

Lenzholzer, S.: Weather in the City: How Design Shapes the Urban Climate. Rotterdam, nai010 publishers, 2015. 224 p.

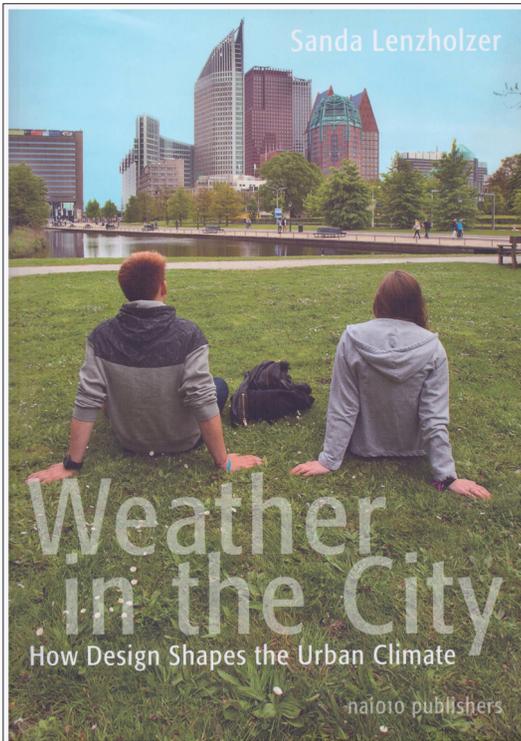
The author, Sanda Lenzholzer, had two clear and conscious goals with this book, to close the gap between the area of meteorology and urban design, and to do so while reaching for a wider audience but still maintaining scientific background. The volume was written by an architect who has a hands-on knowledge on the practical considerations of the planning and construction of buildings. Her interesting aspect is that she does not consider the weather as a stress factor on built structures but as a stress factor on the people living in and around the buildings. The work was previously published in Dutch, and in its time, it gained a lot of media attention. Later on, the author was persuaded into rewriting it for an international audience in English, resulting in this volume. Judging by the contents, it was a worthy decision.

Most books on urban climate and weather have a special topic regarding extreme weather events, e.g. storm water management or heatwaves. One can also find works about specific technologies such as the green roofs, or using renewable energy technologies in buildings. Some other studies are about mitigation of, or adaptation to, climate change or about the

vulnerability of city systems and residents to climate change. However, a collection of weather effects on cities and urban neighbourhoods is lacking, especially the one understandable for people outside the scientific community. This book is a perfect choice for all, including policymakers, who wish to understand the need for urban meteorology and conscious urban planning. The volume is easy to read, but at the same time, it requires some natural scientific interest.

The focus of the book goes from large-scale to micro-scale. It has to be noted that the features included in the volume pertain mostly to cities with temperate climate. The first chapter is a general introduction to how we experience the physical and psychological factors of urban microclimate. Of all the physical factors, special emphasis is put on the role of temperature and wind. Though other factors are noted as well, the clearly important effects of solar radiation, relative humidity and ventilation are the key issues throughout the book. In the first chapter, where the impact of heat stress and wind nuisance on residents and on their activities is considered, we get a glimpse of the mind of an architect.

The second chapter breaks down into units that present each factor determining the urban climate from a more scientific point of view. The radiation effect is not only shown as a heat source but also as how the altitude angle of the sun affects incoming radiation and shadowing. Also from an architectural perspective, the thermal properties (reflection, heat storage and conductivity) of building materials are introduced. Naturally, from radiation the author proceeds to temperature and to the urban heat island effect, but does not go into details about the latter, since that is the main target in most studies. These issues are followed by the description of the wind effect. This is a more detailed part of the chapter and contains a lot of interesting findings based on measurements and modelling. Perhaps the most interesting topic is, from at least a meteorologist's point of view, the formation of typical wind patterns in the urban environment. The author shows how the direction, height and width ratio of a slab-like building affects wind direction and speed, and how they create wind tunnels, downwashes and windbreaks around the buildings, which have a great effect on pedestrians and on their day-to-day behaviour. Especially in this part of the book, the figures are most helpful. Since the phrasing aims for a wide readership, the author omits some physical explanations, but the figures can be further discussed, e.g. in university classes with background knowledge on fluid dynamics.



This chapter also discusses the perception of buildings from a thermal comfort view as well.

The third chapter tackles the question of mapping and categorisation methods of physical properties of a city, from a microclimate forming perspective, e.g. heat emission or wind nuisance. By creating such maps, urban climate related problematic areas can be identified in a city. One presented method is the determination of different ‘climatope’ areas – urban areas with typical microclimatic characteristics (e.g. parks, garden cities, and commercial districts). The other method is the creation of urban maps based on in-situ and satellite measurements.

The shortest chapter of the book (Chapter 4) introduces general methods that can be implemented in city planning in order to reduce the adverse effect of cities on weather. It shows general methods to reduce heat stress, creating ventilation between and within districts, and their possible implementation in planning practices.

The fifth chapter is about mapping the microclimate at a building scale. Analyses of physical microclimate experience are introduced using shadow simulations, educated guesses about wind patterns, wind tunnel tests, computational fluid dynamic simulations and combined versions of observation and simulations. In addition, the method of mapping the psychological aspects of microclimate experience based on interviews and the observation of the behaviour of residents is presented.

The sixth chapter embraces half of the content of the entire volume, it is also the most practical part, containing information on special urban designs. These range from different techniques for shadowing through building materials to the positioning of buildings. In order to avoid a simple enumeration, these architectural designs are grouped along their capacity to influence sun and shade, reflection, emissivity and heat conductivity, and evaporation, to slow or avoid wind, to improve ventilation, to protect against precipitation and to consider psychological aspects of microclimate experience. For each design the author provides general description and refers to issues of effectiveness, advantages and disadvantages, construction problems, costs and maintenance fees. The general description explains the theoretical background and purpose of each design, and employs informative photographs or schemes. The description of the effectiveness, advantages and disadvantages of a given design is usually short but straightforward and critical. Cost estimates are only approximate ones, as the market value depends on the availability of a construction material and on general economic conditions. At the end of the book, a table summarises the goals and target location of each architectural design.

The topics, illustrations and descriptions make one wonder about their own urban environment.

After reading the book, I often find myself looking at buildings from a climate responsive design point of view and I can even recognise the drawbacks of certain architectural designs, though I have no such background. One can also use the design examples to improve the comfort of their own home.

The book itself has an up-to-date look, with a paperback cover. The high quality figures are both informative and simple, not overpowered by design. The figures are understandable for the general audience, but they can be employed even in higher education. Photographs are mostly real life illustrations. Interestingly, the pages are colour coded based on which climatic factors they mostly concern, what can help the readers in finding what they are looking for. Since all the topics in the book are relevant to temperate climates, every aspect is valid and can be used in the Central European region, from the theoretical background to the architectural designs. The price of the book also indicates that the aim is not to provide a comprehensive, physical equation based, urban planning content, but to reach a wider, even non-academic audience. At a mere price of 30€ the book is a bargain for all interested readers.

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