Introduction to Agisoft Metashape

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Data collected by J Ramón Arrowsmith
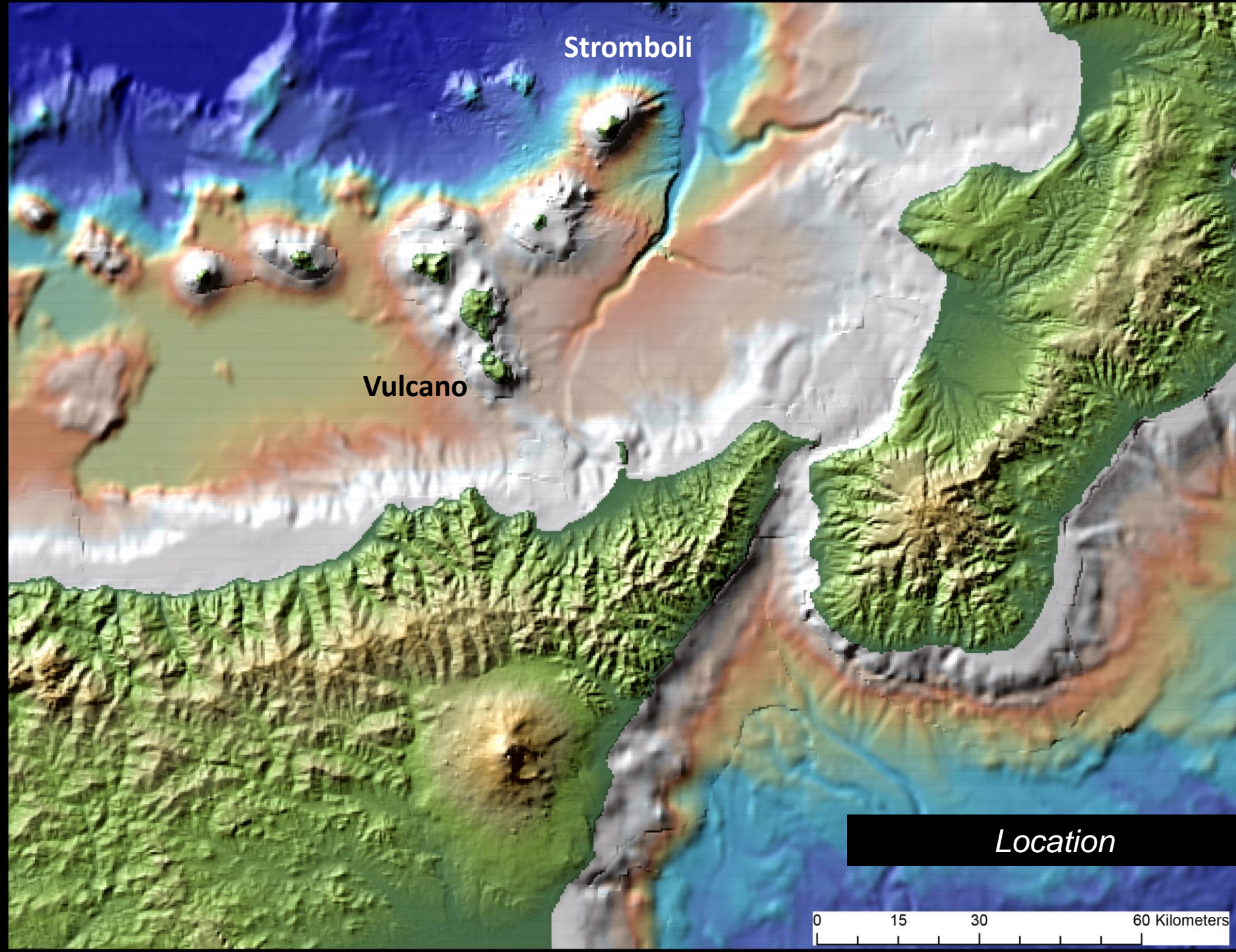
