Agisoft Metashape

Processing Report
11 December 2023

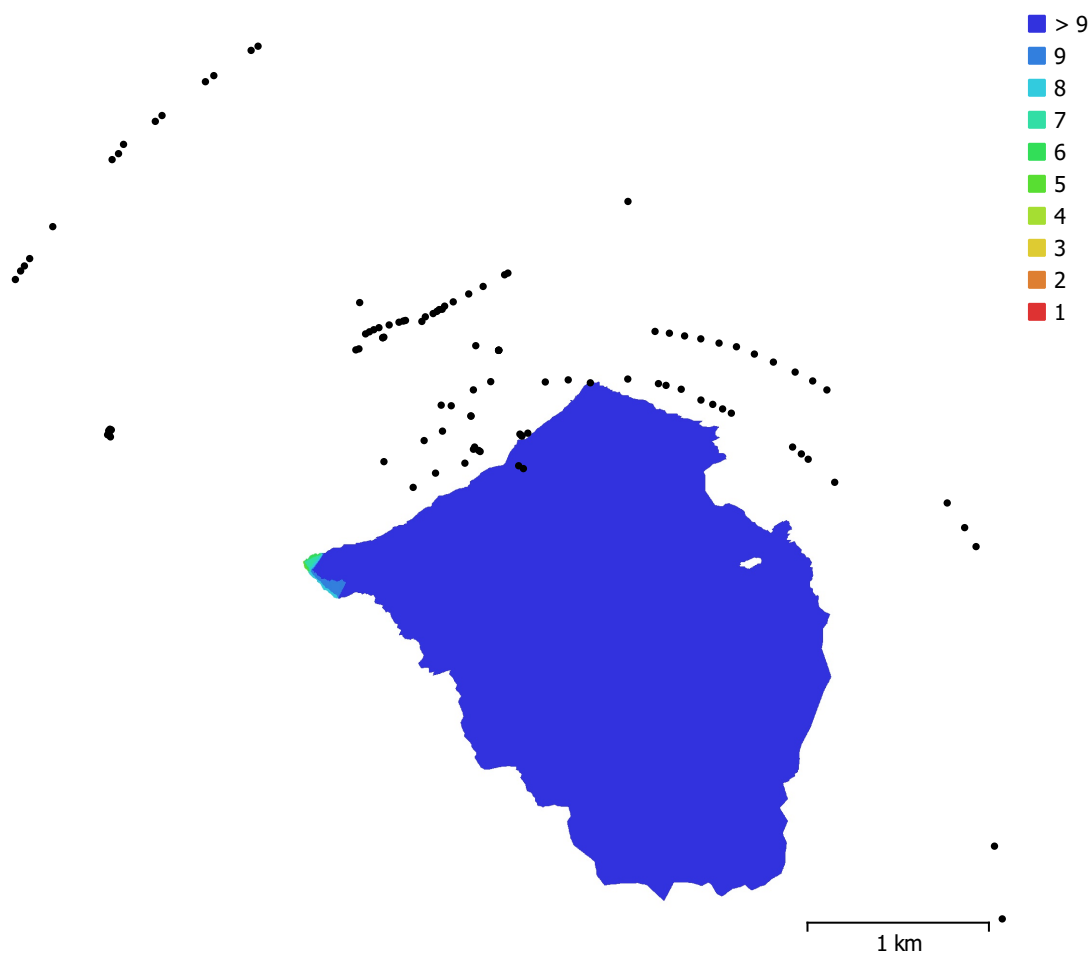# Survey Data

> 9
9
8
7
6
5
4
3
2
1

1 km
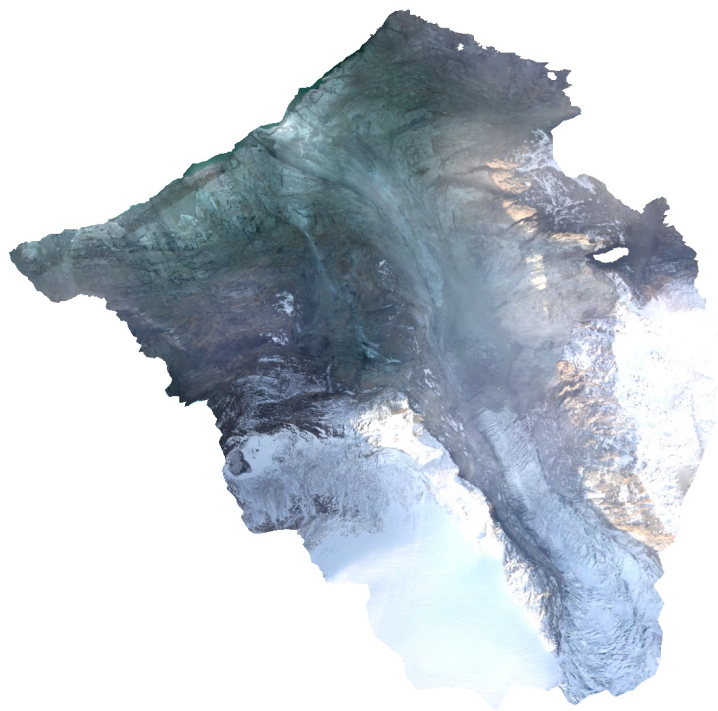
Fig. 1. Camera locations and image overlap.

Number of images:	107	Camera stations:	105
Flying altitude:	2.16 km	Tie points:	28,648
Ground resolution:	20.8 cm/pix	Projections:	122,421
Coverage area:	4.63 km²	Reprojection error:	1.52 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
Canon EOS 5D Mark IV, ...	6720 x 4480	105 mm	4.44 x 4.44 μm	No
Canon EOS 5D Mark IV, ...	6720 x 4480	70 mm	4.44 x 4.44 μm	No
Canon EOS 5D Mark IV, ...	6720 x 4480	65 mm	4.44 x 4.44 μm	No
Canon EOS 5D Mark IV, ...	6720 x 4480	40 mm	4.44 x 4.44 μm	No
Canon EOS 5D Mark IV, ...	6720 x 4480	75 mm	4.44 x 4.44 μm	No

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
Canon EOS 5D Mark IV, …	6720 x 4480	35 mm	4.44 x 4.44 µm	No
Canon EOS 5D Mark IV, …	6720 x 4480	58 mm	4.44 x 4.44 µm	No
Canon EOS 5D Mark IV, …	6720 x 4480	47 mm	4.44 x 4.44 µm	No
