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A more comprehensive view of air pollution in the Mexico City Metropolitan Area using ground-based visible spectroscopy measurements of nitrogen dioxide

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The Mexico City Metropolitan Area (MCMA) is a megacity of primary interest in regards to urban air pollution due to its location in the subtopics (19˚N and 99˚W), its altitude of 2240 m above sea level, and its estimated population of 20 million. Due to its location within a flat basin surrounded by mountains on three sides, air pollution throughout the MCMA is variable and complex. Here, a comprehensive view of air pollution transport events during MILAGRO 2006 at the Tenango del Aire research site, located to the southeast of Mexico City, is presented. Vertical column densities of nitrogen dioxide ($NO_(2)$) from ground-based differential optical absorption spectroscopy (DOAS) measurements are used in conjunction with surface meteorological measurements, surface mixing ratios of nitrogen oxides ($NO_(x)$ and $NO_(y)$) and ceilometer mixing layer height measurements. This rich data set provides insight into the development and extent of mixing of the mixing layer and can be used to observe pollution sources that may reside above the mixing layer, such as lightning produced $NO_(2)$. This work represents an important step in unraveling the complexity of urban air pollution in the MCMA.