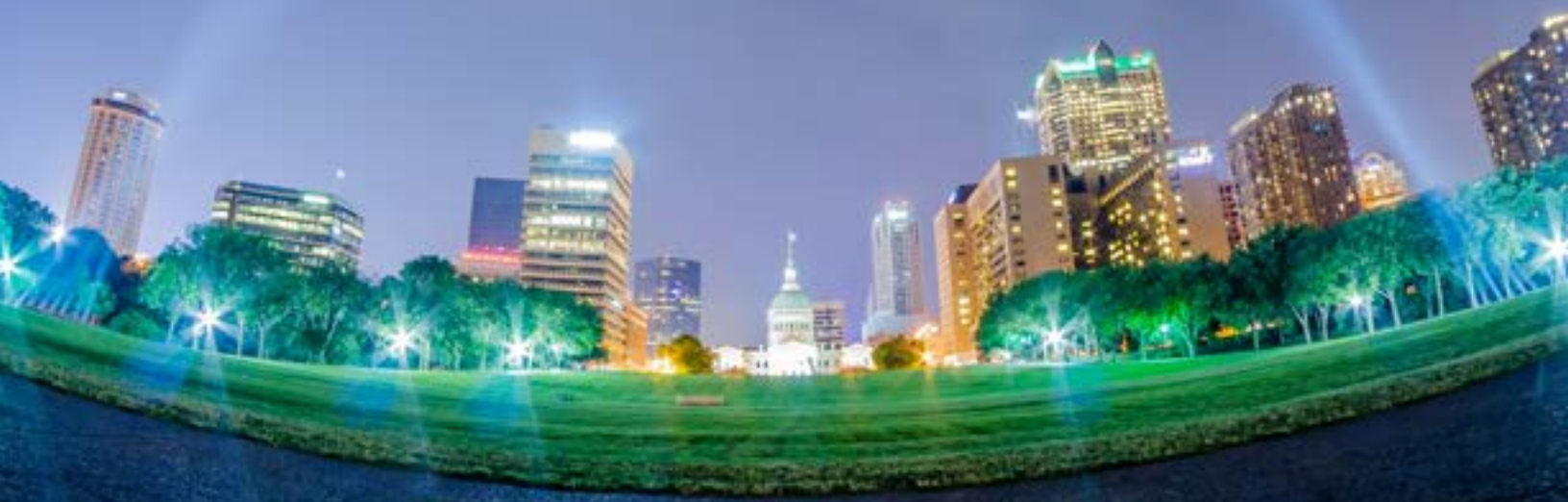
10th International Aerosol Conference (IAC)

September 2-7, 2018

America's Center | St. Louis, Missouri



FINAL PROGRAM

Hosted by the
American Association for Aerosol Research

10RA.15 11:45	**Single Particle Analysis of Samples Collected During the Actris-2 Field Campaign at the Mt. Cimone Station.** **TYLER CAPEK, Swarup China, Daniel Veghte, Angela Marinoni, Douglas Orsini, Claudio Mazzoleni,** Michigan Technological University

