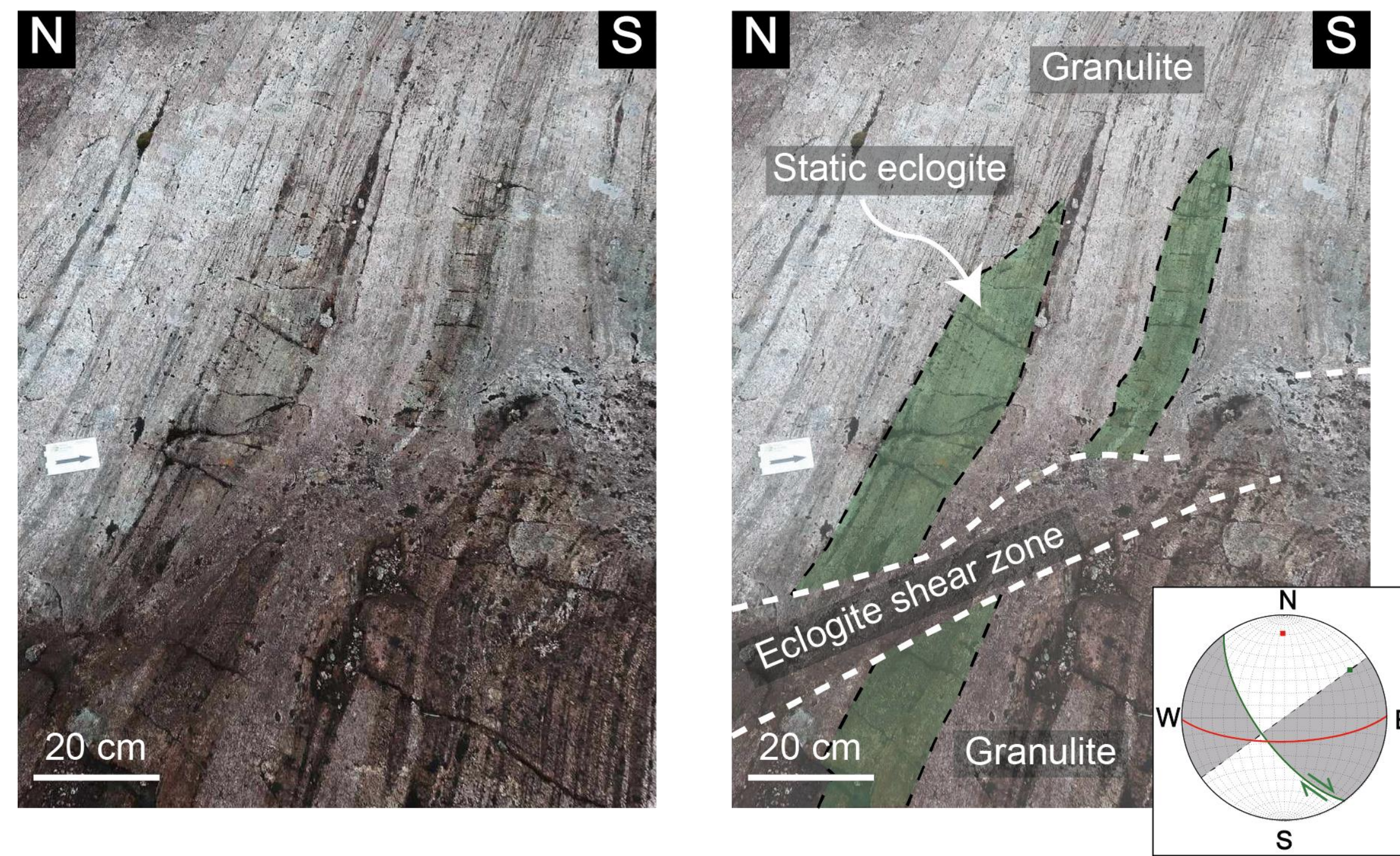


Introduction

A 2-D numerical model is used to study the propagation of the eclogitisation transformation in a heterogeneous matrix.

