

## 6.095 Atmospheric CH<sub>4</sub> mixing ratios and its correlation with CO and a surrogate of Non-Methane Hydrocarbons in Mexico City.

Early Career Scientist

Presenting Author:

**Mónica Solano**, Centro de Ciencias de la Atmósfera,  
[monica@atmosfera.unam.mx](mailto:monica@atmosfera.unam.mx)

Co-Authors:

**Ricardo Torres Jardón**, Centro de Ciencias de la Atmósfera  
**Hugo Alberto Barrera Huertas**, Centro de Ciencias de la Atmósfera  
**Luis Gerardo Ruíz Suárez**, Centro de Ciencias de la Atmósfera

Abstract:

Methane (CH<sub>4</sub>) is one of the greenhouse gas (GHG) emitted by both natural and anthropogenic sources. It has been mentioned that, megacities could account for around 7-15% of their anthropogenic CH<sub>4</sub> emissions and that it is possible that these came from fugitive emissions from the natural-gas supply lines. The Mexico City Metropolitan Area (MCMA) is one of the world's largest and most polluted urban areas; although natural gas is not the most used fuel for domestic, industrial heating or transport in MCMA. A recent GHG emission inventory for MCMA suggests that vehicular emissions contribute with approximately 37% of CH<sub>4</sub>, followed by landfills and dump garbage areas (30%) and construction and manufacturing (27%). An intensive monitoring campaign of CH<sub>4</sub>, Non-methane hydrocarbons (NMHC) and carbon monoxide (CO) was performed between February and March 2015 in southwest MCMA in order to understand the role of vehicular emissions on the atmospheric methane levels. Methane concentrations showed sometimes a diurnal pattern similar to those of CO and to NMHC but the similarity between the peaks was lost (CH<sub>4</sub> vs CO, R<sup>2</sup> = 0.27; CH<sub>4</sub> vs NMHC, R<sup>2</sup> = 0.28). However, NMHC correlated well with CO (R<sup>2</sup> = 0.75). The intercepts of the CH<sub>4</sub>-CO correlation resulted in [CH<sub>4</sub>] ~ 1.8 ppm and of the CO-NMHC correlation in [CO] ~ 0.080 ppb. A comparison with historical CH<sub>4</sub> measurements in MCMA showed that the mean methane concentration observed in March, 1993 was around 3.1 ppm while during the 2015 campaign it was 1.93 ppb. The lowest average of CH<sub>4</sub> levels in 1993 was around 1.88 ppm. It seems that vehicular emissions are not significant contributors to atmospheric CH<sub>4</sub> and that the historic methane concentration has not change significantly in 25 years.