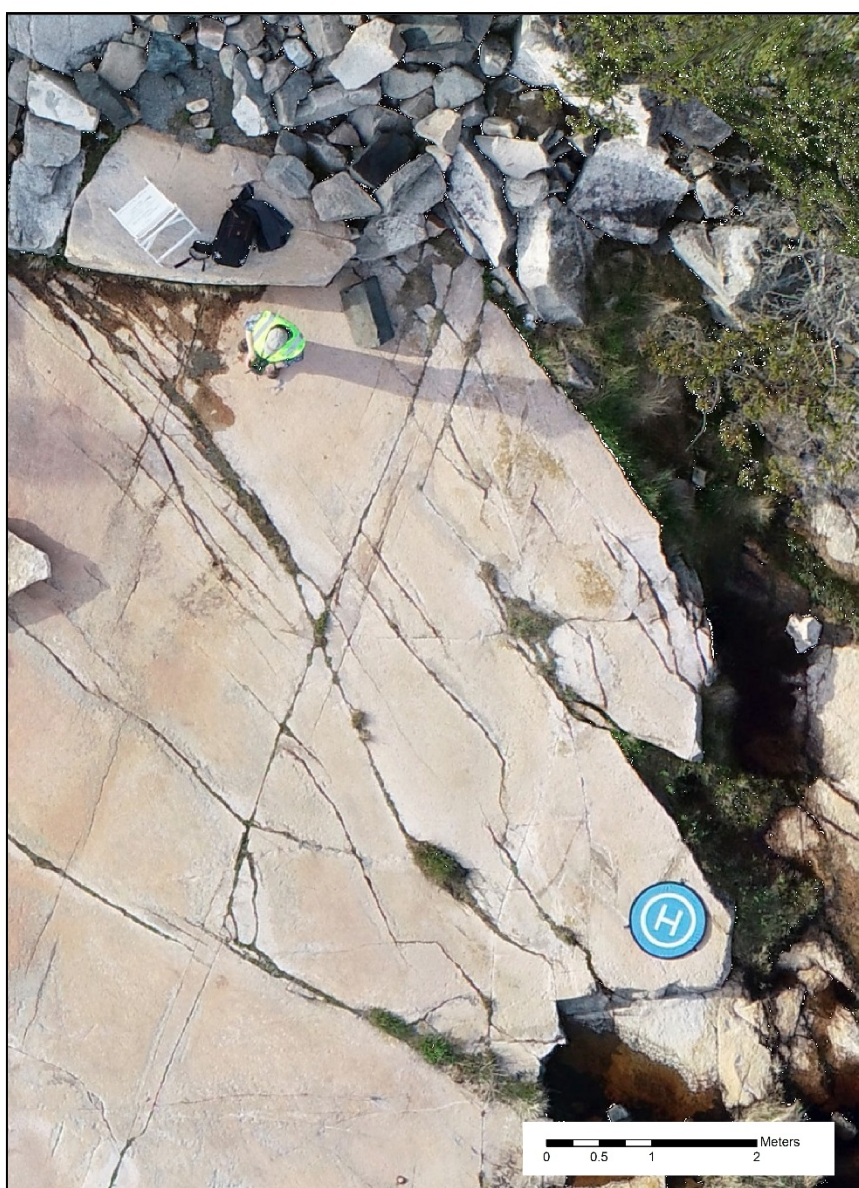
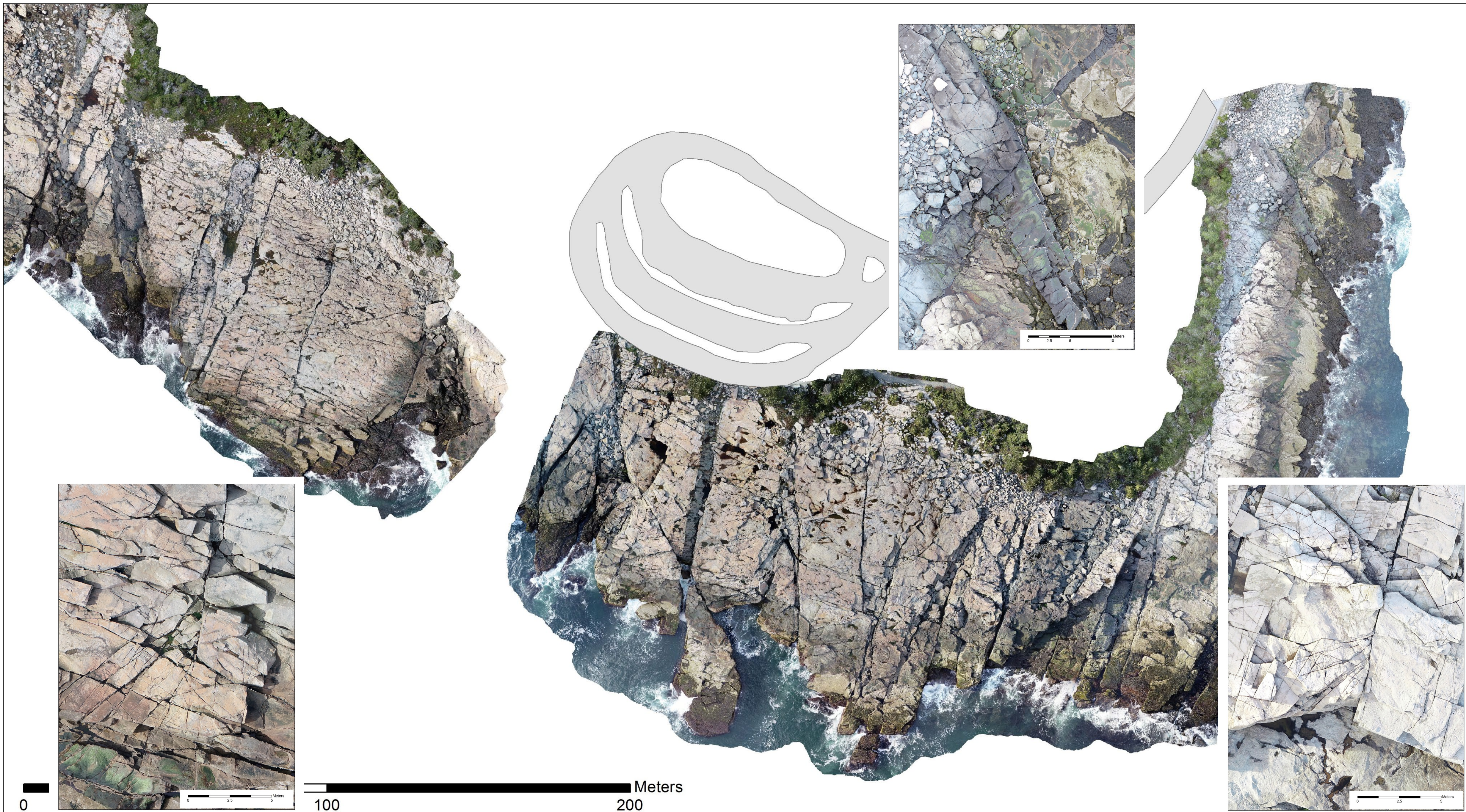


