

Urban Energy Landscape in Practice.

Perspectives on energy infrastructure, heat mitigation and socio-cultural habits in the Chinese megacity Chongqing

Madlen Kobi

Department of Social Sciences, Unit of Social Anthropology, University of Fribourg
(Switzerland)

madlen.kobi@unifr.ch

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UNIVERSITÉ DE FRIBOURG
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“In earlier times, when we didn’t have airconditioning, we used to sleep outdoors on the rooftop. In the evening, we went up there, took our bamboo beds, sat together, wagged our hand fans and looked up into the sky, waiting for the air to cool down. That’s when life was still delightful. Now with the aircon, everyone sits in his own bubble”.



Text: *On the roof terrace, unfolding the bamboo bed, counting the stars, „relaxing in a cool place“*

Source: <http://www.huaxia.com/mlcq/zqsy/bysk/2012/08/2963636.html> (Accessed on March 9, 2021)



Content

- Urban climate in Chongqing
- Anthropological method

- Cooling in Chongqing
 - Before electrification
 - Since electrification / cooling in the highrise

- The prize for cooling the indoors
 - Environmental degradation
 - Changes in social life
 - Socio-economic stratification

- Conclusion

Urban climate and urban heat in Chongqing



Climate zones in China (SNSF-project 2020)

三大火炉 (*san da huolu*/three furnaces)

colloquially: Wuhan, Chongqing, Nanjing

meteorologically: Fuzhou, Chongqing Hangzhou



Source :

https://bking.cdn.bcebos.com/pic/5d6034a85edf8db1d13833b70323dd54574e74ca?x-bce-process=image/watermark,image_d2F0ZXIvYmFpa2U4MA==,g_7,xp_5,yp_5

Urban heat island effects

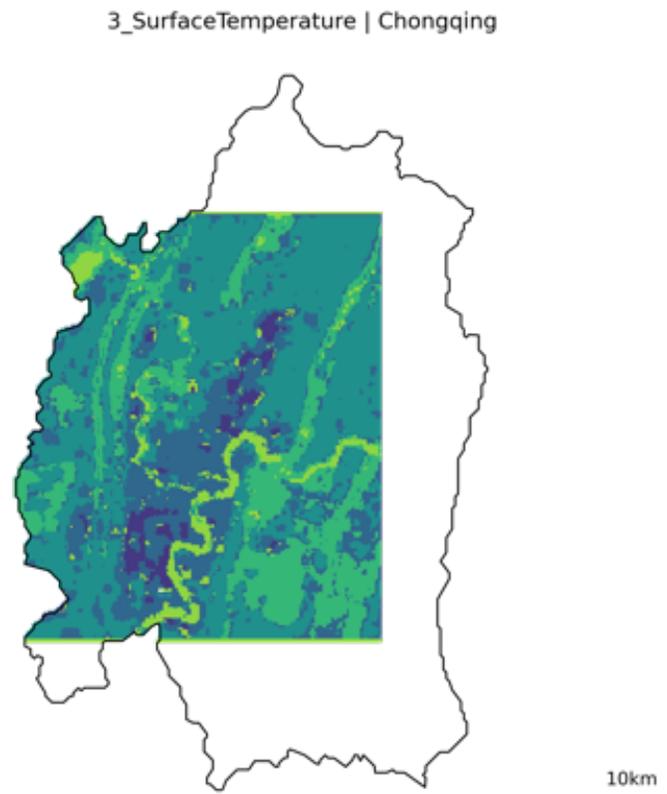


Figure 1: Urban Heat Island Effects in Chongqing (SNSF-project „The City as Indoors“, based on data from 2014)

Figure 2: Chongqing Urban Spread, based on satellite images (<https://www.sciencephoto.com/media/662997/view>)



Summer is painful:

受不了也要受

[even if one cannot bear it, one has to bear it].

1.) Chongqing seen from Lao Jun Dong, 2015 (Photo: M. Kobi)

2.) Chongqing, 1925-1935 (ETH Bildarchiv)



So, how do people keep cool in such a hot and sticky climate?

Longterm ethnographic fieldwork

- Participant observation (weeks, months, years...)
→ 5 months in Chongqing
- „... immerse oneself into the life of the locals and tries not to be noticed, so that they can carry on with their own lives as usual.“ (Eriksen 2015, 34)

Eriksen, Thomas Hylland. 2015. *Small Places, Large Issues. An Introduction to Social and Cultural Anthropology*. London: Pluto Press.



Participant observation

Sense, smell, see, taste, hear, and talk about things

„The very strength of ethnographic field method can also be its weakness: it is demanding, and rewarding, partly because the ethnographer invests not only professional skills in it, but also interpersonal skills.“ (Eriksen 2015, 36)

The anthropologist is the scientific instrument (Eriksen 2015, 34)

→ gender, age, ethnicity, social class influence one's position and access



The anthropological method: learning from others

«The geologist studies with rocks as well as professors; he learns from them, and they tell him things. So too the botanist with plants and the ornithologist with birds.

And anthropologists?

They also study with those among whom they stay, if only for a while. Learning to learn, for them as for the practitioners of any other discipline, means shaking off, instead of applying, the preconceptions that might otherwise give premature shape to their observations. It is to convert every certainty into a question, whose answer is to be found by attending to what lies before us, in the world, not by looking it up at the back of the book.» (Ingold 2013, 2)

Ingold, Tim. 2013. *Making. Anthropology, Archaeology, Art and Architecture*. New York: Routledge.

