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Bayesian Finite-fault inversion for determination of rupture geometry and slip function

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In the finite-fault modelling we aim to invert the observed data to image the earthquake rupture inside the solid crust medium. The common finite fault inversion methods usually take a planar geometry for the ruptured area, however, evidences show more complicated geometries (e.g. 2016 Mw7.8 Kaikura) can causes the seismic event. Having the advanced remote sensing technologies (e.g. InSAR), with a high data resolution in the near fault area, we can increase the accuracy for determination of rupture geometry. In this study, we consider a large three dimensional ensemble of point sources in the solid crust medium, each point source can trigger six moment tensor components that makes the model space of the problem. We then find the most probable geometry of the ruptured area by inverting the interferometric observation for moment tensor components. Using the Bayesian inversion with MCMC (Markov Chain Monte Carlo) simulation the fault geometry and static slip deformation is determined from moment tensor to have a ruptured zone that maximizes the posteriori likelihood. The proposed method would be applied to 2019 M5.9 Torkamanchay earthquake in Iran and the preliminary results is presented.