

2021_04_13_Vent_Exp_Report

Processing Report

April 13, 2021

Fagradalsfjall Vent Experiment Model

03 June 2022



Survey Data

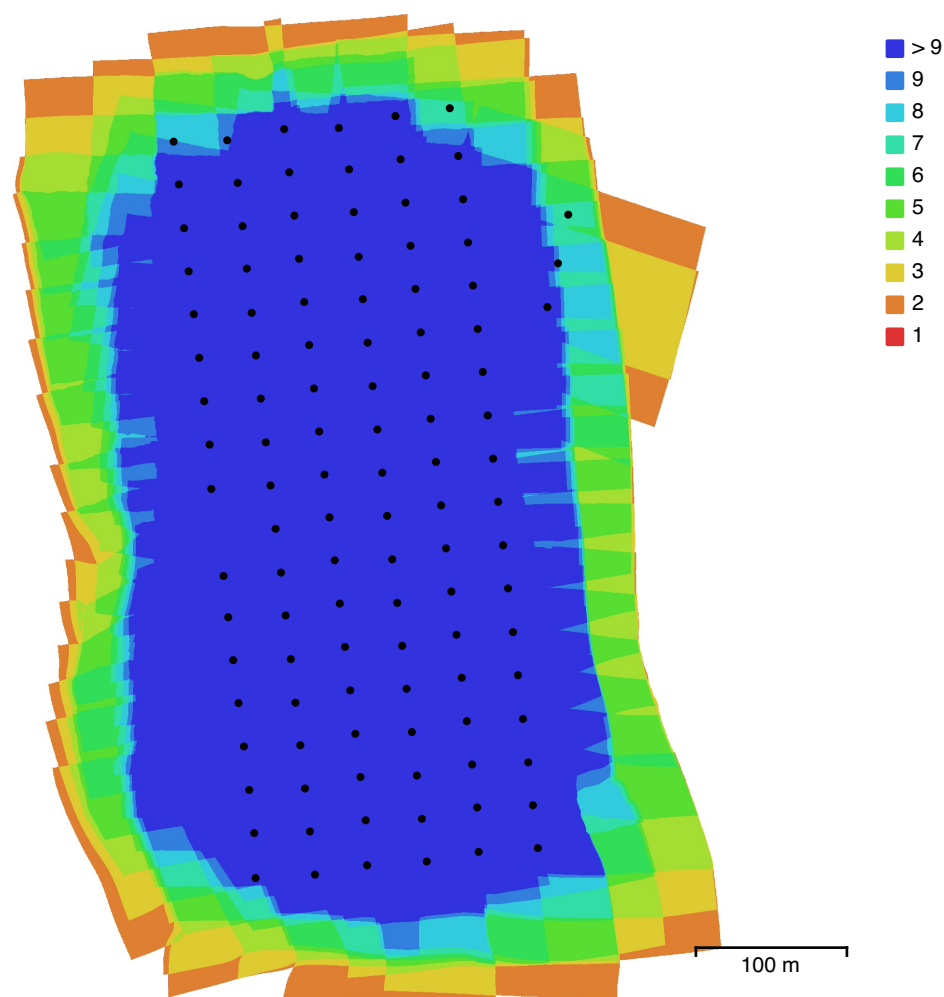


Fig. 1. Camera locations and image overlap.

Number of images:	110	Camera stations:	110
Flying altitude:	123 m	Tie points:	323,033
Ground resolution:	4.94 cm/pix	Projections:	1,223,294
Coverage area:	0.25 km ²	Reprojection error:	0.426 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
FC330 (3.61mm)	4000 x 3000	3.61 mm	1.56 x 1.56 μ m	No

Table 1. Cameras.

