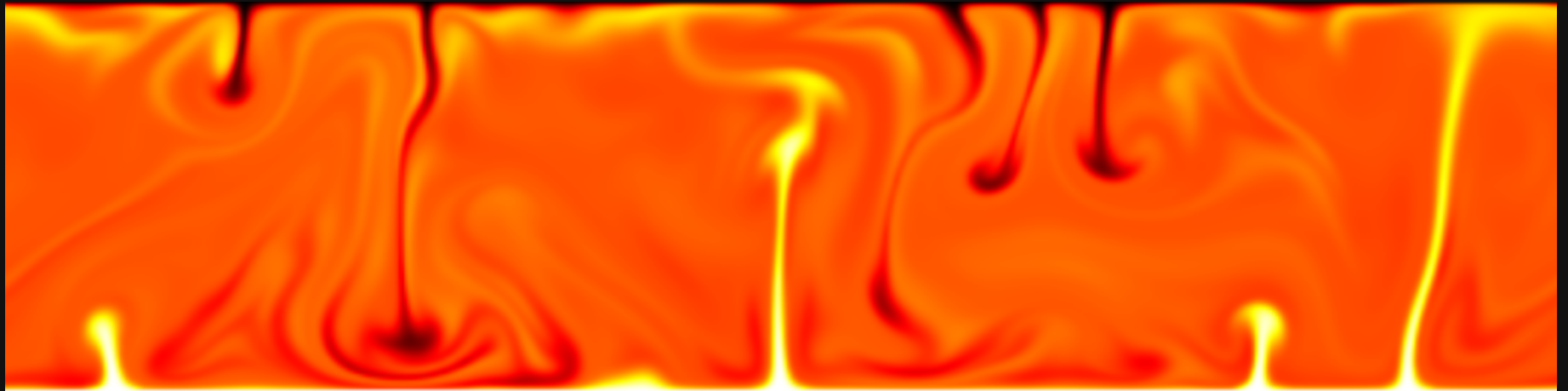


Interactive investigations into planetary interiors



Ian Rose

University of California, Berkeley

AGU 2013

AGU Abstract Browser



Games, Interactive Simulations, and Virtual Labs for Science Teaching and Learning I [SWIRL_CM]

