# Supporting Information for "Does a damaged-fault zone mitigate the near-field impact of supershear earthquakes?—Application to the 2018 $M_w$ 7.5 Palu, Indonesia earthquake"

Elif Oral[1], Huihui Weng[1], and Jean Paul Ampuero[1,2]

[1]Université Côte d'Azur, IRD, CNRS, Observatoire de la Côte d'Azur, Géoazur, France

[2]California Institute of Technology, Seismological Laboratory, Pasadena, CA, USA

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1. Figures S1 to S7

## Introduction

This supporting information provides additional figures to the main text.

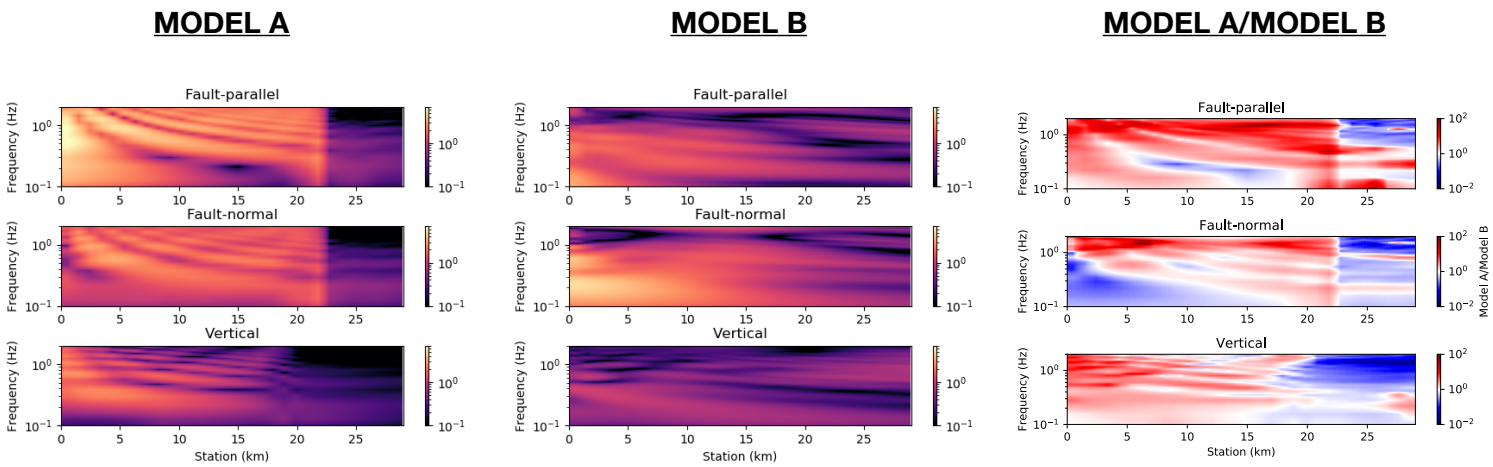



**Figure S1.** Fourier amplitude of acceleration fields for various off-fault distances at a strike distance of 40 km shown for the fault-parallel (top panel), fault-normal (middle panel), and vertical directions (bottom panel) of the fast supershear model (Model A) (a); same plot as (a) shown for the slow supershear model (Model B); the ratio of Fourier amplitudes of Model A and Model B.