Camera Calibration

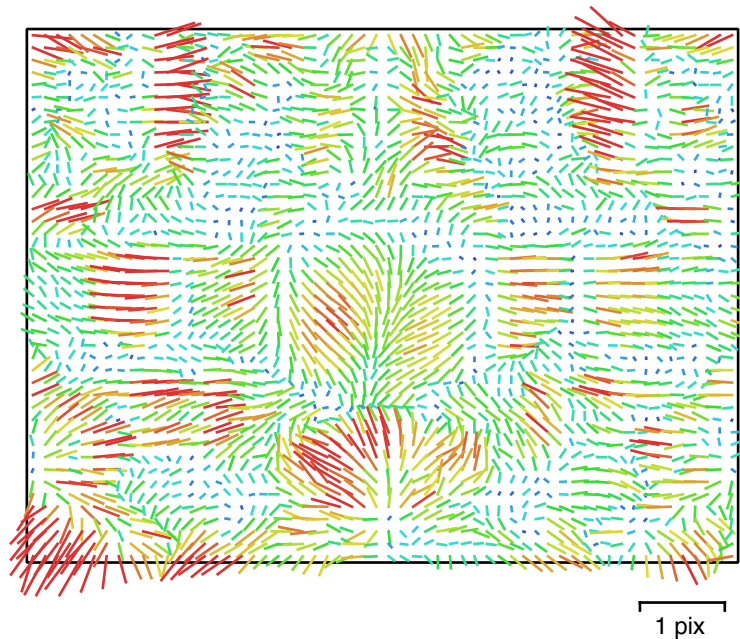


Fig. 2. Image residuals for FC330 (3.61mm).

FC330 (3.61mm)

110 images

Type	Resolution	Focal Length	Pixel Size
Frame	4000 x 3000	3.61 mm	1.56 x 1.56 μm

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
F	2363.65	0.42	1.00	-0.34	-0.97	0.07	0.06	0.17	-0.20	0.26	-0.32	-0.11	-0.09
Cx	-8.28914	0.019		1.00	0.33	0.28	0.26	-0.07	0.07	-0.09	0.11	0.45	0.01
Cy	22.113	0.062			1.00	-0.14	0.00	-0.19	0.21	-0.27	0.32	0.12	0.17
B1	-0.143076	0.014				1.00	0.07	0.02	-0.03	0.03	-0.03	-0.04	0.00
B2	0.273884	0.014					1.00	0.01	-0.01	0.02	-0.02	0.04	-0.03
K1	0.00894469	3.5e-05						1.00	-0.96	0.92	-0.87	-0.03	-0.06
K2	-0.0356436	0.00012							1.00	-0.99	0.95	0.02	0.00
K3	0.0434602	0.00018								1.00	-0.99	-0.03	-0.01
K4	-0.0189237	8.5e-05									1.00	0.03	0.02
P1	-0.000199753	1.2e-06										1.00	-0.01
P2	9.3542e-05	1.1e-06											1.00

Table 2. Calibration coefficients and correlation matrix.