Canon EOS 5D Mark IV, …	6720 x 4480	55 mm	4.44 x 4.44 µm	No
Canon EOS 5D Mark IV, …	6720 x 4480	67 mm	4.44 x 4.44 µm	No
Canon EOS 5D Mark IV, …	6720 x 4480	95 mm	4.44 x 4.44 µm	No
Canon EOS 5D Mark IV, …	6720 x 4480	88 mm	4.44 x 4.44 µm	No
FC3582 (6.72mm)	4032 x 3024	6.72 mm	2.4 x 2.4 µm	No
NIKON Z 8, 0.0 mm f/0.0	8256 x 5504	unknown	4.35 x 4.35 µm	No
NIKON D850, 24.0-70.0 …	8256 x 5504	32 mm	4.35 x 4.35 µm	No
NIKON D850, 24.0-70.0 …	8256 x 5504	48 mm	4.35 x 4.35 µm	No
NIKON D850, 24.0-70.0 …	8256 x 5504	42 mm	4.35 x 4.35 µm	No
NIKON D850, 24.0-70.0 …	8256 x 5504	44 mm	4.35 x 4.35 µm	No
NIKON D850, 24.0-70.0 …	8256 x 5504	50 mm	4.35 x 4.35 µm	No
NIKON D850, 24.0-70.0 …	8256 x 5504	38 mm	4.35 x 4.35 µm	No
NIKON D850, 24.0-70.0 …	8256 x 5504	24 mm	4.35 x 4.35 µm	No
NIKON D850, 24.0-70.0 …	8256 x 5504	31 mm	4.35 x 4.35 µm	No
LEICA SL2, Summicron-…	4182 x 2791	50 mm	8.61 x 8.61 µm	No
DC-TZ202 (8.8mm)	5472 x 3648	8.8 mm	2.41 x 2.41 µm	No
DC-TZ202 (9.1mm)	5472 x 3648	9.1 mm	2.39 x 2.39 µm	No
LEICA SL2, Summicron-…	4184 x 2792	50 mm	8.6 x 8.6 µm	No

