

RAL / ACOM SEMINAR SERIES

Air Quality Dashboard: A new public-facing dissemination system for trends in air quality and its impact on public health and agriculture

Rajesh Kumar, Forrest Lacey and Jennifer Boehnert

NCAR



Wednesday, May 24, 2023

1:00 PM - 2:00 PM (MT)

HYBRID MEETING FL2-1022 | <https://operations.ucar.edu/live-ral>

We have created a user-friendly ESRI based air quality dashboard to communicate air quality information from a high-resolution (12 x 12 km²) reanalysis developed over the contiguous US (CONUS) from 2005-2018. The dashboard maps and communicates the historical modeled air quality data and its impacts on public health and agriculture aggregated at the state and county level. A Streamlit python-based website has also been developed where users can select based on time and space and download aggregated and extracted data as a CSV file. The air quality reanalysis is generated using a newly developed chemical data assimilation system that simultaneously assimilates aerosol optical depth (AOD) retrievals from the Moderate Resolution Imaging Spectroradiometer (MODIS), and carbon monoxide (CO) retrievals from the Measurement of Pollution in the Troposphere (MOPITT) in the Community Multiscale Air Quality (CMAQ) model driven by the Weather Research and Forecasting (WRF) model. The evaluation of WRF against the ground-based and satellite observations showed that the model captured the seasonal, interannual, and regional variability and long-term trends in key meteorological and air quality parameters very well. This long-term dataset has been aggregated to the maximum daily 8-hour ozone (MDA8) and seasonal ozone (OSDMA8) metrics at varying spatial scales ranging from Environmental Protection Agency (EPA) regions, to county-level in order to show the regional drivers to human health as well as calculation of the accumulated ozone exposure (AOT40 and W126) metrics varying temporally and geographically based on crop data for CONUS available from the United States Department of Agriculture. These aggregation techniques have allowed us to identify both trends and some of the meteorological and atmospheric composition drivers in ozone-related risk for specific outcomes and how they vary geographically. The development of this dataset, calculation of societally relevant metrics, and integration of these products in the dashboard will be discussed in detail during this presentation.