Mathematical modeling of magma differentiation in the Earth's crust

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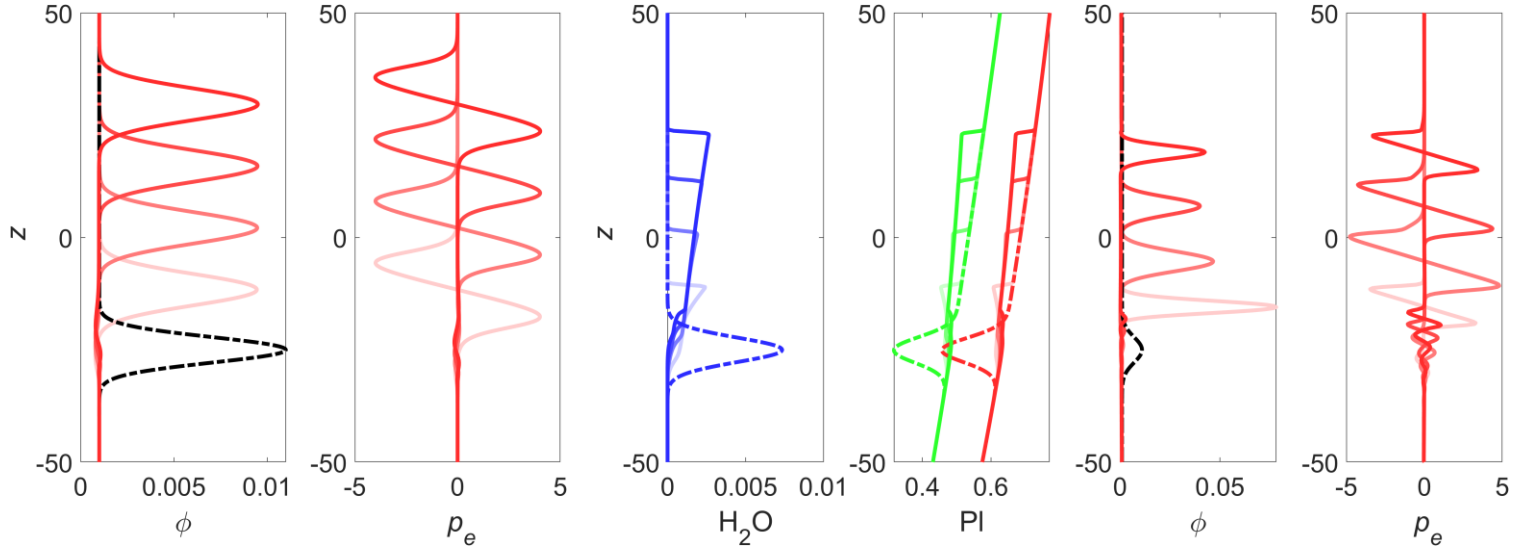
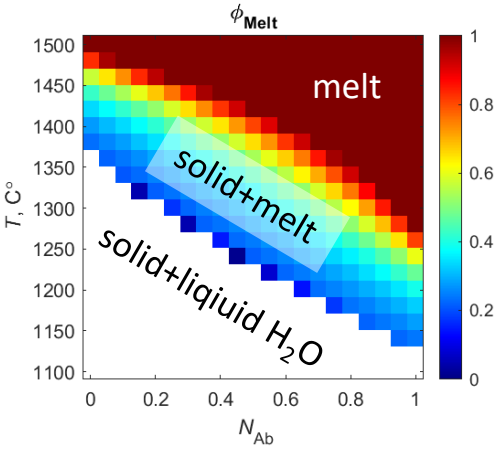
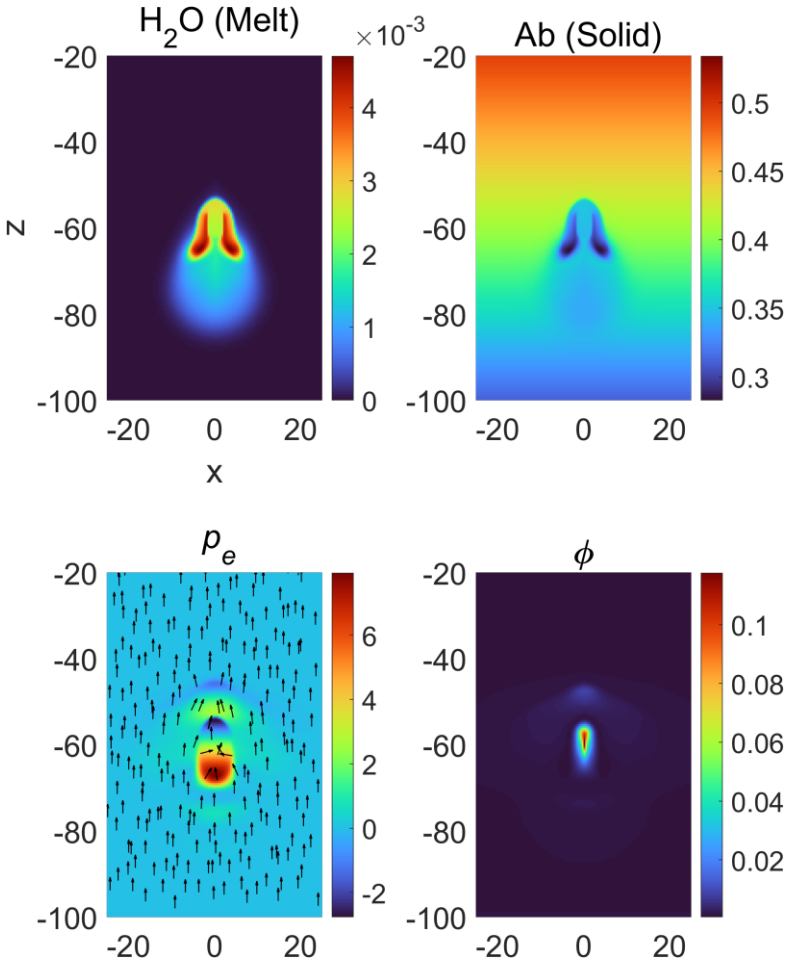


Mechanical compaction "classic" porosity waves

Reactive fluid flow in deforming porous media



- We investigate the dynamics of magma melting and migration in a simple ternary system Albite–Anorthite–H_2O;
- The concentration of H_2O in melt controls the partitioning of Ab and An between solid and fluid phases. We use Gibbs energy minimization for thermodynamic equilibrium calculations;
- Advection of the solid phase is neglected; constant temperature gradient is assumed;
- Volumetric deformations of the solid matrix are modeled using poroviscous rheology with decompaction weakening in 2-D.



Decompaction weakening leads to the channelization of the flow