

General Comments

The manuscript has been much improved by the revisions and clarifications within the text in response to the referee comments. In particular, clarification of the methodology along with references, and correction of the time period of climate forcing used in the experiment I think address the main concerns from the previous version. There are still a few minor points of clarification needed as outlined below, but I recommend publication subject to these being addressed.

Specific Comments

The following points refer to the line numbering of the revised manuscript in the 'Author's Response' document which includes the tracked changes.

There is some ambiguity over the term 'land use' within the paper which needs clarification:

Where crops are included in the model, are they simulated by the model, or are they prescribed? Are they also derived from MODIS and AVHRR, or from land use data such as HYDE et al? (e.g. *Klein Goldewijk, K., A. Beusen, M. de Vos and G. van Drecht: The HYDE 3.1 spatially explicit database of human induced land use change over the past 12,000 years, Global Ecology and Biogeography 20(1): 73-86. DOI: 10.1111/j.1466-8238.2010.00587.x., 2011*) This is not explained in the text, and should be described in lines 233 – 351 for SP and BGC modes.

L233: Are the vegetation fractions prescribed or simulated by the model in SP mode? The text only mentions climatological data rather than vegetation cover data, but the rest of the text suggests that the SP option does use prescribed vegetation compared to simulated vegetation in the BGC-DV mode. Please clarify in the text.

Usually the term 'land use' refers to anthropogenic / agricultural land use. In Table 1 the 'land use' row would better be labelled as 'Vegetation' or 'PFTs', and should include information on whether the vegetation is simulated by the model or prescribed / derived from MODIS/AVHRR. A separate row for 'land use' including information on agricultural land use would be useful. For example:

	BGC for the year 1850	BGC for the 20th century	BGConly	BGC-DV
Vegetation	17 PFTs for 1850 derived from MODIS ?	Simulated / prescribed transient ? 17 PFTs for 20th century	Simulated / prescribed equilibrium ? 17 PFTs for 2000	Simulated equilibrium 15 PFTs (without crops)
Agricultural land use / crops	Set at 1850, from MODIS ?	Simulated / prescribed land use change for 20 th Century from ?	Set at 2000 ?	None, only natural vegetation is simulated

L509-510 “In comparison to the burned area of BGConly-F, BGC-DV-F simulates a relatively small burned area because agricultural fires are excluded in BGC-DV-F and only natural vegetation is simulated (Castillo et al., 2012).”

Probably worth saying here as well that this is also due to fewer trees / less fuel, which is a feedback from the fire.

Technical Corrections

L911-912: “Therefore, the limited impact of fires on precipitation in Li and Lawrence (2017) with the coupled model would be increased by excluding dynamic vegetation in the model.”

Should this be “including dynamic vegetation”?

L89-91: “A process-based fire parameterization of intermediate complexity has been developed and assessed within the framework of the National Center for Atmospheric Research (NCAR) the Community Earth System Model (CESM)”.

This made more sense as originally written: “A process-based fire parameterization of intermediate complexity known as the Community Earth System Model (CESM) has been developed and assessed within the framework of the National Center for Atmospheric Research (NCAR)”

L216-217: “It is important to understand the individual and combined impacts of fires and vegetation distribution on water and carbon exchange; however, few studies to date have assessed this complicated global process.”

Should be “these complicated global processes”

L774 “for the case without considering the vegetation dynamics and differences between BGC-DV-F and BGC-DV-F”

Should be “between BGC-DV-F and BGC-DV-NF”