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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Using cellular automata to simulate wildfire propagation and to assist in fire prevention and fighting" *by* Joana G. Freire and Carlos C. DaCamara

Anonymous Referee #3

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The manuscript represents an interesting contribution on the field of stochastic cellular automata models for wildfire propagation and it's well structured and written. The improvement over the reference model can be of great interest for operational use. Following are some comments regarding the manuscript.

- In the introduction, the authors wrote that deterministic models attempt to a physic-based description of process. As a matter of fact, several deterministic empirical models exist and are widely used operationally (e.g. FARSITE). Please change the formulation of this section.

- In section 3.2 the description of the modified neighborhood rule is given. This should

be the most detailed part of the method section, since it represents the major innovation over the baseline model. However, I've found the description to be lacking important details. The authors wrote that the fire propagation neighborhood is extended in the wind direction, but it's unclear how they consider wind directions that are not aligned with the possible propagation directions on the 2d lattice of the grid (e.g. directions that are not multiple of 45°). Are you considering all the cells in the N2 neighborhood or only the boundaries of the region? How is the neighborhood shaped? Does the shape depend on wind speed? Please extend the description in order to include more details.

- In section 4.1, the methodology for assessing the time step used by the model is explained. In my opinion, it's important to point out that the method used to estimate the time step cannot be used during operational activities, and this represents a major throwback in the actual applicability of the model in real field usage. Model-wise, it's also important to note the limit of using a fixed time step for the propagation of fire on a fixed lattice, hence implying a fixed rate of spread. Following these considerations, the analysis of the performances of the model regarding the propagation time assessment are not very relevant. Please justify your modeling choices or include some considerations on this issue in the discussion.

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