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Urban flooding in West African Cities Suburbs under climate change and land use change : case of Dakar in Senegal

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Using time series analysis by exploratory data analysis and shift detection statistical tests, climate change has been identified in West and Central Africa in the 1960s by many researchers. The main consequence is a drastic reduction in precipitation, decrease of static level of water table, change in land use. An important social factor of climate change has been to induce an influx of rural of rural population towards suburbs of big cities in West and Central Africa. In Dakar, capital of Senegal, decrease of static level of water table has fostered a strong urbanization in the suburbs and a change in land use. From 1999 years, a return of rainfall to normality has resulted in frequent suburbs inundations with dramatic consequences for the populations and a high costs for the Government. In this study, we study climate and changing land use on urban area runoff by using the Storm Water Management Model (SWMM). Remote sensing images of years 1954, 1978 and 2003 corresponding to different land use have been used, for the same rainfall reference year, 2003. The SWMM model has shown that for the same daily rainfall, the changes of land use has resulted in reduced infiltration and increasing runoff, surface storage and runoff coefficient. That seems to be the one the reasons for inundation in the suburb of Dakar. Nevertheless, a better interpretation of the results would necessitate it prior calibration of the SWMM with measurements in the drainage network.
Key words : climate change; change in land use; SWMM; Dakar SENEGAL