Social anthropology: method mix

1. Participant observation

Core of anthropological fieldwork; observation and participation in practice

2. Conversations/interviews

e.g. open, semi-structured, biographical, individual, in groups, with experts, oral history

3. Analysis of written sources (e.g. media, archival material)

Content, discourses

4. Multimodal and collaborative methods

Mapping, videos, ethnographic walks, sketches...

Cooling before electrification

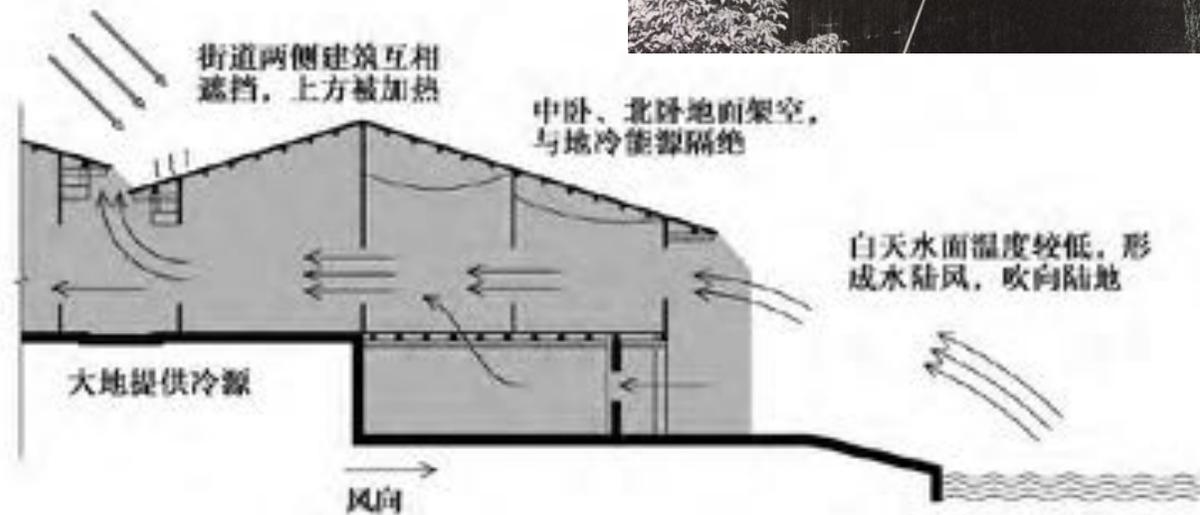


图 10 自然通风分析

Fig 10 Schematic drawing of nature ventilation

Photos: Stilted houses (木结构吊脚楼) that dominated Chongqing's cityscape until the mid-20th century and a house with bamboo walls. (Source: Wang, Chuanping, (ed). 2013. *Lao Fangzi. Chongqing Yingxiang* Chongqing: Chongqing Chubanshe.)

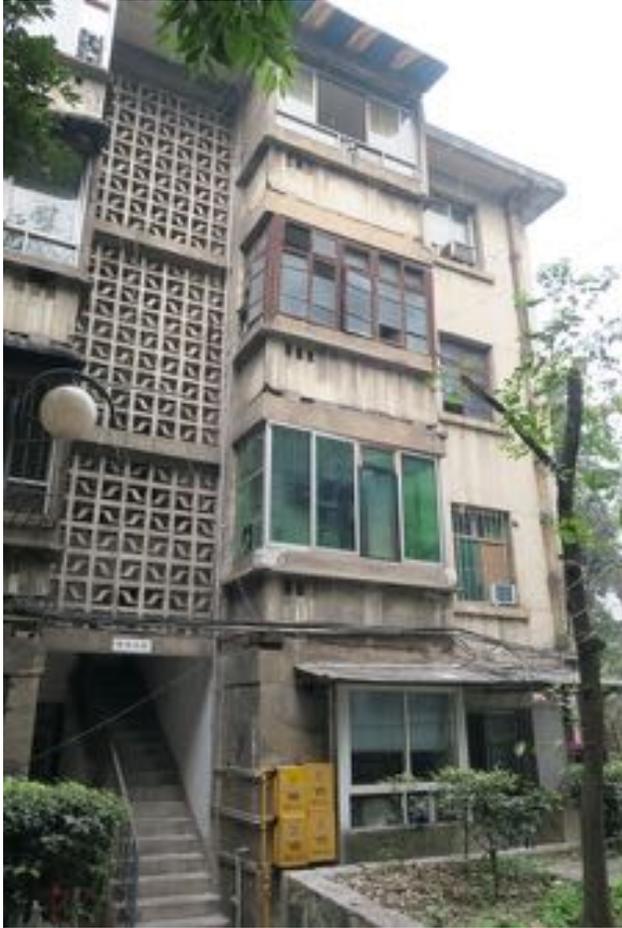
Figure: Schematic drawing of natural ventilation (Source: Yang et al. 2016. Climate adaptation of wooden-plank wall dwelling in hot humid climate regions. *Journal of Civil, Architectural and Environmental Engineering*. 38(4). 1-6.)

