

Presentation Information

Presenter	David Sailor
Title	Feedback Mechanisms in the Urban Environment: Human Response to, and Impact on Episodes of Poor Air Quality and Extreme Heat
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Abstract:

During episodes of poor air quality or excessive heat urban populations respond by changing activity patterns. Such behavior modification can itself impact the episode through modifications in anthropogenic emission of pollutants and waste heat. Additionally, many metropolitan areas enact advisory systems to warn the public of poor air quality and excessive heat. The extent to which the public hears such advisories and responds to them can further impact the episode. The inability to represent meteorological, air quality, and human response feedback mechanisms in the current modeling paradigm makes it difficult to evaluate advisory systems and policy options for improving air quality and the urban thermal environment. Current modeling approaches are also limited in their ability to assess how population growth, technological change, global climate change, and adaptation may affect the urban environment. To address these challenges we have established the FUSE project – a study of Feedback between Urban Systems and the Environment. The goal of this project is to develop an understanding of these feedback mechanisms and to create an integrated analysis framework to evaluate human response to, and impact on, heat waves and episodes of poor air quality. This framework links models of meteorology, air quality, energy consumption and human response, incorporating feedback mechanisms among individual modules. The data that have been used to develop and validate this analysis framework include (1) survey instruments to quantify human activity response functions; (2) field measurement campaigns to spatially resolve air pollution and meteorological conditions; and (3) energy and transportation data to characterize anthropogenic emissions of heat and moisture. This presentation will provide an overview of the FUSE project and summarize results to date for two metropolitan regions where diverse response characteristics were anticipated - Portland Oregon, and Houston Texas.