Evaluation of PlanetScope imagery for global DEM generation

M.J. Noh, Ohio State University

Purpose: Create and regularly update high resolution global Digital Elevation Model (DEM) dataset

Study Objective: Assessed the usefulness of PlanetScope imagery for stereo retrieval of surface height at 3-4 m horizontal resolution

Imagery: PlanetScope Dove imagery acquired from suitable convergent angles

Findings: We found interrogating the PlanetScope database for identify suitable image pairs for stereo processing to be challenging. After a 4-month effort, we were able to obtain 200 PlanetScope stereo pairs for evaluation, fifty percent of which were discarded because of problems associated with radiometric calibration, geolocation accuracy, cloud contamination, and/or completeness of metadata. We were successful in retrieving the surface height from the remaining 50 percent imagery. In addition to availability of imagery at suitable off-nadir viewing angles, we stress the importance of reliable calibration, accurate geolocation, and rigorous cloud clearing for DEM generation.
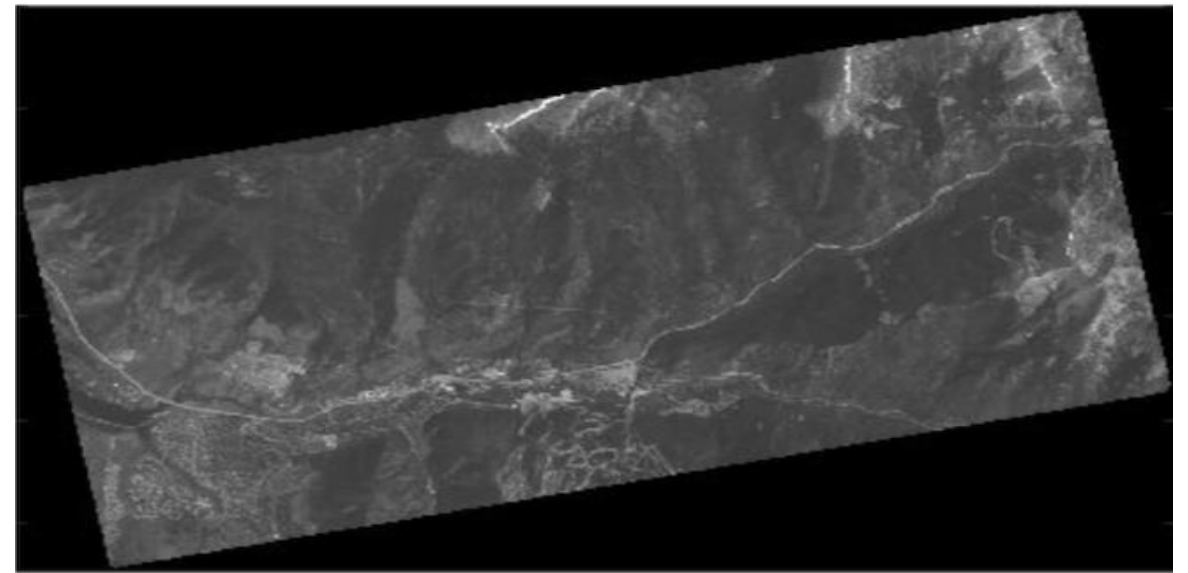
Top: Dove stereo images from Dove 0f33 acquired on 16Aug2019 and Dove 1052 acquired on 25Aug2019. Both satellites were in descending nodes; were resampled to 3.54 m; had incident angles of 4.14° and 2.14°; had azimuth angles of 12.06° and 11.95°, and satellite viewing angles of 3.78° and 1.95°, respectively. Below: the resulting stereo retrieval from the two Dove stereo pairs at a 3.54 m spatial resolution. The images are 10 x 30 km.