Contribution ID: **19**   Type: **Contributed talk**

Efficiently solving non-linear time-dependent problems from the geosciences

Wednesday, 3 April 2024 17:00 (30 minutes)

The presentation investigates the efficient use of a linearly implicit stiff integrator for the numerical solution of density driven flow problems. Upon choosing a one-step method of extrapolation type (code LIMEX), the use of full Jacobians and reduced approximations are discussed. Numerical experiments include nonlinear density flow problems such as diffusion from a salt dome (2D), a (modified) Elder problem (3D), the saltpool benchmark (3D) and a real life salt dome problem (2D). The arising linear equations are solved using either a multigrid preconditioner from the software package UG4 or the sparse matrix solver SuperLU. Based on these component, this work devises guidelines for the design of an efficient solver.

Presenter: WITTUM, Gabriel (King Abdullah University of Science and Technology)