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New directions for urban climate science

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The study of urban climates is at a critical juncture in its development as its subject matter is viewed as increasingly relevant to a number of intersecting concerns across a hierarchy of scales. These concerns include global climate change and its drivers and consequences, which are focused on cities where most reside. Addressing these concerns requires an integrated science of cities, which does not yet exist. Our current urban climate knowledge framework developed as a series of specialist endeavours concentrating on aspects of the outdoor and of the indoor environments. As a result, much of the training, methodologies, technical language and data that are associated with these specialist fields are distinct and not easily transferable. In the climate field, there is a clear division between the outdoor and indoor climates and addressing each independently makes it difficult to find solutions to urban challenges, such as achieving zero Carbon cities. Moreover, the lack of a common framework causes confusion when articulating findings. As examples, the urban canopy layer (UCL) in urban climatology commonly refers to the outdoor space below roof level and is bounded by the ground, the walls of adjacent buildings and the interface at roof level; the walls are also part of the indoor canopy, which is bounded by the walls and the roof. Clearly these spaces are strongly connected by exchanges of energy and mass and by the movement of people across the wall interface, yet these receive little attention. In this presentation we will discuss the emergence of indoor and outdoor climate sciences and the potential for integration within an urban climate science.