Note on the Text

Sign	Description	Value/Unit
A_{coll}	Collision cross section	m^2
A_{geo}	Geometric cross section	m^2
A	Area	m^2
B_λ	Wavelength-dependent black body source function	$W\,m^{-2}\,m^{-1}$
B	Buoyancy term	
C_C	Cunningham correction factor	
C_D	Drag coefficient	
C_k	Enthalpy transfer coefficient	
C_R	Constant comprising radar parameters	
C	Capacitance	m
D_a	Diffusity of aerosol particles in air	$m^2\,s^{-1}$
D_e	Mechanical dissipation of kinetic energy in a tropical cyclone	J
D_v	Mass diffusity of water vapor in air	$m^2\,s^{-1}$
D_{RT}	Distance between the radar and the target	m
D_{eq}	Equivalent spherical diameter	mm
D_{max}	Maximum dimension of solid hydrometeors	mm
E_{CKE}	Collision kinetic energy	J
E_{coal}	Total energy of coalescence	J
E_{sfc}	Surface energy	J
E	Collision efficiency	
F_d^i	Water vapor diffusion term in the mass growth equation for ice crystals	$m\,s\,kg^{-1}$
F_k^i	Thermodynamic term in the mass growth equation for ice crystals	$m\,s\,kg^{-1}$
F_d^l	Water vapor diffusion term in the mass growth equation for cloud droplets	$m\,s\,kg^{-1}$
F_k^l	Thermodynamic term in the mass growth equation for cloud droplets	$m\,s\,kg^{-1}$
F_{SW}^{atm}	Net shortwave radiation in the atmosphere	$W\,m^{-2}$
$F_{LW}^{sfc,\downarrow}$	Downward-directed longwave radiative flux at Earth's surface (sfc)	$W\,m^{-2}$

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Sign	Description	Value/Unit
$F_{SW}^{sfc,\downarrow}$	Downward-directed shortwave radiative flux at Earth surface (sfc)	$\mathrm{W\,m^{-2}}$
$F_{LW}^{sfc,\uparrow}$	Upward-directed longwave radiative flux at Earth's surface (sfc)	$\mathrm{W\,m^{-2}}$
F_{cre}^{sfc}	Net cloud radiative effect at Earth's surface (sfc)	$\mathrm{W\,m^{-2}}$
F_{lcre}^{sfc}	Longwave cloud radiative effect at Earth's surface (sfc)	$\mathrm{W\,m^{-2}}$
F_{scre}^{sfc}	Shortwave cloud radiative effect at Earth's surface (sfc)	$\mathrm{W\,m^{-2}}$
$F_{LW}^{toa,cs}$	Net clear-sky longwave radiation at the top-of-the-atmosphere (TOA)	$\mathrm{W\,m^{-2}}$
$F_{SW}^{toa,cs}$	Net clear-sky shortwave radiation at the top-of-the-atmosphere (TOA)	$\mathrm{W\,m^{-2}}$
F_{LW}^{toa}	Net longwave radiation at the top-of-the-atmosphere (TOA)	$\mathrm{W\,m^{-2}}$
F_{SW}^{toa}	Net shortwave radiation at the top-of-the-atmosphere (TOA)	$\mathrm{W\,m^{-2}}$
F_{cre}^{toa}	Net cloud radiative effect at the top-of-the-atmosphere (TOA)	$\mathrm{W\,m^{-2}}$
F_{lcre}^{toa}	Longwave cloud radiative effect at the top-of-the-atmosphere (TOA)	$\mathrm{W\,m^{-2}}$
F_{scre}^{toa}	Shortwave cloud radiative effect at the top-of-the-atmosphere (TOA)	$\mathrm{W\,m^{-2}}$
F_B	Buoyancy force per unit mass	$\mathrm{m\,s^{-2}}$
F_D	Drag force	N
F_G	Gravity force	N
F_d	Water vapor diffusion term in the droplet radius growth equation	$\mathrm{s\,m^{-2}}$
$\vec{F}_g$	Gravity force per unit mass	$\mathrm{m\,s^{-2}}$
F_k	Thermodynamic term in the droplet radius growth equation	$\mathrm{s\,m^{-2}}$
