

Supplement of

Propagation of CAMS Aerosol Uncertainty to Clear-sky Solar Radiation Estimates

Anna Moustaka et al.

Correspondence to: Anna Moustaka (anna.moustaka@pmodwrc.ch)

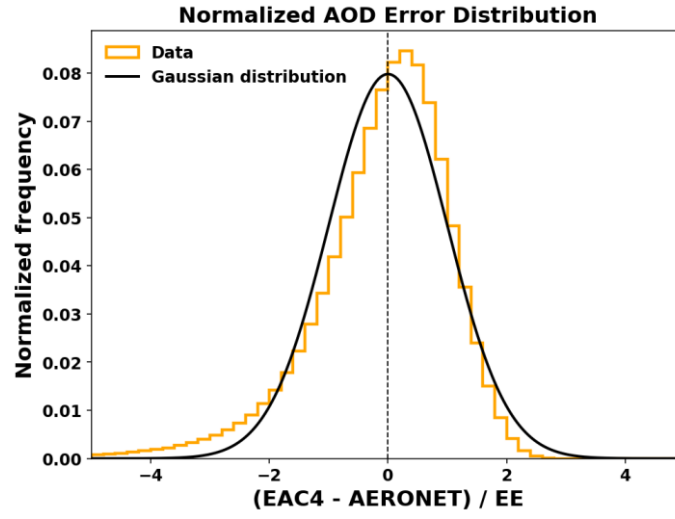


Figure S1: Histogram of the normalized AOD retrieval errors, defined as $AOD_{EAC4} - AOD_{AERONET} / EE$, for all collocated EAC4–AERONET observations used in the uncertainty analysis. The orange histogram represents the normalized frequency distribution of the retrieval differences, while the black curve corresponds to an idealized Gaussian distribution with zero mean and unit variance, $N(0, 1)$.

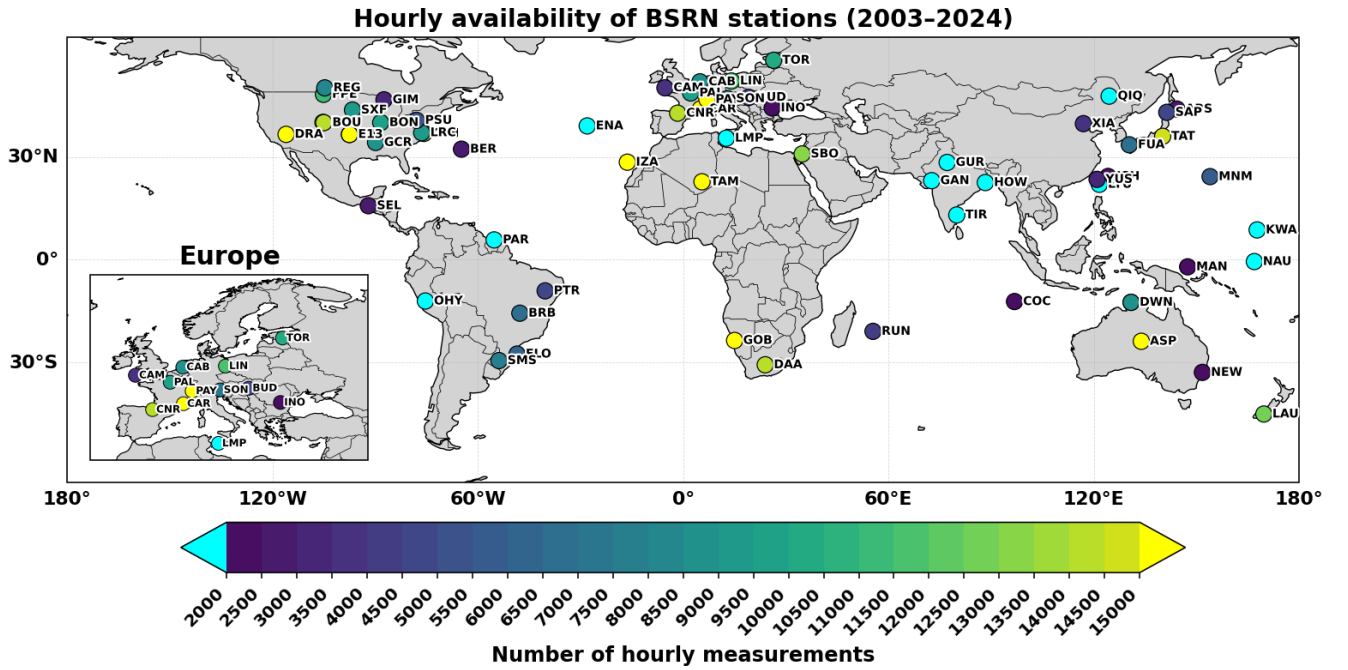


Figure S2: Spatial distribution of the 64 BSRN stations retained for the validation of the EAC4-derived irradiance products (i.e., GHI and DNI) after applying all quality-control criteria. The color scale indicates the number of hourly measurements available at each station during the 2003–2024 period. The inset axis highlights the station spatial distribution over Europe.

