

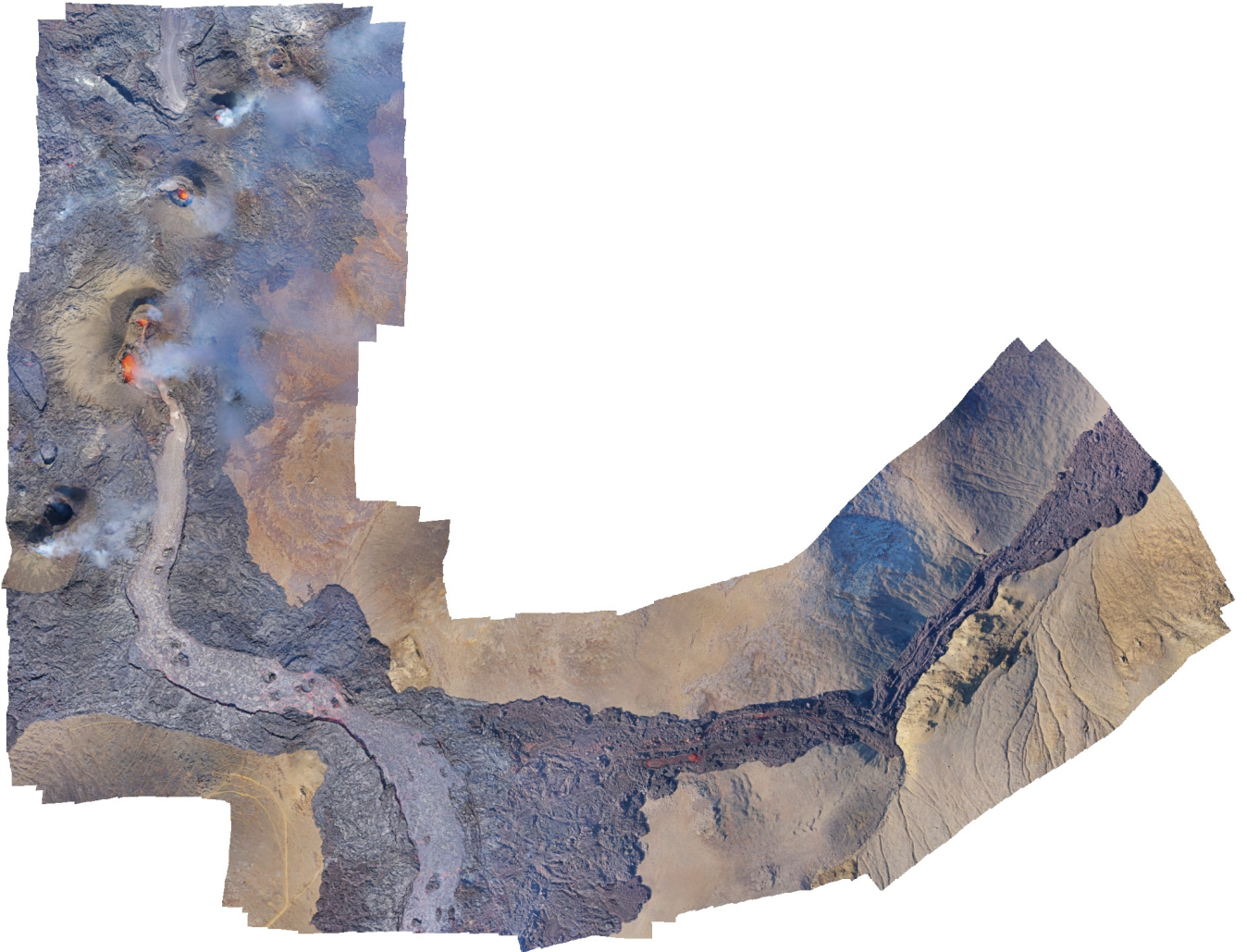
# 2021\_04\_26\_All\_Report

Processing Report

April 26, 2021

Fagradalsfjall Vent Merged Model

03 June 2022



# Survey Data

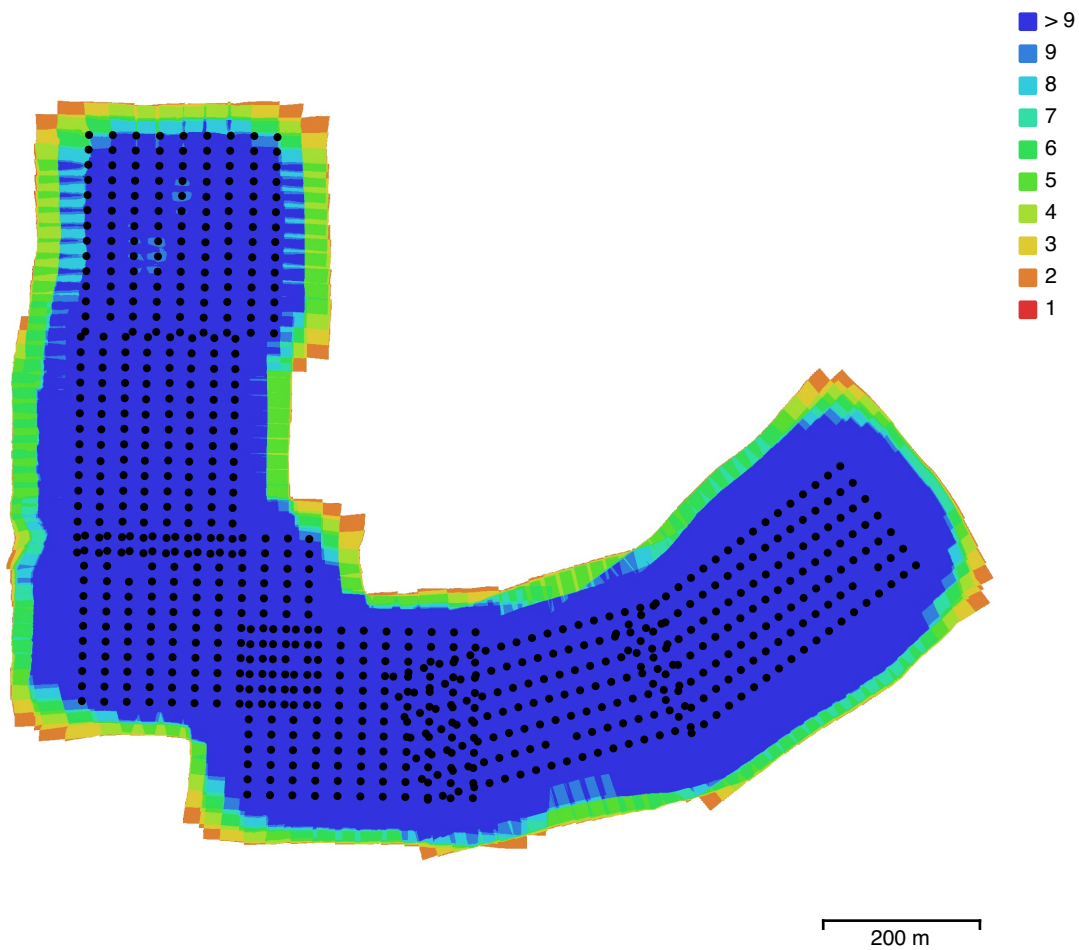


Fig. 1. Camera locations and image overlap.

Number of images:	764	Camera stations:	764
Flying altitude:	132 m	Tie points:	2,230,100
Ground resolution:	3.04 cm/pix	Projections:	10,288,488
Coverage area:	0.626 km <sup>2</sup>	Reprojection error:	0.366 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