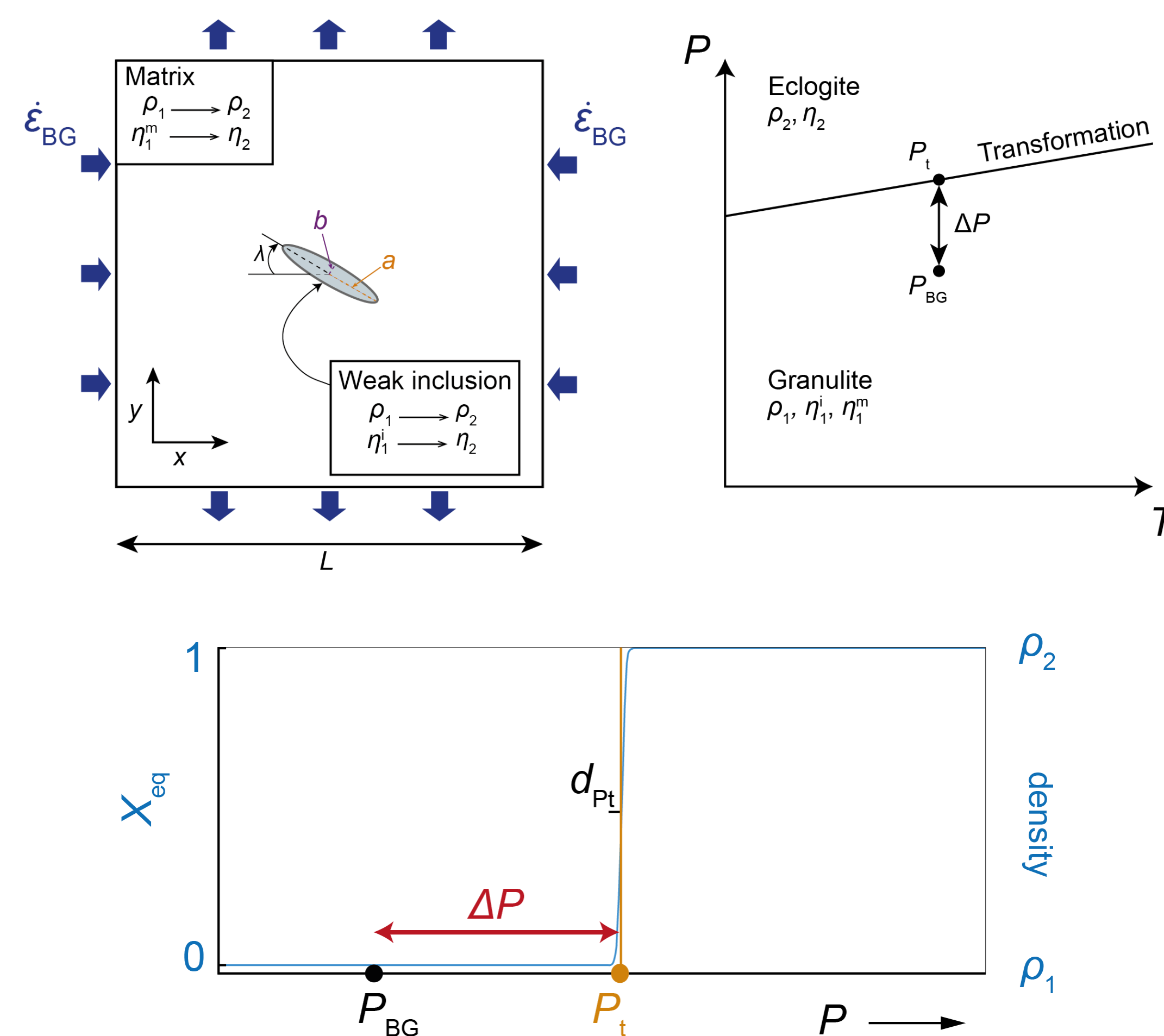
- How do **eclogite fingers** form ?
- What conditions **accelerate** or **inhibit** the eclogitic propagation ?



