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Technical Fact Sheet

South Philadelphia Passive Sampler Method Study

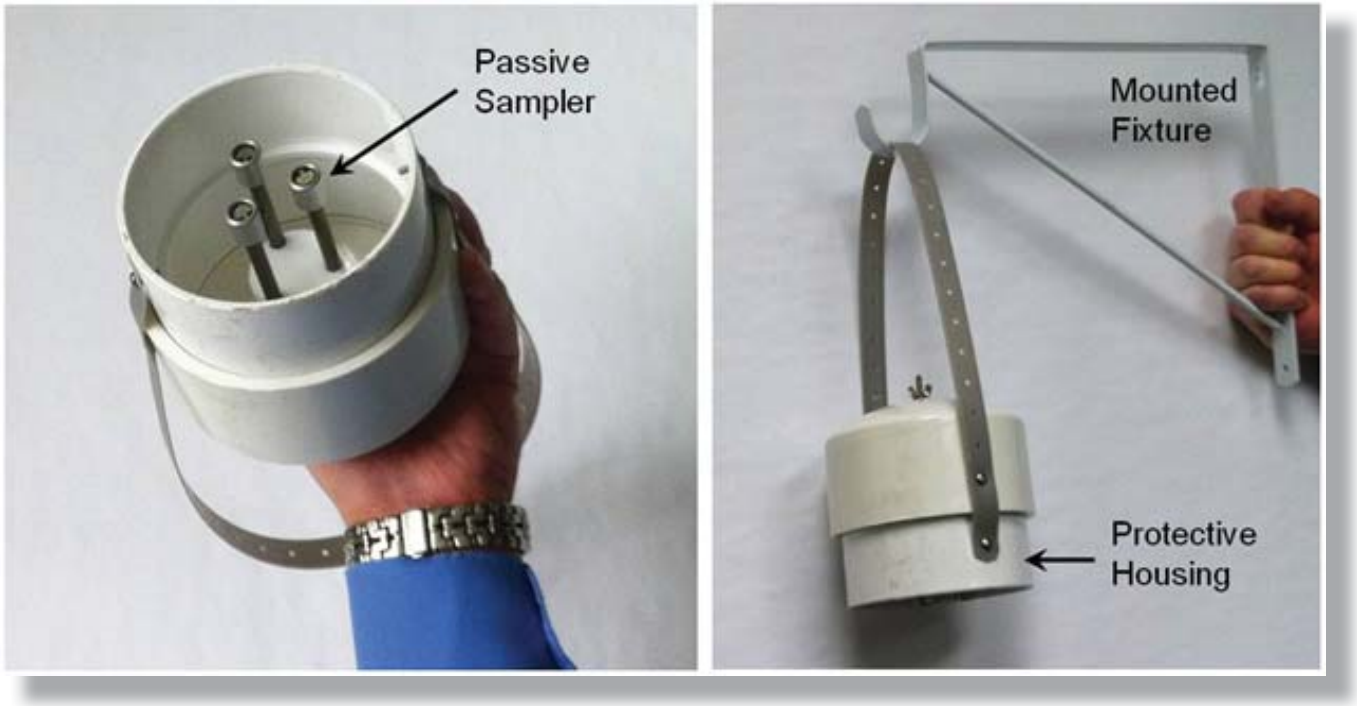
Background

The Environmental Protection Agency, Office of Research and Development (EPA ORD), EPA Region 3, and the City of Philadelphia Air Measurements Services (AMS) are collaborating on research project in South Philadelphia starting in the spring of 2013. This project investigates how low cost sensor and passive sampler measurement systems can help improve information on air pollutant concentration variability in areas with many potential sources (like South Philadelphia).

The South Philadelphia research study focuses on understanding new ways to use passive samplers (PSs). A PS is a three inch long, ¼-inch diameter stainless steel tube filled with a sorbent material (a special form of charcoal). When the tube is exposed to the air, some air pollutants accumulate on the sorbent material and move up the tube through the process of diffusion. After two weeks of exposure to ambient air, the tube is capped and sent to a laboratory for analysis, providing a time-averaged concentration measurement of select air pollutants.

Research Description

A group of three PS samplers inside of a rain shelter are shown in the photos below. Compared to other air quality measurement systems, PSs are very easy to deploy because no electrical power is required, simply place at the desired location. The PSs need to be changed out every two weeks with fresh tubes and this process takes only a few minutes. The PS package shown below is designed to hang from a hook that can be attached to various structures (such as a light pole), about 15ft above the ground. A long pole is used to retrieve the PS package for change-out. Since the PSs are low cost and easy to maintain, data can be collected over an extended period of time allowing seasonal trends in air quality to be investigated.

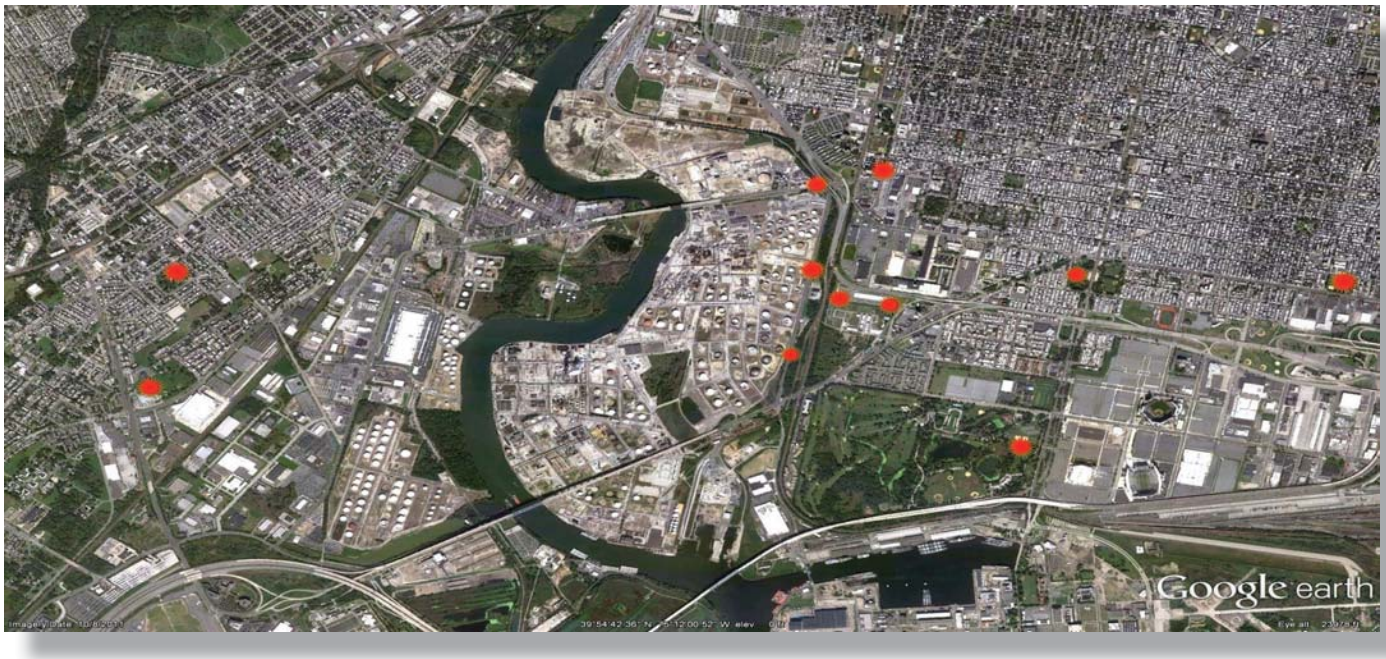


Passive Sampling device

How Will The Research Be Conducted?

The South Philadelphia Passive Sampler Method Study is collaborative research project that has multiple objectives centering on use of low cost measurement technologies to inform air pollutant concentrations in complex source areas. Indicated on the map below, the project team plans to deploy approximately 10-15 sets of PSs in the study area in cooperation with the City of Philadelphia, Parks Service, Housing Authority, AMS, and in collaboration with an outdoor advertising company. A variety of sampling locations are proposed including some near a refining complex and near major roadways, however, these potential sources are not the primary focus of the study. By placing some PS near potential sources and also at distances away, the team hopes to better understand the ability of two week time-integrated PS to inform spatial variations in select air pollutant concentrations. General study objectives include:

- Investigate the ability of two-week PSs to determine spatial variability of select air pollutants in complex urban source environments (like South Philadelphia).
- Explore techniques for novel deployment of PSs in public spaces and in association with commercial entities (such as an outdoor advertising company)
- Provide baseline information on two week time-averaged benzene concentrations in the deployment area and expand information on compounds that can be measured using these PSs.
- Collaborate with the City of Philadelphia AMS communities-scale grant project using optical remote sensing for measurement of benzene and other compounds in the study area.
- In conjunction with other efforts, provide information in support of PS draft measurement method development efforts. This includes providing samples to multiple commercial laboratories to evaluate their ability to analyze PSs for multiple compounds.
- Link to other work on testing of low cost time-resolved sensor technologies.



Map of Proposed Study Area

This project will operate under EPA ORD quality assurance Category 3 (applied research and development). The intended use of the data is for research purposes only. The quality assurance category for this project is not appropriate for regulatory, enforcement, or compliance activity. The South Philadelphia Passive Sampler Method Study is not part of any enforcement or compliance activity.

Contacts

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