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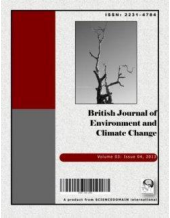

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Editorial: Interactions between Urbanization, Climate Variability and Its Impact on Surface Waters

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(Guest Editors)

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Editorial

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More than half the world's population now lives in cities and the trend of increasing urbanization is expected to continue. Some estimates report that 10% of the world's population (or 600 million people) live in low level coastal zones (i.e. areas with elevations less than 10 m above mean sea level) and of this population, 360 million are urban dwellers. Evidence now clearly indicates our climate is changing and many studies have shown trends towards increasing frequency of extreme meteorological events. Our research has shown that the concepts of resilience and sustainability of urban water systems and the assessment of urban drainage and sanitation infrastructure impacts under climate change have received much less attention as compared to other water resource related systems. This special volume, then, is timely. The twin impacts of urbanization and climate change is leading to greater demands being placed on surface waters. Together, these impacts are creating increasing stresses, both in terms of quality and the quantity, on available surface water resources. Faced with these challenges, engineers, scientists, social scientists, planners, and policy-makers now more than ever are seeking to better understand the problems brought on by the effects of urban expansion and an increasingly changing climate. The coupling between urbanization impacts on surface waters with associated climate variability impacts is becoming stronger and implementation of mitigation measures or adaptation strategies depends on a better understanding of these interactions. This would then mean that the "life as usual" scenario with its severe consequences for future generations may not be tenable. At the same time, mitigation and adaptation options differ dramatically between developed and developing countries. For example, while Singapore has a remarkably advanced, closed loop approach to water management that includes capturing runoff from two-thirds of the island's surface area in reservoirs, reusing wastewater, and desalination, only a two hour flight away, Phnom Penh has no conventional wastewater treatment plant and the existing natural treatment wetlands are being filled in for urban development. Until recently, a preponderance of unpaved streets in Phnom Penh led to clogging of the combined sewer system and extensive surface flooding and there was no experience in employing dynamic modeling to help identify and assess management solutions. In the case of Bangkok, the catastrophic floods of 2011 suggest that

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the city has lost its traditional connection with water in its rush for development. A colleague and leading academic there concludes that future development in Bangkok must incorporate natural, scientific, and cultural perspectives in a living landscape that respects nature. Such ideas most certainly are consistent with eco-city planning concepts and low impact development techniques that perhaps can provide guidance in mitigating and adapting to our shifting climate. The task before us is indeed huge.

This special issue is a collection of eleven peer-reviewed papers written by researchers and scholars from universities and research centers. The papers contained in this special volume address issues of concern relating climate extremes such as drought, floods and sea level rise and adaptation measures to counteract climate change impacts in urban catchments at the city or sub-city scale including the implementation of low impact development measures. The guest editors would like to thank all authors for their contributions to this special issue. Thanks are also extended to Prof. N.B. Chang for his direction throughout the reviewing and editing processes.