INFORMATION ARCHITECTURE OF CITIES



Information Architecture

Prof. Dr. Gerhard Schmitt

(FCL) FUTURE 未来 CITIES 城市 LABORATORY 实验室





DELLA PUBBLICA FELICITA; OGGETTO DE' BUONI PRINCIPI, TRATTATO D LUDOVICO ANTONIO MURATORI BIBLIO CARIO DEL SERENISS, MO SIGNOR DUCA DI MODENA:

The story so far:

- 1. Cities are complex systems, have a metabolism that can be expressed in terms of stocks and flows
- 2. The criteria for the livability of cities are emerging
- 3. When a city grows by 100%, factors such as economy and crime grow by 115%, since antiquity
- 4. The urban temperature influences livability. The urban heat island effect is a side effect of urban planning and architecture.

Temperature anomalies of Singapore

Temperature anomaly: The term temperature anomaly means a departure from a reference value or longterm average. (http://www.ncdc.noaa.gov/ cmb-faq/anomalies.php) Base period: 1951-1980 Reference value Singapore : 26.5523 degree Celsius Data Source: http://data.giss.nasa.gov/ gistemp/tabledata_v3/NH.Ts.txt

ear

1960

EQU-24N

1980 —

2000 Singapore/paya lebar 2020



Aschwanden, G., Zhong, C., Papadopoulou, M., Vernay, D. Müller Arisona, S. and Schmitt, G. 2012. System Design Proposal for an Urban Information Platform, eCAADe.







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How about the tropics?

- Most people in the world live and will live in tropical and subtropical regions
- The urban heat island effect can be observed in the tropics as well, and has a far more serious impact on human development and health than in the moderate climate zones, such as Europe and North America.

Questions to the expert:

- What are the *properties* of cities that affect local climate?
- Why are urban heat islands a serious issue in the *tropics*?
- Surface temperatures what do they describe?
- *Trees and canopy* what role do they play?
- What and how do you *measure* and *visualize* the results?
- *Anthropogenic* what does it mean?
- Can, and if yes, how do *urban design* and *architecture* act?
- What are the main measures of *mitigation* to improve *livability*?



Prof. Dr. Matthias Roth

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Education

1991 PhD University of British Columbia, Dept. of Geography (Atmospheric Science Programme), Vancouver, Canada
1988 MSc University of British Columbia, Dept. of Geography, Vancouver, Canada
1985 Dipl Swiss Federal Institute of Technology (ETH), Dept. of Geography, Zrich, Switzerland
Visiting Appointments
2014 Visiting Porofessor, Environmental Engineering, EPFL, Switzerland

2013 Visiting Scholar, Monash Weather and Climate, Monash University, Australia 2007 Visiting Scholar, School of Geographical Sciences, Arizona State University, USA 2007 Faculty Research Associate, Department of Mechanical and Aerospace Engineering, Arizona State University, USA

2006/07 Visiting Professor, Institute for Atmospheric and Climate Science, ETH Zurich, Switzerland

Research Interests

Boundary-layer meteorology, Microclimatology, Urban Climatology, Atmospheric Turbulence, Cities and Climate Change

Information Architecture of Cities - Motivation

- In the next 25 years, 2 billion more people need living and working spaces in existing and new cities
- In the next 75 years, 3-4 billion more people, mostly in Africa, need living and working spaces in urban systems
- The livability of these cities will form the basis for their sustainability and resilience



Urban Metabolism

Understand the city as a dynamic and complex system

Read and model this system in terms of Stocks and Flows

Recognize Urban Stocks as basic elements of the urban metabolism and as locally available resources



Stocks and Flows

Stocks are entities that rest. Flows are entities that move.

People, materials, air, water, food, health, space, finances, data and information are examples for stocks and flows in the urban context.

They interact with each other in the city as a complex system.





Complex Systems

Complexity science helps to model Systems in economics, physics, biology, chemistry, and others.

More recently, architecture and urban systems - in particular, urban networks - have become an area of interest for complexity science.