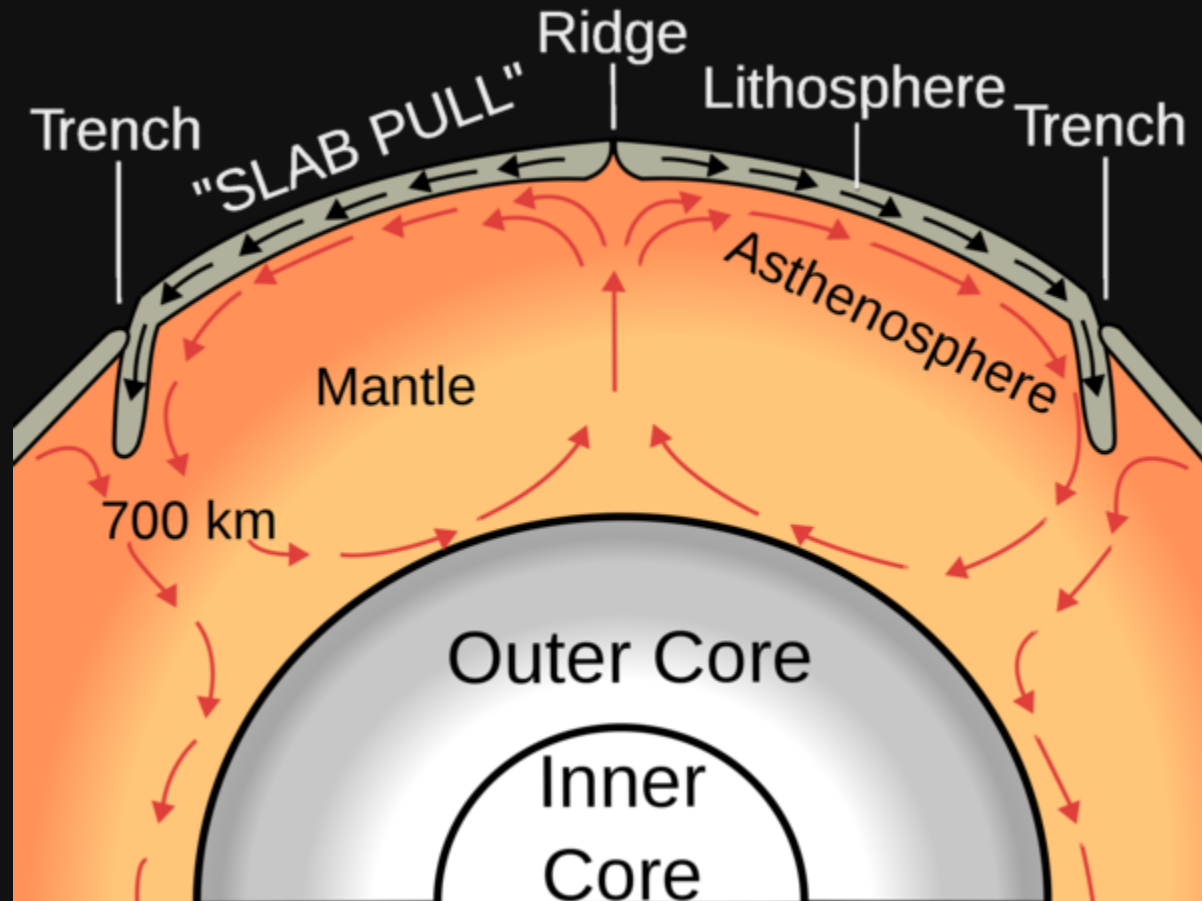
Details

Meeting	2013 Fall Meeting
Section	Education and Human Resources
Identifier	ED13H
Conveners	R M Russell, UCAR, Boulder E L Wood, University of Colorado, Boulder

Abstracts

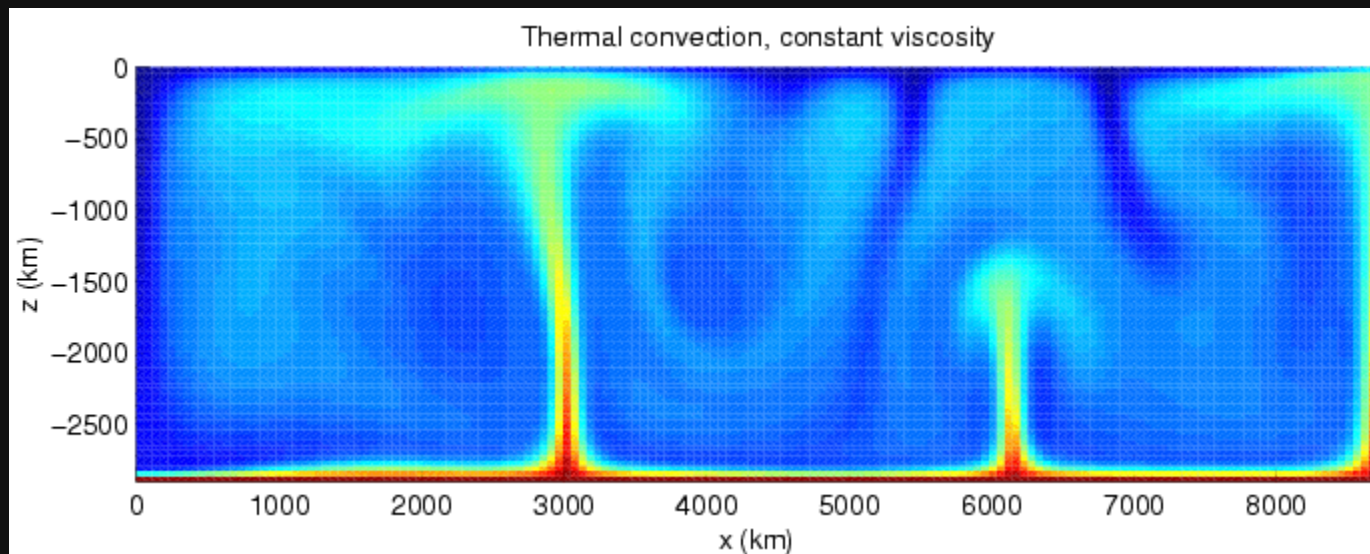
1. [\[ED13H-01\] Engaging the Public in the MESSENGER Spacecraft's Confirmation of Water Ice on Mercury by Using Actual Data](#)
2. [\[ED13H-02\] Interactive Mapping of the Planets: An Online Activity Using the Google Earth Platform](#)
3. [\[ED13H-03\] Computer simulations for the Mars Atmospheric and Volatile Evolution \(MAVEN\) mission through NASA's "Project Spectra!"](#)
4. [\[ED13H-04\] Building worlds and learning astronomy on Facebook](#)
5. [\[ED13H-05\] Engaging Systems Understanding through Games \(*Invited*\)](#)
6. [\[ED13H-06\] The Monash University Interactive Simple Climate Model](#)
7. [\[ED13H-07\] Games and Simulations for Climate, Weather and Earth Science Education](#)
8. [\[ED13H-08\] Educational Videogames: Concept, Design And Evaluation](#)

