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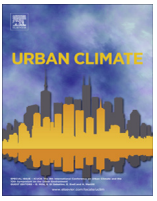

Climatology for city planning in historical perspective

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ABSTRACT

The paper offers a historical perspective on the application of urban climatology in city planning. Correcting the apparent misunderstanding that urban climate science is an 'infant' and untried discipline, its evolution since the mid twentieth century is described, with particular attention to the history of dialogue with planning and urban design. The narrative describes an initial phase of optimism in networks for international cooperation, followed by disappointment at their limited impacts upon planning practice. Several institutional factors are discussed, as well as the suggested paradox that scientific progress from place to process studies may have inhibited communication in the short term, though in the long run it was to lay the technical basis for a much wider application of climate knowledge in planning. The use of GIS-based maps is seen to offer a potentially useful means of mediation between atmospheric analysis and land use recommendations. The northern European origin of 'Klimaatlas' technique is explained as well as its diffusion to diverse climatic and institutional settings. The paper concludes by underlining the relevance of this history to contemporary urban response to global climate change.

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1. Introduction

> In the aftermath of ICUC8 it was surprising to read in *New Scientist* that
> 'the science of urban climate control is still in its infancy and until recently only limited efforts had been made to understand the details of city climate' Austen (2013)

ICUC8 was in fact the eighth major international meeting on urban climate since 1989 and continued a sequence of scientific gatherings that has run for more than fifty years – hardly an infancy. Seminal texts – Kratzer (1937), Oke (1978), Landsberg (1981) – span the middle years of the last century (Kratzer, 1937; Oke, 1978; Landsberg, 1981). Although the knowledge network of the International Association for Urban Climates (IAUC) took its present shape only in 2000, its infancy occurred decades earlier at meetings such as the Brussels symposium on *Urban Climates and Building Climatology* of 1968, when WMO and WHO first convened specialists from many disciplines with the aim of understanding the urban atmosphere, and applying this knowledge for its improvement.

On closer reading, it appeared that *New Scientist* was looking for a different category of innovation: techniques such as subterranean popsicles drilled under Ulan Bator to store winter freeze-water for summer cooling; heat-reflective roofing materials to reduce dependence on air-conditioning in Athenian heat-waves; the installation in a Taiwanese park by a French landscape architect of electrical dehumidifiers and light-absorbing pavements incorporating catalysts intended to break down atmospheric pollutants; thermochromic paving in Tirana; and showcase eco-developments such as Masdar in the Abu Dhabi desert; PlanIT Valley in Paredes, Portugal, and Abu Dhabi's Mina Zayed waterfront, featuring – apparently – such marvels as 'a cylindrical building wrapped in a large moving curtain that follows the sun, providing all-day shade for an outdoor park at the center of the building' (Austen, 2013). Leaving aside the novelty factor of such inventions, *New Scientist* was expressing a widely-shared misconception about urban climate science. Public policy documents such as UN-Habitat, consultancy reports such as Atkins and academic texts such as Bulkeley (UN-Habitat, 2013; Atkins, 2013; Bulkeley, 2013) tend to take the millennium as their starting-point, discounting the previous half-century of efforts, albeit often disappointed, to apply climatic knowledge, and the precedents they offer today's decision-makers in terms of every-day planning tools rather than exotic technical fixes.

The present paper retraces this history from the mid twentieth century. Antecedents of urban climatology go back to the vigorous trend of empirical investigation prompted by the phenomenon of the nineteenth-century city: Luke Howard (1772–1864) measuring *The Climate of London*; Émilien Renou (1815–1902) the atmospheric epidemiology of Paris; Max Von Pettenkofer (1818–1901) the bioclimatology of Munich (Howard, 1833; Janković, 2013). Air pollution and ventilation were as great a concern as water supply, drainage and sewerage for Victorian reformers, but the harm caused by private chimneys and funnels was harder to address than water-borne sanitation. The twentieth-century brought the promise of cleaner energy and transport technologies and greater confidence in collective regulation. The new discipline of town planning (French *urbanisme*, German *Städtebau*) aimed to bring self-awareness and stewardship into the process of town building. 'Planning' implied both political acceptance of intervention and sense of respect for rational evidence-based policy-making. In 1904 the prologue to the opening issue of the world's first planning magazine, *Der Städtebau,* included humidity, temperature, air quality and ventilation among the many technical factors to be considered (Collins and Collins, 1986). But early attempts to incorporate climatic consideration into town planning were limited to crude generalizations about regional weather patterns and prevailing winds (Egli, 1951; Hilberseimer, 1944; Taylor, 1950). Not till the publication of Albert Kratzer's *Stadtklima* in 1937, revised and expanded in 1956, was the relation between built form and urban boundary layer presented in anything like its true complexity (Kratzer, 1937). As a student of the geographer Edward Fels, pioneer in the scientific study of anthropogenic environmental impacts, Kratzer emphasized above all the man-made character of the urban climate: volcano-like in its effects, as he put it, yet a product not of nature but of human agency, and all the more significant for being unintended.

In the basic paradigm of urban climatology the independent variable was the built environment of the city, and its human use. Though man-made, urban form is itself inadvertent, a by-product of multiple independent decisions. As Kraus wrote in the *Quarterly Journal of the Royal Meteorological Society* of 1945: