

Abstract

Low Cost Air Quality Sensor Deployment and Citizen Science: The Peñuelas Project [†]

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Abstract: The U.S. Environmental Protection Agency (EPA) and Desarrollo Integral del Sur, Inc (DISUR), a Puerto Rico-based community action group, collaborated to determine the efficacy of citizen science involving the use of low cost air quality sensors. The EPA developed a unique low cost AC powered multi-pollutant Citizen Science Air Monitor (CSAM) that was provided to the community group along with the training/tools needed for its operation. The citizens self-organized a community effort to conduct approximately five months of intensive air quality monitoring in an area of Puerto Rico (Tallaboa-Encarnación, Peñuelas) having little historical data on spatial variability (Ponce). Real-time measurements of the particulate matter size fraction 2.5 micron (PM_{2.5}), nitrogen dioxide (NO₂), total volatile organic compounds (tVOCs), and meteorological parameters (wind speed, wind directions, temperature, relative humidity) were obtained. The study provided the Peñuelas and surrounding communities an in-depth investigation of local air quality and opportunities for citizen scientists to gain extensive experience in the use of emerging sensor technologies. The collaboration also provided the EPA an opportunity to evaluate low cost sensor performance under harsh environmental conditions (high relative humidity in a coastal environment). We present the approach and preliminary environmental findings of the EPA's efforts the deploy a low cost multi-pollutant sensor pod associated with a citizen science research study.



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