10SA SOURCE APPORTIONMENT I: POSTERS | EXHIBIT HALL 5

Alexander Frie and Célia Alves, chairs

10SA.1 11:45	**Use of Specific Primary and Secondary Organic Markers for PM Source Apportionment Based on Positive Matrix Factorization (PMF).** **Deepchandra Srivastava, Olivier Favez, Emilie Perraudin, Jean-Luc Besombes, Franco Lucarelli, Laurent Alleman, Grazia Maria Lanzafame, Sophie Tomaz, Jean-Luc Jaffrezo, Benjamin Golly, Nicolas Bonnaire, Valerie Gros, Eric Villenave, ALEXANDRE ALBINET,** INERIS
10SA.3 11:45	**Physicochemical Characteristics and Source Apportionment of PM2.5 in an Inland City of Baoji, China.** **ZHOU BIANHONG, Li Meijuan, Fang Ni, Zhang Zhangquan, Liu Suixin,** Baoji University of Arts and Sciences
10SA.4 11:45	**Assessing the PM2.5 Imbalance between a Far and Near-Road Location: High Temporal Frequency Source Apportionment and the Role of Black Carbon.** **UWAYEMI SOFOWOTE, Robert Healy, Yushan Su, Jerzy Debosz, Michael Noble, Anthony Munoz, Cheol H. Jeong, Jon M. Wang, Nathan Hilker, Greg J. Evans, Philip K. Hopke,** EMRB, Ontario Ministry of the Environment and Climate Change
10SA.5 11:45	**An Improved Approach to Resolve Sources of Organic Aerosol by Combining Offline and Online Ambient Measurements.** **DEEPCHANDRA SRIVASTAVA, Olivier Favez, Jean-Eudes Petit, Yunjiang Zhang, Uwayemi Sofowote, Philip K. Hopke, Nicolas Bonnaire, Emilie Perraudin, Valerie Gros, Eric Villenave, Alexandre Albinet,** INERIS
10SA.6 11:45	**Particulate matter in the Northwest of the Iberian Peninsula: A one-year study.** **Fernanda Oduber, Carlos Blanco-Alegre, Ana Isabel Calvo, Amaya Castro, Roberto Fraile, Teresa Nunes, CÉLIA ALVES,** University of Aveiro
10SA.7 11:45	**Source Apportionment of PM2.5 Using Hourly Measurements of Elemental Tracers and Major Constituents in an Urban Environment: Investigation of Time Resolution Influence.** **QIONGQIONG WANG, Liping Qiao, Min Zhou, Shuhui Zhu, Stephen Griffith, Li Li, Jian Zhen Yu,** Hong Kong University of Science & Technology
10SA.8 11:45	**Emission Characteristics of PM2.5 and Trace Gases from Household Wood Burning in Guanzhong Plain, Northwest China.** **YONG ZHANG, Jie Tian, Junji Cao, Wenjie Wang, Haiyan Ni, Suixin Liu, Zhenxing Shen,** Institute of Earth Environment, Chinese Academy of Sciences
10SA.9 11:45	**Application of Positive Matrix Factorisation to the Source Identification of Pcdd/Fs in Urban Air, South Korea.** **EUNHWA JANG, Taewuk Jeong, Nana Yoon, Seungryul Jeong,** Busan Metropolitan Institute of Health and Environment
10SA.10 11:45	**Influence of Future Emission Reductions on Source Apportionment of Organic Aerosol in the Houston Region.** **BONYOUNG KOO, Alan Dunker, Greg Yarwood,** Ramboll
10SA.11 11:45	**Impacts of Hazardous Metals and PAHs in the Ambient Air from Local and Regional Sources and Exceeded Cancer Risks in Taipei city.** **CHIN-YU HSU, Shih-Min Wang, Tzu-Ting Yang, Jyh-Larng Chen, Hung-Che Chiang, Yuh-Shen Wu, Yu-Cheng Chen,** National Health Research Institutes, Taiwan
10SA.12 11:45	**Long-Term Field Observations of Aerosol Chemical Composition in the Boreal Forest.** **LIINE HEIKKINEN, Mikko Äijälä, Matthieu Riva, Krista Luoma, Tuukka Petäjä, Douglas Worsnop, Mikael Ehn**, University of Helsinki
10SA.13 11:45	**Impact of Environmental Policies and the Economy on Changes in Criteria Air pollutants Concentrations and Particulate Matter Compositions in New York State during 2005-2016.** **Stefania Squizzato, Mauro Masiol, David Q. Rich, PHILIP K. HOPKE,** University of Rochester, Rochester, 14642, NY, USA
10SA.15 11:45	**Comparison of Ambient Aerosol Sources at Rural and Suburban Background Sites in Central Europe.** **OTAKAR MAKEš, Petr Vodi ka, Jaroslav Schwarz, Vladimír Ždímal,** Institute of Chemical Process Fundamentals of the CAS, v.v.i
10SA.16 11:45	**Seasonal Variations in Source Apportionment of the Redox Activity of Urban Fine Particulate Matter in Athens, Greece.** **SINA TAGHVAEE, Mohammad Sowlat, Christopher Lovett, Konstantinos Eleftheriadis, Evangelia Diapouli, Manos Manousakas, Constantinos Sioutas,** University of Southern California
10SA.17 11:45	**PM2.5 Source Apportionment Using a Hybrid Environmental Receptor Model.** **LUNG-WEN ANTONY CHEN, Junji Cao,** University of Nevada, Las Vegas