Cooling before electrification



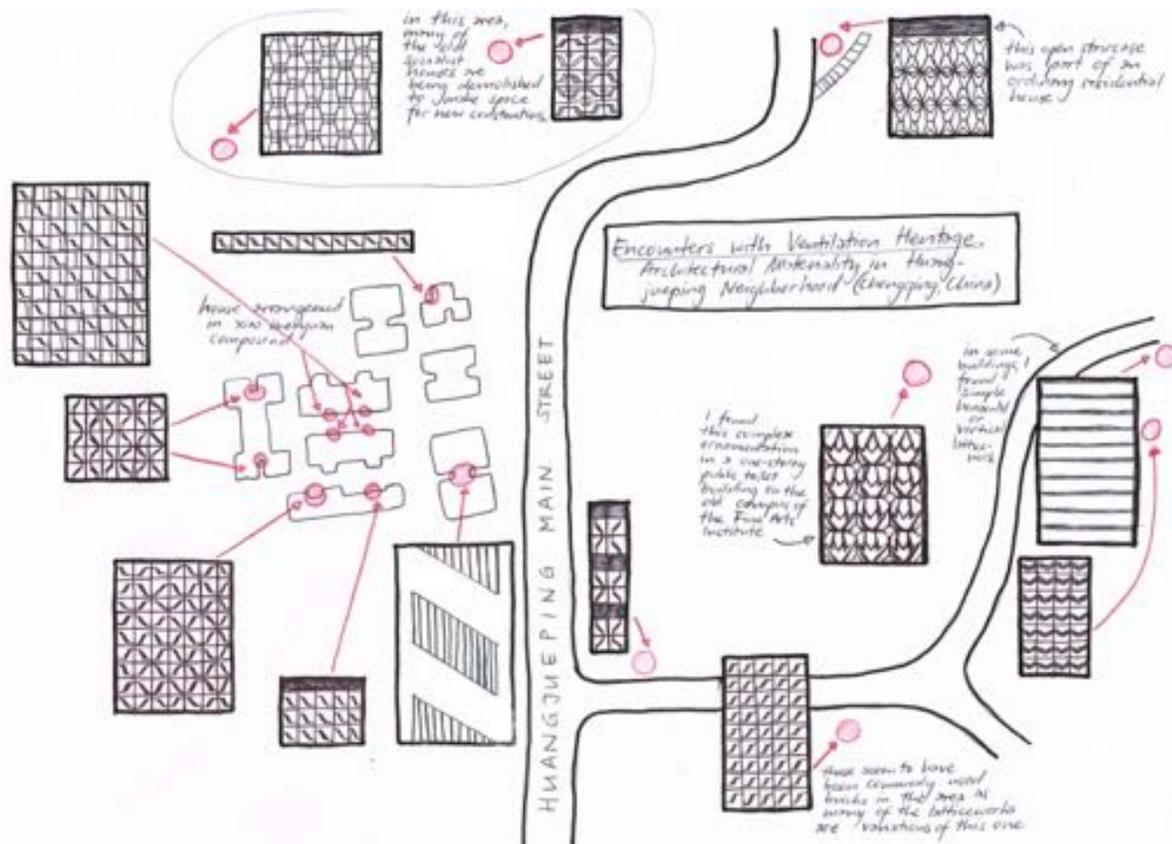
One-storey buildings in Xiao Meishu Xueyuan 小美术学院 built in the 1950s. (Photos: private collection of Family Long)

Cooling before electrification



Buildings in Xiao Meishu Xueyuan 小美术学院 built in the 1970s and 1980s. (Photos: M. Kobi, 2017)

Cooling before electrification



Mapping of apertures in the walls of apartments or staircases in Huangjueping neighborhood

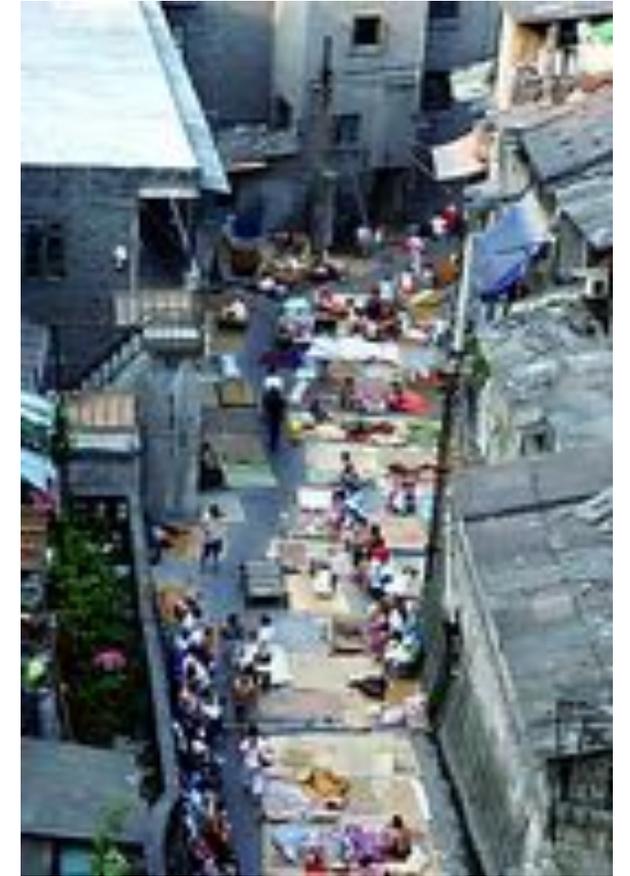
(Map and photo: M. Kobi 2017)

