Dense cloud generation parameters	
Processing time	7 hours 31 minutes
Memory usage	28.22 GB
Software version	1.6.5.11249
File size	7.07 GB
Model	
Faces	80,853,663
Vertices	40,451,886
Vertex colors	3 bands, uint8
Texture	8,192 x 8,192, 4 bands, uint8
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Processing time	4 hours 55 minutes
Memory usage	8.07 GB
Reconstruction parameters	
Surface type	Arbitrary
Source data	Dense cloud
Interpolation	Enabled
Strict volumetric masks	No
Processing time	1 hours 14 minutes
Memory usage	77.28 GB
Texturing parameters	
Mapping mode	Generic
Blending mode	Mosaic
Texture size	8,192
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	15 minutes 20 seconds
UV mapping memory usage	4.24 GB
Blending time	1 hours 13 minutes
Blending memory usage	16.42 GB
Software version	1.6.5.11249
File size	3.44 GB
Tiled Model	
Texture	3 bands, uint8
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Processing time	4 hours 55 minutes
Memory usage	8.07 GB
Reconstruction parameters	
Source data	Dense cloud
Tile size	256
Face count	High
Enable ghosting filter	No
Processing time	5 hours 26 minutes
Memory usage	8.84 GB
Software version	1.6.5.11249
File size	5.30 GB
Orthomosaic	
Size	62,932 x 14,413
Coordinate system	WGS 84 (EPSG::4978)

Colors 3 bands, uint8

Reconstruction parameters

Blending mode Mosaic

Surface Mesh

Enable hole filling Yes

Processing time 1 hours 27 minutes

Memory usage 10.54 GB

Software version 1.6.5.11249

File size 28.62 GB

System

Software name Agisoft Metashape Professional

Software version 1.6.4 build 10928

OS Windows 64 bit

RAM 31.81 GB

CPU Intel(R) Core(TM) i7-9850H CPU @ 2.60GHz

GPU(s) Quadro RTX 3000