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Windswept droplets JOSE BICO, FRANCOIS BESSELIEVRE, MARC FERMIGIER, PMMH-ESPCI, Paris — A small droplet impacting a glass window usually remains stuck on the pane. How can we expel it? One possible solution consists in coating the glass surface with a hydrophobic layer. Another solution is to blow it off. We explore this last solution (partly combined with the first one). The droplet starts moving when the wind exceeds a threshold velocity, depending essentially on the surface wettability and the drop size. Above this threshold, the drift speed of the droplet results from a balance between aerodynamic drag and viscous dissipation near the contact lines. The results for different experimental conditions collapse on a master curve, once the wind speed is rescaled as a Weber number and the droplet velocity as a capillary number. While small droplets remain almost spherical caps, larger ones are strongly deformed and take the shape of a sausage, perpendicular to the wind direction. We finally determine the conditions in which satellite droplets are left at the rear of the moving drop, an issue crucial for blow drying processes.

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