

Education and Training

Short-Term Crustal Dynamics Working Group

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March 31, 2009

Training During Workshops

Most training occurred in 7 workshops, held annually

- 2002: Initiated efforts to benchmark codes
 - Defined suite of benchmarks for verification and assessment of efficiency and features
- 2003: Emphasis on using computational science tools
 - PETSc, scientific frameworks
- 2004-2005: Focused on introducing community to relevant codes
 - Quasi-static modeling codes (GeoFest, LithoMop)
 - Meshing tools (LaGriT, CUBIT)
 - Geologic modeling (EarthVision, Gocad)
- 2006-2008: Focus on education and training of users
 - Hands-on tutorials with documented examples
 - “Tinker time” to allow users to setup their own simple examples

Changes in Education and Training

Much more effective training now than when CIG started

- Early workshops
 - Focused on introduction of codes and tools
 - Hands-on activity limited to installation of code (often unsuccessful)
- Recent workshops
 - Focused on training users how to use codes
 - Significant hands-on time during workshops
 - Users quickly progress from tutorial examples to working on problems of interest
- Desire for training by the community is largely responsible for keeping workshop series going

What Does Not Work

- Tutorials that require compiling codes
 - Building multiple packages takes time
 - Satisfying dependencies is different for each platform
 - Most Linux distributions provide coherent package management
 - Many package managers for Macs have inconsistencies
- Introductions to software from developers outside geodynamics
 - Geodynamics issues not addressed
 - Geologic structure is not described by prisms, planes, cones, spheres, or cylinders
- Benchmarking of codes by the community
 - Communities should establish benchmarks
 - Users lack sustained incentive to update benchmarking results

What Works

- User manual and documented examples
 - Introduction and explanation of options and parameters
 - Step-by-step examples with supplied files
 - Examples start at simplest level and increase in complexity
- Week-long workshops with plenty of “tinker time”
- Tutorials with binaries for several platforms
- Training by users from the geodynamics community
 - Emphasis on using tools to solve problems of interest and overcome common obstacles
- Mailing list where users/developers can interact with rapid feedback
- Developers run benchmarks developed by the community

Unsolved Issues

- Training for expert users
 - Need efficient tools for creating (and maintaining!) road-map of how a code works
 - Effective means for enabling motivated users to help with code development
- Transferring knowledge gained in benchmarking to users
 - Relative efficiency of different discretizations
 - Resolution required to achieve given accuracy
 - Effective finite-element mesh design