

LCLUC Meeting, Maryland, April 2013

Mega Urban Changes and Impacts in the Decade of the 2000s

Interdisciplinary Research in Earth Science (IDS)

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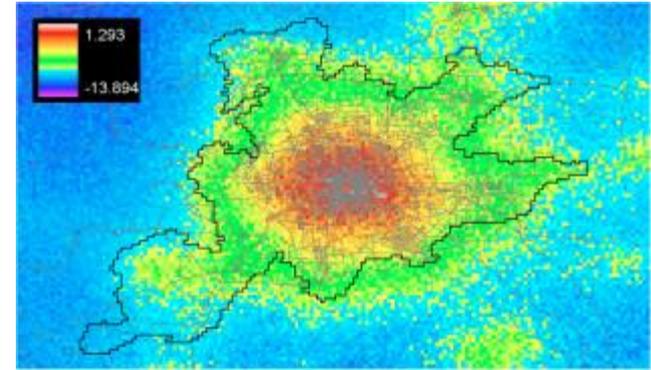
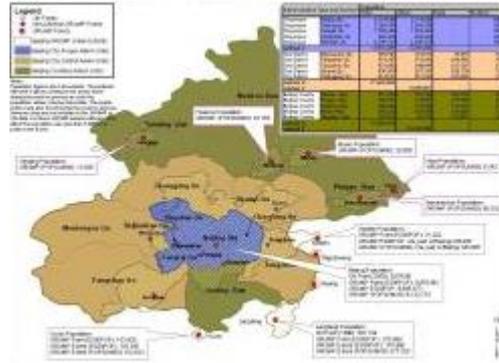
Uwe Deichmann, the World Bank

Objective, Approach, and Science

- **Objective:** Mega Urban Changes and Impacts in the 2000s.
- **Approach:** (1) Satellite observations, (2) surface networks, (3) socioeconomics and demography, (4) Gas, Aerosol, Transport, Radiation, General Circulation, Mesoscale, and Ocean Model.
- **Science questions:**
 1. Can the urban environment be characterized based on physical and measurable parameters such as infrastructures (houses, buildings, factories, etc.) together with high-resolution urban information content (e.g. light/optical data) rather than arbitrary political and administrative units?
 2. Can the rate of change in the urban environment be consistently and continuously delineated without spatial and temporal gaps in a decadal timeframe and at the scale relevant to addressing key issues in environmental as well as social science?
 3. How does urban change, from mega urbanization like in Asia to stable urban areas, impact the environment through processes involving pollution (e.g., NO₂), particulates (e.g., PM10 with size ~10 μm), green-house-gas (GHG) emission (CO₂), urban heat island (UHI), urban dome, air quality and health exposure (e.g., smog, ozone), ground water contamination (e.g., nitrate), temperature change, light contamination, and urban-climate interactions?
 4. How does urban change affect the socioeconomic spectrum of spatial and structural transformations, including the role of the rural non-farm sector in towns and small cities, rural-urban migration decisions, the dynamics of land markets in peri-urban areas, the degree and nature of specialization in cities of different sizes and at different development stages, and the identification of urban agglomeration benefits and congestion diseconomies?
 5. Can mega urban change exacerbate water resource problems (e.g., drought and population dynamics in extreme urbanization) as well as natural and man-made disasters (e.g., extreme urbanization in regions prone to wild fire, flood, tsunami; infrastructure failures, etc.)?

Publication and Noted Progress

Beijing Study:
Book Chapter,
Springer Publish.
in press 2013



- 1. Patent issued by US Patent Office on 19 March 2013: Dense Sampling Method with Rosette Transform (US 8,401,793 B2).**
- 2. Invited presentation on Mega Urbanization in China at U.S. State Department, William Colglazier attended, Oct. 2012.**
- 3. Provided review comments on the Global Trends 2030, National Intelligence Council, released to President Obama, Dec. 2012.**
- 4. Request from the World Bank about rate of urbanization and rate of pollution in China: High profile interests from WB President Jim Kim and China Premier Li Keqiang, Feb. 2013.**
- 5. Meeting with Department of Defense on the use of DSM/RT: Office of the Assistant Secretary of Defense, Research and Engineering, Apr. 2013.**