

29005 Processing Report

**NHMN Paleobiology Collections PAL 29005
Opertochasma (Martesia) maloniana CRAGIN 1905**

16 September 2023



Survey Data

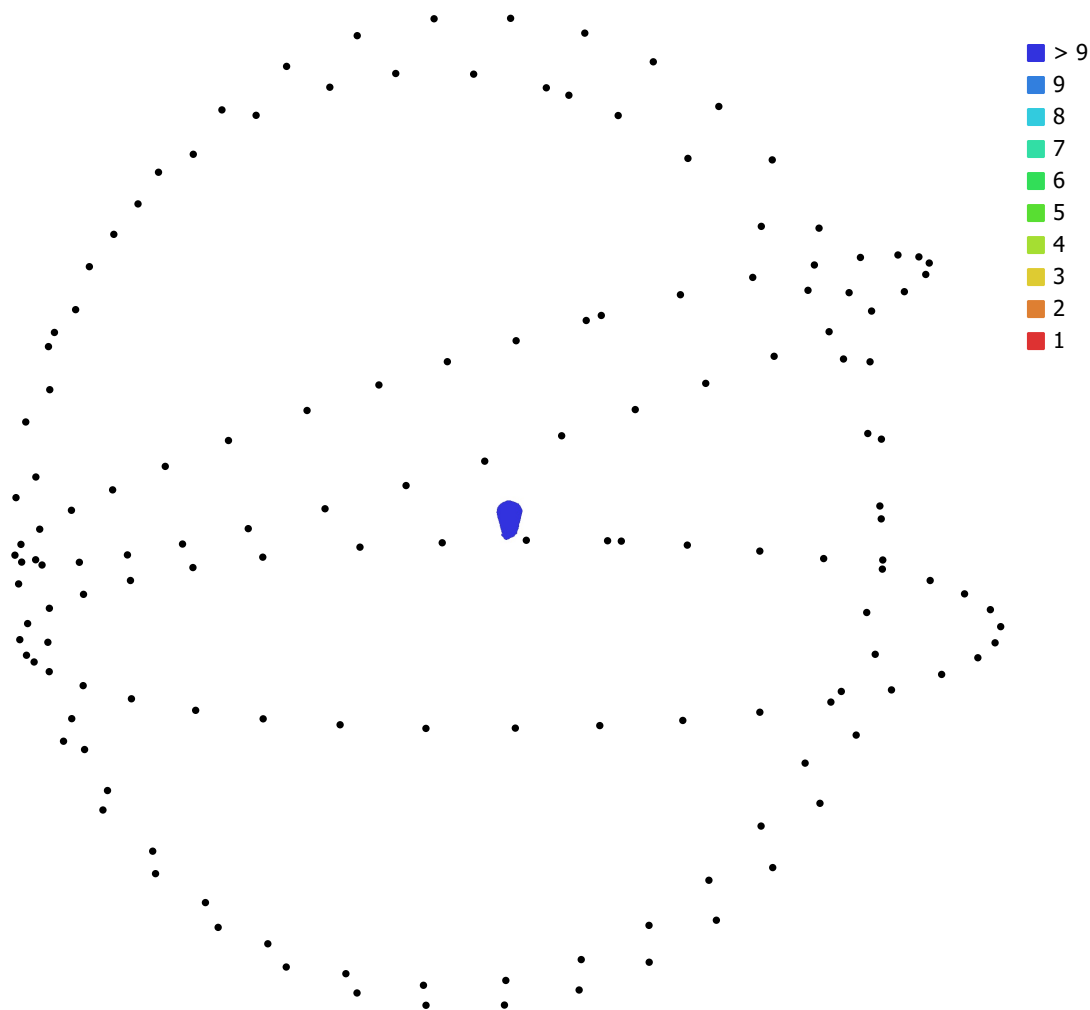


Fig. 1. Camera locations and image overlap.

Number of images: 164

Camera stations: 149

Tie points: 59,901

Projections: 140,365

Reprojection error: 0.339 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
Canon EOS 60D, EF-S60mm ...	5184 x 3456	60 mm	4.4 x 4.4 μm	No
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Table 1. Cameras.