Test_Pro (10.26mm)	5472 x 3648	10.26 mm	2.41 x 2.41 $\mu$ m	No
Test_Pro (10.26mm)	5472 x 3648	10.26 mm	2.41 x 2.41 $\mu$ m	No
Test_Pro (10.26mm)	5472 x 3648	10.26 mm	2.41 x 2.41 $\mu$ m	No
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Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
Test_Pro (10.26mm)	5472 x 3648	10.26 mm	2.41 x 2.41 $\mu\text{m}$	No

Table 1. Cameras.

# Camera Calibration

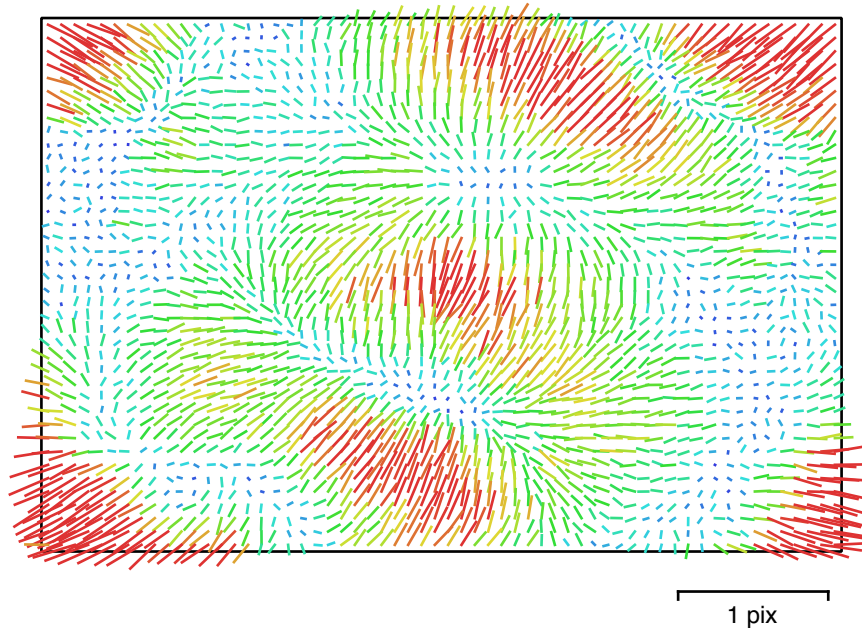


Fig. 2. Image residuals for Test\_Pro (10.26mm).

