

# Long Term Tectonics Discussion Points

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## Scientific Challenges for CIG-II

- Coupling GALE with Magma Dynamics
  - E.g. Simulate melt generation as a function of rifting, subduction.
  - Problems = where the melt go and how does it influence deformation? Can we predict melt composition also? Quantify magma-solid interactions.
- Coupling GALE to Surface Processes
  - Need to implement current methods for mass removal, transport, deposition, paleoclimate simulations
- Application of GALE to Ice/Sheets, glacial flow problems.
  - Need to be able to use GALE on top of a complex boundary (topography).
  - Solve short and long-timescale problems. (e.g. predict erosion of glacial interglacial cycles, compare to geodetic observations).
  - Challenges: Sub ice hydrology, ocean-ice interactions, glacial lakes.
- Grids – Geology input: importing complex geometries into GALE.
- Coupling surface (lithosphere) with large scale mantle convection.

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## Software Engineering Challenges for CIG-II

- Mainstreaming/implementation of:
  - Anisotropy, elasticity, preserving sharp faulted topography with time.
- Faulting in 3D
  - can this be done more efficiently?
- Facilitate input file generation:
  - Need a better method for user engagement with input.
  - Need options/choices visible in input process
  - Closer partnership between CIG-VPAC needed.
  - Program flow/documentation complex.

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### Community Organization Challenges

- Longer, more in depth (developer) workshops.
  - Education on code structure needed.
  - Workshops for users to make their own plugins
  - Users showing success stories of GALE applications (e.g. how to set up more complex problems)
- Continue having shorter (introductory) workshops
- Visiting scientists program for working with developers (CIG and VPAC)