Biogeosciences Discuss.,
doi:10.5194/bg-2016-17-RC2, 2016

Biogeosciences Discussions

Interactive comment on "The status and challenge of global fire modelling" *by* S. Hantson et al.

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Received and published: 21 March 2016

General evaluation The paper presents a framework for evaluation of fire models, particularly in the context of analyzing the potential impacts of climate changes in altering fire regimes. The paper is well written and generally well documented (few minor issues are commented later). It does provide a good overview of existing global DGVM including a fire component, with tables summarizing the main assumptions and drivers. I think the paper would benefit from extending the specific benchmark test that will be used to compare the model performance, as the current version only gives insights on potential approaches. I believe the authors should be more specific on what are the planning to do to actually compare model performance, which indicators will they use, on which period and area (including target resolution).

Minor issues: Line 65: a comma is missed after seasonality: "frequency, intensity, seasonality etc". Line 71: What a significant fraction means? Please quantify Lines 70-

86: No reference to N2O emissions from fires is made. Why? Line 92: Johnston et al., 2012 is missed in the references section. Lines 108-109: "Fire risk is not quantitatively related to area burnt, fuel consumption, or fire emissions". It is not clear what you mean here. Most fire risk systems are assessed with fire statistics (Chuvieco et al. 2014; Chuvieco et al. 2010; Padilla and Vega-Garcia 2011; Paz et al. 2011), and some are associated to burned area and fuel consumption (Consume, for instance: see Pettinari and Chuvieco 2015). Line 143: "outcrops can act as natural barriers to fire fronts". Natural barriers is duplicated from previous line. Line 147: "and highest in areas of intermediate water availability", assuming a dry period exists. Line 159: "purpose, for example for forest clearance, agricultural waste burning or fire", please add pasture management, which is the most common factor in many areas of the world. Line 170: "gross domestic product, GDP, that are linked to population density) results from the co-variance of population density with vegetation production and moisture". This sentence may be tinged, as those relations depend on other factors, such as the importance of agricultural sector in regional economy. For a global analysis, you may be interested to read Chuvieco and Justice 2010. Bowman et al. 2011 has also an interesting analysis of human-fire relations. Line 198: the JSBACH acronym is not defined. Lines 368: When citing alternative sources of model assessment, you do not include reference to the GFED dataset (Giglio et al. 2013), which is widely used for fire –emissions analysis. A reference to the synthesis analysis of Mouillot et al (2014) may be relevant in this point. Please, also note that soil moisture is not equivalent to fuel moisture. The CCI Soil moisture product does not really estimate vegetation wetness. Lines 383-388: When analyzing different global burned area products, you may refer to the intercomparison analysis published by Chang and Song 2009 or the most recent validation effort by Padilla et al. 2015. Line 381 and 814: Please not that ESA MERIS burned area product is officially named Fire_cci (see Chuvieco et al. 2016, which also includes an assessment of fire emissions derived from this product). The temporal resolution of the Fire_cci product is Burn Date for the pixel product at aprox. 300 m resolution. However, the burned area is accumulated in 15 day periods for a gridded

version of product, which has 0.5 d resolution. Line 459: please, include the updated reference to Alonso-Canas and Chuvieco 2015. Line 819. In fig. 1 you may add to Fuel load, Fuel continuity, which is related to fragmentation.

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Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2016-17, 2016.