F_{LH}	Latent heat flux at Earth's surface	$\mathrm{W\,m^{-2}}$
F_{LW}	Net longwave radiation	$\mathrm{W\,m^{-2}}$
F_{SB}	Radiation emitted according to the Stefan–Boltzmann law	$\mathrm{W\,m^{-2}}$
F_{SH}	Sensible heat flux at Earth's surface	$\mathrm{W\,m^{-2}}$
F_{SW}	Net shortwave radiation	$\mathrm{W\,m^{-2}}$
F_{Sun}	Total radiation emitted by the Sun	$3.85 \times 10^{26}\,\mathrm{W}$
$G(n)$	Gibbs free energy of the cluster	J
G^*	Gibbs free energy barrier	J
G_e	Generation of available energy for a tropical cyclone	J

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Sign	Description	Value/Unit
$G_{ex}(n)$	Excess Gibbs free energy due the cluster formation	J
$G_{i,v}$	Gibbs free energy for phase transition from water vapor to ice	J
$G_{i,w}$	Gibbs free energy for phase transition from liquid water to ice	J
$G_{w,v}$	Gibbs free energy for phase transition from water vapor to liquid water	J
G	Gibbs free energy	J
H_A	Henry's law constant of component A	
H_{LCL}	Height of the lifting condensation level	m
H	Enthalpy	J
I_0	Intensity of radiation at TDE	$\mathrm{W\,m^{-2}}$
I_λ	Wavelength–dependent intensity of radiation	$\mathrm{W\,m^{-2}}$
J^{het}	Heterogeneous nucleation rate	$\mathrm{cm^{-2}\,s^{-1}}$
J^{hom}	Homogeneous nucleation rate	$\mathrm{cm^{-3}\,s^{-1}}$
$J^{hom}_{i,v}$	Homogeneous nucleation rate for ice from water vapor	$\mathrm{cm^{-3}\,s^{-1}}$
$J^{hom}_{w,v}$	Homogeneous nucleation rate from liquid water from water vapor	$\mathrm{cm^{-3}\,s^{-1}}$
K_{kin}	Kinetic prefactor for the nucleation rate	$\mathrm{cm^3\,s^{-1}}$
K	Collection kernel	$\mathrm{m^3\,s^{-1}}$
K	Thermal conductivity in air	$\mathrm{J\,m^{-1}\,s^{-1}\,K^{-1}}$
L_f	Latent heat of fusion	$\mathrm{J\,kg^{-1}}$
L_s	Latent heat of sublimation	$\mathrm{J\,kg^{-1}}$
L_v	Latent heat of vaporization	$\mathrm{J\,kg^{-1}}$
L_{f0}	Latent heat of fusion at $T_0 = 273.15\,\mathrm{K}$	$0.334 \times 10^6\,\mathrm{J\,kg^{-1}}$
$L_{s,tr}$	Latent heat of sublimation at $T_{tr} = 273.16\,\mathrm{K}$	$2.834 \times 10^6\,\mathrm{J\,kg^{-1}}$
$L_{v,tr}$	Latent heat of vaporization at $T_{tr} = 273.16\,\mathrm{K}$	$2.501 \times 10^6\,\mathrm{J\,kg^{-1}}$
L	Latent heat	$\mathrm{J\,kg^{-1}}$
L	Characteristic length scale	m
M_d	Molecular weight of dry air	$28.96\,\mathrm{g\,mol^{-1}}$
M_l	Cloud liquid water content in units of mass per unit volume	$\mathrm{kg\,m^{-3}}$
M_s	Molecular weight of salt/solute	$\mathrm{g\,mol^{-1}}$
M_w	Molecular weight of water	$18.015\,\mathrm{g\,mol^{-1}}$
M	Absolute momentum	$\mathrm{m\,s^{-1}}$
N_0	Intercept parameter for an exponentially distributed hydrometeor size distribution	$\mathrm{cm^{-4}}$
N_A	Avogadro constant	$6.022 \times 10^{23}\,\mathrm{mol^{-1}}$
N_a	Total number concentration of aerosol particles	$\mathrm{cm^{-3}}$
N_c	Cloud droplet number concentration	$\mathrm{cm^{-3}}$

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Sign	Description	Value/Unit
N_i	Ice crystal number concentration	cm^{-3}
