Northeastern

Department of Civil and Environmental Engineering Distinguished Seminar Series

Estimating Design Floods in a Warming Climate – Gaps, Challenges, and the Way Forward

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Friday, September 23, 2016 12:00pm-1:00pm
135 Shillman Hall

Abstract

A lot has been said and written about climate change and how it may make floods more frequent and extreme. In this talk I outline what needs to change in a warmer climate for design floods to increase or decrease, present data based (as opposed to model based) evidence for all the changes till date, and present what I feel is a sensible way design flood estimation should be approached in this new climate we are in. Specifically, I show evidence for clear changes in the spatial and temporal patterns associated with extreme storms, along with an increase in design intensities for shorter duration events. These changes present the clearest evidence till date that design flood magnitudes for urban catchments across the world are increasing, a change that needs to be accepted and factored into our planning guidelines urgently given the implications this has to our existing stormwater infrastructure and society in general.

Some of the recent publications that will form the basis for much of this talk are:

Wasko, C. and A. Sharma (2015). "Steeper temporal distribution of rain intensity at higher temperatures within Australian storms." Nature Geoscience **8**(7): 527-529.
Wasko, C., A. Sharma and F. Johnson (2015). "Does storm duration modulate the extreme precipitation-temperature scaling relationship?" Geophysical Research Letters **42**(20): 8783-8790.
Wasko, C., A. Sharma and S. Westra (2016). "Reduced spatial extent of extreme storms at higher temperatures." Geophysical Research Letters **43**: 4026–4032.
Woldemeskel, F. and A. Sharma (2016). "Should flood regimes change in a warming climate? The role of antecedent moisture conditions." Geophysical Research Letters **43**.

Biographical Sketch

Ashish Sharma is a Professor of Hydrology in the biggest Civil Engineering department in Australia, with interests ranging from hydrological forecasting (from hourly to decadal time scales), data assimilation (linking in to forecasting as well as identification/modelling of nonstationarity), remote sensing (for radar rainfall estimation as well as flood inundation/soil moisture estimation), treatment of uncertainty (using Bayesian and stochastic techniques, as well as through developing metrics such as the Quantile Flow Deviation or the SREV metric for GCM simulations), development of efficient physically based hydrological models (see our work on the SMART model about to be released on our website), and climate change impact assessment (through dynamical and statistical downscaling, as well as through the correction of systematic low frequency variability biases in simulations and lateral boundary conditions driving downscaling studies). More details are available at his LinkedIn page - https://au.linkedin.com/in/ashish-sharma-57711b55.

Ashish Sharma, PhD

Professor and Future Fellow, Civil & Environmental Engineering
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Education

- **PhD, Water Resources Engineering, *UTAH STATE UNIVERSITY***
- **M.TECH, Water Resources Engineering, *INDIAN INSTITUTE OF TECHNOLOGY***
- **B.E, Civil Engineering, *UNIVERSITY OF ROORKEE***

Research Interests

- **Hydrological forecasting & stochastic hydrology**
- **Data assimilation and Remote sensing**
- **Uncertainty in radar analysis**
- **Development of efficient physically based hydrological models**
- **Water resources management**

Selected Service and Awards

- **President, International Association of Hydrologic Sciences - Commission on Statistical Hydrology (IAHS-STAHY)**
- **Associate Editor, Journal of Hydrology**
- **Associate Editor, Water Resources Research**