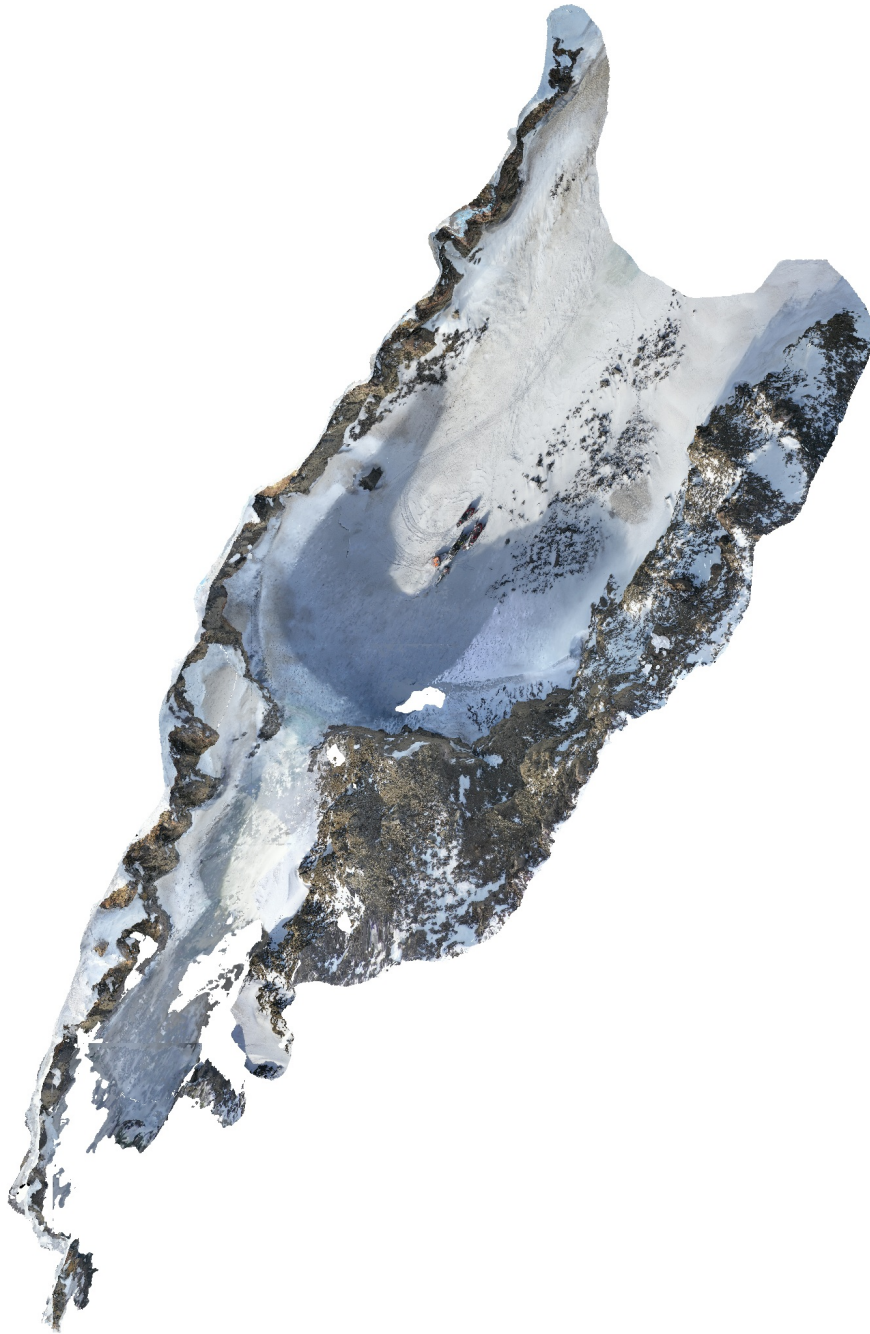


# Hyperittfossen

Processing Report  
01 March 2021



# Survey Data

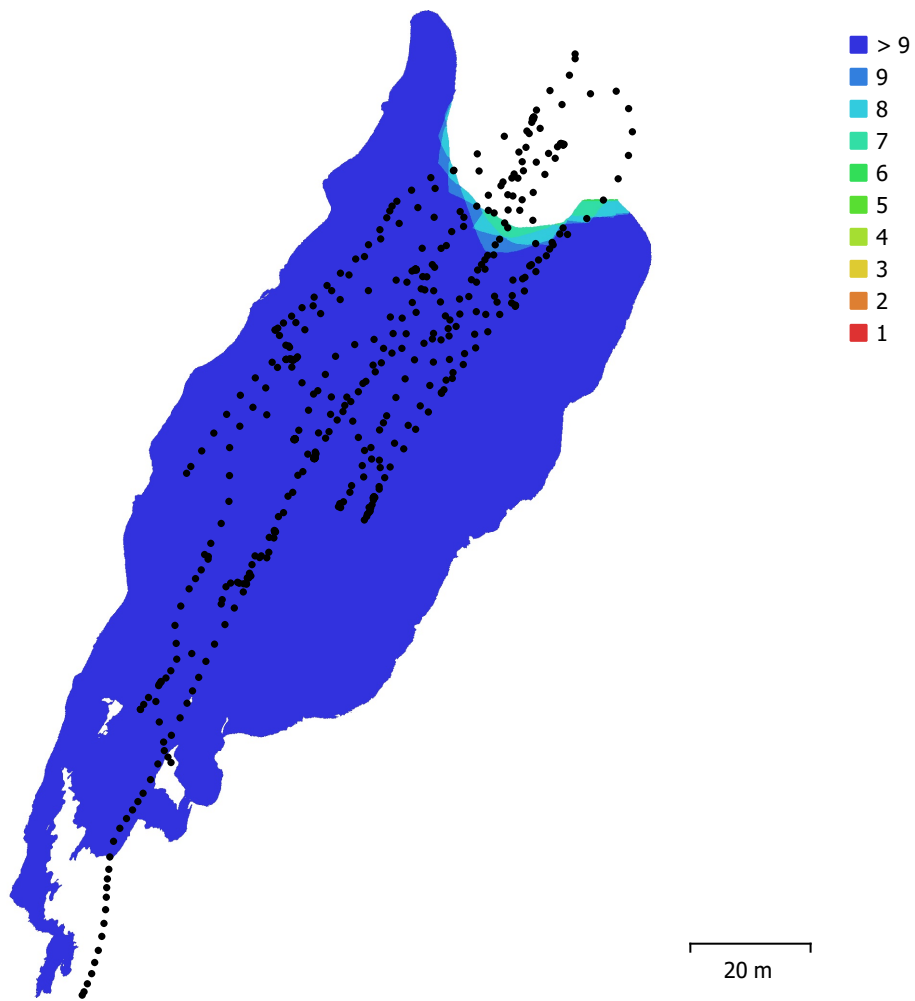


Fig. 1. Camera locations and image overlap.

Number of images:	441	Camera stations:	440
Flying altitude:	28.1 m	Tie points:	193,554
Ground resolution:	5.99 mm/pix	Projections:	1,195,651
Coverage area:	6.09e+03 m <sup>2</sup>	Reprojection error:	1.14 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
L1D-20c (10.26mm)	5472 x 3648	10.26 mm	2.41 x 2.41 $\mu$ m	No
unknown	960 x 544	unknown	unknown	No

Table 1. Cameras.

