Heriot-Watt University
Research Gateway

Urban climate science, urban design and sustainability: contrasting the cities of Manchester (UK), Brisbane (Australia) and Ankara (Turkey)

Citation for published version:
MacKillop, F 2015, 'Urban climate science, urban design and sustainability: contrasting the cities of Manchester (UK), Brisbane (Australia) and Ankara (Turkey)', Paper presented at Croucher Advanced Study Institute on “Changing Urban Climate and the Impact on Urban Thermal Environment and Urban Living”, 7/12/15 - 13/12/15.

Link:
Link to publication record in Heriot-Watt Research Portal

Document Version:
Publisher's PDF, also known as Version of record

General rights
Copyright for the publications made accessible via Heriot-Watt Research Portal is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy
Heriot-Watt University has made every reasonable effort to ensure that the content in Heriot-Watt Research Portal complies with UK legislation. If you believe that the public display of this file breaches copyright please contact open.access@hw.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.

Download date: 13. May. 2021

Heriot-Watt University

Heriot-Watt University
Research Gateway

Urban climate science, urban design and sustainability: contrasting the cities of Manchester (UK), Brisbane (Australia) and Ankara (Turkey)

MacKillop, Fionn

Publication date:
2015

Document Version
Peer reviewed version

Link to publication in Heriot-Watt University Research Portal

Citation for published version (APA):
MacKillop, F. (Photographer). (2015). Urban climate science, urban design and sustainability: contrasting the cities of Manchester (UK), Brisbane (Australia) and Ankara (Turkey). Digital or Visual Products

General rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Download date: 09. Aug. 2018

Urban climate science, urban design and sustainability: contrasting the cities of Manchester (UK), Brisbane (Australia) and Ankara (Turkey)

