Interactive comment on "The Fractional Energy Balance Equation for Climate projections through 2100" by Roman Procyk et. al.

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The manuscript provides, at times, incomplete details on how the results were obtained and how the approach was designed, making reproducibility of the results difficult. I would suggest sufficient details be added. This would also help make potential errors in the approach more detectable.

Author: A revised discussion will be given to how the results were obtained in the revision. The forcing, and temperature data will be included in an open source format, and the code of the model will be made available in the future. Extra information about what is to be included was given in the response to reviewer 1 and 2.

I would also like to see some discussion on approximating the joint prior probability density functions with a multivariate Gaussian process, including what motivated this decision, how accurate this approximation is and if this could have any repercussions for the final results. How the covariance between the parameters used in the joint prior distribution is determined should also be included.

Author: The results shown in Figures 3,4 and 7 are the marginal distributions for each of our five parameters - their Gaussianity was checked and thus we were motivated to approximate the joint posterior probability density functions with a multivariate Gaussian for our future projections otherwise this process can be computationally expensive (prior experience of a coauthors). The way it is written in the paper, we understand the confusion - the prior probability functions are not approximated by a multivariate Gaussian but the posterior probability was with the correlations between all parameters taken into account, this will be clarified further in the revision.

Physical units and chemical formulas should not be typeset in italics.

Author: Ok, this will be corrected.

Ranges should be denoted using en dashes (−), instead of hyphens (-), e.g. 1998–2015.

Author: Ok, this will be corrected.

Top panel in figure 6: The horizontal axis of the smaller window ranges from 0 to 25 years, but the dotted lines suggest it is taken from the range of 0 to 50 years from the larger figure. Please correct/clarify.

Author: The inset is for 0 to 25 years, this will be cleaned up in a revised figure 6 so that the dotted lines reflect this.

Line 274: The likelihood function is said to be a posterior probability. This is incorrect, as the likelihood is a distinct probability distribution. Also in line 274: the terms "posterior" and "a priori" seem to have been switched.

Author: This is correct, a change will be made in the revision.

Being in the Bayesian modeling framework, where parameters are treated as stochastic variables instead of fixed and true values, I think it would be more appropriate to use the term "credible intervals" instead of "confidence intervals". The former refers to an interval within which an unobserved (stochastic) parameter value falls with a particular probability, whilst the latter is an interval that we are, to a certain degree, confident include the true (deterministic) parameter value.

Author: Thank you for pointing out this useful distinction, it will be changed in the revision.