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## Connecting near surface in-situ measurements to ground based total column measurements from Pandora

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As the primary precursor to ozone production, NO<sub>2</sub> exhibits a large amount of heterogeneity on vertical and horizontal scales. While there is a dense network of surface air quality monitoring stations that measure NO<sub>2</sub> at the surface level, boundary layer meteorology and emission height impact the amount of NO<sub>2</sub> within the boundary layer. In an effort to better quantify air pollution affecting humans at the surface, there have been efforts to use satellites and surface monitoring cohesively to better understand emission sources and subsequent chemistry. However, the current fleet of polar orbiting satellites only provide a once daily snapshot of column NO<sub>2</sub>. Pandora, a ground-based spectrometer system, allows us to measure column NO<sub>2</sub> at a much higher temporal resolution, that is on a similar temporal scale of a traditional in-situ surface NO<sub>2</sub> monitor. Using a combination of surface in-situ, Pandora, and ceilometer data, we investigate the variability of NO<sub>2</sub> at the surface and within the boundary layer. The combination of these observations will provide better insight into the decoupling of the near surface and lofted NO<sub>2</sub> caused by mixing within the boundary layer. Furthermore, the results of this study are essential for future analysis and validation of geostationary air quality observations.

**Publication:**

American Geophysical Union, Fall Meeting 2019, abstract #A13Q-3155

**Pub Date:**

December 2019

**Bibcode:**

2019AGUFM.A13Q3155K

**Keywords:**

0345 Pollution: urban and regional;


ATMOSPHERIC COMPOSITION AND STRUCTURE;

0365 Troposphere: composition and chemistry;

ATMOSPHERIC COMPOSITION AND STRUCTURE;

3305 Climate change and variability; ATMOSPHERIC PROCESSES;

3364 Synoptic-scale meteorology; ATMOSPHERIC PROCESSES

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