Cooling before electrification



Buildings in Xiao Meishu Xueyuan 小美术学院 built in the 1970s and 1980s. (Photos: M. Kobi, 2017)

Cooling before electrification



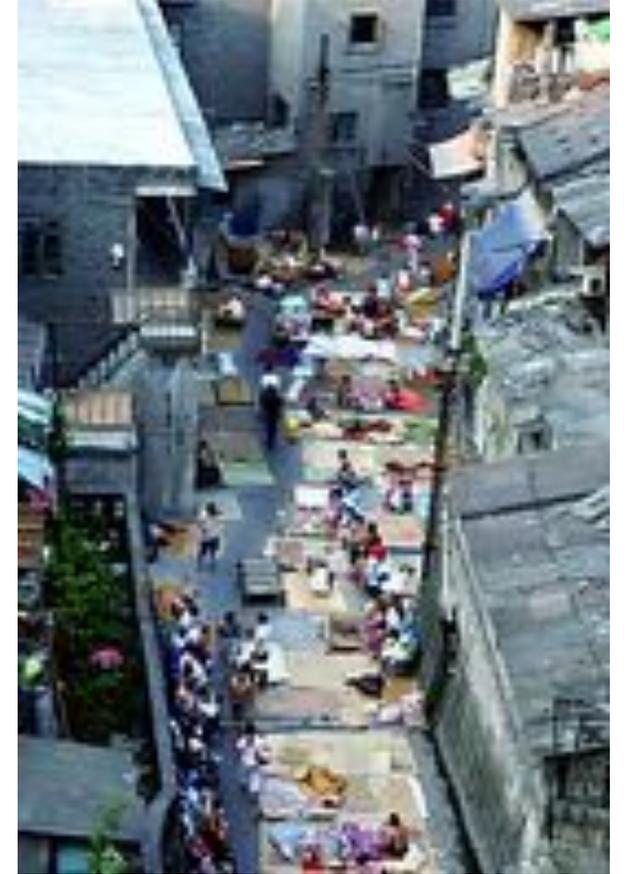
Bamboo beds (*liangban* 凉板), bamboo chairs (*liangyi* 凉椅) and bamboo mats (*liangxi* 凉席) outdoors.

(Sources: 1.- Web / 2.- Private collection of Family Long / 3.- Web)

Thermal comfort

“Places with desirable thermal qualities naturally tend to become social spaces as people gather to take advantage of the comfort found there.” (Heschong 1979, 44)

Heschong, Lisa. 1979. *Thermal Delight in Architecture*. Cambridge (Mass.): MIT Press.



Cooling before electrification



A cold storage warehouse and a collective recreation room for neighbours from the 1980s. (Photos: Yanan Long, 2020).





Chongqing in the 1980s

Xinhua Road (Internet Source)



Chongqing in the 1980s

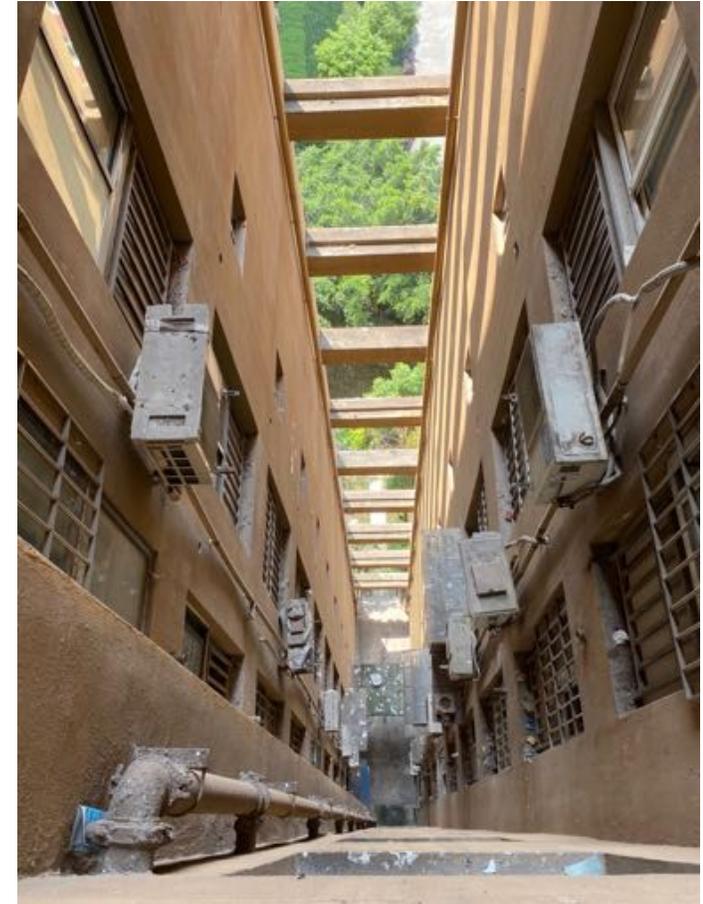
(Image from the web)

Adaptation of heat-mitigating strategies



first, [in the 1980s], we bought a **ceiling fan** [...] from the brand Sanxia [Three Gorges], I used it for so many years and it never broke; these things before were all very well made not like today. Air-conditioning [came later], at first we had a **window air conditioner**, [...]. Later, when it was hot, the window air-conditioner was not enough anymore, [so] we changed to a freestanding one. Around 2000, it broke after we had used it for a long time. [Today,] I usually put on the **standing fan**; only if this really cannot mitigate the heat, then I turn on the **air-conditioning** (Interview with Mrs. Hu 2020).

