

Geosci. Model Dev. Discuss., referee comment RC2
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Comment on gmd-2022-54

Anonymous Referee #2

Referee comment on "Introducing the VIIRS-based Fire Emission Inventory version 0 (VFEIv0)" by Gonzalo A. Ferrada et al., Geosci. Model Dev. Discuss.,
<https://doi.org/10.5194/gmd-2022-54-RC2>, 2022

Biomass burning emissions are one of the large sources of uncertainty in modeling atmospheric composition. This paper describes a new fire emissions inventory that is based on fire radiative power measured by a relatively new satellite instrument (VIIRS), with high spatial resolution. There is a very wide range in emissions estimated by available biomass burning inventories, and this new inventory generally falls in that range. This work is valuable for providing another global inventory at higher spatial resolution than some others. It also contributes to quantifying the uncertainty in fire emissions by using slightly different input data sets and procedures than other inventories.

The paper is clearly written, and the creation of the inventory is described well. The resulting emissions are available on a public website in netcdf files, so readily usable by the community.

The emissions are compared to other inventories in clear plots. Simulations with WRF-Chem using the new emissions, for a couple of regions (N.America, S. Africa) for short time periods, are evaluated with observations and show reasonable performance.

Listed below are a few technical corrections and suggestions for clarifying the text. There are a number of preposition errors (in/on/at) that I have not bothered to list, so additional proof-reading is recommended.

l. 29: 'are used' -> 'are used for'

Lines 42 & 202 & Table 4: FINNv1.5 does not use MODIS Burned Area products. Fire locations are determined from MODIS Thermal Anomalies, and the size of the fire is determined by other means. See Wiedinmyer et al 2011 for details on how the area of each fire is determined.

l.119: mid-202 -- which year?

l.129: hotpots -> hotspots

l.168-171: This is not explained well; I do not understand how the factor 1.2 is found. The statement "using the same methodology described here" is unclear.

l.199: 'other four' -> 'four other'

l.200: 'rely in' -> 'rely on'

Fig. S1: reference to Figure X.

l.418, 420: Figure 6d -> 5d; 4c -> 3c

l.436: FINN also provides emissions for each 1-km fire.

l.439: 'If VFEI would have' -> 'If VFEI had'

Section 5 and Fig. 13: I do not follow the reasoning that the fire emissions at 0.1 degree are necessarily represented in a 3-km grid as shown in Fig.13b. Some models (modelers) would use the 0.1-deg emissions in all the 3-km grid boxes that fall within that box (of course conserving mass). I do not dispute the value of having the finer resolution representation of fire emissions that VFEI provides, but I would guess that the step from panel (a) to panel (b) is not universally, or even generally, applied. The discussion should be qualified, or perhaps just leave out row (b) of Fig. 13.