# S1 Comparison of modelled meteorological variables with measurements

**Figure S1**.

# S2 Sensitivity of results on the saturation concentration of condensing vapors

In the kinetic nucleation parametrization, the nucleation rate, Jkin, is related to sulphuric acid concentration, [H2SO4], as follows:

Jkin = Kkin [H2SO4]2 (S1)

where *Kkin* is the kinetic nucleation coefficient that includes both the collision frequency and the probability of forming a stable cluster after the collision (Weber et al., 1997; Sihto et al., 2006; Lauros et al., 2011).

The condensational growth of particles was simulated with a revised treatment of condensation flux onto free molecular regime particles (Lehtinen and Kulmala, 2003). Besides sulphuric acid, lumped sum of first stable oxidation products of monoterpenes was included as organic condensation vapour for simulating the particle growth. Based on previous studies on particle growth by Zhou et al. (2014) well as studies on organic compounds with non-volatility or low volatility (Kulmala et al., 2013; Ehn et al., 2014), sensitivity study of saturation vapour concentration for the lumped organic condensing vapor has been conducted. Typical saturation vapour concentration range (1011 # m-3 to 1013 # m-3) for compounds of low volatility was tested.

**Figure S2**.

**Figure S3.**

**Figure S4.**

**Figure S5.**

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**Figure captions**

**Figure S1**. Scatter plots and linear fit statistics for a) turbulent kinetic energy (TKE), b) latent heat flux, and c) sensible heat flux as measured by the EC system at SMEAR station and predicted by the model SOSAA at 23 m height.

**Figure S2**. Aerosol size distribution at 2 m height during 10 days period in May 2013 as predicted by the model SOSAA assuming saturation vapour concentration for the lumped organic condensing vapors as (a) case 1: 1012 # m-3 – the original case, (b) case 2: 1011 # m-3 - low saturation vapor concentration (equivalent to more condensation), (c) case 3: 1013 # m-3 - high saturation vapor concentration (equivalent to less condensation).

**Figure S3.** Change velocities (presented as the ratios to the absolute value of the deposition term) for selected particle sizes for (a) storage, (b) aerosol dynamics and (c) vertical exchange during 07 and 08 May (DOY 127 and 128) 2013. Solid lines correspond to the original case 1, dashed lines to low saturation vapor concentration (more condensation) case 2, and dash-dotted lines to high saturation vapor concentration (less condensation) case 3.

**Figure S4.** Diurnal variation of change velocity due to aerosol dynamics (presented as the ratios to the absolute value of the deposition term) for selected particle sizes. Plot (a) corresponds to the original case 1, (b) to low saturation vapor concentration (more condensation) case 2, and (c) to high saturation vapor concentration (less condensation) case 3. The lines present the averages  obtained from model simulations over 10 days period and the shaded areas the variation range as ± around the averages.

**Figure S5.** Diurnal variation of exchange velocity (presented as the ratios to the absolute value of the deposition term) for selected particle sizes. Plot (a) corresponds to the original case 1, (b) to low saturation vapor concentration (more condensation) case 2, and (c) to high saturation vapor concentration (less condensation) case 3. The lines present the averages  obtained from model simulations over 10 days period and the shaded areas the variation range as ± around the averages.