Cooling since electrification



Outdoor units of split air conditioner systems in Chongqing, 2017 (Photo: M. Kobi)

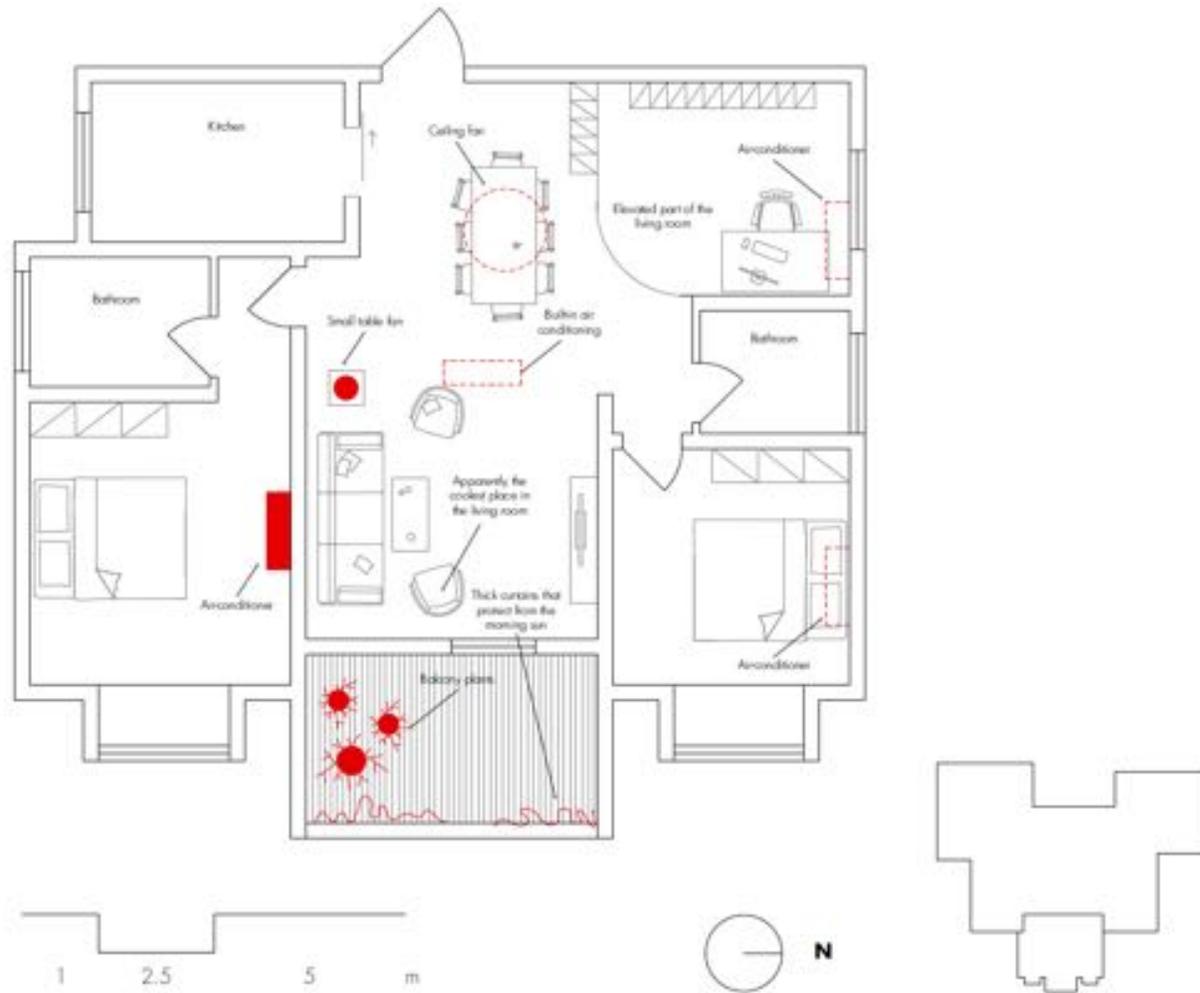
Cooling since electrification



Cool(ed) indoors in a restaurant and a shopping mall, 2017 (Photos: M. Kobi)

