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Introduction: Geospatial Analysis of Urban Environment

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Abstract
To provide a timely snapshot of current research that utilizes geospatial analysis and modeling in urban environment, the Korea-America Association for Geospatial and Environmental Sciences (KAGES) and the editorship of the *International Journal of Geospatial and Environmental Research* (IJGER) organized a special issue of IJGER on the theme of geospatial analysis and urban environment. Eight articles out of 13 submitted manuscripts have been published in this issue. This article provides an overview of the articles published in the special issue.

Keywords
geospatial, analysis, modeling, urban environment, KAGES

INTRODUCTION: GEOSPATIAL ANALYSIS OF URBAN ENVIRONMENT

As more than half of world population present lives in urban areas, many cities are facing multiple social and environmental challenges. Geographical and spatial science perspectives are gaining importance in understanding the complex interactions and feedbacks between natural and human systems in the urban environment. Urban environment is a main space in many applied geospatial research projects and a body of literature on geospatial analysis and modeling in urban environment has grown in recent years. To provide a timely snapshot of current research that utilizes geospatial analysis and modeling in urban environment, the Korea-America Association for Geospatial and Environmental Sciences (KAGES) and the editorship of the *International Journal of Geospatial and Environmental Research* (IJGER) decided to organize a special issue of IJGER on the theme of geospatial analysis and urban environment. The first call for papers was circulated in September 2013. We received 13 submissions. After a double-blind peer review process, we accepted 8 for publication in the special issue.

In this issue, a broad range of topics including urban growth, health, transportation, land use/land cover, water quality, and climate change are addressed. The methodological paper by Ye and Kim addresses the spatial disparity of health care using a network-based accessibility index method. They successfully demonstrate the application of the proposed method by measuring spatial accessibility to hospitals in Hillsborough County, Florida. The paper by Li & Kim highlights the importance of survivability of the urban subway system in Beijing, China to existing research considering an accessibility-based measure in transportation network research. They empirically assess the subway accessibility. Using a weighted rank-based simulation algorithm, authors identify critical components in the subway system and provide corresponding contingency plans based on the best and worst-case scenarios. Runfola et al.'s paper explores the use of spatial interpolative methods in conjunction with object based image analysis to estimate turf grass land cover quantity and allocation in Greater Boston, Massachusetts, USA. Their results indicate that a previous, nation-wide estimate of turf grass overestimated the quantity of turf grass by 49.2 square kilometers in the study region. They also suggest that refining coarse-resolution estimation techniques could be a fruitful research avenue in regions where fine resolution imagery is not available.

Sim & Mesev examined the consequences of alternative scenarios of habitat change as a consequence of urban growth in Greater Orlando. Their results by different scenarios are well demonstrated by the consequences of alternative scenarios of urban growth on potential habitat loss for a suite of species and vegetation habitats. The methods from this study may well be repeated on other regions with similar urban pressures. The authors claim that the findings by the study are especially useful for environmental organizations and local policy makers with respect to environmental quality and ecological habitats. The paper by Keuser investigates changes in mean and extreme precipitation in the metropolitan area of Milwaukee, Wisconsin in an attempt to find the effects of urban areas on precipitation patterns. The author utilizes a unique data set of the historical gridded (8-km spacing) daily precipitation data for 1950-2006. The spatial patterns in the metropolitan area reveal signs of urban effects, particularly at the monthly scale,

corroborated by general wind directions. The signs of urban effects differed between extreme precipitation and monthly totals, suggesting different mechanisms for urban effects on precipitation. The author suggests signals of urban influence on precipitation need to be corroborated by more detailed investigation on precipitation characteristics.

Chang, Praskievicz, and Prandvash investigate the sensitivity of municipal water consumption to climate and weather variability for Portland's water provider service area between 1960 and 2013. Their results show that determining which climate and weather factors are the most influential to consumption per capita is greatly dependent on the scale of temporal aggregation. Uniquely, they examine the role of climate variables with multiple timescales on seasonal water consumption. Their findings are useful for water resource management strategies under increasing pressure from potential climate variability and change. Singh and Chang's paper examines the relationships between land cover change and water quality change in three urbanizing watersheds in the Pacific Northwest region of the United States. Their analysis suggests that there may be a potential lag between changes in land management and changes in water quality across different scales. They also suggest that the response of water temperature to urban development might be quicker than the response of other water quality parameters to urban development. The delayed response of other water quality parameters also suggests that other watershed environmental variables (e.g., slope, and drainage density) other than land cover change might be responsible for explaining the variations in changes in water quality. They conclude that future research should consider the effect of the city's pipe network, especially in heavily urbanized areas, because storm runoff may be redirected from the natural watershed to other points in the stream, causing potential discrepancies in the results.

Finally, we like to particularly recognize the contribution by Dr. Carolyn J. Merry who died in a car accident on Tuesday, June 3, 2014. She leaves an imprint of her recent research on IJGER with Dr. Ahn and Dr. Gordon. The paper by Ahn, Gordon, and Merry projects the impact of land use changes on a watershed scale for the Big Darby Creek Watershed located near Columbus, Ohio with help of remote sensing data. Forecasts by their research are utilized to devise alternative land use and stormwater control policies. Furthermore, a developed framework can be used to study urbanizing watersheds for developing future modeling efforts on a larger scale.

We are grateful to the 35 reviewers who have greatly helped us in screening the papers. Without their intelligent input, it is impossible for us to make the publication of the special issue real. It is our hope that the papers presented here can lead to a fruitful future of research in the field of geospatial analysis and modeling of urban environment.