

Interactive comment on “Astronomical component estimation (ACE v.1) by time-variant sinusoidal modeling” by Matthias Sinnesael et al.

Anonymous Referee #2

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This manuscript presents a method for better constraining age-models in the context of cyclostratigraphy. The paper is clear and short, the methodology is well exposed and scientifically sound. I therefore believe it deserves being published after some minor corrections discussed below.

1/ As also mentioned by the first reviewer, I believe it is critical to provide and discuss the uncertainties associated with the fitting procedure, and try to translate them into error bars in the final age models or sedimentation rates.

2/ I am also a bit frustrated by the lack of discussion on the results obtained with the ODP846 record (basically Fig.3G) which is only presented by the sentence : “Except for a small difference between 70 and 100m the match is close”. How large is the mismatch in terms of absolute age ? Where does this mismatch actually come

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from ? There is a lower signal amplitude at 41kyr at this time (Fig.3D), but this is also the case below 150m where the agreement with LR04 is rather good . . . The LR04 sedimentation rate is rather flat, so there is (a priori) no strong change in the record at this time. The explanations given in the conclusion (page 13 lines 10-16) are therefore not fully convincing for this particular case study. 3/ Clearly, the Danian record is the best example of the added value of the method (since there are little stratigraphic constraints except cyclostratigraphy). The advantages of the new method are discussed in the text (page 13, lines 17-25) but not well illustrated on the figures. It would be quite easy, and very helpful, to add on Figure 4F indications of alternative sedimentation rates (traditional tuning by Sinnesael et al 2016, . . .) somewhat equivalent to Figure 3G.

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