## Test\_Pro (10.26mm)

120 images

Type	Resolution	Focal Length	Pixel Size
Frame	5472 x 3648	10.26 mm	2.41 x 2.41 $\mu\text{m}$

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
F	4308.58	0.28	1.00	-0.34	0.44	-0.13	-0.02	-0.02	0.03	-0.01	-0.01	0.03	-0.12
Cx	5.03859	0.02		1.00	-0.09	-0.00	0.02	0.00	0.00	-0.01	0.02	0.55	0.04
Cy	-9.83349	0.017			1.00	-0.07	-0.06	-0.00	0.01	0.00	-0.01	0.07	0.41
B1	2.40884	0.021				1.00	0.04	-0.03	-0.01	0.01	-0.00	0.01	-0.04
B2	-0.194418	0.02					1.00	-0.02	0.00	-0.00	0.00	0.04	-0.00
K1	-0.00471333	4.1e-05						1.00	-0.95	0.91	-0.86	-0.01	0.01
K2	0.00979237	0.00027							1.00	-0.99	0.96	-0.00	0.01
K3	0.0164473	0.0007								1.00	-0.99	0.00	-0.01
K4	-0.0441829	0.00063									1.00	-0.00	0.01
P1	0.000574204	1.1e-06										1.00	-0.02
P2	-0.00188909	8.4e-07											1.00

Table 2. Calibration coefficients and correlation matrix.

# Camera Calibration

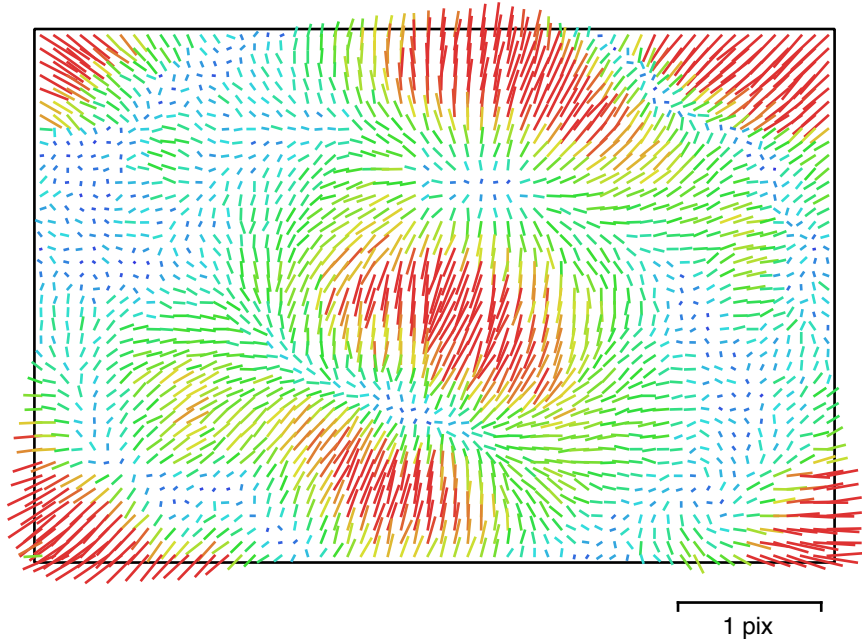


Fig. 3. Image residuals for Test\_Pro (10.26mm).

## Test\_Pro (10.26mm)

131 images

Type	Resolution	Focal Length	Pixel Size
Frame	5472 x 3648	10.26 mm	2.41 x 2.41 $\mu\text{m}$

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
F	4311.21	0.27	1.00	-0.18	0.36	-0.12	-0.04	-0.03	0.04	-0.02	-0.01	0.06	-0.19
Cx	5.39463	0.015		1.00	0.03	-0.06	-0.03	-0.00	0.00	-0.00	0.01	0.71	0.06
Cy	-9.76567	0.012			1.00	-0.03	-0.09	-0.01	0.01	-0.00	-0.01	0.12	0.47
B1	1.71874	0.021				1.00	0.02	-0.03	-0.01	0.01	-0.00	0.00	-0.02
B2	-0.305549	0.019					1.00	-0.02	0.00	-0.00	0.00	-0.01	0.01
K1	-0.00427563	3.4e-05						1.00	-0.95	0.91	-0.86	-0.02	0.02
K2	0.0133126	0.00022							1.00	-0.99	0.96	0.00	0.00
K3	0.00643877	0.00058								1.00	-0.99	0.00	-0.01
K4	-0.0355205	0.00052									1.00	-0.00	0.01
P1	0.00060341	9.2e-07										1.00	-0.00
P2	-0.00191559	6.4e-07											1.00

Table 3. Calibration coefficients and correlation matrix.

