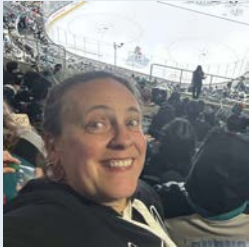


Creep Rate, Episodicity, and Earthquake Potential (CREEP) Technical Activity Group



Christie Rowe (Nevada Seismo Lab), Betsy Madden (SJSU), Mike Floyd (MIT)

USGS has contributed at every step, especially Steve DeLong, Josie Nevitt, Todd Erickson, Jessie Vermeer, Cassie Hanagan....Earthscope educators, Forest McFarland, Dylan Cardiff, Roger Bilham...so many more.

September 1, 2026

SCEC Annual Meeting, Palm Springs, California



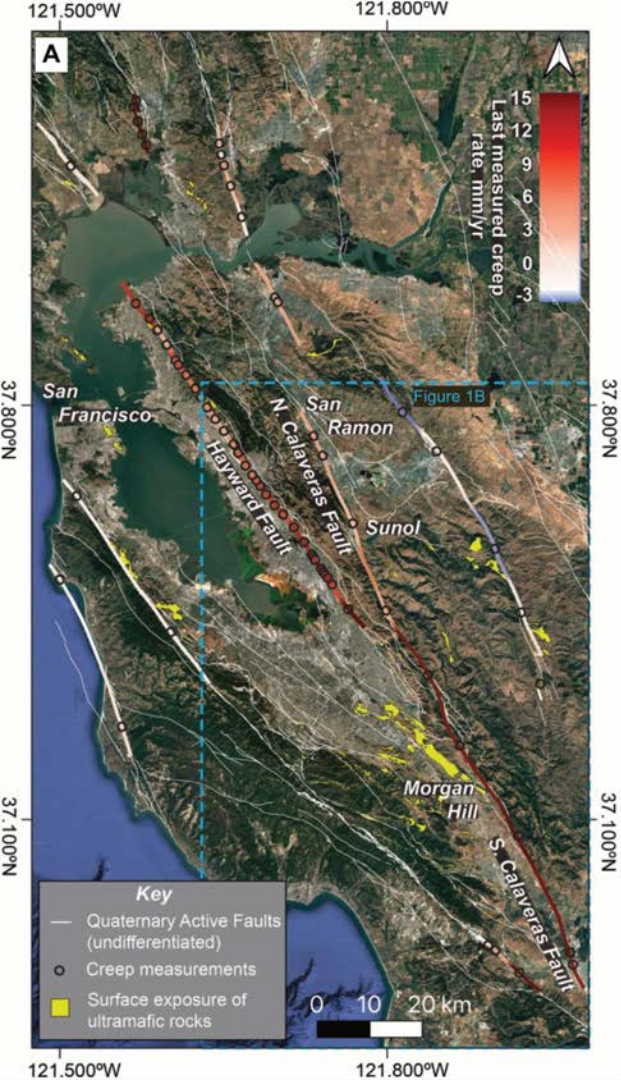
Who cares about creeping faults?

- **Creep shows us where the fault is** - extremely precise fault mapping of creeping strands, see through geomorphic disturbance (urban, farming)
- **Utility / structural displacement hazard** - especially with progressive undergrounding of power lines to reduce fire hazard.
- ***Could creep acceleration be detected as a precursor phenomenon, e.g. for a large earthquake on the Hayward Fault?***
- ***Could spatio-temporal patterns of fault creep reveal fault loading, e.g. in a network of linked faults such as the San Francisco Bay Area?***



Why is this a SCEC problem?

- Need to build **observational capacity** Statewide
- Creep is increasingly significant with SCEC's expanded footprint into **creepier fault regions**
- Local knowledge and experience in Bay Area resides in private sector – utilities, consultants – researcher community can learn a lot through **relationship-building**
- New opportunities for **earthquake cycle modeling** if creep data is fully leveraged



Alignment Arrays

Installed on creeping faults
1960s-onward

Captured many moderate
earthquakes + afterslip
duration

Revealed timing and
magnitude of aseismic
transients

Passion project looking for
stewardship





**Steve DeLong (USGS)...
the current professor of
the dark arts**

Alignment Array
measurements
require expensive
delicate
equipment,
specific skills, and
unusual diligence.

*Can't we replace
this with remote
sensing?*



CREEP workshop San José State March 2026



Big, HUGE “state of the art” paper in prep with 50-odd contributors

- **YES**, we see unrealized opportunities for using creep time series
- **NO**, remote sensing cannot replace the AA measurements
- **YES**, there are a lot of folks who want to contribute!



Motivations for CREEP-TAG

- **Immediate:** The long time series of creep measurements on Alignment Arrays in a linked fault network in the San Francisco Bay Area is threatened by lack of community capacity and support to continue measurements
- **Related issue which shares a solution:** Not enough researchers with field measurement skills to respond to earthquakes and generally collect perishable data related to fault slip.
- **Scientific Gains for Seismic Hazard:** Creep records may hold the key to understanding timescales of fault loading, tradeoffs between strands, and testing rheologic descriptions of fault behavior, but presently these data are underutilized. Building Alignment Array data into SCEC CFM will encourage more exploration of the power of these data.