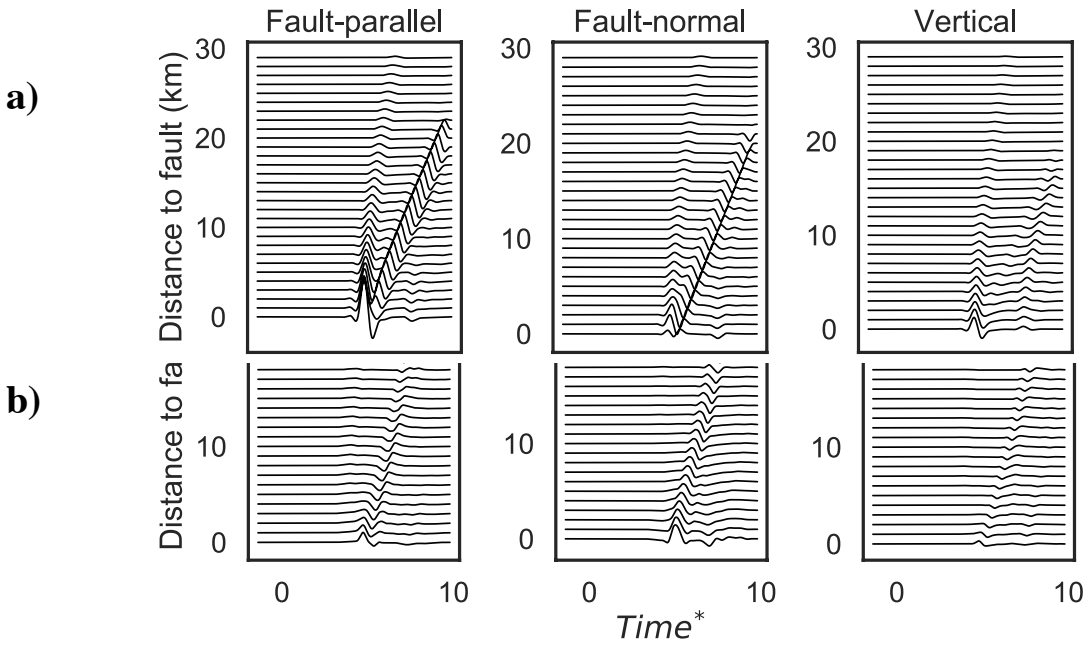
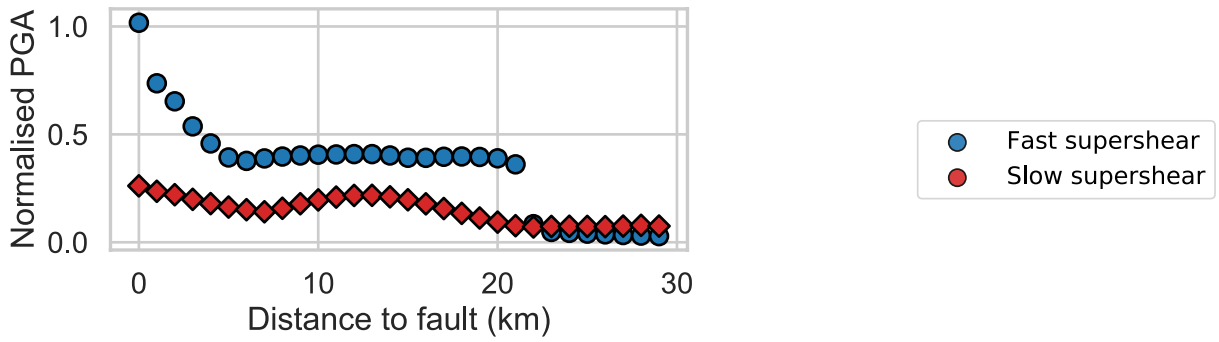



**Figure S2.** Acceleration-time histories in fault-parallel (first column), fault-normal (second column) and vertical (third column) directions shown for Model A (a) and Model B (b). Wave amplitudes are normalised everywhere by the maximum wave amplitude of the Model A.

