Drone aerial imagery of a macroalgal-covered coastline in Kobbefjord (SW Greenland) in 2018 and 2019

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Aerial images of inner Kobbefjord (SW Greenland) were acquired on two occasions in 2018 (2018-09-07 15:06; 2018-09-07 16:00) representing different tidal levels and on one occasion in 2019 (2019-08-26). Images were acquired using a DJI Mavic Air drone. The imagery was acquired in connection with the "Greenland Ecosystem Monitoring Program" "Nuuk Basis" monitoring of marine flora (http://g-e-m.dk/). The Mavic Air surveys were planned in advance and flown autonomously using Pix4D Capture (https://www.pix4d.com/). Pix4D Capture plans flight lines and controls image acquisition to ensure adequate front and side-lap for processing using Structure from Motion photogrammetry software. This drone survey was carried out with the primary goal of documenting and quantifying the area distribution of the tidal vegetation (dominated by the brown macroalga *Ascophyllum nodosum*) and shallow subtidal vegetation at the monitoring site. 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). Images were processed using Agisoft Metashape Professional (v1.7; Linux Ubuntu) following the USGS protocols for processing coastal imagery (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. The alignment, markers, and gradual selection steps were applied to all three sets of images, following a similar workflow as described by Cook and Dietze (2019). 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. Before computing the dense cloud, separate chunks were created for each UAV survey with only the images, and associated point clouds, from each individual survey retained. 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 full 8 mm resolution, as well as 3 cm resolution. For details, see the processing report that accompanies this dataset.

This dataset includes the following:

- Raw UAV imagery

- 8 mm digital elevation model in geotiff format (WGS84) for each survey (KF17 2018, KF19 2018, KF19 2019)
- 8 mm orthomosaic geotiff format (WGS84) for each survey (KF17 2018, KF19 2018, KF19 2019)
- 3 cm resolution digital elevation model in geotiff format (WGS84) for each survey (KF17 2018, KF19 2018, KF19 2019)
- 3 cm resolution orthomosaic in geotiff format (WGS84) for each survey (KF17 2018, KF19 2018, KF19 2019)
- Metashape processing report for each survey (KF17 2018, KF19 2018, KF19 2019)

References

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