

# **Birketvedttoppen**

**Reconstruction Uncertainty 15**

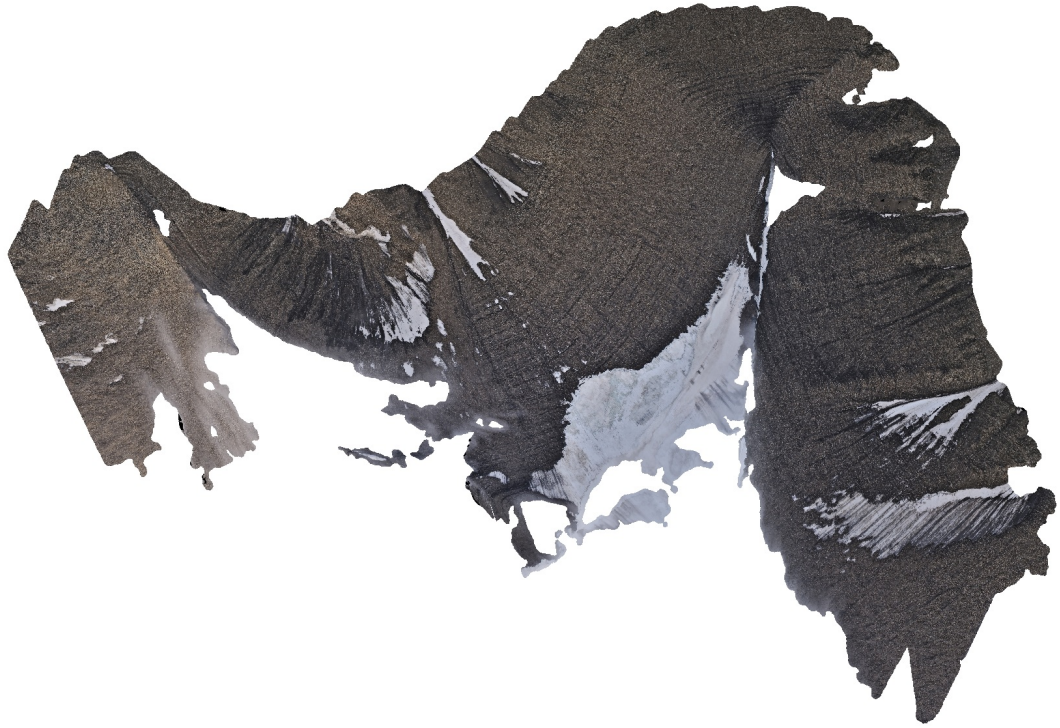
**Projection accuracy 3**

**Reprojection error 0,3**

**Dense Cloud Confidence 3-255**

**Filter Component Size: 99%**

**01 March 2022**



# Survey Data

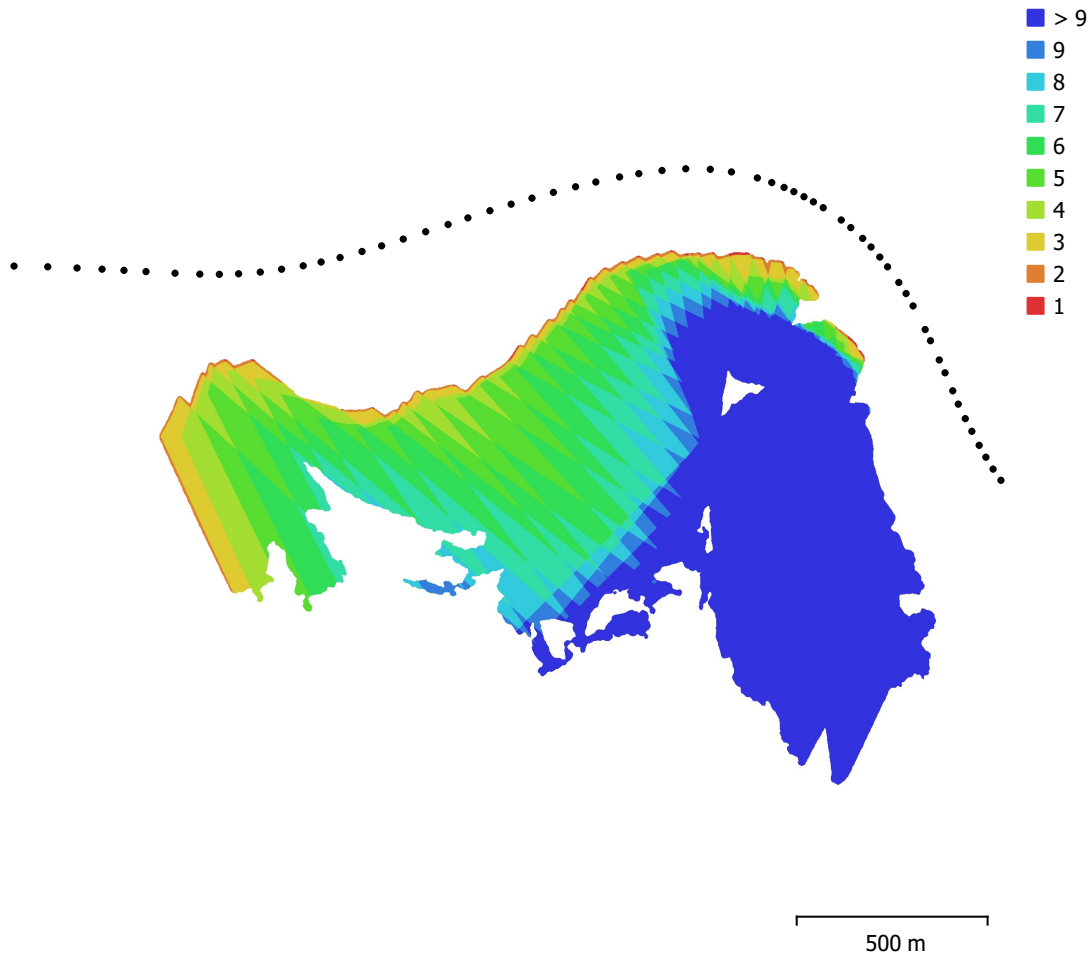


Fig. 1. Camera locations and image overlap.

Number of images:	61	Camera stations:	61
Flying altitude:	512 m	Tie points:	141,125
Ground resolution:	5.41 cm/pix	Projections:	480,839
Coverage area:	1.35 km <sup>2</sup>	Reprojection error:	0.23 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
NIKON D800 (50mm)	4924 x 7374	50 mm	4.88 x 4.88 $\mu$ m	No

Table 1. Cameras.

# Camera Calibration

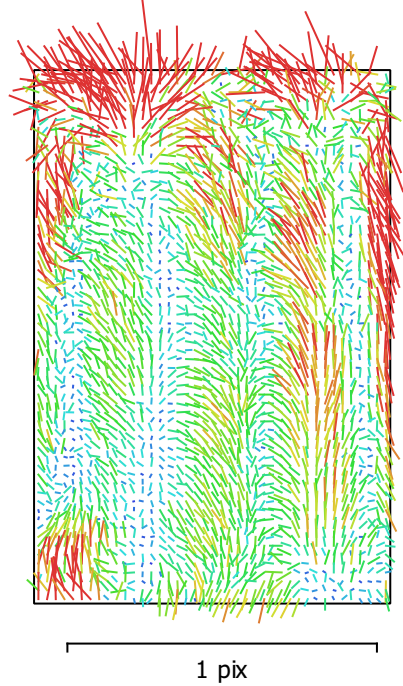


Fig. 2. Image residuals for NIKON D800 (50mm).

## NIKON D800 (50mm)

61 images

Type  
Frame

Resolution  
**4924 x 7374**

Focal Length  
**50 mm**

Pixel Size  
**4.88 x 4.88  $\mu\text{m}$**

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
<b>F</b>	<b>10574</b>	0.16	1.00	0.18	-0.15	0.07	0.09	-0.09	0.24	-0.07
<b>Cx</b>	<b>10.0054</b>	0.28		1.00	0.12	-0.04	0.05	-0.04	0.85	0.02
<b>Cy</b>	<b>6.99574</b>	0.19			1.00	-0.06	-0.03	0.05	-0.01	0.77
<b>K1</b>	<b>-0.108727</b>	4.4e-05				1.00	-0.95	0.89	-0.01	-0.05
<b>K2</b>	<b>0.069186</b>	0.00057					1.00	-0.98	0.02	-0.02
<b>K3</b>	<b>0.203255</b>	0.0023						1.00	-0.02	0.03
<b>P1</b>	<b>0.00037557</b>	5.2e-06							1.00	0.11
<b>P2</b>	<b>0.000263522</b>	3.7e-06								1.00

Table 2. Calibration coefficients and correlation matrix.

