Software Tools for Geodynamic Modeling and Analysis

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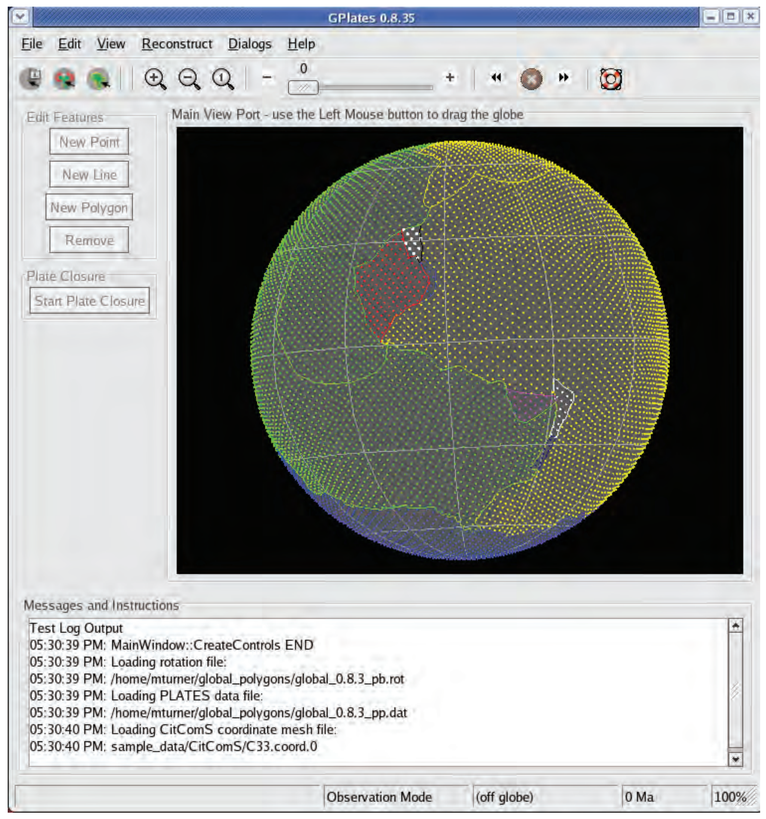
GPlates: a 3D GIS-like tool for Tectonic Reconstructions

- Open-source application developed by Caltech, University of Sydney, and the Norwegian Geologic Survey (NGU)
-Tectonic Feature Data is used to create global plate polygons
- Plate polygon boundaries are computed upon each reconstruction
- Global velocity data generated for geodynamic model, CitComS.



Semi-Automated processing of model input and output with suite of Python scripts and GMT calls.

Image production options include:

- Single, double, quartet or six-panel figures
- Map view, cross sections, annular rings

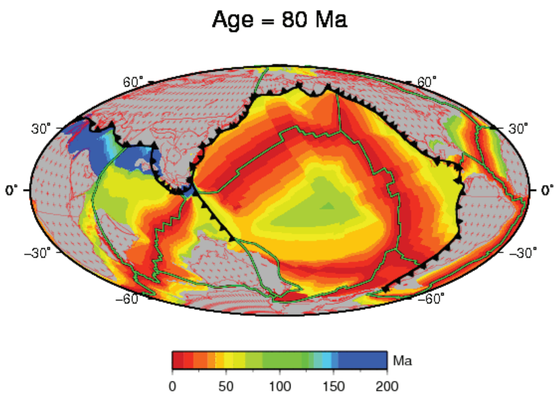
- Feature data overlay
- Velocity data overlay

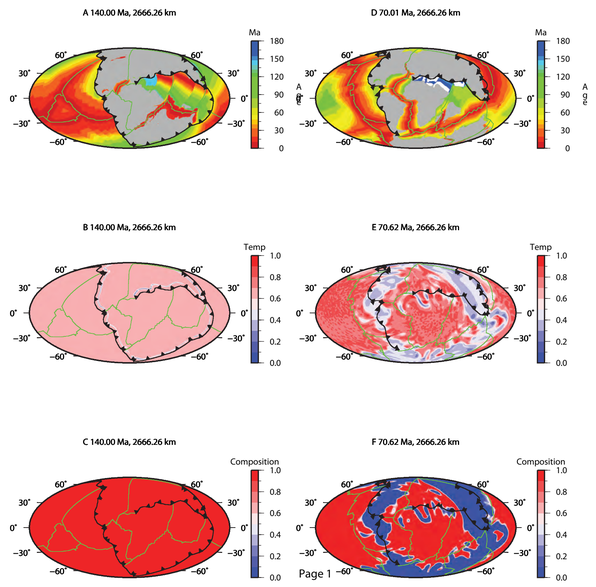
- Automatic Iteration over model level
- Automatic Iteration over model age