Early 2027: BOOTCAMP





Add Alignment Array Data to CGM

Data from Measurements of Creep Rates on northern California Faults, California (ver. 3.0, February 2026)

Dates

Publication Date : 2017-05-23
Start Date : 1979
End Date : 2025-01-11
Last Revision : 2026-02-10

Citation

McFarland, F.D., Caskey, J.S., and DeLong, D.B., 2017, Data from Measurements of Creep Rates on northern California Faults, California (ver. 3.0, February 2026): U.S. Geological Survey data release, <https://doi.org/10.5066/P17YB0AC>.

Summary

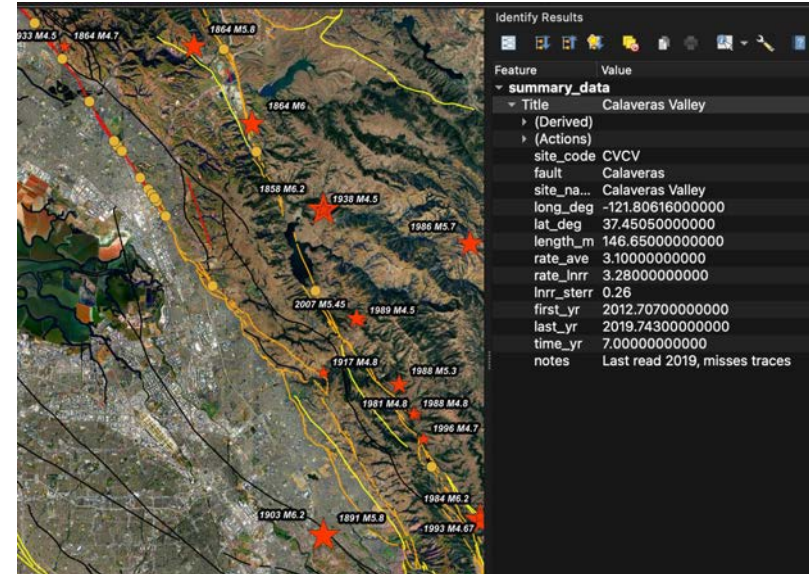
This Data Release summarizes repeat survey measurements made to monitor surface fault creep (tectonic movement along faults that occurs without strong shaking from earthquakes) in northern California, mostly in the greater San Francisco Bay Area. Additional description of these data and the methods used to collect them is provided in the included references. This Data Release provides nearly annual measurements at 50 measurement sites, and includes fault geographic locations, total creep over time, location of measurements by week, and notes regarding the

Map »



Spatial Services

ScienceBase Cloud WMS :
<https://api.sciencebase.gov/geoserver>
ScienceBase Cloud WFS :
<https://api.sciencebase.gov/geoserver>



Downloadable in csv format from Science Base – Feb 2026 update by Steve DeLong includes shapefiles with average creep rate!



Add

Data from Measurements of Creep Rates California (ver. 3.0, February 2026)

Dates

Publication Date: 2017-05-23
Start Date: 1979
End Date: 2025-01-11
Last Revision: 2026-02-10

Citation

McFarland, F.D., Caskey, J.S., and DeLong, B.B., 2017, Data from Measurements of California Faults, California (ver. 3.0, February 2026); U.S. Geological Survey data release <https://doi.org/10.5066/P17YBOAC>.

Summary

This Data Release summarizes repeat survey measurements made to monitor surface displacement along faults that occurs without strong shaking from earthquakes in northern California (San Francisco Bay Area). Additional description of these data and the methods used to collect and include references. This Data Release provides nearly annual measurements at 50 sites along the San Francisco Bay Area, with repeat measurements at 10 sites at 10-year intervals.

[show more...](#)

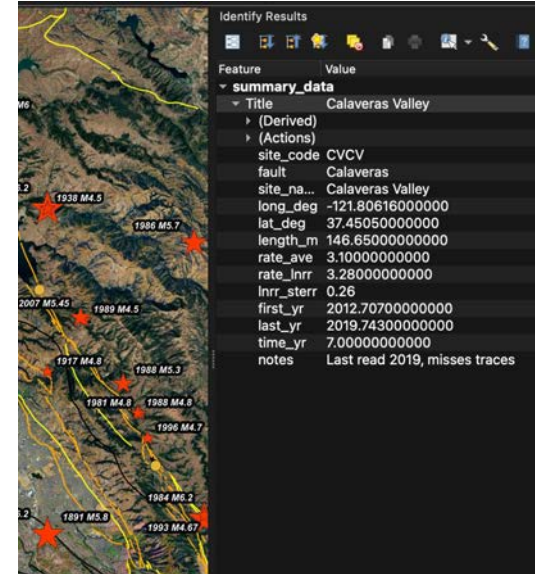
Downloadable in csv
DeLong includes shapefiles

Insanely great.



Thanks, Steve.

CGM



update by Steve



Strike Task Force

- Inventory existing AA
- Prioritize AA for maintenance, replacement? Retirements and Additions?
- Determine best method to use for broader team to collect high quality measurements
- Recommend measurement plan



GET INVOLVED WITH CREEP-TAG

1. Apply to attend Bootcamp (San José, early 2027)!
2. Offer to help teach something at Bootcamp! (see poster for proposed scope)
3. Help plan CGM integration of creep datasets (Alignment Arrays, Creep Meters, what else?)
4. Volunteer to join the task force and set priorities
 - a. **Modelers**, help us think about time and space for measurements!



Creep Rate, Episodicity and Earthquake Potential (CREEP-TAG)

Group A, Poster #109

2026 SCEC Annual Meeting | Ashley Griffith (OSU)