

## ***Interactive comment on “Cyclic activity of Fuego de Colima volcano (Mexico): insights from satellite thermal data and non-linear models” by Silvia Massaro et al.***

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We greatly appreciated the very interesting comments by the reviewer. As highlighted by the reviewer, our results indicate that long-term cyclicity is better explained by a dual magma chamber system, as previously highlighted by Melnik and Costa (2014). Short-term cyclicity can be explained by the fluctuation of the shallow dyke, as previously highlighted by Costa et al. (2007-GRL). However it is very true that a model configuration only is not able to describe all the three periodicities investigated in our paper (long-, intermediate- and short-term). This is an actual numerical modelling limitation and probably in order to have a more sophisticated model able to describe all three time

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scale at once it is necessary to incorporate more physics (e.g. full thermal effects) and consider fully 3D geometries. This would represent a great computational challenge but it is the direction where to go. In the revised version we discussed these limitations in the Discussion Section. We agree that the evacuation of significant portions of the upper conduit and the following destruction of the lava dome during Vulcanian explosions can affect periodicity. However, as it was shown by Costa et al. (2012) who considered the effect of 200 m plug collapse, such processes would mainly affect the very short-term periodic regimes and it should be more effective on sub-daily. Certainly, it is not excluded an exceptional large evacuation of the upper conduit would be able to influence longer periodicities (i.e. weekly – monthly) as those shown in our study but it is more likely affects sub-weekly periodicity that is not contemplated in this study due to the limitations of the observational dataset. This has been now discussed in the revised version in the Discussion Section. We hope this work could motivate the community towards the development of new 3D numerical models that should be able to describe all the periodicity patterns described here in a more inclusive way. Please find attached the revised version of the manuscript with the marked changes.

On behalf of the authors, Sincerely, Silvia Massaro

Please also note the supplement to this comment:

<https://www.solid-earth-discuss.net/se-2019-31/se-2019-31-AC1-supplement.pdf>

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