

Clim. Past Discuss., author comment AC2
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Reply on RC2

Slah Boulila et al.

Author comment on "Age and driving mechanisms of the Eocene–Oligocene transition from astronomical tuning of a lacustrine record (Rennes Basin, France)" by Slah Boulila et al., *Clim. Past Discuss.*, <https://doi.org/10.5194/cp-2021-46-AC2>, 2021

Reply to Comment on cp-2021-46

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Anonymous Referee #2

*Referee comment on "Age and driving mechanisms of the Eocene-Oligocene Transition from astronomical tuning of a lacustrine record (Rennes Basin, France)" by Slah Boulila et al., *Clim. Past Discuss.*, <https://doi.org/10.5194/cp-2021-46-RC2>, 2021 ;*

#1 This study presents an astronomical time scale from ~31 to ~39 Ma. It is worth of investigation since there are unresolved precise time scale for this period. However, as the RC1 mentioned there are new studies like GTS 2020 and Westerhold et al., 2020 paper that need to be compared and discussed.

Reply to Comment #1_ cp-2021-46_ Referee #2:

See the reply to the same comment in **Comment #2_ cp-2021-46_ Referee #1:**

#2 Statistical method of testing astronomical signals is also needed.

Reply to Comment #2_ cp-2021-46_ Referee #2:

We added statistical methods for testing the astronomical signals, illustrated in figures 2 and 3 (see detailed **Reply to Comment #1_ cp-2021-46_ Referee #1**).

#3 From my understanding, authors anchored the floating time scale to the previously proposed age of EOB and then use this as a starting point to tune the bandpassed 405-kyr of studied data to the orbital solution. This process needs to be clearer in the presentation.

Reply to Comment #3_ cp-2021-46_ Referee #2:

Indeed, this needs clarification because we actually did not tune to the complete orbital solution. We rather tuned to a pure 405 kyr target sine curve, then we anchored the floating time scale to the previously proposed ages of EOB to look for the best phase relationship between the sedimentary NGR and the orbital eccentricity data at the 405 kyr cycle band. Tuning to the complete 400 kyr cycle band from the orbital solution would generate artificial harmonics from the periodic components surrounding the 405 kyr (g2-g5) term.

Subsequently, based on the retained age of EOB that provides the reasonable phase between the NGR and the orbital eccentricity variations (Section 5.1), we adjusted the EOB anchored floating time scale to the orbital solution by tuning only the 405 kyr (g2-g5) cycle extremes in the NGR to their time equivalents in the astronomical signal.

We have now clarified these points in detail in the « Methods » Section 3.3.

#4 In line 160, "We have aso" should be "we have also"

Reply to Comment #4_ cp-2021-46_ Referee #2:

Corrected.

#5 In Figure 4, what are the blue lines in panel B and C?

Reply to Comment #5_ cp-2021-46_ Referee #2:

Good catch! This was another (larger) passband for g1-g5 and g2-g5, which provided similar results than the passband depicted by the red curve. We now removed these redundant blue curves from panels B and C.

If authors can address the above issues, I recommend this as publication.

Thank you!