New Drone-based Aerial Outcrop Photography at Schoodic Point, Acadia National Park

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NEW DRONE-BASED AERIAL OUTCROP PHOTOGRAPHY AT SCHOODIC POINT, ACADIA NATIONAL PARK

First-ever quadcopter drone flights over Schoodic Point and adjacent coastal bedrock have generated new spectacular hi-resolution imagery of the outcrop surface in seamless and continuous orthomosaics. Our DJI Phantom 4 Pro quadcopter with 20 mpx camera was flown for ~2 hours on a single day (April 18, 2019) at 100 feet/30 meters above ground level. 858 overlapping nadir photos were taken covering about 4000 ft/1300 meters of shoreline outcrop in two sections; the east half and flank of Schoodic Point (303 photos for 400 meters of shoreline) and west of Schoodic Point to Pond Cove (557 photos for 900 meters of shoreline). Photo sets for these two sections were processed using the photogrammetry software Agisoft PhotoScan to align photos with ~150,000 matching tie points, create a dense point cloud of ~30 million points, generate a mesh with ~2 million faces and added textures to produce accurate detailed 3D models and hi-resolution orthomosaics. Processing time for each photo set for medium level of accuracy/quality was ~7 hours including 2.5 hrs for aligning photos and 4 hours for depth mapping and point cloud generation. The final resolution for the orthomosaic images has been refined down to ~1 cm (9.2 mm) ground distance pixel sizes compared with Google imagery at ~10 cm ground distance pixel sizes but the final .tif or .jpeg image files are large-sized, ranging from 500 mb .jpeg to 3 Gb .tif files. This new hi-resolution view will enable detailed mapping and visualization of the many dike intrusions and fault zone features found and previously surveyed throughout the Schoodic Peninsula. In particular, this new view will allow the mapping and compilation of small-scale brittle horsetail-terminated strike-slip faults that have never before been imaged or mapped. Planned photographic quadcopter surveys for the Fall 2019 off-season include shoreline outcrops of the west half of Schoodic Point, as well as Pond Island and Little Moose Island. Any flight planning requires low wind, no precipitation and 3 mile visibility to be able to fly, overcast skies for best photography with no shadows and no park visitors on the outcrop per FAA Part 107 regulations.



