5.040 Deploying a low-cost, community-based air quality monitoring network in Hawai‘i .

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Abstract:

Poor air quality is the single largest environmental risk factor for premature death globally, but the lack of widespread observations has traditionally limited our understanding of air pollutant sources and impacts. However, with recent advances in low-cost sensor technology, it is now possible to deploy dense networks of air quality monitoring stations in a wide range of environments. Such networks have several advantages over traditional, more costly systems: i) they enable higher resolution monitoring for health and regulatory purposes, ii) novel network configurations have potential for meteo-chemical model evaluations, and iii) the sensors are a means to interact with the public in new ways.

Despite these advantages, there have been relatively few rigorous evaluations of low-cost sensor characteristics and thus the value of low-cost networks remains largely unknown. Here, we present initial results from a sensor network on the Island of Hawai'i to measure levels of volcanic air pollution (‘vog’ composed of sulfur dioxide [SO_2] and particulate matter [PM]). Vog is a significant public health concern on the Island and exposure levels have been linked to negative health and respiratory symptoms in the community. Hawai’i Island’s Kilauea volcano is the world’s most active volcano and the single largest point source of SO_2 in the United States. This makes for a unique location to test a low-cost air quality sensor network because pollutants are injected into clean background air from a known source. Preliminary results include i) PM and SO_2 sensor evaluations using field co-location and laboratory tests and ii) spatial and temporal vog patterns from trial network deployments.