**a)**




**b)**

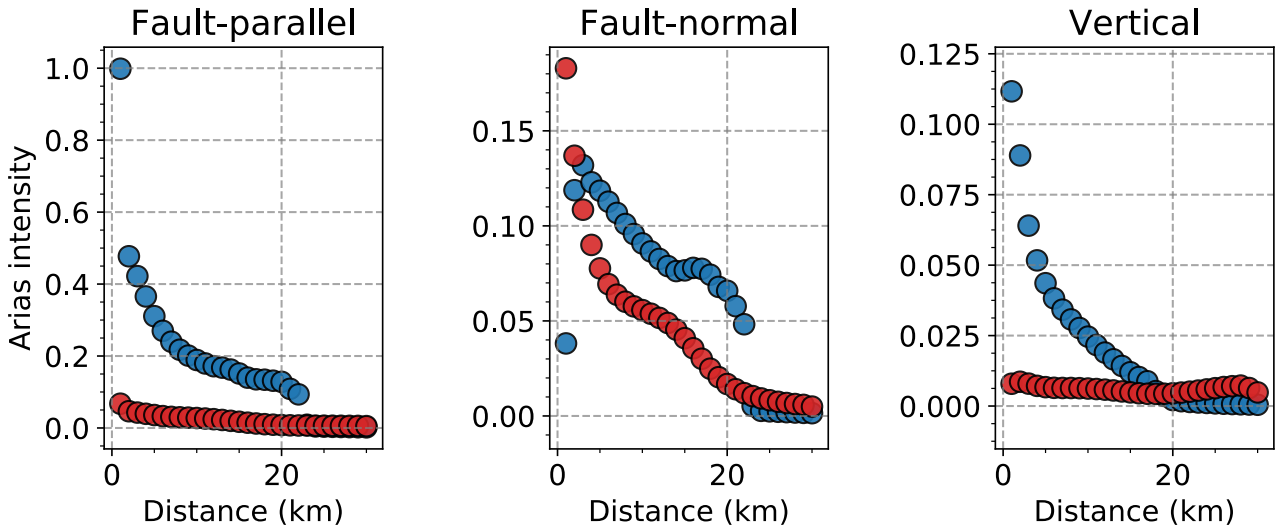



**Figure S3.** Comparison of PGA change by off-fault distance (a), and peak Arias intensities (b) between Model A and Model B. All values are normalised by the maximum value of the Model A.

