

Interactive comment on “Comment on “Using multiple observationally-based constraints to estimate climate sensitivity” by J. D. Annan and J. C. Hargreaves, Geophys. Res. Lett., 33, L06704, doi:10.1029/2005GL025259, 2006” by S. V. Henriksson et al.

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In response to the numbered points:

1. We are surprised by the authors' statement that they could not reproduce the calculation in our original paper (AH06), despite describing it as simplistic. We believe that the description given in the paper is adequate and understand that others have managed to reproduce the calculation independently. Of course we would be happy to walk

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the authors through it, and are disappointed that they have not previously contacted us directly regarding this. If the authors cannot reproduce our calculation it is hard to see on what basis they can credibly claim that our results are not reasonably robust to the approximations used.

2. We would welcome the authors' own quantitative analyses of these points.

3. Clearly any Bayesian calculation of the climate sensitivity depends on both prior and the likelihood. In preferring previously published literature, the authors must support not only their use of data but also the priors used. Furthermore, contrary to the claim of the authors, AH09 also introduces more observational analyses - particularly that of Forster and Gregory 2006, which was published contemporaneously with AH06. While their analysis does not itself provide a very tight constraint on the climate sensitivity, it also does not depend at all on ocean heat uptake or forcings and thus is entirely independent of the main nuisance parameters identified in the Comment. This, combined with the investigations into the robustness of our results (AH06 Section 4 and AH09 Section 4), leads us to believe that the main conclusions are reasonably sound. However, we certainly do not claim that our results are the last word on the matter, and repeat our suggestion that the authors, or anyone else, might like to perform their own calculations based on their own interpretations of the available evidence.

4. Apparently our attempt to adopt the notation of the Comment has resulted in further confusion, so we will attempt to make the main point in another way. The authors claim here that it is "likely" that the error in our calculation is "large", and that therefore it is "better to use less information in a correct calculation than to use more in an incorrect one". However, the authors have provided absolutely no quantitative support for either the first or second claim. We, conversely, claim that it is likely that the errors in our calculations are moderate, and (in contrast to the authors of the Comment) have provided a clear description of our calculations together with numerous investigations into their robustness, particularly Sections 4 of both AH06 and AH09.

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Perhaps the best summary of our case can be provided by simply quoting the final sentence of AH06, which remains valid today:

"We hope that these results will encourage the further development of more robust and better quantified probabilistic interpretations of the various lines of evidence concerning the behaviour of the climate system."

Interactive comment on Clim. Past Discuss., 5, 2343, 2009.