



## **aerosol radiative effects and forcing: spatial and temporal distributions**

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A monthly climatology for aerosol optical properties based on a synthesis from global modeling and observational data has been applied to illustrate spatial distributions and global averages of aerosol radiative impacts. With the help of a pre-industrial reference for aerosol optical properties from global modeling, also the aerosol direct forcing (ca  $-0.35\text{W/m}^2$  globally and annual averaged) and their spatial and seasonal distributions and contributions by individual aerosol components are estimated. Finally, CCN and IN concentrations associated with this climatology are applied to estimate aerosol indirect effects and forcing.