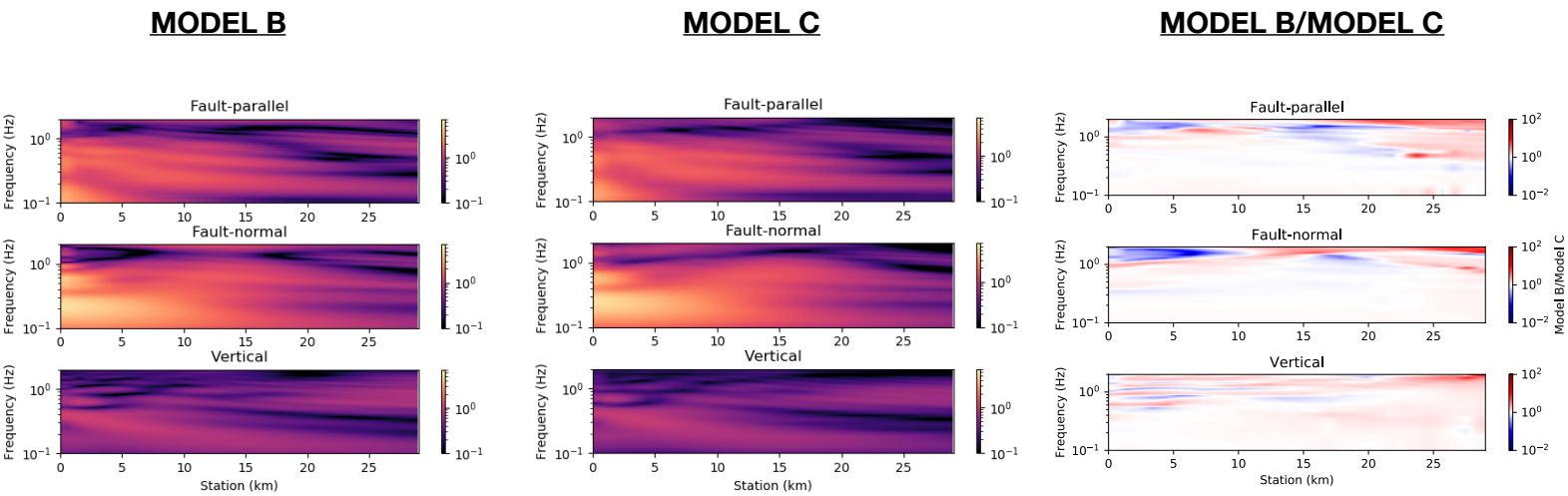
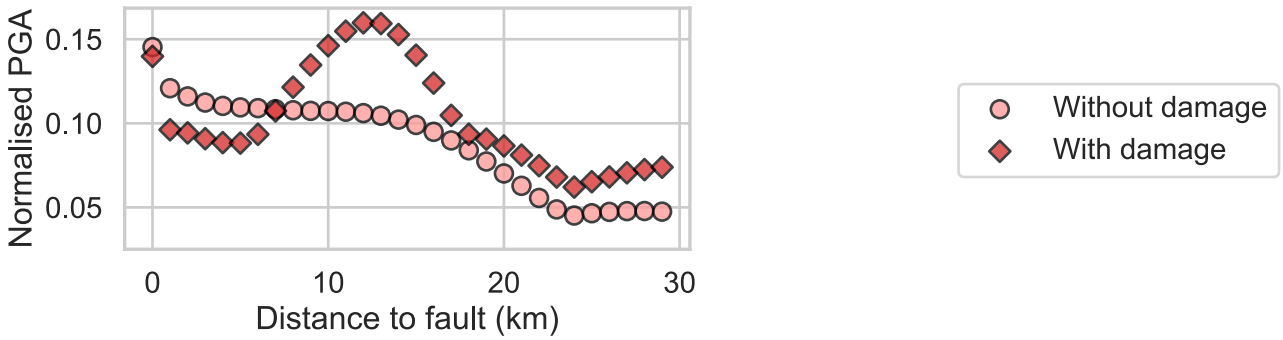



**Figure S4.** Fourier amplitude of acceleration fields for various off-fault distances at a strike distance of 40 km shown for the fault-parallel (top panel), fault-normal (middle panel), and vertical directions (bottom panel) of the slow supershear model with damage (Model B) (a), same plot as (a) shown for the slow supershear model without damage (Model C), and the ratio of Fourier amplitudes of Model B and Model C (c).

