Metadata Report

Project Name San Gabriel and North San Jacinto Bedrock Cliffs, California, July 2016 – July 2019

Summary

Dataset includes (1) .las point clouds of steep, bare-bedrock cliffs derived from structure-from-motion photogrammetry. (2) Scaled orthophotos extracted approximately normal to a prominent cliff face within the structure-from-motion model. Individual point cloud extents are approximately 10 – 300 m across. Structure-from-motion models were rendered in AgiSoft Photoscan. Structure-from-motion models where aligned and georeferenced to aerial lidar point clouds using iterative-closest-point alignment tool in CloudCompare. Datasets are not classified and include vegetation. Data collection occurred in summers (May-August) of 2016-2019.

Datasets are complimentary to submitted manuscript to JGR earth surface:

Neely, A.B., and DiBiase, R.A., in review. Drainage area, bedrock fracture spacing, and weathering controls on landscape-scale patterns in surface sediment grain size, Journal of Geophysical Research, Earth Surface, doi:10.1002/essoar.10502617.1

Supplementary files in complimentary manuscript contain shapefile outlines of cliff regions where bedrock fracture spacing was measured and table including bedrock cliff name and measured bedrock fracture spacing.

Personnel

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Site Information

- Description: Steep hillslopes with bare bedrock cliffs in two mountain ranges with contrasting bedrock fracture spacing
- Objective: Measure bedrock fracture density and bedrock fracture spacing on scaled orthophotos
- Site location and structure-from-motion model georeferencing accuracy:

Site name	Number of Points	Approximate Easting (UTM zone 11N, NAD83)	Approximate Northing (UTM zone 11N, NAD83)	Alignment Offset (m) (mean±std)[1]
SG1605-1	6808722	445731.4	3786272.5	0.61 ± 0.47
SG1605-2	5425515	445732.1	3785961.6	0.51 ± 0.33
SG1605-3	11295644	445765.8	3786564.9	0.60 ± 0.37
SG1605-4	1765227	445741.3	3785979.5	0.53 ± 0.57
SG1605-5	1531763	446108.4	3786342.6	0.53 ± 0.27
SG1605-6	9180940	446061.5	3786269.9	0.49 ± 0.27
SG1605-7	2405415	445631.5	3786189.2	0.08 ± 0.1
SG1605-8	1105713	445581.3	3786187.2	0.90 ± 0.76
SG1605-9	2993600	445621.6	3786224.2	0.49 ± 0.33
SG1605-10	3770982	445922.7	3785011.5	0.85 ± 0.56
SG1605-11	6211129	445922.7	3785011.5	0.40 ± 0.27
SG1706-1	39717649	446924.6	3787325.4	0.49 ± 036
SG1706-2	5576392	446601	3787216.7	0.76 ± 0.90
SG1608-1	5709006	444987.2	3787706.9	0.35 ± 0.24
SG1608-2	5709006	445050.3	3787714.9	0.35 ± 0.24
SG1608-3	4715516	444866.6	3788018.3	1.38 ± 0.91
SG1608-4	12663422	444558.1	3787329.8	1.87 ± 0.77
SG1608-5	18956132	444783	3787835.5	0.76 ± 059
SG1608-6	2256241	444642.8	3787815.9	0.88 ± 0.41
SG1608-7	2267966	444622.4	3787852.8	0.95 ± 0.54
SG1609-1	7086913	444054.18	3787498.8	1.15 ± 0.96
SG1609-2	55238085	444289.3	3787547	0.85 ± 0.57
SG1703-1	4978698	441413.5	3786051.2	0.83 ± 0.67
SG1703-2	1973191	441420.5	3785709.4	0.54 ± 0.45

SG1703-3	1565915	441362.1	3785839.8	0.45 ± 0.39
SG1705-1	15961847	443048.05	3787569.8	0.51 ± 0.32
SJ1601-1	186000	530892.5	3742428.9	0.61 ± 0.32
SJ1601-2	759008	530907.5	3742406.8	0.56 ± 0.28
SJ1601-3	4026230	530955.8	3742476.7	0.78 ± 0.51
SJ1601-4	899020	531020.2	3742480.3	0.74 ± 0.51
SJ1601-5	1938603	531010.08	3742507.7	0.69 ± 0.52
SJ1601-6	6964600	531293	3742906.8	0.59 ±0.61
SJ1601-7	5677779	531324.6	3742978.1	0.94 ± 1.17
SJ1601-8	12487527	531211.4	3743202.8	0.74 ± 0.73
SJ1601-9	1120403	531186.82	3743287.6	0.90 ± 0.63
SJ1601-10	3660470	531152.9	3743157.6	0.55 ± 0.57
SJ1601-11	4004001	531109.2	3743145.7	0.66 ± 0.64
SJ1601-12	1629124	530993.4	3743143	0.50 ± 0.63
SJ1601-13	8651299	530957.8	3743117	0.61 ± 0.66
SJ1601-14	3636648	530894.1	3743077.2	0.91 ± 0.91
SJ1603-1	13747001	529207	3743110.3	1.50 ± 1.10
SJ1603-2	16979555	529097.2	3743080.5	0.98 ± 0.68
SJ1603-3	2261153	529024.3	3743001.9	0.68 ± 0.70
SJ1603-4	3112157	528997.4	3742990.9	1.58 ± 1.04
SJ1603-5	3112157	528995.9	3742983.8	1.58 ± 1.04
SJ1701-1	4234998	532877.7	3743993.7	0.90 ± 0.67

[1] Mean and standard deviation of cloud to cloud distances measured at each structure-from-motion model point between aerial lidar point cloud and structure-from-motion point cloud. Calculated in CloudCompare V 2.9.1.

- Site conditions: dry, shadows and time of day vary
- Date/time spent at each site: summer 2016-2019 (see .LAS file name: yr-mm-dd)

Survey Results

- Nikon 5500 camera body with 300 mm telephoto lens, EOS Arrow 100 Submeter GNSS Receiver
- Georeferencing errors were assessed by alignment between lidar point cloud and structure-from-motion point cloud. (see table column 5)
- Aligned to lidar point cloud datasets (*https://doi.org/10.5069/G9J38QPM*)
- Photos were taken (Nikon 5500 – 300 mm lens) from 50 – 1000 m from target cliff at 6-12 georeferenced ridgeline camera stations (EOS arrow).

Products

- Collection dates: Summers of 2016 – 2019 (specified in file name)
- Coordinate system: UTM zone 11N, NAD83
- Spatial resolution: spatially varies, (mean point spacing < 10 cm)
- Horizontal Accuracy: Total error = horizontal error of reference aerial lidar point cloud summed with cloud to cloud distance measurements (table column 5)
- Vertical Accuracy: Total error = vertical error of reference aerial lidar point cloud summed with cloud to cloud distance measurements (table column 5)
- Data formats: .las
- Data processing methods: Structure-from-motion rendering performed in AgiSoft Photoscan. Photos were geotagged with camera station GPS position (EOS arrow) and aligned with reference preselection on high quality. Dense cloud was exported as .las file to CloudCompare where “align” tool was used to fine-scale align structure-from-motion model dense cloud and bare-earth point cloud derived from aerial lidar platform. Aligned structure-from-motion point cloud was exported as .LAZ file.

Misc Notes

Bedrock cliff name in table above links to scaled-orthophoto file name, and cliff name in companion manuscript cited above.