Table 1. Cameras.
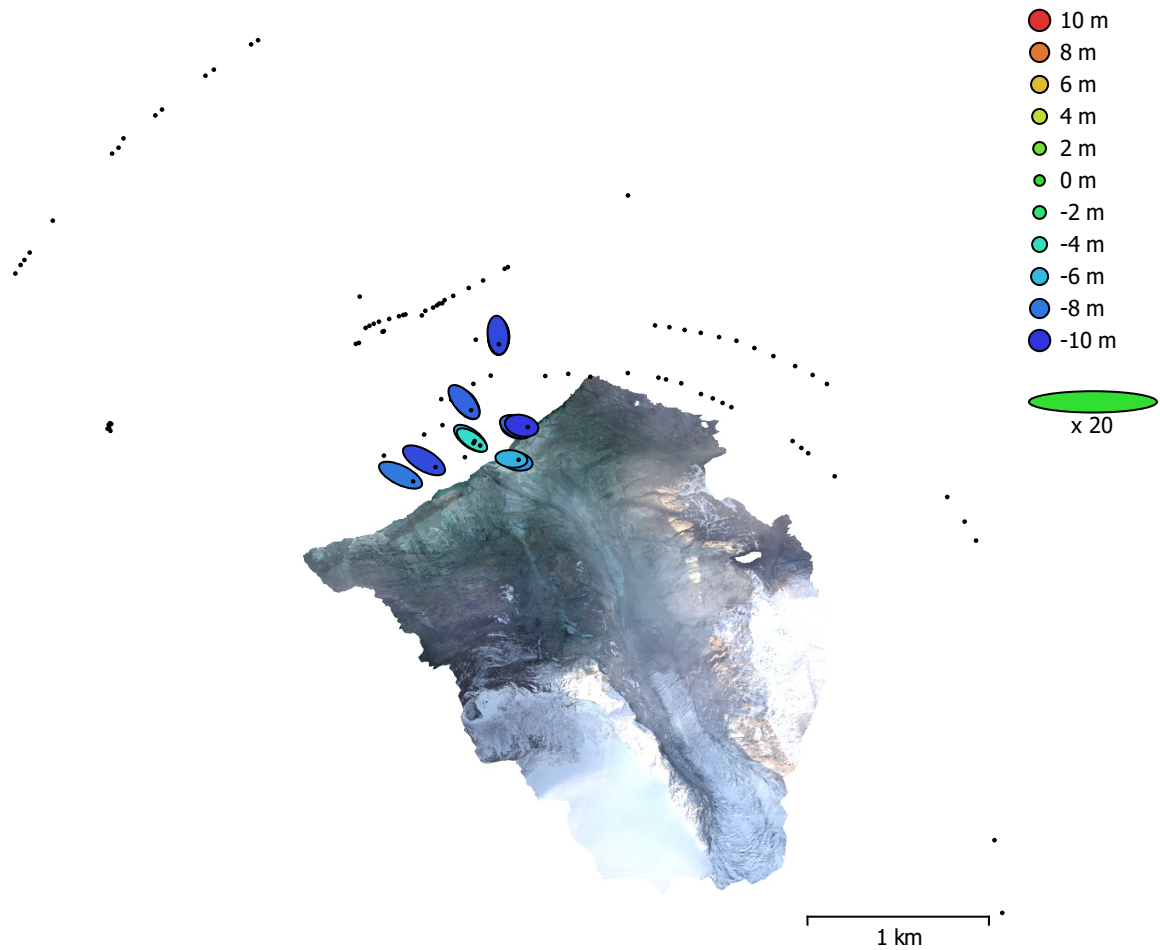
Camera Locations

Fig. 28. 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)
3.74097	3.16023	8.47575	4.89714	9.78878

Table 27. Average camera location error.

