Carbon Monoxide (CO)

Carbon monoxide (CO) is one of the most abundant air pollutants, which plays an important role in the atmospheric chemistry. Like NO_2, CO is also a precursor for the tropospheric ozone, which is a major secondary pollutant and a greenhouse gas. CO consumes a significant fraction of hydroxyl (OH) radical, which otherwise would reduce the concentration of methane, which is a second most important greenhouse gas after CO_2. Therefore, CO is considered as an indirect greenhouse gas with a significant indirect radiative forcing, influencing the climate.

Incomplete combustion of fossil fuel and biomass/biofuel is a major source of CO. In particular, the CO concentrations are elevated over the regions experiencing intense biomass burning, e.g., forest fires, agricultural waste burning, etc. In addition, a significant source of CO is the oxidation of organic compounds, e.g., like methane and Isoprene. The major sink of CO is its oxidation by OH radical.

Lifetime of CO in the lower troposphere is in the range from a week to two months. Therefore, it is used as a tracer for the long-range transport of air pollution. Due to longer lifetime of CO, its spatial distribution is seen to more uniform than those of short-lived species such as NO_2 or SO_2.

Total column of carbon monoxide (CO) from TROPOMI

TROPOMI (TROPOspheric Monitoring instrument) is a nadir-viewing spectrometer (ultraviolet, visible and shortwave infrared) onboard polar-orbiting ESA's Sentinel-5 Precursor satellite with high-spatial resolution of 7.5 km × 5.5 km (across x along track for shortwave infrared band), swath of ~2600 km and equator crossing time ~13:30 local time. Total column CO retrieved from observations around 2.3 µm (shortwave infrared) is sensitive to the boundary layer CO. Level-2 near-real time (NRTI) total column CO (molecules cm^{-2}) is spatially averaged to uniform 10 km × 10 km grids for quality assurance of 0.5 and 0.75. Spatial averaging is carried out by $\sum (a_i \times y_i)/ \sum a_i$; where a_i=area of ith pixel and y_i= column CO over i^{th} pixel. Negative or zero values are omitted for daily maps over the Indian region.