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Supplement of

The role of organic condensation on ultrafine particle growth during nucleation events

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Supplementary material

TABLE S1. Major compounds for each lumped VOC within SAPRC99 (Tsimpidi et al., 2010).

Species	**Major Components**	**Type of source**	**V-SOA precursors**
ALK1	Ethane, Methyl Formate	Anthropogenic	No
ALK2	Propane, Cyclobutane, Ethyl Formate, Methyl Acetate	Anthropogenic	No
ALK3	n-Butane, Ethanol, Isobutane, Dimethyl, Butane, Dimethyl Pentane	Anthropogenic	No
ALK4	n-Pentane, n-Hexane, Branched C5-C6, Alkanes, Cyclopetane, Trimethyl Butane, Trimethyl Pentane, Isopropyl Alcohol, n-Propyl Alcohol	Anthropogenic	Yes
ALK5	C7-C22 n-Alkanes, C6-C16 Cycloalkanes, Branched/Unspeciated C8-C18 Alkanes	Anthropogenic	Yes
OLE1	Propene, C4-C15 Terminal Alkenes	Anthropogenic	Yes
OLE2	Isobutene, C4-C15 Internal Alkenes, C6-C15 Cyclic or di-olefins, Styrenes	Anthropogenic	Yes
ARO1	Toluene, Benzene, Ethyl Benzene, C9-C13 Monosubstituted Benzenes	Anthropogenic	Yes
ARO2	Xylenes, Ethyl Toluenes, Dimethyl and Trimethyl Benzenes, Ethylbenzenes, Naphthalene, C8-C13 Di-, Tri-, Tetra-,Penta-, Hexa-substituted Benzenes, Unspeciated C10-C12 Aromatics	Anthropogenic	Yes
TERP	α-pinene, β-pinene, Limonene, Carene, Sabinene, other monoterpenes	Biogenic	Yes
ISOP	Isoprene	Biogenic	Yes
SESQ	Sesquiterpenes	Biogenic	Yes

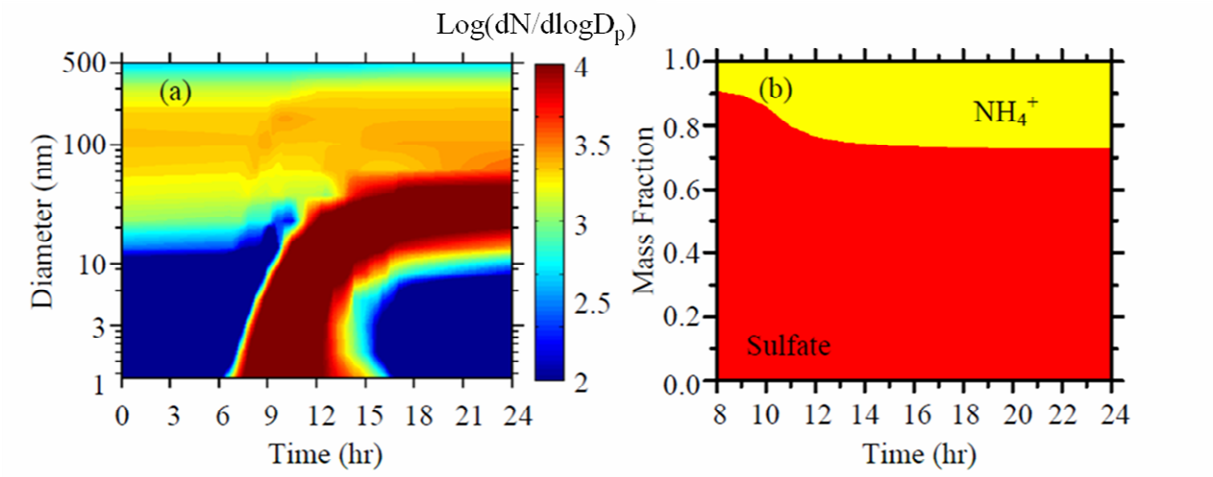

FIGURE S1: (a) Predicted aerosol dry size distribution during a typical spring day with a nucleation event at Finokalia without condensation of organics. Particle number concentration is plotted against time of day (x-axis) and particle diameter (y-axis). **(b)** Predicted composition of new particles.