Finger-bearing outcrop in partially eclogitized granulites (Holsnøy, Norway).

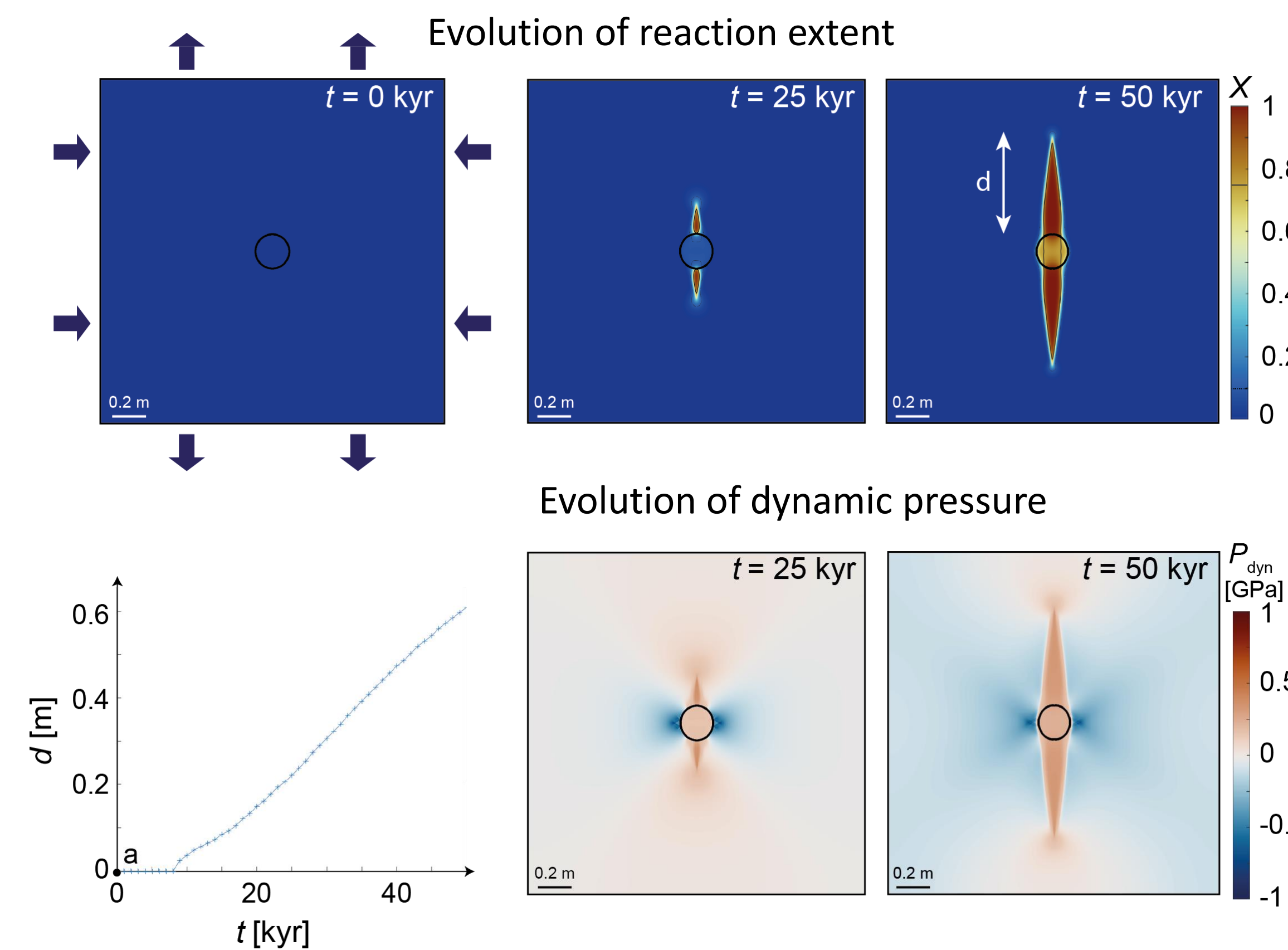
Model design

- 2D compressible thermo-mechanical models.
- Including visco-elasto-plastic rheologies and metamorphic transformation.