N_w	Number density of water molecules in the parent phase	cm^{-3}
N_x	Number concentration of hydrometeors	cm^{-3}
$N_{0,\gamma}$	Intercept parameter for the hydrometeor size distribution in a gamma distribution	$\mathrm{m}^{-4-\mu}$
N_{BV}	Brunt–Väisälä frequency	s^{-1}
N_{CCN}	Number concentration of cloud condensation nuclei	cm^{-3}
N	Number of molecules	
P	Probability of freezing	
Q_1	Thermodynamic variable related to the increase in supersaturation due to adiabatic expansion and cooling of the air	m^{-1}
Q_2	Thermodynamic variable related to the decrease in supersaturation due to condensation of water vapor	
Q_c	Heat energy due to conduction	J
Q_{ext}	Unitless extinction efficiency factor	
Q	Heat energy	J
R^*	Universal gas constant	$8.314\,\mathrm{J\,mol}^{-1}\,\mathrm{K}^{-1}$
R_a	Gas constant of moist air	$\mathrm{J\,kg}^{-1}\,\mathrm{K}^{-1}$
R_d	Gas constant of dry air	$287.1\,\mathrm{J\,kg}^{-1}\,\mathrm{K}^{-1}$
R_p	Precipitation rate	m
R_r	Rainfall rate	m
R_s	Snowfall rate	m
R_v	Gas constant of water vapor	$461.5\,\mathrm{J\,kg}^{-1}\,\mathrm{K}^{-1}$
R_{Earth}	Radius of the Earth	$6.3781 \times 10^6\,\mathrm{m}$
R_{Sun}	Radius of the Sun	$6.98 \times 10^8\,\mathrm{m}$
Re	Reynolds number	
R	Radius of a collector drop	m
$S(r)$	Size-dependent equilibrium saturation ratio of a solution droplet with radius r	
S_0	Solar constant	$1360\,\mathrm{W\,m}^{-2}$
S_a	Total aerosol surface area per unit volume	$\mu\mathrm{m}^2\,\mathrm{cm}^{-3}$
S_i	Saturation ratio with respect to ice	
S_w	Saturation ratio with respect to liquid water	
S_{act}	Activation saturation ratio	
S_{cry}	Crystallization saturation ratio	
S_{del}	Deliquescence saturation ratio	
Sc	Schmidt number	
S	Saturation ratio (in general)	
S	Entropy	$\mathrm{J\,K}^{-1}$

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Sign	Description	Value/Unit
T_0	Melting point temperature	273.15 K
T_c	Isentropic condensation temperature	K
T_d	Dew point temperature	K
T_e	Equivalent temperature	K
T_f	Frost point temperature	K
T_s	Surface temperature	K
T_v	Virtual temperature	K
T_w	Adiabatic wet-bulb temperature	K
T_{Sun}	Temperature of the Sun	5769.6 K
T_{atm}	Temperature of an isothermal atmosphere	K
T_{conv}	Convective temperature	K
T_{eff}	Effective temperature	K
T_{env}	Environmental (ambient) temperature	K
T_{es}	Saturated equivalent temperature	K
T_{iw}	Isobaric wet-bulb temperature	K
T_{r_d}	Temperature at a hydrometeor's surface	K
T_{tr}	Triple point temperature	273.16 K
T	Temperature (in general)	K
T	Characteristic time scale	s
U	Internal energy	J
U	Characteristic velocity scale	$\mathrm{m\,s^{-1}}$
V_a	Total aerosol volume per unit volume	$\mu\mathrm{m^3\,cm^{-3}}$
V_d	Volume of dry air	$\mathrm{m^3}$
V_n	Volume of a cluster	$\mathrm{m^3}$
V_{sweep}	Sweep-out volume	$\mathrm{m^3}$
V	Volume of an air parcel/air mass	$\mathrm{m^3}$
W	Work	J
X	Arbitrary quantity	
Z_e	Equivalent radar reflectivity factor	$\mathrm{mm^6\,m^{-3}}$
Z	Radar reflectivity factor	$\mathrm{mm^6\,m^{-3}}$
ΔF_{LW}	Longwave radiative forcing at TOA	$\mathrm{W\,m^{-2}}$
ΔF_{SW}	Shortwave radiative forcing at TOA	$\mathrm{W\,m^{-2}}$
ΔF	Radiative forcing at TOA	$\mathrm{W\,m^{-2}}$
ΔG^*_{het}	Gibbs free energy barrier for heterogenous nucleation	J
$\Delta G^*_{i,v}$	Gibbs free energy barrier between water vapor and ice	J
$\Delta G^*_{i,w}$	Gibbs free energy barrier between liquid water and ice	J
ΔG^*	Gibbs free energy barrier for a phase transition	J
ΔG_S	Surface term of the change in Gibbs free energy	J
ΔG_V	Volume term of the change in Gibbs free energy	J
$\Delta G_{S,hom}$	Surface term of the change in Gibbs free energy for a pure liquid droplet	J

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Sign	Description	Value/Unit
$\Delta G_{S,sol}$	Surface term of the change in Gibbs free energy for a pure liquid droplet	J
$\Delta G_{V,hom}$	Volume term of the change in Gibbs free energy for a pure liquid droplet	J
$\Delta G_{V,sol}$	Volume term of the change in Gibbs free energy for a solution droplet	J
$\Delta G_{i,v}$	Change in Gibbs free energy between water vapor and ice	J
$\Delta G_{i,w}$	Change in Gibbs free energy between liquid water and ice	J
ΔG	Change in Gibbs free energy (in general)	J
ΔH	Heat uptake by the ocean	$\mathrm{W\,m^{-2}}$
ΔR	Net radiative imbalance at TOA	$\mathrm{W\,m^{-2}}$
ΔT_s	Change in global mean surface temperature	K
Γ_d	Dry adiabatic lapse rate	$9.8\,\mathrm{K\,km^{-1}}$
Γ_s	Saturated adiabatic lapse rate	$\mathrm{K\,km^{-1}}$
Γ	Lapse rate of an air parcel	$\mathrm{K\,km^{-1}}$
Λ_e	Entrainment rate	$\mathrm{m^{-1}}$
Λ	Slope parameter for a gamma or exponential distribution	$\mathrm{m^{-1}}$
Ω	Angular velocity due to Earth's rotation	$7.29 \times 10^{-5}\,\mathrm{rad\,s^{-1}}$
Θ_i	Incident angle in spherical coordinates	
Θ_t	Refracted angle in spherical coordinates	
Θ	Scattering angle in spherical coordinates	
α_c	Cloud albedo	
α_i	Specific volume of ice	$\mathrm{m^3\,kg^{-1}}$
α_l	Specific volume of liquid water at $T_0 = 273.15\,\mathrm{K}$	$10^{-3}\,\mathrm{m^3\,kg^{-1}}$
α_m	Mass accommodation coefficient for ice crystal growth	
α_p	Planetary albedo	
α_s	Surface albedo	
α_v	Specific volume of water vapor at $T_0 = 273.15\,\mathrm{K}$ at 100% relative humidity	$206.4\,\mathrm{m^3\,kg^{-1}}$
α	Specific volume of air, which is the inverse of the air density	$\mathrm{m^3\,kg^{-1}}$
ϵ_λ	Wavelength-dependent emissivity	
ϵ_s	Emissivity of Earth's surface	
ϵ_{atm}	Emissivity of Earth's atmosphere	
ϵ	Ratio of $R_d/R_v = M_w/M_d$	0.622
ϵ	Emissivity (in general)	
η	x-component of the relative vorticity	$\mathrm{s^{-1}}$

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Sign	Description	Value/Unit
γ_w	Activity coefficient	
$\gamma_{R/r}$	Radii ratio of the collector drop R to the collected droplet r	
γ	Lapse rate of the environmental air	$\mathrm{K\,km^{-1}}$
$\hat{E}$	Coagulation, coalescence or sticking efficiency	
κ	Ratio of R_d/c_p	0.286
κ	Hygroscopicity parameter	