EAC4-mean-seasonal GHI, 2003-2024

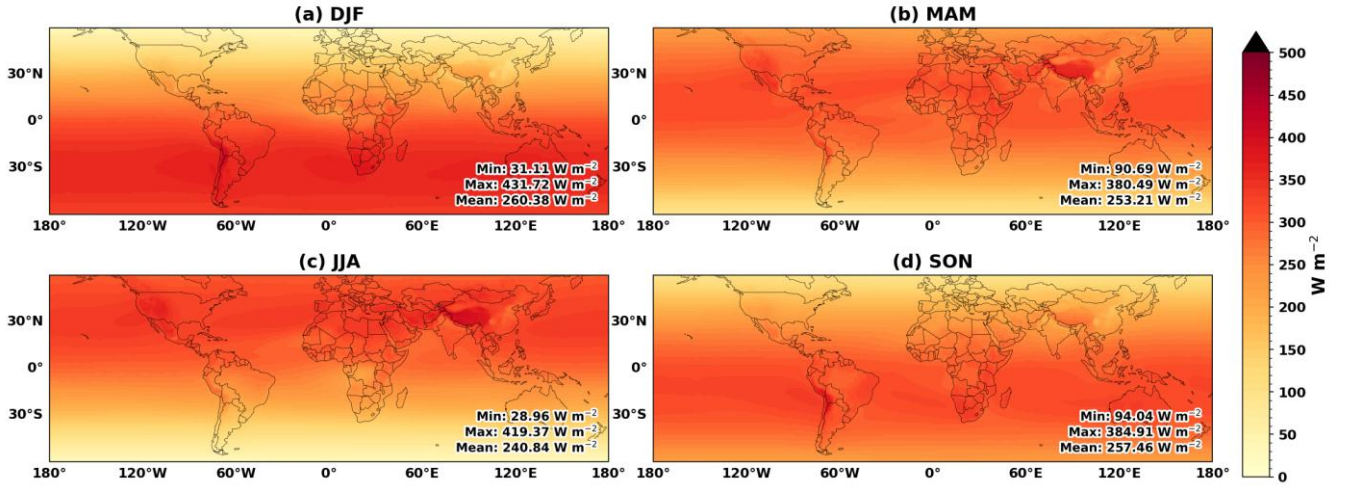


Figure S3: Spatial distribution of the mean-seasonal global horizontal irradiance (GHI) for the period 2003–2024. Panels (a) DJF, (b) MAM, (c) JJA, and (d) SON show the mean-seasonal GHI expressed in W m^{-2} .