Dr Fionn MacKillop, Assistant Professor

Heriot-Watt University, Edinburgh, Scotland

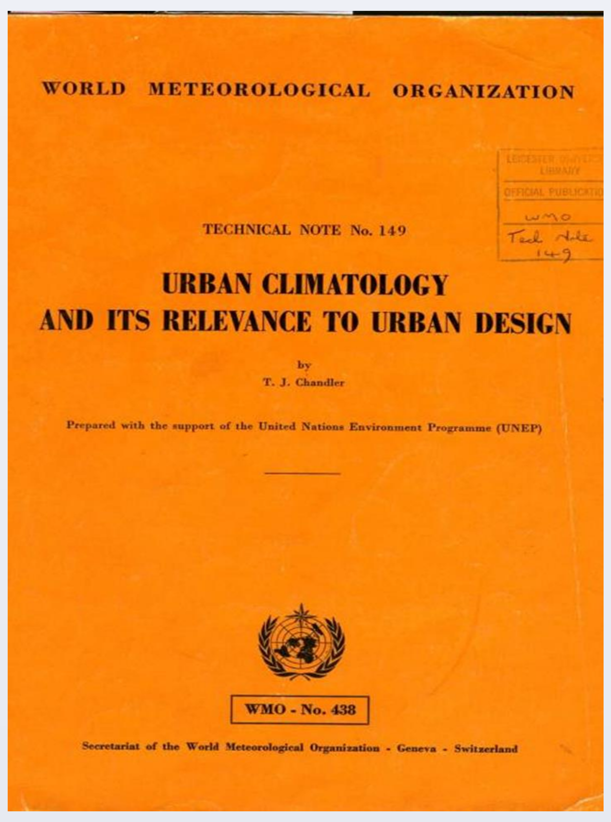
CONTEXT

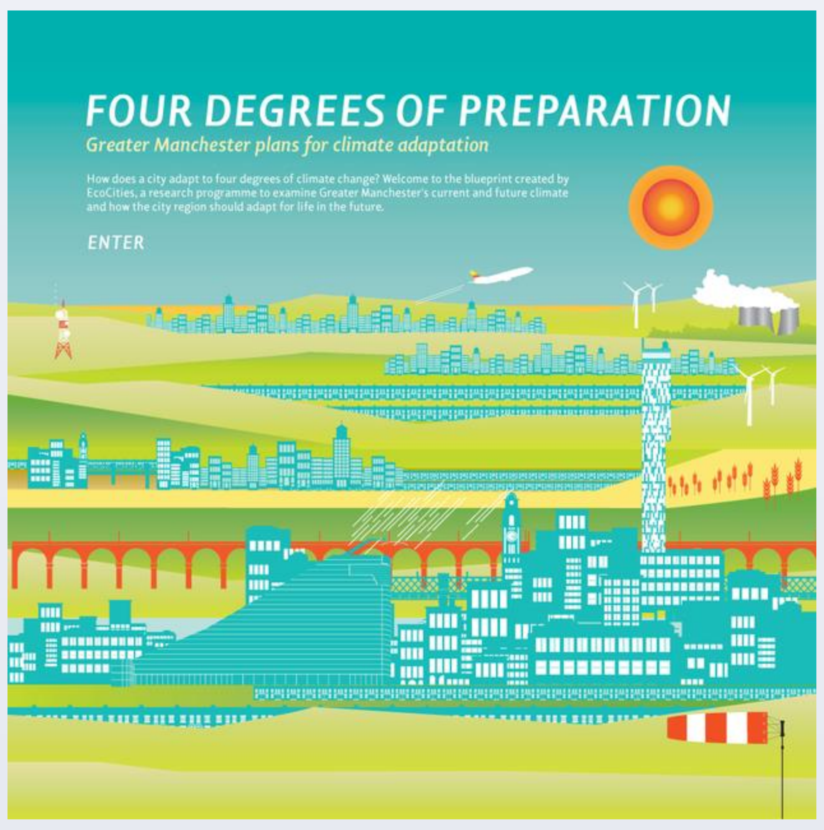
Urban climate science offers potentially cost-effective and relatively simple options to dramatically improve the sustainability and resilience of buildings and communities, whilst improving quality of life and wellbeing.

Building siting in relation to light and air, incorporation of green and blue spaces for thermal comfort and runoff management, use of passive design components in building ventilation, are all potential applications of urban climate science to urban design.

However, research (e.g. MacKillop and Hebbert 2013) shows the limited application of urban climate science in the majority of urban design today.

This poster presents the work I have carried out on the application of urban climate science to building sustainability and resilience in three very different cities: Manchester, Ankara and Brisbane.





OBJECTIVES AND METHODS

-My research, carried out over several years (2011-2015) uses a combination of literature reviews, interviews of key practitioners, observation and in-situ experience of buildings and communities.

-To compare and contrast urban design and climate science policies/practices in highly heterogeneous climatic, social, political and economic contexts.

-Attempt to define benchmarks and best practices of sustainable urban design and development in relation to principles of climate science and urban design.

-Explore opportunities for knowledge exchange between cities, and obstacles preventing this.

METHODS

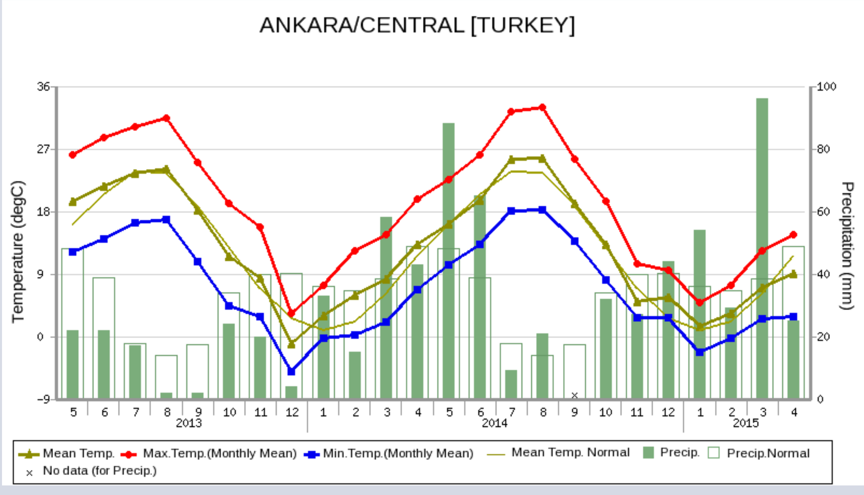
-Primary qualitative data collection in the 3 cities, focusing on climate and urban design policies and practices, as well as quality of life/city experience data among segments of the population.

