

Interactive comment on “High dimensional decision dilemmas in climate models” by A. Bracco et al.

Anonymous Referee #2

Received and published: 6 July 2013

The manuscript presents important and timely strategies to calibrate model parameter in atmospheric circulation models (AGCM). There is a growing complexity in AGCM and a push to increase resolution of these models. Providing tools that enhances climate modelers ability to optimize adjustable parameter while minimizing computational runs during this process is a necessary tool. One challenge with automatic optimization is the question of which objective function should be optimized over. This work builds on previous work (Neelin et al. 2010), which allows for many different objective function at low computational cost, using a metamodeling approach to provide tools for calibration and analysis of parameter dependence in AGCM.

Finding global minimums for a particular objective function when optimizing AGCM comes with trade-off that must be chosen. The work in this manuscript develops the

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method that will allow climate modelers to more systematically exploration the space of the trade-off that must be made.

Overall, this is well written and extensive piece of research. They deal with the non-linear effects of the model. More discussion can be give to identify limits of their methods, such as is the case when using polynomial models for highly dynamic even discontinuous fields.

Interactive comment on Geosci. Model Dev. Discuss., 6, 2731, 2013.

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