**a)**




**b)**

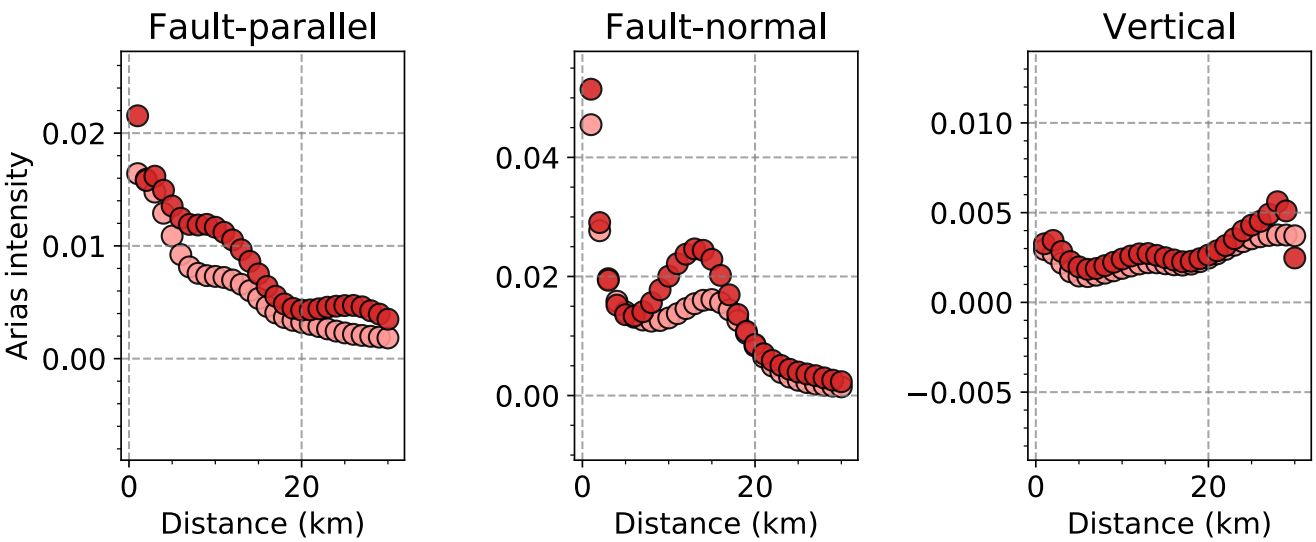



**Figure S5.** Comparison of PGA change by off-fault distance (a), and peak Arias intensities (b) between Model B and Model C. All values are normalised by the maximum value of the Model A.

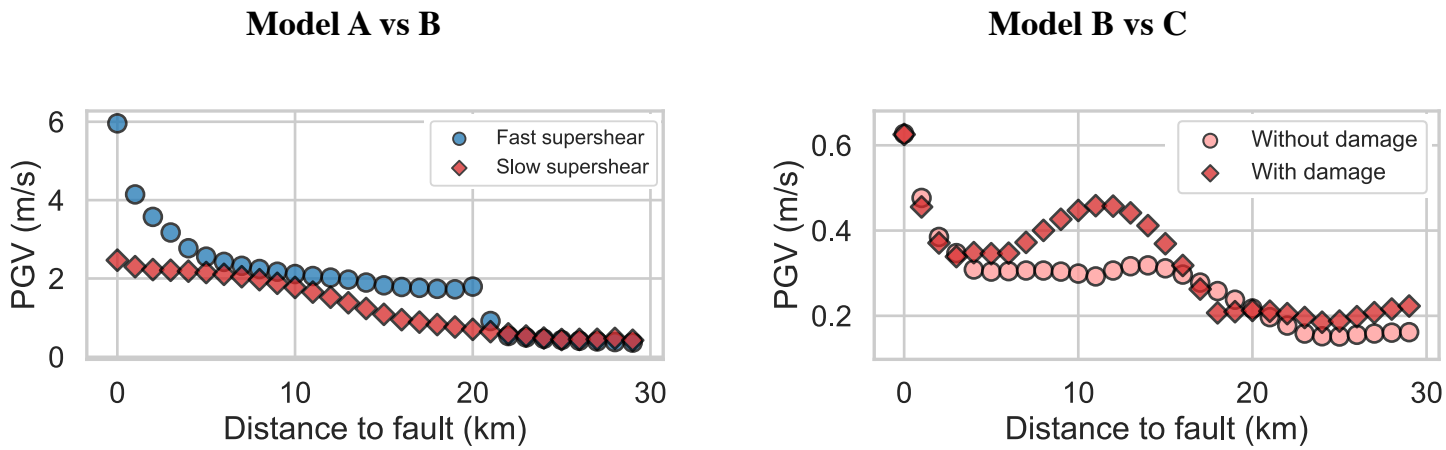



**Figure S6.** Comparison of peak ground velocities vs distance from the fault between fast (Model A) and slow (Model B) supershear models (a), and between slow supershear models with damage (Model B) and without damage (Model C). All values are shown without any normalisation. The signals used in the comparison of Model B and C are filtered above 0.5 Hz to accentuate the LVFZ effect on ground motion.

