

Reply to comments by Andy Reisinger

We thank Andy Reisinger for his positive comments. Please find our responses to his comments below. The reviewer's comments are copied into the document for ease of reading and appear in blue. Our responses are given in black.

This is a very good and useful paper, thanks to its very nice and straightforward explanation of the differences and similarities between iGTP and GWP. My only comment/suggestion is that the authors could expand their summary of their explanation (page 123 lines 7-16) a little bit. The current text only notes that the larger the inertia, the larger the differences between iGTP and GWP. That is clearly correct and an important conclusion. However, it doesn't explain why (in Figures 2 and 3) the sign of the difference is different between CH₄, N₂O and SF₆. This explanation is found elsewhere in the preceding text but is not included here. So it might be worthwhile adding in this summary/explanation paragraph that the iGTP will be greater than GWP for gases whose persistence in the atmosphere is shorter than that of CO₂ over the time horizon considered (i.e. it is always greater for CH₄ and greater for N₂O for time horizons >100 years), whereas iGTP is lower than GWP for SF₆ for many centuries (because of the more rapid decay in the first three exponential terms describing the persistence of CO₂). This would help readers take away an intuitive estimate of where and when iGTP and GWP will be truly equivalent and where and when they will be poorer approximations. These findings are consistent with those by Peters et al (2011) but I think this article presents a somewhat more intuitively tangible explanation of the differences and what drivers them, and is therefore a very worthwhile addition to the literature.

We agree that this could be explained more in more detail (under this section heading), and we will carefully consider this advice for the future. However, since the paper is also rather short, and since the fundamental explanation for the diverging values between IGTP and GWP is given in the section just above it might become too repetitious to offer it in more detail here too.