

Nomenclature

Variable	Sb.	Value/Range
<i>Water physical properties</i>		
density	ρ	10^3 kg m^{-3}
kinematic visc.	ν	$10^{-6} \text{ m}^2 \text{ s}^{-1}$
diffusion coef.	D	$\sim 10^{-9} \text{ m}^2 \text{ s}^{-1}$
surface tension	γ	$70 \times 10^{-3} \text{ N m}^{-1}$
capillary length	λ_c	2.7 mm
<i>Drop</i>		
radius	R_d	2.3 mm
volume	V_d	$5 \times 10^{-8} \text{ m}^3$
velocity	u_d	[1; 10] m s ⁻¹
puddle spread. rad.	r_d	1 cm
puddle height	h_d	100 μm
<i>Film</i>		
thickness	h	[30; 300] μm
	$h(h^* = 1)$	115 μm
<i>Mixing and ejections</i>		
eq. radius	R_{eq}	[6; 16] mm
second-ord. moment	σ_{eq}	[2; 5] mm
ejected prop.	φ_e	[0.6; 1]
drop prop. in film	$\varphi_{d \rightarrow f'}$	[0; 0.5]
film prop. in ejections	$\varphi_{d \leftarrow f'}$	[0; 0.1]

Table 1.1: General nomenclature: physical properties and typical length scales.

Variable description. – Associated symbol. – Typical order of magnitude or range.

Variable	Sb.	Expression	Value/Range
<i>Timescales</i>			
dripping	t_0	–	[0.1; 10 ⁷] s
drop impact	t_i	$2R_d/u_d$	[1; 5] ms
capillary time	t_c	$\sqrt{4\rho R_d^3/(3\gamma)}$	15 ms
drainage	t_d	$\nu r_d^2/(gh_d^3)$	12 s
precipitation	t_p	h_d/α^\dagger	[20; 2 × 10 ⁴] s
visc. vert. diff. over h	t_ν	h^2/ν	[5; 280] ms
visc. horiz. diff. over R_d	$t_{\nu,d}$	R_d^2/ν	6 s
molec. vert. diff. over h_d	t_\downarrow	h_d^2/D	10 s
molec. horiz. diff. over R_d	t_\rightarrow	R_d^2/D	90 min
<i>Nondimensional numbers</i>			
Reynolds (drop free fall)	Re	$2\rho_a R_d u_d/\mu_a^\ddagger$	[300; 3000]
film thickness	h^*	$h/\sqrt{\nu t_c}$	[0.4; 4.3]
Weber	We	$2\rho R_d u_d^2/\gamma$	[525; 2750]
Ohnesorge	Oh	$\nu\sqrt{\rho/(2\gamma R_d)}$	1.7×10^{-3}
Péclet (growth model)	Pe	$gh_d^3/(3\nu D)$	2700

Table 1.2: General nomenclature: characteristic timescales and nondimensional numbers.

Variable description. – Associated symbol. – Mathematical expression. – Typical order of magnitude or range. – [†] α in Tabs. 6.1 and 6.2. – [‡] $\rho_a = 1.2 \text{ kg m}^{-3}$, $\mu_a = 18 \times 10^{-6} \text{ Pa s}$.

Stalagmites

Cave	Name	Sb.	z [m]	r_{sm} [cm]
<i>Clamouse</i>	Clam01	●	8.7	4.5
	Clam02	■	1.2	2.7
	Clam03	◆	0.3	2.4
	Clam04	▼	15.6	5.7
<i>Orgnac</i>	Org01	●	23.8	6.7
	Org02	■	20.1	5.0
	Org03	◆	2.6	3.7
	Org04	▼	3.9	2.8
	Org05	▲	21.5	6.8
	Org06	▶	25.2	8.5
	Org07	◀	4.7	3.7
<i>La Salamandre</i>	Sal01	●	25.6	6.7
	Sal02	■	21.6	6.9
	Sal03	◆	16.0	5.8

Table 2.1: Cave measurements database: high-speed movies (Ch. III).
Falling height z . – Average top radius r_{sm} .

Cave	Name	Type	Sb.	z [m]	t_0 [s]	r_{sm} [cm]	Ψ	S	Meas.
<i>Clamouse</i>	Clam02	▭	●	1.2	31.4	2.7	1.2	0.04	● ■
	Clam05	▭	◆	2	53.3	2.9	2	0.5	● ■
	Clam06	▭	▼	2.9	4.9	2.52	-168	0.05	●
	Clam07	◐	●	7.6	3.0	9.4	-375	10^{-4}	● ■
	Clam08	▭	▲	8.2	59.6	6.2	-0.6	1	●
	Clam09	◐	■	0.05	1.1	2.9	-192	2×10^{-4}	● ■
	Clam10	▭	▶	6.4	767.1	2.0	-0.8	1.5	■
	Org02	▭	■	20.1	10.5	5.0	0.5	2×10^{-3}	●
	Org03	◐	●	2.6	6.5	3.7	21.5	0.8	● ■
	Org04	◐	■	3.9	88.3	2.8	12	1.4	■
<i>Orgnac*</i>	Org07	◐	◆	4.7	201.8	3.7	30	0.7	●
	Org08	◐	▼	5.6	88.3	2.5	26	0.6	● ■
	Org09	◐	◆	22.7	2.9	7.0	-88	2×10^{-4}	● ■
	Org10	◐	▼	25.5	6.2	7.6	-9.7	5×10^{-3}	● ■
*	Lab01	◐	●	0.05	–	7.5	-120	0.2	● ■

Table 2.2: Cave measurements database: drainage (Ch. V).
Falling height z . – Dripping period t_0 . – Average top radius r_{sm} . – Shape Ψ . – Scale S .
Filling ● or drainage meas. ■, weighing ■, dial gauge ■ or optical sensor ●.