

## Mitigating urban heat island phenomena in planning Chinese mega-cities

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The main environmental problems of Chinese mega-cities arise from the fact that priority is given to economic development more than to environmental protection. It is necessary to control technologies used in creating the urban environment together with methods of urban planning. In Germany, especially in the field of urban planning, many planners are taking advantage of climatologists' results (Bruendl, 1988; Horbert *et al.*, 1984). Nowadays, heat island phenomena (e.g. Landsberg, 1981), exemplified by the warming of urban areas, are of great concern. Warming of urban areas is generally regarded as making urban life uncomfortable. Previous research on urban climatology has shown the causes of heat island phenomena to be anthropogenic heat emission, reduction of green space and water surface in urban areas, change of heat capacity of the material on urban surfaces, change of environment with regard to radiation, and the combination of these factors (e.g. Oke, 1987). Research progress on the improvement of urban thermal environments has been inadequate, while a great amount of knowledge on urban climate has been accumulated in the long history of urban climatology (Yoshino, 1990/1991).

Nowadays, urban planning with consideration of urban climate, represented by the concept of an urban ventilation lane, is widely practiced in Germany. Methods for climatological observations and numerical simulations of the thermal environment are well established in urban planning. In the early 1990s, the Ministry of Environment, State of Baden-Wuerttemberg, started an air quality control plan (Ministerium fuer Umwelt, Baden-Wuerttemberg, 1991) for its capital city Stuttgart. This plan, also known as the clean air plan for the area of Stuttgart (Luftreinhalteplan Grossraum Stuttgart), includes the concept of the urban ventilation lane as one of its policy options. The plan aims to reduce urban air pollution by natural cold drainage air flows that are to be intensified by suitable alignment of buildings as well as land-use zoning based on scientific data (Wirtschaftsministerium, Baden-Wuerttemberg, 1998). The plan also aims to improve thermal comfort within this urban area. Parks, forests and buildings were planned in order to allow the flow of fresh pure air into the central city area.

"Feng Shui" is a discipline or a system of knowledge established in ancient China. In "Feng Shui", there are many statements on the control of the ambient environment through methods of urban or building planning. It also included items on the urban thermal environment. The author believes that urban planning with consideration of urban climate as practices in German cities is a German form of "Feng Shui", or modern western "Feng Shui". The author feels that its application to Chinese mega-cities for the mitigation of serious urban thermal pollution will be successful because China has a long history of traditional "Feng Shui". The new idea is the import of modern German "Feng Shui" to China. Of course, we need not only to study the climatological features of Chinese cities but also to compare the legal systems

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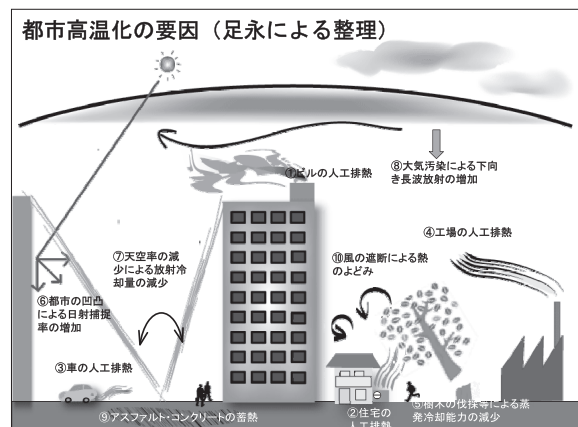
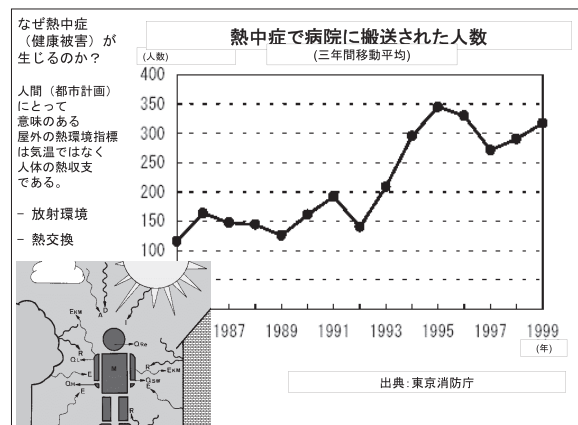
supporting urban planning in Germany and China.