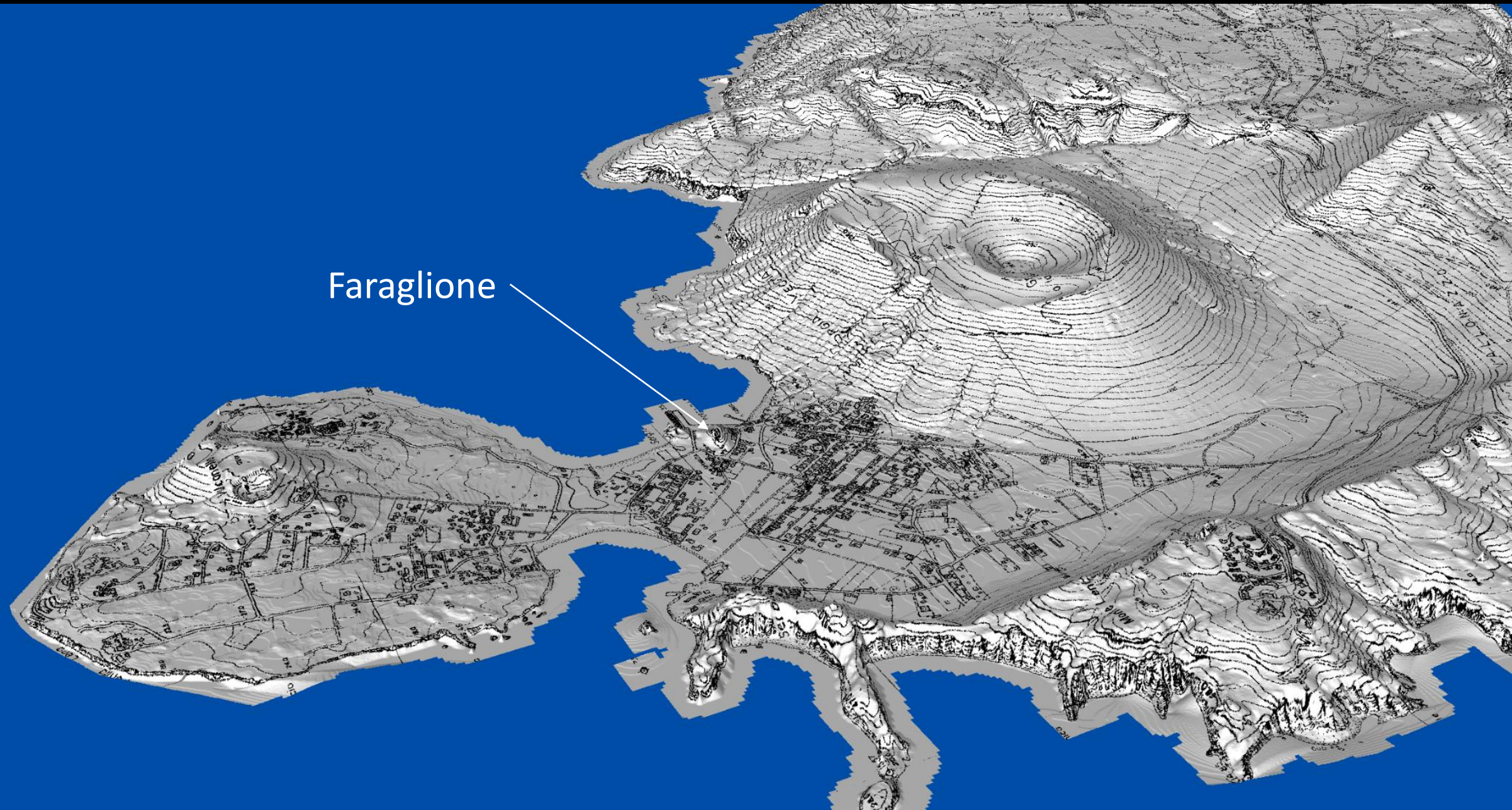*Tutorial notes*
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OpenTopography
High-Resolution Topography Data and Tools