# Camera Calibration

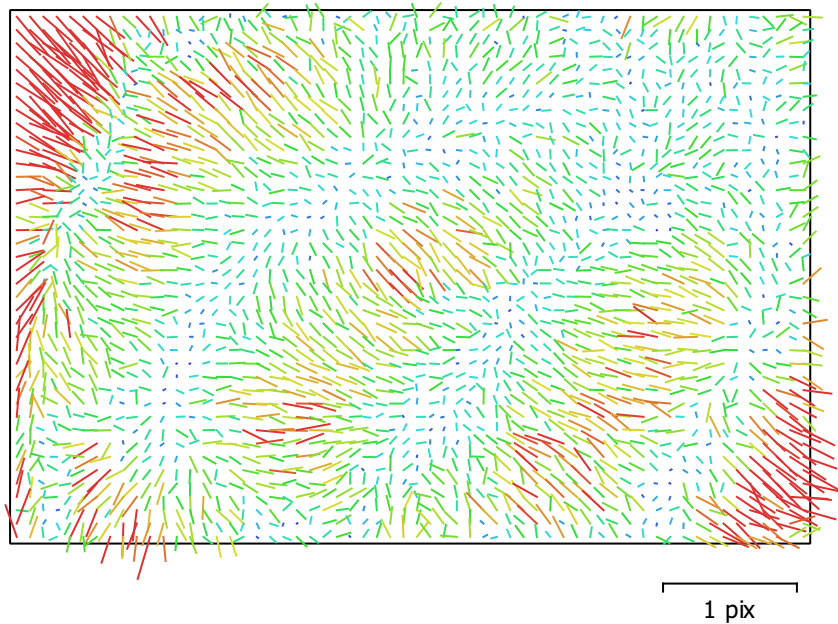


Fig. 2. Image residuals for L1D-20c (10.26mm).

## L1D-20c (10.26mm)

438 images

Type	Resolution	Focal Length	Pixel Size
<b>Frame</b>	<b>5472 x 3648</b>	<b>10.26 mm</b>	<b>2.41 x 2.41 <math>\mu\text{m}</math></b>

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
<b>F</b>	<b>4357.7</b>	0.039	1.00	0.07	-0.18	-0.15	0.24	-0.22	0.04	-0.09
<b>Cx</b>	<b>2.59671</b>	0.078		1.00	0.02	0.01	0.01	-0.01	0.96	0.03
<b>Cy</b>	<b>-50.6827</b>	0.087			1.00	-0.02	0.01	-0.01	0.02	0.94
<b>K1</b>	<b>0.00621029</b>	3.6e-05				1.00	-0.96	0.90	0.01	-0.02
<b>K2</b>	<b>0.042168</b>	0.00015					1.00	-0.98	0.01	0.01
<b>K3</b>	<b>-0.0458652</b>	0.0002						1.00	-0.01	-0.02
<b>P1</b>	<b>-0.00017713</b>	5.6e-06							1.00	0.03
<b>P2</b>	<b>-0.00365746</b>	5.2e-06								1.00

Table 2. Calibration coefficients and correlation matrix.

