LiDARViewer

Point-based LiDAR visualization and analysis

Imaging and Analyzing Southern California's Active Faults with LiDAR
San Diego Supercomputer Center
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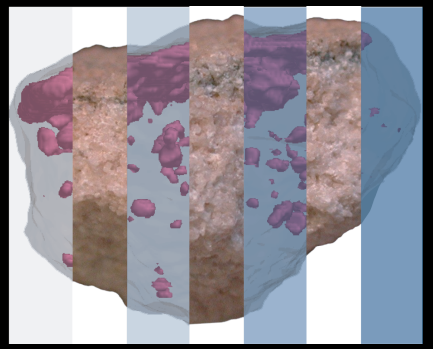
Peter Gold (UT Austin)

What is **LiDAR**Viewer?

- Open source software for *point-based* LiDAR visualization

Who developed **LiDAR**Viewer?

- UC Davis WM Keck Center for active Visualization in the Earth Sciences (keckCAVES.org)
- Geoscientists + Computer scientists focused on interactive exploration of 3D data



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Immersive Visualization

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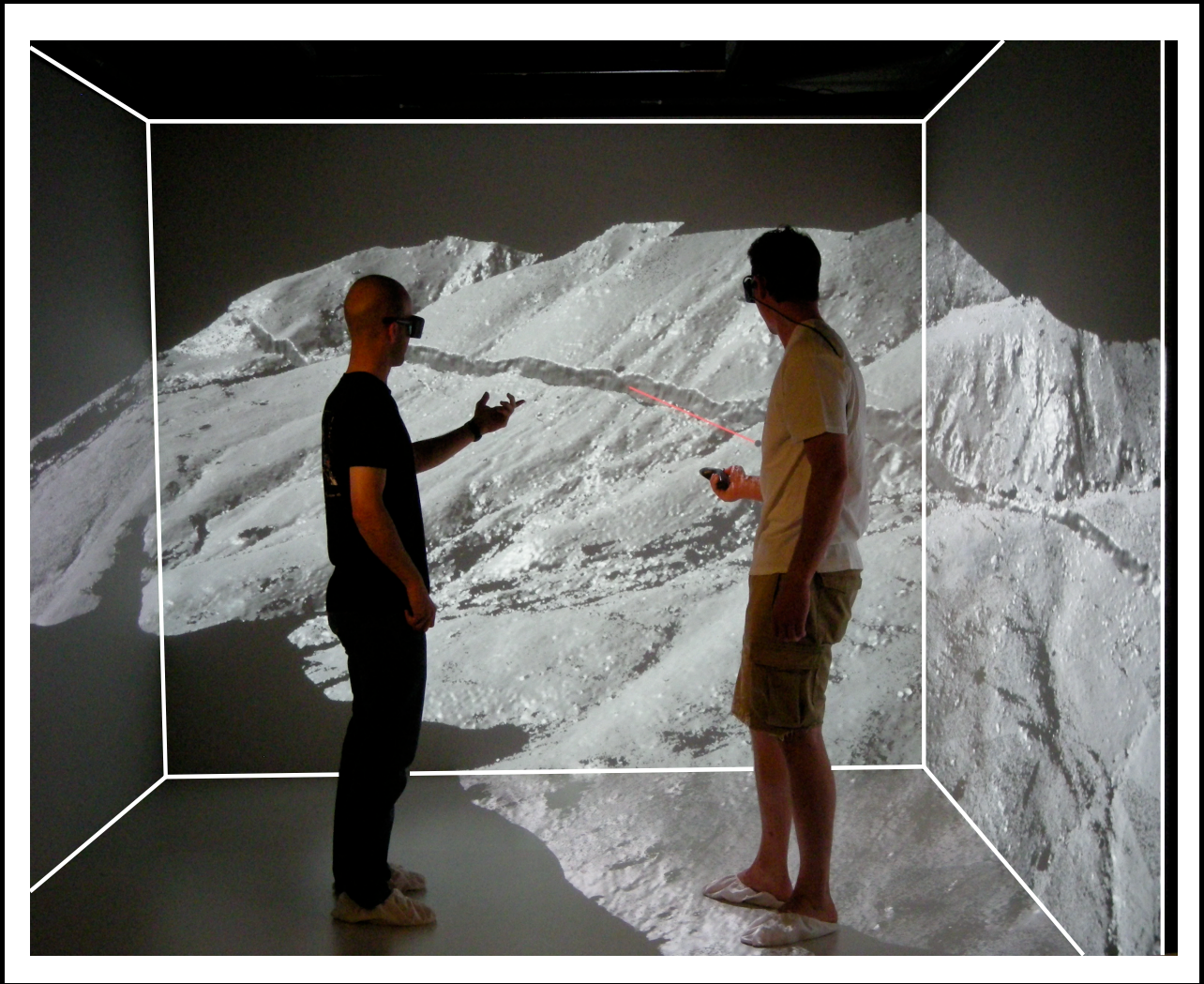