Example for the demo is from the Eolian Islands north of Sicily: Vulcano Island

Stromboli

Vulcano

Location

0   15   30   60 Kilometers

Faraglione

Step 1: Check OT for images/data (image folder provided)

Step 1: Add Folder of photos
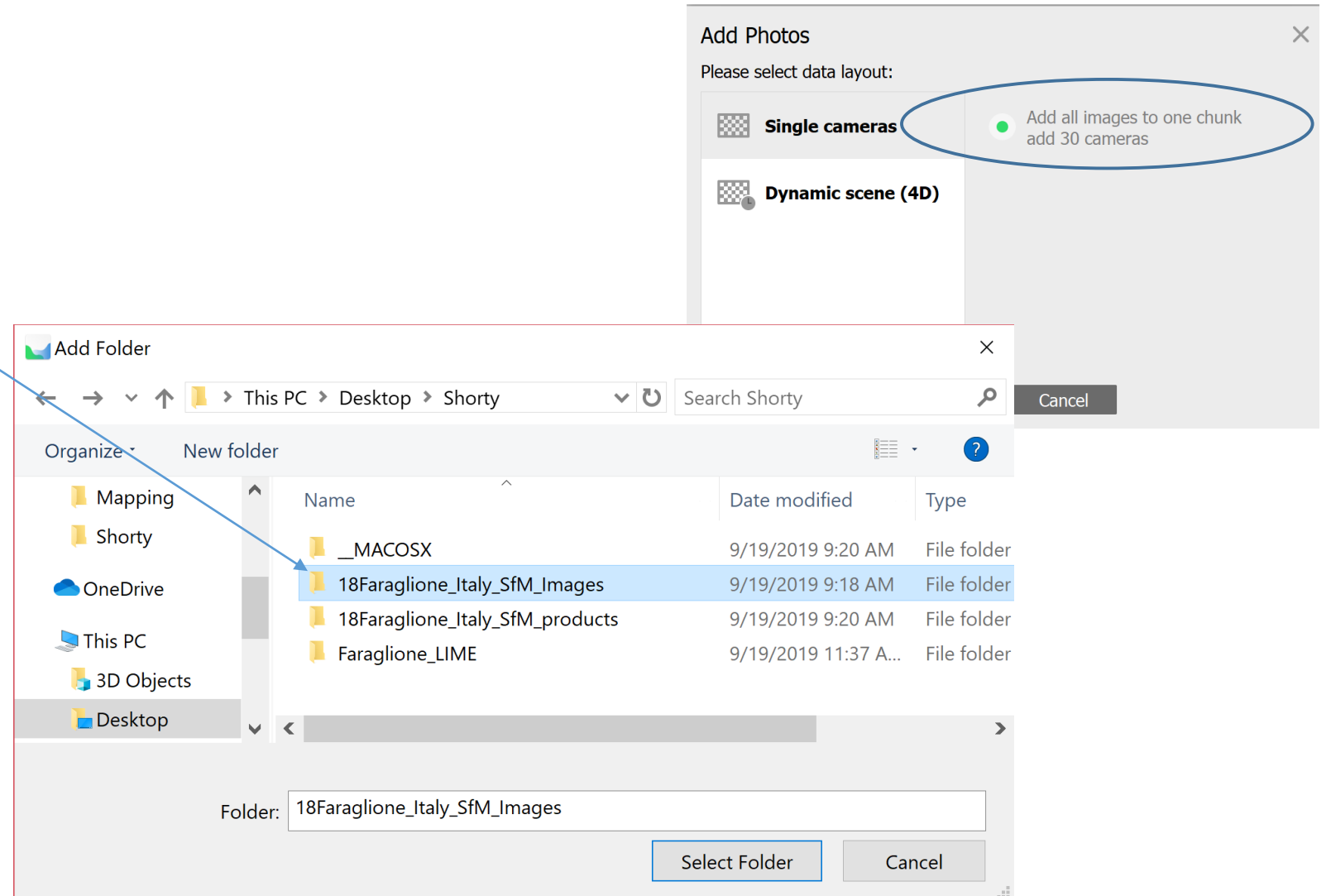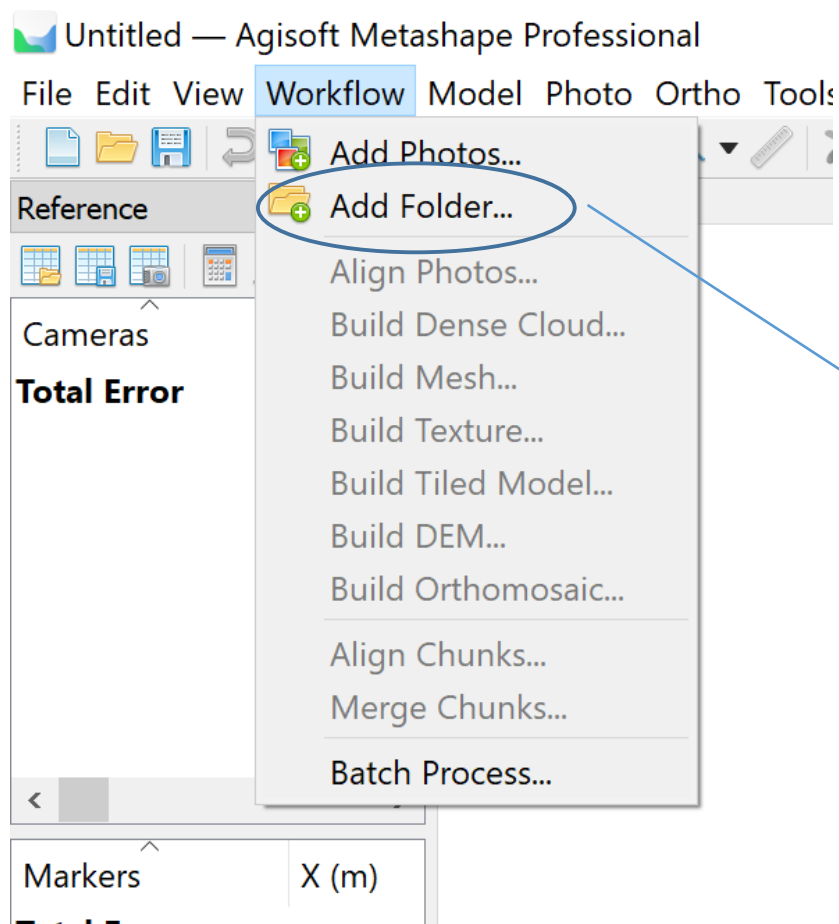
Step 2: Align photos (=SIFT plus Structure from Motion)