Camera Calibration

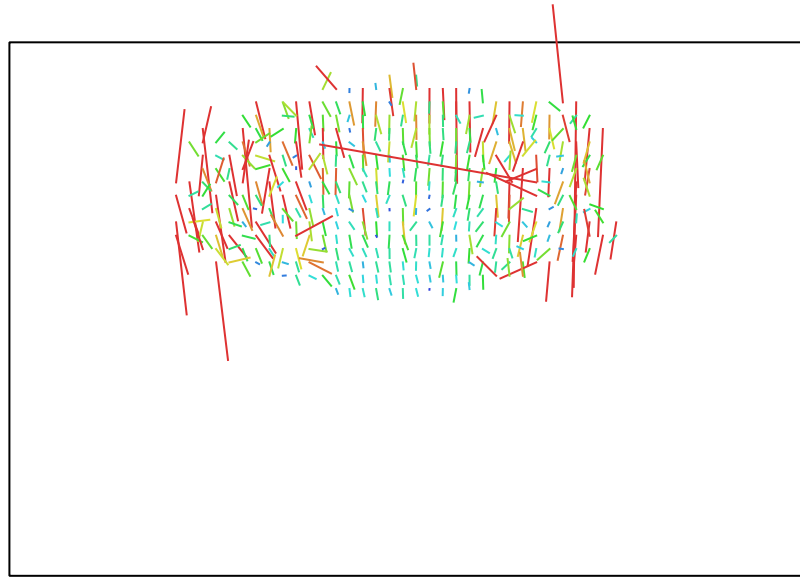


Fig. 2. Image residuals for Canon EOS 60D, EF-S60mm f/2.8 Macro USM (60mm).

Canon EOS 60D, EF-S60mm f/2.8 Macro USM (60mm)

37 images

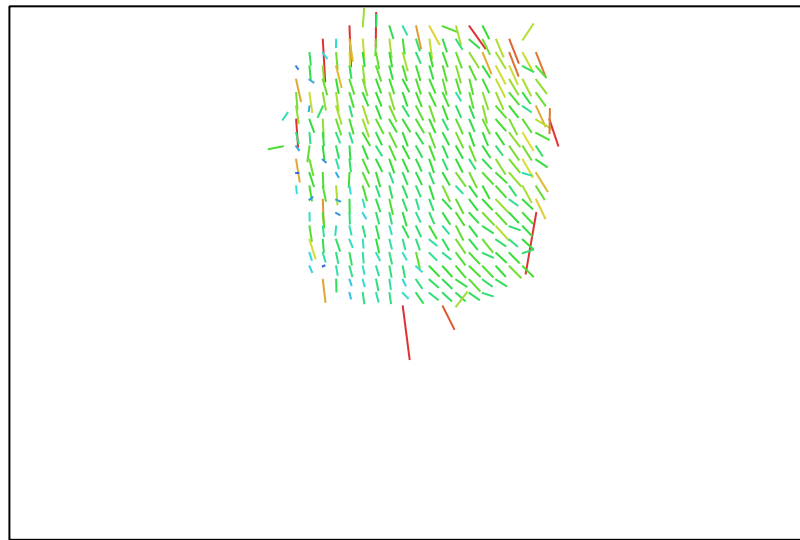
Type	Resolution	Focal Length	Pixel Size
Frame	5184 x 3456	60 mm	4.4 x 4.4 μm

	Value	Error	F	Cx	Cy	K1	K2	P1	P2
F	23617.1	1.1e+02	1.00	-0.16	0.40	-0.11	-0.26	0.05	-0.31
Cx	-331.357	98		1.00	-0.33	0.04	0.56	0.09	0.52
Cy	79.5455	1.3e+02			1.00	0.04	-0.66	-0.09	-0.29
K1	-0.381301	0.082				1.00	-0.57	-0.47	0.64
K2	28.105	13					1.00	0.19	0.13
P1	0.00101073	0.00052						1.00	-0.34
P2	0.00384075	0.0016							1.00

Fixed parameters: b1, b2, k3, k4

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration



1 pix

Fig. 3. Image residuals for Canon EOS 60D, EF-S60mm f/2.8 Macro USM (60mm).

