

CIG Business Meeting

December 11, 2007

Long Term Tectonics Working
Group Report - December 11,
2007

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Roy (LTT-WG co-chairs)



National Science Foundation
WHERE DISCOVERIES BEGIN

LTT-WG History

- LTT-WG established through grass roots effort in 2007
 - Membership proposed to CIG in October 2007
 - WG approved by Executive Committee in November 2007

LTT-WG Membership

- Dennis Harry, Colorado State University (co-chair)
- Mousumi Roy, University of New Mexico (co-chair)
- Thorsten Becker, University of Southern California
- Todd Ehlers, University of Michigan
- Noah Fay, University of Arizona
- Ritske Huismans, Bergen University
- Carolina Lithgow-Bertelloni, University of Michigan
- Dietmar Muller, University of Sydney
- Patrice Rey, University of Sydney
- Jolante van Wijke, Los Alamos National Laboratory

Workshops & Community-Driven Development

- Workshop on Geodynamic Modeling of Tectonic Processes held in Breckenridge, CO June 10-12, 2005
 - Planning
 - Established framework for CIG LTT-WG
 - GALE
 - Community organization
- First LTT-WG meeting held December 10, 2007
 - Future: recommend annual 2-day workshops
 - 1 day of science talks (what is being done using CIG codes for LTT research)
 - 1 day workshop for user training and to advance and develop new models
 - Community will be queried to identify the best venue

Linkage to General Computational Problems

- GALE
 - Need better documentation, user interface, and tutorial explanation of parameters used in GALE and scaling relations
 - Need more geologically realistic examples
 - LTT-WG will work with CIG to build library of post-processing utilities to expand applications of GALE models
 - High priority code improvements
 - Incorporate melt production & related heat transport calculations
 - Incorporate basic surface process models
 - Flow-through boundary conditions
- CitCOM
- Pylith

Short Term Plans

- Establish rules of governance for LTT-WG (term limits)
- Build community relations & establish communication pathways between users, LTT-WG, and CIG
- Produce document summarizing uses of different CIG codes, their basic computational methods, and their strengths & weaknesses

Long Term Plans

- Coupling multi-physics codes
 - Surface processes
 - Erosion, transport, deposition
 - Realistic lithosphere-asthenosphere interactions
 - Mass transport/heat
 - Melt
 - Aqueous fluids
- Coupling codes for multi-scale problems in a modular way
 - CitCOM <-> GALE <-> Pylith
 - CitCOM: Ashenosphere/Lithosphere scale processes
 - GALE: Lithosphere scale processes
 - Pylith: Crustal scale processes
- Motivation
 - Testable aspects of models are data driven
 - Basin sedimentaiton records
 - Exhumation records
 - Thermobarometry/thermochronology
 - Small-scale observations inform large-scale processes

Hurdles

- LTT modeling community is small, and the U.S. cohort is very small
 - Is this a sustainable user base?
 - Will growth of the user base result in growth of scientifically useful models?
- Funding to support LTT modeling studies using CIG codes is dwindling.