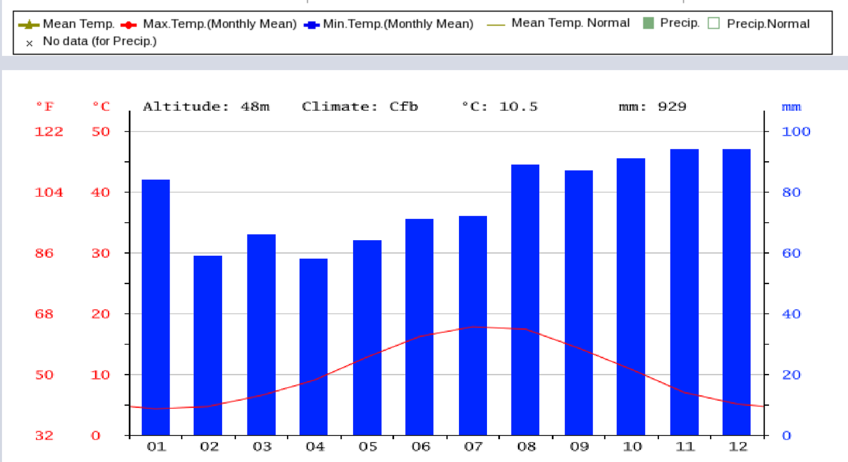
-Primary quantitative data obtained from interviews of experts and practitioners in the fields of urban design and climate science in the 3 cities.

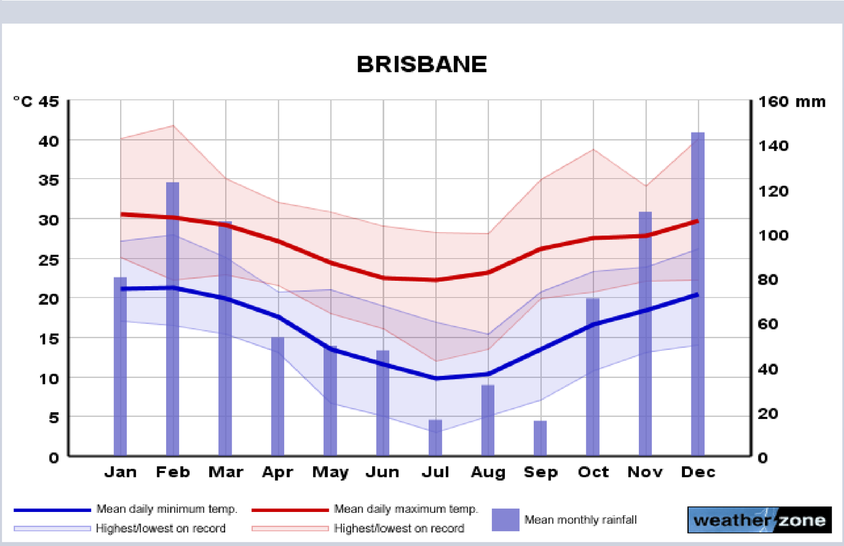
-Secondary quantitative data on climatic parameters obtained from literature reviews and database searches.

CLIMATIC AND URBAN CONTEXTS

Highly contrasted climatic and urban contexts: temperate, sub-tropical and continental arid climates are represented in the sample.





