

**IHDP Open Meeting '08**  
**16-19 October 2008, New Dehli, India**

**Session Proposal**  
**Sponsored by UGEC and the 100 Cities Project**

**Session Title:**

**New Directions for Urban Remote Sensing for Sustainability  
Science: Old Questions, New Approaches, and Remaining  
Gaps**

**Session description**

Mankind is increasingly facing the challenges of an urbanizing world. In 2008 the world will be predominantly urban and within the next 15 years 93% of the urban growth will be occurring in developing countries whereby Asia alone will account for more than half the world's urban population. More than half of the world's urban population lives in cities of less than 500,000 inhabitants.

In recent years Urban Remote Sensing (URS) has proved to be a useful tool for cross-scale urban planning and urban ecological research. Remote sensing in urban areas is by nature defined as the measurement of surface radiance and properties connected to the land cover and land use in cities. Beyond physical measurements and pretty pictures, a major question posed is: what is the potential of URS for an integrated interdisciplinary social science with a focus on urban sustainability. How can URS fill the gaps in scientific information best for the needs of integrated spatial social science?

Present day challenges or threats existing at the urban environment interface are investigated by social scientists. Theories and, in particular, tools of social science rely on interaction with individuals, e.g., in surveys or ethnographic research. One can observe that social science studies are attracted to RS data while observing changes in physical characteristics on a local (e.g. urban studies), regional (forest cover changes, urban to peri-urban demographic development) or even on a global scale. In this field, remote sensing can be coupled with social science data streams, e.g. within surveys or observation of behavior (e.g, migration, market activities). But there is no correspondence in nature or landscape units to grids or even small-scale administrative units. Hence, studies concentrating on the challenge of world urbanization still claim an unmet need for linked spatial and socio-demographic information. Rindfuss and Stern (1996, <http://books.nap.edu/books/0309064082/html/index.html>) discuss the gap between social-science and remote-sensing research as well as the potential benefits in bridging that gap. Remote-sensing scientists state the social utility as the expensive government financed data and techniques become more valuable for the society. Some social scientists view remote sensing as a tool for gathering information on the context that influences social phenomena or the environmental consequences of various social, economic, and demographic processes. Social

science itself can contribute to the accuracy of remote-sensing research by validating and interpreting the data as well as supporting data confidentiality and public use.

Urban remote sensing can be applied to create practical models and products for tracking farmland conversion, land use and land cover changes (LULC), floodplain analysis, urban heat island modeling, and vegetation monitoring – from crop types to urban green spaces or forest ecological changes, for example. LULC classifications can be incorporated into local and regional ecosystem models to assess the effects of urban change on carbon cycling and source/sink relationships. Empirical studies have demonstrated that the variations of landscape elements (e.g., natural vegetation remnant patches, parks, golf courses, agricultural fields, and urban blocks) may significantly influence ecosystem processes, such as net primary productivity, watershed discharge characteristics, and nutrient cycling (Lowrance et al. 1985, McDonnell and Pickett 1990, Risser 1990, Knapp et al. 1993, McDonnell et al. 1997). To detect the changes in landscape pattern and this ecological consequences (e.g., C source-sink dynamics) at the regional scale or above, it is imperative to integrate remote sensing, field work, and ecosystem modeling.

Methods are improving but cross-disciplinary skills still need better integration and forethought. In this joint session between the Urbanization and Global Environmental Change (UGEC) project (<http://www.ugec.org/>) and the 100 Cities Project - a NASA funded project - at Arizona State University, a major actor within the growing international URS network (<http://100cities.asu.edu/imagemap/index.html>) seek to better understand how urban remote sensing can best be utilized with both, researchers and practitioners, in developing urban models, planning, and policy formulation. This session is meant to assemble scholars interested in the above described interface for exchanging and discussing latest ideas, concepts and research efforts to foster further meaningful work on urban remote sensing.

## **Abstract**

Urban Remote Sensing (URS) has proved to be a useful tool for cross-scale urban sustainability research as humankind increasingly facing the challenges of an urbanizing world. It can track rapid changes in physical characteristics of human environments – local, regional and global and can allow scientists to gather important information in the context of human environment interactions such as the environmental consequences of various social, economic, and demographic processes and phenomena.

But studies concentrating on the challenge of world urbanization and its interconnections to global environmental change still claim an unmet need for linked spatial and socio-demographic information. The well documented gap between social science and remote sensing research arises from a lack of correspondence in nature or landscape units to grids or even small-scale administrative units and an imperfect coupling of URS information with social science data streams. The potential benefits of bridging that gap are great and voices in support of cross-disciplinary advances in URS methods and techniques and their integration with social science are multiplying as the social value of such an effort becomes obvious.

This session seeks to better understand how urban remote sensing can best be utilized by both researchers and practitioners in urban models, planning, and policy formulation. Two major questions posed in the session are: What is the potential of URS for an integrated interdisciplinary social science with a focus on urban sustainability?; How can URS fill the gaps in scientific information best for the needs of integrated spatial social science?

**Participation:**

Interested researchers are asked to submit a 250 word abstract of their proposed contribution. The abstract should outline methodologies and data sources (if applicable) and state the contribution of the paper to the body of literature on the subject. The submission should be accompanied by a CV of each author/co-author. Abstracts and CVs should be submitted by email to Maik Netzband [[maik.netzband@ufz.de](mailto:maik.netzband@ufz.de)] and Michail Fragkias [[fragkias@asu.edu](mailto:fragkias@asu.edu)]  
Deadline for Submission: December 23<sup>rd</sup>, 2007

**Session Organizers**

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