# Camera Calibration

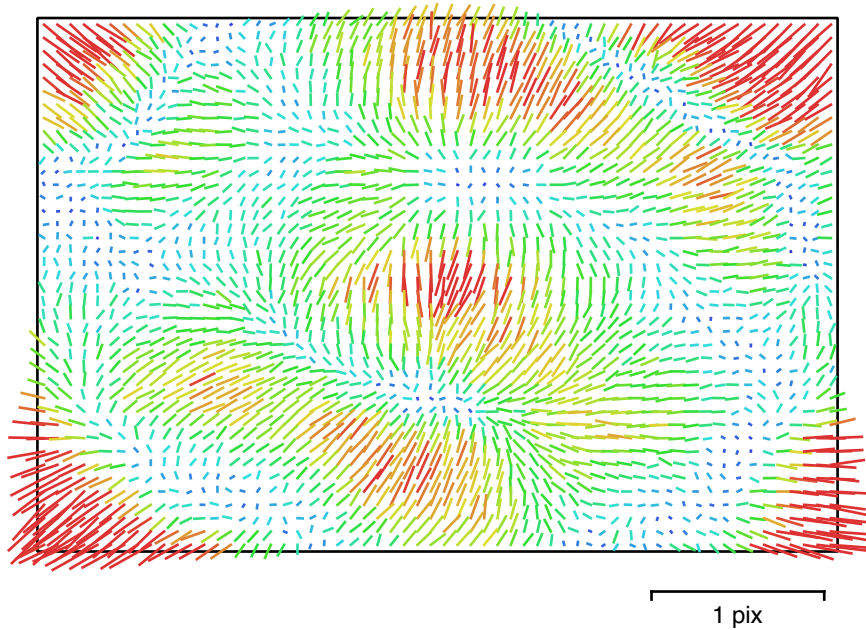


Fig. 4. Image residuals for Test\_Pro (10.26mm).

## Test\_Pro (10.26mm)

125 images

Type	Resolution	Focal Length	Pixel Size
Frame	5472 x 3648	10.26 mm	2.41 x 2.41 $\mu\text{m}$

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
F	4309.44	0.35	1.00	-0.41	0.53	-0.12	0.02	-0.04	0.03	-0.01	-0.03	0.04	-0.17
Cx	5.04873	0.017		1.00	-0.22	-0.01	-0.02	-0.00	0.00	-0.01	0.02	0.55	0.07
Cy	-8.55892	0.014			1.00	-0.05	-0.04	-0.02	0.01	0.00	-0.02	0.01	0.39
B1	2.79544	0.024				1.00	0.01	-0.03	-0.01	0.00	0.00	-0.01	-0.03
B2	-0.167055	0.023					1.00	-0.02	0.00	-0.00	-0.00	0.02	-0.03
K1	-0.00506997	3.7e-05						1.00	-0.95	0.90	-0.86	-0.03	0.01
K2	0.0129841	0.00024							1.00	-0.99	0.96	0.01	0.01
K3	0.00702475	0.00065								1.00	-0.99	-0.01	-0.01
K4	-0.0355798	0.00059									1.00	0.00	0.02
P1	0.000590932	1.1e-06										1.00	-0.00
P2	-0.00188882	7.9e-07											1.00

Table 4. Calibration coefficients and correlation matrix.

# Camera Calibration

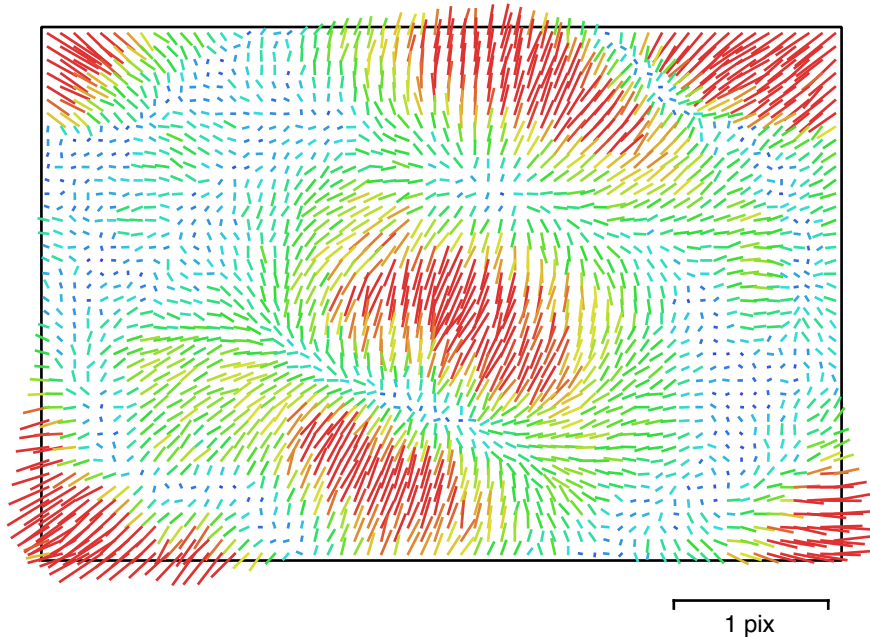


Fig. 5. Image residuals for Test\_Pro (10.26mm).