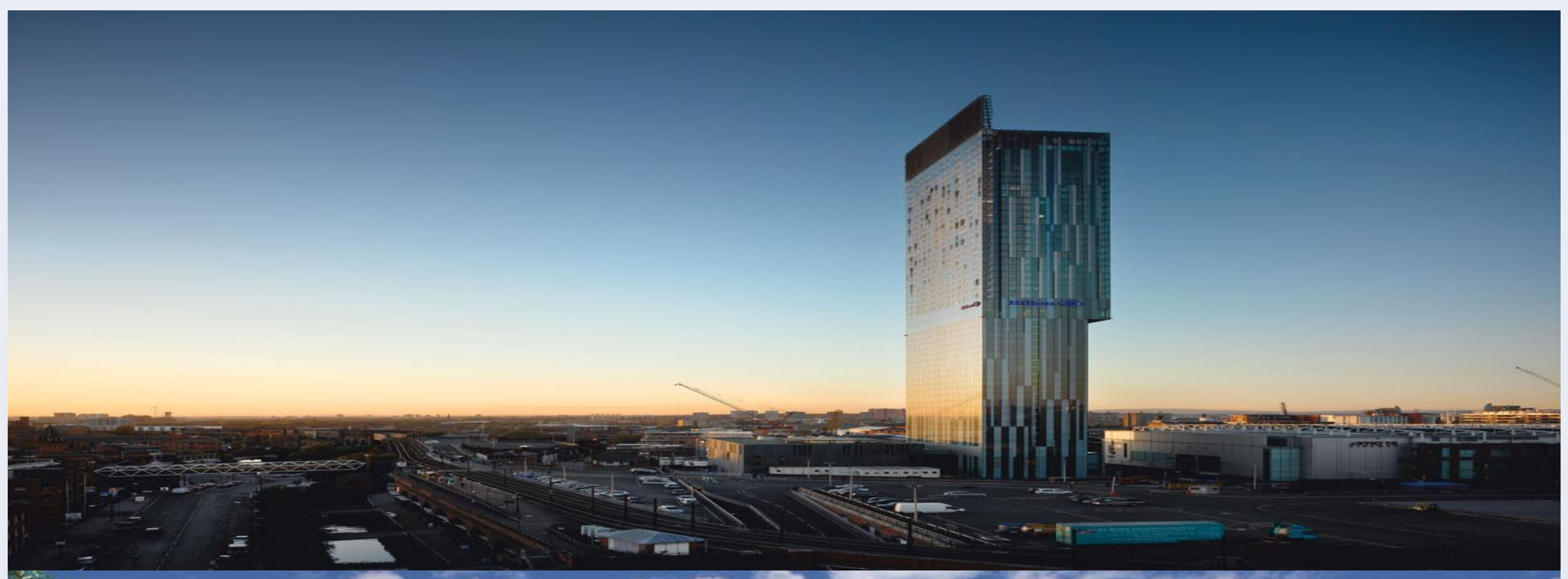


RESULTS

-**Manchester**: long history of climate science in relation to planning, e.g. 'Cottonopolis' and the importance of humid climate for textile industry. Today, city government, developers, planners and other stakeholders are actively considering climate and climate scenarios in development projects, such as 'EcoCities' and Oxford Road Corridor.

-**Brisbane**: a tradition of climate-based building design (e.g. Queenslander houses using natural cross-ventilation and abundant shading) has been superseded by the ubiquitous glass and steel tower and stucco houses heavily dependent on air conditioning in a hot, humid climate. There is an emphasis on sustainable building design but essentially in flagship, isolated projects.

-**Ankara**: despite influence of German planners in the conception of the city, very little impact of urban climate science in planning is evidenced in the built environment. Planning is very much top-down and growth oriented with environmental and socio-spatial outcomes coming very far behind. Thus, the potential for this city to benefit from urban climate science input into urban design is very significant.



CONCLUSIONS

-Integration of urban climate science, urban design and sustainability/resilience vary strongly from city to city.

-A combination of cultural, social and economic factors explains these differences.

-The scope for greater knowledge exchange and best practice diffusion is considerable.

-However, a range of obstacles hinders this, from cultural factors (especially in the conceptions of sustainability and urban design), to economic and professional ones (e.g. conceptions of the role of the planner).

-Greater knowledge exchange, whether through governmental channels (WMO, UN), professional organisations (IFHTP, CIB), and decentralised, informal networks such as ICUC, is required to advance the coordination of urban climate science and urban design for greater urban sustainability and resilience.

REFERENCES AND ACKNOWLEDGEMENTS

Chandler, T. 1976, Urban climate and its relevance to urban design, WMO Technical Note no.149, Geneva.

Frommes, Bob, 1980, Fundamental knowledge in urban and building climatology, International Federation of Housing and Planning.

Givoni, B., 1965 Man, *Climate and Architecture*, Elsevier, Amsterdam.

Givoni, B., 1998 *Climate Considerations in Building and Urban Design*, Van Nostrand Reinhold, New York.

MacKillop, F., 2013, Hebbert, M., Urban Climatology Applied to Urban Planning: A Post-war Knowledge Circulation Failure *International Journal of Urban and Regional Research*, 37 (5), 1542-1558.

MacKillop, F., August 2012, Climatic City: two centuries of urban climate science in Manchester, UK, *Cities*, Volume 29, Issue 4, Pages 244–251.

Mills, G, 2006, Progress towards sustainable settlements: a role for urban climatology, *Theoretical and Applied climatology*, 38: 43-49.

Oke TR 1984, Towards a prescription for the greater use of climatic principles in settlement planning, *Energy and Buildings*, Vol 7, Issue 1, pp.1-10.

Oke T R ed 1986 Urban Climatology and its Applications with Special Regard to Tropical Areas, WMO No 652, Geneva.

Page, J (1970), Fundamental problems of urban and building climatology considered from the point of view of decision making by architects and urban designers, *WMO Technical Note* 109, WMO no255.

WMO 1994, *Report of the Technical Conference on Tropical Urban Climates*, Geneva.

ACKNOWLEDGEMENTS

UK Economic and Social Research Council (ESRC), Grant RES 062 23 2134, 'Climate Science in Urban Design' project.

University of Southern Queensland, early career research grant (2011-2013).

Heriot-Watt University, early career research funding.

RESEARCH POSTER PRESENTATION DESIGN © 2015
www.PosterPresentations.com