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Interactive comment on "Analysis fire patterns and drivers with a global SEVER-FIRE model incorporated into Dynamic Global Vegetation Model and satellite and on-ground observations" *by* Sergey Venevsky et al.

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Venevsky et al. (2018) present a new coupled vegetation-fire model, SEVER-FIRE. The presentation of this model is marred by unfounded claims, inconsistencies, and unwarranted disparagement of earlier research.

Readers who closely follow the development of dynamic global vegetation models (DGVMs) will have recognized that the coupled model's parent DGVM is a minor variant of the widely used LPJ model; while the new fire component is based on Venevsky

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et al.'s earlier (2002) regional fire model, RegFirm. Thus, the new model is assembled from the same components as the LPJ-SPITFIRE model published by Thonicke et al. (2010), eight years previously. The preprint does not cite more recent developments and applications based on SPITFIRE, such as Prentice et al. (2011), Pfeiffer et al. (2013), Lasslop et al. (2014), Kelley et al. (2014), Yue et al. (2014), Baudena et al. (2015) and Wu et al. (2015).

It is natural to ask what the model achieves that other fire-vegetation models (see e.g. Rabin et al. 2017) do not. The preprint does not claim any superior ability to reproduce observed patterns. It does however claim to be based on a different, and implicitly superior, approach to modelling fire. For example, page 3 refers to other models (including Thonicke et al., 2010) being based on "sets of rather complicated equations with variety of coefficients (despite they name themselves intermediate complexity models)..." Later, the preprint states about SEVER-FIRE that "No satellite derived data are used as an input of the model. Only physically based or just 'common sense' based equations from on-ground observations allow direct implementation of SEVER-FIRE model..." and "Unlike in other global DGVM fire modules ... all equations are kept simple following ideology of Reg-FIRM." Thus, earlier models are criticized for their use of satellite data as input (for lightning frequency in the case of SPITFIRE) although the basis for this objection is not stated. Appeals are made to simplicity and 'common sense' – the former being a defensible aim, the latter not a scientific concept – and, curiously, to an 'ideology'. These appeals do not amount to a convincing case for a new model, especially as it includes equations – notably those determining rates of human ignition, e.g. equation (9) – presented entirely without justification.

Remarkably, page 5 also alludes to an explicit aim "to provide...a fully mechanistic description..." But no current fire-vegetation model, including this one, could plausibly be described as 'fully mechanistic.' The authors seem to admit this later (page 10), when they describe the treatment of human ignitions in their model as "very simplistic".

In principle there is always room for new models. The one presented here is new, in

that it differs in several respects from earlier models, including Thonicke et al. (2010). However, to be worth publishing, a new model should surely represent an identifiable advance, in terms of either derivation or performance, over existing models. For SEVER-FIRE, as presented, this seems not to be the case.

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