

# ***Interactive comment on “Flexible parameter-sparse global temperature time-profiles that stabilise at 1.5 °C and 2.0 °C” by Chris Huntingford et al.***

**Chris Huntingford et al.**

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Anonymous Referee #1

Huntingford et al. develops simple temperature-time profiles that stabilize at 1.5 and 2.0 degrees C above preindustrial levels. In climate model comparisons of global warming, typically the greenhouse gas concentrations or emissions are held constant across models and the range of temperature responses is examined. This paper provides a first step towards a method to standardize global mean temperature progressions which could then be used to assess the range of greenhouse gas concentration or emission functions that are consistent with such global mean temperature progressions. The paper is modest in its goals but is worthy of publication.

We thank this reviewer for their time and encouragement over this manuscript.

Line 21 – Comparisons between HadCRUT4 and ESM-simulated global mean surface air temperature should probably take into account the non-global spatial extent of HadCRUT4 as well as HadCRUT4’s blend of air and sea surface temperatures (Cowtan et al., 2015)

Cowtan et al (2015) “Comparison of climate models with observations using blended land air and ocean sea surface temperatures” *Geophys. Res. Lett* 42, 6526–6534, doi:10.1002/2015GL064888.

We use HadCRUT4 to provide an estimate of recent temperature rise  $\Delta T_0$  ( $^{\circ}\text{C}$ ) and rate of temperature rise  $\beta$  ( $^{\circ}\text{C yr}^{-1}$ ). This provides initial conditions to our mathematical curves. For precise policy applications, then we agree it is important to make the user aware of these issues. We now write in the manuscript: “We note, though, that when using HadCRUT4 as our observationally-based starting point, then it is necessary to be aware of its non-global spatial extent. Additionally it is compiled with a mix of air and sea surface temperatures, as described in Cowtan et al. (2015).”

Line 22 – What does decadal smoothed mean? A 10-year running mean or some other filter?

We have clarified this from the HadCRUT4 documentation, and now write in the manuscript: “HadCRUT4 smoothing is with a 21 point binomial filter applied to annual values”

Figure 1 and 2 – I would suggest limiting the x-axis maximum to the year 300 so that the differences in the curves over the 21st century can be seen more easily.

Done – the x-axis is now for the period up to 300 years from present day.

Technical Corrections: Line 14 – I suggest that the authors change “but may be less able soon” to “but may be less able to in the near-term”

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Done

Figure 4 caption – Becom -> become

Corrected

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