

**An analysis of tropospheric ozone over Boulder, CO**

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Atmospheric ozone profile in Boulder, CO is measured by the Dobson (since 1978) and Brewer (since 2006) ozone spectrophotometers, and by ozonesondes (since 1979). Almost 30 years of Dobson climatology show a distinct seasonal cycle in tropospheric levels of ozone. Although the majority of atmospheric ozone resides in the stratosphere, tropospheric ozone is very important for air quality and climate change issues. Therefore, continuous monitoring of tropospheric ozone is very important for assessment of climate changes on global, regional and local environment. An Umkehr ozone measurement is taken by the Dobson or Brewer instrument on every clear, sunny day, whereas an ozonesonde is launched approximately one time a week. Although ozone sonde can provide a highly resolve vertical information on ozone distribution, the Dobson ground-based measurement takes measurements on average 15 times per month. Moreover, there are other NOAA monitoring stations in the US that do not support balloon measurements. Ozone in the free troposphere is greatly influenced by atmospheric dynamics. Therefore, meteorological parameters and trajectories are used to determine if ozone measurements taken on different days are comparable, in an attempt to improve the correlation between different-day Umkehr and ozonesonde tropospheric ozone values. Day-to-day variability in tropospheric ozone in Boulder, CO is closely related to tropopause height (correlation of 0.6), meteorological regimes (0.5) and back trajectories (0.5). The time series of Umkehr tropospheric ozone data in Boulder show that the day-to-day variability in ozone controls 0.34 correlation between measurements taken within 24 hours apart. The Umkehr and sonde ozone measured with less than 2-days apart agree at 36 % when the data are in the same meteorological regime. The meteorological regime is determined by the Boulder station location relative to subtropical and polar night jets.