Raining into shallow water as a description of the collapse of a column of grains JOHN HINCH, DAMTP, Cambridge University, EMELINE LARRIEU, IMFT, Toulouse, LYDIE STARON, DAMTP, Cambridge University — A modified shallow-water model is presented for the collapse of tall columns of grains. The flow is divided in two parts. Depth-averaged shallow-water equations are applied to a thin horizontally spreading layer which is subjected to Coulombic friction. The falling mass of grains is gradually added in the zone of the initial column during the free-fall time of the column. This 'rain' is assumed to have no horizontal momentum. The results obtained here are in agreement with both planar and axisymmetric experiments over a range of aspect-ratio a. In particular, the runout distance is found to vary as $a^{0.65}$ (planar) and $a^{0.52}$ (axisymmetric). The flow dynamics compares well with discrete simulations which have been successfully compared with experiments.

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