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1 **Supplemental Material for**

2 *When do fractured media become seismically anisotropic? Some implications on quantifying*

3 *fracture properties*

4 *Yousef, B.M. & Angus, D.A.*

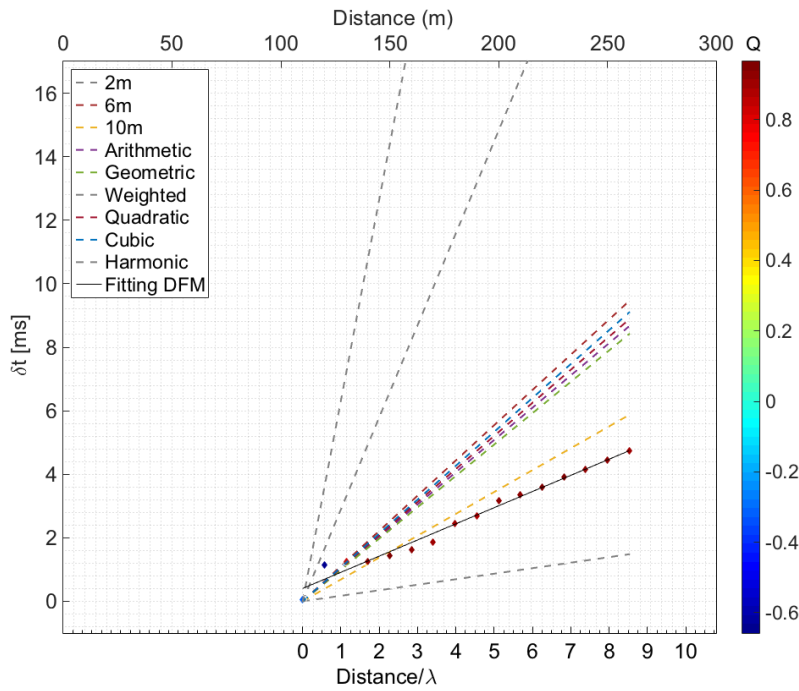
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7 In Figure S1 we show that the linear slip (LS) effective medium model (EMM) of Schoenberg
8 & Sayers (1995) fails to accurately predict the observed shear-wave splitting (SWS) from the
9 finite-difference explicit fracture model for the case of $Z_N/Z_T=1.0$ (one of the two conditions
10 where mathematically LS should be valid, Chichinina et al., 2015). In Figure S2 we show that
11 even under the long wavelength approximation (LWA), SWS only develops after propagating
12 at least 1 to 2 wavelengths within the fracture volume. To do this, we simulate a seismic
13 source having dominant frequency of 50 Hz within a model having fracture size $d=6$ m,
14 fracture density of 0.1 and $Z_N/Z_T=0.3$. For 50 Hz signal, the wavelength is approximately 60 m
15 such that the ratio of wavelength to fracture size is 10 (i.e., within the LWA of $\lambda/d \gg 1$).

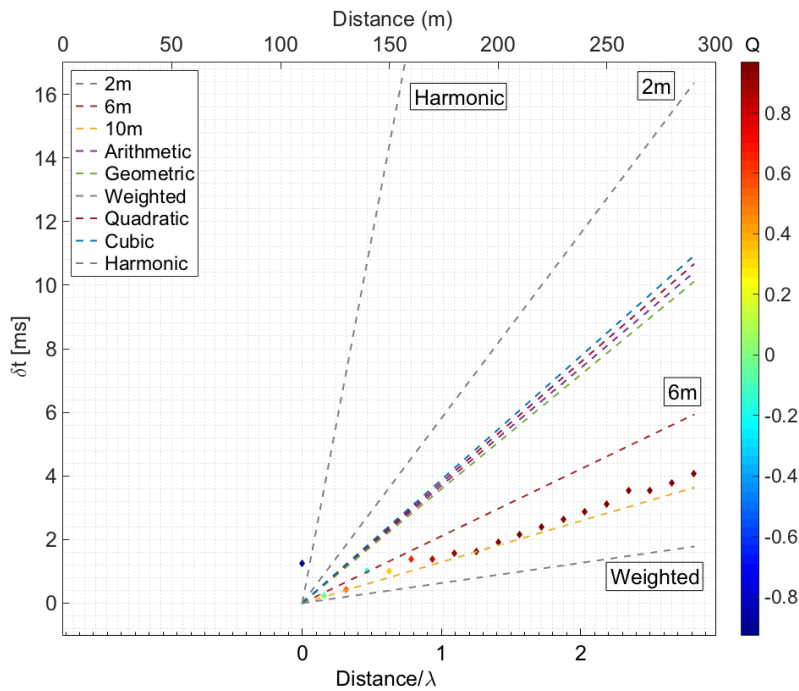
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19 **Figure S1:** Comparison of LS EMM δt predictions with the observed SWS for the fracture model: $d=6$ m,
 20 $\epsilon=0.1$ and $Z_N=Z_T=1.0$. LS EMM predictions of Schoenberg & Sayers (1995) for spacing 2 m, 6 m and 10
 21 m (best fitting LS EMM model) as well as LS EMM predictions from the summed distribution in Figure 9
 22 using 6 different means: arithmetic, geometric, harmonic, quadratic, cubic and weighted. See caption in
 23 Figure 4 for details.



24

25 **Figure S2:** Comparison of LS EMM δt predictions with the observed SWS for dominant source
26 frequency of 50 Hz (approximate wavelength of 60 m) for the fracture model: $d=6$ m, $\varepsilon=0.1$ and
27 $Z_N=Z_T=1.0$. LS EMM predictions of Schoenberg & Sayers (1995) for spacing 2 m, 6 m and 10 m (best
28 fitting LS EMM model) as well as LS EMM predictions from the summed distribution in Figure 9 using 6
29 different means: arithmetic, geometric, harmonic, quadratic, cubic and weighted. See caption in Figure 4
30 for details.

31 **References:**

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33 fractured rocks of TI symmetry: Analysis of constraints and limitations in linear slip model,
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36 204-211.