Mantle convection and plate tectonics education



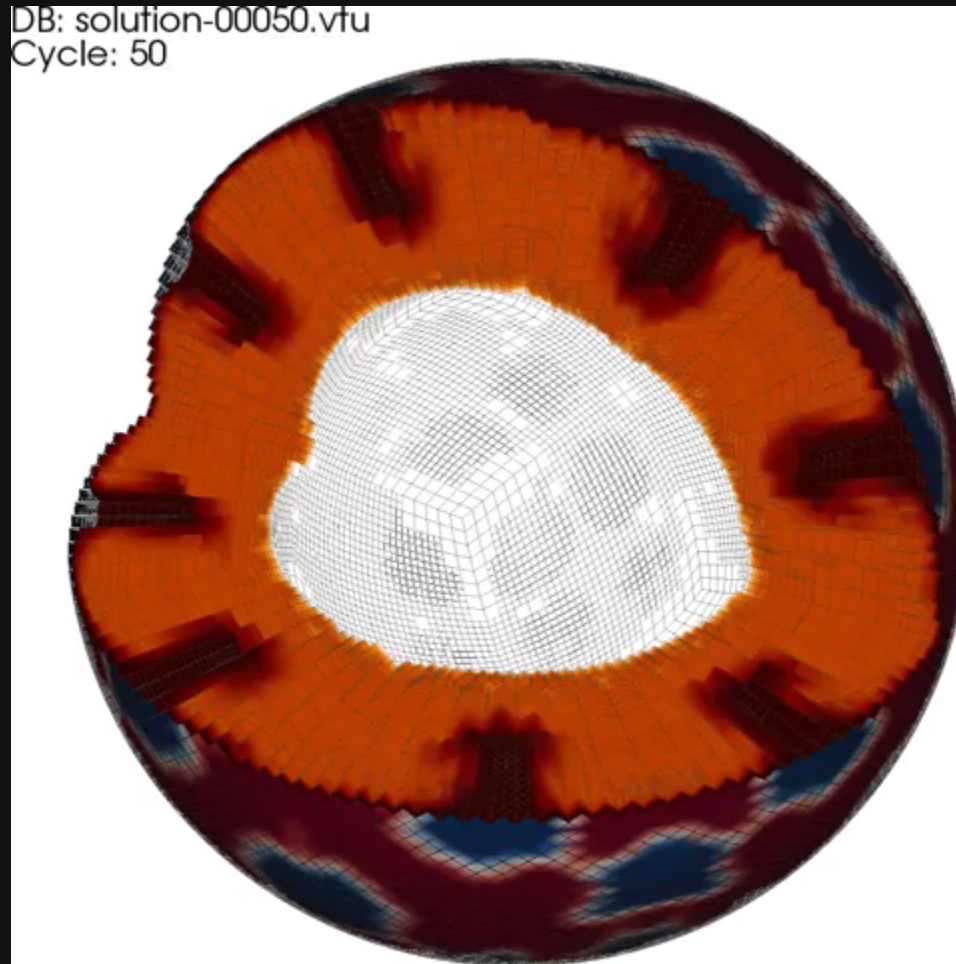
Cartoons (en.wikipedia.org)

Mantle convection and plate tectonics education



Model screenshots (en.wikipedia.org)

Mantle convection and plate tectonics education



Credit: Wolfgang Bangerth

Goals

- Interactivity
- Speed, speed, speed
- Portability
- Nice to look at
- A minimum of visual clutter

Technical details

- Written in C++
- Renders with OpenGL
- Uses SDL2 for event handling
- On the web: compiles to Javascript via emscripten



