Parameter	Description	Default value
SWITCHES		
dilu_on	Defines whether the dilution is on or not. If dilu_on = 0, the aerosol will not dilute. If dilu_on = 1, the aerosol will dilute with rate defined by parameter dilu_coeff.	1
coag_on	Defines whether the coagulation is on or not. If coag_on = 0, the particles won't coagulate. If coag_on = 1, the coagulation is set on.	1
sedi_on	Defines whether the sedimentation is on or not. If sedi_on = 0, sedimentation is turned off. If sedi_on = 1, sedimentation will occur. Only usable for sedimentation in SAPPHIR chamber!	0
gas_source_is_vect	Defines whether the parameter gas_source is a vector or scalar. This cannot be set by user. Instead, the program checks if gas_source is an array or not and sets the value to 1 or 0 respectively.	
dilu_vect_on	Defines whether the parameter dilu_coeff is an array or scalar. This cannot be set by user. Instead, the program checks if dilu_coeff is an array or scalar and sets the value to 1 or 0 respectively.	
part_source_is_vect	Defines whether the parameter part_source is a time-dependent vector or a constant. This cannot be set by user. Instead, the program checks if part_source is an array or scalar and sets the value to 1 or 0 respectively.	
coag_mode	Defines whether the particles coagulate 'normally' or agglomerate. Value should be either 'coag' for normal coagulation or 'aggl' for agglomeration. Agglomeration works only for particles in the free-molecule region. Condensation and deposition might not work correctly for agglomerates.	
coag_num	Numerical representative of coag_mode. If coag_mode == 'coag' => coag_num = 1. If coag_mode == 'aggl' => coag_num = 0. This cannot be set directly by user, but the program sets it based on the value of coag_mode.	
fixed_sections	Defines whether the model will use fixed or moving sections. If fixed_sections == 0, moving sections will be used. Otherwise the sections will be fixed. When the model uses moving sections, the diameter defining the section grows or shrinks by condensation or evaporation. When using fixed sections, the diameters defining sections are constant. If particles grow by condensation so that they reach the limit diameter, they will be moved to the next section. The limit diameter is logarithmically halfway between adjacent sections.	
Cvap_const	Defines whether the vapor concentration is constant or not. If Cvap_const == 1, the vapor concentration stays at value Cvap0 during the whole simulation time, so that the value gas_source has no effect on vapor concentration. If Cvap_const ~= 1, the vapour concentration is not kept constant, but its value depends on Cvap0 and gas_source.	

<table>
<tr><th>Parameter</th><th>Description</th><th>Default value</th></tr>
<tr><td>BASIC VALUES</td><td></td><td></td></tr>
<tr><td>part_source</td><td>Particle source rate (1/cm^3/s).

If particle source is constant during the simulation, this parameter is a vector of following form:
<table><tr><td>source rate (1/cm^3/s)</td><td>particle size (m)</td></tr></table>where particle size is the diameter of particles created. For example part_source=[1, 3e-9] will generate one 3-nanometer particle/cm^3 every second during the simulation.

If user wants to create particle sources of different sized particles, this can be done by defining part_source as a 3D-matrix. For example lines
part_source(:,:,1) = [1, 3e-9];
part_source(:,:,2) = [5, 5e-9];
will create one 3-nanometer particle/cm^3 and five 5-nanometer particles/cm^3 every second during the simulation.

Particle sources can also be defined as time-dependent vectors. In that case, the vector should be of following form:
<table><tr><td>t_0</td><td>source rate (1/cm^3/s)</td><td>particle size (m)</td></tr><tr><td>t_1</td><td>source rate (1/cm^3/s)</td><td>NaN</td></tr><tr><td>. . .</td><td>. . .</td><td>. . .</td></tr><tr><td>t_end</td><td>source rate (1/cm^3/s)</td><td>NaN</td></tr></table>where the source rate in first line defines the source rate of particles at time t_0, the next line defines it at time t_1 etc. Particle size in first line defines the diameter of particles created; the values of column 3 in the rest of lines do not matter.</td><td></td></tr>
<tr><td>gas_source</td><td>The condensing vapor source rate (1/cm^3/s). Can be defined as a scalar or two-column array. When defined as scalar, the source rate will be constant during the simulation.

