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RANS simulations of variable density flows subject to a changing body forces and shocks REBECCA BERTSCH, ROBERT GORE, Los Alamos National Laboratory — Modeling turbulent mixing in variable density (VD) fluid flows is a key topic of interest in multi-physics applications due to the complex instability characteristics they exhibit. DNS and LES are ideal for studying these types of flows but are computationally expensive. RANS models have developed into accurate and efficient tools to investigate the evolution of turbulence in these complex flow problems and are well validated for prototypical variable density flows such as Rayleigh-Taylor and Richtmyer-Meshkov. However, most lack the ability to accurately capture mix features in VD flows subject to shocks and changing body forces. This talk will present results from a modified RANS model, which substitutes the molecular diffusion term in the species equation with a counter-gradient transport term that is dependent on the turbulent mass flux and species micro-densities. This modification better captures the mix physics across a range of Atwood numbers. Results from the new model will be presented for RM and RT and compared with DNS and experimental data.

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