## Test\_Pro (10.26mm)

131 images

Type	Resolution	Focal Length	Pixel Size
Frame	5472 x 3648	10.26 mm	2.41 x 2.41 $\mu\text{m}$

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
F	4311.45	0.27	1.00	-0.30	0.39	-0.13	-0.04	-0.02	0.03	-0.01	-0.02	0.04	-0.17
Cx	5.2436	0.019		1.00	-0.07	-0.07	0.06	-0.01	0.01	-0.01	0.02	0.55	0.09
Cy	-8.67826	0.016			1.00	-0.07	-0.10	-0.00	0.01	-0.00	-0.01	0.05	0.38
B1	1.46045	0.021				1.00	0.01	-0.02	-0.01	0.00	0.00	-0.01	-0.03
B2	-0.455398	0.019					1.00	-0.01	0.00	-0.00	0.00	0.05	0.00
K1	-0.00435924	3.4e-05						1.00	-0.96	0.91	-0.86	-0.01	0.01
K2	0.0132675	0.00022							1.00	-0.99	0.96	-0.00	0.00
K3	0.00727909	0.00059								1.00	-0.99	0.00	-0.01
K4	-0.0364483	0.00052									1.00	-0.00	0.01
P1	0.000622715	9.1e-07										1.00	0.03
P2	-0.0018363	6.5e-07											1.00

Table 5. Calibration coefficients and correlation matrix.

# Camera Calibration

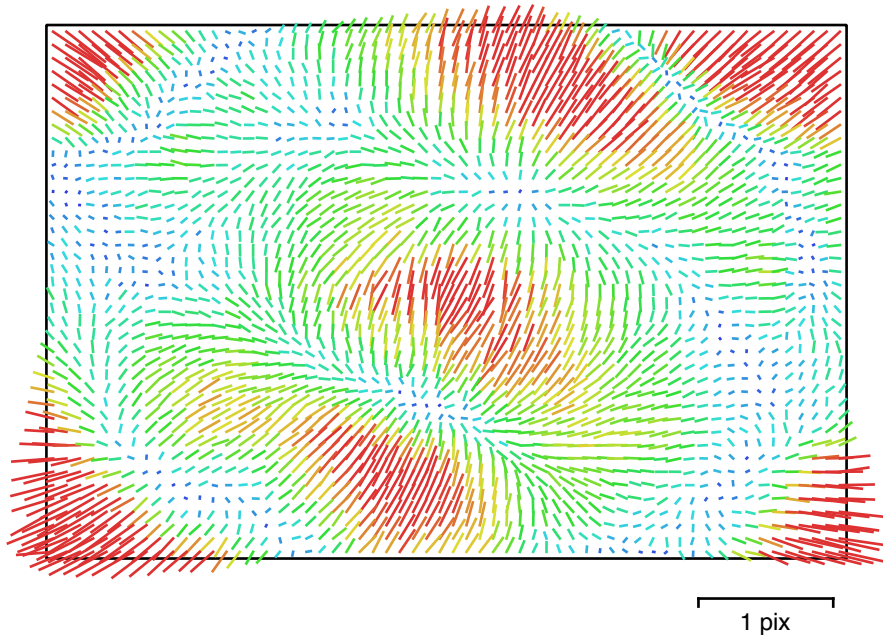


Fig. 6. Image residuals for Test\_Pro (10.26mm).

## Test\_Pro (10.26mm)

125 images

Type	Resolution	Focal Length	Pixel Size
Frame	5472 x 3648	10.26 mm	2.41 x 2.41 $\mu\text{m}$

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
F	4329.62	0.24	1.00	-0.40	0.48	-0.13	-0.03	-0.02	0.05	-0.03	-0.01	0.04	-0.18
Cx	5.31871	0.013		1.00	-0.26	-0.11	0.02	-0.01	-0.00	-0.01	0.02	0.64	0.05
Cy	-8.46147	0.011			1.00	-0.04	-0.18	-0.01	0.02	-0.01	-0.01	-0.03	0.42
B1	1.44107	0.019				1.00	0.00	0.01	-0.01	0.01	-0.01	-0.03	0.02
B2	-0.475419	0.019					1.00	0.01	-0.00	0.00	0.00	0.01	-0.02
K1	-0.00498382	2.8e-05						1.00	-0.97	0.92	-0.87	-0.01	-0.00
K2	0.0169911	0.00019							1.00	-0.99	0.96	0.00	0.01
K3	-0.0031586	0.0005								1.00	-0.99	-0.00	-0.01
K4	-0.0274943	0.00045									1.00	-0.00	0.01
P1	0.000614032	7.3e-07										1.00	-0.02
P2	-0.00191314	5.4e-07											1.00

Table 6. Calibration coefficients and correlation matrix.