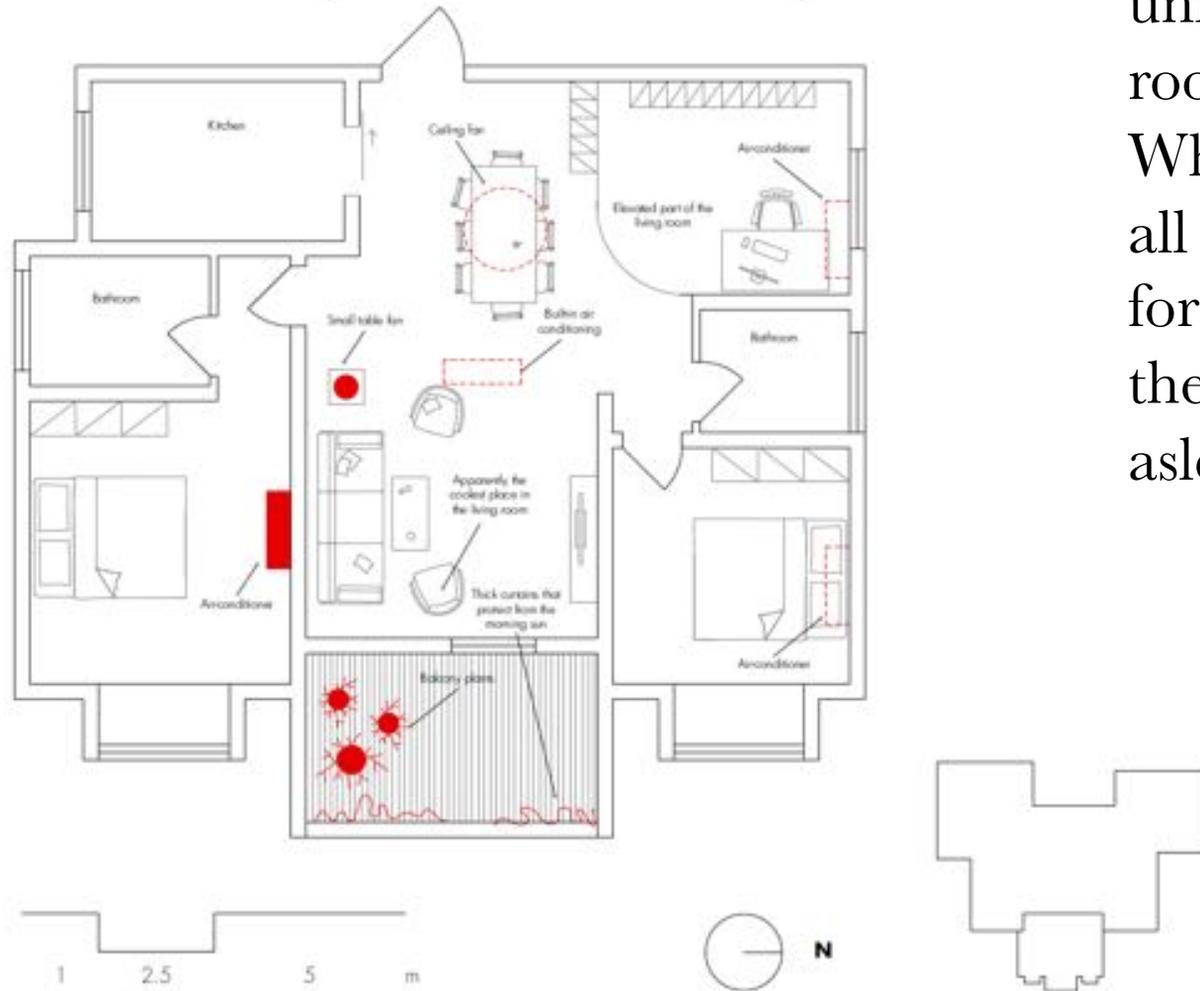


Cooling in the highrise



Cooling in summer: apartment of Wang Tong, August 2017 (Source: SNSF-project, drawing by Mathias Balkenhol; Photos: Yanan Long, 2020)

Cooling in the highrise



“Apart from the built-in air conditioning in the living room, we have an air-conditioning unit in every room. When cooling the living room, we close the doors to the bedrooms. When we leave the apartment, we turn off all devices. [...]. I often cool down my room for one to two hours before bedtime, and then I turn it off again before falling asleep.”