# Camera Locations

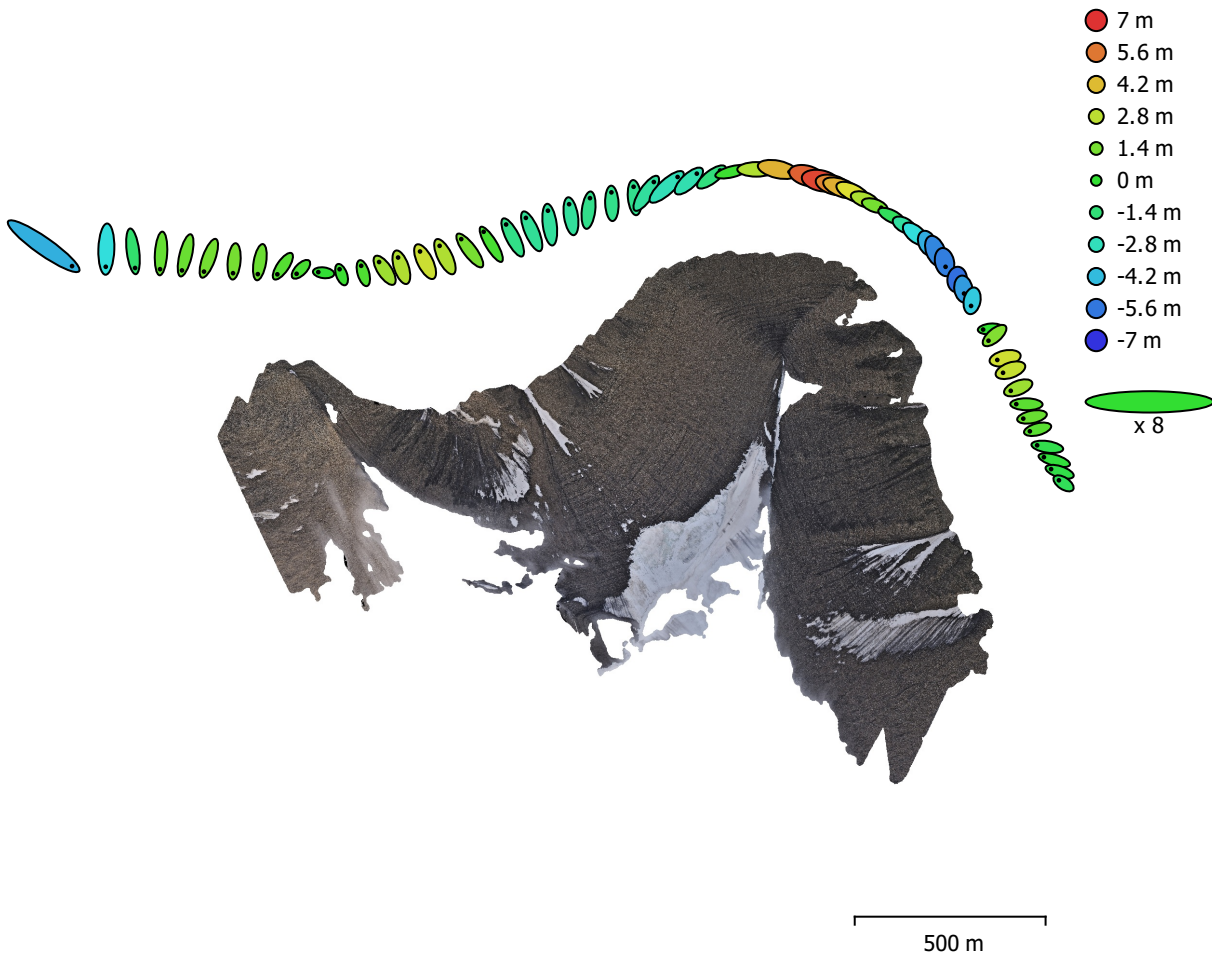


Fig. 3. Camera locations and error estimates.

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)
4.88126	5.60429	2.83784	7.43201	7.95538

