



Statistical validation of Miocene tuning underlying astronomically calibrated FCs age

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In 2008, an astronomically calibrated age of 28.201 ± 0.046 Ma was published for the Fish Canyon tuff sanidine, the most widely used standard in Ar/Ar geochronology. This age was based on a direct comparison of astronomical and single crystal sanidine Ar/Ar ages for ashbeds of late Miocene age in the Mediterranean. It was adopted in GTS2012 as age for the FCs to calculate Ar/Ar ages. However, other much younger astronomical ages have subsequently been published as well as a somewhat older age based on statistical optimization of U/Pb and Ar/Ar age pairs. Here we present the results of a statistical test of our initial tuning as well as alternative tunings in which the tuning has been shifted one up to three precession cycles to get it into agreement with the other ages published for the FCs. For this purpose, we compared the amplitude modulation of the precession related signal in a tuned high-resolution sonic record from the Atlantic side of the Mediterranean with eccentricity. Our preferred tuning results in the best fit, while a three cycle younger tuning, which is in harmony with the much younger FCs ages, reveals the poorest fit due to the opposite relation of the amplitude with the 100-kyr eccentricity cycle. The one cycle older tuning also results in a less good fit. This outcome provides robust statistical support for the continued use of the 28.201 ± 0.046 Ma age for the FCs. However, also this age is not in perfect agreement with all radio-isotopic ages published since 2008 and, thus, the FCs age remain to be critically (re-)evaluated in the future.