Obtaining and Updating GNSS Data in Southern California

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Introduction

To enhance seismic hazard models, its crucial to address data gaps in GNSS coverage.This study conducted a targeted GNSS filed campaign in central and Southern California, focusing on areas with insufficient data to improve the resolution of geodetic observations and support seismic research.

Figure 1: Geodetic equipment set up in the field with a survey grade tripod.

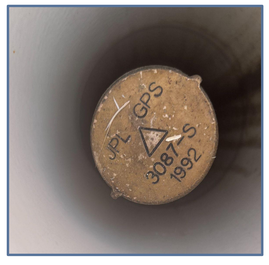
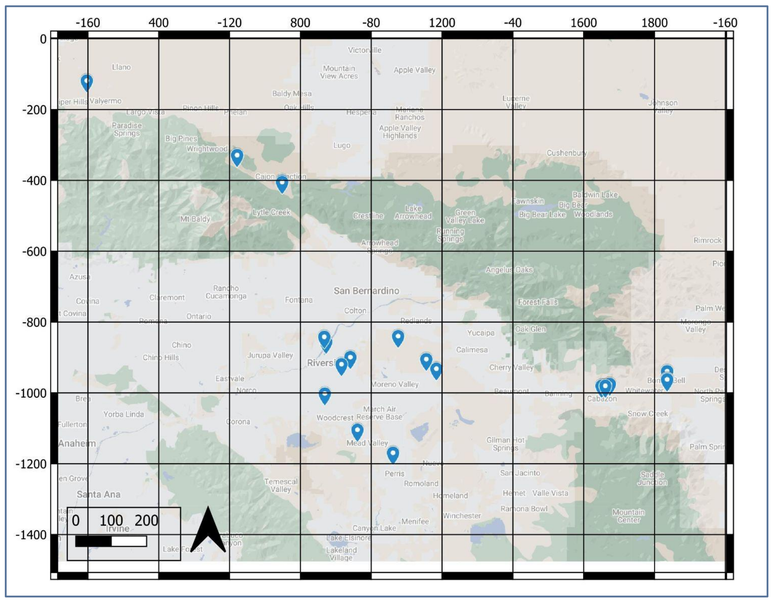


Figure 2: Different types of benchmarks found.



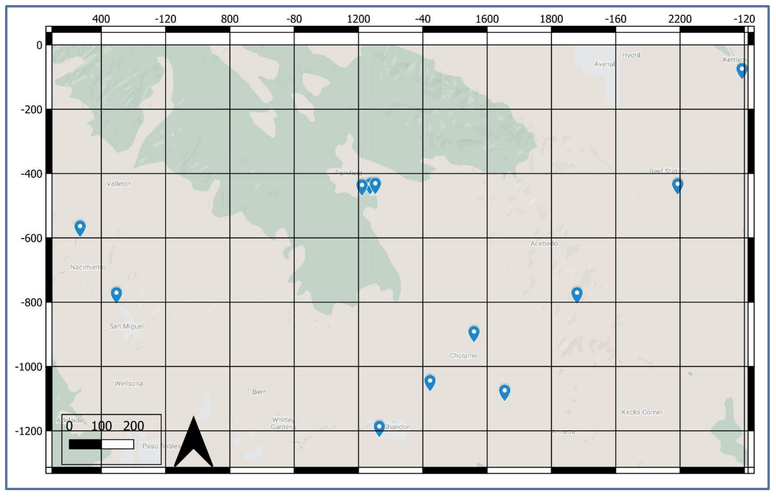


Figure 3 : All of the 37 benchmarks found across southern California

Results

- Conducted field campaign to collect new and update GNSS data from 37 sites, including 25 in Southern California and 12 in Parkfield.
- Our initial hypothesis was that filling data gaps in these areas would enhance the resolution of seismic hazard models. The results met this expectation by providing new measurements that contribute to the refinement of geodetic observations.
- Recovery and resurvey of previously inaccessible sites added valuable data points that will support ongoing seismic hazard assessment and earthquake response efforts.

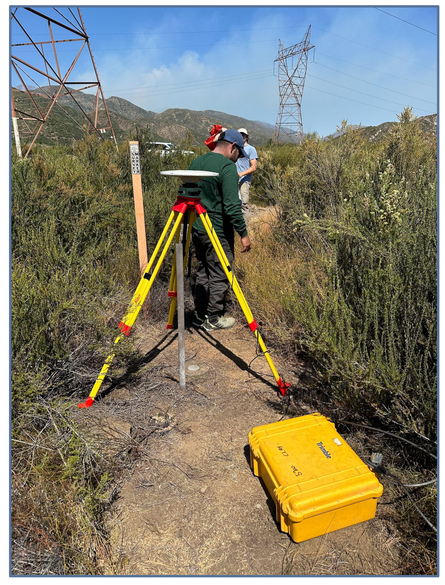


Figure 4: Field photo of us successfully setting up the GPS equipment and me standing on the San Andreas Fault.

Objective

The objective of this project was to enhance GNSS data coverage in central and southern California by conducting a targeted field campaign to survey and recover GNSS sites in key areas. By aiding GNSS based models, the project aims to support the Community Geodetic Model, aid in earthquake response efforts, and provide better measurements of ground movement before and after an earthquake.

Methodology

- Reviewed and analyzed GNSS data from previous campaigns by SCEC, NGS, USGS, and UCR to identify sites.
- Utilized Google Earth to assess the accessibility and recoverability of these sites.
- Collected new data by surveying and occupying selected GNSS sites for 12-14 hours.
- Converted raw data into RINEX files for processing. Conducted quality checks using NGS OPUS toll.

Conclusion

The GNSS field campaign successfully filled key data gaps in central and southern California, enhancing seismic hazard models by providing new and updated measurements. These findings improve our understanding of elastic strain accumulation on faults, aiding in more accurate earthquake preparedness and response. The implications for geophysical research are significant, particularly in refining models like the Community Geodetic Model (CGM).

Acknowledgements

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