

Comments for the CHyMP

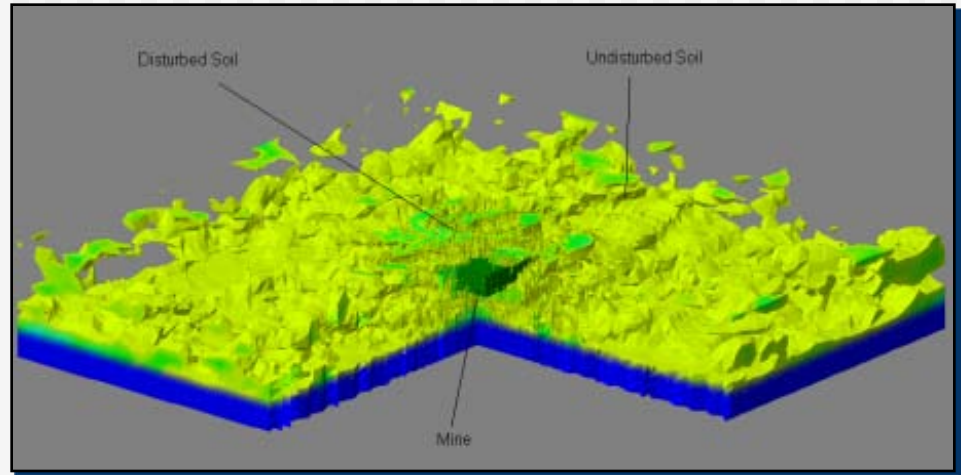
US Army Engineer Research
and Development Center
(ERDC)

Vicksburg, MS

Motivation

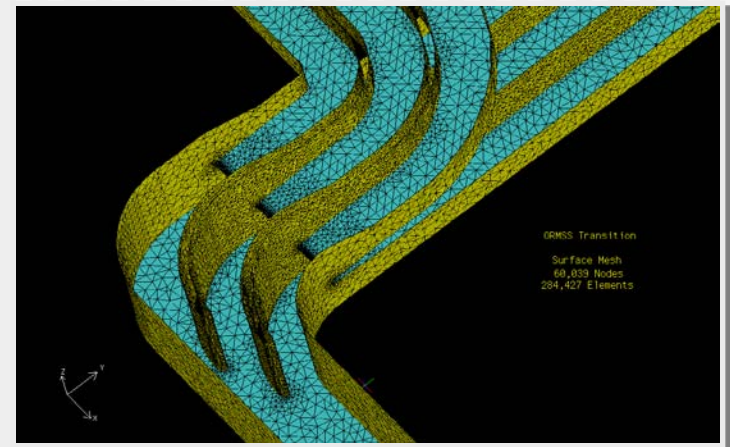
- Ecological Evaluation and Restoration
- Groundwater Cleanup
- Flood Analyses
- Remote Sensing
- Water Supply
- Sediment Erosion and Deposition
- Estuarine and Riverine Flow and Transport