# Camera Calibration

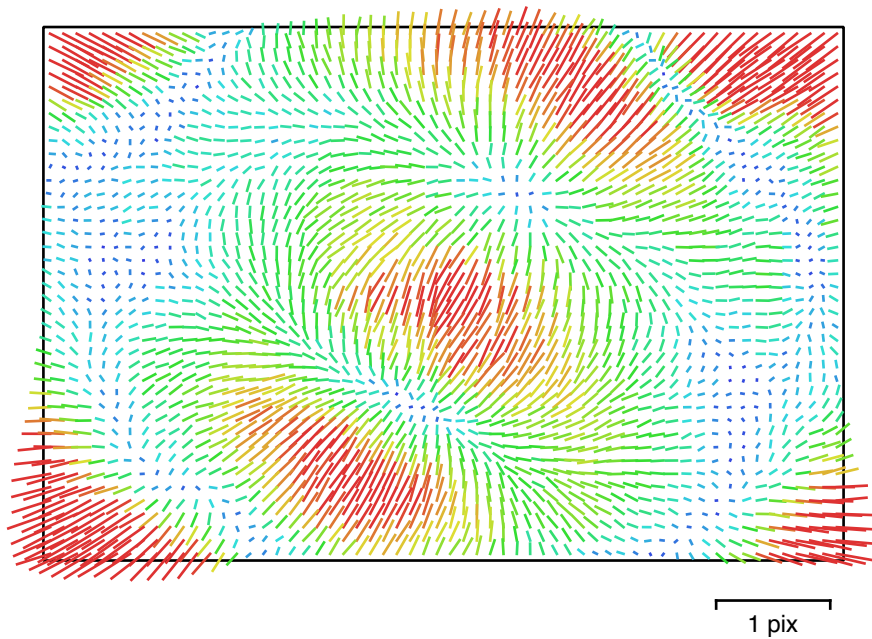


Fig. 7. Image residuals for Test\_Pro (10.26mm).

## Test\_Pro (10.26mm)

132 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	B1	B2	K1	K2	K3	K4	P1	P2
<b>F</b>	<b>4327.71</b>	0.24	1.00	-0.41	0.59	-0.08	-0.12	0.00	0.04	-0.03	-0.00	0.05	-0.12
<b>Cx</b>	<b>4.1082</b>	0.011		1.00	-0.17	-0.17	0.02	-0.01	-0.00	-0.00	0.01	0.78	0.10
<b>Cy</b>	<b>-9.0093</b>	0.011			1.00	-0.05	-0.29	0.00	0.02	-0.01	-0.01	0.10	0.59
<b>B1</b>	<b>1.3538</b>	0.019				1.00	0.02	-0.00	-0.01	0.01	-0.00	-0.08	0.00
<b>B2</b>	<b>-0.779055</b>	0.019					1.00	0.00	-0.00	0.00	0.00	-0.05	-0.12
<b>K1</b>	<b>-0.00565898</b>	2.7e-05						1.00	-0.96	0.92	-0.87	-0.01	0.00
<b>K2</b>	<b>0.0197402</b>	0.00018							1.00	-0.99	0.96	0.00	0.00
<b>K3</b>	<b>-0.0106302</b>	0.00046								1.00	-0.99	-0.00	-0.00
<b>K4</b>	<b>-0.0205583</b>	0.00042									1.00	-0.00	0.01
<b>P1</b>	<b>0.000619035</b>	7e-07										1.00	0.04
<b>P2</b>	<b>-0.00193155</b>	5.5e-07											1.00

Table 7. Calibration coefficients and correlation matrix.

