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an aerosol climatology optical properties and its associated direct radiative forcing

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Aerosol particles are quite complex in nature. Aerosol impacts on the distribution of radiative energy and on cloud microphysics have been debated climate impact issues. Here, a new aerosol-climatology is presented, combining the consistency and completeness of global modelling with quality data by ground-monitoring. It provides global monthly maps for spectral aerosol optical properties and for concentrations of CCN and IN. Based on the optical properties the aerosol direct forcing is determined. And with environmental data for clouds and estimates on the anthropogenic fraction from emission experiments with global modelling even the climate relevant aerosol direct forcing at the top of the atmosphere (ToA) is determined. This value is rather small near -0.2W/m2 with limited uncertainty estimated at (+/-0.3) due to uncertainties in aerosol absorption and underlying surface conditions or clouds.