

Identifying environmental controls on vegetation greenness phenology through model-data integration

Author's Responses to the Reviews

In the following we are referring to the interactive discussion as follows:

REF1: Comments from anonymous referee #1, www.biogeosciences-discuss.net/11/C4000/2014/

RES1: Response to referee 1, www.biogeosciences-discuss.net/11/C4383/2014/

REF2: Comments from anonymous referee #2, www.biogeosciences-discuss.net/11/C4434/2014/

RES2: Response to referee 2, www.biogeosciences-discuss.net/11/C5096/2014/

Comments from referees (short summary)	Author's response	Author's changes in manuscript
Length of the manuscript REF1 and REF2 suggest to shorten the text and to better select figures to improve the readability of the text.	See our responses in RES1 (sect. 1) and RES2 (sect. 1).	We moved the original Figures 7, 8, 9 and 10 to the Supplement and replaced them with the new Figure 6. Additionally we merged and shortened the original sections 3.2.2, 3.2.3 and 3.2.4 into a new section 3.2.4. To further shorten the main manuscript we removed all Appendices and moved the material to a new Supplement document.
Model complexity REF1 was concerned that the higher number of parameters in the LPJmL-GSI phenology module could increase the complexity of the model and thus result in a better model performance.	See our detailed response in RES1 (sect. 2).	We did not apply changes on the manuscript. The LPJmL-OP phenology module has only a lower complexity as it misses environmental controls on phenology. Thus, LPJmL-OP and LPJmL-GSI are not equal candidates in comparisons of model complexity.
Extrapolation	See RES1 (sect. 2.2).	We added Figure 3 from RES1 to the

capabilities		Supplement (Figure S26) and included our response RES1 (sect. 2.2) into the new section 3.3 of the main text.
REF1 asked to demonstrate the extrapolation capabilities of LPJmL-GSI by splitting the data in temporal or spatial distinct sets for model optimization and evaluation.		
Model deficiencies	See RES2 (sect. 2)	We summarized model deficiencies and potential further improvements in the new section 3.3.
REF2 asked to summarize a discussion on model deficiencies.		
Impacts on carbon and water cycles	See RES2 (sect. 2)	We updated Figure 6 of the main text and added Figures 1 and 2 from RES2 to the Supplement (Figures S20, S21). Additionally we changed the structure of section 3.2 and added a discussion on the effects on ET (section 3.2.3).
REF2 asked to more discuss the effect of the improved phenology module on carbon and water cycles, especially on evapotranspiration.		
Transferability to other DGVMs	See RES2 (sect. 3).	We added this discussion to the new section 3.3.
REF2 asked about the transferability of the LPJmL-GSI phenology module to other DGVMs.		
Correlations between parameters	See RES2 (sect. 4)	We added Figure 4 of RES2 to the Supplement (Figure S16) and refer to it in section 3.4 of the main text.
REF2 asked about correlations between prior and posterior parameters		
Water vs. temperature controls in permafrost regions	See RES1 (sect. 3) and RES2 (sect. 4)	We added this discussion to section 3.4.
REF1 and REF2 both argue that water availability in permafrost soils depends on temperature and thus temperature is enough to explain phenology in permafrost regions.		
Minor comments	See RES1 and RES2	We considered the minor comments in the new

Full List of Changes