Close-up view showing launch site at Schoodic Point from 100ft/30m elevation orthomosaic.



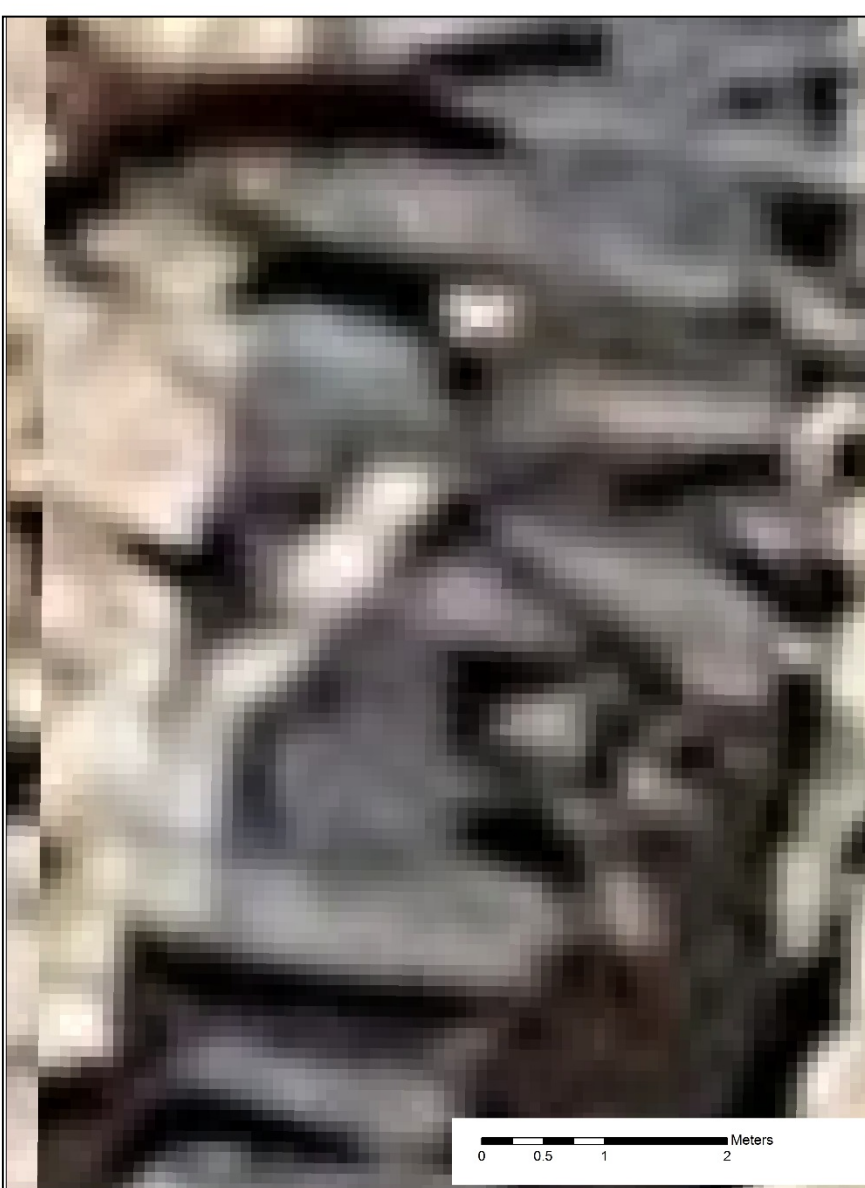
Close-up view of prominent dike intrusion at Schoodic Point from 100ft/30m elevation orthomosaic.



Details of a dike swarm NW of Schoodic Point created using survey techniques with RTK GPS rovers and tripod-mounted electronic total stations.



