Assessment of Air Quality in San Juan Metro Area following Hurricane Maria

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The anthropogenic primary and secondary atmospheric pollutants emissions are controlled by the Environmental Protection Agency (EPA) due to its negative effects on public health and the environment. These restrictions are known as the National Ambient Air Quality Standards (NAAQS), and they include the control of SO_2, NO_2, CO, NO, O_3, and particle matter ($PM_{2.5}$ and PM_{10}) emissions. Such species are the products of incomplete combustion processes taking place mainly in fossil fuel burning. After the catastrophic path of hurricane María, Puerto Rico found itself within an increase in backup power generator usage due to the lack of electrical power. The main objective of this project is to monitor air quality over the San Juan Metro Area (SJMA) after the hurricane, and how this changes with the recovering of electrical power. Our first step is to measure the concentration of primary and secondary atmospheric pollutants using Real-time, Affordable, Multi-Pollutant (RAMP) air quality monitors, which are low-cost sensors with a mechanism that involves oxidation-reduction reactions. The RAMPs are located over different neighborhoods within the SJMA (Puerto Nuevo, Cataño, Río Piedras (commercial and residential), and Carolina) to measure SO_2, NO_2, CO, NO, O_3, and $PM_{2.5}$ concentrations, alongside with other environmental variables like temperature and relative humidity. Each month, the pollutant concentrations are analyzed and compared to the NAAQS values to monitor the air quality with the ongoing electrical power recovering. Aerosol Optical Thickness (AOT), a property that describes the depth of the aerosol atmospheric layer based on its optical properties, is being measured using a Microtops II, which uses photodiode sensors to detect the amount of incoming solar radiation for five different wavelengths (380, 440, 500, 675, and 870 nm). The Microtops II is manually handled, and AOT measurements are taken every 15-30 minutes. Finally, atmospheric pollutant concentrations and AOT values will be analyzed together with black carbon (BC) concentrations measured using a MicroAethalometer and a black carbon monitor by a fellow co-worker. These processes will go on until full recovery of electrical power over the SJMA.