Crystal D. McClure, PhD

Senior Atmospheric Data Scientist
Team Leader
Atmospheric Scientist

Sonoma Technology

Dr. McClure joined Sonoma Technology in 2019. She has over 15 years of experience measuring and analyzing wildfire smoke and other air toxics, including National Ambient Air Quality Standards (NAAQS) pollutants, volatile organic compounds (VOCs), and metals. She uses her advanced knowledge of atmospheric chemistry, experience with field and lab experiments, and programming expertise to determine the cause and impacts of air pollution events, provide quality assurance for real-time and historical datasets, and create interactive websites for data visualization.

Dr. McClure has participated in multiple U.S. Environmental Protection Agency (EPA) work orders including the development of data dashboards (websites) that display PM and air toxic quality assurance information, the development of a data dashboard that provides an analysis of air toxic data and monitoring requirements on a quarterly basis, and the comparison of air quality index (AQI) information shown to the public by multiple websites during wildfire smoke periods. Her programming expertise has propelled data capture, analysis, and visualization for each of these projects.

Dr. McClure has analyzed and validated decades-long datasets of VOCs, PM, and air toxics. She has also used big datasets to model the behavior of wildfire smoke across North, Central, and South America. Given ten years of satellite observations, she built programs to ingest, validate, and process wildfire data through BlueSky Pipeline to create a decade-long dataset of wildfire smoke concentrations through most of the western hemisphere. This dataset was used to help assess the impacts of smoke on health and was compared with other modeled results to determine efficacy.

Education

- PhD, Atmospheric Sciences, University of Washington
- MS, Atmospheric Sciences, University of Washington
- BS, Meteorology, Texas A&M University

Memberships

- American Geophysical Union (AGU)
- International Association of Wildland Fire (IAWF)
- American Meteorological Society (AMS)

For a list of publications, see sonomatech.com/ResPub/CDMpub.pdf.

Dr. McClure has led multiple data management efforts. She helped design and implement an automated system to capture hourly data from public-facing websites to help determine the difference in AQI data portrayed to the public. She also oversees the operation and data quality of VOC data from an active monitoring site. As part of data management for an active monitoring site, she created automated alarms and routine data checks to ensure quality control.

Dr. McClure has experience with building, testing, and analyzing data from low-cost sensors. During her time as a doctoral research associate, she designed and built a low-cost sensor that sampled VOC concentrations using thermal desorption, and analyzed these concentrations using gas chromatography/mass spectroscopy. She also has experience testing and deploying these sensors at controlled burn events.

Before joining Sonoma Technology, Dr. McClure completed the Atmospheric Sciences Doctorate Program at the University of Washington. Her research focused on the apportionment of wildfire pollution in urban and rural areas, and she conducted a multi-decade nationwide study of wildfire smoke impacts. She managed and conducted multiple field campaigns at both urban and mountain-top sites to study smoke impacts. She also analyzed the national- and regional-scale impacts of wildfire smoke using R and GIS. After completing her PhD, Dr. McClure was a Post-Doctoral Research Scientist at UC Davis studying the chemical and optical properties of wildfire aerosols.

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