CAVE: Virtual reality environment that allows:

- Immersive 3D visualization
- Interactive data manipulation
- Quantitative measurement

LidarViewer

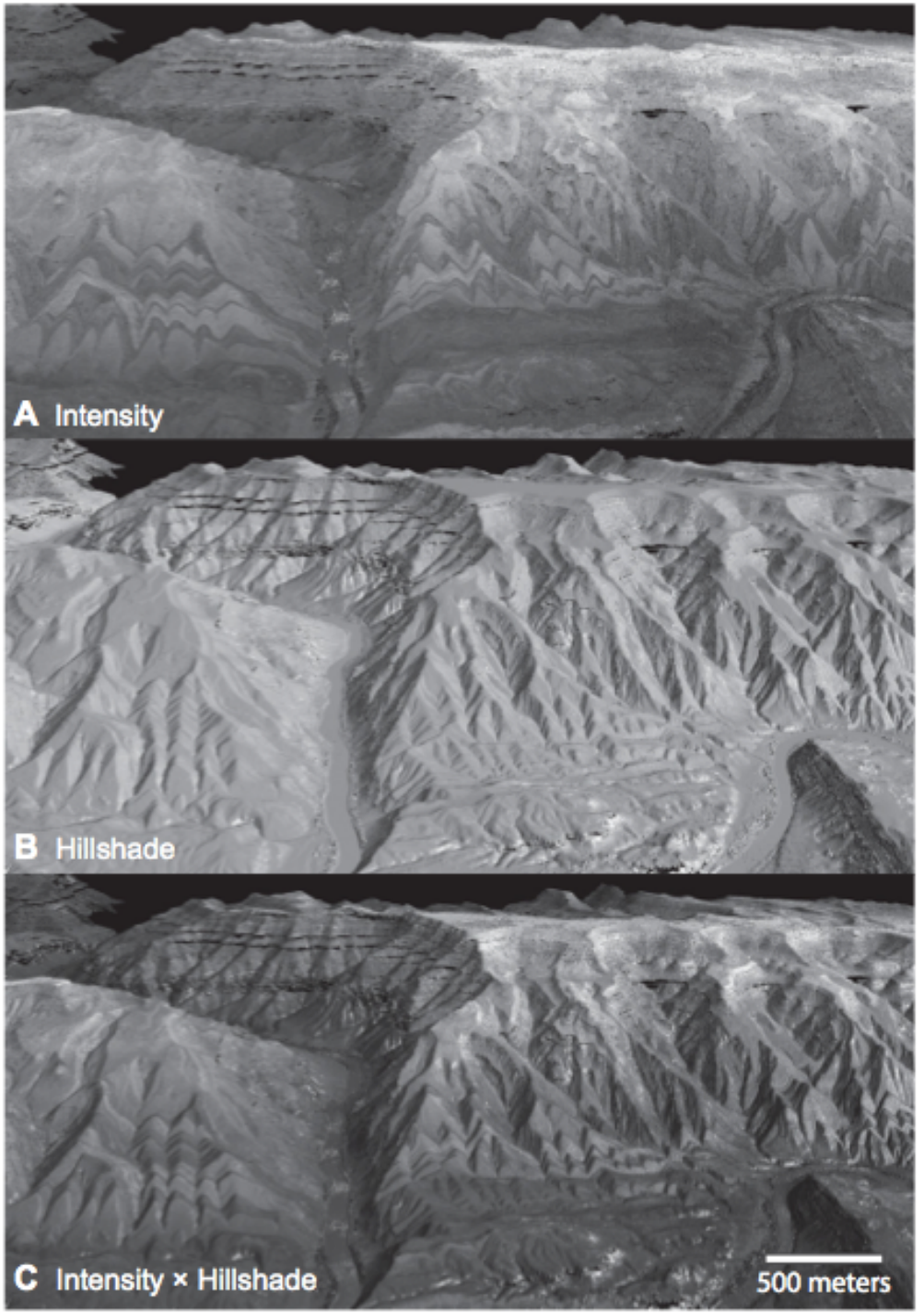
- Point based tool for lidar visualization and analysis

