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A Community Velocity Field Exercise and improvements to documentation and user needs for the CGM

Final Report

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Documentation and user guide for the Community Geodetic Model

We have completed the first draft of a user guide for version 2.0.0 of the Community Geodetic Model (CGM; SCEC CGM Working Group, 2023), which is compiled using Sphinx and available online at https://geoweb.mit.edu/~floyd/scec/cgm/docs/2.0.0/.

CEM demonstration booth at the 2025 SCEC Annual Meeting

We planned and presented a one-hour interactive demonstration session for the CGM during the 2025 SCEC Annual Meeting, from 9pm to 10pm on Sunday, September 7th during the Poster Viewing 1 (Group A) session, at the entrance to the poster area. This included a live demonstration of the CGM Explorer on a large screen, in front of a small seated or passing audience, and answering questions about the products from interested current or potential users of the CGM. This was part of a Community Earth Model (CEM)-wide effort to advertise and interact directly and visually with the SCEC community. Other CEMs (the Community Fault, Stress, Velocity, Rheology and Thermal Models), and various Quakeworx groups, presented similar demonstrations during poster sessions over the following days at the Annual Meeting.

Participation in the 2026 SCEC Fault Creep Workshop

PIs Floyd, Materna and Guns attended the 2026 SCEC Fault Creep Workshop (https://www.scec.org/events/2026-fault-creep-workshop/), Floyd and Guns in person and Materna virtually. PIs Floyd and Tymofyeveva presented a summary of the current status of the CGM, with a particular focus on the CGM Explorer's current capabilities and data formats after being asked by hosts Elizabeth Madden (SJSU) and Christie Rowe (UNR) whether historic, and

hopefully continuing, alignment array data from the USGS might be appropriate and viable to incorporate into, visualize and serve to the community via the CGM Explorer (Floyd, Tymofyeyeva, et al., 2026). PI Guns presented a summary of current and future remote sensing missions and opportunities, and a comparison of how several different methods cover a range of length scales (e.g. apertures) and time periods, which can elucidate varying characteristics of fault kinematics, including creep (Guns, 2026). Both presentations provided context on how many types of geodetic methods, which are common to the SCEC Tectonic Geodesy disciplinary group and the CGM, within the larger Community Earth Models group, specifically, may be aggregated and leveraged for the ongoing study of creep. The workshop facilitated discussion between SCEC and USGS scientists, beyond just the immediate topic of fault creep, and one outcome was continued collaboration with the hosts towards integration of existing and future creep measurements into the CGM, as the likely most appropriate CEM for the particular type of results from alignment array data, where possible.

Products

Statewide California Earthquake Center (SCEC) Community Geodetic Model (CGM) User Guide. https://geoweb.mit.edu/~floyd/scec/cgm/docs/2.0.0/

Floyd, M., Tymofyeyeva, E., & the CGM Working Group (2026). The Community Geodetic Model. Oral presentation at the 2026 SCEC Fault Creep Workshop. https://www.scec.org/wp-content/uploads/2026/03/2026_SCEC_Fault_Creep_Workshop_March_5_1540_Floyd-Tymofyeyeva.pdf

Guns, K. (2026). The Pros and Cons of Air- and Space-based Remote Sensing of Creep in Northern California. Oral presentation at the 2026 SCEC Fault Creep Workshop.

Materna, K., & Tan, M. (2025, 09). Earthquake-triggered displacements in the central Salton Trough reveal wide range of slip modes. Poster Presentation at 2025 SCEC Annual Meeting. https://central.scec.org/meetings/2025/am/poster/070

Tan, M., Materna, K., Bilham, R., & Gittins, D. B. (2025, 09). Kinematics of Creep Events on the Imperial Fault. Poster Presentation at 2025 SCEC Annual Meeting. https://central.scec.org/meetings/2025/am/poster/077

References

Floyd, M., Tymofyeyeva, E., Materna, K., Bekaert, D., Fielding, E., Funning, G., González Ortega, A., Govorcin, M., Guns, K., Herring, T., Liu, Z., Sangha, S., Shen, Z.-K., Wang, K., & Xu, X. (2023). Southern California Earthquake Center (SCEC) Community Geodetic Model (CGM) (2.0.0) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.10076838