

Interactive comment on “A Novel Approach to Assessing Nuisance Risk from Seismicity Induced by UK Shale Gas Development, with Implications for Future Policy Design” by Gemma Cremen and Maximilian J. Werner

Anonymous Referee #1

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The article “A Novel Approach to Assessing Nuisance Risk from Seismicity Induced by UK Shale Gas Development, with Implications for Future Policy Design” presents an interesting approach for assessing induced seismicity risk from fluid injection operations, with a focus on hydraulic fracturing and shale gas extraction. This approach is primarily based on the volume of fluids injected in the well, combined with ground motion prediction equations and statistical models for earthquake generation, to derive probabilities of exceedance of prescribed ground motion thresholds. The model is initially calibrated and applied to the Preston New Road shale gas site. Then the authors

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discuss a number of uncertainties related to the model parameters and evaluate their influence over the derived risk levels. Overall, the article is well-structured and written and clearly seems to be within the scope of Natural Hazards and Earth System Sciences. Therefore, I recommend its publication. However, there are a few points that need some further clarifications and possibly revisions.

The rupture behavior was found to be the most important source of uncertainty in the derived ground motion values. While in the volume-based model the authors explore the uncertainty in the b-values and SEFF in Section 5.1, it would also be interesting to explore the effect of using different shear modulus values for shales that are commonly reported in the literature.

Page 13, Line 277 “b-values values”. Remove repetition.

In Fig.10a the authors plot the probabilities of exceeding prescribed PGV values according to the GMPE and its equivalent for the maximum expected amplitude, as magenta and blue color lines, while in Line 459 refer to black lines. Please clarify.

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