Climate of the Past Discussions

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Reply on CC1

Keno Riechers et al.

Author comment on "Orbital insolation variations, intrinsic climate variability, and Quaternary glaciations" by Keno Riechers et al., Clim. Past Discuss., https://doi.org/10.5194/cp-2021-136-AC1, 2021

We thank Dr. Daruka for his comment. As pointed out by him, in the original version of our manuscript we already made clear at line 156 that the model proposed in the Daruka & Ditlevsen (2016) paper, DD16 hereafter, produces MPT-like behavior. We also explained that we deviate from DD16 to achieve this by slowly varying the parameters α and β. Our modification of the DD16 model is introduced to have MPT-like behavior that not only shows changes in the dominant periodicity, from 41 ky to roughly 100 ky, but also exhibits roughly correct timing of terminations.

To clarify things further we will add in the revised manuscript a clarifying sentence around Eqs. (29) and (30), stating that ``In the original model formulation of DD16, MPT-like behavior was produced by slowly varying the parameter $\kappa(t) = \kappa 1 + 0.5(\kappa 0 - \kappa 1)\{1.0 - \tanh((t - t0)/ts)\}$. We deviate from DD16 by introducing instead a slow change in the parameters $\alpha(t)$ and $\beta(t)$ of Eq. (29b), as follows: $\alpha(t) = 2.1 - 1.4 \tanh((t + 1100)/500)$, (30a) $\beta(t) = 2.5 + 1.4 \tanh((t + 1100)/500)$. (30b). The functions $\alpha(t)$ and $\beta(t)$ so defined are plotted in Fig. 10(b) and they induce, as we shall see forthwith, a model behavior that not only resembles the MPT but also shows correct timings for most of the terminations."