# Camera Calibration

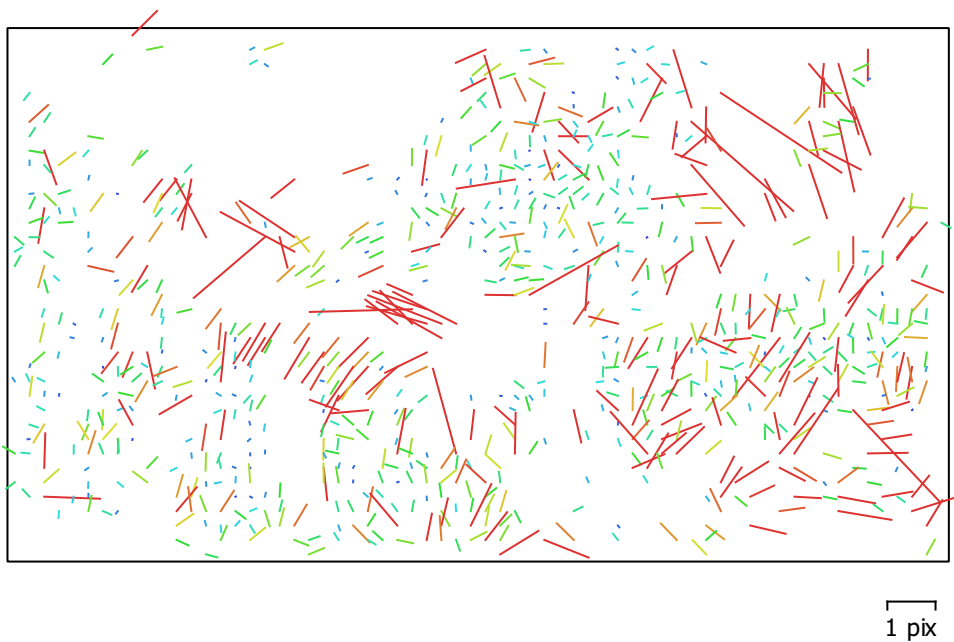


Fig. 3. Image residuals for unknown.

**unknown**

3 images

Type  
**Frame**

Resolution  
**960 x 544**

Focal Length  
**unknown**

Pixel Size  
**unknown**

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
<b>F</b>	<b>786.443</b>	0.31	1.00	-0.03	-0.18	-0.42	0.51	-0.52	0.10	0.12
<b>Cx</b>	<b>27.278</b>	0.54		1.00	0.36	-0.16	0.10	-0.08	0.93	0.25
<b>Cy</b>	<b>-19.8932</b>	0.53			1.00	-0.22	0.06	-0.01	0.19	0.81
<b>K1</b>	<b>0.0305166</b>	0.0045				1.00	-0.96	0.90	-0.15	-0.29
<b>K2</b>	<b>-0.0682402</b>	0.019					1.00	-0.98	0.14	0.19
<b>K3</b>	<b>0.113651</b>	0.025						1.00	-0.12	-0.16
<b>P1</b>	<b>0.0134513</b>	0.00027							1.00	0.13
<b>P2</b>	<b>-0.00711065</b>	0.00022								1.00

Table 3. Calibration coefficients and correlation matrix.

