Surface Ozone at Remote, High Elevation USFS and NPS Sites

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Objectives

• Measure surface ozone concentrations at remote, high elevation sites

• Analyze the results in terms of elevation, topography, and surface vegetation

• Draw inferences, when possible, regarding the relative contributions of long distance (trans-Pacific) transport vs. regional transport vs. local photochemical production of O$_3$. 
SMC-USFS-NPS Field Work

• Summer field campaigns to date:

  Joshua Tree National Park (2006)
  White Mountains (2009-2016)
  Lake Tahoe (2010, 2012)

Today: **DEPO, Lake Tahoe, White Mountains**
Methodology

Solar-powered ozone “boxes”

- ozone only (no meteorological data)
- portable (~ 70 pounds)
- can utilize satellite telemetry to transmit data in real time
- approx. cost is $7500 to $12000 per unit
- have been in use since 2003
Devils Postpile NM

- **2007 and 2008** – Summer measurements at Meadow Site
- **2013** – Coordinated summer fieldwork using two closely spaced sampling locations (Meadow Site, Flagpole Site)
- **2014 to present** – Year-round measurements at both the Meadow Site and the Granite Dome Site
DEPO Multi-Year: Common Day Range of 15 June - 15 September

Hour of Day (0 = 24 = midnight PST)
Lake Tahoe Basin

- **Summer 2010** – coordinated field study with active ozone monitors at 12 different sites

- **Summer 2012** – short-term follow-up study with active ozone monitors at 4 different sites
White Mountains

- Measurements started in the summer of 2008 at one site at 7295 fasl; currently operating year-round at three high-elevation WMRC stations:

  Crooked Creek   (10,600 fasl)
  Barcroft Observatory   (12,725 fasl)
  White Mtn. Summit   (14,260 fasl)
Wish List / Future Work

• A lightweight ozone “box” on the TB2 buoy in the middle of Lake Tahoe

• Additional collaborators for the WMRC sites

• Satellite telemetry for all of the $O_3$ boxes, not just WMRC - Summit and WMRC - Barcroft

• High-resolution modeling to help explain the results