Canon EOS 60D, EF-S60mm f/2.8 Macro USM (60mm)

37 images

Type	Resolution	Focal Length	Pixel Size
Frame	5184 x 3456	60 mm	4.4 x 4.4 μm

	Value	Error	F	Cx	Cy	K1	K2	P1	P2
F	23636.4	94	1.00	-0.16	0.50	-0.39	-0.18	0.50	-0.48
Cx	-517.594	1.1e+02		1.00	-0.11	0.20	0.24	-0.07	0.27
Cy	125.394	2.3e+02			1.00	-0.48	-0.25	0.71	-0.50
K1	-0.298305	0.099				1.00	-0.53	-0.80	0.92
K2	6.05936	5.5					1.00	0.07	-0.27
P1	-0.000767552	0.0011						1.00	-0.80
P2	-0.000456255	0.002							1.00

Fixed parameters: b1, b2, k3, k4

Table 3. Calibration coefficients and correlation matrix.

Camera Calibration

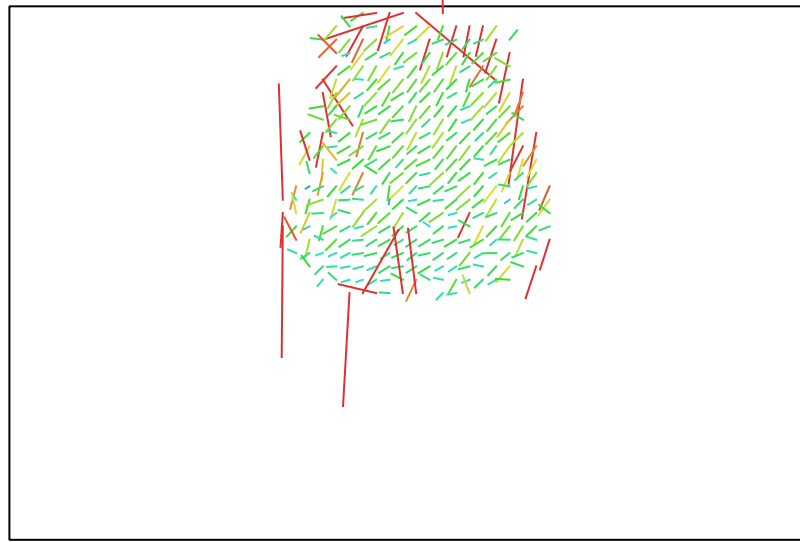


Fig. 4. Image residuals for Canon EOS 60D, EF-S60mm f/2.8 Macro USM (60mm).

Canon EOS 60D, EF-S60mm f/2.8 Macro USM (60mm)

37 images

Type	Resolution	Focal Length	Pixel Size
Frame	5184 x 3456	60 mm	4.4 x 4.4 μm

	Value	Error	F	Cx	Cy	K1	K2	P1	P2
F	23126.1	1.1e+02	1.00	0.06	-0.02	-0.44	0.07	0.06	-0.27
Cx	-9.39608	1.2e+02		1.00	0.12	-0.03	0.06	0.96	0.03
Cy	-359.422	1.6e+02			1.00	-0.04	0.36	0.23	0.91
K1	0.329794	0.18				1.00	-0.76	-0.06	0.22
K2	-36.3379	50					1.00	0.11	0.26
P1	-0.00245932	0.0032						1.00	0.11
P2	0.000296986	0.0047							1.00

Fixed parameters: b1, b2, k3, k4

Table 4. Calibration coefficients and correlation matrix.