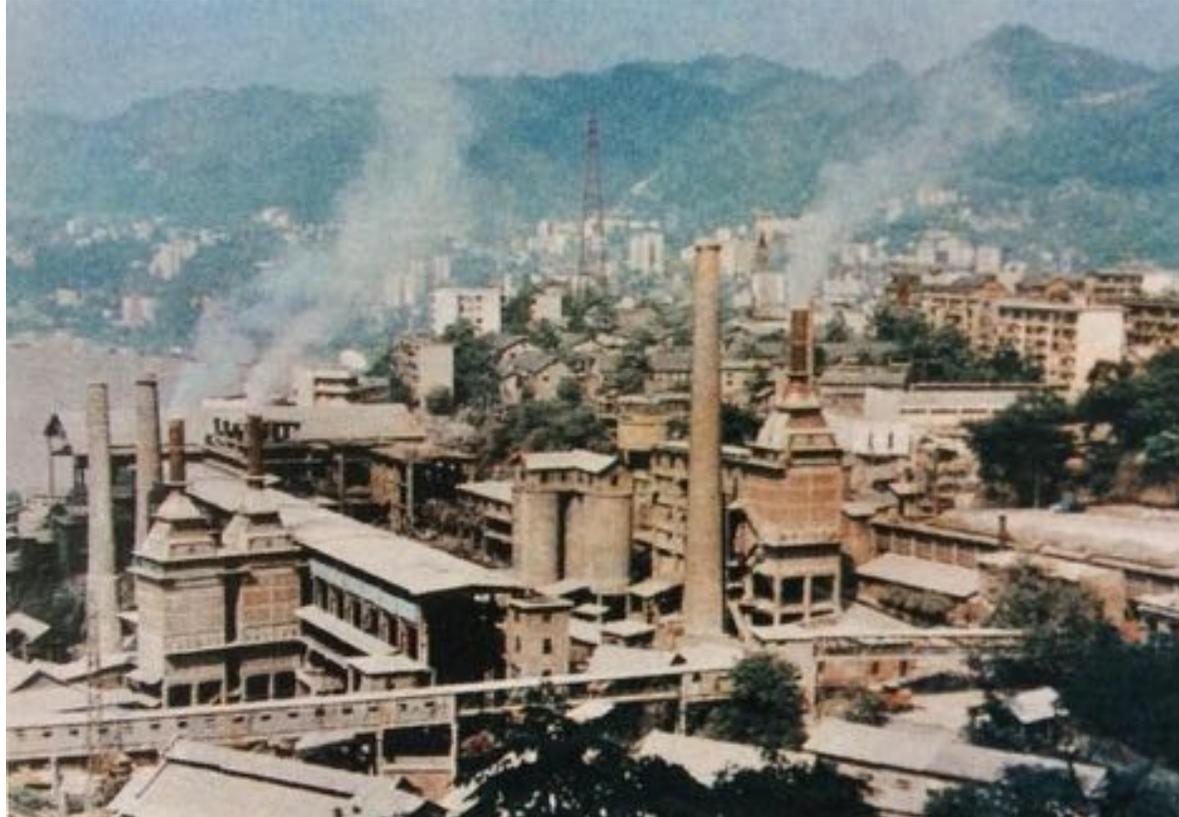


Cooling in summer: apartment of Wang Tong, August 2017 (Source: SNSF-project, drawing by Mathias Balkenhol; Photos: Yanan Long, 2020)



The Consequence of Excessive Cooling:

1. Environmental degradation



Chongqing Cement Plant (重庆水泥厂) in inner Chongqing established in 1937. Date of the photograph unknown, probably around the 1970s. (Source: Chongqing City Design Department 2015, p. 90.)

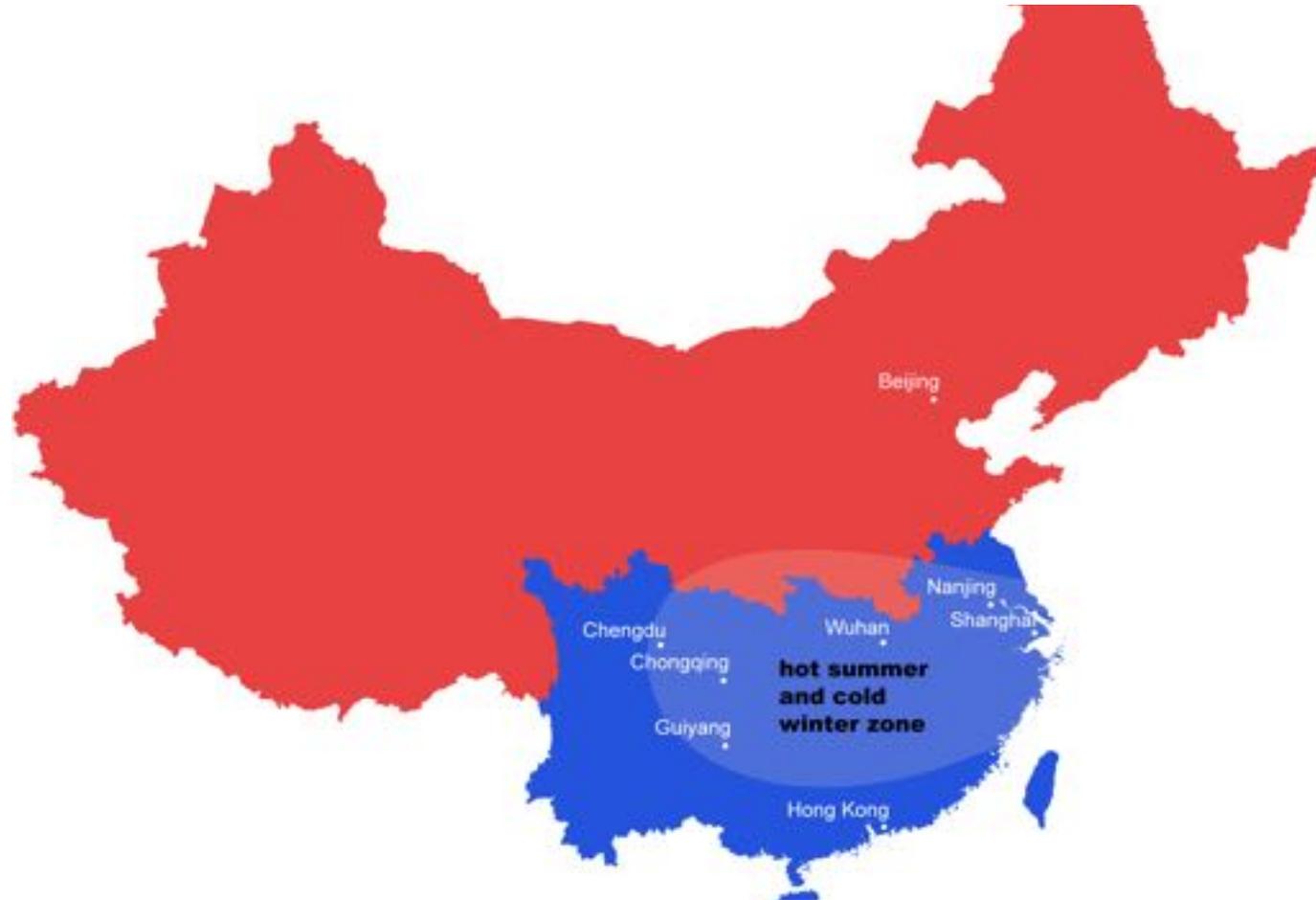
The Consequence of Excessive Cooling: 1. Environmental degradation



