Analyses of the main sources of PM2.5 using bottom up and top down data in two metropolitan cities in Mexico: Mexico City Metropolitan Area and Toluca Metropolitan Area.

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Abstract:

Although important improvements have been achieved in Mexico City Metropolitan Area (MCMA) air quality over the last three decades, ozone and PM2.5 are still above the national air quality standards and WHO recommendations. Air quality monitoring in other cities has been expanded in recent years; these data show that smaller cities and metropolitan areas, where air pollution was not perceived as a problem, are facing high levels of pollutants, with PM2.5 levels even two to three times higher than those registered in MCMA since 2003. Although PM2.5 health impacts are well evidenced, existing air pollution contingency programs in Mexican cities do not include PM2.5 yet, mainly because identification of effective control measures are still lacking. In this work, an analysis of the main PM2.5 emissions sources is presented using existing bottom-up inventories and when available, top-down emissions studies for two Mexican metropolitan areas: the Mexico City Metropolitan Area (MCMA) and Toluca Metropolitan Area (TMA). TMA is metropolitan area with 2.1 million habitants (2,203 km$^2$) comprises 14 counties including the capital city of the State of Mexico and it is connected economically and physically with MCMA. Annual average levels for the TMA and MCMA were 42 µg/m$^3$ (in 2012) and 27 µg/m$^3$ (in 2014). PM2.5 levels in MCMA (18 million people/ 7,866 km$^2$) have been maintained over the last decade in contrast to the increment in population and vehicular fleet. MCMA bottom up inventories indicate residential combustion and soil resuspension as the main PM2.5 sources (53%), top-down emissions identify other sources contribution. TMA bottom-up inventory indicates residential wood combustion (cooking) as the main PM2.5 emissions sources. In this work, a proposal of a top-down emission analyses integrated by a group of institutions including a field campaign and remote sensing measurements will be presented for TMA.