10SA.13

Impact of Environmental Policies and the Economy on Changes in Criteria Air pollutants Concentrations and Particulate Matter Compositions in New York State during 2005-2016. Stefania Squizzato, Mauro Masiol, David Q. Rich, PHILIP K. HOPKE, *University of Rochester, Rochester, 14642, NY, USA*

Over the past several decades, several mitigation strategies have been adopted by federal and state agencies in the United States to improve air quality. These strategies were mostly targeted to reduce SO_2 and NO_x emissions from light- and heavy-duty vehicles and electric power generation. Between 2007 and 2009, the financial/economic crisis also lowered activity and reduced emissions. Simultaneously, changes in the prices of coal and natural gas drove a shift in fuels used for electricity generation toward natural gas.

This study investigates the seasonal patterns, diel cycles, spatial gradients, and trends of gaseous and particulate pollutant concentrations and $PM_{2.5}$ sources over New York State (NYS) between 2005 and 2016. Gaseous pollutants concentrations (SO_2, O_3, CO, and NO_x) and $PM_{2.5}$ mass and chemical speciation data (elements, major inorganic ions, EC, OC) were retrieved from USEPA (https://aqs.epa.gov/api). The final dataset included 54 sites for $PM_{2.5}$ mass and gases (26 for $PM_{2.5}$, 37 for O_3, 26 for SO_2, 8 for NO_x, 2 for NO_y, 11 for CO) and 6 urban sites (Albany, Bronx, Buffalo, Manhattan, Queens, and Rochester) and 2 rural sites (Pinnacle and Whiteface) for $PM_{2.5}$ speciation data.

EPA PMF 5.0 was applied to the speciation data to identify and apportion the major sources of $PM_{2.5}$ across these sites. The relationships between ambient concentrations, changes in emissions retrieved from the national emission inventory (NEI), and economic changes were studied.

Results show that the combined effects of the mitigation strategies, economic pressures, and the recession led to an overall decrease in $PM_{2.5}$ and primary gaseous pollutants concentrations across New York State ultimately resulting in relatively homogeneous spatial distributions for $PM_{2.5}$ and SO_2. $PM_{2.5}$ concentrations decreased significantly at all sites with slopes ranging from -8.6%/y and –2.2%/y. SO_2 concentrations dropped significantly at all sites within this period, with the highest slopes observed at the urban sites (e.g., -8.5%/y at Queens, New York City).

The reduction of NO_x emissions contributed to the reduction of high ozone episodes during summer, but there was no reduction in spring maxima. Increases in autumn and winter ozone concentrations were estimated (e.g., 6.6 ± 0.4%/y on average in New York City). Statistically significant relationships were observed between $PM_{2.5}$, primary pollutants, and economic indicators. Overall, the decrease in electricity generation with coal, and the simultaneous increase in natural gas consumption for power generation, led to a decrease in $PM_{2.5}$ and gaseous pollutants concentrations.

Seven main common sources of $PM_{2.5}$ were identified across the state: (i) secondary sulfate; (ii) secondary nitrate; (iii) gasoline emissions; (iv) diesel emission; (v) road dust; (vi) biomass burning and (vii) OP-rich. A road salt source was identified at Albany, Buffalo, Rochester, Pinnacle and Whiteface. Additional sources at the New York City sites (Bronx, Manhattan, and Queens) were fresh sea salt, aged sea salt and residual oil combustion.

Among the main $PM_{2.5}$ sources, decreases of secondary sulfate, secondary nitrate, and diesel emissions were observed (-6.7±1.1%/y, -5.3±1.2%/y, -5.3±1.9%/y, respectively) across the state. Decreases can be associated with the mitigation strategies aimed at reducing emissions from light- and heavy-duty vehicles and electric power generation and to the shift from high sulfur to ultralow sulfur fuels. Beginning on July 1, 2012, New York State required that all No. 2 oil sold within the state for any purpose to have ultralow sulfur content. Gasoline emissions increased in Albany, Buffalo, and New York City with slopes higher than 7%/y reflecting the increase of registered vehicles in the area (e.g., New York City +9%, Buffalo +5%, and Albany +6% during 2007-2016).