Ground Control Points

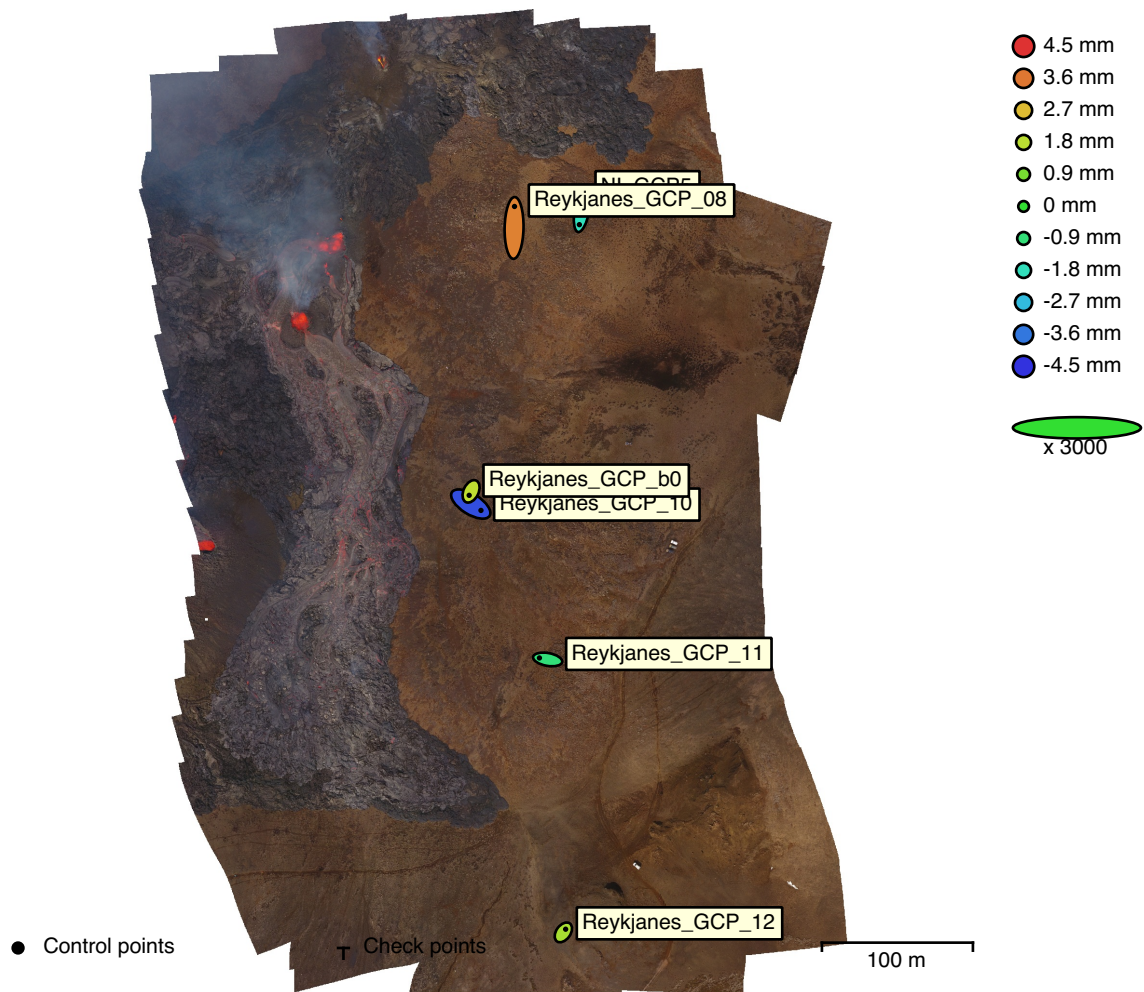


Fig. 3. GCP locations and error estimates.

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 (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total (mm)
6	2.47477	5.02664	2.5466	5.60282	6.15441

Table 3. Control points RMSE.

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

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
NI_GCP5	-1.2307	-6.95927	-1.78819	7.28997	0.422 (16)
Reykjanes_GCP...	0.195516	9.47882	3.46767	10.0951	0.801 (16)
Reykjanes_GCP...	4.50443	-2.80941	-4.13151	6.72697	0.663 (30)
Reykjanes_GCP...	-3.63059	0.645533	-0.927344	3.80235	0.542 (26)
Reykjanes_GCP...	1.00531	1.39547	1.53303	2.30395	0.756 (8)
Reykjanes_GCP...	-0.843962	-1.75115	1.84634	2.681	0.769 (2)
Total	2.47477	5.02664	2.5466	6.15441	0.636

Table 4. Control points.
X - Easting, Y - Northing, Z - Altitude.

