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Geoscientific Model Development Discussions

Interactive comment on "Physical parametrisation of fire-spotting for operational fire spread models: response analysis with a model based on the Level Set Method" *by* Inderpreet Kaur et al.

Anonymous Referee #1

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Authors present a physical parametrization of a model developed by one of the authors to include random processes into operational fire spread models as a post-processing scheme. These random processes include mainly fire-spotting, but also turbulence. Authors applied this scheme to wildfire spread models based on the Level Set Method.

The topic of the paper is well suitable for the journal, and of current interest as wildfires are increasing concerns in the research community in the context of climate change.

The organization of the paper is correct. The state of the art included in the introduction is complete and the bibliography used is updated. I suggest revising also the following paper: Calculation of Spotting Particles Maximum Distance in Idealised Forest

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Discussion paper

Fire Scenarios José C. F. Pereira, José M. C. Pereira, André L. A. Leite, and Duarte M. S. Albuquerque, Journal of Combustion, Volume 2015 (2015), Article ID 513576, http://dx.doi.org/10.1155/2015/513576 In this section, there is a minor typesetting error in line 33 of page 2, “no of the them. . .”

Section two is a resume of the mathematical model that is more deeply described in previous works of one of the author.

Section three is the main part of the article, where the physical parametrization is detailed. To make it easier to read and understand we suggest including a notation table. Does U represent the meteorological wind?

In section four, a more detailed description of the experiments is required, for example the simulation area size and the computational cost of the experiments. Why the turbulent diffusion coefficient is assumed to be 0.15mˆ2 sˆ-1? Sentence of line 15 in page 8 should be detailed with data and/or references.

Section 5 deserves more attention. We suggest an improvement on figure 1, top panel by adding intermediate contour lines between 25 and 60 min. In this top panel are considered both, turbulence and fire-spotting? The parameter beta_e is an interesting idea to evaluate the effective increase in the burned area but, we found that the sensitivity of the model to the wind speed, fire intensity and firebrand radius is not complete with the experiments developed. A global sensitivity analysis should be performed in order to a comprehensive study of the physical parametrization of the model.

In conclusion section, sentences between line 20 and 25 in page 10 raise doubts. When the wind speed or fire intensity is high, ROS is higher, and the fire front quickly achieves secondary fires, so beta_e could be smaller, but maybe this does not mean that the firebrands fail to cause new ignitions. When is measured beta_e in figure 2?

With the improvements suggested, the paper can be accepted.

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