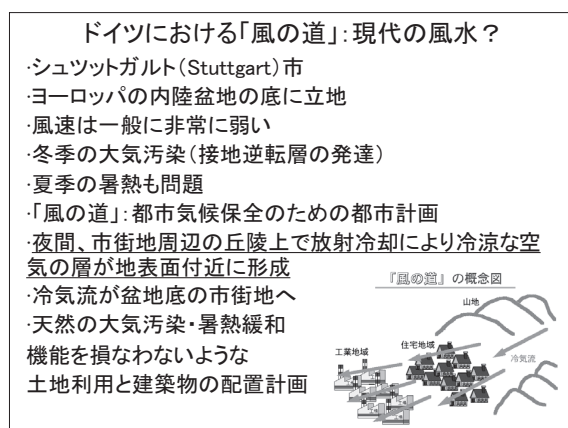
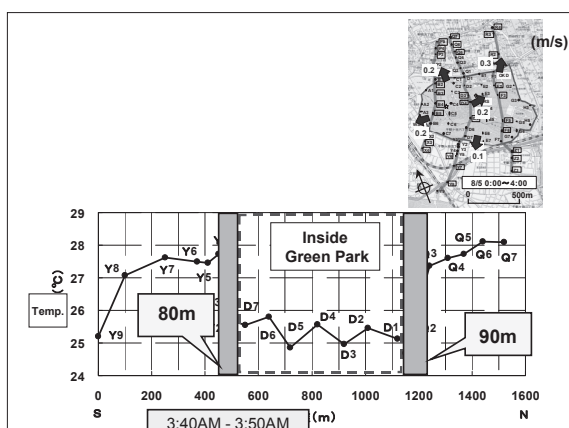
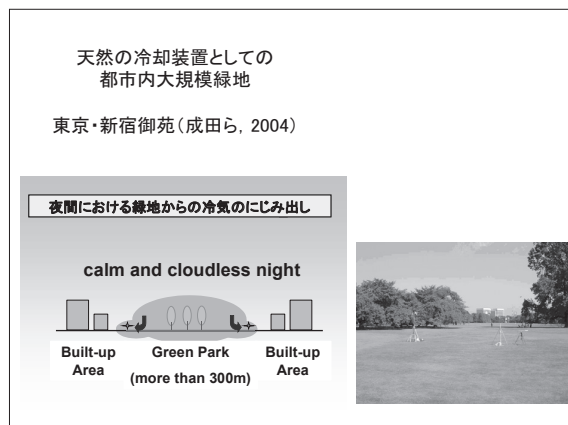
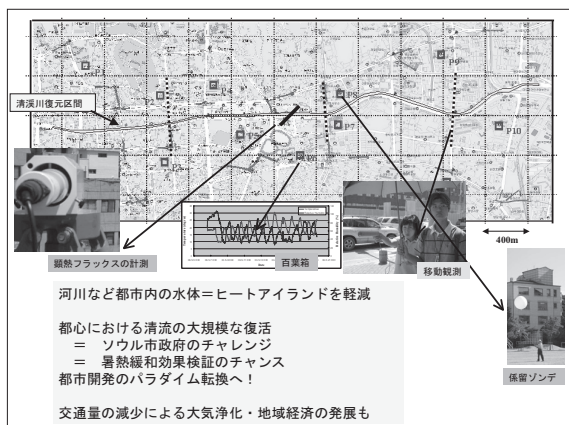
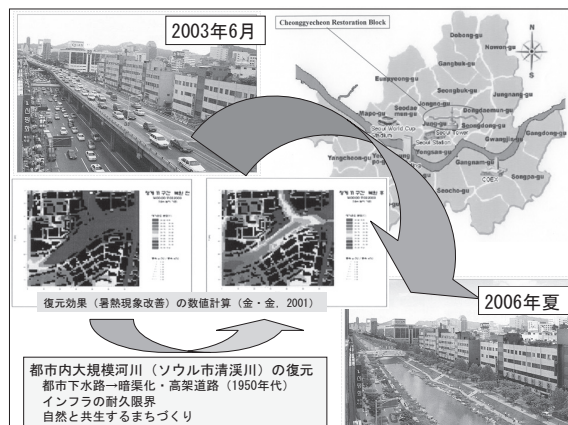
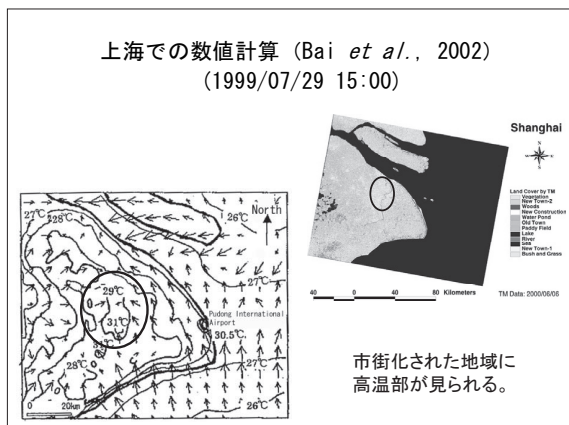
In Japan, Ministry of Environment (MoE) has started making systematic counteractions against urban heat island (UHI) in Japanese regional autonomies regarding UHI as one of air pollution by heat. Nowadays a viewpoint of thermal environmental protection in urban planning process is still an unfamiliar concept for Japanese urban planners. But thermal stress in summer is one of the strong interests of many Japanese citizens. MoE has organized several councils on UHI problems and published reports on counteractions for them. These activities have brought the concept of mitigation of urban thermal pollution as a new viewpoint to urban planning process in regional autonomies in Japan. The author, as a member of these councils, discussed on desirable counteractions for UHI in Japanese and Chinese regional autonomies and evaluations on the individual counteractions, based on discussions and results of these councils. Each council was composed of 7 to 15 experts (building scientists, physical geographers, meteorologists, environmental scientists, urban planners, administrative staffs in regional autonomies).

