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Interactive comment on "Varying relationships between fire intensity and fire size at global scale" *by* Pierre Laurent et al.

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This is interesting work but I detected a few issues that if addressed would make the manuscript more accurate.

L35. Why is Van Wagner cited in relation to Rothermel's model, with which he had no relation whatsoever? Van Wagner was Canadian, and so involved with the Canadian fire behaviour prediction system, not the U.S.

L36-37. "whose rate of spread scales with a power function of the wind velocity, landscape slope and fire intensity." The authors are referring to reaction intensity, not fire intensity (aka fireline intensity, which is the product of rate of spread, fuel consumption and heat of combustion and can be correlated to a certain extent with FRP).

L41-42. "On the other hand, the velocity of fire propagation determines the amount of fuel entering the combustion zone, and therefore feeds back on the intensity of the fire event." Not sure what this means. Rate of spread is an intrinsic component of fire intensity but not because it affects fuel consumption.

L42-43. "fire intensity also significantly impacts the fuel combustion completeness". It's the other way around, fuel consumption is an element in the calculation of fire intensity.

L57. This is general, i.e. not specific of Rothermel′s model. For given fuel conditions/ fuel types faster fires are more intense, and faster fires will become large.

L95. Has fire intensity been defined?

L170. The hypothesis does not stem from Rothermel's model, it just happens that fire intensity by definition (Byram 1959) is the product of rate of spread, fuel consumption and heat of combustion, as mentioned before.

L221. "They can therefore propagate further than ground fire and fire resistant species found in savannas and woodlands". This sentence is confusing. Fire in savanna is driven by grass, not by trees (which are resistant only in the sense that they are fire adapted).

I think the interpretation of the findings, by being concentrated on the effect of fuel connectivity, is restrictive. The authors could improve the discussion by considering that the most powerful driver of fire spread/size is wind speed (see the switches of Bradstock 2010). Thus, fuels can be totally available to burn due to drought, and produce intense fires that are not that large because they do not coincide with strong winds and low relative atmospheric humidities. Thus, the annual cycle of fire extent and intensity is also a matter of timing of coincidence between drought and atmospheric conditions.

References:

Bradstock RA. 2010. A biogeographic model of fire regimes in Australia: current and

future implications. Global Ecology and Biogeography 19: 145–158.

Byram, G.M. 1959. Combustion of forest fuels. In ‘Forest fire: control and use’.(Ed. KP Davis) pp. 61–89.

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