Thanks for giving me the chance to review the MS by Su et al. I think this MS has real merit and contribution to a certain extent. However, some concerns need to be addressed in the current version.

Reply: Thank you very much. I appreciate the thoughtful and constructive comments. I have carefully addressed each comment and revised the manuscript accordingly.

Major concerns:

1. Section Abstract. The current abstract is concise but could be more informative. I think the key quantitative results or/and specific findings should be given.

   Reply: Thank you for bringing this to our attention. The magma beneath the fault ascended rapidly, reaching the lower crust within 20 million years, with a cooling rate of approximately ~35°C/Myr. Conversely, the thickened magma took 40-50 million years to ascend to the lower crust, cooling at a rate of ~10°C/Myr. In contrast, magma without thickening and fault would take considerably longer time to reach the lower crust. We will add this in the revision (Lines 19-24).

2. Section Numerical simulation and model setup. First, authors should introduce the specific location of the cross section (Fig. 2). Second, I suggest that a single section is not enough to reflect the tectonic activity of the whole study area, and additional sections are necessary. Third, Section model setup should include a justification for the chosen parameters and boundary conditions. Explain why these choices are appropriate for the study area and the geological processes being modeled.

   Reply: Thank you for bringing this to our attention. We have added an approximate location of the cross-section Fig. 2b within Figure 1. As depicted in Figure 1, the Changle-Nan'ao Fault Zone significantly influences the magma distribution along the coast, showing a similar pattern in magma planes. Hence, selecting a profile for simulation can effectively illustrate the magma evolution process along the coast. The coastal fault zone of the SCB is approximately 40-60 km wide (Cui et al., 2013). To better reflect this, we increased the fault width of models from 4 km to 45 km (Fig. 2). This adjustment slightly altered the ascent style of magma, but it did not significantly affect their uplift and cooling rates. We have also included relevant references to justify our boundary conditions and parameter selections, enhancing the realism of the model. We will add this in the revision (Lines: 144,151, 168, 186-187, 219, 285-293).

3. Section Result. Due to the absence of time and fault information in Fig. 3, I cannot accurately judge the accuracy of the interpretation of the results.

Reply: Thank you for your feedback. We have updated each figure to include the evolutionary time. In addition, we added the evolutionary results of the bottom magma. “In Model 1, after 10 Myr, the bottom magma was divided into five upwelling magma bodies: 1, 2, 3, 5, and 6. Magma body 1 corresponds to the fault location, bodies1, 2 and 5 correspond to pre-existing thickened magma bodies, body 4 corresponds to relatively shallow pre-existing magma, and body 3 is located below body 4. At this stage, bodies 1, 2, and 5 are uplifted higher than bodies 3 and 6. As evolution progresses, body 3 reaches the position of body 4 and rapidly achieves heights comparable to those of bodies 2 and 5 (Fig. 3e), whereas body 6 is significantly less uplifted. In Model 2, under compressive stress, four rising magma bodies formed at the bottom. No rising magma bodies formed at the bottom right. The formed magma bodies tilted and ascended to the left (Figs. 3f-j).” We will add this in the revision (Lines 224-236).

4. Section Discussion. I suggest that authors should add some text to explicitly address potential limitations of the study or models and suggest areas for future research.

Reply: Thank you for highlighting this issue. The deep structure of the late Mesozoic SCB is poorly constrained, resulting in speculative assumptions about key parameters such as fault depth and magma thickness. The model might oversimplify the complex geological features, potentially leading to inaccurate results. Additionally, assuming a uniform crustal thickness may not capture the true variability of the crust. The geometry of the lithospheric faults in the model is simplified, and important details that could affect magmatic processes are neglected. Variations in interpretations of fault characteristics and magma properties contribute to the idealized nature of our model results, which may differ significantly from actual geological conditions. This study aims to use these idealized scenarios to illustrate the complexity and diverse interpretations of magma evolution processes along the South China coast. Moreover, given the model's two-dimensional nature, it simplifies the intricate threedimensional processes that likely influence magmatic evolution. Future research will focus on addressing these complexities to provide a more comprehensive understanding. We will add this in the revision (Lines 323-336).

Specific concerns:

1. The figure captions are simple and need more detail information, such as Fig. 3.

Reply: Thank you very much for pointing out this issue. The captions have been modified as follows:

Fig. 2 (A) Schematic cross section illustrating the subduction of the Paleo-Pacific plate. (B) Reference model geometry depicting temperature, density and viscosity variations with depth (see location in Fig. 1). The boundary conditions are the same between Model 1 and Model 2, except that Model 2 is assigned a horizontal force on the right side.

Fig. 3 Results of Models 1 and 2, illustrating magma upwelling for 10-50 myr, respectively. (a)-(e): Underplating magma rising, forming five magma bodies of varying heights in Model 1; (f)-(j): Underplating magma tilting under right-sided compression in Model 2. The crust, mantle and magma materials are modelled as phases (fluids) on a dimensionless scale, with values of 0, 0.5 and 1, respectively. The contours denote the flow distribution of mantle fluid.

Fig. 4 (a) Comparison of the observed cooling histories of the CNB magmatic plutons (data from Chen et al. 2020) with time–temperature paths generated by models of rising magma; the green shadow represents the actual cooling age of the CNB magmatic plutons. (b) Zircon Hf isotopes and ages of coastal magmatic rocks in the SCB (data from Li et al., 2023). (c) Sketch illustrating the formation stage of the underplating magma and tectonic background during 80-110 Ma, 110-130 Ma and 130-160 Ma. The olive shadow crossing sections (a) and (b) denote the age range of 110-130 Ma.

We will add these in the revision

2. Fig. 1 is not cited in the article.

Reply: Thank you very much for pointing out this issue. Fig.1 will be cited on lines 95 and 137 in the revision