California Earthquake Prediction Evaluation Council

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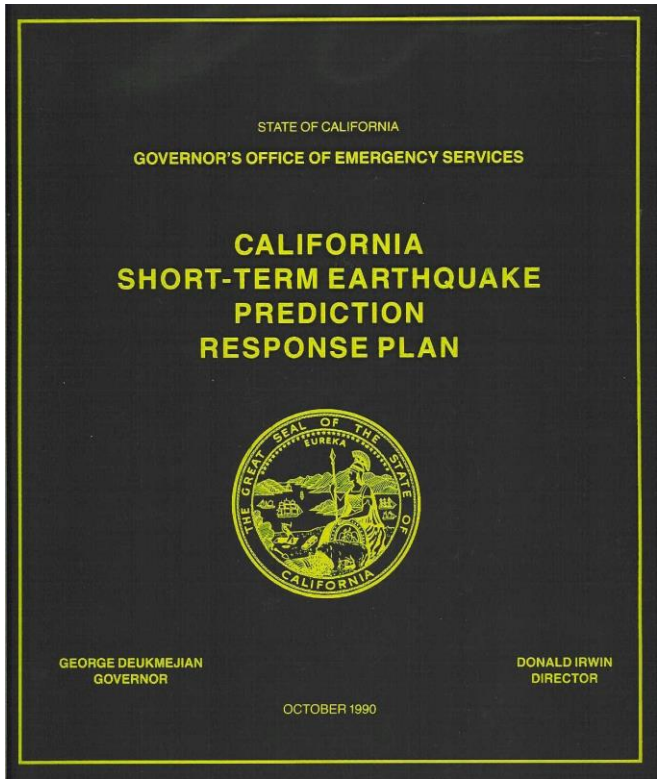
My Involvement

- 1986-1993 — Executive Secretary: duties were assisting State Geologist in scheduling meetings, writing summaries of meeting discussions and decisions
- 1988-1990 — Project Management in development of response plans for short-term prediction and advisories
- 2007-2011 — Ex-Officio member representing CalOES
- 2017 — With Evelyn Roeloffs, wrote a journal paper on California Earthquake Advisory Plan activation

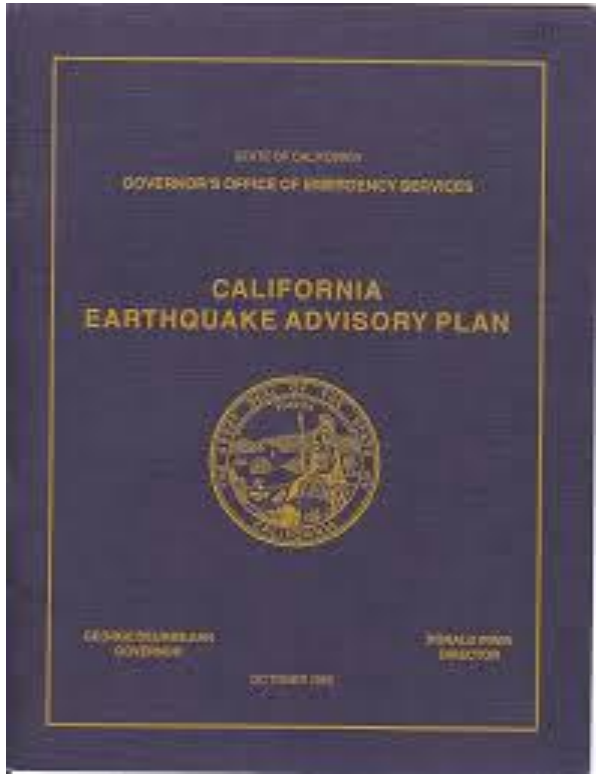
Roeloffs, E., & Goltz, J. (2017). The California earthquake advisory plan: A history. *Seismological Research Letters*, *88*(3), 784-797.

Prediction and Advisory Response Plans

Short-Term Earthquake Prediction Response plan



California Earthquake Advisory Plan



Background of These Plans (1990)

- **Short-Term Prediction Response Plan**
  - Developed following Parkfield Earthquake Prediction Experiment
  - Anticipated that additional CEPEC validated predictions would be issued
  - Plan calls for graduated levels of response based on: probability --
  - Slight (10% or less); Moderate (11-49%); High (50--100%)
  - Three "readiness conditions" based on probability and consequences
  - Plan has never been activated

- **Earthquake Advisory Plan**
  - Activated many times since 1990 (See Roeloffs and Goltz, 2017)
  - To address events that might be precursors to a damaging level earthquake
  - Based on studies that 5% of moderate CA earthquakes are followed by larger events within a 10km, 5 day time space window (Reasenberg and Jones, 1989)
  - Rule of Thumb: $M \geq 5$ on faults known to have generated large earthquakes in the past
  - CEPEC rapid assessment procedures activated
  - Statement transmitted to CalOES that may result in announcement to potentially affected regions

Reasenberg, P. and Jones, L. (1989). Earthquake Hazard after a Mainshock in California, *Science* 243, 1173-1176.

Roeloffs, E., & Goltz, J. (2017). The California earthquake advisory plan: A history. *Seismological Research Letters*, *88*(3), 784-797.

Advisories

- The CA Earthquake Advisory Plan is now 36 years old
- Nevertheless, the advisory is still a reasonable approach to anomalous seismic activity in California
- Both earthquake studies and emergency management practice have evolved over time and the plan should be revised
  - Foreshock probabilities remain extremely uncertain despite recent attempts to improve methods of calculating the statistical probability (Lippiello, et al, 2025) that a given M6 event will be followed by a larger earthquake.
  - Emergency management practice has also changed including the communication of a warning, and the content of warnings regarding response recommendations and CalOES executive level understanding and appreciation of the advisory process.
- An effort to revise and update the plan would be a reasonable approach with funding from CalOES and oversight provided by CEPEC

Lippiello, E., Petrillo, G., Godano, C. and Dal Zilio, L., 2025. Toward recognizing the waveform of foreshocks. *Geophysical Research Letters*, *52*(15), p.e2025GL115466. https://doi.org/10.1029/2025GL115466

Reflections and Suggestions

- CEPEC has not always met on a regular basis—it should
- The CA Earthquake Advisory Plan is outdated and should be revised
- CEPEC advisory messages to CalOES have typically emphasized low (though not insignificant) probabilities, perhaps add potential consequences (e.g. areas where damaging level shaking may occur if a larger event follows)
- CEPEC should have a protocol for responding to potential precursory seismic activity in the Cascadia Subduction Zone
- State Geologist and CalOES representative on CEPEC should brief the CalOES executive staff (periodically) on the nature and functions of CEPEC