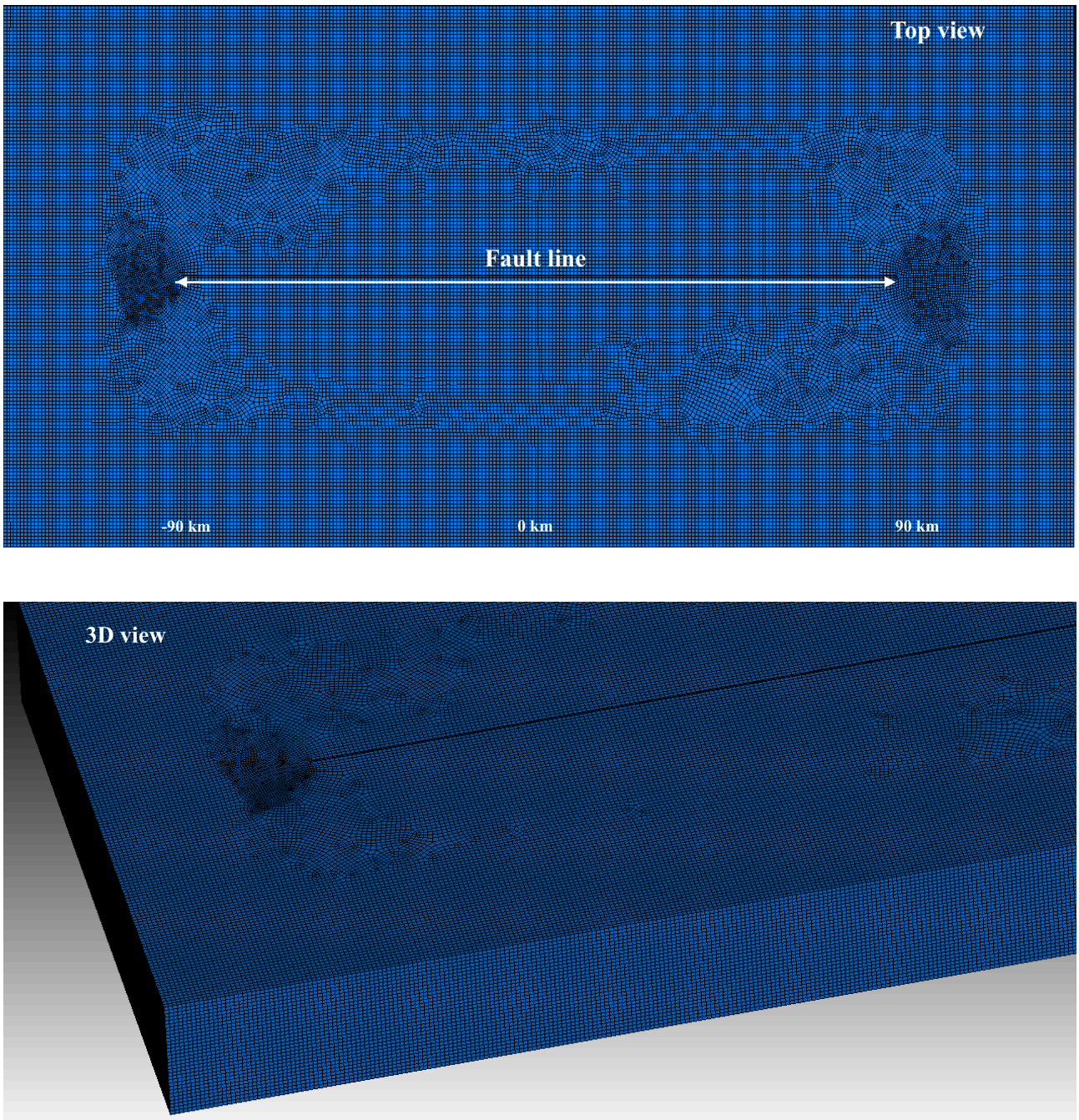



**Figure S7.** Detailed view of the mesh that is used in the simulations.