Frequency of Secondary Ice Production Events upon Freezing of Drizzle Droplets Levitated in Airflow

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Experiment Overview

Setup	case 1	case 2	case 3
Droplet material	pure water	pure water	aqueous solution of sea salt analogue
Airflow humidity	moist	dry	moist
Airflow velocity	terminal fall speed	terminal fall speed	terminal fall speed
Droplet size[1]	325 µm ± 23 µm	315 µm ± 16 µm	303 µm ± 25 µm
No. of droplets	86	365	263

[1] Uncertainties correspond to the 95 % confidence interval, assuming normal distribution for the error on the droplet size and binomial distribution for the error on the event frequency. Negative error margins should be ignored.

Frequency of Secondary Ice Production Events

Case 1

Temperature in °C	Complete Breakup in %	Incomplete Breakup in %	Cracking in %	Surface Bubble Bursting in %	Spicular Bubble Bursting in %	Jetting in %
−3.9 ± 1.2	15.0 ± 15.4	0.0 ± 8.1	5.0 ± 11.4	5.0 ± 11.4	0.0 ± 8.1	5.0 ± 11.4
−8.7 ± 1.3	20.0 ± 19.1	0.0 ± 10.2	26.7 ± 20.5	0.0 ± 10.2	0.0 ± 10.2	0.0 ± 10.2
−12.3 ± 1.1	45.0 ± 20.0	5.0 ± 11.4	10.0 ± 13.7	5.0 ± 11.4	0.0 ± 8.1	35.0 ± 19.3
−14.5 ± 1.6	18.2 ± 21.3	0.0 ± 12.9	36.4 ± 24.7	9.1 ± 18.1	0.0 ± 12.9	18.2 ± 21.3
−20.7 ± 1.3	10.0 ± 13.7	0.0 ± 8.1	20.0 ± 16.8	0.0 ± 8.1	0.0 ± 8.1	10.0 ± 13.7

Case 2

Temperature in °C	Complete Breakup in %	Incomplete Breakup in %	Cracking in %	Surface Bubble Bursting in %	Spicular Bubble Bursting in %	Jetting in %
−1.6 ± 0.6	8.6 ± 9.7	0.0 ± 5.0	17.1 ± 12.3	8.6 ± 9.7	0.0 ± 5.0	5.7 ± 8.5
−4.2 ± 0.4	5.7 ± 8.5	2.9 ± 7.0	22.9 ± 13.5	0.0 ± 5.0	0.0 ± 5.0	0.0 ± 5.0
−6.7 ± 0.5	8.6 ± 9.7	0.0 ± 5.0	17.1 ± 12.3	0.0 ± 5.0	0.0 ± 5.0	5.7 ± 8.5
−8.4 ± 0.6	11.4 ± 10.7	8.6 ± 9.7	8.6 ± 9.7	0.0 ± 5.0	0.0 ± 5.0	11.4 ± 10.7
−11.4 ± 0.7	17.1 ± 12.3	5.7 ± 8.5	28.6 ± 14.4	0.0 ± 5.0	0.0 ± 5.0	17.1 ± 12.3
−13.1 ± 0.5	25.7 ± 14.0	11.4 ± 10.7	5.7 ± 8.5	0.0 ± 5.0	0.0 ± 5.0	5.7 ± 8.5
−14.7 ± 0.5	20.0 ± 12.9	2.9 ± 7.0	20.0 ± 12.9	2.9 ± 7.0	0.0 ± 5.0	2.9 ± 7.0
−18.7 ± 0.7	2.9 ± 7.0	0.0 ± 5.0	22.9 ± 13.5	2.9 ± 7.0	0.0 ± 5.0	0.0 ± 5.0
−22.5 ± 1.0	0.0 ± 5.0	0.0 ± 5.0	8.6 ± 9.7	0.0 ± 5.0	0.0 ± 5.0	2.9 ± 7.0
−29.2 ± 0.2	0.0 ± 3.6	0.0 ± 3.6	0.0 ± 3.6	0.0 ± 3.6	0.0 ± 3.6	0.0 ± 3.6

Case 3

Temperature in °C	Complete Breakup in %	Incomplete Breakup in %	Cracking in %	Surface Bubble Bursting in %	Spicular Bubble Bursting in %	Jetting in %
−8.7 ± 1.2	4.4 ± 6.8	0.0 ± 3.9	6.7 ± 7.8	13.3 ± 10.0	6.7 ± 7.8	0.0 ± 3.9
−12.4 ± 1.3	13.6 ± 10.2	0.0 ± 4.0	6.8 ± 7.9	11.4 ± 9.5	4.5 ± 7.0	9.1 ± 8.8
−16.2 ± 1.1	4.0 ± 5.0	2.8 ± 4.4	1.3 ± 3.5	5.3 ± 5.5	1.3 ± 3.5	4.0 ± 5.0
−20.0 ± 1.2	15.4 ± 9.9	3.9 ± 6.1	9.6 ± 8.3	0.0 ± 3.6	0.0 ± 3.6	11.5 ± 9.0
−23.7 ± 1.3	4.3 ± 6.5	0.0 ± 3.8	2.1 ± 5.4	25.5 ± 12.1	10.6 ± 9.0	0.0 ± 3.8