

Supplementary Table 1. List of symbols

Notation		Units
a	dimensionless attenuation	-
d	particle diameter	m
f	drag factor	-
g	acceleration due to gravity	m s ⁻²
g'	reduced gravity	m s ⁻²
k_N	Newton drag correction	-
k_S	Stokes drag correction	-
l	depth below the upper layer	m
m	exponent on reduced gravity	-
m_t	mass below l detected at a time t	
n	number of fingers	-
p	slope of the linear regression between I and c_d	m ³ kg ⁻¹
r	radial component of the polar coordinates	m
t	time	s
t_i	duration required to develop an unstable region	s
w	experimental tank width	m
x	distance travelled by the laser inside the experimental tank	m
z	height (from the initial density interface)	m
A	area of the horizontal cross section of the experiment	m ²
C	local particle concentration	kg m ⁻³
C_u	initial particle concentration of the upper layer	kg m ⁻³
D	fluorescent dye concentration	kg m ⁻³
D_{50}	median particle diameter	m
D_{16}	16 th percentile diameter	m
D_{84}	84 th percentile diameter	m
F	camera digital level (fluorescence)	-
F_D	Flux by double diffusion	kg m ⁻² s ⁻¹
F_{exp}	Particle mass flux measured in experiments	kg m ⁻² s ⁻¹
F_I	Particle mass flux by individual settling	kg m ⁻² s ⁻¹

H_1	upper layer thickness	m
H_2	lower layer thickness	m
I	dimensionless light intensity	-
L	characteristic flow thickness	m
L^*	ratio between the cloud and the PBL thickness	m
P	dimensionless laser power	-
R	residual light effect on digital level	-
V	characteristic flow velocity	m s ⁻¹
V_f	finger velocity	m s ⁻¹
V_p	particle settling velocity	m s ⁻¹
W	finger width	m
X_f	fluid mixing ratio	-
X_p	particle volume fraction	-
At	Atwood number	-
Gr	Grashof number	-
Re	Reynolds number	-
Re_p	particle Reynolds number	-
St	Stokes number	-
α	empirical scaling parameter for the time	m s ⁻¹
β_m	volumetric expansion coefficient of a particle suspension	-
γ	spatial intensity distribution	m ⁻¹ rad ⁻¹
δ	PBL thickness	m
δ_f	characteristic fluctuation lengthscale	m
ϵ	fluorescent dye absorption coefficient	m ² kg ⁻¹
κ_f	diffusion coefficient of the fastest diffusing substance	m ² s ⁻¹
κ_p	diffusion coefficient of the particles	m ² s ⁻¹
λ	finger spacing	m
μ	fluid dynamic viscosity	kg m ⁻¹ s ⁻¹
θ	angular component of the polar coordinates	rad
ν	fluid kinematic viscosity	m ² s ⁻¹
ρ	PBL density	kg m ⁻³
ρ_a	ambient density	kg m ⁻³
ρ_f	fluid density	kg m ⁻³
ρ_p	particle density	kg m ⁻³

ρ_s	sugar solution density	kg m^{-3}
ρ_u	density of the upper layer	kg m^{-3}
ρ_w	water density	kg m^{-3}
σ	sorting parameter (Inman, 1952)	m
ϕ	fluorescent dye quantum efficiency	-
ΔA	pixel area	$\text{m}^2 \text{ rad}$
Δm	difference in particle mass between successive measurements	kg
Δt	time step of the particle mass flux measurements	s
ΔU	characteristic velocity fluctuations	m s^{-1}
Σ	sedimentation number	-