Most processing steps are located in the "Workflow" tab. A job can be batched or each step processed individually
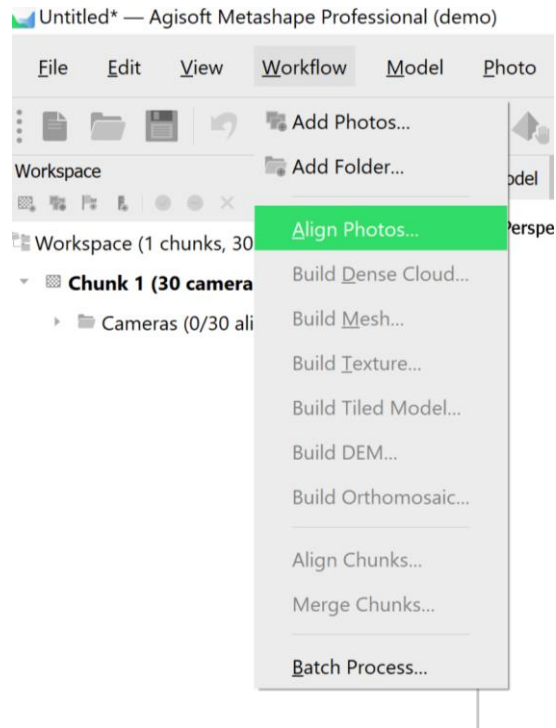
Alignment parameters set the foundation for following workflow steps. High accuracy may take substantial time. We use medium alignment here to save time and still acquire a desirable model. Medium means the photos are downscaled by a factor of 4 leading to possible errors in camera position calculations.

Generic preselection pairs photos on first pass and speeds up alignment. Reference is most useful with quality GPS tagged photos or georeferenced model.

Align Photos   ✕

General

Accuracy: Medium   ▼

✓   Generic preselection

☐   Reference preselection

Reset current alignment

Advanced

Key point limit: 40,000

Tie point limit: 4,000

Apply masks to: None   ▼

☐   Adaptive camera model fitting

OK   Cancel
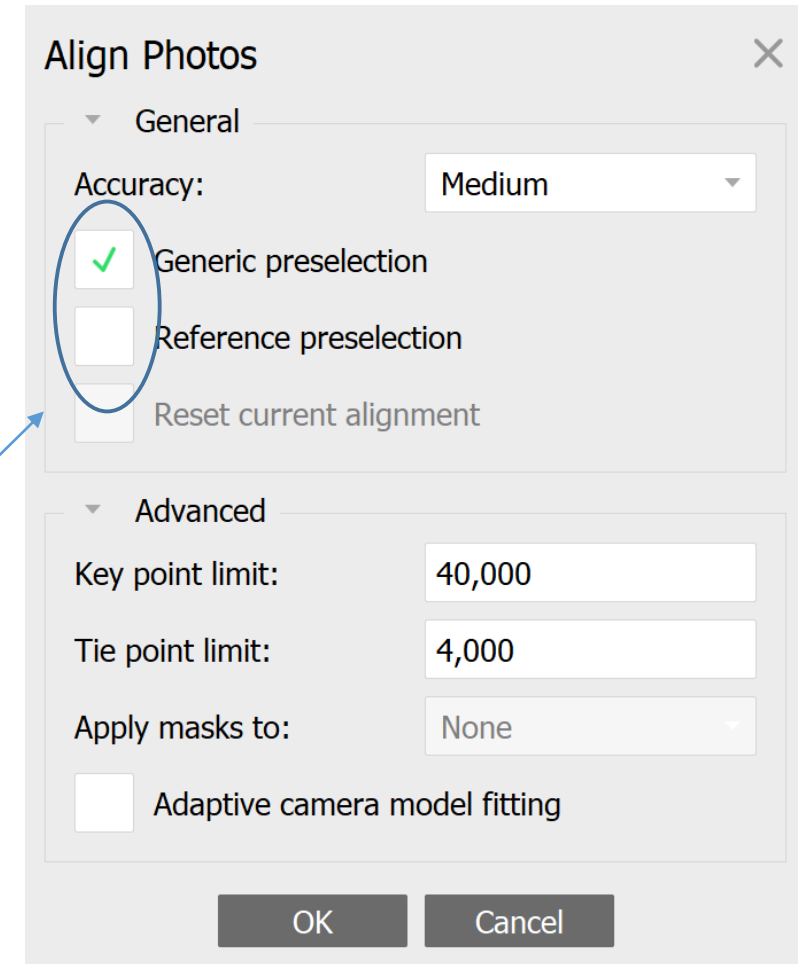
Step 2: Align photos (=SIFT plus Structure from Motion)

