The source scaling of swarm-genic slow slip events

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Slow slip events (SSEs) are fault ruptures so slow to excite seismic waves and detected via deformation data, but:

- SSEs can trigger seismic events as:
  - Non-volcanic tremor and VLF
  - Swarms of ordinary (fast) earthquakes
  - and/or

\textbf{We study SSEs accompanied by swarms of earthquakes** (SG-SSEs)}

- The strong interplay between the aseismic and seismic moment release
- The physical processes controlling the aseismic/seismic energy release

\textsuperscript{**} We focus on SG-SSEs because there are data on seismic moments and other source properties of ordinary earthquakes, not the case for seismic tremor.
Database earthquake swarm-genic slow slip events (SG-SSE)

- Seismicity considered if only during ongoing SSEs
- 27 instances SG-SSE
- 3 at volcanoes, 2 strike-slips, 3 normal faults, 19 thrust faults (18 in subduction zone)

Collected source parameters, like:

- Aseismic (Geodetic) Moment from deformation data
- Cumulative Seismic Moment of earthquake swarm from seismological data
- Depth
Scaling aseismic and seismic moments

- Data populates two regions separated by depth of SG-SSE
- Each population shows a power-law scaling
- Scaling implies seismic moment increase as geodetic moment becomes larger
- Scaling independent of the tectonic setting
- On average deeper SG-SSEs (>10km) produce less earthquakes
• Strong interplay between aseismic and seismic slip indicated by moments scaling

• Shallower SSEs are accompanied by relatively larger size swarms than deeper SSEs

• The larger the SG-SSEs the larger the magnitude of the earthquake swarms

• Depth dependent rheological conditions modulated by fluid pore pressure, temperature and density of asperities appear to be the main controls on the scaling.

• …stay tuned more analysis and interpretation on other source parameters is coming in a paper...