

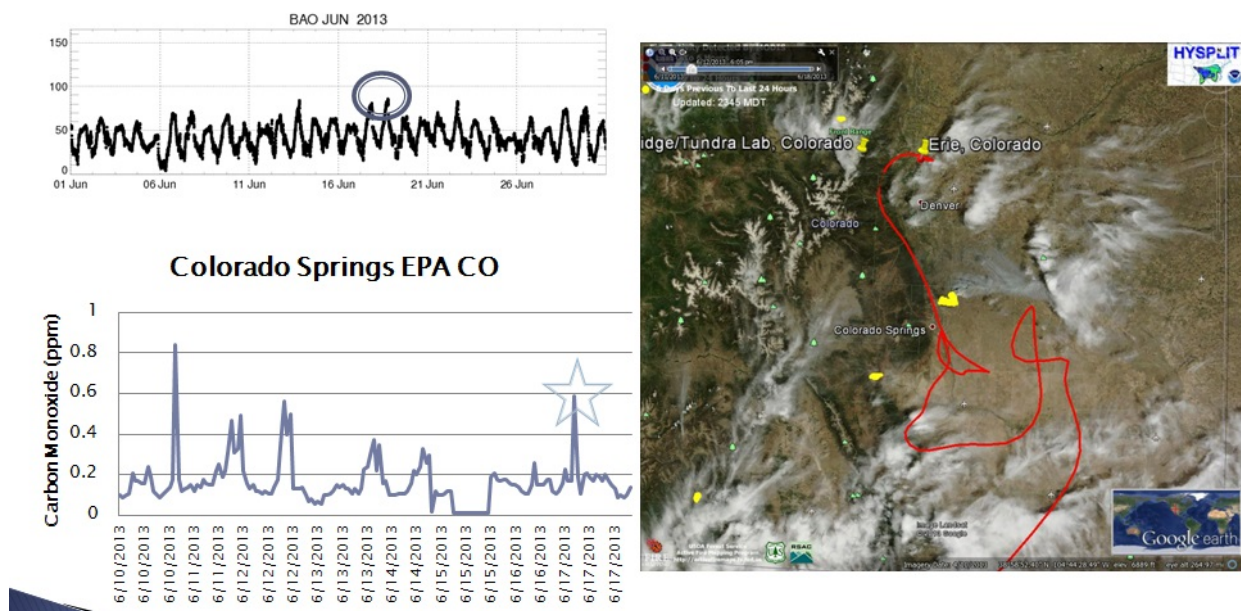
## Colorado Front Range Surface Ozone Characterization

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The Colorado Front Range is a unique geographical region for air quality studies, including research of surface level ozone. Surface level ozone is not only a primary contributor to local smog, but leads to public health complications and altered ecosystem functioning. This region of Colorado is currently in a nonattainment status for surface level ozone, due to a variety of contributing factors. The Front Range is undergoing expansion of population, industrial production, and oil and gas extraction as well as enduring dramatic change in the annual wildfire frequency and size. Each of these processes contributes nitrogen oxides (NO<sub>x</sub>) and Volatile Organic Carbons to the atmosphere. In the presence of sunlight, these compounds react and create surface level ozone. With the high frequency of sunny days in the Front Range region and increasing rates of pollution, the atmosphere has conditions suitable for production and accumulation of ozone at ground level. In order to understand the dynamics of Front Range ozone accumulation, Thermo Scientific ozone monitors have been continuously sampling from 3 different altitudes since the early 2000s. Analysis of ozone data in relation to NO<sub>x</sub>, PAN, CO<sub>2</sub>, and back-trajectory air mass origins help to address local pollution sources. With NOAA Hysplit back-trajectory modeling, tropospheric ozone aircraft measurements and complementary *in situ* data sets, increased ozone episodes are scrutinized to determine main sources of precursor emissions that lead to elevated ozone and variability in the long-term trends. Highlighting episodes of high ozone allows for further understanding of Colorado ozone dynamics and can assist in the future regulations on this important pollutant. Colorado ozone climatology and variability is addressed with emphasis on local pollution sources and precursor emissions which lead to elevated ozone episodes.



**Figure 1.** Data from Erie, Colorado shows elevated ozone June 18th and 19th, 2013. NOAA Hysplit back trajectory shows the path of the air mass to the measurement station. The air mass crosses through two major fire plumes 36 hours before entering the measurement site. The EPA Carbon Monoxide data from the Colorado Springs fire area demonstrates how this elevated ozone can be attributed to local forest fire.