Acronyms, Symbols and Indices

Acronyms

Acronym	Denotation
AMIL2DA	Advanced MIPAS-Level-2 Data Analysis
ARTS	Atmospheric Radiative Transfer Simulator
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
ATMOS	Atmospheric Trace Molecule Spectroscopy Experiment
BOA	Bottom of Atmosphere
BRDF	Bidirectional Reflectance Distribution Function
CFC	Chlorofluorocarbons
CKD	Clough-Kneizy-Davis
DISORT	DIScrete Ordinate Radiative Transfer Model
DOIT	Discrete Ordinate ITerative
CRISTA	Cryogenic Infrared Spectrometers and Telescopes for the Atmosphere
ECMWF	European Centre for Medium-Range Weather Forecasts
ENVISAT	ENVIronmental SATellite
EOS	Earth Observation System
FASCODE	Fast Atmospheric Signature Code
FIR	Far Infrared
FM2D	Forward Model 2D
FOV	Field of View
FWHM	Full-Width Half-Maximum
GCM	General Circulation Model
GEISA	Gestion et Etude des Informations Spectroscopiques Atmosphériques, Management and Study of Atmospheric Spectroscopic Information
GOMOS	Global Ozone Monitoring by Occultation of Stars

Acronym	Denotation
HIRDLS	High Resolution Dynamics Limb Sounder
HiTemp	High-Temperature Molecular Spectroscopic Database
HITRAN	High-Resolution Transmission Molecular Absorption Database
IEEE	Institute of Electrical and Electronics Engineers
IMK	Institut für Meteorologie und Klimaforschung
ILS	Instrumental Line Shape
IR	Infrared
IRTM	Viking Infrared Thermal Mapper
ISCCP	International Satellite Cloud Climatology Project
IWC	Ice Water Content
IWP	Ice Water Path
JPL	Jet Propulsion Laboratory
KOPRA	The Karlsruhe Optimized and Precise Radiative Transfer Algorithm
LbL	Line-by-Line
LIMBTRAN	Limb Radiative Transfer Model
LORE	Limb Ozone Retrieval Experiment
LOS	Line of Sight
LOWTRAN	Low Resolution Transmission Model
LTE	Local Thermodynamic Equilibrium
MAC	Molecular Atmospheric Constituents
MAS	Millimeter Atmospheric Sounder
MCC++	Monte Carlo Method in C++
McClouds_FM	Monte Carlo Cloud Scattering Forward Model
McSCIA	Monte Carlo for SCIAmachy
MIPAS	Michelson Interferometer for Passive Atmospheric Sounding
MIRART	Modular InfraRed Atmospheric Radiative Transfer
MLS	Microwave Limb Sounder
MODIS	Moderate Resolution Imaging Spectroradiometer
MODTRAN	MODerate Spectral Resolution Atmospheric TRANSsmittance Algorithm and Computer Model
MOMO	Matrix Operator MOdel
MS	Multiple Scattering
NESR	Noise Equivalent Spectral Radiance
NIR	Near Infrared

Acronym	Denotation
OPAC	Optical Properties of Aerosols and Clouds
OSIRIS	Optical Spectrograph Infrared Imaging System
PSC	Polar Stratospheric Clouds
PSDISORT	Pseudo-Spherical DIScrete Ordinate Radiative Transfer Model
RGB	Red Green Blue
RT	Radiative Transfer
RTE	Radiative Transfer Equation
SAO	Smithsonian Astrophysical Observatory Database
SARTre	[Approximate] Spherical Atmospheric Radiative Transfer Model
SCIAMACHY	SCanning Imaging Absorption spectroMeter for Atmospheric CHartographY
SHSG	Spherical Harmonic Spatial Grid Method
SMR	Submillimeter Radiometer
SOLSE	Shuttle Ozone Limb Scattering Experiment
SS	Single Scattering
STORM	STOkes Vector Radiative Transfer Model
TELIS	TErahertz and sub millimeter LImb Sounder
TES	Tropospheric Emission Spectrometer
TIR	Thermal Infrared
TOA	Top of Atmosphere
TS	Total Scattering
UARS	Upper Atmospheric Research Satellite
US	United States of America
UV	Ultraviolet
VIS	Visible
WCRP	World Climate Research Program

Symbols and Indices

Symbol	Denotation
A	geometric cross section
a	geometrical size of a particle
$\boldsymbol{a}$	absorption vector
a_{m}	modal diameter
α	absorptivity
$\alpha_{\mathrm{D,L}}$	Doppler/Lorentz half width
B	Planck function
$\beta_{\mathrm{a,s,e}}$	absorption, scattering, extinction coefficient
β_{mac}	continuum absorption coefficient of molecule m
c	speed of light
D_e	effective size
δ	Kronecker-δ
E	energy
E_l	lower energy level
E_{net}	net flux density
ϵ_{meas}	measurement uncertainty
ε	emissivity
Θ	scattering angle
θ	zenith angle
F	line shape function
$\mathbf{g}$	eigenvector
H	scale height
h	Planck's constant
I	radiance, intensity
$\mathbf{I}$	vector of intensity
J	radiation source function
K	Voigt function
$\boldsymbol{K}$	extinction matrix
k	Boltzmann's constant

Symbol	Denotation
L	maximum dimension of a particle
λ	wavelength
m	mass of molecule
m	complex refractive index
m_r	real part of refractive index
m_i	imaginary part of refractive index
μ	cosine of zenith angle θ
N_{str}	number of streams
n(a)	particle size distribution
n_m	number density
ν	wavenumber
ν_0	spectral line position
$\tilde{\nu}$	frequency
P	phase function
p	pressure
$\mathcal{P}_m$	mth order Legendre polynomial
$\tilde{\mathcal{P}}_l^m$	normalized associated Legendre polynomials
$Q(T)$	partition function
$Q_{a,s,e}$	efficiency of absorption, scattering, extinction
R	Earth radius
r	reflectivity, surface albedo
ρ	surface reflection function
S	line strength
S	radiation field independent source term
$\mathbf{S}$	vector of source terms
s	distance, path length
Δs	length of path segment
σ_0	distribution width
$\sigma_{a,s,e}$	absorption, scattering, extinction cross section
T	temperature
$\mathcal{T}$	transmission
τ	optical depth, optical thickness
$\Delta \tau$	optical depth of a path segment
ϕ	azimuthal angle

Symbol	Denotation
V	volume
x	size parameter
χ_m	coefficients of Legendre polynomial expansion
z	altitude
Δz	geometrical thickness of a layer
$\boldsymbol{\Omega}$	direction of radiation
ω	quadrature weight
ω_0	single scattering albedo

Indices

Indice	Denotation
$'$	incident
$-$	downward
$+$	upward
$\odot$	related to direct solar beam
0	reference
a	absorption
B	thermal emission
c	cloud
D	Doppler
DIS	DISORT
diff	diffuse radiation
dir	direct radiation
Δ	difference
e	electric
e	extinction
L	Lorentz
m	mth order Legendre polynomial, molecule
max	maximum
meas	measured
min	minimum
mol	molecular
MS	multiple scattering
mw	microwindow
norm	normalized
ν	spectral
obs	observer
par	particulate matter
r	rotational
surf	surface

Indice	Denotation
s	scattering
s	per path segment
sim	simulated
SS	single scattering
surf	surface
t	translational
tan	tangent
V	Voigt
v	vibrational
z	at altitude