Now we have a sparse cloud along with calculated camera positions
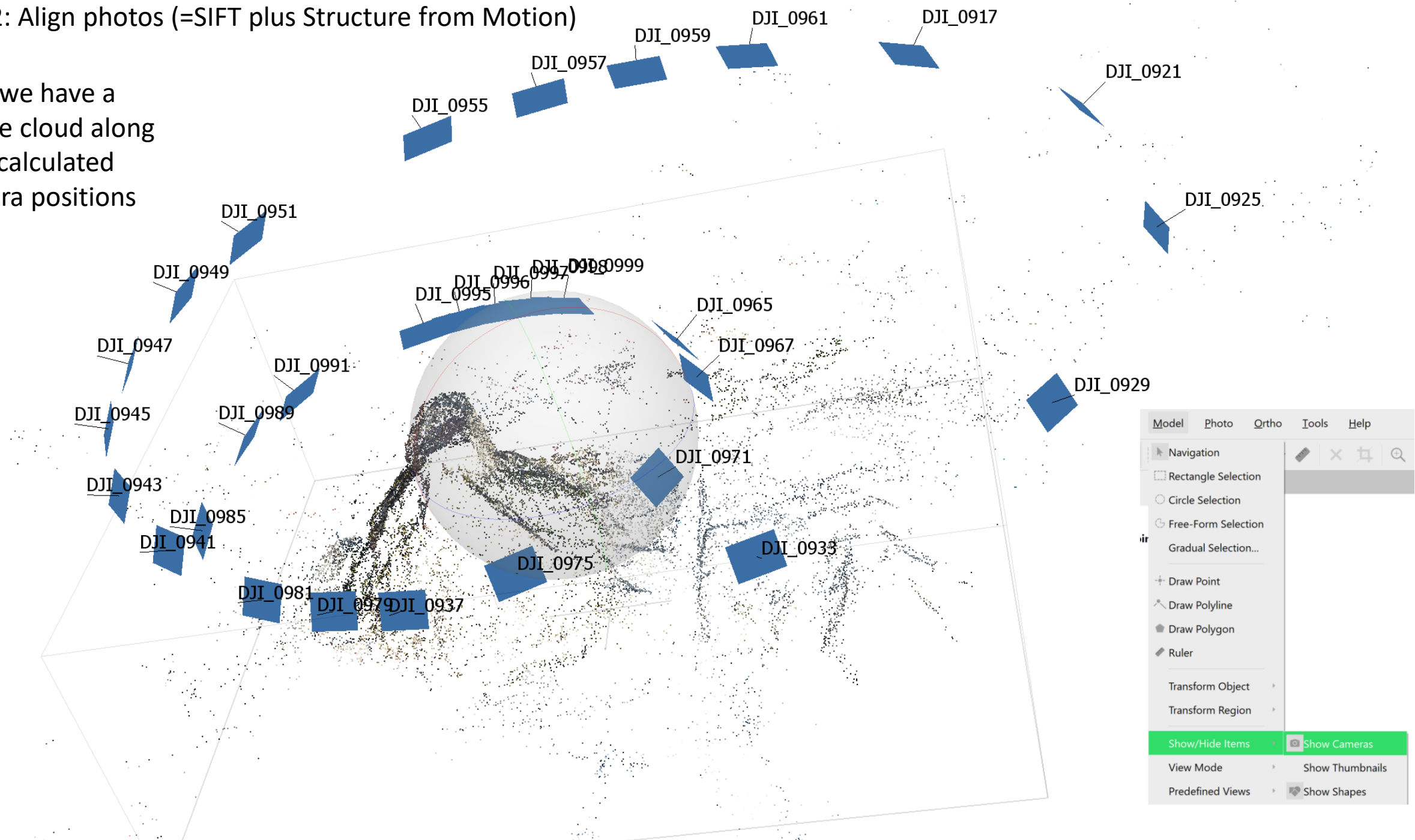
Step 2: Build Dense Cloud
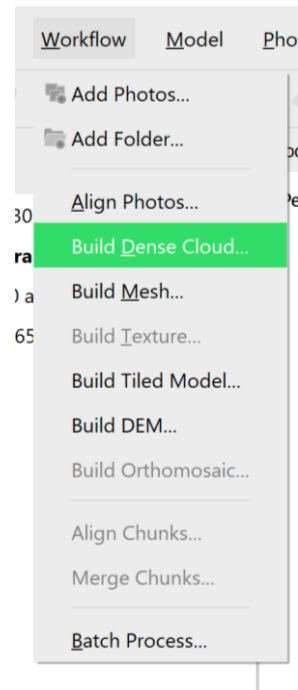
High quality dense cloud is recommended but again is time consuming. A first pass with low quality is good for visualization and helps determine errors within alignment settings