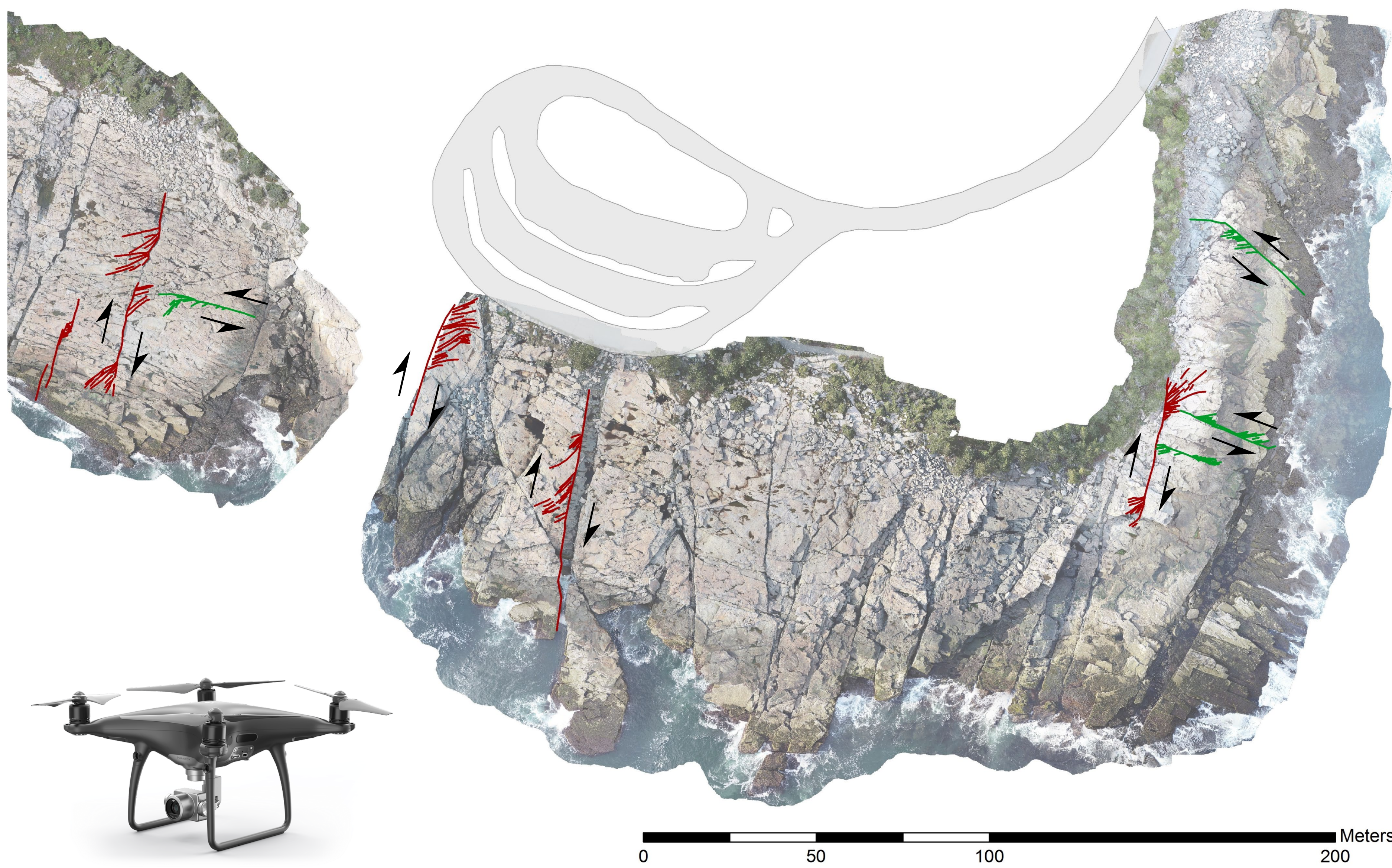
Close-up view showing hi-resolution (1 cm pixel sizes) detail of rotated granite slab in Schoodic Point dike from 100ft/30m elevation orthomosaic.



Close-up view showing same detail of rotated granite slab in Schoodic Point dike from available Google imagery with ~10cm pixel sizes.



Same details of a portion of a dike swarm NW of Schoodic Point from 100ft/30m elevation orthomosaic.



References:

Swanson, M.T., 2015, Mapping mafic/felsic dikes and strike-slip faults at Schoodic Point, Acadia National Park, Geol. Soc. Amer., Abstr. W Prog., V. 47, # 3, p. 90.
Swanson, M.T., 2018, Mapping dikes and faults on the Schoodic Peninsula, Acadia National Park, Acadia Science Symposium.

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