Urban Water Interfaces (UWI)

IGB Leibniz-Institute of Freshwater Ecology and Inland Fisheries

Technische Universität Berlin

The DFG Research Training Group on Urban Water Interfaces (UWI) invites to guest lectures by

Prof. Thian Yew Gan (University of Alberta, Canada)

Thursday, 20th August 2015, TU Berlin, Chair of Water Resources Management and Modeling of Hydrosystems, Room 566, 11 am and 2 pm

Lecture 1: Perspectives on Global Climate Change Impacts to the Cryosphere and Hydrosphere - 11 am

Abstract

In recent years severe storm events have been occurring more frequently and in greater intensity globally. As the Earth warms, there is increased heating of the ocean and the atmosphere, which resulted in increased atmospheric water vapor, and more precipitation will fall over shorter time intervals, leading to more frequent and severe extreme storm events and flooding problems. However, an enhanced hydrological cycle could also mean the occurrence of more frequent and severe droughts in semi-arid to arid regions of the world, such as Africa, the Canadian Prairies and the mid-west of USA. Besides climate change impact to the hydrosphere, the cryosphere is also undergoing rapid changes during the 20th and the early 21st Century: (a) Duration of ice cover of rivers and lakes in high latitudes of N. H. (Northern Hemisphere) decreased by about two weeks; (b) Significant retreat of glaciers world wide; (c) Thinning of Arctic sea-ice extent and thickness by about 40% in late summer in recent decades; (d) Snow cover of the N. H. decreased by about 10% in area since global observations by satellites began in the late 1960s; (e) In North America, snow water equivalent decreased by about 10mm since observations by passive microwave sensors began in the late 1970s; (f) Degradations of permafrost detected in some polar and sub-polar regions, and (g) the total 20th Century global average sea level rise was about 0.17m. Perspectives on the global energy balance, greenhouse effects and examples of observed changes to the hydrosphere and the cryosphere will be presented. Future climate scenarios projected by general circulation models (GCMs) of the 4th Assessment Report of the Intergovernmental Panel of Climate Change (IPCC, 2007), and that of the 5th Coupled Model Intercomparison Project (CMIP5) of IPCC, and case studies based on regional climate models and land surface schemes will be discussed. The discussions will also include possible implications to the future global climate, hydrology, and water resources under the impacts of climate change.

Lecture 2: Updating Intensity-Duration-Frequency (IDF) Curves of Alberta Canada – 2 pm

Abstract
In recent years severe storm events have been occurring more frequently and in greater intensity across the world. As the Earth warms, higher temperatures likely mean that more precipitation will fall over shorter time intervals, thus increasing the frequency and severity of extreme storm events, which means that municipal infrastructure based on current IDF curves could suffer from under design problems and so public safety could be compromised. Prof. Gan will present a recent study on the climate change impact on future IDF curves in Alberta, Canada using a regional climate model (RCM) called MM5 (the Pennsylvania State University / National Center for Atmospheric Research numerical model) which was set up in a one-way, three-domain nested framework to simulate summer precipitation in central Alberta. MM5 was driven with boundary conditions taken from major General Circulation Models (GCM) of IPCC (Intergovernmental Panel of Climate Change) and set to simulate the climatic processes for Edmonton for climate normal (1971-2000), and simulated results were compared with available observed rain gauge data of Edmonton to ensure that MM5's estimates are consistent with those based on observed rainfall data under different spatial scales.
After validating MM5's simulated precipitation with observed data for climate normal (1971-2000), MM5 was used to simulate future climate of Edmonton of Canada for 2041-2100 under SRES (Special Report on Emissions Scenarios) of A2, A1B, and B1. Due to simulation bias, a quantile-based bias correction method was applied to derive grid-based IDF curves. The possible impact of climate change to storms of central Alberta for return periods, 5, 10, 25, 50 and 100 years were investigated. Apparently, future IDF curves of Edmonton show that intensities of future storms will have higher intensities, especially for short duration (< 6 hr) storms.

About the Speaker

Thian Yew Gan is a professor of civil engineering of the University of Alberta specializing in cryosphere, satellite data, hydrology, hydroclimatology, climate change. He is a research ambassador of DAAD (German Academic Exchange Service), and a fellow of the American Society of Civil Engineers (ASCE). He has published over 90 refereed journal papers, a book by the Cambridge University Press, and has about 2,700 H-Index citations. He has been a Issac Manasseh Meyer Fellow of the National University of Singapore (2014); Tan Chin Tuan fellow of Nanyang Technological University of Singapore (2013-14); visiting professor of Aalto University, Finland (2013); a visiting scholar of United Nation University (UNU-FLORES), Germany (2013); a Rossby Fellow of Stockholm University, Sweden (2012); Erskine Fellow of University of Canterbury, New Zealand (2011); Visiting professor of Swiss Institute of Technology (EPFL), Lausanne, Switzerland (2010); Research Scientist of Cemagraf, France (2009); CIRES Visiting Fellow of University of Colorado-Boulder (2007); Guest university professor (W3) of Technical University of Munich, Germany (2006-07); Adjunct professor of Utah State University, USA (1998-2005); Honorary Professor of Xian University of Technology and Yangtze University of China; JSPS Fellow of Kyoto University (2000) and guest professor of Saga University (1999) of Japan, and assistant professor of Asian Institute of Technology (1989- 1990), Bangkok.

Further information about Prof. Gan is found at:
http://www.civil.engineering.ualberta.ca/Research/ResearchAreas/WaterResources/ThianGan.aspx

How to find TU Berlin, Chair of Water Resources Management and Modeling of Hydrosystems:
http://www.wahyd.tu-berlin.de/menue/about_us/location/parameter/en/