



Water and the city (Henry Darcy Medal Lecture)

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Total world population is about six billion, half living in cities, one third living in slums. This figure has doubled from 1960, when urban population was less than one billion out of the total figure of 3 billion; no more than one fifth was estimated to live in slums at that time. Demography experts predict that population will be around 9 billion in 2050, two thirds (6 billion) living in urban areas, and no reasonable prediction is available for slums. History shows that water is a key factor of urbanization: springs and rivers played a fundamental role in determining where one could settle, and where we are settled now. Water availability is expected to be a major control of man's life in the next future of planet Earth. The daily municipal water withdrawal ranges from 80 to 150 liters per person in China, India and Brazil cities; can they pretend to get more than 600 liters as a US citizen currently does? The impact of natural disasters such as storms and floods is strongly linked to increasing vulnerability associated with urbanization. Are state-of-the-art mitigation policies effective in reducing this impact in both terms of human casualties and economic damage? These and similar questions are fundamental to address hydrological science and engineering hydrology in next years. This talk will approach some open problems arising from the impact of increasing urbanization on the water cycle and, mostly, the associated feedback on human life. These include the need for an insight of nonstationarity, transients and feedback control of hydrological processes; the merging of the space-time scales of hydrological processes with the spatial scales of the city, and the temporal scale of lifestyles; and the way for water scientist and engineers to be involved in the design of cities and the search for life styles coherent with a sustainable development approach.