

Numerical Modelers, Resilience Solution Experts and Observationalists Came Together to Design Urban Field Experiments Focused on Extreme Heat and Related Hazards

Abstract

Achieving climate resilience in the context of a rapidly changing climate calls for collaboration among experts across multiple disciplines. Unfortunately, there has historically been a disconnect between geophysical and social scientists; experts in climate observations, predictive modeling and resilience solution planning often employ differing terminologies, working parameters, and assumptions.

To accelerate the generation of equitable climate and energy solutions for urban areas, the Department of Energy funded four Urban Integrated Field Laboratories (UIFL) including the Southwest UIFL (SW-IFL). As part of the SW-IFL project, a group of twenty experts in the aforementioned disciplines regularly worked together to find intersection points for the conduct of multidisciplinary science aiming to advance our understanding of the urban climate system and generate actionable intelligence. The 18-month effort culminated in the execution of four innovative field experiments aligned with the capabilities and needs of each discipline. Observationalists contributed mobile observatories that measure climate properties at sub-km, sub-hour resolution. Numerical modelers contributed kilometer-scale simulation tools and detailed information about building morphology and energy performance. Resilience solution planners provided information about past and future urban plans and connections with local policy makers and community members. This multidisciplinary dataset will allow the community to begin answering questions about the impact of the built environment on heat and air quality equity within neighborhoods, the widespread cooling potential of urban cooling features (e.g., green spaces, lakes, and cool pavements), and the distribution of air pollutants across Arizona. The dataset will soon become open access for the entire community. For now, we present some highlights of the dataset and lessons learned when designing urban field deployment strategies as an interdisciplinary team.

To accelerate the generation of equitable climate and energy solutions for urban areas, the Department of Energy funded four Urban Integrated Field Laboratories (UIFL) including the Southwest UIFL (SW-IFL). As part of the SW-IFL project, a group of twenty experts regularly worked together to find common ground to advance our understanding of the urban climate system and generate actionable intelligence. The 18-month effort culminated in the design and execution of four field experiments aligned with the capabilities and needs of each discipline. Observationalists contributed mobile observatories to measure climate parameters at high resolution. Numerical modelers contributed simulation tools and information about building shape and energy performance. Resilience solution planners provided information about urban plans and community connections. This multidisciplinary dataset, that will soon become openly available, will serve to answer questions about heat and air quality equity across Arizona. For now, we present some highlights of the dataset and lessons learned.

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Southwest Urban Integrated Field Laboratory (SW-IFL) team

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