



MMAE SEMINAR

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E-1 BUILDING – CRAWFORD AUDITORIUM

3:30 – 4:30 PM

Atmospheric Flow in Complex Topography

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Abstract

More people now live in urban areas than in rural areas, and about 70% of these urban centers are located in complex topography, where airflow is determined by the background (synoptic) flow as well as local slope/valley flows driven by diurnal heating and cooling (known as the *thermal circulation*). If the synoptic flow is weak, the urban meteorology is characterized by up-slope/up-valley winds during the day and down-slope/down-valley winds at night. Low-wind periods occur during the morning and evening transition periods where winds switch from one type to another. Slope flows play a vital role in the distribution of heat, nutrients and pollutants in urban areas. Morning and evening rush-hour traffic are concomitant with transition periods, which, compounded with weak winds, lead to severe air pollution episodes. A research program on complex terrain flows, consisting of theoretical and numerical computations as well as field and laboratory experiments, is underway at Arizona State University, some the results of which will be described in this presentation. Examples of the implementation of fluid dynamics parameterizations in meso-scale weather prediction models will also be discussed.