Workflow

- Add Photos...
- Add Folder...
- Align Photos...
- **Build Dense Cloud...**
- Build Mesh...
- Build Texture...
- Build Tiled Model...
- Build DEM...
- Build Orthomosaic...
- Align Chunks...
- Merge Chunks...
- Batch Process...

Build Dense Cloud

General

Quality: Low

Advanced

Depth filtering: Mild

☐ Reuse depth maps

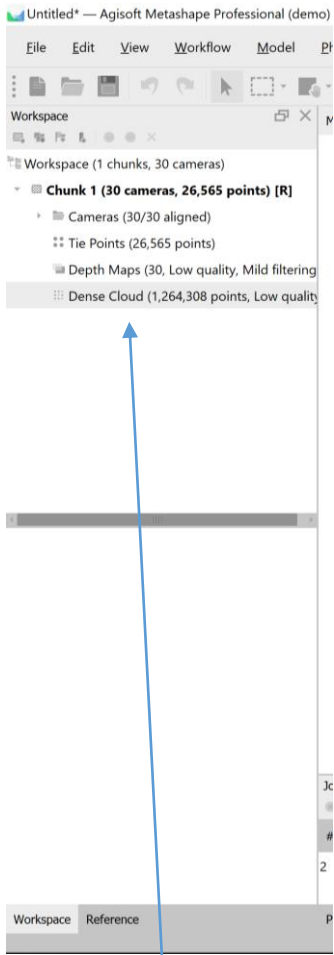☑ Calculate point colors

OK   Cancel

Untitled* — Agisoft Metashape Professional (demo)

File   Edit   View   Workflow   Model   Ph

Workspace

Workspace (1 chunks, 30 cameras)
- **Chunk 1 (30 cameras, 26,565 points) [R]**
  - Cameras (30/30 aligned)
  - Tie Points (26,565 points)
  - Depth Maps (30, Low quality, Mild filtering)
  - Dense Cloud (1,264,308 points, Low quality)

Workspace   Reference

Use the workspace on left side to navigate or see symbols in toolbar

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Take some time to explore.

This may be the last step for some purposes. Dense point cloud can now be exported and analyzed in software such as CloudCompare

