

Symbol ^{a,b}	Parameter	Units
$P_{\text{co}}, P_{\text{cross}}$	P-MPL signal channels: co-polar and cross-polar	a.u.
$P, P^{\parallel}, P^{\perp}$	P-MPL range-corrected signals: total, parallel, perpendicular signals ($P = P^{\parallel} + P^{\perp} = P_{\text{co}} + 2P_{\text{cross}}$)	a.u.
β_p	Total particle backscatter coefficient	$\text{km}^{-1} \text{sr}^{-1}$
β_i	Backscatter coefficient for a specific particle component (i)	$\text{km}^{-1} \text{sr}^{-1}$
β_p^{int}	Height-integrated total particle backscatter coefficient	sr^{-1}
β_i^{int}	Height-integrated backscatter coefficient for a specific particle component (i)	sr^{-1}
β_{mol}	Molecular backscatter coefficient	$\text{km}^{-1} \text{sr}^{-1}$
Δ	Root square differences (see Eq. 8)	$\text{km}^{-1} \text{sr}^{-1}$
$\tilde{\Delta}$	Root mean square differences (see Eq. 10)	sr^{-1}
δ^V	Linear volume depolarization ratio	—
δ_p	Linear particle depolarization ratio	—
δ_i	Linear particle depolarization ratio for a specific particle component (i)	—
δ_{mol}	Molecular depolarization ratio	—
$\delta_{\text{Df+ND}}$	Total fine (Df + ND) depolarization ratio (residual depolarization ratio)	—
$\delta_{\text{Df+ND}}^c$	Columnar total fine (Df + ND) depolarization ratio	—
R	Backscattering ratio ($= \frac{\beta_{\text{mol}} + \beta_p}{\beta_{\text{mol}}}$)	—
S_a	Lidar ratio (LR) (KF derived)	sr
σ_p	Total particle extinction coefficient	km^{-1}
σ_i	Extinction coefficient for a specific particle component (i)	km^{-1}
AOD	Aerosol optical depth (total particle extinction, AERONET data)	—
AEx	Ångström exponent (AERONET data)	—
k_{eff}	Effective mass extinction efficiency (MEE)	$\text{m}^2 \text{g}^{-1}$
k_i	Mass extinction efficiency for a specific particle component (i)	$\text{m}^2 \text{g}^{-1}$
c_{v_x}	Extinction-to-volume conversion factor for a specific particle size mode	10^{-12} Mm
VC_x	Volume concentration for a specific particle size mode (AERONET data)	10^{-12} Mm
τ_x	Extinction for a specific particle size mode (AERONET data)	—
TMC	Total mass concentration	g m^{-3}
M_i	Mass concentration for a specific particle component (i)	g m^{-3}
$\overline{\text{TMC}}$	Total mass loading (height-integrated TMC, over-bar is removed for simplicity)	g m^{-2}
$\overline{M_i}$	Mass loading (height-integrated M_i) for a specific particle component (i)	g m^{-2}