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Age calibration of the Paleogene time scale in GTS2012

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The age calibration of the Paleogene time scale in GTS2012 was challenging as it marks a scale that is in transition towards one that is fully underlain by astronomical dating. Initially, two different age models were constructed for the magnetic reversal history during the Paleogene, one based on radioisotopic dating and one on astronomical tuning. Strict criteria were employed to select radioisotopic calibration points, namely - preferably - single crystal sanidine Ar/Ar dated ash layers in sections or cores that have a reliable magnetostratigraphy of which the correlation to the marine magnetic anomaly profile is straightforward. In practice, however, these criteria could not always be maintained as otherwise the set of calibration points would have been too limited. The problem with the astronomical age model is that different tuning options to 405-kyr eccentricity exist for the older part of the Paleogene, while also the number of 405-kyr cycles remains undecided. We selected the option that is consistent with the intercalibration between the Ar/Ar and astronomical dating methods; this intercalibration resulted in an astronomical calibrated age of 28.201 $\pm$ 0.046 Ma for the Fish Canyon tuff sanidine Ar/Ar dating standard, which is used throughout GTS2012. Comparison between the two age models revealed discrepancies around 50 and 30 Ma in the order of 0.5 myr or more. Here we will outline these discrepancies and present the final hybrid age model on which the Paleogene time scale in GTS2012 is based. Implications of the new time scale will be discussed.