

Senator Beck survey design & methods

survey design:

- terrain variety at expense of complete coverage
- multiple look angles on steep terrain
- common tiepoints between scan positions
- efficient travel & workflow

methods:

- reflectors
 - backsight/control points
 - registration tiepoints
- GNSS control on ScanPos & reflectors
 - PPK survey



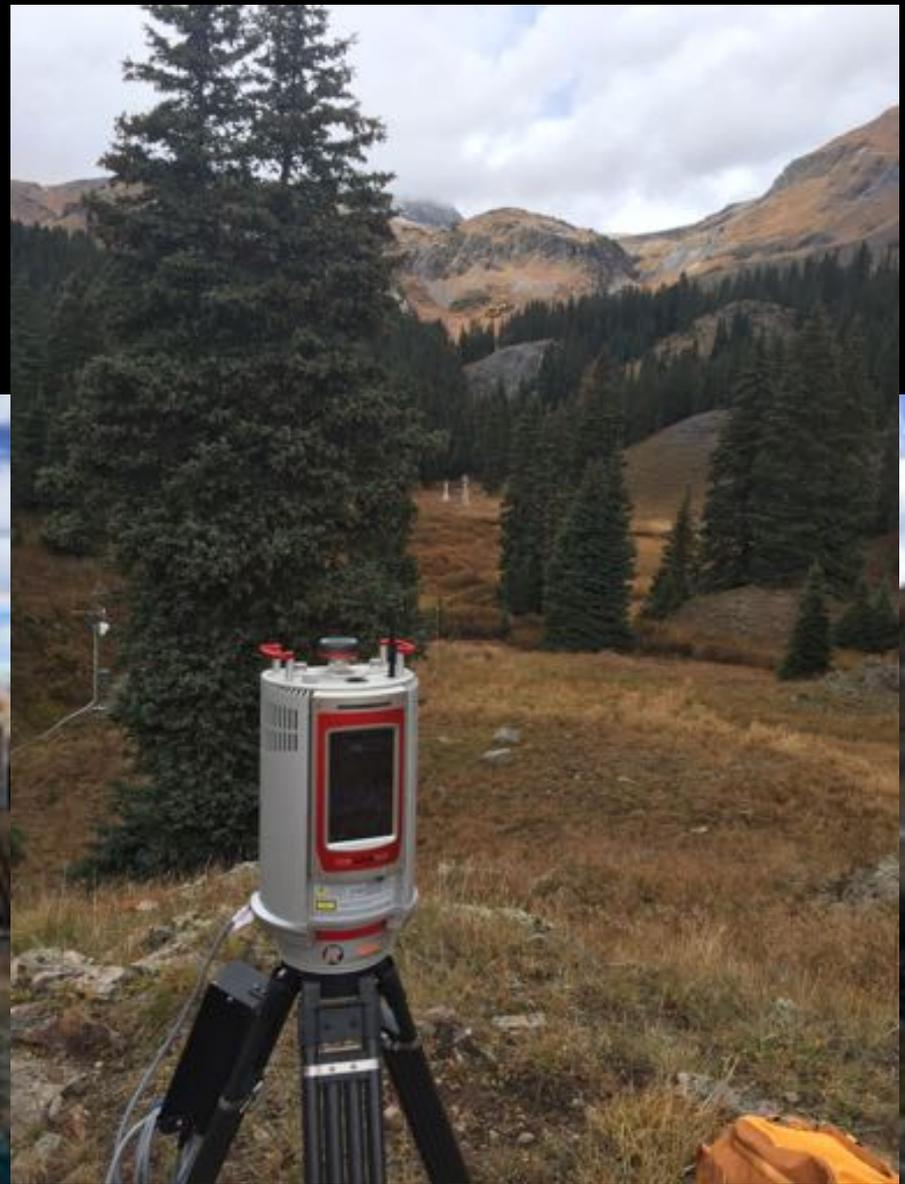
Senator Beck snow-free campaign

- 28 Sept 2016, alpine day: 4 scan positions
- 29 Sept 2016, subalpine day: 6 scan positions



Senator Beck snow-free campaign

- 28 Sept 2016, alpine day: 4 scan positions
- 29 Sept 2016, subalpine day: 6 scan positions