λ_a	Mean free path of molecules in air	m
λ_{Pl}	Planck climate sensitivity parameter	$\mathrm{W\,m^{-2}\,K^{-1}}$
λ_{max}	Wavelength of peak emission in Wien's displacement law	μm
λ	Wavelength	m
λ	Climate sensitivity parameter	$\mathrm{W\,m^{-2}\,K^{-1}}$
μ_a	Arithmetic mean aerosol radius	μm
μ_g	Geometric mean aerosol radius	μm
$\mu_{g,S}$	Surface geometric mean aerosol radius	μm
$\mu_{g,V}$	Volume geometric mean aerosol radius	μm
$\mu_{g,m}$	Mass geometric mean aerosol radius	μm
μ	Chemical potential	$\mathrm{J\,mol^{-1}}$ or $\mathrm{J\,molecule^{-1}}$
μ	Dynamic viscosity	$\mathrm{kg\,m^{-1}\,s^{-1}}$
ν	Kinematic viscosity	$\mathrm{m^2\,s^{-1}}$
ω	Angular velocity	$\mathrm{s^{-1}}$
$\overline{P}_R$	Power received at a radar antenna	W
$\overline{f}_v$	Ventilation coefficient	
$\overline{r}_d$	Mean cloud droplet volume radius	m
$\overline{r}_i$	Mean ice crystal volume radius	m
ϕ	Latitude	°
ρ_a	Air density	$\mathrm{kg\,m^{-3}}$
ρ_d	Density of dry air	$\mathrm{kg\,m^{-3}}$
ρ_i	Density of ice	$\mathrm{kg\,m^{-3}}$
ρ_l	Density of liquid water	$\mathrm{kg\,m^{-3}}$
ρ_s	Density of solution	$\mathrm{kg\,m^{-3}}$
ρ_v	Density of water vapor	$\mathrm{kg\,m^{-3}}$
ρ_{v,r_d}	Water vapor density at the hydrometeor's surface	$\mathrm{kg\,m^{-3}}$
ρ_{vs}	Saturation water vapor density	$\mathrm{kg\,m^{-3}}$
ρ	Density (in general)	$\mathrm{kg\,m^{-3}}$
σ_B	Backscattering cross section	$\mathrm{m^2}$
σ_a	Arithmetic standard deviation of the aerosol size distribution	μm
σ_g	Geometric standard deviation of the aerosol size distribution	μm

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Sign	Description	Value/Unit
$\sigma_{INP,i}$	Surface tension (interfacial energy) between an Ice-nucleating particle (INP) and ice	$\mathrm{N\,m^{-1}}$
$\sigma_{INP,w}$	Surface tension (interfacial energy) between an INP and liquid water	$\mathrm{N\,m^{-1}}$
$\sigma_{i,a}$	Surface tension (interfacial energy) between ice and moist air	$\mathrm{N\,m^{-1}}$
$\sigma_{i,v}$	Surface tension (interfacial energy) between ice and water vapor	$\mathrm{N\,m^{-1}}$
$\sigma_{i,w}$	Surface tension (interfacial energy) between ice and liquid water	$\mathrm{N\,m^{-1}}$
$\sigma_{s,a}$	Surface tension (interfacial energy) between a solute and moist air	$\mathrm{N\,m^{-1}}$
$\sigma_{w,a}$	Surface tension (interfacial energy) between liquid water and moist air	$\mathrm{N\,m^{-1}}$
$\sigma_{w,v}$	Surface tension (interfacial energy) between liquid water and water vapor	$\mathrm{N\,m^{-1}}$
σ	Stefan–Boltzmann constant	$5.67 \times 10^{-8}\,\mathrm{W\,m^{-2}\,K^{-4}}$
τ_{AP}	Aerosol optical depth	
τ_{cl}	Cloud optical depth	
θ_e	Equivalent potential temperature	K
θ_w	Wet bulb potential temperature	K
θ_{es}	Saturated equivalent potential temperature	K
θ_v	Virtual potential temperature	K
θ	Potential temperature	K
θ	Inclination or polar angle in spherical coordinates	
θ	Contact angle	
$\tilde{E}$	Collection efficiency	
$\tilde{\mu_a}$	Logarithm of the geometric mean aerosol radius	μm
