

Analysis of atmosphere in Phoenix, Ariz., suggests new model for sound urban growth policies

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Atmospheric research often focuses on clouds' impact on weather and climate. Yet even low clouds are a long way off, with a base some 6,000 feet above earth. University of Notre Dame fluid dynamics and engineering professor Harindra Fernando works the other end of the air column closer to home—the bottom of the atmosphere in the city, which is known as the urban boundary layer.

A report on his team's work appears in a recent journal article in *Physics of Fluids*, which is published by the American Institute of Physics (AIP).

The goal is to understand atmospheric impact on people's health and comfort due to elements such as wind and airborne particle flow, dispersal and transport. Think of it as the physics of comfort. Dr. Fernando puts it this way: "The urban boundary layer of the atmosphere is where people live. And the long term-viability of cities and our ability to assure a high quality of urban life is affected by how clean our environment is and how fast it is changing by human impacts."

Dr. Fernando's team used [fluid mechanics](#) to understand flow and help devise mathematic models to predict periods of high [particulate pollution](#) that affect human health and periods of extreme temperature impacting human comfort. Explains Dr. Fernando, who also is an emeritus professor at Arizona State University: "Our team started applying fluid dynamic analysis in a rapid urban growth situation of

Phoenix because it is a useful test bed for developing an understanding of complex processes. We then built models to provide a basis for sound growth policy. Even though they must be further validated in the field, now policy and decision makers come to us for guidance. It's been very encouraging, because we want our cities and their residents to flourish."

More information: The article, "Flow, turbulence, and pollutant dispersion in urban atmospheres" by H. J. S. Fernando et al was published on May 13, 2010 in the journal Physics of Fluids. See: link.aip.org/link/PHFLE6/v22/i5/p051301/s1

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