

Aerial images of a headland in Nuup Kangerlua (Godthåbsfjord, SW Greenland) were acquired on 11 July 2017 using a DJI Phantom 3 Standard quadcopter drone. The imagery was acquired during the Mission Arctic citizen science expedition (Carlson et al., 2021). Overlapping images were acquired at 5 second intervals and the drone was manually piloted around the island in an approximate grid pattern. The altitude data recorded in the image EXIF header was converted to relative altitude by running a python in Agisoft Metashape. The script was provided by Agisoft (https://github.com/agisoft-llc/metashape-scripts/blob/master/src/read_altitude_from_DJI_meta.py). Next, the contrast limited adaptive histogram equalization (CLAHE) method was used to improve contrast in the shallow, submerged areas around the island. The contrast-enhanced images were processed in Agisoft Metashape using the USGS workflow for coastal image processing (Over et al., 2021). Following Over et al. (2021), images were aligned using High accuracy, generic and reference pre-selection, and key point and tie point limits of 60000 and 0, respectively. After alignment, the global spatial accuracy of the sparse point cloud was improved by identifying prominent rocks in the intertidal zone that were used as markers in Metashape. The positions of each corresponding marker were extracted from Bing satellite imagery of the area. This technique is similar to that described in Azim et al. (2019) and Rossiter et al. (2019). Four markers were used for this survey. After adding the markers, the reference data for each image was unselected, the four markers were selected, and the georeferencing parameters were recalculated and the camera alignment was optimized. Next, outliers in the sparse point cloud were identified and removed using an iterative gradual selection procedure, which reduced the reprojection error to 0.25. The dense point cloud was then computed using ultra high quality depth maps and mild filtering. The point colors and confidence were also computed. The dense cloud was cleaned by selecting all points with confidence values of 0-2 and then deleting them. Any remaining outliers (sinkers and fliers) were removed manually. The DEM was computed, followed by an orthomosaic. A digital elevation model (DEM) and an orthomosaic were exported at 2.5 cm/pix resolution. For details, see the processing report that accompanies this dataset.

This dataset includes the following:

- CLAHE-enhanced drone images (255)
- 2.5 cm resolution digital elevation model in geotiff format (WGS84)
- 2.5 cm resolution orthomosaic in geotiff format (WGS84)
- 5 cm resolution orthomosaic in geotiff format (WGS84)
- Metashape processing report

References

- Azim et al. (2019) Manual geo-rectification to improve the spatial accuracy of ortho-mosaics based on images from consumer-grade unmanned aerial vehicles. *Precision Agriculture* 20:1199-1210 doi:10.1007/s11119-09647-9
- Carlson et al. (2021) The 2017 Mission Arctic Citizen Science Sailing Expedition Conductivity, Temperature, and Depth Profiles in Western Greenland and Baffin Bay. *Frontiers in Marine Science* 8:665582 doi:10.3389/fmars.2021.665582

Over et al. (2021) Processing coastal imagery with Agisoft Metashape Professional Edition, Version 1.6- Structure from Motion workflow documentation. USGS Open File Report 2021-1039, USGS Reston, Virginia <https://pubs.usgs.gov/of/2021/1039/ofr20211039.pdf>

Rossiter et al. (2019) Application of multiplatform, multispectral remote sensors for mapping intertidal macroalgae: A comparative approach. *Aquatic Conservation: Marine and Freshwater Ecosystems* 30:1595-1612 doi:10.1002/aqc.3357