Digital Elevation Model

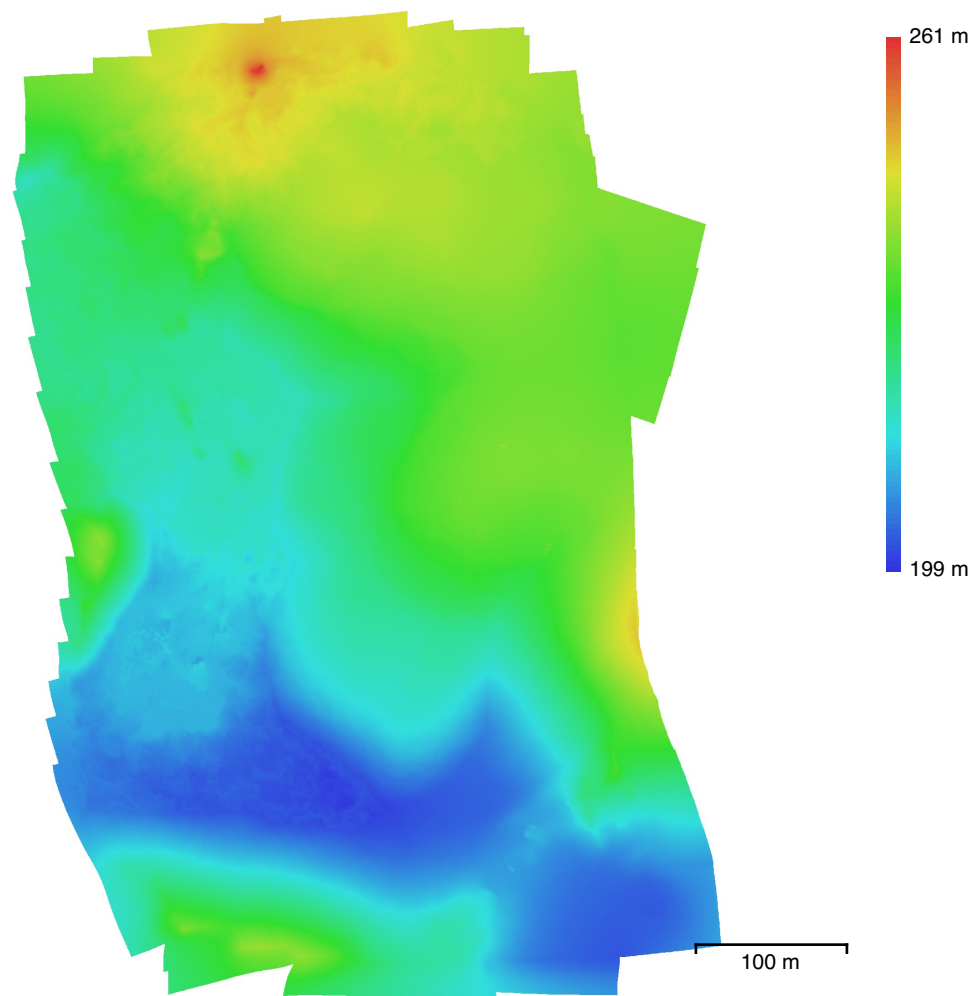


Fig. 4. Reconstructed digital elevation model.

Resolution: 9.88 cm/pix
Point density: 102 points/m²

Processing Parameters

General

Cameras	110
Aligned cameras	110
Markers	108
Coordinate system	WGS 84 / UTM zone 27N (EPSG::32627)
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	323,033 of 715,352
RMS reprojection error	0.1776 (0.426455 pix)
Max reprojection error	0.41601 (1.76482 pix)
Mean key point size	2.39363 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	4.15311

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	6 minutes 2 seconds
Matching memory usage	548.18 MB
Alignment time	2 minutes 54 seconds
Alignment memory usage	243.99 MB

Optimization parameters

Parameters	f, b1, b2, cx, cy, k1-k4, p1, p2
Adaptive camera model fitting	No
Optimization time	7 seconds
Date created	2022:03:08 17:15:57
Software version	1.8.1.13915
File size	54.79 MB

Depth Maps

Count	110
Depth maps generation parameters	
Quality	High
Filtering mode	Moderate
Max neighbors	16
Processing time	5 hours 33 minutes
Memory usage	1.70 GB
Date created	2022:05:26 04:09:37
Software version	1.8.1.13915
File size	506.89 MB

Dense Point Cloud

Points	20,559,410
Point colors	3 bands, uint8

Depth maps generation parameters

Quality	High
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Filtering mode	Moderate
Max neighbors	16
Processing time	5 hours 33 minutes
Memory usage	1.70 GB
Dense cloud generation parameters	
Processing time	8 minutes 38 seconds
Memory usage	3.96 GB
Date created	2022:05:26 04:18:15
Software version	1.8.1.13915
File size	394.45 MB
DEM	
Size	6,952 x 9,028
Coordinate system	WGS 84 / UTM zone 27N (EPSG::32627)
Reconstruction parameters	
Source data	Dense cloud
Interpolation	Enabled
Processing time	35 seconds
Memory usage	300.55 MB
Date created	2022:05:26 17:00:30
Software version	1.8.1.13915
File size	104.37 MB
Orthomosaic	
Size	9,485 x 13,225
Coordinate system	WGS 84 / UTM zone 27N (EPSG::32627)
Colors	3 bands, uint8
Reconstruction parameters	
Blending mode	Mosaic
Surface	DEM
Enable hole filling	Yes
Enable ghosting filter	No
Processing time	2 minutes 12 seconds
Memory usage	1.59 GB
Date created	2022:05:26 17:05:37
Software version	1.8.1.13915
File size	1.55 GB
System	
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