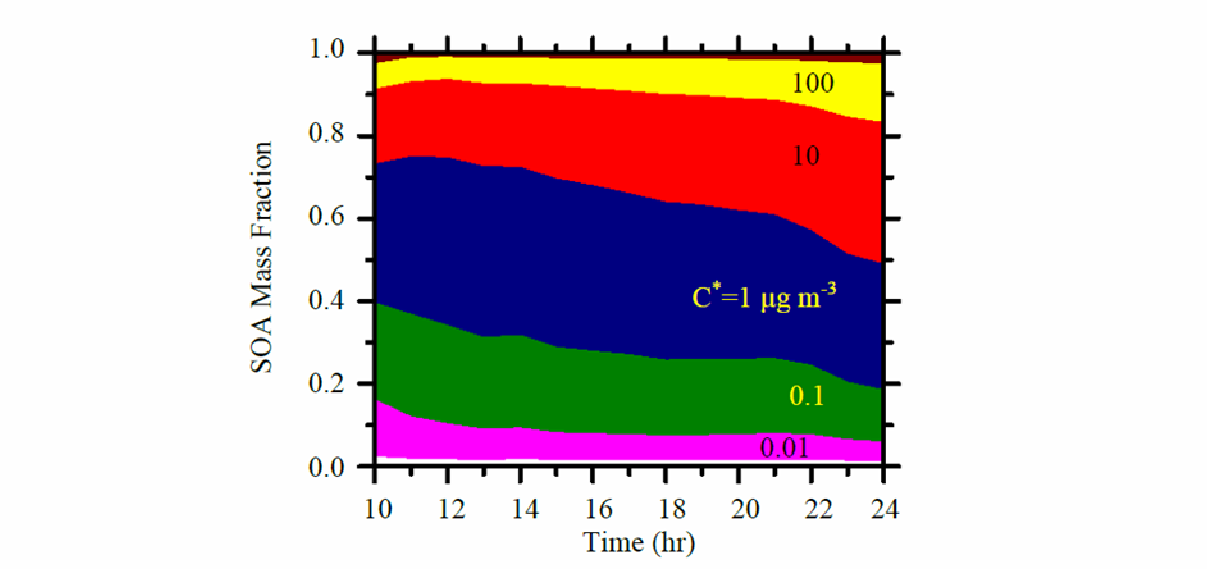

FIGURE S2: Predicted composition of organic aerosol in the new particles for different effective saturation concentrations with $\sigma = 0.025$ N m^{-1} at Hyytiala.

