

Assessing the Association Between Asthma and Air Quality in the Presence of Wildfires

L.J. Young, K.K. Lopiano, X. Xu, N.M. Holt, E. Leary, , University of Florida, Gainesville, FL;
M.Z. Al-Hamdan, W.L. Crosson, M.G. Estes, J.C. Luvall, S.M. Estes, , USRA/NASA/MSFC, Mobile, AL;
C. DuClos, M. Jordan, , Florida Department of Health, Tallahassee, FL;
C.A. Gotway, U.S. Centers of Disease Control and Prevention, Atlanta, GA;

Asthma hospital/emergency room (patient) data are used as the foundation for creating a health outcome indicator of human response to environmental air quality. Daily U.S. Environmental Protection Agency (EPA) Air Quality System (AQS) fine particulates (PM_{2.5}) ground data and the U.S. National Aeronautical Space Administration (NASA) MODIS aerosol optical depth (AOD) data were acquired and processed for years of 2007 and 2008. Figure 1 shows the PM_{2.5} annual mean composite of all the 2007 B-spline daily surfaces.

Initial models for predicting the number of weekly asthma cases within a Florida county has focused on environmental variables. Weekly maximums of PM_{2.5}, relative humidity, and the proportions of the county with smoke and fire were the environmental variables included in the model. Cosine and sine functions of time were used to account for seasonality in asthma cases. Counties were considered to be random effects, thereby adjusting for differences in socio-demographics and other factors. The 2007 predictions for Miami-Dade county when using B-splines PM_{2.5} are displayed in Figures 2.