Fig. 1: The Three Gorges Dam started to operate in 2012 as largest hydroelectric power station in the world.
(Source: Le Grand Portage, 2009. CC-BY-2.0.)

Fig. 2: Source: <https://www.flickr.com/photos/sentinelhub/47007987002>

Excursus: also rising energy consumption in winter!



The Heating Divide in China

Blue areas: no central or district heating infrastructure

More and more residents install electricity-driven heating devices (underfloor heating, radiators, airconditioning for heating...)

(Map source: SNSF-project «The City as Indoors: Urban Climate and Architecture», drawing by Tareq Tamimi)

The Consequence of Excessive Cooling:

2. Changes in social life

enjoying the cool of the shade (*xieliang* 歇凉) is closely related to a kind of collective activity beyond the family in public spaces.

vs.

cooling oneself down (*naliang* 纳凉)

enjoying a cool breeze (*chengliang* 乘凉)



Source of images: 芬腾20周年纪念漫画视

<https://www.zcool.com.cn/work/ZMTk5ODQ2MTY=.html>, accessed on May 1, 2024.

The Consequence of Excessive Cooling:

2. Changes in social life

people apparently are more distanced
(*lengmo* 冷漠)

the ‘cold’ in the high-rise as characterizing
the social environment

(interview with Mr. Kong and Mrs. Zhu)

People playing mahjong in a shadowed alley in Chongqing, probably 1990s. (Source unknown)

Showroom of an AC distributor in Chongqing (M. Kobi 2017)



The Consequence of Excessive Cooling:

3. Socio-economic stratification



Living room of a middle class family in a highrise apartment with built-in air-conditioning. / Different cheap cooling devices
(Photos: M. Kobi, 2017)

The Consequence of Excessive Cooling:

3. Socio-economic stratification



Information from fieldwork

Yuan:

- in the 1990s, her mother tried to stay below 200 RMB (approximately €26) for electricity per summer
- today, she knows a gallery owner who spends about 2000 RMB (approximately €257) a month, four air-conditioners running permanently.

Tong's family:

- two-bedroom apartment
- spend around 700 RMB (approximately €89) a month on electricity despite their thrifty use of the air-conditioning.



Going for a stroll under Huacun Overpass (huacun lijiao 花村立交). (Photo: M. Kobi, 2017)

Concluding words

Circularity effects in urban climate research

Household energy consumption, in large part with climate control, has not only driven global climate change, but has also affected local urban climates.

Interweave of:

- indoors and outdoors
- city and nature
- architecture and infrastructure
- practices and policies



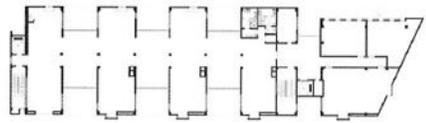
Chongqing cityscape, 2017 (Photo: M. Kobi)

Path dependency

‘[t]he buildings we inhabit today consequently contain within them important scripts for the future for they are, like it or not, helping to build what will become the traditions and conventions of tomorrow’
(Shove 2003: 76)

Shove, Elizabeth. 2003. *Comfort, Cleanliness and Convenience. The Social Organization of Normality*. New Technologies/New Cultures Series. Oxford: Berg.

Local examples of climate-responsive architecture



Liu Jiakun: Department of Sculpture of the Sichuan Academy of Fine Arts, Chongqing



vector architects: Chongqing Taoyuanju Community Center



Safdie architects: eling residences



Coping with Urban Climates

Comparative Perspectives
on Architecture and Thermal Governance

*Sascha Roesler,
Madlen Kobi,
Lorenzo Stieger (eds.)*

This publication presents the new concept of "thermal governance". Contemporary urban societies are still short on concise and deliberate thermal governance that could prove effective for the thermal management of urban districts, or even entire cities. Up until now, coping with specific thermal conditions has been a private matter rather than one subject to the city-wide coordination that this publication – based on empirical realities in Cairo, Chongqing, Geneva and Santiago de Chile – outlines. The private model will change over the next few decades, considering the politically launched transition from carbon based to renewable energy supply methods. In fact, energy transition and climate adaptation are one and the same process.

KLIMA POLIS Vol. 2
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Energy pricing, governmental infrastructure investments or social expectations impact urban climates just as wind speed and humidity do.

Included case studies: Cairo, Santiago de Chile, Geneva, Chongqing

Open Access (Free download):
<https://www.degruyter.com/document/doi/10.1515/9783035624243/html>

Thank you for your attention! / Grazie per l'attenzione!

Questions and comments are welcome...



Playing mahjong while cooling oneself down