$\tilde{\sigma_a}$	Logarithm of the geometric standard deviation of the aerosol size distribution	μm
$\varphi(V_n)$	Total Gibbs free energy of the interface between a cluster and the parent phase	J
φ	Azimuth angle in spherical coordinates	
$\vec{F}_C$	Coriolis force per unit mass	$\mathrm{m\,s^{-2}}$
$\vec{F}_{CF}$	Centrifugal force per unit mass	$\mathrm{m\,s^{-2}}$
$\vec{F}_F$	Friction force per unit mass	$\mathrm{m\,s^{-2}}$
$\vec{F}_{PG}$	Pressure gradient force per unit mass	$\mathrm{m\,s^{-2}}$
$\vec{F}$	Force vector	N
$\vec{\omega}_h$	Horizontal vorticity vector	$\mathrm{s^{-1}}$
$\vec{\omega}$	Three-dimensional relative vorticity vector	$\mathrm{s^{-1}}$
$\vec{i}$	Unit vector in the x-direction	

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Sign	Description	Value/Unit
$\vec{j}$	Unit vector in the y-direction	
$\vec{k}$	Unit vector in the z-direction	
$\vec{v}_h$	Horizontal wind vector	$\mathrm{m\,s^{-1}}$
$\vec{v}_{rel}$	Horizontal wind vector relative to the storm movement	$\mathrm{m\,s^{-1}}$
$\vec{v}$	Three-dimensional velocity vector	$\mathrm{m\,s^{-1}}$
ξ	y-component of the relative vorticity	$\mathrm{s^{-1}}$
ζ	z-component of the relative vorticity	$\mathrm{s^{-1}}$
a_s	Activity of a solution droplet	
a_w	Water activity	
a	Absorptivity	
c_1	Constant 1 in Planck's law	$3.74 \times 10^{-16}\,\mathrm{W\,m^2}$
c_2	Constant 2 in Planck's law	$1.45 \times 10^{-2}\,\mathrm{m\,K}$
c_i	Specific heat capacity of ice	$\mathrm{J\,kg^{-1}\,K^{-1}}$
c_l	Specific heat capacity of liquid water at $T_{tr} = 273.16\,\mathrm{K}$	$4217\,\mathrm{J\,kg^{-1}\,K^{-1}}$
c_p	Value of the specific heat capacity of dry air at constant pressure at $T_0 = 273.15\,\mathrm{K}$	$1005\,\mathrm{J\,kg^{-1}\,K^{-1}}$
c_v	Value of the specific heat capacity of dry air at constant volume at $T_0 = 273.15\,\mathrm{K}$	$718\,\mathrm{J\,kg^{-1}\,K^{-1}}$
c_{pv}	Specific heat capacity of water vapor at constant pressure at $T_{tr} = 273.16\,\mathrm{K}$	$1884.4\,\mathrm{J\,kg^{-1}\,K^{-1}}$
c_{vv}	Specific heat capacity of water vapor at constant pressure at $T_{tr} = 273.16\,\mathrm{K}$	$1418.4\,\mathrm{J\,kg^{-1}\,K^{-1}}$
c	Specific heat capacity	$\mathrm{J\,kg^{-1}\,K^{-1}}$
c	Speed of light	$2.998 \times 10^8\,\mathrm{m\,s^{-1}}$
$e^*(\infty)$	Equilibrium water vapor pressure over a bulk solution	Pa
$e^*(r)$	Equilibrium water vapor pressure over a solution droplet of radius r	Pa
$e_{s,i}$	Saturation water vapor pressure with respect to ice	Pa
$e_{s,w}(\infty)$	Saturation water vapor pressure over a flat (or bulk) liquid water surface	Pa
$e_{s,w}(r)$	Saturation water vapor pressure of a droplet with radius r with respect to liquid water	Pa
$e_{s,w}$	Saturation water vapor pressure with respect to liquid water	Pa
e	Partial pressure of water vapor	Pa
f_f	Frozen fraction	
f_{act}	Activated fraction	
f	Coriolis parameter	$\mathrm{s^{-1}}$

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Sign	Description	Value/Unit
