Answer to RC2: 'Comment on egusphere-2022-949', Yann Rolland, 23 Oct 2022

General comment

I have read this manuscript with interest as it provides a synthesis of recently acquired (and some new) RSCM data at the SW Alps scale and provide a comprehensive modelling approach to explain these data. The form of the manuscript is excellent. It is well organized and concisely written, the figures are well drafted. Though, I am not an expert of modelling, I found this part well presented and understandable at least from the results.

I found especially interesting the position of the authors in not considering raman temperatures as just a result of Alpine thickening as previous authors did (see specific discussion points below), but as a result of previous rifting history. Of course, this could be surprising at first glance in metasediments not exhibiting any other metamorphic minerals at temperatures >300°C. However, this is always the case in Low Pressure sediments (like in contact-metamorphism in general), and maybe the impact of (hot) fluid circulations could explain some relatively short-lived thermal reset (note that ore formation is documented at least for the Jurassic phase). This point could be better discussed in the paper. However, I found that the explanations proposed (two rifting episodes) and tested by modelling are very interesting and fit very well with the regional geology where Jurassic and Lower Cretaceous rifting phases are clearly highlighted. Finally, the general model that is presented seems sound. Of course, the relationship with the Valais ocean is not simple, as the paleogeography has been significantly disturbed by the Alpine orogeny, but, however, the proposed reconstruction agrees with the shape of the Vocontian low and the dissymmetry of the Valais unit (not continuing in SW Alps).

In conclusion, I think that this work deserves a rapid publication with some relatively minor revisions.

Minor comments

Figures: in many cases the text in figures is too small (see attached file).

Figures have been checked and modified where relevant.

L47 : Altough, these temperatures are similar to those estimated by mineral thermometry in the Briançonnais (e.g. Lanari et al., 2014), this is no the case in the Pelvoux domain where RSCM estimates lie systematically higher, by about 50°C in eastern Pelvoux, (Simon-Labric et al., 2009), and by > 100°C to the west of Pelvoux ECM (especially, considering vitrinite reflectance results from Cretaceous beds, (Deville and Sassi (2006)), which led Bellanger et al. to propose a "hypothetical" substractive contact that has not been observed in the field...

Agreed. We added some of the references suggested and tried to make clearer in the text the fact that temperatures in the external domains can be larger than those estimated in the internal zones.

L75 :

- I would say ‘before 34 Ma’ to be more consistent with error bars of geochronological methods (Ar-ar dating of syn-kinematic phengite)

We corrected this part as also suggested by RC2

- Top NW deformation is documented in the Eocene: Lanari et al., 2014, Terra Nova: Top NNW syn-kinematic deformation dated at 45 Ma in briançonnais units at the base of the Helminthoid flysch

We modified the text and added this ref.

L271: not sure the concept of "temperature structure" is adequate…? maybe the thermal state/profile?

We modified as suggested.

See attached file for details