During recent several years, many mass medias (*ex.* NHK, The Japan Times, The Washington Post) have picked up these actions of the Japanese government. For these actions, strong interests are given from Asian countries. As foreign examples of such actions, *Staedtebauliche Klimafibel* (Wirtschaftsministerium, Baden-Wuerttemberg, 1998) and VDI-guideline (VDI, 1997) in Germany, EPA Report (EPA, 1992) in USA are well known but applicable contents for Japanese case studies have to be developed by our own country. In some regional autonomies in Japan, they will promote counteractions for UHI with for global warming as one general action. Now SCJ (Science Council of Japan) is also preparing his new action plan and recommendation for policy making on UHI. These Japanese movements will give no little impact for China on policy for urban planning considering urban thermal environmental protection.

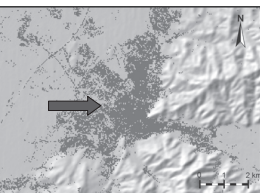
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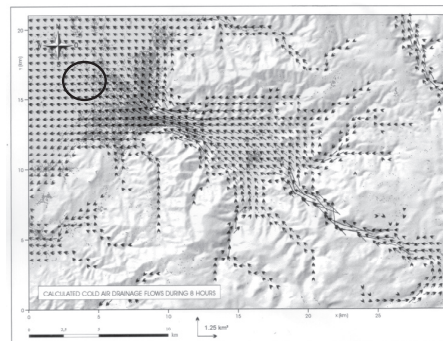




## フライブルク(Freiburg)市の事例



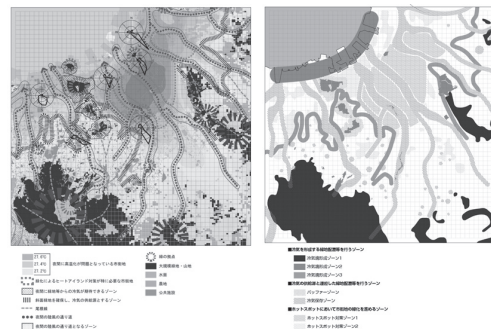
## 夜間フライブルクの市街地を冷却する冷気流 数値計算 (Schwabらによる)



## 風の道を取り入れた開発例 フライブルク郊外 Rieselfeld



## 福岡の風の道戦略 (国土交通省記者発表)



### まとめ

- ★まちづくりにおける大気・熱環境の保全  
アジアの都市にはまだ普及していない。
- ★ガイドライン・教科書(ドイツの事例)  
内容を教条的に適用すると危険(さらなる基礎研究は必要)。
- ★三大火炉(重慶、武漢、南京)、北京、上海、華南地方の都市など、夏季の暑熱対策が長期間必要。
- ★日本の場合、地権など再開発をめぐる合意形成過程が大変。  
(中国が有利)
- ★(科学的知見に裏打ちされた)現代の風水  
成長著しいアジアの都市において増す重要性