Supplement of Atmos. Chem. Phys., 24, 5337–5367, 2024
https://doi.org/10.5194/acp-24-5337-2024-supplement

Atmospheric Chemistry and Physics
Open Access
EGU

Supplement of

Observationally constrained regional variations of shortwave absorption by iron oxides emphasize the cooling effect of dust

Vincenzo Obiso et al.

Correspondence to: Vincenzo Obiso (obisovincenzo@gmail.com)

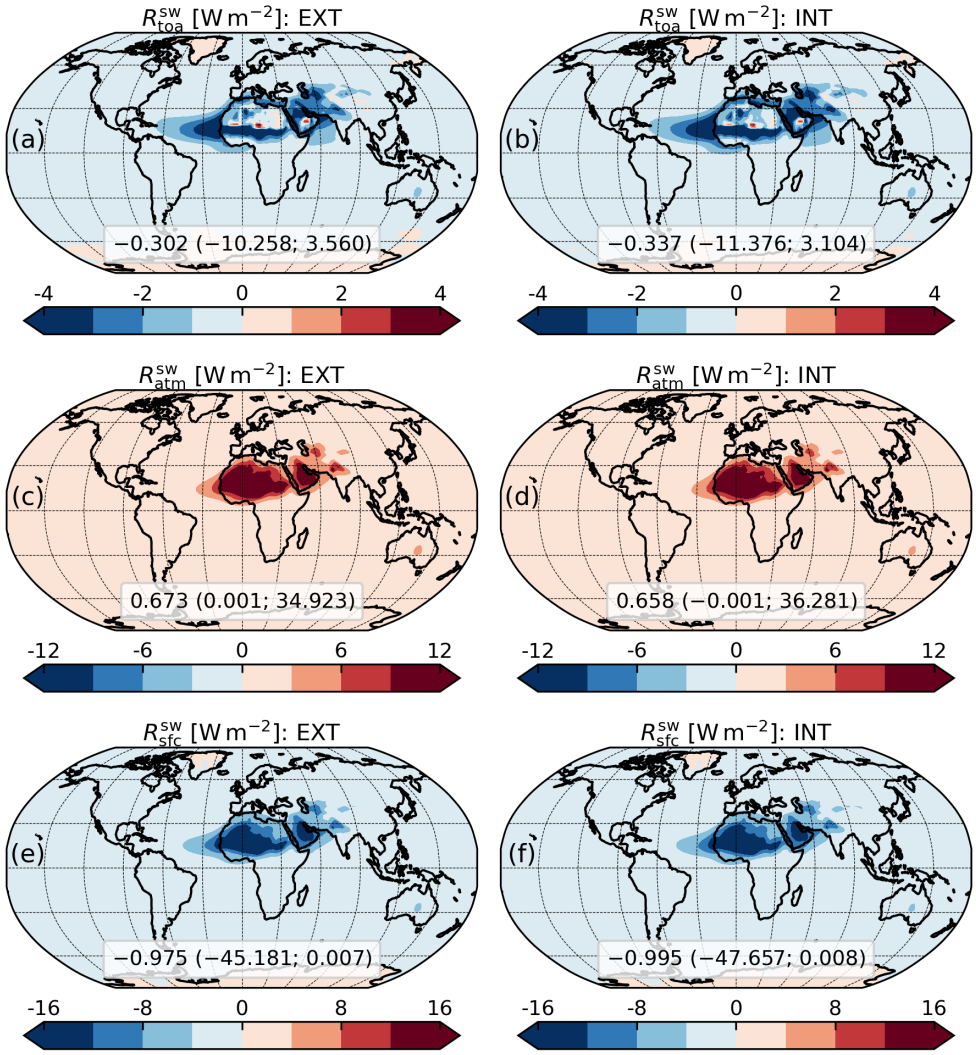

Figure S1. Annual mean direct radiative effect at the top of atmosphere ($R^{\mathrm{sw}}_{\mathrm{toa}}$), in the atmosphere ($R^{\mathrm{sw}}_{\mathrm{atm}}$) and at surface ($R^{\mathrm{sw}}_{\mathrm{sfc}}$), from the mineral experiments with external (EXT; a, c and e, respectively) and internal (INT; b, d and f, respectively) mixing configuration. The direct radiative effect is relative to the entire shortwave spectrum (0.30–$4\,\mu\mathrm{m}$). The extremes of the color bars are set to include 1^{st} and 99^{th} percentiles of the mapped variables. Global averages along with minimum and maximum (within parentheses) are also reported.