- Code coupling AND reuse of code infrastructure AND consistent data access



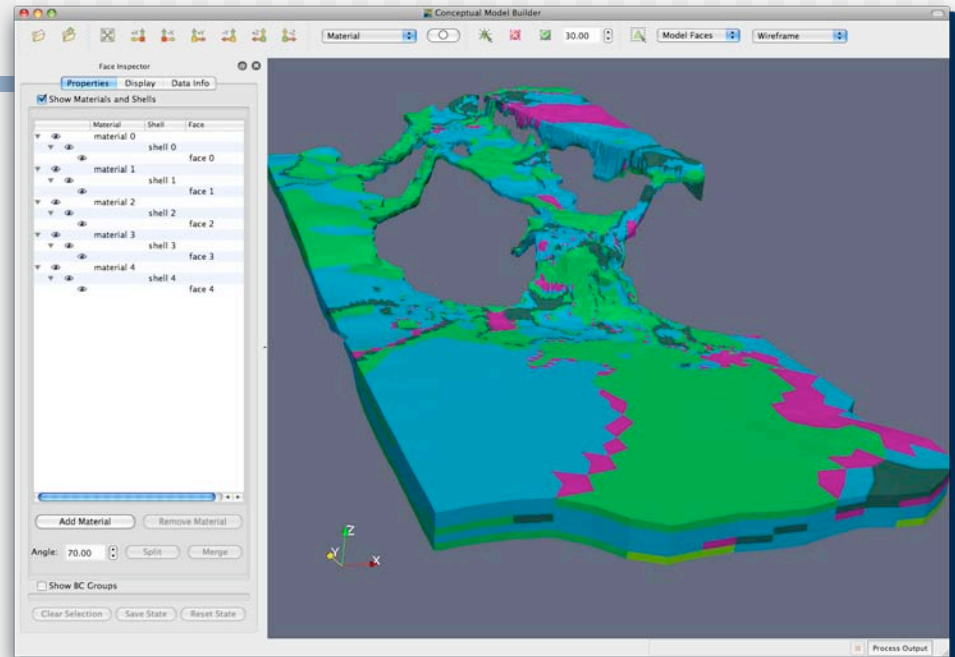
General Issues

- Wide Range of Time and Space Scales
 - Pore scale to basin scale
 - Seconds to years
- Wide range of equation sets
 - Richards, Two-phase
 - Diffusive wave, Full shallow water
 - Navier Stokes
 - Energy
- Computing Platforms
 - Desktop/Laptop (Microsoft, Mac, Linux)
 - Department-level cluster (parallel, distributed memory)
 - HPC (shared/distributed memory, multi-node, multi-core)
- Multiple fidelity and evolving fidelity modeling



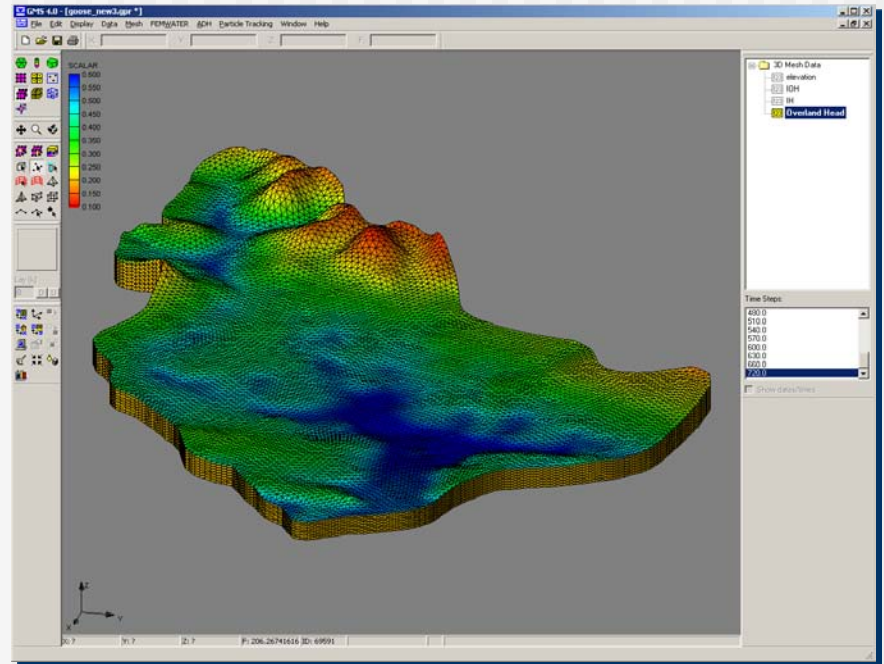
What have we learned?

- Two-generations of problem solving environments (WASH/ADH and pyADH)
- Must support applications and R&D
- Different levels of coupling
 - Loose (e.g., periodic file exchange)
 - Tight (in-code, iterated)
- Consistent pre- and post-processors (implies consistent file I/O)
- GUI must maintain problem independence (conceptual modeling). Difficult to imbed complexity in generic pre-processor
- Common language is important to success (e.g., LAPACK)
- Expect unexpected couplings (for us, DEM, ray caster)
- Need well-conceived community problems



Special Considerations for Large Problems

- Limitations of desktop pre- and post-processors
- Mesh generation
- Security issues can trump proposed or existing model couplers



Questions

- *What is the role of community-related hydrologic modeling in your organization?*
 - Assessing water resources engineering issues
 - Predicting transport of sediment, contaminants
 - Comparing remedial alternatives

- *How would your organization benefit from a community-wide hydrologic modeling platform, like CHyMP?*
 - Simple, standardized model coupling will ease collaboration
 - Easier access to others' data
 - Reduce the lag time between developments and general application

- *Would it potentially serve the mission of your organization to collaborate in the development of CHyMP?*
 - Yes

- *How are the ideas expressed in the morning talks relevant to the direction of hydrologic modeling in your organization?*