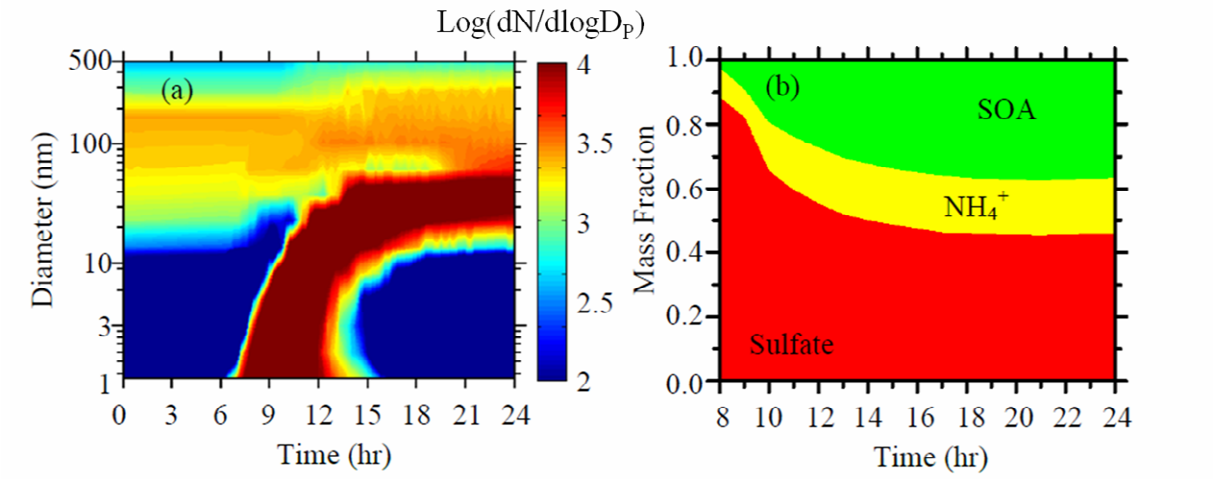

FIGURE S3: Simulation with surface tension of 0.025 N m^{-1} at Finokalia: **(a)** predicted particle size distribution and **(b)** the composition of nucleated particles.

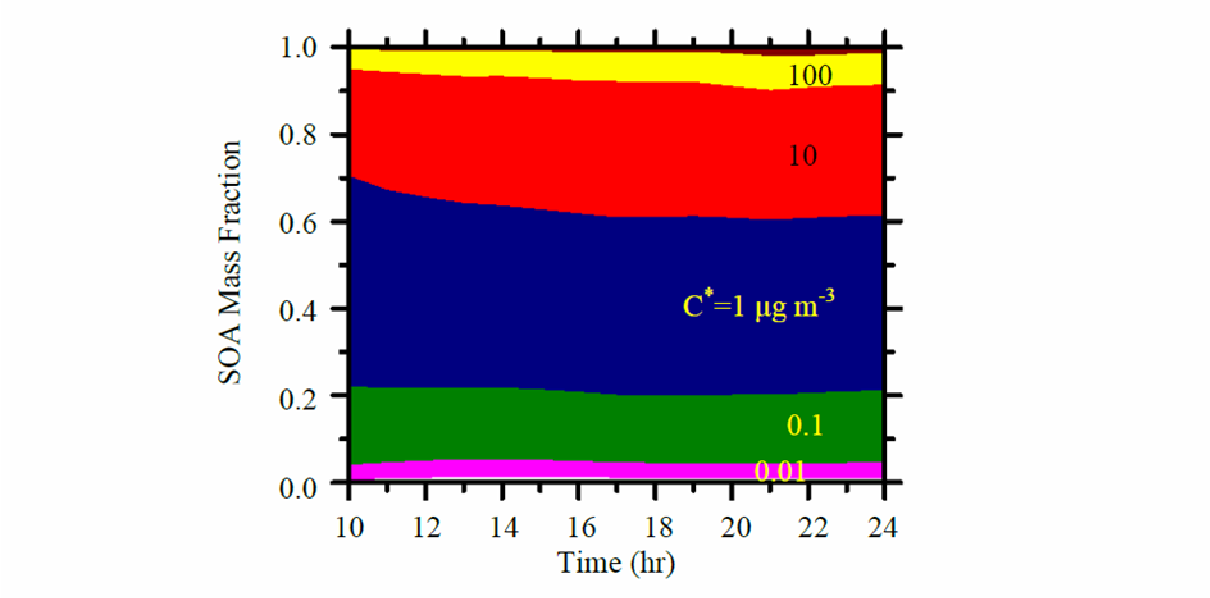

FIGURE S4: Predicted composition of organic aerosol in the new particles for different effective saturation concentrations with $\sigma = 0.025$ N m^{-1} at Finokalia.