- Visualization environments
  - Standard 2D desktops/laptops
  - 3D-enabled desktops
  - Support for position tracked tools (e.g., Razer Hydra, Xbox Kinect)
  - Immersive environments (fully position tracked, e.g. CAVES)
  - Linux/unix only

Key Features of **LiDAR**Viewer

- Rapid data processing
  - Short lag time between data collection/receipt and use
- Multi-billion point datasets
  - Full datasets can be loaded without decreasing resolution
  - Out of core processing, hierarchical data structures, **view-dependent resolution**
- Point-based visualization
  - Visualizing **point clouds**, rather than digital surface models
  - Looking at the actual measurement, rather than an interpretation
- 3D interactivity, data selection, and measurement

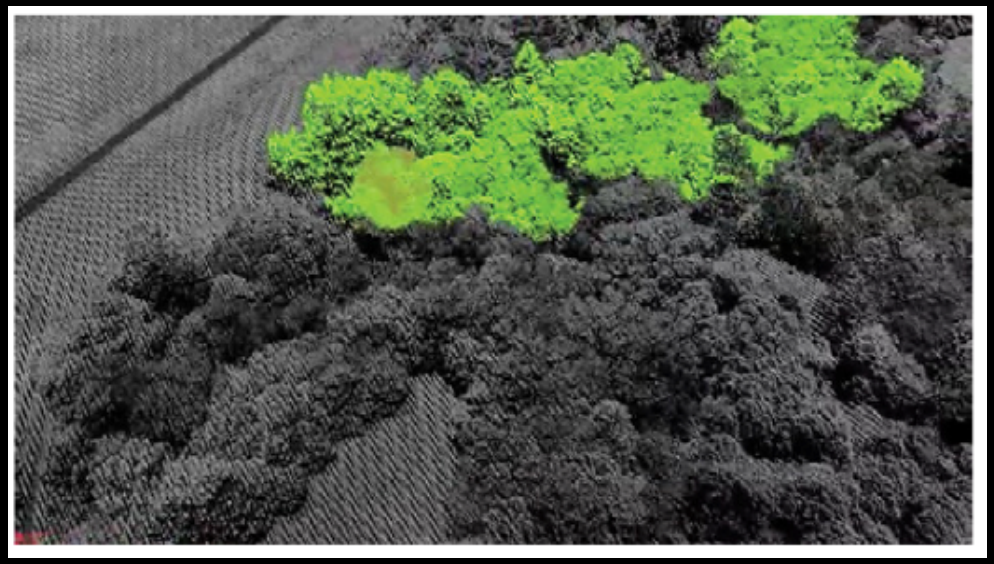
Real-time hillshading and lighting adjustment