f	Compatibility parameter	
g	Specific Gibbs free energy	$\mathrm{J\,kg^{-1}}$
g	Acceleration due to Earth's gravity	$9.81\,\mathrm{m\,s^{-2}}$
h	Specific enthalpy	$\mathrm{J\,kg^{-1}}$
h	Height above Earth's surface, vertical distance	m
i	van't Hoff factor	
k_B	Boltzmann constant	$1.38 \times 10^{-23}\,\mathrm{J\,K^{-1}}$
$k_{\lambda,abs}$	Wavelength-dependent absorption coefficient for greenhouses gases, aerosol particles and cloud hydrometeors	$\mathrm{m^{-1}}$
$k_{\lambda,ext}$	Wavelength-dependent extinction coefficient for greenhouses gases, aerosol particles and cloud hydrometeors	$\mathrm{m^{-1}}$
$k_{\lambda,scat}$	wavelength-dependent scattering coefficient for greenhouses gases, aerosol particles and cloud hydrometeors	$\mathrm{m^{-1}}$
m_0	Mass of one water molecule	$3 \times 10^{-26}\,\mathrm{kg}$
m_R	Mass of the collector drop	kg
m_a	Aerosol mass	kg
m_c	Mass of cloud air	kg
m_d	Mass of dry air	kg
m_i	Mass of an "spherical" crystal	kg
m_l	Mass of a liquid droplet	kg
m_m	Mass of moist air	kg
m_s	Mass of a solute	kg
m_w	Mass of liquid water	kg
m	Mass	kg
m	Angular momentum	$\mathrm{m^2\,s^{-1}}$
$n_N(r)$	Number concentration of aerosol particles per unit length	$\mathrm{\mu m^{-1}\,cm^{-3}}$
$n_N(r_h)$	Number concentration of hydrometeors per unit length	$\mathrm{m^{-1}\,m^{-3}}$
$n_N^e(r)$	Number concentration of aerosol particles on a logarithmic scale	$\mathrm{cm^{-3}}$
$n_m^e(r)$	Mass concentration of aerosol particles on a logarithmic scale	$\mathrm{\mu g\,cm^{-3}}$
$n_S^e(r)$	Surface concentration of aerosol particles on a logarithmic scale	$\mathrm{\mu m^2\,cm^{-3}}$
$n_V^e(r)$	Volume concentration of aerosol particles on a logarithmic scale	$\mathrm{\mu m^3\,cm^{-3}}$
n_r	Number of internal reflections	

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Sign	Description	Value/Unit
n_s	Number of solute molecules or moles	
n_v	Number concentration of water vapor molecules	m^{-3}
n_w	Number of water molecules or moles	
$n_{\lambda,a}$	Wavelength-dependent index of refraction of air	
$n_{\lambda,w}$	Wavelength-dependent index of refraction of water	
n	Number of moles or number of molecules	
p_0	Atmospheric reference pressure	1000 hPa
p_L	Laplace pressure	Pa
p_c	Pressure at which the isentropic condensation temperature is reached, which equals the lifting condensation level (LCL)	Pa
p_n	Pressure within a cluster	Pa
p_s	Saturation vapor pressure	Pa
p	Atmospheric pressure	Pa
q_i	Cloud ice mass mixing ratio: mass of cloud ice per unit mass of dry air	$kg\,kg^{-1}$
q_l	Cloud liquid water mass mixing ratio: mass of cloud liquid water per unit mass of dry air	$kg\,kg^{-1}$
q_s	Saturation specific humidity	$kg\,kg^{-1}$
q_v	Specific humidity: mass of water vapor per unit mass of moist air	$kg\,kg^{-1}$
q_x	Condensate mixing ratio: mass of condensate per unit mass of dry air	$kg\,kg^{-1}$
q	Specific heat energy	$J\,kg^{-1}$
r_0	Initial droplet radius	m
r_c	Critical cluster radius for nucleation	m
r_d	Cloud droplet radius	m
