

Is the Tropospheric Ozone Entering the U.S. West Coast Changing? - Trinidad Head, California as a Site for Measuring Background Tropospheric Ozone

S.J. Oltmans¹, A.S. Lefohn², J.M. Harris^{1,3}, B.J. Johnson¹, and B. Vasel^{1,4}

¹NOAA Earth System Research Laboratory, GMD, 325 Broadway, Boulder, CO 80305

²A.S.L & Associates, 111 North Last Chance Gulch, Suite 4A, Helena, MT 59601

³STC, 10 Basil Sawyer Drive, Hampton, VA 23666

⁴Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, 80309

The tropospheric ozone content of air entering the west coast of the U.S. may play a role in enhancing background ozone over the U.S. and thus influence the ability of some states to meet air quality standards. Ozone is also an important and greenhouse. Ozone profile measurements have been made from Trinidad, California since August 1997 and continuous surface observations have been made from the ESRL/GMD Observatory at Trinidad Head since April 2002. Winter and spring are the seasons of strongest flow to the U.S. west coast with the potential of carrying air influenced by emissions in Asia. Rapid economic development in east and south Asia has the potential for producing ozone precursor emissions that could lead to rising tropospheric ozone levels that may in turn be transported into the U.S. Using surface ozone data from four years of hourly observations at Trinidad Head keyed to back trajectories shows that almost all elevated ozone concentrations (mixing ratios ≥ 50 ppb) seen in the spring at Trinidad Head come from air entering the west coast of the U.S. unaffected by North American sources. Two longer-term ozone time series from Eureka, California (near the Oregon border) and Olympic National Park, Washington, suggest that springtime ozone at these sites has not increased. These sites are investigated using trajectories to determine to what extent the data are representative of air entering the U.S., since unlike the Trinidad Head site they are not located immediately on the coast. Ozonesonde data from Trinidad, CA gives a picture of how surface ozone on the west coast is influenced by air from aloft. Ozone profiles along with other species measured regularly from small aircraft as part of the North American Carbon Program provide a unique opportunity to investigate the sources of ozone entering the west coast of the U.S.

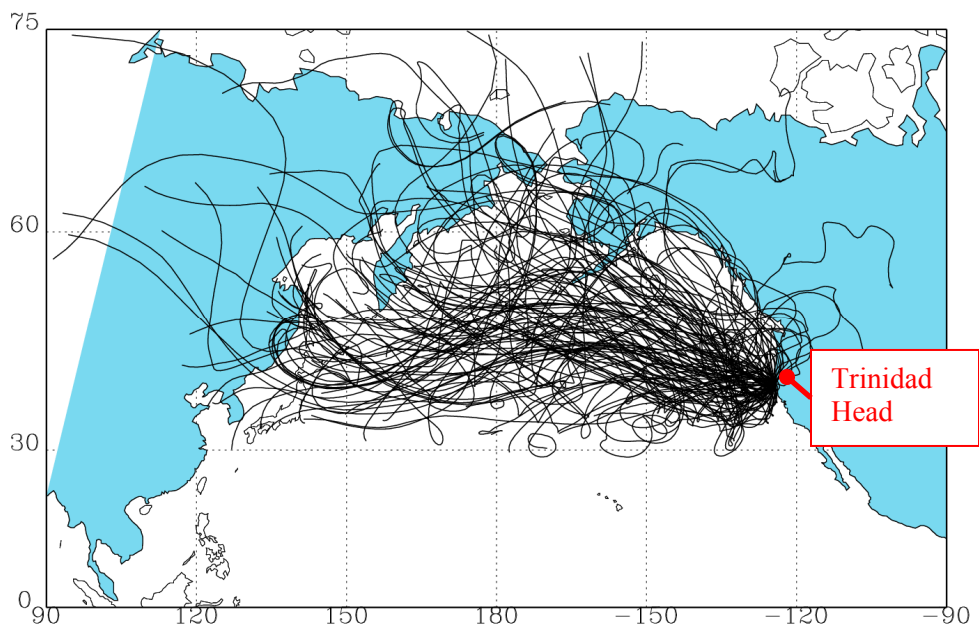


Figure 1. Ten-day back trajectories for air parcels reaching Trinidad Head, California during April 2002-2005 on days when hourly ozone concentrations were ≥ 50 ppb.