EAC4-mean-seasonal relative σ_{GHI} , 2003-2024

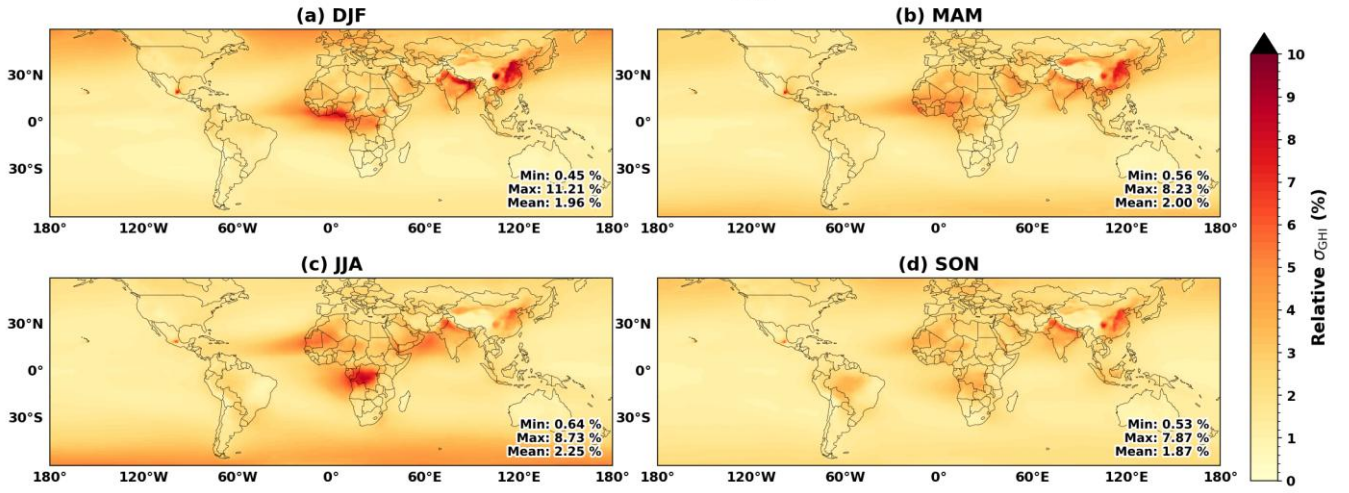


Figure S4: Spatial distribution of the mean-seasonal relative uncertainty of GHI (σ_{GHI}) for the period 2003–2024. Panels (a) DJF, (b) MAM, (c) JJA, and (d) SON show the mean-seasonal relative uncertainty of GHI (%).

EAC4-mean-seasonal DNI, 2003-2024

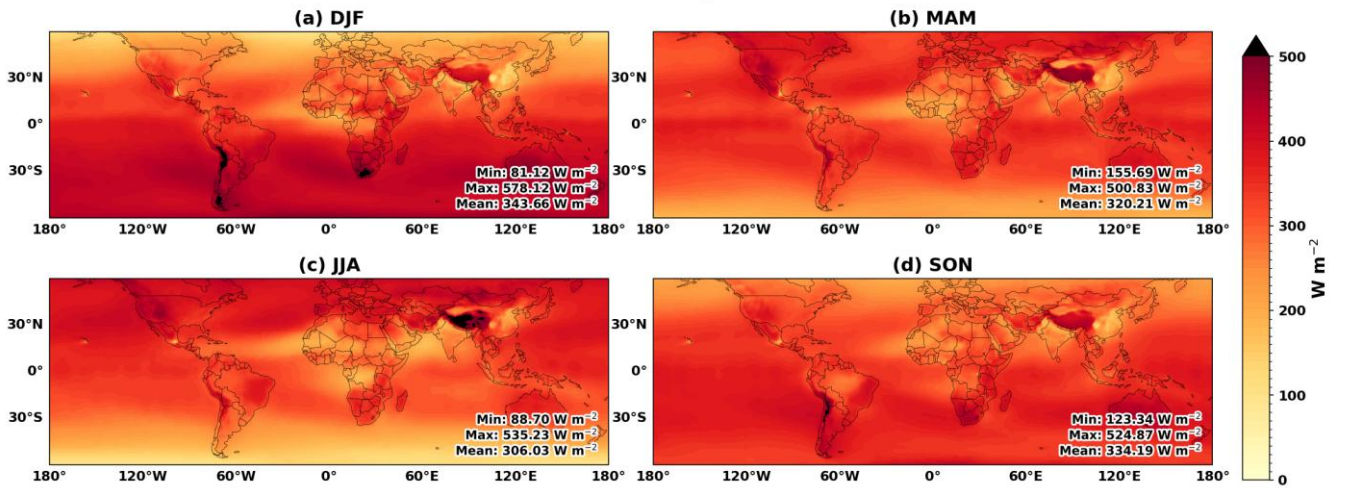


Figure S5: Spatial distribution of the mean-seasonal direct normal irradiance (DNI) for the period 2003–2024. Panels (a) DJF, (b) MAM, (c) JJA, and (d) SON show the mean-seasonal DNI expressed in W m^{-2} .

