Geoscientific Model Development Discussions

Geosci. Model Dev. Discuss., author comment AC2
https://doi.org/10.5194/gmd-2022-132-AC2, 2022

Response to reviewers and executive editor

Dave van Wees et al.

Author comment on "Global biomass burning fuel consumption and emissions at 500-m spatial resolution based on the Global Fire Emissions Database (GFED)" by Dave van Wees et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2022-132-AC2, 2022

Final reply to the reviewers and executive editor

We thank the reviewer for their constructive comments. Below we have answered their comments alongside the accompanying changes in the manuscript.

Reply to referee 1 (RC1)

Response to comment 1 and 3:

Abbreviation of soil organic carbon (SOC) have been fixed.

Response to comment 2:

The introduction text regarding FRP-based emissions estimation has been rewritten and "most of these dependencies" has been changed to "some of these dependencies":

"Models used for estimating contemporary global fire emissions are typically based on either a biogeochemical model for estimation of fuel load and fuel consumption in combination with satellite-based burned area to calculate emissions (e.g. van der Werf et al., 2017), or remotely-sensed active fire detections from thermal anomalies in combination with parametric relationships that convert fire radiative power (FRP) to fire radiative energy (FRE) and emissions (e.g. Kaiser et al., 2012; Mota and Wooster, 2018). The biogeochemical modelling approach relies heavily on remote sensing data of vegetation cover, vegetation productivity, and moisture conditions, whereas the FRP approach bypasses some of these dependencies by directly relating FRE to emissions."

Reply to referee 2 (RC2)

Response to comment 1:

Acronym of IPCC written out in text

Response to comment 2:

We added a lint to Introduction section 1:

"…, these data are aggregated by vegetation type to a spatial resolution of 0.25° (approximately 28 km at the equator) for carbon model calculations."

Response to comment 3:

We added a line to Methods section 2.2:

"The simulation starting year of 2002 was based on the availability of MODIS data from both the Terra and Aqua satellites."

Reply to the Executive Editor

As indicated earlier, we have extended our simulation and all our results to include 2020. Accordingly, the previously uploaded Zenodo datasets will be updated and produced in their final form. Finally, the model code will be added as a supplement to the paper. The corresponding links and DOI identifiers have been added to the sections "Code and data availability" and "Supplement".