Nonlinear Processes
in Geophysics

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Discussions

Interactive comment on "Utsu aftershock productivity law explained from geometric operations on the permanent static stress field of mainshocks" *by* Arnaud Mignan

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Dear reviewer,

Thank you for your comments on the discussion paper by Mignan (2017).

As per your suggestion, I will now mention the case of triggered off-fault seismicity, as exemplified by the Big Bear earthquake, which is indeed "also due to static stress changes imparted by the mainshock". The anisotropic effects observed on nearby faults can be explained by the Solid Seismicity Postulate, as shown already in Figure 5 of Mignan (2016). This will now be explained in the text. Since such heterogeneities

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in space are not systematic, they are indeed "out of topic in this paper", which is concerned with the general productivity law that applies to all mainshocks on average.

Regarding Figure 2a, 10-bars seems like a reasonable value for a stress drop. Looking at Figure 5 of Abercrombie and Leary (1993), observations are centred on 1-100 bar in log10 scale. Then Figure 2a represents the case where the stress drop counterbalances the regional deviatoric stress, so whatever value is used, the final outcome would be the same (Figures 2a and 2d being similar to Figure 3 of King et al., 1994). Finally, a reference to Miller et al. (2004) will be added to indicate that additional physical processes (such as trapped high pressure gas) may also explain part of the on-fault aftershock activity.

References:

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