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Global seasonal and vertical distribution of carbon monoxide from MOPITT data between 2000 and 2006

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Carbon monoxide (CO) is a good indicator for sources and the distribution of air pollution in the atmosphere. Sources can be natural like vegetation fires or anthropogenic like industrial and traffic emissions, biomass burning etc. The main sink for CO is the oxidization by hydroxyl radicals. CO concentrations are spatially variable in the atmosphere as it is a rather short-lived trace gas. The lifetime of CO from several days to few weeks is short enough to identify sources of air pollution as well as long enough to trace the advection of polluted air masses. CO has an indirect radiative forcing effect by elevating concentrations of methane and tropospheric ozone through chemical reactions with other atmospheric constituents especially with the hydroxyl radical (OH), which would otherwise destroy these gases.

CO is one of the few trace gases, which can be measured from space. The Measurements of Pollution in the Troposphere (MOPITT) provide a global data set of CO since March 2000. This instrument is on board the polar orbiting EOS Terra satellite. This gas correlation radiometer measures absorption in the thermal band of 4.7μm and solar radiation at 2.2-2.4μm in four channels. This data set provides information of the CO distribution with a horizontal resolution of 22 x 22 km and seven levels in the vertical. A complete global coverage is reached every three days.

Here, we investigate spatial and vertical distribution of CO globally using seven years of MOPITT data. Special emphasis is given on highly polluted regions. We also investigate seasonal cycles and trends in CO concentrations in the selected polluted areas.