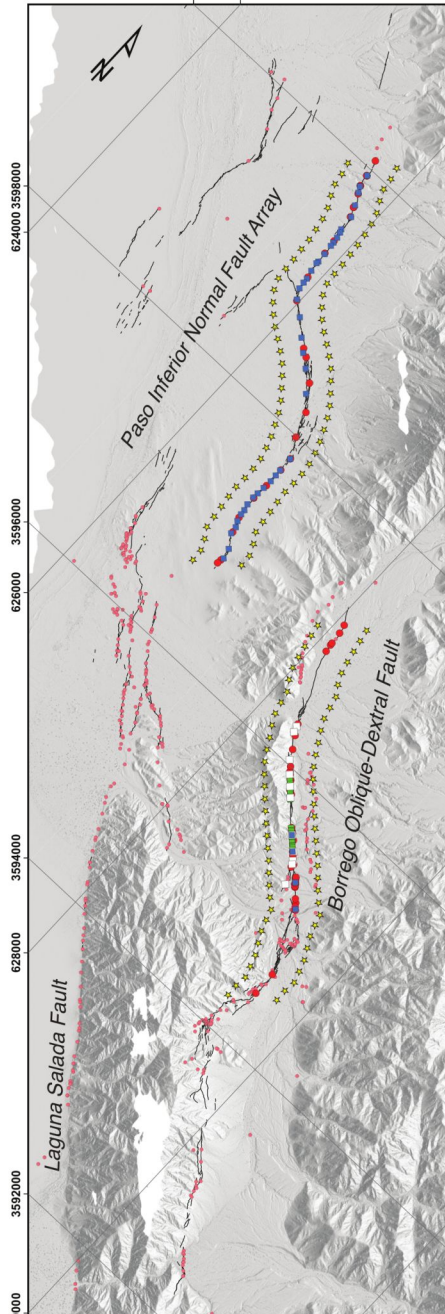


Intercomparison of Registration Techniques and Interactive 3D Visualization of Differential LiDAR from the 2010 El Mayor-Cucapah Earthquake

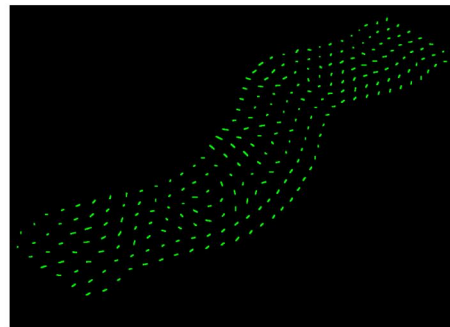
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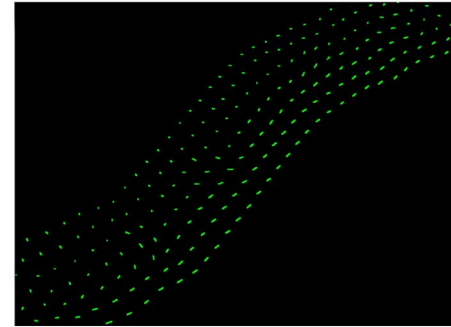
Differential LiDAR provides unprecedented images of the near-field ground deformation and fault slip due to earthquakes. Here we examine the performance of the Iterative Closest Point (ICP) technique for data registration between pre- and post-earthquake LiDAR point clouds of varying density. We use the 2010 El Mayor-Cucapah data set as our region of interest since this earthquake produced different types of surface ruptures, yielding a variety of deformation styles for analysis. We also test a more simplistic, Chi-Squared minimization approach and find that it produces good results when compared to ICP. We present different techniques for visualizing large vector fields, and show how each method highlights a unique feature in the data set. Dense vector fields are useful when analyzing smaller deformations in the surface. A sparse, averaged vector field analyzes the bigger, overall shifts without interference caused by small details. Flow-based visualizations like Line Integral Convolution (LIC) graphs, provide insight into particular artifacts of data collection, such as distortions due to uncorrected pitch and yaw of the aircraft during the survey.



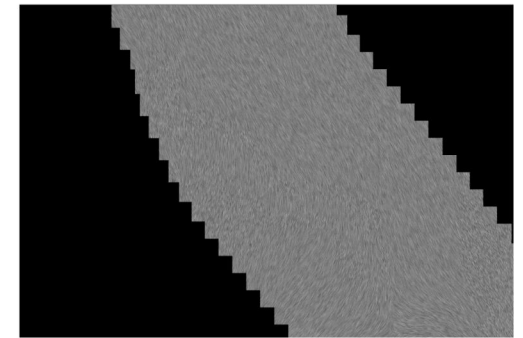
ICP



PASO INFERIOR FAULT



BORREGO OBLIQUE-DEXTRAL FAULT



NORTHERN SECTION OF THE BORREGO FAULT

CHI SQUARED

