Abstract Submitted
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A poro-elasto-visco-plastic model of the dewatering of a two-phase suspension TOM S. EAVES, University of Dundee, DANIEL T. PATERSON, University of British Columbia, DUNCAN R. HEWITT, University College London, NEIL J. BALMFORTH, D. MARK MARTINEZ, University of British Columbia — A poro-elasto-visco-plastic model for the consolidation of a two-phase suspension is presented, motivated by the compaction and dewatering of wood-fibre pulp. For that material, traditional two-phase models of particulate porous media based upon plastic yielding of the particle network prove insufficient to capture the observed dynamics. The incorporation of viscous effects stemming from the compaction of the wood-fibre-network assists the model in reproducing experimental dewatering tests at moderate rates of compaction. However, during more rapid dewatering there is clear emergence of an elastic behaviour in the wood-fibre network. We present a poro-elasto-visco-plastic extension of the model, its calibration for wood-pulp using quasi-static cycles of loading and unloading, and demonstrate its improved representation of the rapid dewatering experiments.

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