



Investigation of trace gas to aerosol relationships over biomass burning areas using daily satellite observations

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The quantification and characterization of aerosols from space is a great challenge. Especially in the presence of clouds and over land surfaces, it is often difficult to distinguish the signals of aerosol scattering from scattering by cloud particles or surface reflection.

Instead of deriving aerosol properties directly, satellite observations of tropospheric trace gases, emitted by the same emission sources as the aerosols, can be used to derive additional information on the aerosols. Such observations have two potential advantages: First, from the composition of trace gases, information on the aerosol type can be derived. Second, such observations are possible in the presence of clouds (although usually with reduced sensitivity if the trace gases are located below the cloud).

In this feasibility study we investigate the relationship between satellite observations of trace gases (CO, NO₂, HCHO, CHOCHO) and AOD (measured from satellite or ground). We also include in our comparison satellite observations of the so called UV aerosol index (UVAI), which is an indicator of the aerosol absorption. Like the trace gas observations, also the UVAI can be retrieved in the presence of clouds.

We investigate aerosol-trace gas relationships over biomass burning regions. Depending on their optical properties and altitude distribution such aerosols can have a strong impact on the atmospheric energy budget through direct and indirect effects. We perform correlation analyses for selected AERONET stations and also for larger biomass burning areas by also taking into account satellite observations of fire counts.