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

# Digital Elevation Model

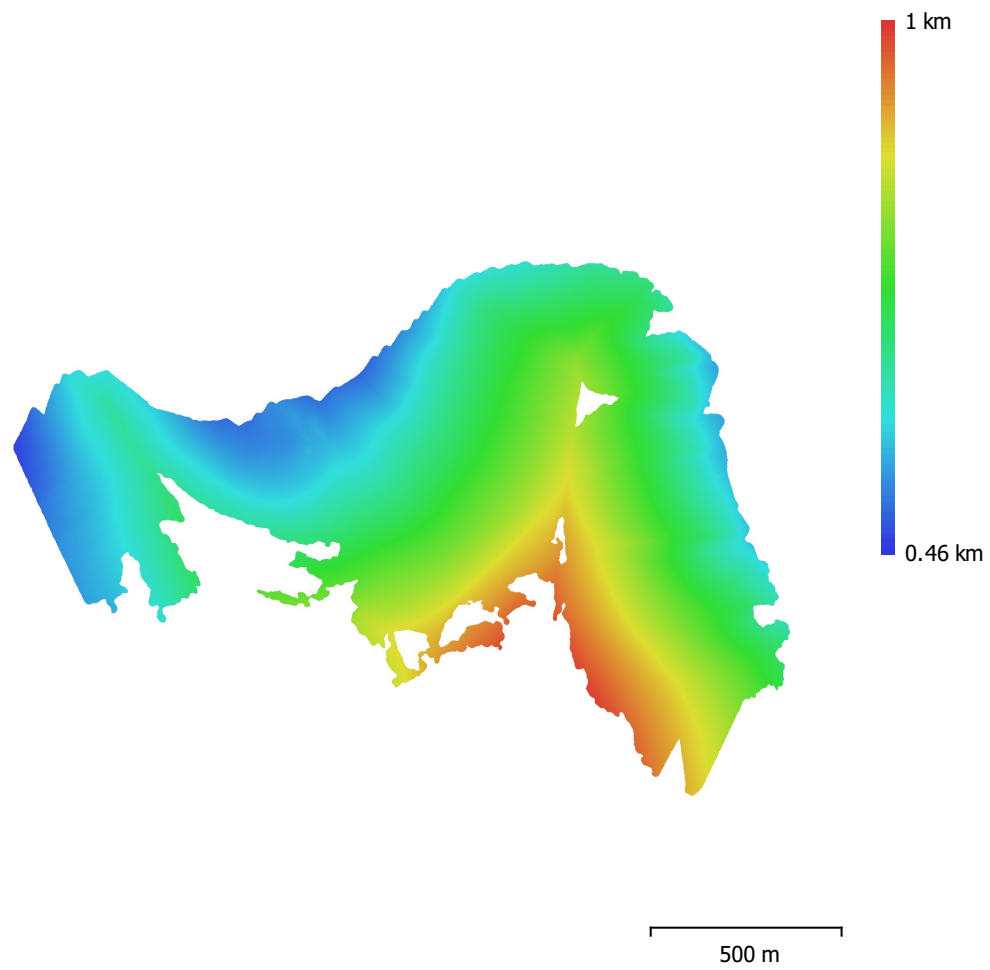


Fig. 4. Reconstructed digital elevation model.

Resolution: 21.6 cm/pix  
Point density: 21.4 points/m<sup>2</sup>

# Processing Parameters

## General

Cameras	61
Aligned cameras	61
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

## Point Cloud

Points	141,125 of 396,123
RMS reprojection error	0.134134 (0.230252 pix)
Max reprojection error	0.299993 (1.27419 pix)
Mean key point size	1.71993 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	3.10324

## Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	No
Key point limit	60,000
Tie point limit	0
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	1 minutes 15 seconds
Matching memory usage	433.67 MB
Alignment time	41 seconds
Alignment memory usage	250.99 MB

## Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	2 seconds
Software version	1.7.2.12040
File size	37.82 MB

## Depth Maps

Count	61
<b>Depth maps generation parameters</b>	
Quality	Medium
Filtering mode	Mild
Processing time	1 minutes 4 seconds
Memory usage	1.17 GB
Software version	1.7.2.12040
File size	172.11 MB

## Dense Point Cloud

Points	31,906,593
Point colors	3 bands, uint8
<b>Depth maps generation parameters</b>	
Quality	Medium
Filtering mode	Mild
Processing time	1 minutes 4 seconds
Memory usage	1.17 GB
<b>Dense cloud generation parameters</b>	

Processing time	3 minutes 29 seconds
Memory usage	5.18 GB
Software version	1.7.2.12040
File size	658.14 MB
<b>Model</b>	
Faces	2,037,608
Vertices	1,027,053
Vertex colors	3 bands, uint8
Texture	4,096 x 4,096 x 10, 4 bands, uint8
<b>Depth maps generation parameters</b>	
Quality	Medium
Filtering mode	Mild
Processing time	1 minutes 4 seconds
Memory usage	1.17 GB
<b>Reconstruction parameters</b>	
Surface type	Arbitrary
Source data	Dense cloud
Interpolation	Enabled
Strict volumetric masks	No
Processing time	12 minutes 54 seconds
Memory usage	17.55 GB
<b>Texturing parameters</b>	
Mapping mode	Generic
Blending mode	Mosaic
Texture size	4,096
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	3 minutes 37 seconds
UV mapping memory usage	3.94 GB
Blending time	52 seconds
Blending memory usage	6.07 GB
Software version	1.7.2.12040
File size	327.63 MB
<b>Tiled Model</b>	
Texture	3 bands, uint8
<b>Depth maps generation parameters</b>	
Quality	Medium
Filtering mode	Mild
Processing time	1 minutes 4 seconds
Memory usage	1.17 GB
<b>Reconstruction parameters</b>	
Source data	Dense cloud
Tile size	256
Face count	Medium
Enable ghosting filter	No
Processing time	30 minutes 37 seconds
Memory usage	4.50 GB
Software version	1.7.2.12040
File size	864.67 MB
<b>System</b>	
Software name	Agisoft Metashape Professional
Software version	1.7.2 build 12040
OS	Windows 64 bit
RAM	127.78 GB
CPU	Intel(R) Core(TM) i9-10900 CPU @ 2.80GHz
GPU(s)	NVIDIA GeForce RTX 2080 SUPER