

***Interactive comment on* “The Global Fire Atlas of individual fire size, duration, speed, and direction” by Niels Andela et al.**

Anonymous Referee #1

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General comment

Andela et al., present a novel and very important dataset of several important fire characteristics globally on a daily basis. This dataset will serve earth system and social scientists on topics ranging from (but not limited to) fire emission estimates in earth system modelling, feedback between fires and ecosystem, fire management and studies of socio-economic feedback of fires. The manuscript is well written and the underlying methodologies have been explained precisely. Being the first dataset of such kind, a complete validation was challenging. However the authors have used the available resources, e.g. VIIRS (globally for four different ecosystems) for burn date, MTBS in the US for the fire perimeter and a combination of both for the fire duration.

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The dataset, however, has a large uncertainty for short fires (persisting for less than a day, for example, crop residue fires), which is acknowledged in the discussion. I have only minor comments regarding this manuscript and recommend publication of this manuscript in ESSD after the authors have addressed them:

Specific comments:

The methodology considers clusters of fires in a given fire season (12 months) as a starting point. What if the fires season is less than 12 months? For example, the same area is burnt twice after a gap of six months? As per my understanding, the local minima filter will only assign it to the later burnt date of the fire season. This will also have consequences on the estimation of fire duration and perimeter.

The authors conclude that this dataset is useful for emission modelling. In my opinion, the authors should also acknowledge the limitation of this dataset for use in atmospheric models for emission estimates from fires. The Global Fire Atlas does not take into account the smoldering stage of fires, which significantly contribute to gas and particle emissions. In this context, the work of Kaiser et al., 2011 should be mentioned, which uses the fire radiative power for emission estimates.

Kaiser, J. W., et al. (2012), Biomass burning emissions estimated with a global fire assimilation system based on observed fire radiative power, *Biogeosciences*, 9(1), 527-554, doi:10.5194/bg-9-527-2012.

Page 4, line 155: What fraction of local minima is discarded after each iteration step? This information is important for optimization of the number of iteration (which was taken to be 3 in the present work).

Figure 4: The horizontal axis legend (Δ burn date (burned area minus active fires)) is not clear to me.

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Figure 7: Please check the units in the middle panel (for ignitions).

The discussion regarding fire direction on page 14 is relatively weak. The fire directions are highly variable depending on topographical features, prevalent wind field and fuel availability. What can one conclude from such variable fire direction and how this information is useful?

The Global Fire Atlas dataset is available for the year 2003-2016. Will this dataset be continuously updated? Given that the dataset is so important, the authors should provide information of update frequency and policy.

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