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comment

Interactive comment on “Numerical simulation of mantle convection using a temperature dependent nonlinear viscoelastic model” by M. Norouzi et al.

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First of all, the copy I was able to download has no figures, which makes it difficult to assess the results in more detail. The authors mention that their inclusion of the depth dependence of gravity is a special feature of their study, but I do not see any substantial discussion of what is gained through it. It is true that in the case of Earth, depth dependence of g is not usually considered, simply because g is almost constant through the mantle. I am perplexed that the authors derive their depth dependence from a paper from Bullen (1939) and do not even mention PREM (Dziewonski & Anderson, PEPI, 1981), which is probably still the default reference to use if one doesn't derive the gravity profile self-consistently from the model. If I plot the eq. 13 they derived from Bullen, it turns out that it is almost constant down to ca. 2500 km depth but deviates strongly from PREM in the lowermost mantle; it yields a g value of 15 m/s^2 at the CMB, while

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PREM hardly exceeds 10.5. I would expect this to promote instabilities rising from the CMB much more easily than it should be according to PREM, and I wonder what this effect does to their models.

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