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**Xiaolin Li\*** ([linli@ams.sunysb.edu](mailto:linli@ams.sunysb.edu)), Department of Applied Math and Stat, SUNY at Stony Brook, Stony Brook, NY 11794, and **Wurigen Bo, Brian Fix, JoungDong Kim** and **James Glimm**. *Front tracking and its coupling with convection dominated problems.*

The renovated FronTier library, equipped with high order surface algorithms, is coupled with a set of new PDE solvers. This includes the AMR-enabling compressible solver, the incompressible Navier-Stokes solver and the precipitation solver. We apply these new solvers to simulations of fluid mixing, bubbling, jet, fluid-structure interaction and convection driven precipitation of subsurface flow. We will present some interesting verification and validation on these problems. (Received March 29, 2010)