X - Easting, Y - Northing, Z - Altitude.
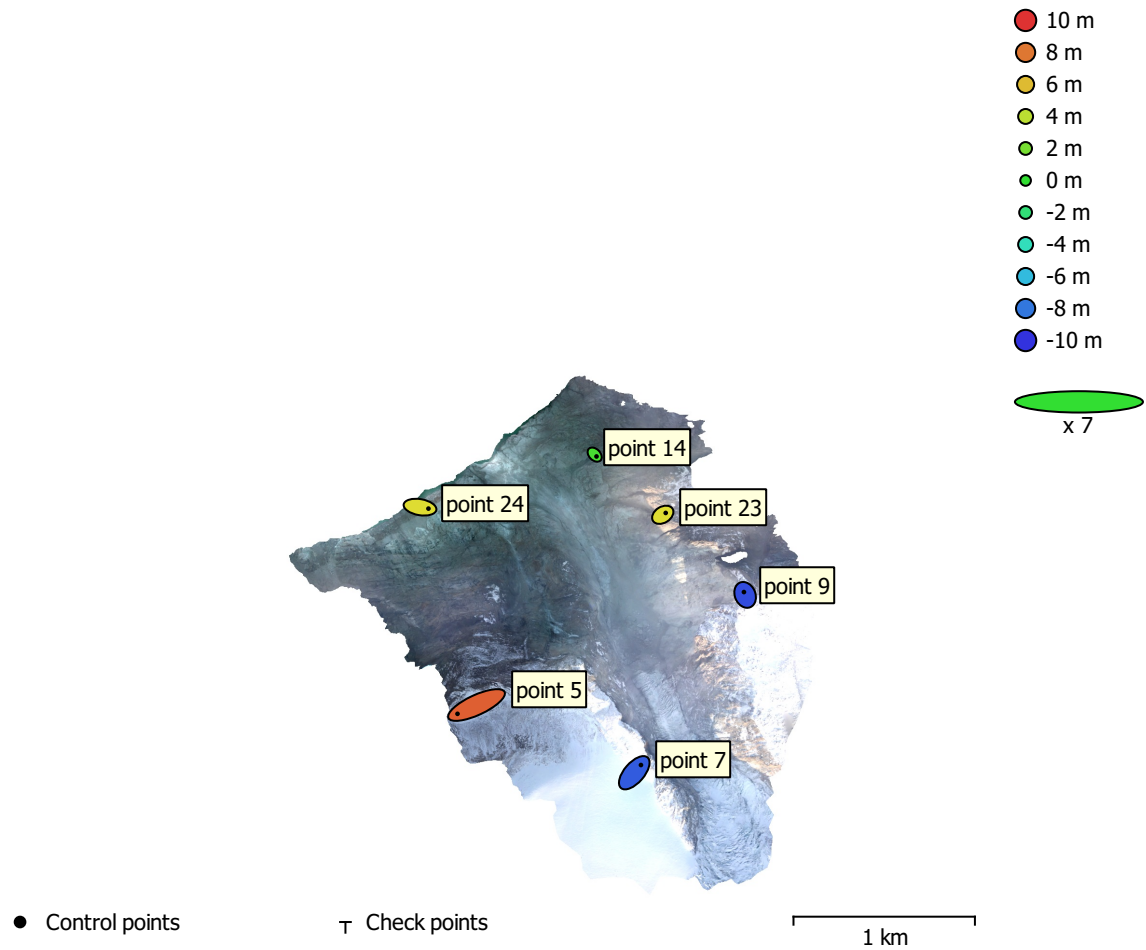
Ground Control Points

Fig. 29. 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 (m)	Y error (m)	Z error (m)	XY error (m)	Total (m)
6	14.2537	7.98025	6.95687	16.3356	17.7553

Table 28. Control points RMSE.
X - Easting, Y - Northing, Z - Altitude.

