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Non-cohesive, unimodal sediment transport in non-hydrostatic dam-break flow[1] PATRICIO BOHORQUEZ, Universidad de Jaen — The mixture equations for non-cohesive, unimodal sediment transport in turbulent free-surface flow are derived from the conditionally averaged Navier-Stokes equations. The mathematical similarity between the sediment volumetric concentration β and the water phase indicator function γ is highlighted in the present model. We take advantage of this fact to formulate an explicit Finite Volume Method in which the pressure equation is formulated as the Schur complement in a segregated pressure-based solver. The numerical scheme was implemented into OpenFOAM®, an open source software tailored for Computational Continuum Mechanics. The capabitities to account for non-buoyant sediment transport in shallow-water flows is illustrated by computing an erosional dam-break flow. This benchmark depicts the capabilities of the present model to account for erosional processes, as well as to model the boundary between the traction carpet (or bed load layer) and the intermittently suspended sediment, which cannot be sharply defined in hyperconcentrated flows.

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