



What Do 10 Years Of Atmospheric Aerosol Measurements From The NOAA And NASA Aerosol Monitoring Sites At App Tell Us About The Effect Of Changing SE U.S. Air Quality On Regional Solar Radiation And Climate? (Abstract only)

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Abstract

The effects of atmospheric aerosols (haze, dust, smoke) on solar radiation and clouds represent the largest uncertainties in climate models used to predict future temperatures, according to the most recent Intergovernmental Panel on Climate Change (IPCC) assessment. The southeastern U.S. is home to high summertime haze levels, which may have contributed to lack of regional warming during 20th century. Improvements in U.S. air quality in the past 2-3 decades may reduce the cooling effect of aerosols in SE U.S. but there is a scarcity of long-term aerosol measurements needed to evaluate climate models. Appalachian State University (APP) is home to one of the two most comprehensive aerosol monitoring facilities in the U.S. and the only comparable facility relying completely on students to assist the project investigator. Over 50 students have contributed to the long term (10 year) aerosol datasets from the NOAA and NASA network sites at APP, which will be used by the Aerosols Working Group as part of the upcoming IPCC assessment. Aerosol loading has decreased significantly over the 10 years of measurements at APP, leading to a smaller aerosol cooling effect which is most pronounced during summer months. The decreases in light absorption are likely influenced by reductions in diesel emissions. Reductions in aerosol light scattering are consistent with reductions in SO₂ emissions by coal-burning power plants in eastern U.S. Long-term aerosol datasets from APP will be presented, along with results from the first measurement-based study of aerosol direct radiative effect in SE U.S. (Sherman and McComiskey).

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