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Avalanche behavior in yield stress fluids DANIEL BONN, Laboratoire de Physique Statistique, Van der Waals-Zeeman Instituut, Univ. of Amsterdam — We show that above a critical stress, typical yield stress fluids (gels, clay suspensions) and soft glassy materials (the colloidal glass of Laponite) start flowing abruptly and subsequently accelerate, leading to avalanches that are remarkably similar to those of granular materials. Rheometrical tests reveal that this is associated to a bifurcation in rheological behavior: for small stresses, the viscosity increases in time: the material "ages," and eventually stops flowing. For slightly larger stresses the viscosity decreases continuously in time: the flow accelerates and we observe a 1 "rejuvenation" of the material by the flow. We show that for the Laponite system, both the aging and the shear rejuvenation can be observed directly using Diffusive Wave Spectroscopy. We propose a simple physical model capable of reproducing the rheological observations. These results may have some implication in geophysics: they shed some light on certain landslides of clayey soils, and the way quicksand works.

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