Geoscientific
Model Development
Discussions

Interactive comment on "Constraining a land surface model with multiple observations by application of the MPI-Carbon Cycle Data Assimilation System" *by* G. J. Schürmann et al.

Anonymous Referee #3

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Authors describe the assimilation of FPAR and atmospheric CO2 data into the MPI-CCDAS framework and the paper concludes that the assimilation of these two pieces of information allow to tune parameters of the terrestrial ecosystem component so that it performs better after it runs unconstrained.

The manuscript is interesting and GMD is a proper avenue for its publication but in its current format the manuscript is too long, or it appears too long because of its arduous reading since several points are not clear. The framework is not very well described so a reader is left to wonder.

I am always struggling with the fact how inversions and carbon data assimilation handle the fact that the model must be spun up properly before it can be used. This issue is

addressed somewhat in Section 5 but still needs more discussion. In particular, even after reading this manuscript, I am still unclear what value does a prior have when the parameter values have been suddenly changed. In a climate-mode a change in parameter values mean that the model must be spun up again to make its pools reach new equilibrium. As a result, don't the optimized parameters in the MPI-CCDAS system also account for the fact that the model wasn't spun up and brought to the present day using optimized parameters. Also, as soon as the new optimized parameters are used (without the model being spun up properly) doesn't it mean that if the model were to run long enough it will eventually start drifting towards its "true" equilibrium.

I have several handwritten comments in the attached supplement (an annotated version of manuscript) which indicates the places where sentences and words were unclear.

The choice of colors in Figures 3 and 7 is really bad which doesn't allow a reader to evaluate results.

Finally, had the manuscript been in a single column mode with double spaced lines it would have been an easier read.

Please also note the supplement to this comment:
http://www.geosci-model-dev-discuss.net/gmd-2015-263/gmd-2015-263-RC3-supplement.pdf