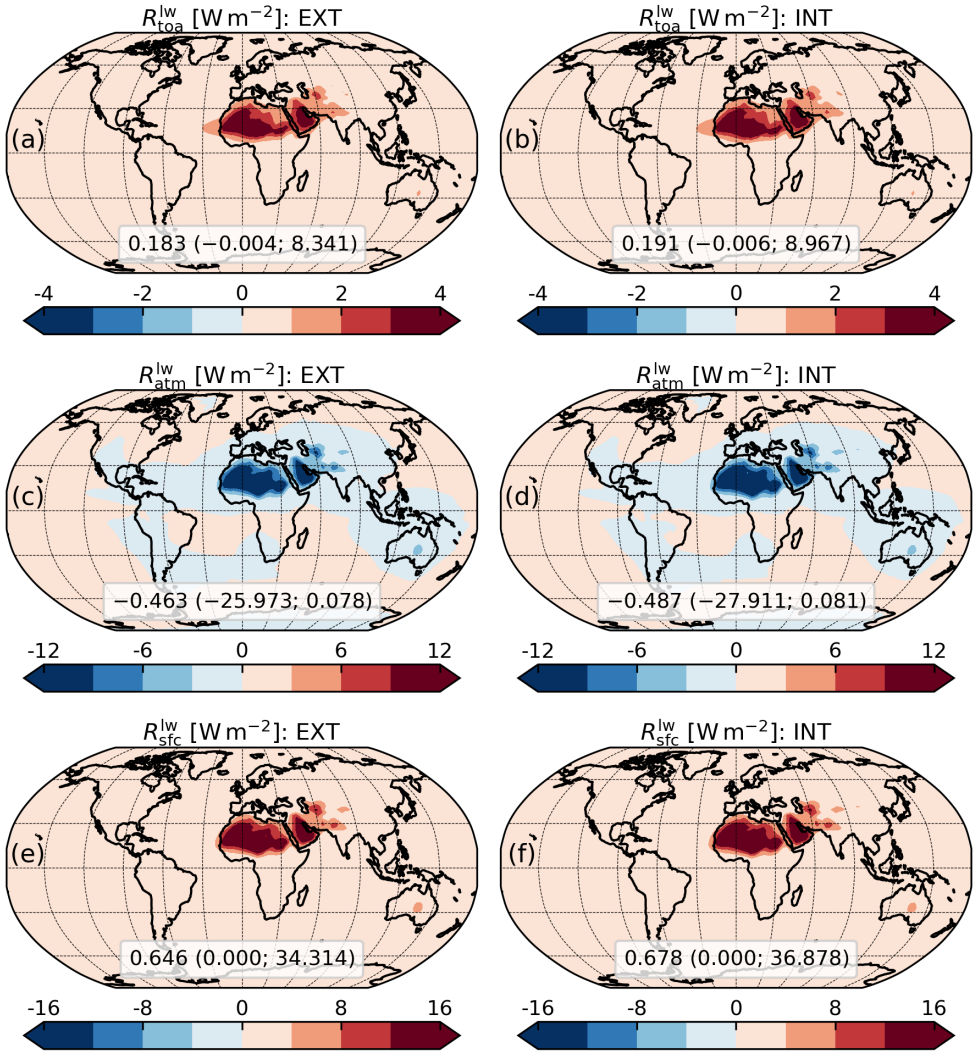

Figure S2. Same as Fig. S1 but showing the longwave direct radiative effect: $R^{\mathrm{lw}}_{\mathrm{toa}}$, $R^{\mathrm{lw}}_{\mathrm{atm}}$ and $R^{\mathrm{lw}}_{\mathrm{sfc}}$ at the top of atmosphere, in the atmosphere and at surface, respectively.

