

Interactive comment on “Vertical distribution of ozone and VOCs in the low boundary layer of Mexico City” by E. Velasco et al.

Anonymous Referee #2

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Referee review: Vertical distribution of ozone and VOCs in the low boundary layer of Mexico City, authors Velasco et al.

General comments: The manuscript presents data (meteorological variables and concentrations of ozone and several VOCs) from numerous profiles collected on a tethered balloon platform. Observations from mega-cities, such as Mexico City, are important to assist in understanding local, regional, and possibly global air pollution issues. While this presentation may contain interesting observations, the presentation could well be improved to better represent arguments made. Also, several questions directed toward the data quality and applications should be considered.

Specific comments:

The importance of the chemical and meteorological measurements to air quality is often cited, but is rarely discussed outside of general comments about mixing or ozone “titration.” There are numerous air pollution studies made in Mexico City that could be introduced and used to provide a context for data presented. While it may be true that urban meteorology may create some incomplete mixing in the short term at low altitudes, it is unclear how this will affect chemical processes whose time scales are on the order of several hours (a few references may help).

Some 175 profiles were measured on 28 days, an average of 6.25/day, but likely more profiles were measured on some days than others. Data from all profiles, however, are averaged together. The depth and development of the boundary layer indicated by the scalars measured could be more clearly presented for individual days of multiple profiles. The authors should at the minimum explain why averaging all profiles is a more instructive method for presenting the data.

Ozone profiles consisted of continuous measurements during ascent and descent of balloon. VOC gradients were made by filling canisters sequentially at several altitudes. Some examples showing the comparison of ozone measurements made during ascent and descent for several flights may give a picture of the variability of concentrations of trace gases in the short term.

Technical corrections:

The ozone calibration routine described in no way eliminated the effect of interferences in the ozone measurement.

The description of the GC technique used in the determination of VOC concentrations must be in error. EPA Method TO-14A does not use the series column combination described, only the single methyl-silicone column. The combination described, with the alumina column first and the components delivered to the same detector, would not allow for the determination of heavier weight organics (toluene, xylenes), which would never elute from the alumina column under the conditions described.

Figure 4 refers to a Fast Olefin Sensor (FOS), whose response was reported as pptv propene. No description or reference to this instrument is included in the experimental description section. This reviewer is aware of several chemi-luminescence sensors that are specific for certain olefins, but the response factors to other olefins by these detectors vary widely.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 12751, 2007.

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