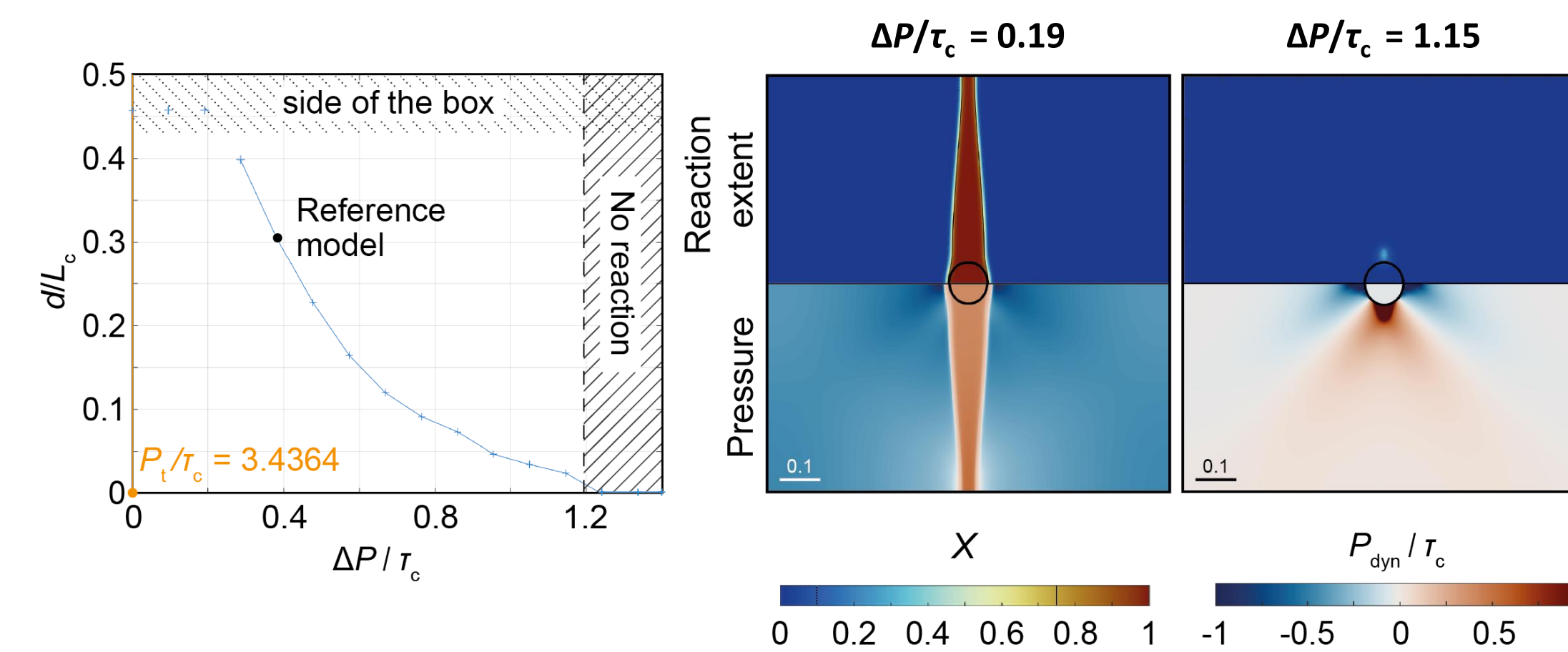


(see Poster by Yamato et al., EGU25-5874, X1.133)

