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The Effects of Corona Discharge on Tropospheric Ozone Levels
GILBERT RIVERA, St. Edward's University, ALEX KOTSAKIS, University of Houston, PAUL WALTER, GARRY MORRIS, St. Edward's University — Ozone is most commonly associated with the ozone layer in the stratosphere; however, ozone is found in the troposphere as well. In the stratosphere, ozone is produced by dissociation of oxygen (O_2) with high energy UV light, then subsequently reacting one of the freed O atoms with O_2 in the presence of a third molecule to form ozone (O_3). In the troposphere, ozone can form via reactions of hydrocarbons and NO_x in the presence of sunlight. Ozone can also be formed from corona discharges. Corona discharges are caused when hydrometeors (i.e., ice crystals, etc.) approach each other. This leads to ionization of the air around the hydrometeors, which causes charges to separate in the clouds. On September 5, 2013 in Houston, balloon measurements showed high levels of ozone during the ascent as a storm was approaching and low levels during the descent less than two hours later. Our hypothesis is that in the ascent there are high levels of ozone production as a result of corona discharge. Lightning strikes produce significant amounts of NO_x, which in the absence of sunlight reacts with ozone, thereby reducing its concentration. We are currently carrying out data analysis of other ozonesonde measurements to find evidence that either supports or invalidates our hypothesis.

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