Senator Beck snow-on campaigns

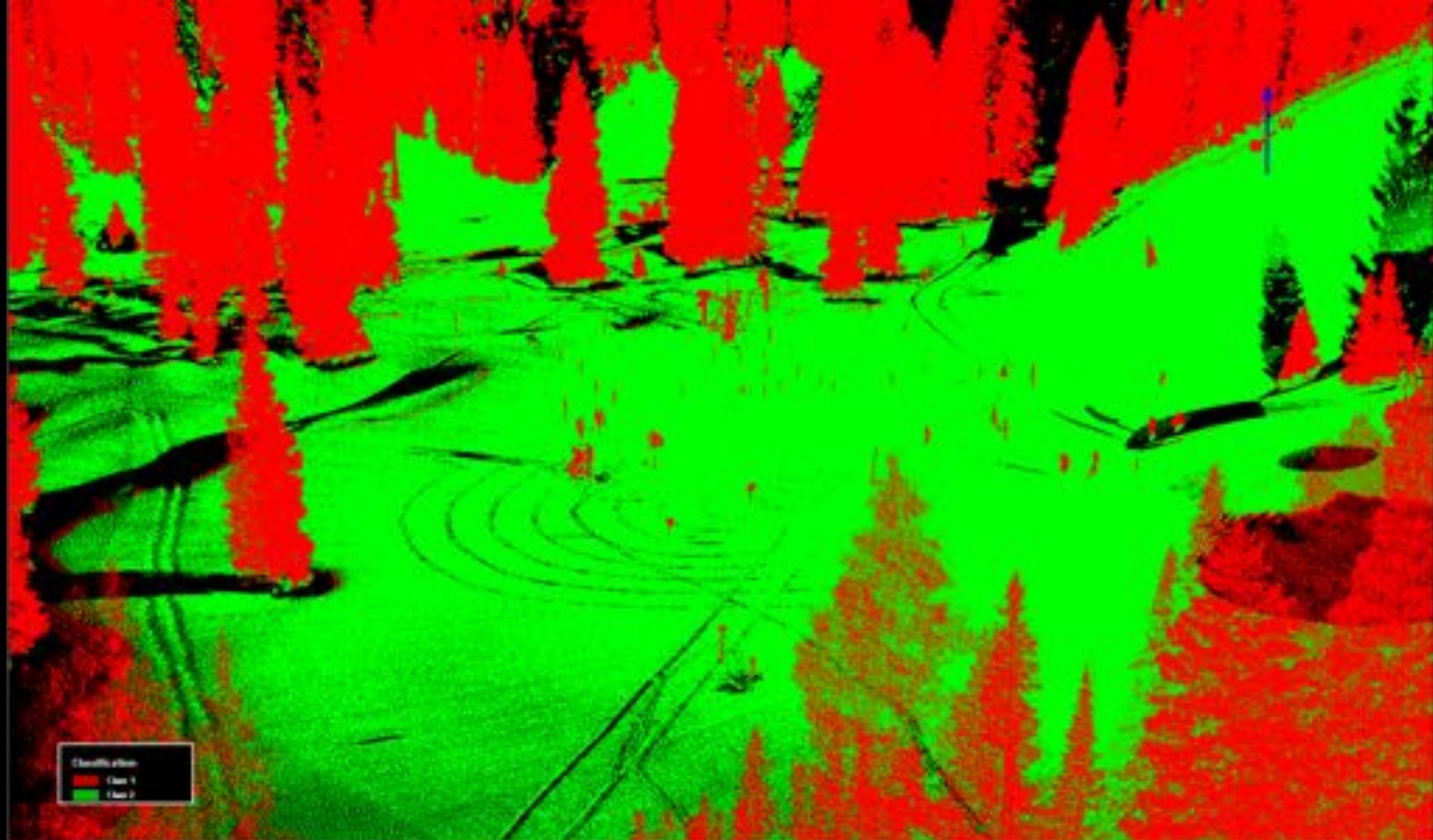
Week 1: 6-10 Feb

- 1 alpine day:
3 scan positions
- 1 subalpine day:
3 scan positions

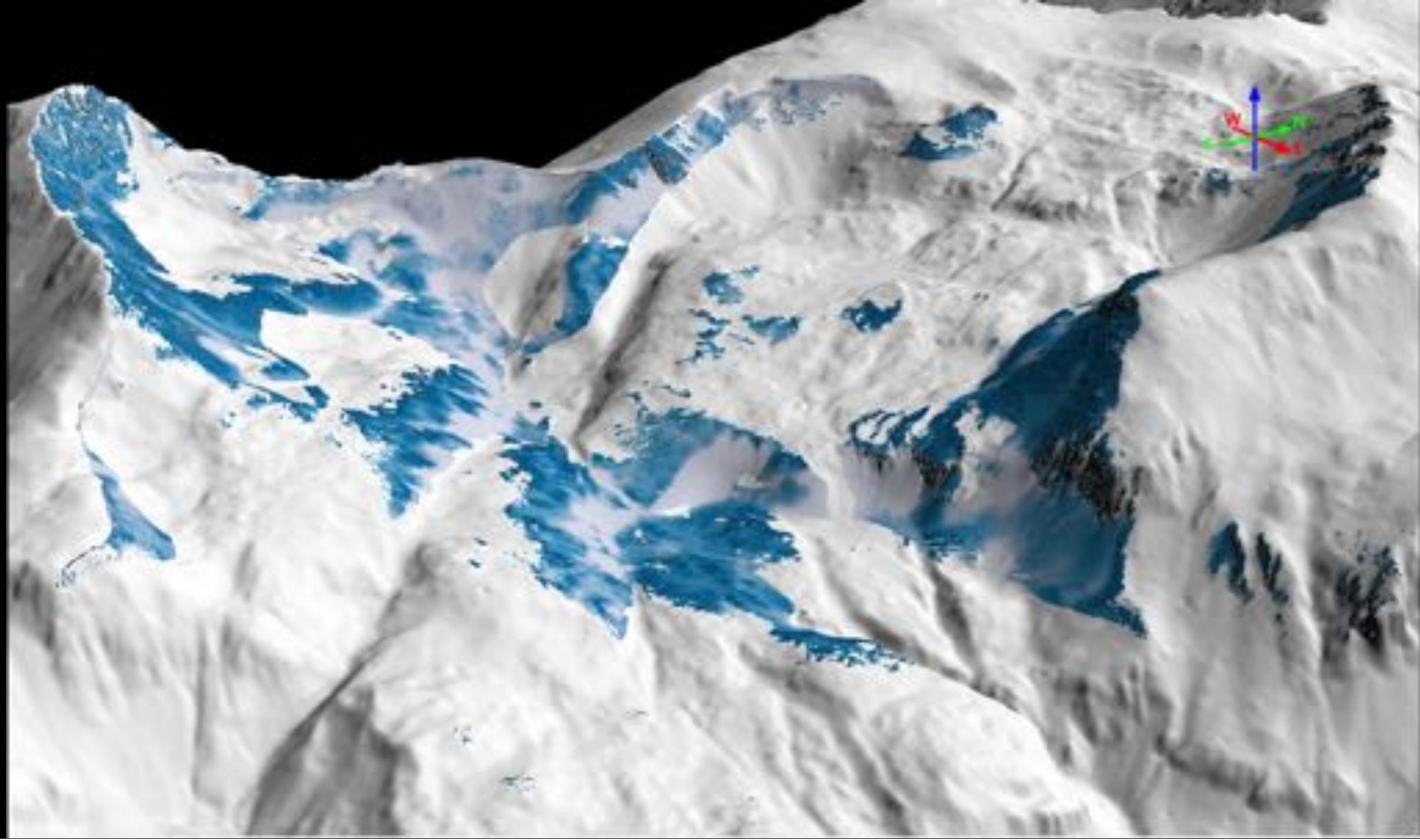
Week 3: 20-24 Feb

- 1 alpine day:
3 scan positions
- 1 subalpine day:
3 scan positions





Classification
Class 1
Class 2



CU/CRREL RS/GIS

Riegl VZ-4000 Processing & Products

- Riegl VZ-4000 TLS & Trimble processed using Riegl RiScan Pro software (online waveform processing) registered using R10 GNSS PPK survey data & Multi-Station Adjustment post-processed using PDAL
- Each point contains Easting, Northing, and Elevation (m) projected into WGS84, UTM Zone 13N NAVD88 GEOID12B
- Intensity (i) field for each point populated with calibrated (range-corrected) reflectance
- Data reduced to consistent point density using 0.02m octree
- Outlier points classified as noise (LAS code 7) using distance threshold
- Points classified as ground/not ground using progressive morphological filter (PDAL filters.smrf)
- Snow depths calculated via point-to-raster (snow-on point to snow-free raster) (PDAL/py script) SD stored in the *GpsTime* LAS field, with colormap; negative depths removed BE elevations stored in *Red* field
- .laz format