# Ground Control Points

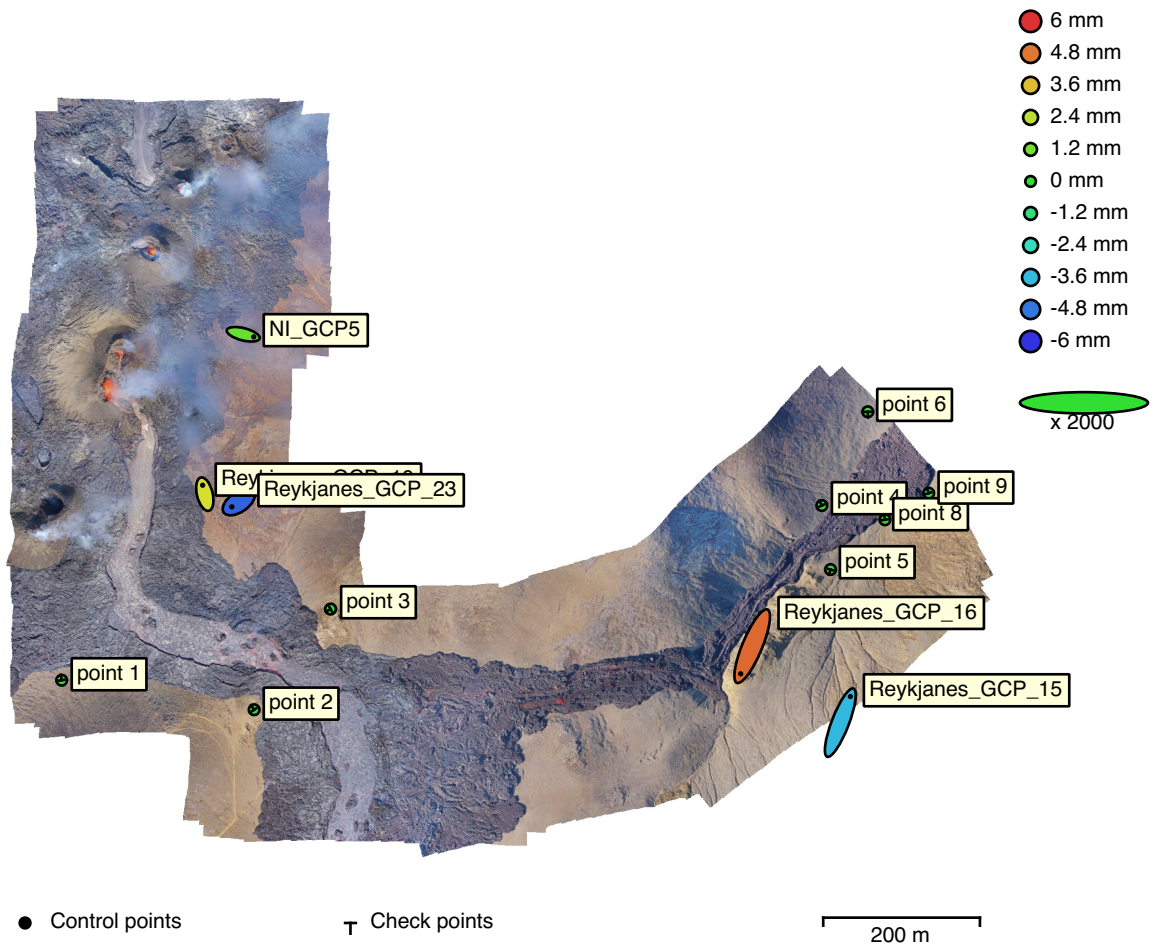


Fig. 8. GCP locations and error estimates.

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 (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
5	1.13698	2.24882	0.38667	2.51991	2.5494

Table 8. Control points RMSE.  
X - Easting, Y - Northing, Z - Altitude.

Count	X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
8	1.91834e-05	0.000152946	0.000234603	0.000154144	0.000280711

Table 9. Check points RMSE.  
X - Easting, Y - Northing, Z - Altitude.

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
Reykjanes_GCP_10	-0.276433	1.14383	0.286171	1.21106	0.803 (27)
Reykjanes_GCP_16	-1.47248	-3.52505	0.506322	3.85364	0.886 (33)
Reykjanes_GCP_23	-0.877175	-0.604193	-0.517149	1.18403	1.253 (22)
NI_GCP5	1.33978	-0.341731	0.0903231	1.38562	0.917 (16)
Reykjanes_GCP_15	1.2863	3.32714	-0.365668	3.58583	2.962 (6)
<b>Total</b>	<b>1.13698</b>	<b>2.24882</b>	<b>0.38667</b>	<b>2.5494</b>	<b>1.176</b>

Table 10. Control points.  
X - Easting, Y - Northing, Z - Altitude.

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
point 1	1.27402e-05	-7.41494e-05	-0.000205451	0.000218793	0.000 (15)
point 2	1.53775e-05	-2.25529e-05	-5.83811e-05	6.44473e-05	0.000 (42)
point 3	1.01057e-05	5.61362e-06	0.000220352	0.000220655	0.000 (22)
point 4	3.11211e-05	-6.71458e-05	0.000258708	0.000269085	0.000 (44)
point 5	1.78639e-05	6.07595e-05	-3.64808e-05	7.30868e-05	0.000 (57)
point 6	-1.20587e-05	0.000373972	-0.000457566	0.000591072	0.000 (6)
point 8	2.80481e-05	-0.000175897	0.000259964	0.000315131	0.000 (34)
point 9	1.49459e-05	-4.58851e-05	-3.04502e-05	5.70617e-05	0.000 (13)
<b>Total</b>	<b>1.91834e-05</b>	<b>0.000152946</b>	<b>0.000234603</b>	<b>0.000280711</b>	<b>0.000</b>

Table 11. Check points.  
X - Easting, Y - Northing, Z - Altitude.