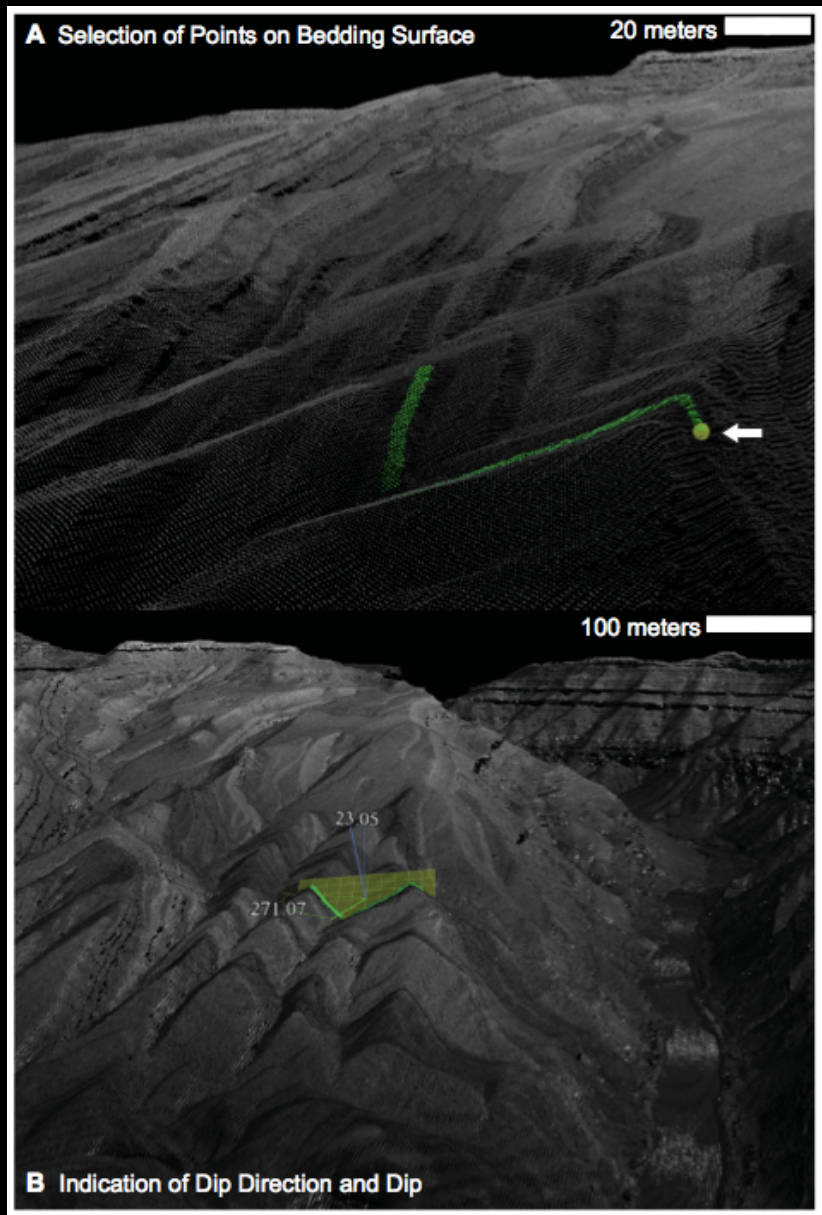


Kreylos et al., 2013, *Geosphere*

Real-time point selection

- **Best-fit approximations (planes, lines, strike and dip)**
- Distance to plane visualization
- Vegetation selection/removal





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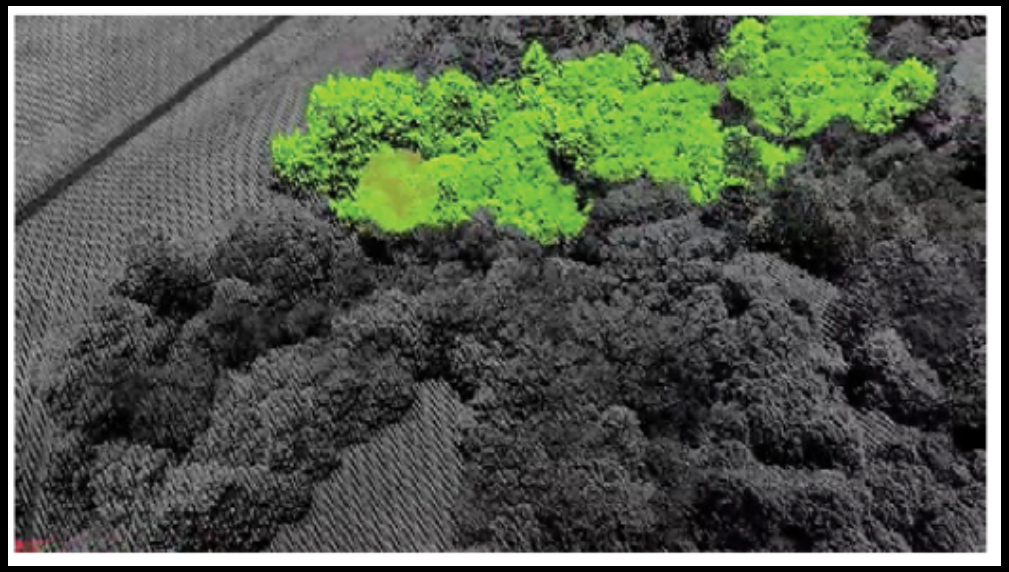

