The Red Butte Canyon Ozone Network: monitoring background concentrations, canyon flows and oxidant exchange in a pristine mountain canyon adjacent to Salt Lake City, UT

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Ozone (O_3) is as a key pollutant that contributes to poor air quality during the summer and winter seasons in Utah. Despite the importance of O_3 as a pollutant and an oxidant, many questions remain regarding its formation, transport and its role in secondary chemical reactions. In particular, the role that the complex topography of the Wasatch mountains and its canyons play in the chemical processes and transport of O_3 remains poorly understood. In an effort to address these outstanding questions, we developed a transect of three O_3 monitoring stations distributed throughout Red Butte Canyon, a United States Forest Service Research Natural Area adjacent to the University of Utah. Red Butte Canyon has multiple existing environmental and climate monitoring stations that complement these O_3 monitoring efforts. The results of this combined network is a dataset designed to investigate multiple questions including: (a) the role of canyon flows in the transport of O_3 during stratospheric injections in the summer, (b) examining the exchange of O_3 from the free troposphere with stagnant air during persistent cold air pools in the winter, (c) the potential for using mountain sites to understand and monitor background O_3 concentrations, and (d) examining how transported precursor pollutants from the nearby urbanized area affect O_3 formation in the Wasatch mountains. A better understanding of these processes is central in the implementation of successful O_3 mitigation policies. In this presentation we will describe the network and present several case studies from the first year of the project that address the project objectives.