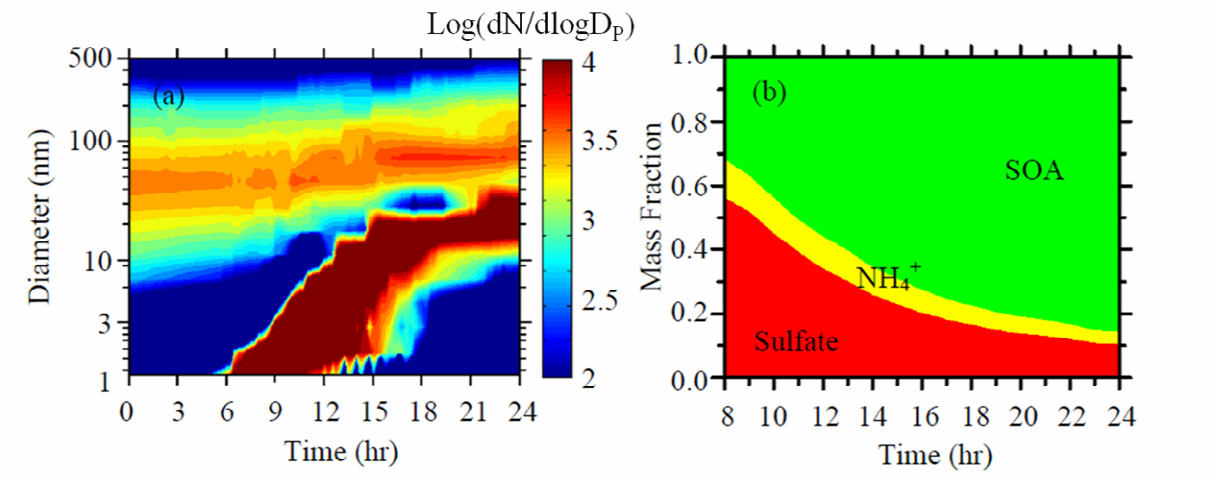

FIGURE S5: Simulation with condensation of organics neglecting the Kelvin effect and without the chemical aging of bSOA precursors at Hyytiala: **(a)** predicted aerosol dry size distribution and **(b)** composition of nucleated particles.

