

Interactive comment on “The GGCM phase II emulators: global gridded crop model responses to changes in CO₂, temperature, water, and nitrogen (version 1.0)” by James Franke et al.

Anonymous Referee #1

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Methodology is not clearly separated from results. More information on the skill of the models that go into emulators would aid rationale. Some models are more skilful than others. Do you expect the MME to be the most skilful simulation? If different models perform better in different regions, why not use this information in the emulators?

Similarly, which processes are included vs not included in the underlying models. How good at threshold responses are these models? Cf "In general, emulator performance is poor anywhere that models show steep yield changes once some threshold has been reached, whether these are abrupt gains or complete crop failures" - I find these cases very important especially when looking at the end of the century.

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Why different numbers of perturbations used across different models?

Use of normalised “error” (should be “deviation” or similar) makes differences between models hard to see and makes results appear perhaps better than they are.

Be clear which data were used for calibration vs evaluation

"Emulator performance is generally good relative to model spread in areas where crops are currently cultivated and in temperate zones in general" - probably not hard giving that the crop models are not calibrated. I think the whole study should have been done with calibrated crop models.

line 115 - put info for figure in caption as not helpful in main text. And in Fig.1, cannot see advertised labels of a, b, c, d (although perhaps journal adds these later).

line 195 onwards - would model features that are able to be dropped be the same if the procedure was repeated including non-cultivated land? i.e. in marginal areas, are different factors important for determining yields? This is mentioned below (line 223).

Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2019-365>, 2020.

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