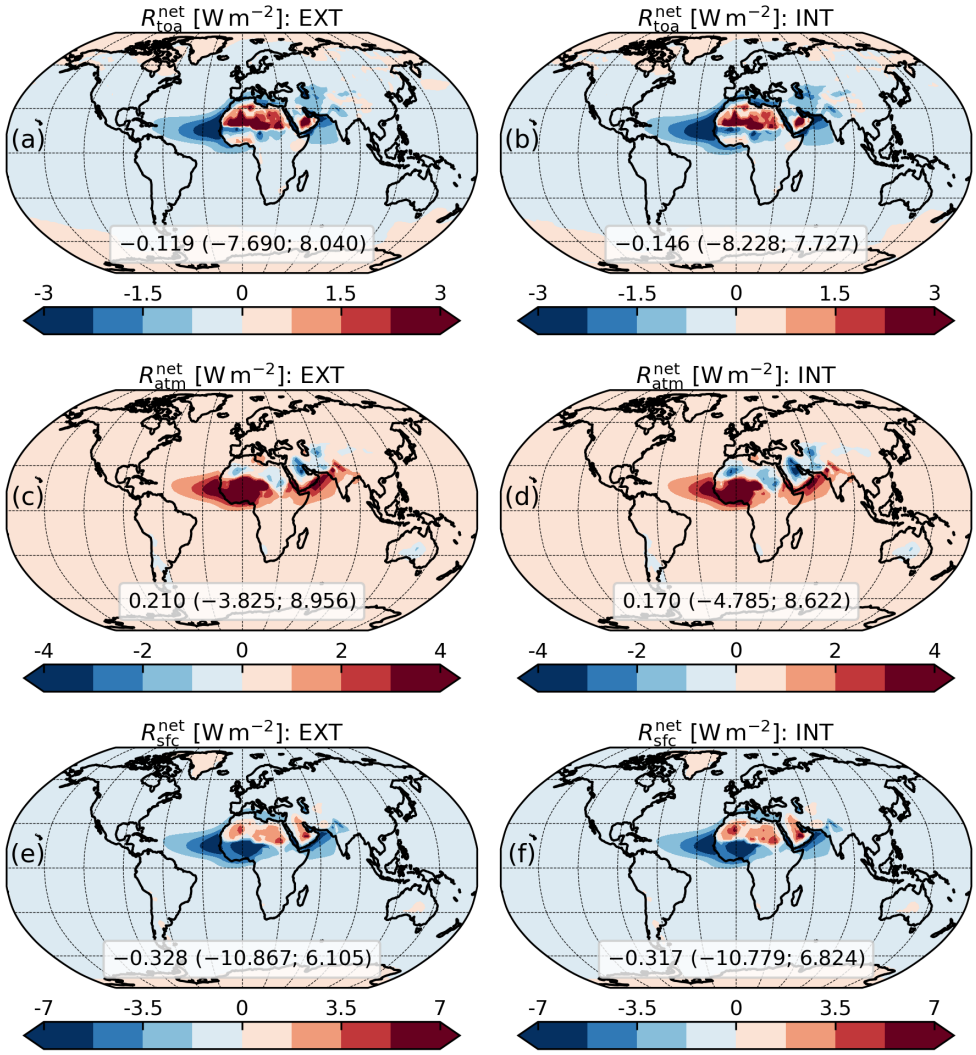

Figure S3. Same as Fig. S1 but showing the net direct radiative effect (sum of shortwave and longwave contributions): $R^{\mathrm{net}}_{\mathrm{toa}}$, $R^{\mathrm{net}}_{\mathrm{atm}}$ and $R^{\mathrm{net}}_{\mathrm{sfc}}$ at the top of atmosphere, in the atmosphere and at surface, respectively.

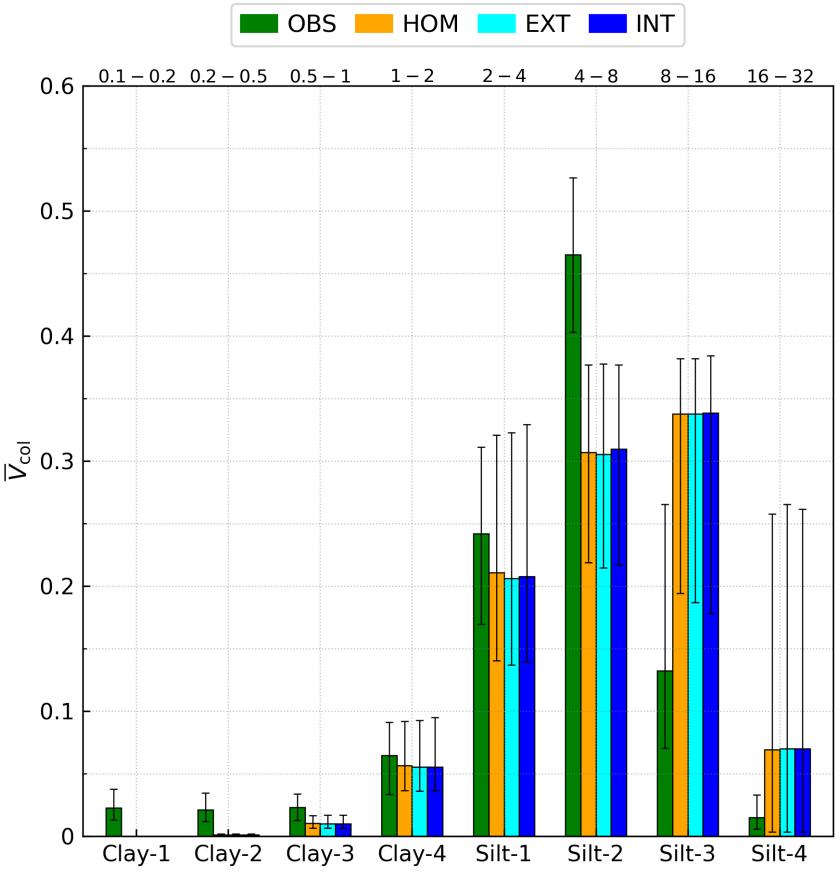

Figure S4. Normalized size distribution of climatological monthly mean column particle volume ($\overline{V}_{\mathrm{col}}$) from the control run with homogeneous composition (HOM) and the mineral experiments with external (EXT) and internal (INT) mixing configuration, compared to AERONET monthly retrievals (OBS), that are projected onto the model size bins, at the selected stations and months from the AeroTAU4 data set. The size-distributed model column volume is derived from the column mass load, thus assuming a dust mass density that is constant across the size bins. The ranges reported on the upper x-axis indicate the diameters (expressed in μm) covered by each size bin. The solid bars represent medians, along with 1^{st} and 99^{th} percentiles (error bars), of the monthly means across all the selected stations and months.