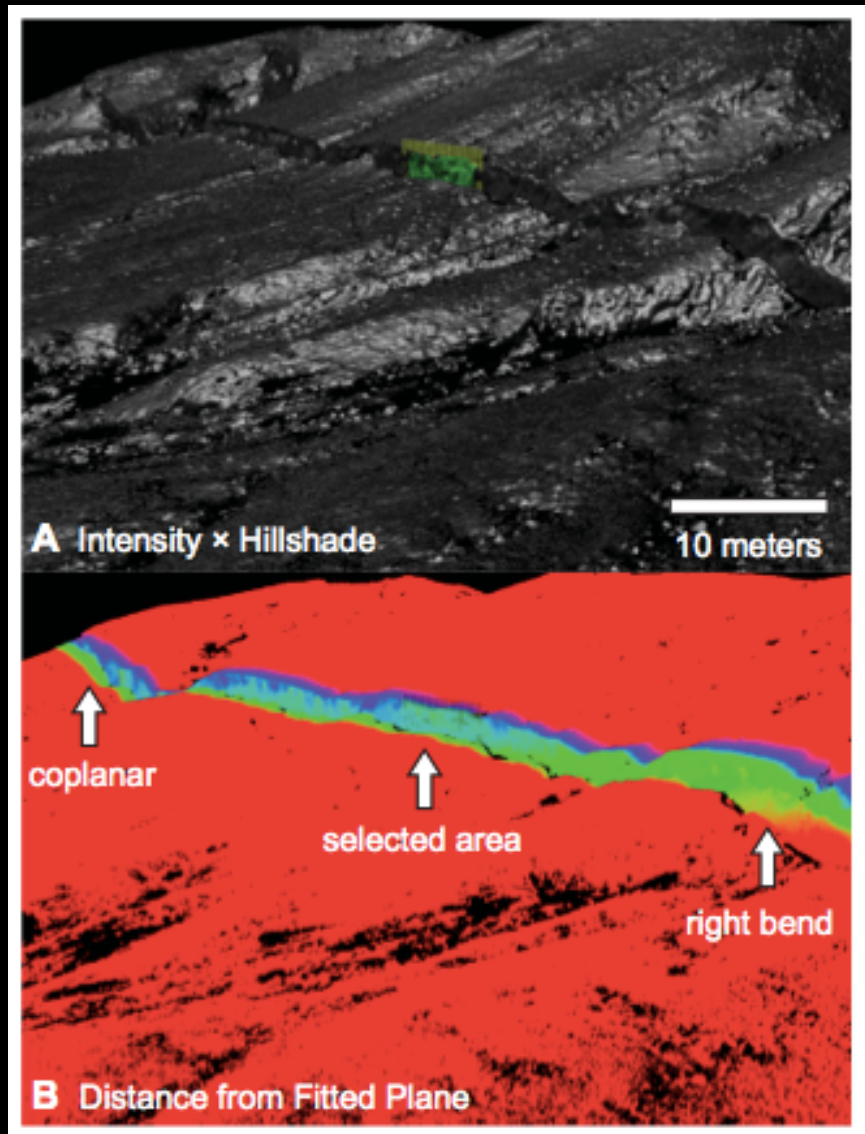

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Real-time point selection

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- Distance to plane visualization
- **Vegetation selection/removal**