Reference model

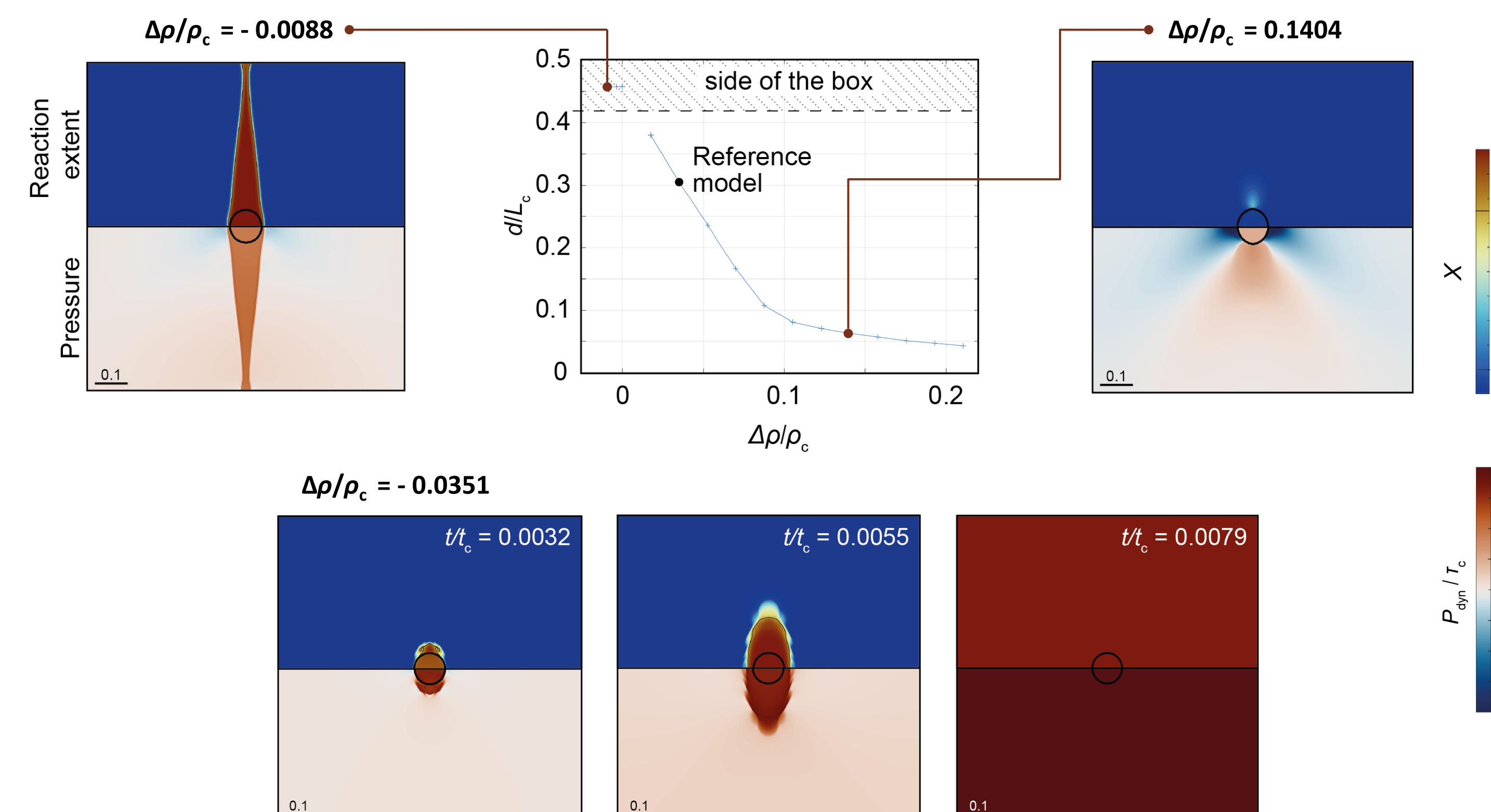


Effect of pressure overstepping

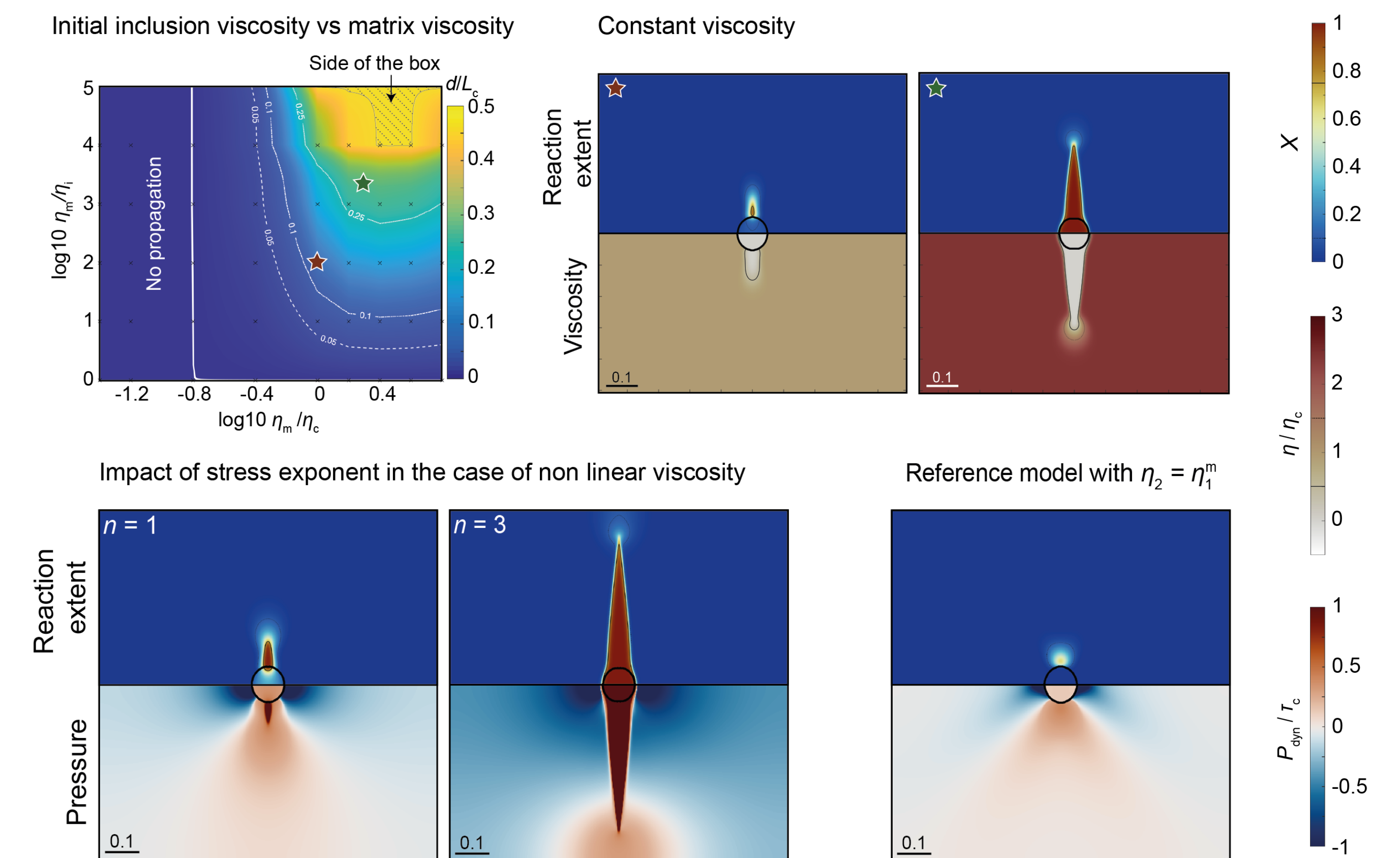


Model results for different values of the difference in pressure between transformation pressure P_t and initial pressure P_{BG} , denoted ΔP .

