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TOUGH3-FLAC3Dv6: a tool for parallel simulation of fluid flow and geomechanics

Antonio Pio Rinaldi (1,2), Jonny Rutqvist (2), Laura Blanco-Martín (2,3), Mengsu Hu (2), and Manuel L. Sentís (4)

(1) Swiss Seismological Service, ETH Zürich, Zürich, Switzerland (antoniopio.rinaldi@sed.ethz.ch), (2) Energy Geosciences Division, LBNL, Berkeley, CA, USA (jrutqvist@lbl.gov, mengsuhu@lbl.gov), (3) Department of Geosciences, MINES ParisTech, Fontainebleau, France (laura.blanco_martin@mines-paristech.fr), (4) Swiss Federal Nuclear Safety Inspectorate (ENSI), Brugg, Switzerland (manuel.sentis@ensi.ch)

The current development of georesources exploitation strongly relies on numerical simulation of fluid flow and geomechanics. Coupled processes are essential to properly assess changes in system transmissivity as well as to study the risk associated with induced seismicity.
Since its initial development in the late 1990s, TOUGH-FLAC has been applied to study geomechanical aspects of CO_2 sequestration, nuclear waste disposal, enhanced geothermal systems, underground gas storage and compressed air energy storage, gas production from hydrate-bearing formations, induced seismicity, as well as for the implementation and the study of constitutive equations.
The recent development of the TOUGH3 code allows for a fast and more reliable fluid flow simulator. At the same time, new versions of FLAC3D are released periodically, allowing for new features and faster execution.
Here, we present the implementation of the coupling between TOUGH3 and FLAC3Dv6.0, maintaining a parallel computing capability for the coupled fluid flow and geomechanical code. We compare the newly developed version with the previous approach, and provide some example applications to account for the new features of the two codes.