

Atmospheric transport to high elevation WACAP sites in the western U.S.

Dan Jaffe and Cori Melton

One of the goals of the NPS Western Airborne Contaminants Assessment Program (WACAP) is to identify possible source regions for the contaminants that are observed in high elevation ecosystems. To help in this work, we are analyzing patterns of atmospheric transport for 8 National Parks in the western U.S., using the NOAA-HYSPLIT kinematic trajectory model. For each site, 5 years of daily backward trajectories are calculated. Each trajectory is then assigned to an individual "cluster", based on the similarity of the transport pattern. Along the way, several decisions must be made concerning the starting height and duration of the trajectories, the number of clusters and the best method to use for clustering. The trajectories can then be combined with precipitation data to identify which patterns of transport are associated with the largest precipitation amounts. For example using 5-day backward trajectories for Rocky Mountain National Park, we have identified clusters associated with atmospheric transport from the southwestern U.S. and Mexico, the Pacific Northwest (US), long-range transport from the Pacific and one cluster associated with minimal/local transport. The back trajectories give us information on the daily and seasonal changes in atmospheric transport and precipitation, however connecting this information with the long-term cumulative exposure from contaminants remains a challenging problem. In this presentation, I will close with some thoughts on how we can approach this.