Effect of density change during transformation



Effect of viscosity variations

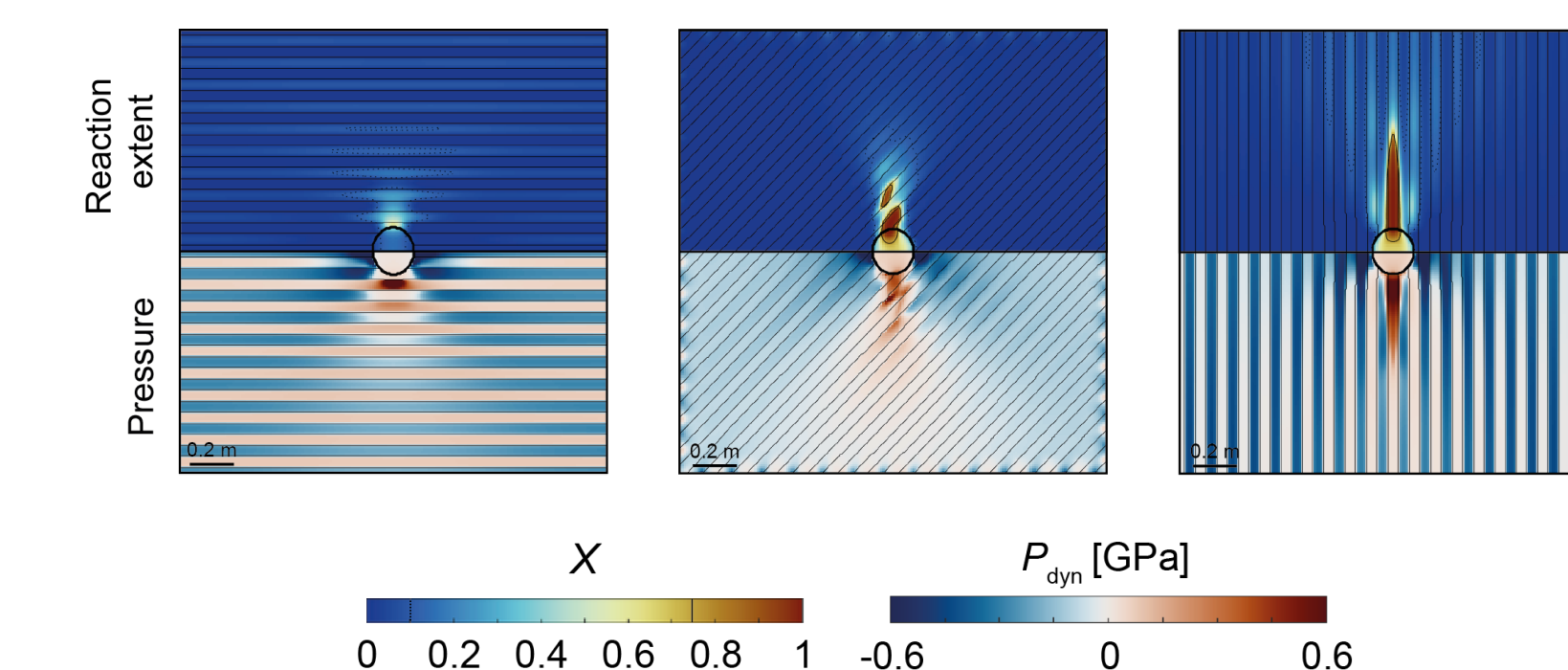


Conclusions

- Thanks to an intensive parametric study, we show that the presence of mechanical heterogeneities can generate local overpressures that are responsible for the initiation and propagation of eclogite fingers.
- Some parameters control the initiation of eclogitisation such as: (i) the difference in pressure between the background pressure and the pressure of transformation, and (ii) the difference in viscosity between the protolith (i.e. the granulite) and the eclogite.
- Other parameters instead control the propagation of the fingers (e.g. the viscosity of the product or the difference in density between granulite and eclogite).

