

EGU2020-11165

<https://doi.org/10.5194/egusphere-egu2020-11165>

EGU General Assembly 2020

© Author(s) 2020. This work is distributed under the Creative Commons Attribution 4.0 License.



## On the relationship between offshore geodetic coverage and slip model uncertainty

**Ehsan Kosari**, Matthias Rosenau, Jonathan Bedford, Michael Rudolf, and Onno Oncken  
Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, Potsdam, Germany

Characterizing the time-dependent slip evolution along subduction megathrusts during seismic cycles is a key step to unfold the recurrence patterns of and hazard imposed by great earthquakes. However, having adequate geodetic observations in the appropriate locations is essential for reliably modelling both interseismic coupling and coseismic slip. The 2011 Tohoku-oki earthquake as a well-known trench breaking and tsunamigenic megathrust seismic event clearly demonstrated the limitations of the distributed slip models using land-limited geodetic instruments. In this study, we have set up a scaled analogue megathrust model to produce analogue earthquakes while Digital Image Correlation (DIC) and the Analogue Geodetic Slip Inversion Technique (AGSIT) have been applied to retrieve the model surface velocities (incremental displacement) and model coseismic slip distribution, respectively. We generated more than 20 slip models for a series of events by sequentially disregarding trenchward rows of virtual GPS stations (vGPSs) for slip modelling thereby systematically reducing simulated offshore coverage. The analogue earthquakes have been categorized to two different sets as non-trench-breaking and trench-breaking ruptures. Here we show how slip models of analogue earthquakes change as a function of offshore coverage quantitatively and qualitatively. The sensitivities with respect to a potential bimodality of slip distribution and up-dip limit of the slip distribution model have also been assessed.