r_h	Radius of hydrometeors	m
r_{50}	Radius above which 50 % of all aerosol particles have been activated	m
$r_{Sun-Earth}$	Distance between the Sun and the Earth	1.5×10^{11} m
r_{act}	Activation droplet radius	m
r_{aero}	Aerodynamic aerosol radius	m
r_{dry}	Dry aerosol radius	m
r_{eq}	Equivalent spherical radius of an aerosol particle	m
r_{max}	Maximum raindrop radius	m
r_{wet}	Actual or wet aerosol radius	m
r	Radius	m
s_c	Critical supersaturation for CCN activation	%
s_e	Specific moist static energy	$J\,kg^{-1}$
s_i	Supersaturation with respect with ice	%

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Sign	Description	Value/Unit
s_w	Supersaturation with respect with liquid water	%
$s_{w,max}$	Maximum supersaturation with respect to liquid water	
s	Specific entropy	$\mathrm{J\,K^{-1}\,kg^{-1}}$
s	Path length	m
t	Time	s
u_g	Geostrophic wind speed in x-direction	$\mathrm{m\,s^{-1}}$
u_r	Radial velocity	$\mathrm{m\,s^{-1}}$
u	Specific internal energy	$\mathrm{J\,kg^{-1}}$
u	Horizontal wind speed in x-direction	$\mathrm{m\,s^{-1}}$
v_0	Volume of an individual molecule	$\mathrm{m^3}$
v_D	Doppler velocity	$\mathrm{m\,s^{-1}}$
v_B	Velocity due to Brownian diffusion	$\mathrm{m\,s^{-1}}$
v_Im	Velocity due to impaction	$\mathrm{m\,s^{-1}}$
v_In	Velocity due to interception	$\mathrm{m\,s^{-1}}$
v_tot	Dry deposition velocity	$\mathrm{m\,s^{-1}}$
v_T	Terminal velocity	$\mathrm{m\,s^{-1}}$
v_g	Geostrophic wind speed in y-direction	$\mathrm{m\,s^{-1}}$
v_r	Relative velocity between two falling hydrometeors	$\mathrm{m\,s^{-1}}$
v_t	Tangential velocity	$\mathrm{m\,s^{-1}}$
v_{ice}	Volume of one H_2O molecule in ice	$3.25 \times 10^{-29}\,\mathrm{m^3}$
$v_{t,max}$	Maximal tangential velocity of a tropical cyclone at the surface	$\mathrm{m\,s^{-1}}$
$v_{t,s}$	Tangential velocity of a tropical cyclone at the surface	$\mathrm{m\,s^{-1}}$
v	Volume of one mole of an ideal gas at $p = 1013.25\,\mathrm{hPa}$	$22.41\,\mathrm{mol^{-1}}$
v	Volume of one mole of an ideal gas at $p = 1000\,\mathrm{hPa}$	$22.71\,\mathrm{mol^{-1}}$
v	Horizontal wind speed in y-direction	$\mathrm{m\,s^{-1}}$
w_l	Adiabatic cloud liquid water mass mixing ratio	$\mathrm{kg\,kg^{-1}}$
w_s	Saturation water vapor mass mixing ratio	$\mathrm{kg\,kg^{-1}}$
w_v	Water vapor mass mixing ratio: mass of water vapor per unit mass of dry air	$\mathrm{kg\,kg^{-1}}$
w	Specific work	$\mathrm{J\,kg^{-1}}$
w	Vertical velocity (= updraft speed)	$\mathrm{m\,s^{-1}}$
w_{eff}	Effective updraft speed	$\mathrm{m\,s^{-1}}$
x_0	Impact parameter within which a collision is likely to occur	m
x_w	Mole fraction of water	
x	The x-direction points from west to east	
x	Size parameter	
y	The y-direction points from south to north	

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Sign	Description	Value/Unit
z	The z-direction points upwards	
$\lvert K\rvert^2$	Square of the absolute value of the complex index of refraction	

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