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Comment on se-2021-11

Antonio Castro (Referee)

Referee comment on "Interactions of plutons and detachments: a comparison of Aegean and Tyrrhenian granitoids" by Laurent Jolivet et al., Solid Earth Discuss., https://doi.org/10.5194/se-2021-11-RC1, 2021

This is an interesting paper that merits publication after some minor changes.
It is implicit in the proposed model that melting of lower crust and detachments are related each other. This is the classical model of MCC. Transitions from magmatic state structures to ductile (rock) and brittle shear zones and faults are in support of the conceptual model. Melting induced by mantle magmas agrees with petrological constraints and experiments. However, these processes are not restricted to heat input; the supply of water to the lower crust is a necessary condition according to experiments (Castro 2020). Water is likely supplied by mafic magmas formed in a hydrated mantle (Pargasite-bearing). The described mafic rocks that associate to plutons have the characteristics of vaugnerites (sanukitoids) and can be the water donors to the crust. Thus, the process must start in the mantle under extension and decompression (pargasite breakdown has a positive clapeyron slope). Mafic (hydrous melts) can be stored at the base of the crust and some pulses may reach the upper crust at late stages after the partially molten zone is exhausted. This seems to be compatible with the sequence of magmas.
The outcome from numerical simulations matches quite well the conceptual models built on the basis of the geological and structural study. In this way these models cannot be called conceptual but geological, as they are based on real data, and not on simple observations. The paper lacks of basic information on the chemistry of intrusive rocks. If available, it would be interesting to show basic geochemical diagrams (e.g. Peacock diagrams, aluminosity, etc.). These may reinforce the interpretations on lower crust melting and the arrival of mantle-derived magmas at the time of extension and dome formation. In my opinion the paper can be published after addressing these minor revisions.