[EGU]

[GMDD]

Interactive
comment

Interactive comment on "Empirical Bayes approach to climate model calibration" *by* Charles S. Jackson and Gabriel Huerta

K. Gierens (Editor)

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I got a second opinion per email. The essential points are quoted here.

> This paper, which is statistical in nature, does not achieve the level of clarity which would be appropriate .... Moreover, the authors' statistical model used to link simulator output and observations is ... inverted compared to the dominant model in the statistical field of Computer Experiments, which asserts the existence of a 'best' parameterisation m^* for which $d|m^* = g(m^*) + \epsilon + e$ where ϵ is a contribution from structural uncertainty and e is a contribution from measurement error, both multivariate (the dependence of ϵ on m^* is usually suppressed). Because the characteristics of ϵ and e are rather different, it pays to separate them; e in particular

may have a zero expectation and diagonal variance matrix. This model has been dominant for nearly 20 years, and it is the standard model within which we might consider 'calibration', which is finding the conditional distribution $m^*|d$, on the basis of a prior distribution for m^*.

By contrast, the authors' statistical model is not even clear, because line 54 and eq (1) are incompatible, and the idea of the model correlating the observations makes little sense – observations do not care about models! I think the authors go on to adopt the standard model given above, with (5) being the likelihood function under a fully-Gaussian model for $\epsilon + e$. But there is no m on the righthand side of (5), and x is never properly defined, so it is hard to say. I think the authors are saying that we should include an uncertain scale parameter in the covariance function of ϵ. This is hardly innovative....

There have been big problems to understand what the authors are doing. I must admit, I share these problems. And I think it is not just because I am not a specialist in model calibration. To my view, a statistical topic like model calibration should be interesting to readers of GMD, i.e. model developers. But typically they are not experts in advanced statistical topics. To my view, it is not necessary that a general reader understands all details, but the text must be clear so that the general idea (what is it good for and how could I try to use it) becomes comprehensible.

The outcome of the review process is that both reviewer's recommend rejection, in particular because of lack of clarity. I will follow these recommendations and reject this paper.