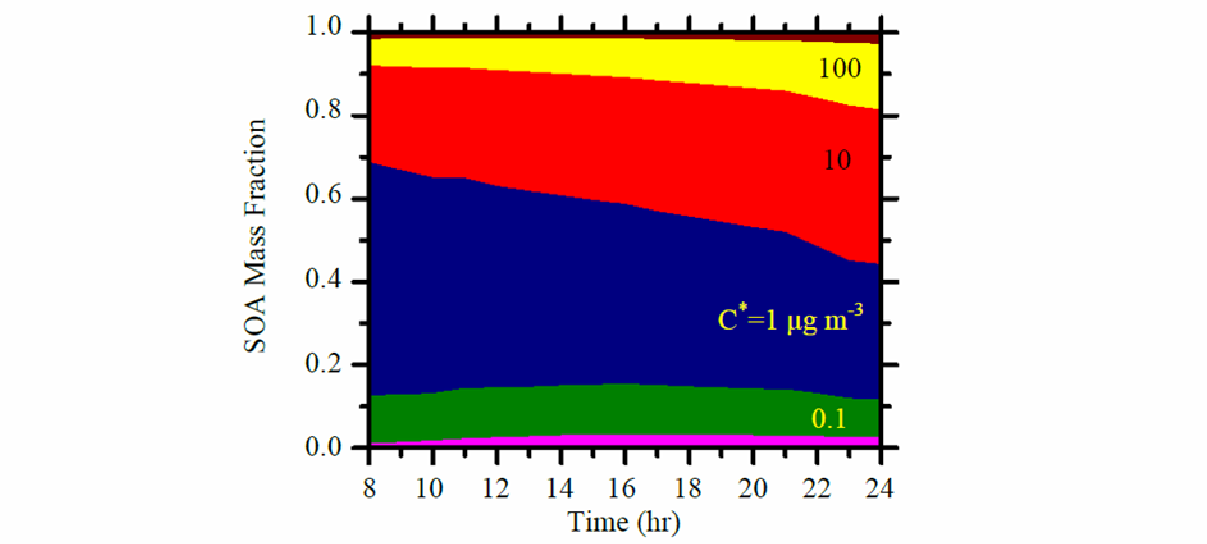

FIGURE S6: Predicted composition of organic aerosol in the new particles for different effective saturation concentrations with zero surface energy and without the chemical aging of bSOA precursors at Hyytiala.

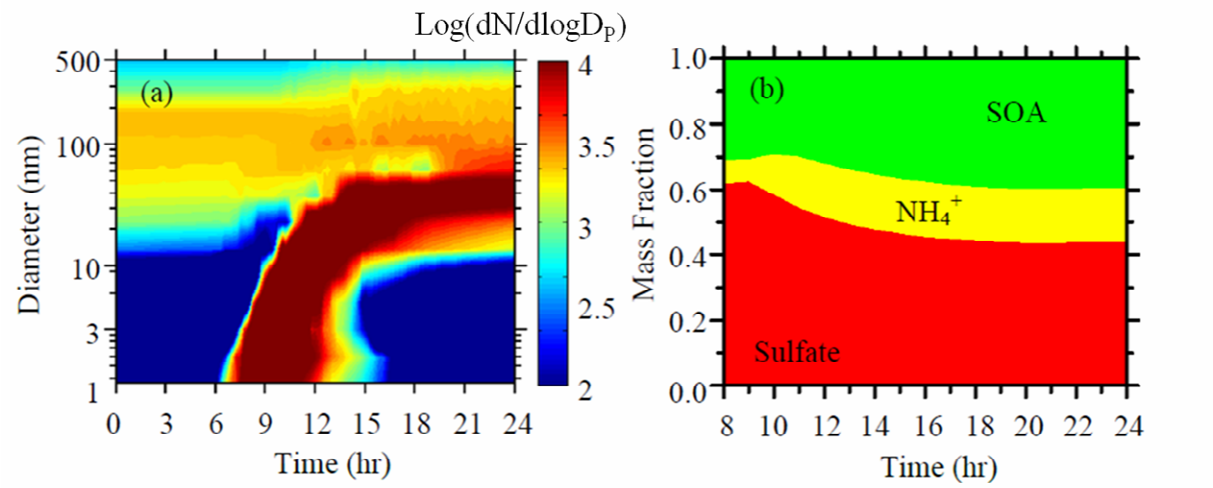

FIGURE S7: Simulation with condensation of organics neglecting the Kelvin effect and without the chemical aging of bSOA precursors at Finokalia as function of local time: **(a)** predicted particles size distribution and **(b)** the composition of nucleated particles.

