Reservoir Modeling Working Group Meeting

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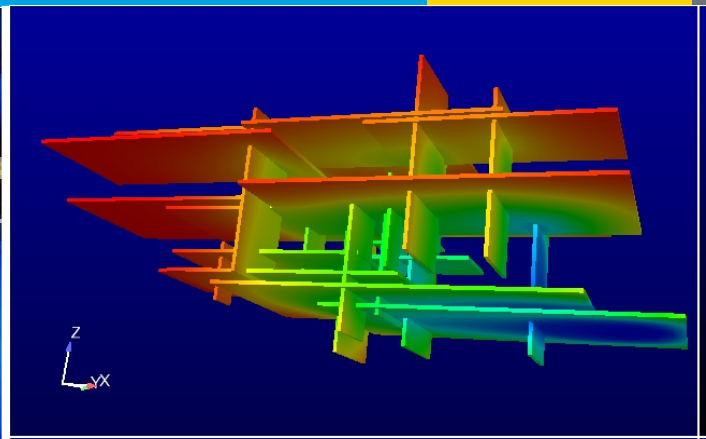

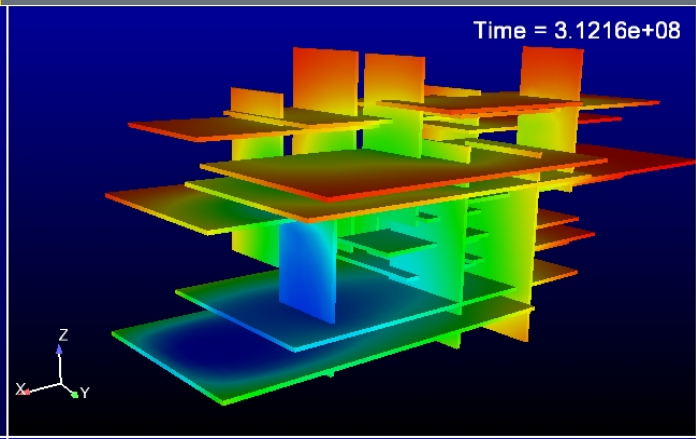

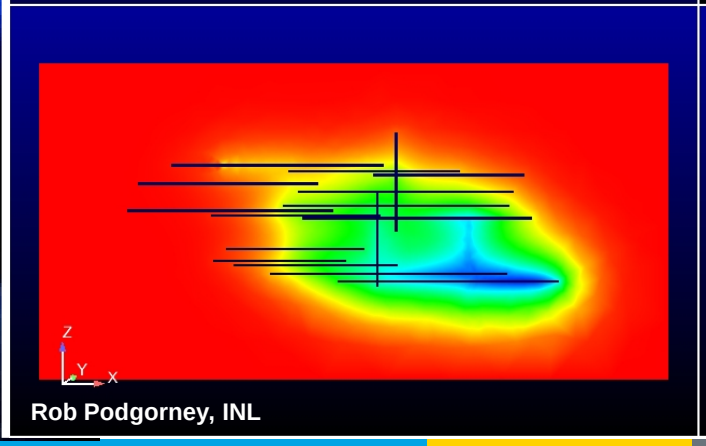

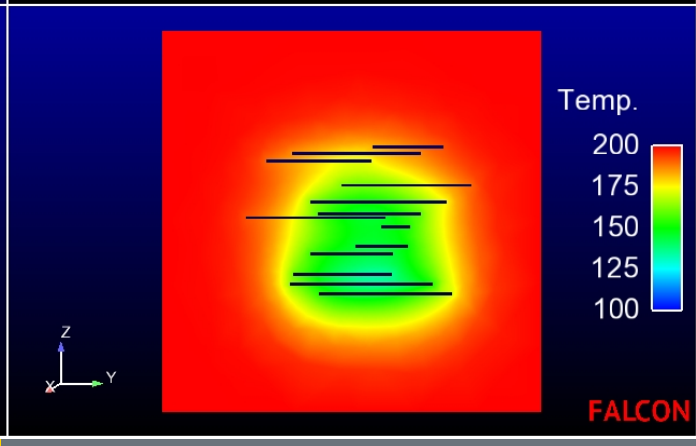

2012 Geothermal Technologies Program Peer Review

The Westin Westminster Hotel, Westminster, Colorado

Thursday, May 10, 2012, 1:30-3:00 PM

Lauren Boyd

Benjamin Phillips

Working Group History

***Past Meetings*:**

March 2010 IPGT Modeling Working Group Meeting

May 2010 GTP Peer Review

Participant presentations- overview of model capabilities

- Systems being modeled
- Assumptions
- Data generation
- Validation
- Information sharing
- Needs

May 2011 GTP Peer Review

Participant discussion

- Goals for Reservoir Modeling
- Developer needs
- Code comparison interest?

***Outcomes*:**

Common Goal:

"To predict and improve the performance of EGS systems being modeled"

- Estimate resource lifetime/production potential
- Manage/mitigate assoc. environmental issues
- Reduce cost and risk associated with EGS stimulation by limiting uncertainties (temp, pressure, permeability changes)
- Guide exploration

Needs:

- DATA from EGS stimulation activities

Code Comparison:

- Interested in pursuing
- Past comparisons fostered better working relationships/collaborations for future code development
- Should start with hypothetical scenarios
- "Greenfield" better for real data input

GTP Code Comparison Vision and Goals

- Create a community forum for model validation and improvement.
- Form a broad consortium of developers and their codes – research, industry, and international partners.
- Define and thoroughly document geothermal-specific test problems.
- Analysis and publication of results.
- Develop a dynamic code comparison framework that will support the current project objectives as well as the ongoing needs of the geothermal modeling community.

Why now?

- Major improvements in computational power have yielded a new class of tools not available the last time the geothermal community mounted a model intercomparison.
- Recent code development projects under GTP support have yielded new capabilities primed for demonstration.
- Opportunity to substantially benefit new field-scale tests through carefully guiding experimental design and data collection goals.
- Opportunity to build on the sound science of recent validation efforts undertaken by a number of other subsurface communities.

Geothermal Code Comparison Effort

GTP Objective: Create a community forum for reservoir model validation and improvement.

2012	2013	2014	2015

Definition

- Data gathering (analytic models, lab, field)
- Build code developer consortium (Lab, university, industry)
- Define geothermal-specific problems (synthetic, field)
- Define protocols and data framework

Consortium Implementation

- Consortium refines benchmark protocols (inputs, outputs)
- Consortium runs phased benchmarks

Analysis

- Define and apply metrics
- Identify development needs
- Complete verification framework
- Publication of results

Near-Term Activities:
Community Input and Feedback

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- Discussion forum on the Geothermal VELO for comments and suggestions.
- Code-characteristics wiki:

  Resource to inform GTP, peers, comparison structure.

  Broad participation is highly encouraged.

  Feedback welcome.

  Document available to consortium members.

Developer's Name	Affiliation	Code Name(s)	Licensing and Availability	Last GTP Support	Project Title or Primary Application(s) if non-GTP	Class	Coupling	Focus	Scale	Key Physics	….
			e.g., Open source available at http://www.mycode.com	e.g., 2012, N/A	e.g., Title; or EGS, EOR, CO2 sequestration	e.g., THM	e.g., Coupled - two codes, solution sequence; information transfer mechanism; convergence mechanism	e.g., Reservoir Creation	e.g., 1-100 cm	e.g., Navier-Stokes w/turbulence; multiphase; continuum mechanics; tracer tracking	….