emscripten

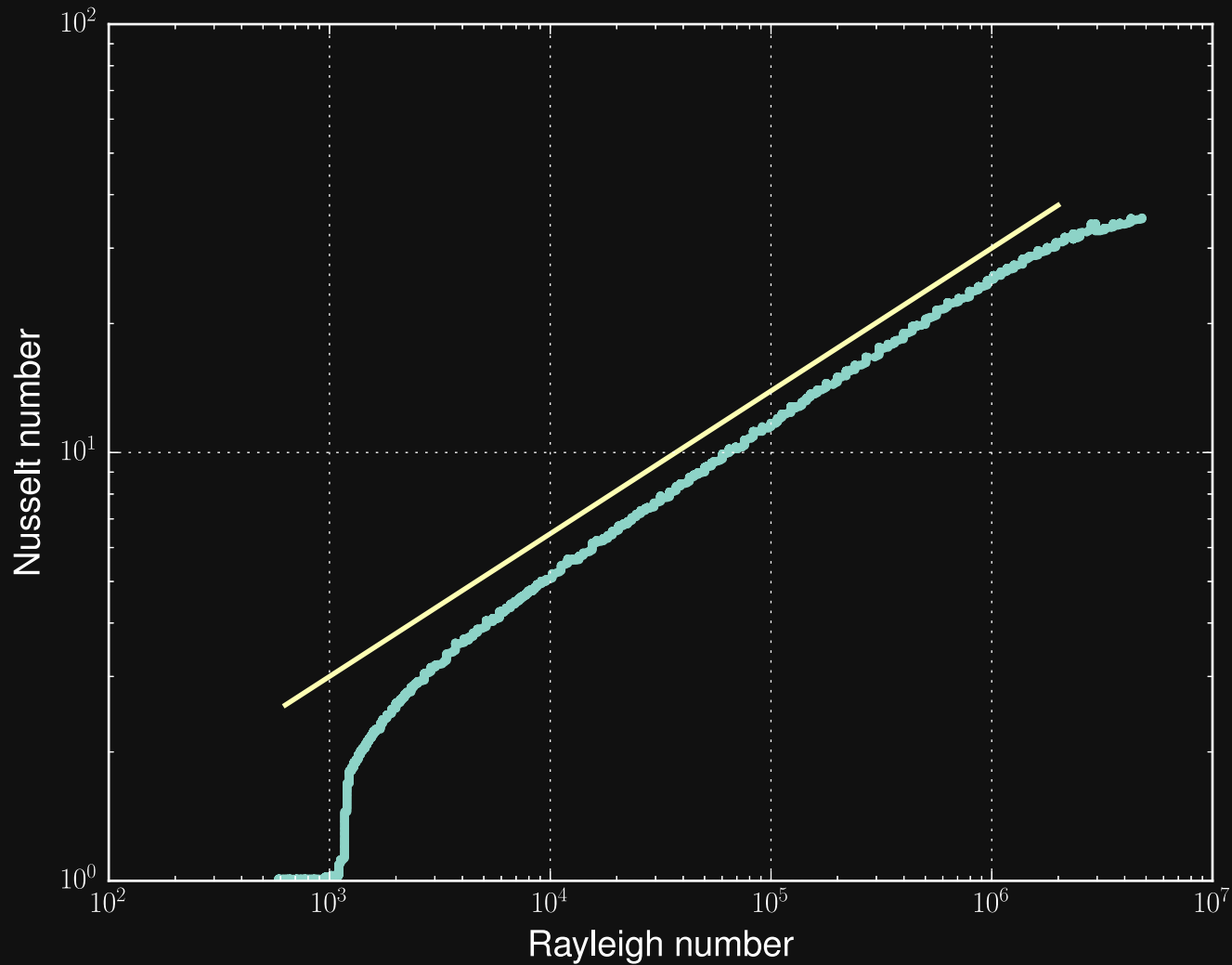


Demonstration?

Backup demonstration



Example lesson plan



Rayleigh number-Nusselt number scaling

Extensions

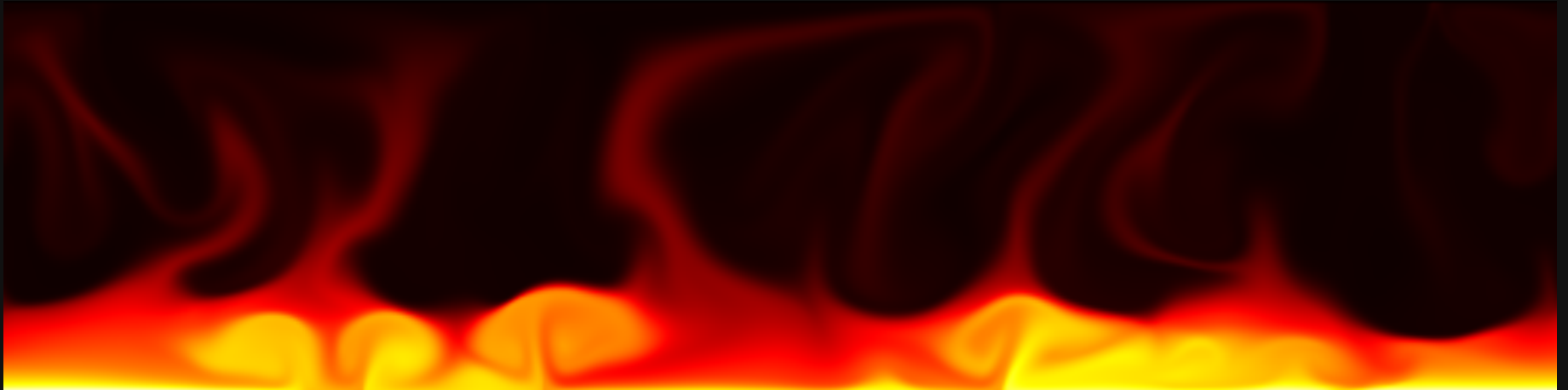
- More lesson plans
- More physics

Takeaways

- Computers have gotten really fast.
- Javascript engines have gotten really clever.
- Compiling software to the web is worth your time.
- Look to professional game development.

Thanks!

Questions?



Email : ian.r.rose@gmail.com

Github : [ian-r-rose](https://github.com/ian-r-rose)