CloudCompare^{V2}

CloudCompare

3D point cloud and mesh processing software Open Source Project

Step 3: Build Mesh

Triangle calculated from dense point cloud
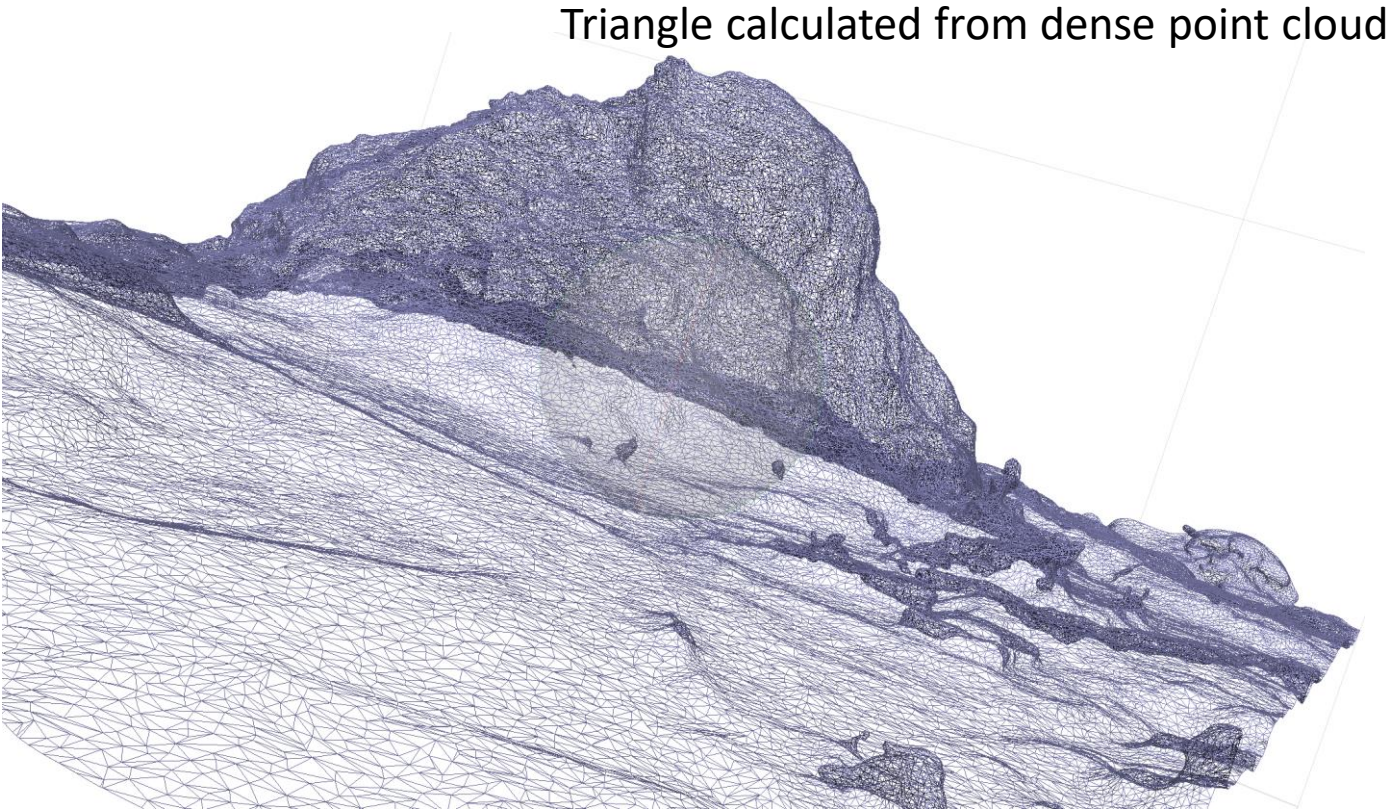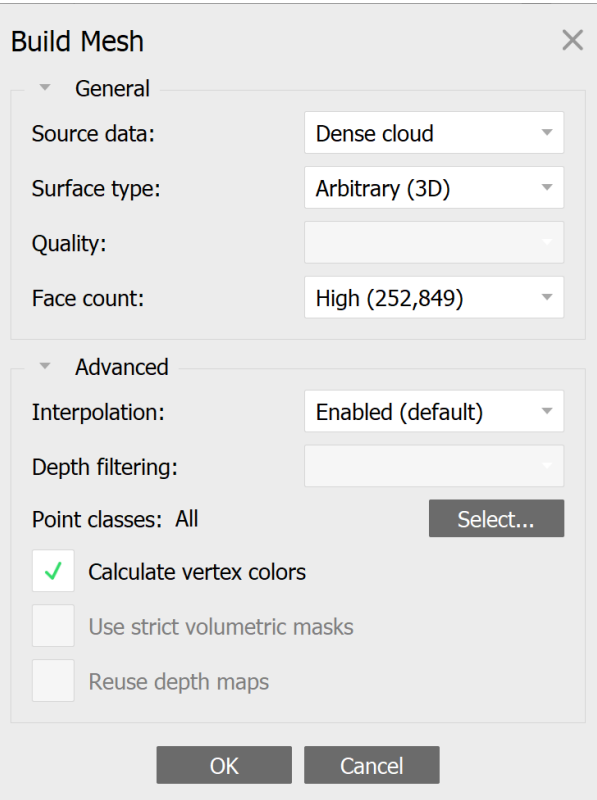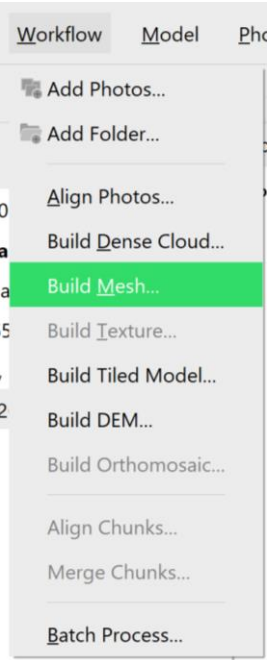