Camera Calibration

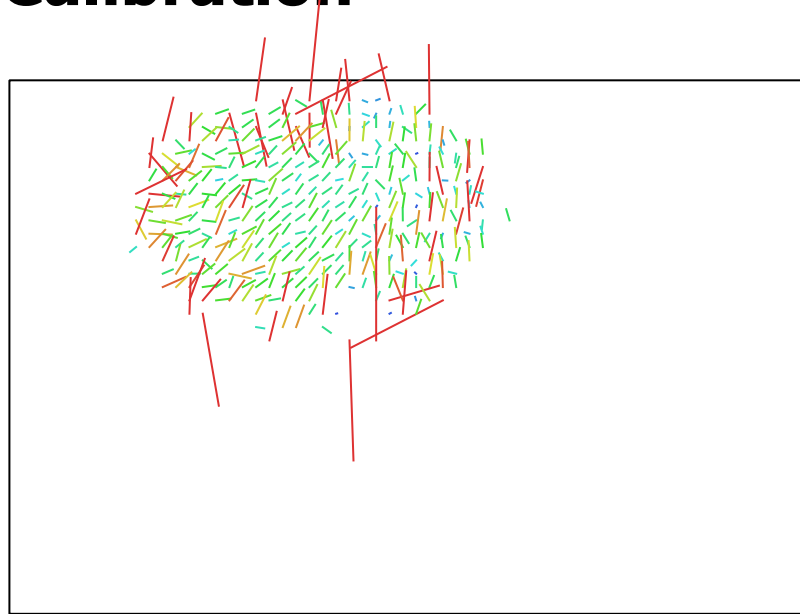


Fig. 5. Image residuals for Canon EOS 60D, EF-S60mm f/2.8 Macro USM (60mm).

Canon EOS 60D, EF-S60mm f/2.8 Macro USM (60mm)

38 images

Type	Resolution	Focal Length	Pixel Size
Frame	5184 x 3456	60 mm	4.4 x 4.4 μm

	Value	Error	F	Cx	Cy	K1	K2	P1	P2
F	22527.7	1.5e+02	1.00	0.07	0.54	0.16	-0.29	-0.11	-0.22
Cx	253.563	1.8e+02		1.00	0.15	0.22	-0.74	-0.68	-0.10
Cy	551.953	1.5e+02			1.00	0.26	-0.54	-0.21	-0.43
K1	-0.502006	0.054				1.00	-0.65	0.38	0.59
K2	8.84047	3.4					1.00	0.42	0.07
P1	0.000612444	0.0014						1.00	0.68
P2	-0.00434253	0.0011							1.00

Fixed parameters: b1, b2, k3, k4

Table 5. Calibration coefficients and correlation matrix.

Digital Elevation Model



Fig. 6. Reconstructed digital elevation model.

Processing Parameters

General

Cameras	164
Aligned cameras	149
Markers	10
Scale bars	5
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	59,901 of 183,780
RMS reprojection error	0.137096 (0.339389 pix)
Max reprojection error	0.35241 (1.5509 pix)
Mean key point size	2.35424 pix
Point colors	3 bands, uint8
Key points	483.26 MB
Average tie point multiplicity	2.83944

Alignment parameters

Accuracy	Highest
Generic preselection	No
Reference preselection	No
Key point limit	100,000
Key point limit per Mpx	1,000
Tie point limit	0
Filter points by mask	Yes
Mask tie points	No
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	1 hours 16 minutes
Matching memory usage	2.81 GB
Alignment time	3 minutes 8 seconds
Alignment memory usage	465.18 MB

Optimization parameters

Parameters	f, cx, cy, k1, k2, p1, p2
Adaptive camera model fitting	No
Optimization time	3 seconds
Date created	2023:09:16 17:06:56
Software version	2.0.1.15925
File size	11.87 MB

Depth Maps

Count	138
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Depth maps generation parameters

Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	3 minutes 43 seconds
Memory usage	2.90 GB
Date created	2023:09:16 17:21:28
Software version	2.0.1.15925
File size	73.33 MB

Model

Faces	1,616,780
Vertices	808,392
Vertex colors	3 bands, uint8
Texture	8,192 x 8,192, 4 bands, uint8

Depth maps generation parameters

Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	3 minutes 43 seconds
Memory usage	2.90 GB

Reconstruction parameters

Surface type	Arbitrary
Source data	Depth maps
Interpolation	Disabled
Strict volumetric masks	No
Processing time	1 minutes 38 seconds
Memory usage	2.79 GB

Texturing parameters

Mapping mode	Generic
Blending mode	Mosaic
Texture size	8,192
Enable hole filling	Yes
Enable ghosting filter	No
UV mapping time	1 minutes 35 seconds
UV mapping memory usage	2.75 GB
Blending time	1 minutes 13 seconds
Blending memory usage	1.42 GB
Blending GPU memory usage	1.80 GB

Date created	2023:09:16 17:23:04
Software version	2.0.1.15925
File size	120.31 MB

System

Software name	Agisoft Metashape Professional
Software version	2.0.1 build 15925
OS	Windows 64 bit
RAM	63.71 GB
CPU	12th Gen Intel(R) Core(TM) i7-12700H
GPU(s)	Intel(R) Iris(R) Xe Graphics NVIDIA GeForce RTX 3060 Laptop GPU