Abstract Submitted
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A thermodynamically consistent model for granular-fluid mixtures considering pore pressure evolution and hypoplastic behavior[1] JULIAN HESS, YONGQI WANG, Technische Universitt Darmstadt — A new mixture model for granular-fluid flows, which is thermodynamically consistent with the entropy principle, is presented. The extra pore pressure described by a pressure diffusion equation and the hypoplastic material behavior obeying a transport equation are taken into account. The model is applied to granular-fluid flows, using a closing assumption in conjunction with the dynamic fluid pressure to describe the pressure-like residual unknowns, hereby overcoming previous uncertainties in the modeling process. Besides the thermodynamically consistent modeling, numerical simulations are carried out and demonstrate physically reasonable results, including simple shear flow in order to investigate the vertical distribution of the physical quantities, and a mixture flow down an inclined plane by means of the depth-integrated model. Results presented give insight in the ability of the deduced model to capture the key characteristics of granular-fluid flows.

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