

Milestone 3 - Results

Milestone 3: Results

Details the results for the third milestone, in which the melt velocity was determined given the existing solid velocity and pressure fields.

Model descriptions

Two different models were implemented for which the melt velocity was determined. The first of these was an extension of the ridge model implemented in Milestone 1, but with a constant porosity field, such that the solution was static in time. This model can be found in:

```
/Magma/Models/Milestone3/Ridge2D_FieldBasedConstantPorosity
```

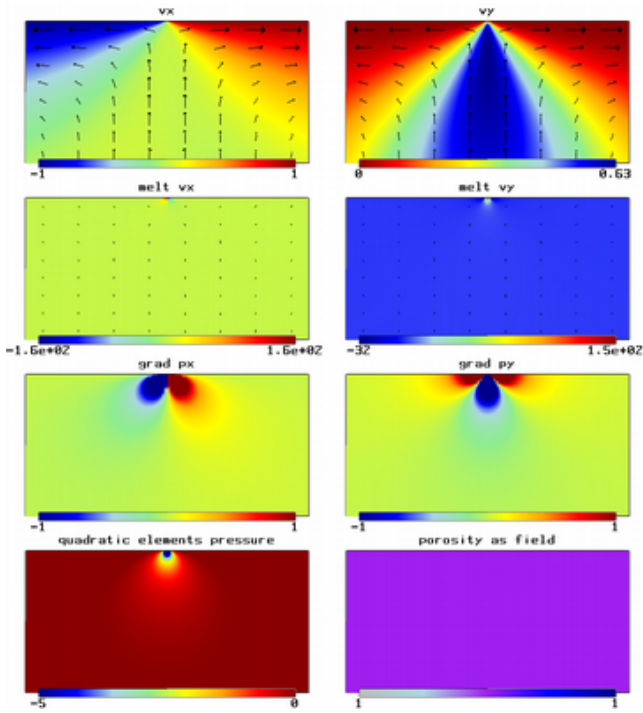
The second model was an extension of the porosity driven Stokes flow with a Gaussian initial distribution implemented in milestone 2. This model resides at:

```
/Magma/Models/Milestone3/FieldBasedPorosityDrivenFlow2D
```

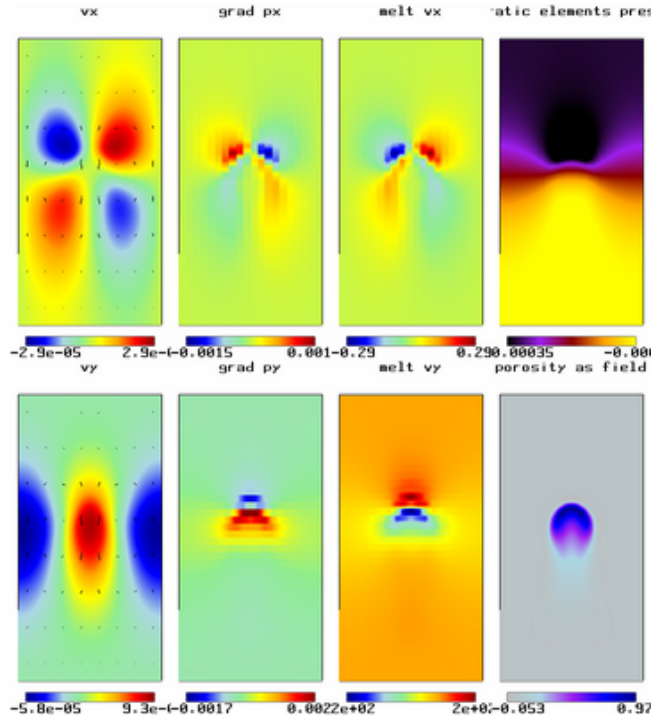
Since the melt velocity is decoupled from the McKenzie equations, it is relatively simple to calculate, provided that the pressure and solid velocity fields have already been accurately determined. As such no tests were applied to validate its accuracy, however qualitatively their behavior is observed to be correct.

Melt Model

MILESTONE 3 - RESULTS



2D Ridge with Constant Porosity. Solid and melt velocity, pressure and pressure gradient fields for 2D ridge model with constant porosity. Melt velocity magnitudes are significantly larger near the point of discontinuity due to their proportionality to the pressure gradients, which are largest at these points.



Gaussian Porosity Driven Flow Solid and melt velocity, pressure and pressure gradient fields for Stokes flow driven by a Gaussian initial porosity distribution.