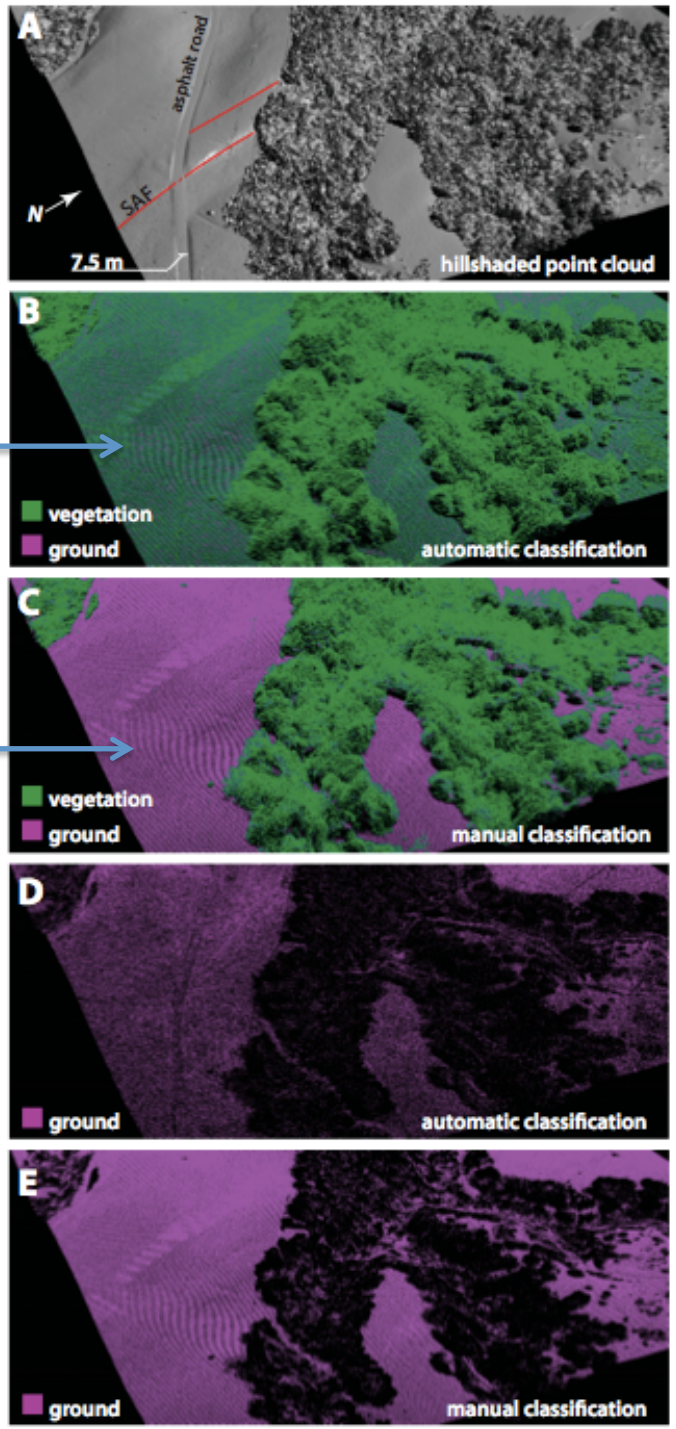
Automatic: 47% of points classified as vegetation

Manual: 13% of points classified as vegetation

Automatic classification = fast, but too aggressive

Manual classification = time consuming, maybe not aggressive enough

Kreylos et al., 2013, *Geosphere*



- **LiDAR**Viewer Resources

- www.keckcaves.org
- http://wiki.cse.ucdavis.edu/keckcaves:home

- Gold, P.O., Oskin, M.E., Elliott, A.J., Hinojosa-Corona, A., Taylor, M.H., Kreylos, O., and Cowgill, E., 2013, **Coseismic slip variation assessed from terrestrial lidar scans of the El Mayor-Cucapah surface rupture***: Earth and Planetary Science Letters*, v. 366, p. 151–162, doi: 10.1016/j.epsl.2013.01.040.
- Kreylos, O., Oskin, M., Cowgill, E., Gold, P., Elliott, A., and Kellogg, L., 2013, **Point-based computing on scanned terrain with LidarViewer**: *Geosphere*, v. 9, p. 546–556, doi: 10.1130/GES00705.S2.