# Camera Locations

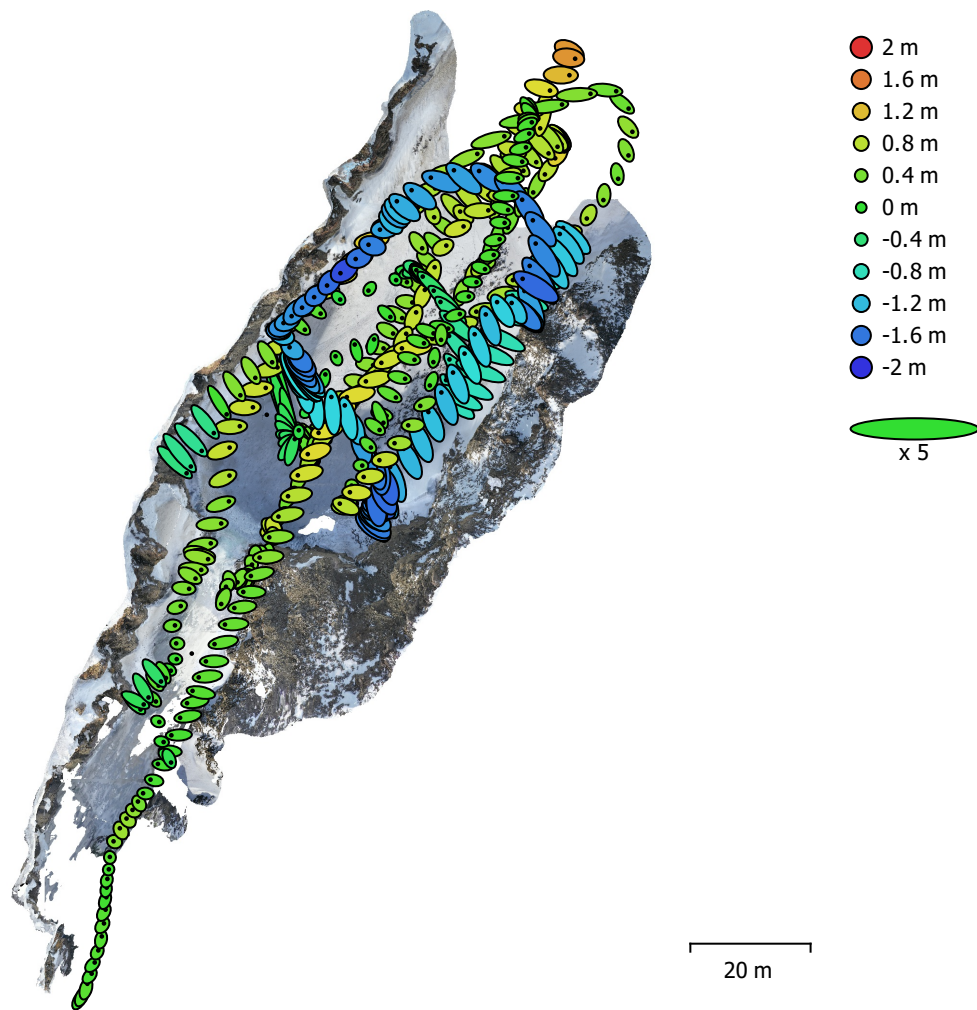


Fig. 4. Camera locations and error estimates.

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)
0.429965	0.493426	0.800675	0.654476	1.03413

Table 4. Average camera location error.  
X - Longitude, Y - Latitude, Z - Altitude.

