(21-220414-B) **Impact of Meteorology on Baseline Ozone in the Western United States**

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Tropospheric ozone (O_3) is a key atmospheric gas that controls the oxidizing capacity of the atmosphere and has significant health and environmental implications. Due to ongoing reductions in the concentrations of O_3 precursors (i.e., oxides of nitrogen and volatile organic compounds), it is increasingly important to assess the influence of meteorology on baseline O_3 to inform pollution control strategies aimed at lowering O_3 levels. Measurements of baseline O_3 as it arrives to North America have been made since 2004 at the Mount Bachelor Observatory in central Oregon at 2.8 km a.s.l. by the University of Washington and since 1997 at Trinidad Head, CA by NOAA GML using ozonesondes. These observations show the long-term variability and seasonality of baseline O_3 in the western United States. Recently, we have begun to investigate the sources and controls on baseline O_3 using Generalized Additive Modeling (GAM). This statistical approach identifies meteorological predictors (e.g., temperature, water vapor mixing ratio, barometric pressure, etc.) that can be used in a non-linear GAM framework to predict the observed O_3 concentration. Preliminary results show that these predictors are statistically correlated with the observed O_3 concentration and can be used as part of the predictive model. Using continuous hourly data for MBO from 2004–2016, our first results demonstrate that the model can account for 39% of the ambient variability and is unbiased across the O_3 distribution. While these are preliminary results, we expect that they can be improved by including more predictors (e.g., back trajectories, satellite observations of free tropospheric O_3, etc.). Ultimately, this work can lead to a better understanding of what controls baseline O_3, and the analysis approach could also be used to forecast future baseline O_3 concentrations.

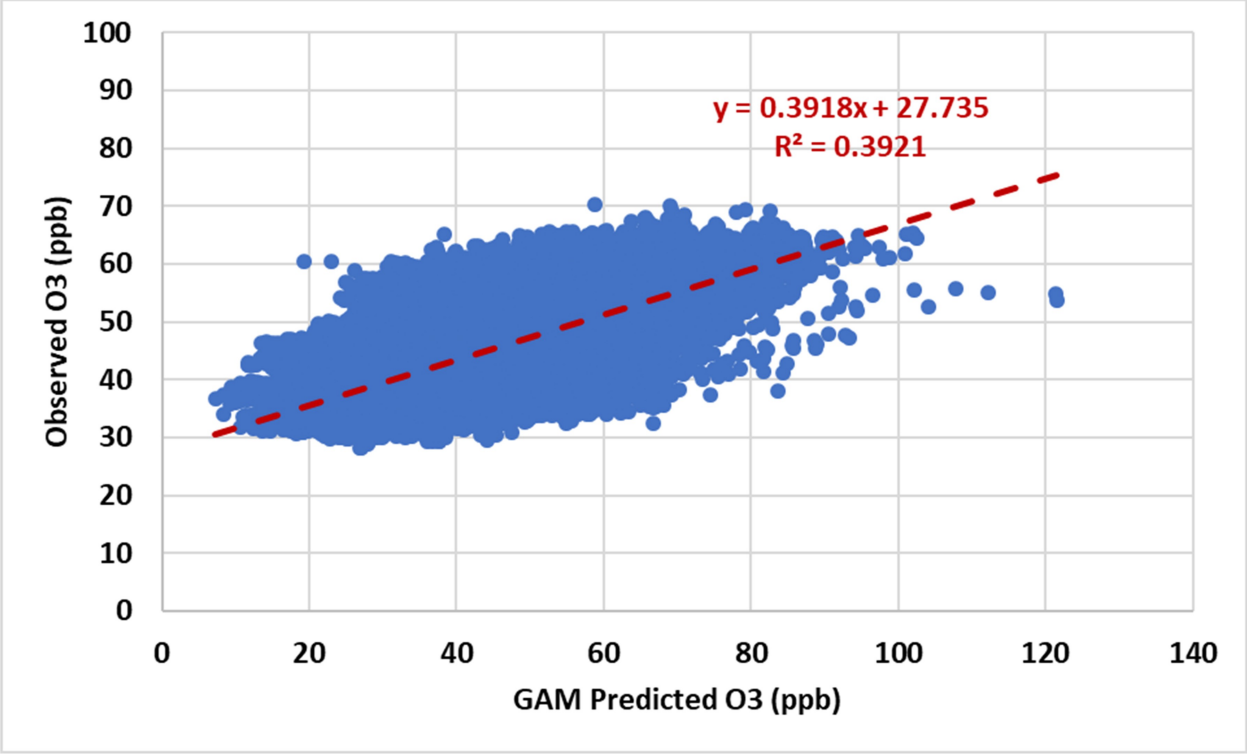

Figure 1. Observed versus GAM-predicted O_3 at Mount Bachelor Observatory from 2004–2016.