# Digital Elevation Model

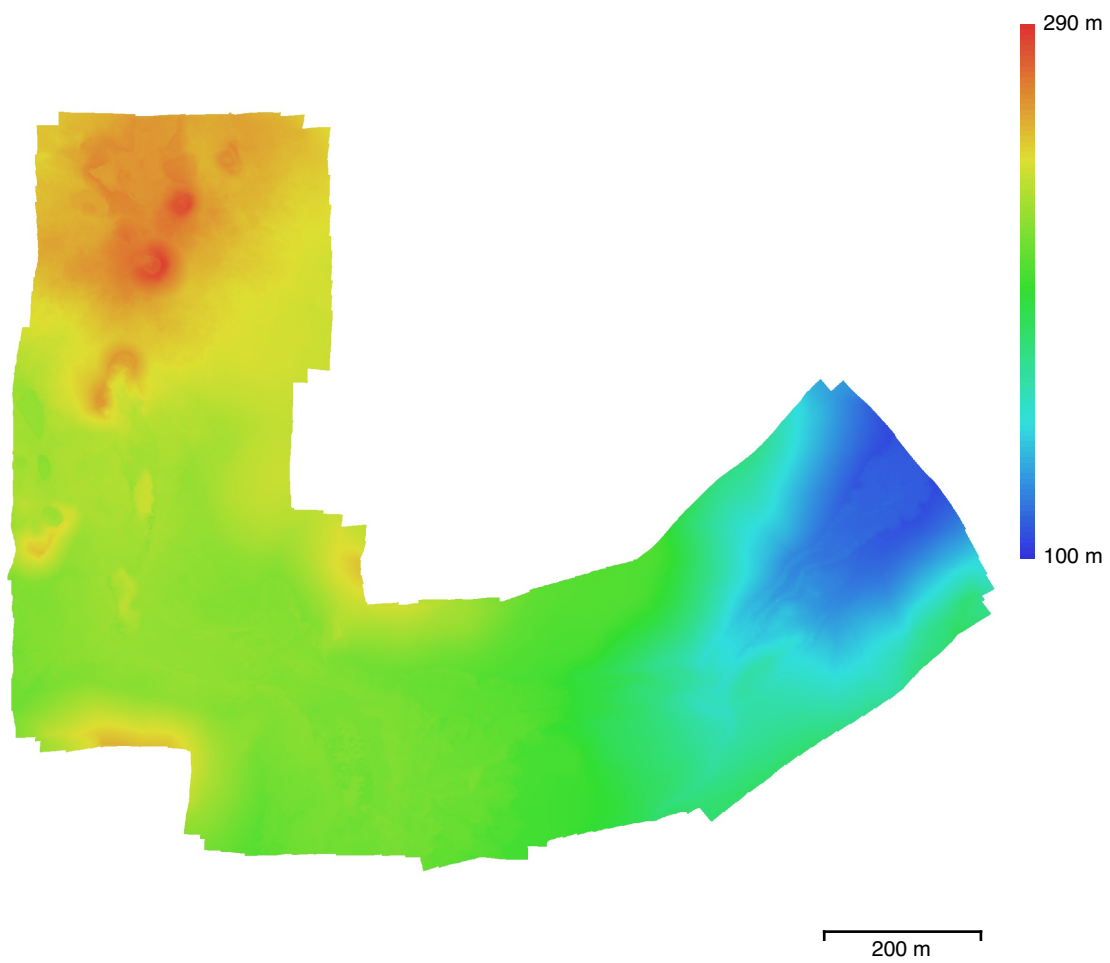


Fig. 9. Reconstructed digital elevation model.

Resolution: 6.08 cm/pix  
Point density: 271 points/m<sup>2</sup>

# Processing Parameters

## General

Cameras	764
Aligned cameras	764
Markers	13
Coordinate system	WGS 84 / UTM zone 27N (EPSG::32627)
Rotation angles	Yaw, Pitch, Roll

## Point Cloud

Points	2,230,100 of 4,912,853
RMS reprojection error	0.158617 (0.366014 pix)
Max reprojection error	0.489926 (1.83511 pix)
Mean key point size	2.29964 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	4.73301

## Alignment parameters

Accuracy	High
Generic preselection	Yes
Reference preselection	Source
Key point limit	60,000
Key point limit per Mpx	1,000
Tie point limit	0
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	46 minutes 45 seconds
Matching memory usage	764.56 MB
Alignment time	1 hours 0 minutes
Alignment memory usage	2.33 GB

## Optimization parameters

Parameters	f, b1, b2, cx, cy, k1-k4, p1, p2
Adaptive camera model fitting	No
Optimization time	1 minutes 9 seconds
Date created	2022:03:11 18:07:05
Software version	1.8.1.13915
File size	420.01 MB

## Depth Maps

Count	763
<b>Depth maps generation parameters</b>	
Quality	High
Filtering mode	Moderate
Max neighbors	16
Processing time	4 days 10 hours
Memory usage	4.93 GB
Date created	2022:05:18 10:30:24
Software version	1.8.1.13915
File size	5.21 GB

## Dense Point Cloud

Points	191,734,755
Point colors	3 bands, uint8

## Depth maps generation parameters

Quality	High
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Filtering mode	Moderate
Max neighbors	16
Processing time	4 days 10 hours
Memory usage	4.93 GB
<b>Dense cloud generation parameters</b>	
Processing time	4 hours 12 minutes
Memory usage	11.81 GB
Date created	2022:05:18 14:42:43
Software version	1.8.1.13915
File size	3.11 GB
<b>DEM</b>	
Size	38,340 x 35,159
Coordinate system	WGS 84 / UTM zone 27N (EPSG::32627)
<b>Reconstruction parameters</b>	
Source data	Dense cloud
Interpolation	Enabled
Processing time	5 minutes 43 seconds
Memory usage	313.82 MB
Date created	2022:05:18 17:41:00
Software version	1.8.1.13915
File size	687.21 MB
<b>Orthomosaic</b>	
Size	41,462 x 31,934
Coordinate system	WGS 84 / UTM zone 27N (EPSG::32627)
Colors	3 bands, uint8
<b>Reconstruction parameters</b>	
Blending mode	Mosaic
Surface	DEM
Enable hole filling	Yes
Enable ghosting filter	No
Processing time	31 minutes 43 seconds
Memory usage	1.86 GB
Date created	2022:05:18 18:13:26
Software version	1.8.1.13915
File size	22.42 GB
<b>System</b>	
Software name	Agisoft Metashape Professional
Software version	1.8.1 build 13915
OS	Mac OS 64 bit
RAM	64.00 GB
CPU	
GPU(s)	None