Perspectives

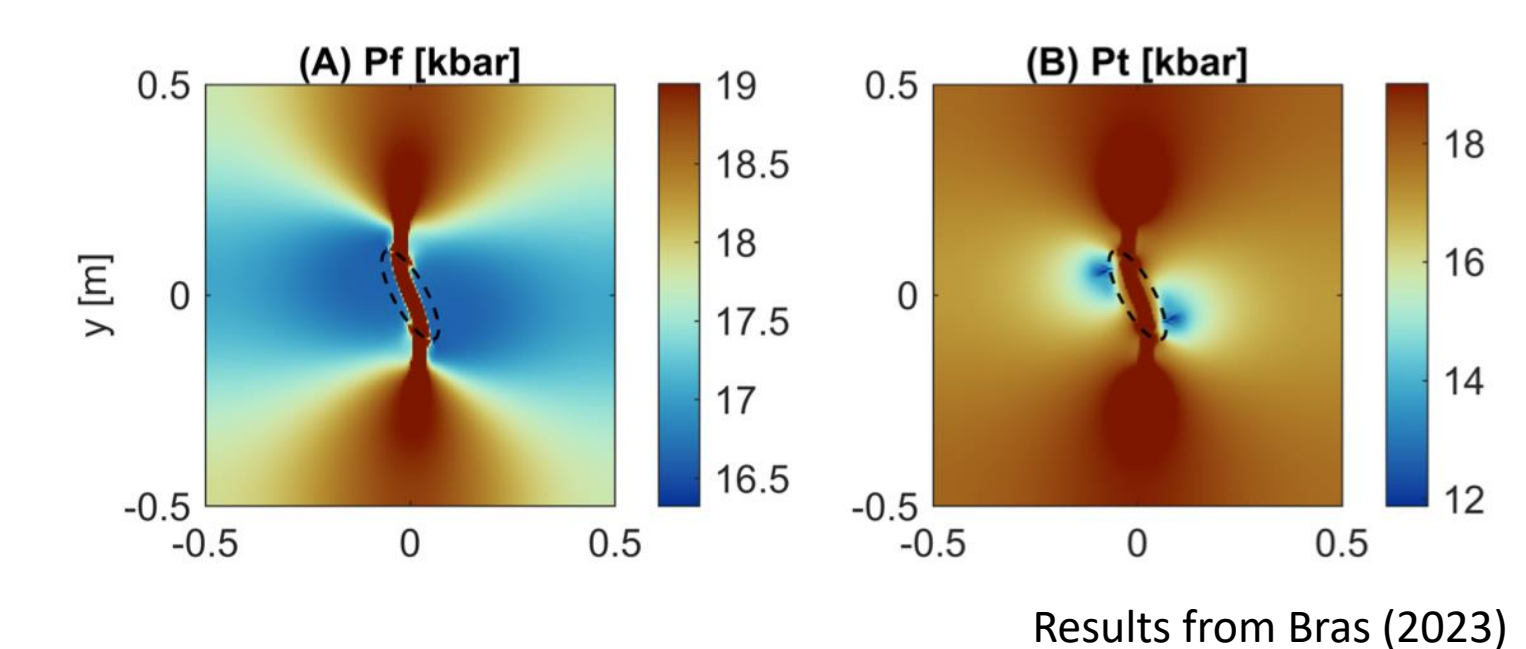
Effect of anisotropy: how to model layering?



- Viscosity layering?
- Kinetics layering?
- Permeability layering?

Developing Hydro-Chemo-Mechanical models incorporating metamorphic transformations

- Pf vs. Pt?
- Impact of porosity/permeability?



Do you want to see the abstract ?



Reference

Bras, E. (2023). Couplages entre métamorphisme, fluides et déformation: étude de cas de l'éclogitisation dans les arcs de Bergen. Université de Rennes.