Label	X error (m)	Y error (m)	Z error (m)	Total (m)	Image (pix)
point 14	2.89759	-2.90614	0.600132	4.14751	3.837 (13)
point 9	-1.88326	4.45316	-9.24802	10.4357	1.966 (6)
point 7	10.5469	12.1534	-8.81604	18.3484	1.655 (5)
point 5	-29.9723	-13.8772	8.71042	34.1583	4.693 (2)
point 23	4.65466	2.89509	5.03316	7.44178	2.027 (4)
point 24	13.2595	-2.27325	5.05726	14.3721	7.444 (16)
Total	**14.2537**	**7.98025**	**6.95687**	**17.7553**	**5.055**

Table 29. Control points.

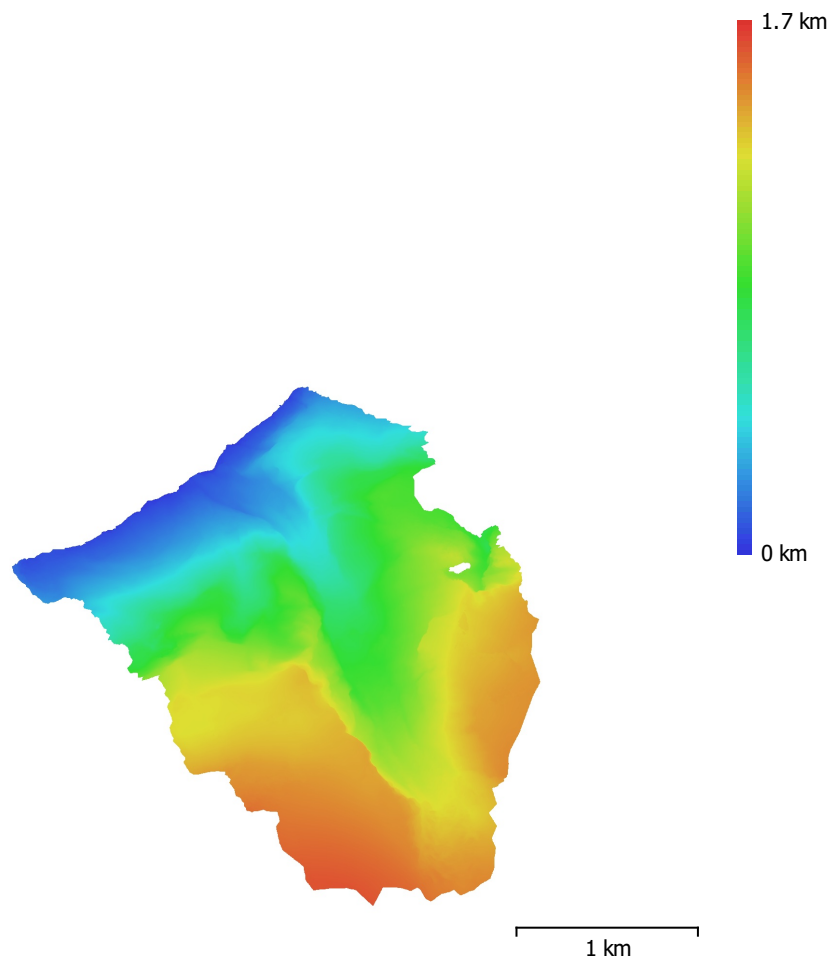X - Easting, Y - Northing, Z - Altitude.

Digital Elevation Model

Fig. 30. Reconstructed digital elevation model.

