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Interactive comment on "Gravity modeling of the Alpine lithosphere affected by magmatism based on seismic tomography" *by* Davide Tadiello and Carla Braitenberg

Anonymous Referee #1

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The authors made an interesting and good work in mapping the density structure along the Southern Alpine region, with special focus over the Venetian gravity anomaly high, from 3D inverse gravity modelling constrained by seismic tomography data.

There are some points that need to be clarified before acceptance: 1°) The authors must make more explicit throughout the text what are the results from their work and what are from previous work, such as the velocity model, something that is not explained very clearly if it is theirs or if they used Kastle's et al. (2018) data.

2°) The authors stated that they obtained the gravity disturbance map for EIGEN 10 < N $\leq$ 2190, generally these combined models present a good performance up to 2159

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(e.g. EGM2008 - Pavlis et al. 2012). Using the model up to such higer degree/order, isn't it very noisy? Justify your choice.

3°) Regarding to the Crustal conversion authors stated that: in this work, for distinguishing the sedimentary rocks velocity domain from the crystalline domain, and therefore which of the two relations to use, it has been chosen the velocity value of 6km/s-1 at which the two curves intersect. This does not generate an artifact in the conversion to densities when passing from one curve to another? since the slope changes overwhelmingly?

4°) In section 4.4 Inversion of the gravimetric residual and model density correction: authors should add an final error estimate.

5°) Some references to geografic locations, basins, terrains, intrussives, etc. that are mentioned in the text should be added in the plant view of the final figures for clarity.

6°) When describing the methodology used in data processing, they should unify the verb tenses, it would be better in past, they mixed with the present simple.

7°) Specific coments over text and minor comments are in the attached pdf.

Please also note the supplement to this comment:
https://se.copernicus.org/preprints/se-2020-101/se-2020-101-RC1-supplement.pdf

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