If gas_source is an array, it must have two columns; the first column is a time vector and the second one tells the gas_source value at respective time. The time vector doesn't need to have same length as parameter tvect. However, the first and last element of gas_source's first column must have the same values as respective elements of tvect. If the length of the array is different than tvect's length, gas_source will be interpolated to same length.</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Parameter	Description	Default value
dilu_coeff	Dilution coefficient (1/s). Dilution affects particle concentration in following way: dN/dt = -dilu_coeff*N (N is particle concentration) Parameter dilu_coeff can be either a scalar or an array. When defined as a scalar, dilution coefficient will be constant during the simulation. If dilu_coeff is an array, it must have two columns; the first column is a time vector and the second one tells the dilu_coeff value at respective time. The time vector doesn't need to have same length as parameter tvect. However, the first and last element of dilu_coeff's first column must have the same values as respective elements of tvect. If the length of the array is different than tvect's length, dilu_coeff will be interpolated to same length.	
satu_conc	The condensing vapor saturation concentration ($1/cm^3$).	
lambda	The condensing vapor mean free path (m).	
diff_coeff	The condensing vapor diffusion coefficient (cm^2/s).	
vap_molmass	Molecular mass of condensing vapor (g/mol).	
particle_dens	Density of particle matter. (g/cm^3).	
stick_coeff	Sticking coefficient. The probability that vapor molecules will stick to aerosol particles.	
Cvap0	Initial condensing vapor concentration ($1/cm^3$)	
T	The temperature (K)	
TIME VECTOR		
tvect	The time vector (seconds). Define as row vector. The vector spacing does not remarkably affect calculation time, but defines only the spacing of the results.	
DISTRIBUTION PARAMETERS		
N0	Initial total particle concentration ($1/cm^3$). If user wants to create a distribution that consists of several log-normal distributions, N0 can be defined as a vector. Then the total distribution will be a superposition of log-normal distributions. If N0 is defined as N0 = [1e3, 1e5], the first distribution has particle concentration N0(1) (= 1e3), standard deviation sigma(1) and mean diameter mu(1). The total particle concentration will then be N0(1) + N0(2). Note that each distribution must have values for sigma and mu, so if N0 is a vector, mu and sigma must be vectors of same length.	
mu	The mean of the lognormal size distribution. If user wants to create a distribution that consists of several log-normal distributions, mu can be defined as a vector. Then the total distribution will be a superposition of n log-normal distributions, so that each distribution is defined by N0(i), mu(i) and sigma(i). Thus, if mu is a vector, N0 and sigma must be vectors of same length.	

Parameter	Description	Default value
sigma	Sigma (standard deviation) of log-normal size distribution. If user wants to create a distribution that consists of several log-normal distributions, sigma can be defined as a vector. Then the total distribution will be a superposition of n log-normal distributions, so that each distribution is defined by N0(i), mu(i) and sigma(i). Thus, if sigma is a vector, N0 and mu must be vectors of same length.	
Dp_min	The exponent of minimum diameter of the size grid. The program will create a logarithmically spaced size grid between diameters 10^{Dp_min} and 10^{Dp_max}. The particle distribution will use this grid as x-axis and therefore Dp_min and Dp_max define limits inside which the distribution must stay. Thus, if particles for example grow during simulations, Dp_max must be defined high enough so that the distribution stays inside the limits.	
Dp_max	The exponent of maximum diameter of the size grid. The program will create a logarithmically spaced size grid between diameters 10^{Dp_min} and 10^{Dp_max}. The particle distribution will use this grid as x-axis and therefore Dp_min and Dp_max define limits inside which the distribution must stay. Thus, if particles for example grow during simulations, Dp_max must be defined high enough so that the distribution stays inside the limits.	
sections	The number of sections the model will use. The size grid is created between 10^{Dp_min} and 10^{Dp_max} and the number of grid points is defined by parameter 'sections'. The grid is logarithmically spaced. Particles are then placed in the sections according to their diameter. The bigger the number of sections, the more accurate the model will be. However, increasing the number of sections slows down the model.	
output_sections	Defines the number of sections in output size grid. After the simulation has run, the distribution at each time point is interpolated to the original size grid. The original size grid has however the same amount of sections as the calculated distributions, which causes error in interpolation. By defining output_sections bigger than 'sections', the original size grid is made denser for the interpolation, minimizing the error. That is why output_sections should always be bigger than 'sections', for example ten times bigger.	

Parameter	Description	Default value
TOLERANCE PARAMETERS	Defines the tolerance settings for ode45.	
Cvap_tol	Vapor concentration tolerance.	
N_tol	Particle concentration tolerance.	
Dp_tol	Particle diameter tolerance.	