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Abstract

Source apportionment of the total ambient organic carbon in the central Los Angeles over the 2005-2015 time period.

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Abstract:

One of the major drivers of ambient fine particulate matter (PM2.5) toxicity is organic carbon (OC) which can be emitted from multiple emission sources. In this study, thus, the main sources of total OC in the central Los Angeles (CELA) were determined over the 2005-2015 time period, using the positive matrix factorization (PMF) source apportionment model. This time period was specifically selected to evaluate the effects of implemented air quality legislations on the different contributing sources to the total OC concentrations during the study period. Concentrations of OC, elemental carbon, OC volatility fractions, ozone, sulfate, and several trace metals and elements were extracted employing the Chemical Speciation Network (CSN) database to be used in the model. Our results indicated three sources as major contributors to total OC: (i) vehicular (tailpipe) emissions, (ii) secondary organic aerosol, and (iii) non-tailpipe emissions. It was also observed that tailpipe emissions contribution to total OC has been decreased over the study period, most likely because of the new implemented regulations to limit the vehicular emissions in the area. In details, the 57% contribution of tailpipe emission to total OC in 2015 dropped to 43.4% and 49.6% in the time period of 2010-2015. In contrast, the relative contributions of secondary organic aerosol and non-tailpipe emissions, cumulatively, to total OC showed considerable increases over the study period. The findings of this study highlight the need for investigation of the non-tailpipe emissions, given the developed mitigation strategies for tailpipe emissions in the CELA over the recent years.

Biography:

Constantinos Sioutas completed his PhD in Environmental Engineering at Harvard University. He is the Fred Champion Professor and Professor of Civil and Environmental Engineering at University of Southern California. He has published more than 300 peer-reviewed papers in reputed journals.

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