

Interactive comment on “Quantifying the role of fire in the Earth system – Part 1: Improved global fire modeling in the Community Earth System Model (CESM1)” by F. Li et al.

Anonymous Referee #1

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General Comments

The authors incorporate an extension of the recent Li et al. (2012) global fire parameterization into the Community Earth System Model (CESM), and evaluate the resulting predictions of burned area and fire emissions using the version-3 Global Fire Emissions Database (GFED3). The authors then attempt to ascertain the importance of direct anthropogenic influence on global fire regimes over the ~150-year historical period from 1850–2004, concluding that “the direct anthropogenic impact is the main factor driving the trends of global burned area in the whole period and fire carbon

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emissions only before ~1870.”

The topic is appropriate for *Biogeosciences* and will be of interest to readers. I have no significant concerns about the model extensions presented by the authors, and request only the relatively minor clarifications and technical corrections noted below.

Specific Comments

Page 16775, line 8 and Table 4: “All of the simulations have a low bias over Africa...” Clearly Mod-new is a major improvement, but the low burned area bias remains substantial (~34%) in southern-hemisphere Africa. Are there reasons this might be expected? Please clarify. A similar burned area bias also seems to occur in northern Australia but is not mentioned in the text.

Technical Corrections

Page 16756, line 14: “...the product of the fire counts and average burned area of a fire.”

Page 16756, line 20: “...the fire counts have MODIS observations...” Might be clearer to say that the fire counts are derived from, or are obtained from, MODIS observations.

Page 16765, line 21: Consider replacing the phrase “run out of” with “spread beyond” for clarity.

Page 16770, line 13: Change “First, effect of fire temperature...” to “First, the effect of fire temperature...”

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Page 16811, Figure 15 - Three-dimensional pie charts are notorious for distorting the data they portray. I suggest using a two-dimensional pie chart or a table instead.

Fig. 1: The text “Wire Diagram” is not needed in the diagram.

Fig. 3: Correct spelling of *indicators* in caption.

Fig. 16: Please shift horizontal mapping range to be consistent with previous figures and to avoid splitting Africa into two pieces.

Interactive comment on Biogeosciences Discuss., 9, 16753, 2012.