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# Water entry of yield-stress droplets

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## Résumé

We study through direct numerical simulations the water entry of yield-stress droplets. Following the impact on water free surfaces, these Non-Newtonian fluids undergo at least three stages: a spreading one (1), related to the impact acceleration, driven by the viscous dissipation and during which the droplet reaches its maximum deformation; a droplet-water interaction stage (2) along which the viscoplastic material tends to recover its initial morphology before being finally dominated by the yield-stress (3), which prevents further deformations. Different final shapes are observed as a function of the capillary, viscous and inertial effects. Their link with the fluid rheology is discussed in the light of scaling laws, kinematic and energy exchange analyses.

**Mots-Clés:** water entry, yield, stress fluid, direct numerical simulation

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