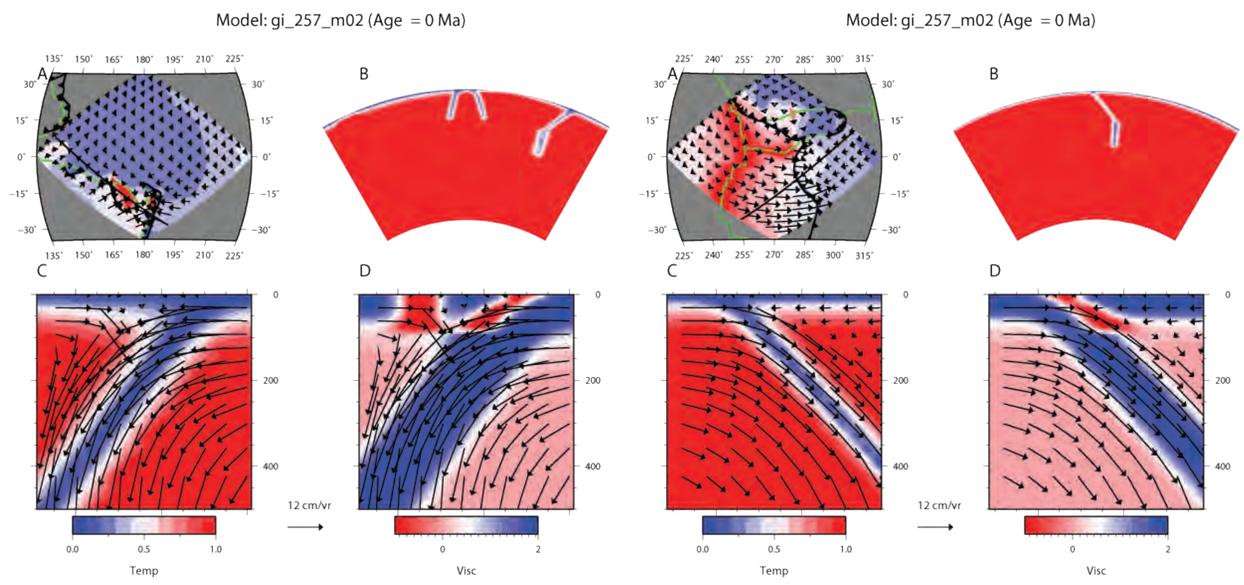
- Detailed modeling of slab physics

- Subduction Zone feature data is processed via GPlates in a GIS-like fashion

- Python scripts combine data from GPlates and slab parameters to build initial conditions for the convection model.



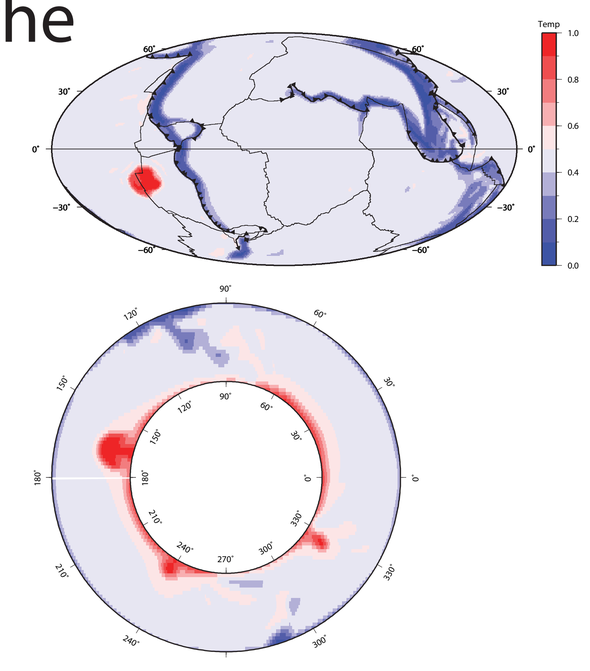




Modeling Low Velocity Structures in the Mantle with the Thermo-Chemical aspects of CitcomS

- Global 3D Citcoms output is sliced along annular rings using code incorporated from CIG.

- Image generation scripts allow for detailed analysis of thermal structures



Scripts for a Stratigraphic Workflow

- Dynamic topography output is interpolated to plate reference frame.

- Initial shape of the continent defined using total sediment isopach, Present day topography and predicted dynamic topography

- Differential dynamic topography is adjusted for sea-level change

- Predictions of coastline position, isopach thickness and tectonic subsidence by filling basins below sea-level

- Misfit calculations between observed and predicted isopachs, coastlines and tectonic subsidence.