

Using Earthscope and B4 LiDAR data to analyze Southern California's active faults

DRAFT WORKSHOP OUTLINE

Day One – December 3rd

- 9:00 am Welcome and introductions
Goals of course and agenda review (Team)
Acknowledgements (Team)
- 9:30 am General overview of applications of LiDAR (Arrowsmith)
- 10:00 am 1. Review of LiDAR technology and data acquisition (Crosby):
- GPS + IMU + scanning laser rangefinder
- Pulse rate, pulse density, spot size, number of returns
2. Overall LiDAR processing workflow - what happens at each step, who typically does it? (Crosby)
- Typical deliverables
- Data volumes, considerations for managing these datasets, projection issues, metadata, file formats and terminology.
- 10:30-10:45 am *Break*
3. What is the acquisition and processing parameter space that geoscience users should be aware of? What are possible sources of error/artifacts? (Hudnut & Crosby)
- GPS control and dataset accuracy vs. quality – corduroy, scan line artifacts, etc.
- The role of vegetation in determining "quality" of the data (Crosby)
- 11:15 am EXERCISE: An introduction to point cloud data using FUSION for visualization (Crosby).
- 12 - 1 pm *Lunch* During Lunch: QTModeler Demo and playing with QT Reader (Ken).
- 1:00 pm Creating DEMs From Points (Crosby & Arrowsmith):
- Methods – local vs. global (Bin, TIN, IDW, spline, etc).
- What are advantages/disadvantages of each method? (artifacts, interpretability, computation time).
- 1:30 pm EXERCISE 2: Basic visualization of LiDAR DEMs using ArcMap (Arrowsmith & Crosby)
- DEM with color gradients
- DEM with Hillshade

- Slope & slopeshade
- Generating Contours from DEMs

3:00 – 3:15 pm Break

3:15 pm EXERCISE 3: Basic visualization of LiDAR DEMs using Global Mapper (Crosby):
 - Similar visualizations as above + 3D, KMZ export, WMS access to images and other raster data.

4:15 pm EXERCISE 4: Extracting Information from DEMs in ArcMap (Crosby & Arrowsmith):
 - Point and Profile queries
 - Canopy height maps
 - Change detection

5:30 pm Stop

6 pm Optional no-host group dinner at casual location on campus. Details TBD.

Day Two – December 4th

9:00 am Online data lidar data sources (Crosby):
 - General sources
 - OpenTopography intro.

9:30 am EXERCISE 5: Accessing EarthScope/B4 data products via OpenTopography and using of those data for various GIS analyses – builds on skills developed yesterday afternoon (Arrowsmith & Crosby).

11:30 am EXERCISE 6: Using command line/free tools to process LAS data to custom DEMs and produce basic visualizations.

12:30 -1:30 pm Lunch - During Lunch: Informal exploration of SoCal LiDAR datasets and open conversation and demonstration of educational activities using LiDAR data.

1:00 pm Optional SDSC Machine Room tour

1:30 pm EXERCISE 7: Profiler GUI—Matlab-based tool for computing small offsets along faults and discussion of results (Arrowsmith)

2:30 pm EXERCISE 8: Quantitative geomorphic analysis (Arrowsmith):
 - Channel profile analysis
 - Slope area analysis
 - general tectonic geomorphology discussion

4:30pm General discussion and wrap up (Crosby & Arrowsmith). Possible topics:

- Geoscience Education ideas (Arrowsmith and Robinson)
- Acquiring LiDAR / writing your own spec / RFP (Crosby)
- Terrestrial LiDAR (Arrowsmith)
- Classification of point cloud data (Crosby)
- GeoES 2.0 coordination (Group)
- AARA lidar data update: what data sets are coming? (Crosby)
- Where is there lidar data that you know about? (Group)
- Other software to be aware of (Crosby)

5:30pm END – Thank you!