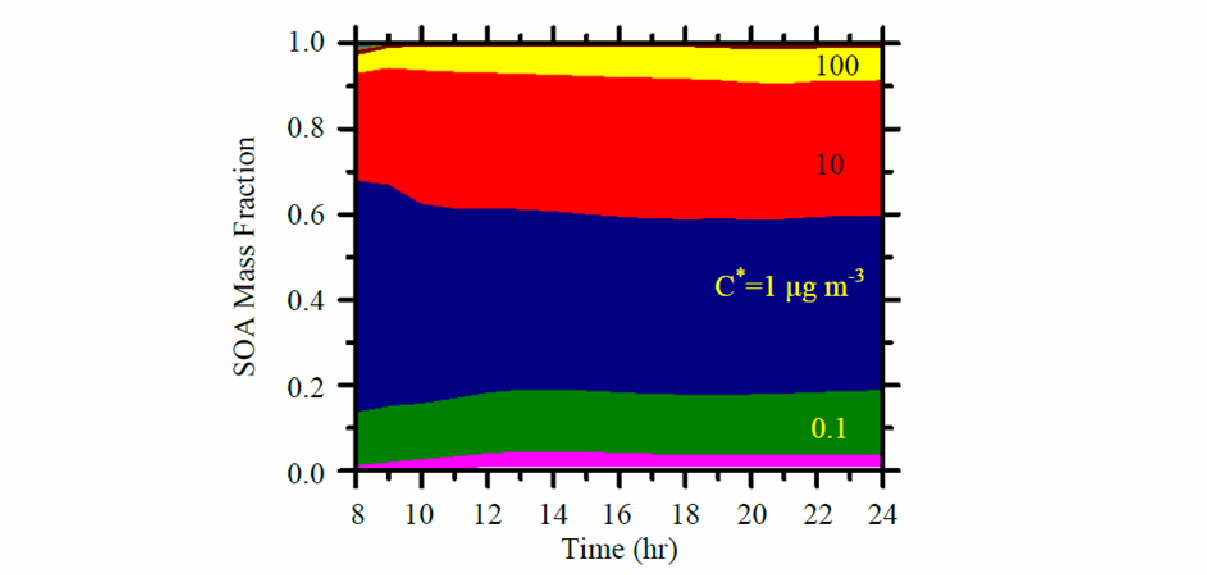

FIGURE S8: Predicted composition of organic aerosol in the new particles for different effective saturation concentrations with zero surface energy and without the chemical aging of bSOA precursors at Finokalia.

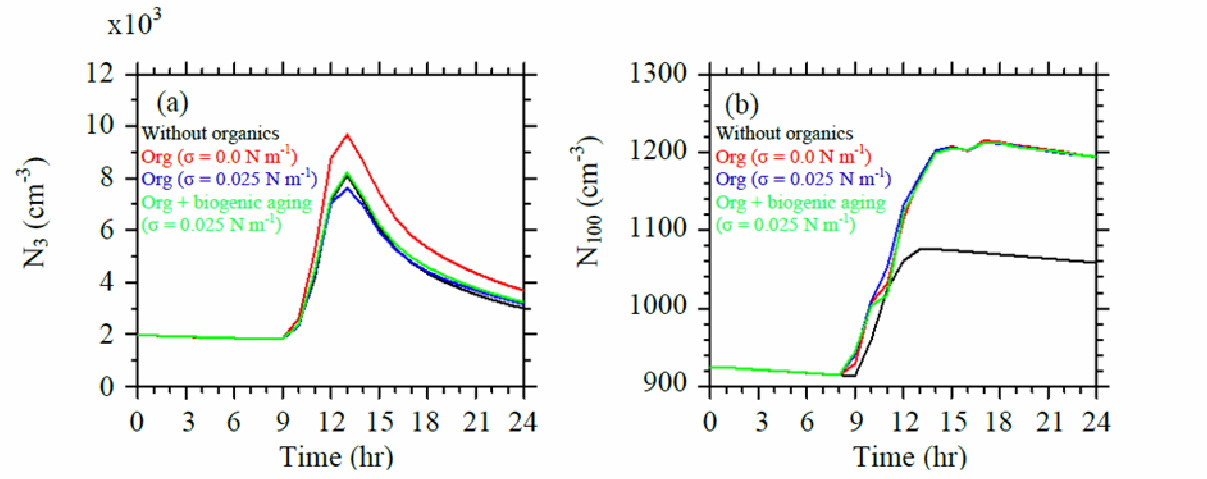

FIGURE S9: Predicted concentrations of (a) N_3 and (b) N_{100} at Finokalia for the four simulated cases. Black line represents no condensation of organics, red is with condensation of organics with σ = 0.0 N m^{-1}, blue is with condensation of organics with σ = 0.025 N m^{-1} and green is condensation of organics with aging reactions of bSOA precursors and σ=0.025 N m^{-1}.