Supporting Information for

Bayesian framework for inversion of second-order stress glut moments: application to the 2019 Ridgecrest sequence mainshock

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Introduction

This file includes four figures that supplement the arguments made in the main text. Figure S1 shows all R1 waveforms that were considered for incorporation into the waveform inversion. Evaluating how well the observed waveforms were matched by point source synthetics was an important quality control step for the procedure outlined in the main text. Figure S2 shows the distributions of independent components of the second moments of the stress glut for 3 separate chains of the inversion for the second moments of the Ridgecrest earthquake described in the paper. These chains were used to evaluate the convergence of the inversion using the Gelman-Rubin diagnostic referenced in the main text. Figure S3 shows the distribution of the hyperparameter $\sigma$, which controls uncertainty and is solved for simultaneously with the other parameters in the inversion. The mean value of $\sigma$ is used to control the uncertainty in the synthetic test. Figure S4 shows the distribution of the maximum off-fault distance described in the main text. These distributions were used to claim that this study does not produce evidence for significant off-fault moment release for the Ridgecrest earthquake.
**Figures**

**Figure S1.** Traces of stations submitted to manual quality control in this study. Station plots with black outlines indicate stations that were kept. Station plots with red outlines indicate stations that weren’t kept.
Figure S2. Kernel density estimate plots for multiple chains describing the distributions of independent components of the second moments of the stress glut for the 2019 Ridgecrest sequence mainshock. Different colors (blue, red, and green) represent different chains of the inversion.

Figure S3. Distribution of hyperparameter $\sigma$ determined in the inversion using real data and included in the inversion using synthetic data.

Figure S4. Posterior distribution of the maximum off-fault distance derived using the ensemble of spatial covariance matrices and assuming a vertically dipping fault plane. Left plot is the ensemble for the synthetic test. Right plot is the ensemble for the test using observations. Red vertical lines delineate the mean of the ensemble.