**Dataset Parameters Summary**

**Parameter** | **Value** | **Unit**
--- | --- | ---
**GSD** | 0.034 m | Average
**Max Elevation** | 0.131 m | 3D differencing
**Min Elevation** | -0.321 m | 3D differencing
**Max Difference** | 200 m | 3D differencing
**Vertical RMS** | 3.3 cm | Orthomosaic Root-Mean-Square Error
**Horizontal RMS** | 1.9 cm | Orthomosaic Root-Mean-Square Error
**Percent Points Overlap** | 97% | Orthomosaic Root-Mean-Square Error
**Number of Checkpoints** | 155 | Orthomosaic Root-Mean-Square Error
**Number of Images** | 17,450 | Orthomosaic Root-Mean-Square Error

**Dataset Coverage**

- **New iUAS/SfM Orthomony**
- **New iUAS/SfM Hillshade**
- **B4 or Salton Sea LiDAR Hillshade**

**Example Image**

- **Salton Sea**
- **B4**
- **iUAS/SfM Data**

**Detail Images**

- **Change Detection**
- **Surfside ICP Differencing Using OpenTopography Tools**
- **New sUAS/SfM Orthoimagery**
- **New sUAS/SfM Hillshade**
- **B4 or Salton Sea LiDAR Hillshade**

**SfM and diGNSS Processing**

- **Orthomosaic processing**
- **Mediation between bare Earth and 3D differencing**
- **dGNSS**
- **Surfside ICP Differencing**

**Opportunities and Challenges**

- **Opportunities**
  - Ability to cover >10,000 km² per day in a Brisk deployment
  - Ability to process a large number of photos per day
  - Rapid preliminary processing
  - Rapid high-resolution processing with cluster of high-performance machines
  - Potential to produce large HRT data set following a surface-nultiplying event

- **Challenges**
  - New or absent airborne LiDAR data for two flights
  - Maintaining visual contact with sUAS, access to launch sites on the ground
  - Georeferencing after event
  - Potential for cH damage
  - Ability to upload ~600 photos/day to remote server

**Acknowledgments**

- Thank you to the support from the Office of Ocean Exploration and Research (OER) of the National Oceanic and Atmospheric Administration (NOAA) for funding this project. The data presented here were acquired in support of the project "Co2Hole-3D: Mapping an active subduction zone in the Gulf of California, Mexico". Additional support for this project was provided by the National Science Foundation (NSF) grant OCE-1762369 (Co2Hole Project). The authors thank the following organizations for supporting this project:
  - University of Utah, College of Science
  - Southern California Integrated Lidar Center (SCILC)
  - National Center for Airborne Laser Mapping (NCALM)

**Get the Data:**

- [https://doi.org/10.5069/G94M92RG](https://doi.org/10.5069/G94M92RG)

**Change Detection**

- **Significant vertical and horizontal displacement**
- **iUAS/SfM Orthoimagery**
- **B4 or Salton Sea LiDAR Hillshade”**

**Overview**

- **High Resolution Topography Along 40 km of the Southern San Andreas Fault**
- **3D differencing**
- **iUAS/SfM Orthoimagery**
- **B4 or Salton Sea LiDAR Hillshade”**

**Field Data Collection**

- **B4 airborne LiDAR was collected in 2005 with now-old technology**
- **Make HRT dataset available to the community**

**Motivation**

- **Re-defined methodology to rapidly collect well-georeferenced, high-resolution topography**
- **Beach that is available on OpenTopography**
- **drea from north of Painted Canyon to Bombay**

**Hardware**

- **Suite of five purpose-built workstations run at UVU following the methods below.**
- **4 people, only 2 are necessary**
- **B4 airborne LiDAR was collected in 2005 with now-old technology**

**Acknowledgements**

- Thank you to the support from the Office of Ocean Exploration and Research (OER) of the National Oceanic and Atmospheric Administration (NOAA) for funding this project. The data presented here were acquired in support of the project “Co2Hole-3D: Mapping an active subduction zone in the Gulf of California, Mexico”. Additional support for this project was provided by the National Science Foundation (NSF) grant OCE-1762369 (Co2Hole Project). The authors thank the following organizations for supporting this project:
  - University of Utah, College of Science
  - Southern California Integrated Lidar Center (SCILC)
  - National Center for Airborne Laser Mapping (NCALM)

**Dataset Parameters Summary**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame Rate</td>
<td>20.131 fps</td>
</tr>
<tr>
<td>Horizontal VRMse</td>
<td>1.9 cm</td>
</tr>
<tr>
<td>Vertical VRMse</td>
<td>3.3 cm</td>
</tr>
<tr>
<td>Average and standard</td>
<td></td>
</tr>
<tr>
<td>Point Cloud Density</td>
<td>246 points/m²</td>
</tr>
<tr>
<td>Total Points</td>
<td>8.43 x 10⁹</td>
</tr>
<tr>
<td>~30 km²</td>
<td></td>
</tr>
</tbody>
</table>

**Quality Control**

- **Differences in points between B4 LiDAR data and our local reference stations.**
- **New sUAS/SfM Orthoimagery and 3D differencing studies.**

**Get the Data:**

- [https://doi.org/10.5069/G94M92RG](https://doi.org/10.5069/G94M92RG)