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Atmos. Chem. Phys., 3, 251-257, 2003
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A model for particle formation and growth in the atmosphere with molecular resolution in size

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Abstract. The formation and growth of atmospheric aerosol particles is considered using an exact discrete method with molecular resolution in size space. The method is immune to numerical diffusion problems that are a nuisance for typical simulation methods using a sectional representation for the particle size distribution. For condensational growth, a slight modification is proposed for the Fuchs-Sutugin expression, which improves the prediction of the growth rate of nano-sized particles by as much as a factor of two. The presented method is applied to particle formation in a Finnish Boreal forest and is shown to capture the essential features of the dynamics quite nicely. Furthermore, it is shown that the growth of the particles is roughly linear, which means that the amount of condensable vapour is constant (of the order 10^{13} $1/m^3$).

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