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Anelastic and compressible simulations of moist deep convection

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This presentation will discuss simulations of the two benchmark deep convection cases applying anelastic and compressible models, namely the Bryan-Fritsch 2D thermal in a deep moist-neutral atmosphere and the Weisman-Klemp 3D supercell formation in the sheared environment. A unified fluid flow model based on the EULAG numerical framework (see www.mmm.ucar.edu/eulag) is used. The compressible model features either an explicit scheme (requiring short time steps for numerical stability) or a novel semi-implicit solver that allows time steps as long as the anelastic model. Model simulations show excellent agreement between anelastic and compressible solutions and provide strong evidence for the efficacy of the compressible semi-implicit solver. The latter paves the way for the application of the semi-implicit model in global moist deep flows where the anelastic approach is often argued to be inappropriate.