Resolution: 1 m/pix
Point density: 1 points/m²

Processing Parameters

General

Cameras	107
Aligned cameras	105
Markers	6
Coordinate system	WGS 84 / NSIDC Sea Ice Polar Stereographic North (EPSG::3413)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	28,648 of 84,403
RMS reprojection error	0.21694 (1.51525 pix)
Max reprojection error	3.53112 (37.3852 pix)
Mean key point size	6.50384 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	5.39804

  Alignment parameters

Accuracy	High
Generic preselection	Yes
Reference preselection	Source
Key point limit	40,000
Key point limit per Mpx	1,000
Tie point limit	4,000
Exclude stationary tie points	No
Guided image matching	Yes
Adaptive camera model fitting	Yes
Matching time	42 seconds
Matching memory usage	371.16 MB
Alignment time	34 seconds
Alignment memory usage	407.46 MB

  Optimization parameters

Parameters	f, b1, cx, cy, k1, k2, p1, p2
Adaptive camera model fitting	Yes
Optimization time	0 seconds
Date created	2023:09:27 18:03:14
Software version	2.0.1.15986
File size	7.86 MB

Depth Maps

Count	68

  Depth maps generation parameters

Quality	Medium
Filtering mode	Mild
Max neighbors	16
Processing time	1 minutes 1 seconds
Memory usage	1.29 GB
Date created	2023:09:27 19:10:49
Software version	2.0.1.15986
File size	148.01 MB

Point Cloud

Points	12,014,943

  Point attributes

Position	

Color	3 bands, uint8
Normal	
Point classes	
Created (never classified)	12,014,943
Depth maps generation parameters	
Quality	Medium
Filtering mode	Mild
Max neighbors	16
Processing time	1 minutes 1 seconds
Memory usage	1.29 GB
Point cloud generation parameters	
Processing time	1 minutes 55 seconds
Memory usage	6.03 GB
Date created	2023:09:27 19:12:44
Software version	2.0.1.15986
File size	159.07 MB
Model	
Faces	7,776,158
Vertices	3,891,028
Vertex colors	3 bands, uint8
Texture	8,192 x 8,192, 4 bands, uint16
Depth maps generation parameters	
Quality	Medium
Filtering mode	Mild
Max neighbors	16
Processing time	1 minutes 1 seconds
Memory usage	1.29 GB
Point cloud generation parameters	
Processing time	1 minutes 55 seconds
Memory usage	6.03 GB
Reconstruction parameters	
Surface type	Arbitrary
Source data	Point cloud
Interpolation	Enabled
Strict volumetric masks	No
Processing time	2 minutes 24 seconds
Memory usage	5.24 GB
Texturing parameters	
Mapping mode	Generic
Blending mode	Mosaic
Texture size	8,192
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	1 minutes 35 seconds
UV mapping memory usage	2.94 GB
Blending time	56 seconds
Blending memory usage	4.73 GB
Blending GPU memory usage	2.64 GB
Date created	2023:09:27 19:40:45
Software version	2.0.1.15986
File size	558.87 MB
DEM	
Size	2,908 x 2,859
Coordinate system	WGS 84 / NSIDC Sea Ice Polar Stereographic North (EPSG::3413)
Reconstruction parameters	
Source data	Mesh

Page 35

Interpolation	Disabled
Processing time	7 seconds
Memory usage	293.99 MB
Date created	2023:09:27 19:41:36
Software version	2.0.1.15986
File size	23.57 MB

Orthomosaic

Size	11,539 x 11,344
Coordinate system	WGS 84 / NSIDC Sea Ice Polar Stereographic North (EPSG::3413)
Colors	3 bands, uint8

Reconstruction parameters

Blending mode	Mosaic
Surface	DEM
Enable hole filling	Yes
Enable ghosting filter	No
Processing time	1 minutes 10 seconds
Memory usage	2.30 GB
Date created	2023:09:27 19:42:31
Software version	2.0.1.15986
File size	828.02 MB

System

Software name	Agisoft Metashape Professional
Software version	2.0.1 build 15986
OS	Windows 64 bit
RAM	63.70 GB
CPU	12th Gen Intel(R) Core(TM) i9-12900K
GPU(s)	NVIDIA GeForce RTX 3080