EAC4-mean-seasonal relative σ_{DNI} , 2003-2024

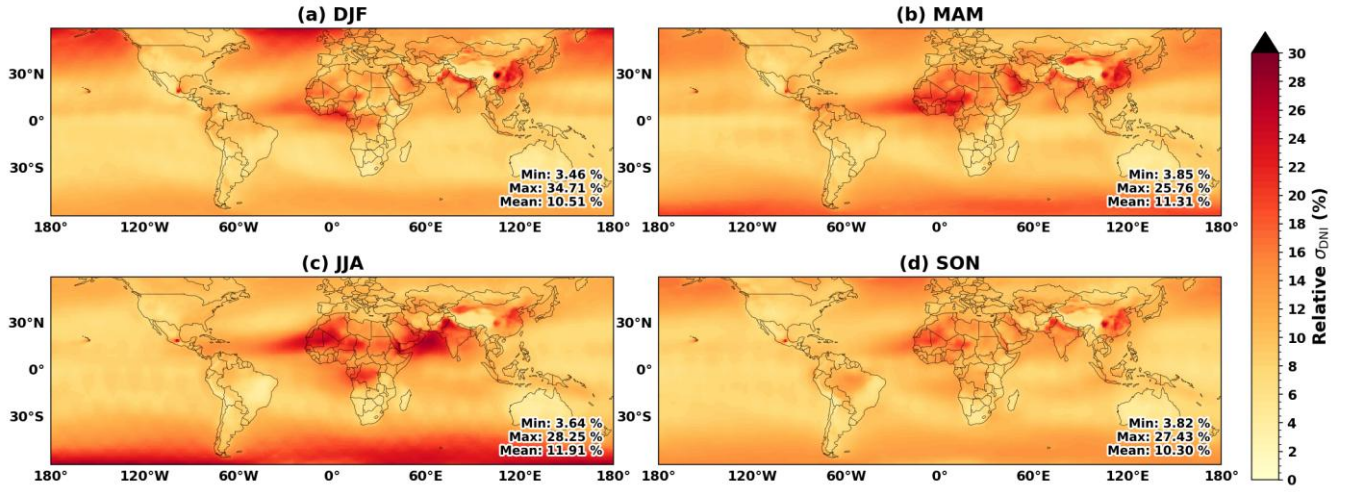


Figure S6: Spatial distribution of the mean-seasonal relative uncertainty of DNI (σ_{DNI}) for the period 2003–2024. Panels (a) DJF, (b) MAM, (c) JJA, and (d) SON show the mean-seasonal relative uncertainty of DNI (%).

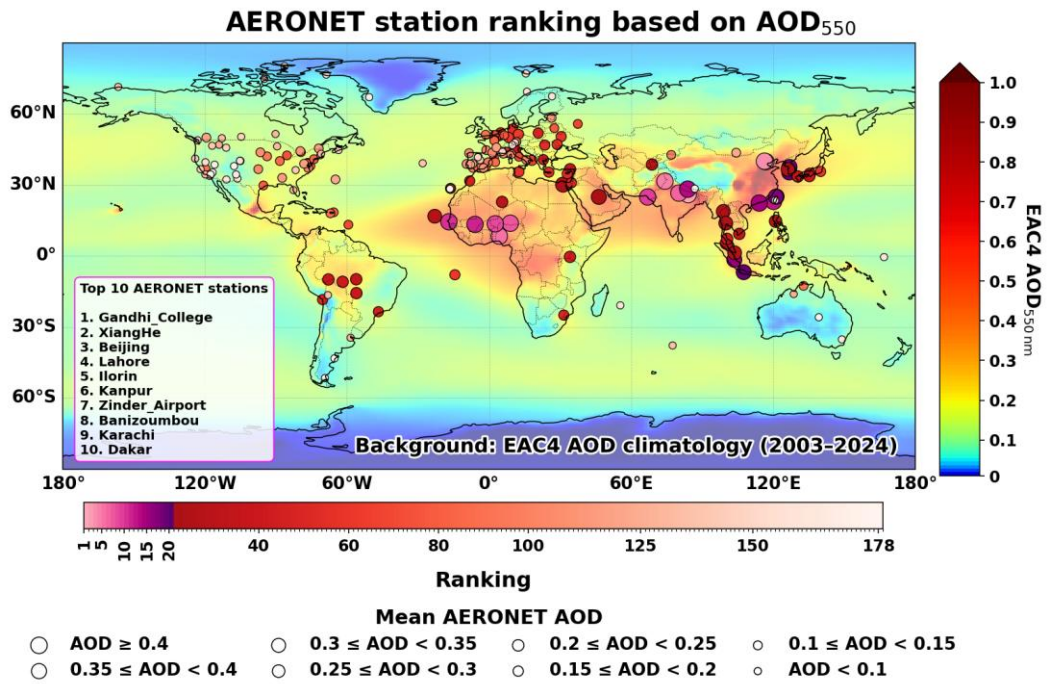


Figure S7: Global distribution and ranking of the 178 AERONET stations used in the present analysis based on their long-term mean AERONET AOD at 550 nm during the 2003–2024 period. The colored background represents the annual mean EAC4 AOD climatology at 550 nm for the same period. Marker colors indicate the ranking position of each station, while marker sizes correspond to different ranges of mean AERONET AOD.