

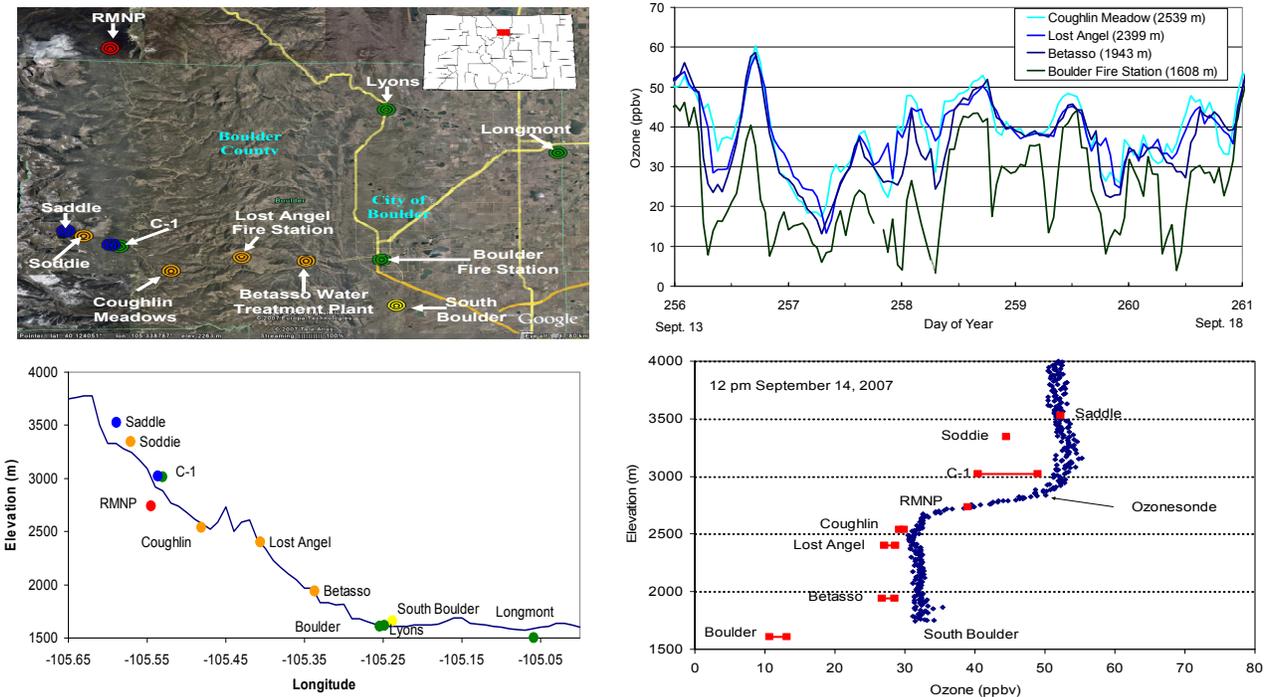
Ozone Chemistry and Transport Along a 2000 meter Altitude Gradient in the Colorado Front Range from Twelve Surface Sites and Balloon Sonde Observations

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Over the past years summer ozone levels in the Colorado Denver – Front Range Region have repeatedly exceeded the 80 ppbv threshold and in 2007 the region was declared in nonattainment with the 8-hour National Ambient Air Quality Standard. Boulder’s elevation of 1600 m above sea level, and its location at the bottom of the eastern edge of the Rocky Mountains and at the periphery of the Denver urban area make it susceptible to both downslope transport of air with elevated ozone originating at higher altitude above the Rocky Mountains, and to polluted air that has experienced anthropogenic ozone production during transport from adjacent urban source regions. During 2007 a number of new ozone surface sites were put on line to create a 12-station surface network in Boulder County. This network is one of the (possibly the) most dense ozone networks. It is also unique in that these stations are spaced at about 200-300 m intervals along a 2000 m elevation gradient. This offers an opportunity to perform new interpretations of the weekly NOAA ESRL ozonesonde launches in South Boulder by comparing same altitude data from the freely rising ozonesondes with the concurrent measurements from surface sites. These analyses have yielded new insights into ozone surface processes. The combined surface and ozonesonde measurements, and the 20+ years record of historical ozonesonde data are furthermore utilized for studying ozone changes, chemistry, and transport in this plains-mountain transition zone.



Figures 1-4. Map and elevation profile (left side, with the insert in the upper right depicting in red Boulder County within the State of Colorado) showing current surface ozone monitoring sites operated by CU-INSTAAR (orange), the State of Colorado (yellow), the National Park Service (red), NOAA (blue), and Boulder County Public Health/CU-INSTAAR (dark green). The example data graphs for September 2007 on the right show the increase in ozone with elevation that is generally seen both in measurements from the surface sites and in the ozonesonde data.