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_2 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_2 at the surface level, boundary layer meteorology and emission height impact the amount of NO_2 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_2. Pandora, a ground-based spectrometer system, allows us to measure column NO_2 at a much higher temporal resolution, that is on a similar temporal scale of a traditional in-situ surface NO_2 monitor. Using a combination of surface in-situ, Pandora, and ceilometer data, we investigate the variability of NO_2 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_2 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.

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