Using Dense Cloud as source data gives best results. Arbitrary surface type is recommended although height field can be useful with flat topography.

Workflow menu:
- Add Photos...
- Add Folder...
- Align Photos...
- Build Dense Cloud...
- Build Mesh...
- Build Texture...
- Build Tiled Model...
- Build DEM...
- Build Orthomosaic...
- Align Chunks...
- Merge Chunks...
- Batch Process...

Build Mesh

General
- Source data: Dense cloud
- Surface type: Arbitrary (3D)
- Quality:
- Face count: High (252,849)

Advanced
- Interpolation: Enabled (default)
- Depth filtering:
- Point classes: All   Select...
- ✓ Calculate vertex colors
- ☐ Use strict volumetric masks
- ☐ Reuse depth maps

OK   Cancel

Use the workspace on left side to navigate or see symbols in toolbar

Model
Perspective 30°

- Shaded
- Solid
- Wireframe
- Textured

Step 4: Build Texture

Workflow   Model   Pho

- Add Photos...
- Add Folder...

- Align Photos...
- Build Dense Cloud...
- Build Mesh...
- **Build Texture...**
- Build Tiled Model...
- Build DEM...
- Build Orthomosaic...

- Align Chunks...
- Merge Chunks...

- Batch Process...

Default settings work here.
Detailed explanations for all
settings are provided in Agisoft
[Metashape User Manual](#)

Build Texture ✕

General

Mapping mode:	Generic ▾
Blending mode:	Mosaic (default) ▾
Texture size/count:	4096 x 1 ▴▾

Advanced

✓ Enable hole filling
✓ Enable ghosting filter

[OK] [Cancel]
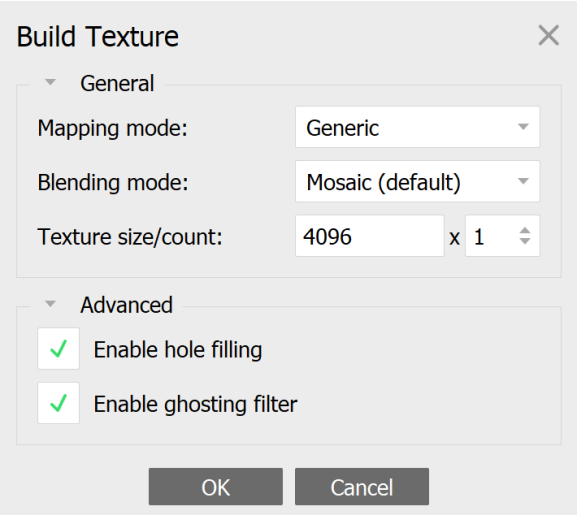
Not bad. Have a look around.

Step 5-6: Build DEM and Orthomosaic

Build DEM

Projection

Type: ● Geographic ○ Planar ○ Cylindrical

WGS 84 / UTM zone 33N (EPSG::32633)

Parameters

Source data: Dense cloud

Interpolation: Enabled (default)

Point classes: All   Select...

Region

☐ Setup boundaries: 496331.374 - 496618.494 X

Reset 4251748.327 - 4252062.534 Y

Resolution (m): 0.221665

Total size (pix): 1295 x 1418

OK   Cancel

Note the product resolution quality and that they are derived from previous workflow options.

Build Orthomosaic

Projection

Type: ● Geographic ○ Planar ○ Cylindrical

WGS 84 / UTM zone 33N (EPSG::32633)

Parameters

Surface: Mesh

Blending mode: Mosaic (default)

☐ Refine seamlines

✓ Enable hole filling

☐ Enable back-face culling

● Pixel size (m): 0.027697 X

Metres... 0.027697 Y

○ Max. dimension (pix): 4096

Region

☐ Setup boundaries: ____ - ____ X

Estimate ____ - ____ Y

Total size (pix): ____ x ____

OK   Cancel

Need paid version to complete these steps

Finished. We can now export all models and generate a processing report