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Mountain-top free tropospheric observations of atmospheric chemistry

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High elevation mountaintops provide unique locations for studying atmospheric chemistry. In the past few years, two new mountaintop observatories have been established in the Northern Hemisphere. These are the Mt.Bachelor Observatory (2.7 km asl) in central Oregon, USA and the Pico Mountain observatory (2.2 km asl) in the Azores, Portugal. Both sites are downwind or within a major NH ocean (the Pacific and Atlantic, respectively), are relatively free from nearby sources of pollution and regularly sample the free troposphere. As such, both sites routinely observe long-range transport of pollutants from the upstream continental region (Asia and North America, respectively). These sites provide a unique opportunity to understand the processing of pollutants emitted from two of the largest pollution source regions on the planet. Observations at these sites provide a unique opportunity to address a number of key issues in atmospheric chemistry:

1) Process studies 2) Observations of long-range transport (Asia to North America and North America to Europe). 3) Validation of models and satellite observations. 4) Long-term observations of gases that are not uniformly mixed in troposphere.

In this presentation I will give examples of some of the key results from both sites and discuss the role for mountaintop observatories in the set of tools available to study the earth-system.