# Digital Elevation Model

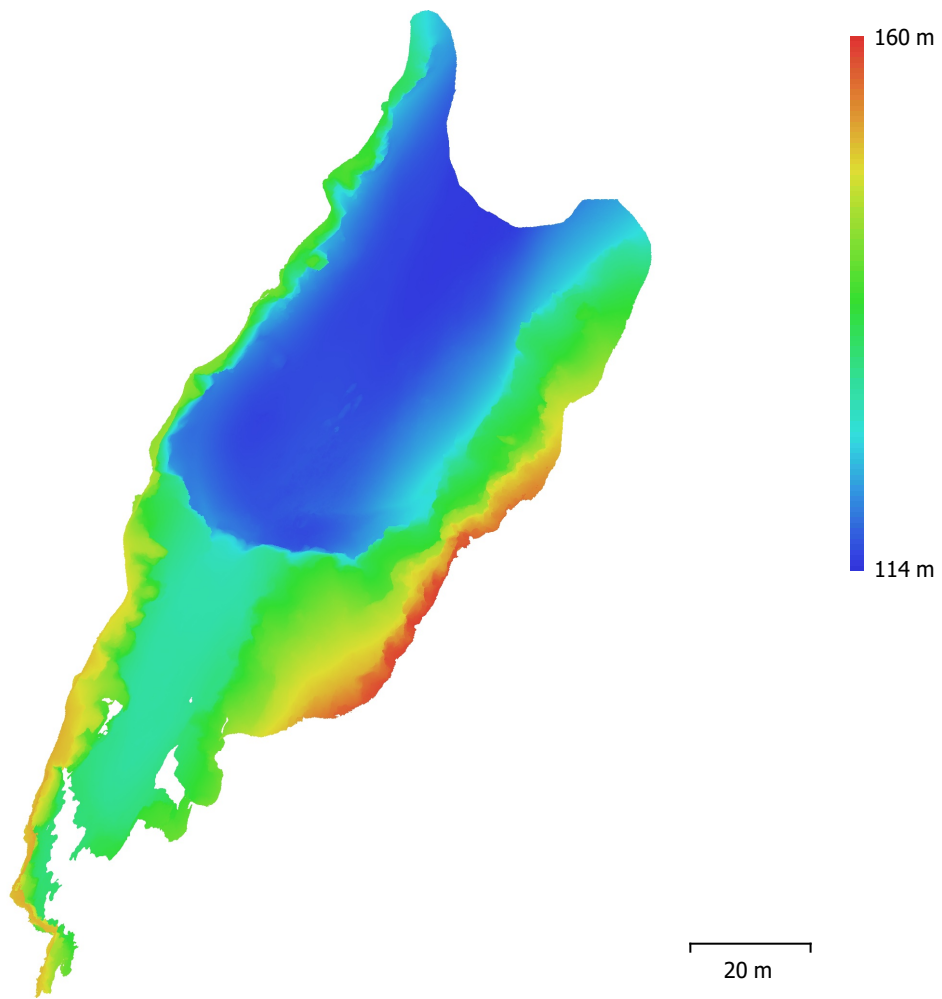


Fig. 5. Reconstructed digital elevation model.

Resolution: 1.2 cm/pix  
Point density: 0.696 points/cm<sup>2</sup>

# Processing Parameters

## General

Cameras	441
Aligned cameras	440
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

## Point Cloud

Points	193,554 of 257,759
RMS reprojection error	0.245947 (1.14345 pix)
Max reprojection error	1.06015 (45.6592 pix)
Mean key point size	4.02992 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	8.37674

## Alignment parameters

Accuracy	High
Generic preselection	Yes
Reference preselection	Source
Key point limit	40,000
Tie point limit	4,000
Guided image matching	No
Adaptive camera model fitting	No
Matching time	38 minutes 36 seconds
Matching memory usage	389.08 MB
Alignment time	8 minutes 8 seconds
Alignment memory usage	240.96 MB

## Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	13 seconds
Software version	1.6.1.10009
File size	38.17 MB

## Depth Maps

Count	440
<b>Depth maps generation parameters</b>	
Quality	High
Filtering mode	Mild
Processing time	3 hours 51 minutes
Memory usage	6.09 GB
Software version	1.6.1.10009
File size	2.58 GB

## Dense Point Cloud

Points	152,206,388
Point colors	3 bands, uint8

## Depth maps generation parameters

Quality	High
Filtering mode	Mild
Processing time	3 hours 51 minutes
Memory usage	6.09 GB

## Dense cloud generation parameters

Processing time	6 hours 48 minutes
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Memory usage	19.39 GB
Software version	1.6.1.10009
File size	1.94 GB
<b>Model</b>	
Faces	2,000,000
Vertices	1,006,152
Vertex colors	3 bands, uint8
Texture	4,096 x 4,096, 4 bands, uint8
<b>Depth maps generation parameters</b>	
Quality	High
Filtering mode	Mild
Processing time	3 hours 51 minutes
Memory usage	6.09 GB
<b>Reconstruction parameters</b>	
Surface type	Arbitrary
Source data	Dense cloud
Interpolation	Enabled
Strict volumetric masks	No
Processing time	1 hours 27 minutes
Memory usage	76.61 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	5 minutes 55 seconds
Blending time	21 minutes 41 seconds
Software version	1.6.1.10009
File size	119.73 MB
<b>Tiled Model</b>	
Texture	3 bands, uint8
<b>Depth maps generation parameters</b>	
Quality	High
Filtering mode	Mild
Processing time	3 hours 51 minutes
Memory usage	6.09 GB
<b>Reconstruction parameters</b>	
Source data	Dense cloud
Tile size	256
Face count	Medium
Enable ghosting filter	No
Processing time	1 hours 32 minutes
Memory usage	6.34 GB
Software version	1.7.1.11797
File size	787.79 MB
<b>System</b>	
Software name	Agisoft Metashape Professional
Software version	1.7.1 build 11797
OS	Windows 64 bit
RAM	127.78 GB
CPU	Intel(R) Core(TM) i9-9900K CPU @ 3.60GHz
GPU(s)	GeForce RTX 2080