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List of symbols

A	Avogadro's number (6.023×10^{23} mol^{-1})
$APAR$	radiation absorbed by a forest canopy [μmolm^{-2}s^{-1}]
b	empirical coefficient in REA method
c_l	velocity of light (2.9979×10^{8} ms^{-1})
c_s	speed of sound [ms^{-1}]
c_t	actual speed of sound [ms^{-1}]
C	temperature in Celsius [°C]
C_d	dry-bulb temperature [°C]
C_{dp}	dew point temperature [°C]
C_v	volume heat capacity of soil [Jm^{-3}°C^{-1}]
C_W	wet-bulb temperature [°C]
d	span length [m]
dP	the difference between total pressure and static pressure [Pa]
$D_{2000.0}$	magnetic declination at 0:00 on Jan. 1, 2000 [°]
e	water vapor pressure [Pa]
e_d	Saturation deficit [Pa]
e_s	Saturation vapor pressure [Pa]
ΔE	thermopile output voltage [mV]
F_c	CO_2 flux [mgm^{-2}s^{-1}]
F_g	vertical flux of a trace gas [mgm^{-2}s^{-1}]
F_s	CO_2 storage change [mgm^{-2}s^{-1}]
F_E	radiant flux density [Wm^{-2}]
$F_{E\lambda}$	radiant flux density of single wavelength λ [Wm^{-2}]
F_Q	molar photon flux density [molm^{-2}s^{-1}]
$F_{Q\lambda}$	molar photon flux density of single wavelength λ [molm^{-2}s^{-1}]
h	Planck's constant (6.626×10^{-34} Js)
H	sensible heat flux [Wm^{-2}]
H_{body}	sensible heat flux generated at the instrument surface [Wm^{-2}]
H_{op}	sensible heat flux measured by the open-path gas analyzer [Wm^{-2}]
ΔH	Difference of sensible heat flux measured by SAT from one measured by opne-path gas analyzer: $H - H_{op}$ [Wm^{-2}]
J	number of days elapsed since 0:00, Jan. 1
k	thermopile sensitivity [mV(Wm^{-2})$^{-1}$]
k_d	dome coefficient
$L\uparrow$	downward longwave radiation [Wm^{-2}]
$L\downarrow$	downward longwave radiation [Wm^{-2}]

m_c	molecular weight of CO_2 [$kgmol^{-1}$]
m_d	molecular weight of dry air [$kgmol^{-1}$]
m_w	molecular weight of water vapor [$kgmol^{-1}$]
n	the number of measurement heights
p	atmospheric pressure [Pa]
p_c	partial pressure of CO_2 [Pa]
$PAR\uparrow_{above}$	reflected PAR measured above forest canopy [$\mu molm^{-2}s^{-1}$]
$PAR\uparrow_{below}$	reflected PAR measured under forest canopy [$\mu molm^{-2}s^{-1}$]
$PAR\downarrow_{above}$	downward PAR measured above forest canopy [$\mu molm^{-2}s^{-1}$]
$PAR\downarrow_{below}$	downward PAR measured under forest canopy [$\mu molm^{-2}s^{-1}$]
q	specific humidity [$kgkg^{-1}$]
Q	soil heat flux [Wm^{-2}]
Q_b	soil heat flux at the bottom of the lowest soil layer [Wm^{-2}]
R_0	resistances at 0 °C [Ω]
R_{100}	resistances at 100 °C [Ω]
R_d	infrared radiation that passes through a dome [Wm^{-2}]
R_{net}	net radiation [Wm^{-2}]
$S\uparrow$	upward shortwave radiation (reflected solar radiation) [Wm^{-2}]
$S\downarrow$	downward shortwave radiation (global solar radiation) [Wm^{-2}]
t	time [s]
t_1, t_2	time required for an acoustic signal to travel between the transceivers [s]
t_a	culmination time [h]
Δt_f	flux averaging period [s]
t_s	standard time [h]
T	absolute temperature [K]
T_1	triple-point temperature of water (273.16 K)
T_a	air temperature [K]
T_b	sensor body temperature [K]
T_d	dome temperature [K]
T_s	soil temperature [K]
T_v	sonic virtual temperature [K]
T_{vt}	actual sonic virtual temperature [K]
u	wind velocity [ms^{-1}]
v_d	wind velocity component parallel to the path [ms^{-1}]
v_n	wind velocity component normal to the path [ms^{-1}]
V_a	volume of gaseous phase [m^3]
V_r	volume of liquid phase [m^3]
V_s	volume of solid phase [m^3]

w	vertical wind velocity [ms^{-1}]
W_r	weight of liquid phase [g]
W_s	weight of solid phase [g]
x	mixing ratio [$kgkg^{-1}$]
x_s	mixing ratio in saturated air [$kgkg^{-1}$]
z	height [m]
z_d	thickness of a soil layer [m]
z_f	flux measurement height [m]
β	solar zenith angle [°]
γ	longitude [°]
γ_0	meridian [°]
δ	declination of the sun [°]
ε	ratio of molecular weight of vapor to that of dry air
ζ_a	hour angle [°]
ζ_s	solar altitude [°]
η	saturation ratio [m^3m^{-3}]
θ	volumetric water content [m^3m^{-3}]
θ_{sat}	saturated volumetric water content [m^3m^{-3}]
Θ	water content [$kgkg^{-1}$]
λ	wavelength [m]
ρ	air density [kgm^{-3}]
ρ_c	CO_2 mass density [kgm^{-3}] [mgm^{-3}]
ρ_{cc}	CO_2 concentration [$\mu molmol^{-1}$]
ρ_d	dry air mass density [kgm^{-3}]
ρ_g	concentrations of the atmospheric trace gas [mgm^{-3}]
σ	Stefan-Boltzmann constant (5.67051×10^{-8} $Wm^{-2}K^{-4}$)
σ_w	standard deviation of w [ms^{-1}]
φ	latitude [°]
Φ_a	absolute humidity [kgm^{-3}]
Φ_c	percentage humidity [%]
Φ_p	relative humidity [%]
X	temperature in Fahrenheit [F]
Ψ	matric potential [Pa]
ω	$2\pi/365$ or $2\pi/366$
Ω	equation of time [h]
a, c_1, c_2, j, k_1, k_2, k_3, α	constants