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DEPARTMENT OF CIVIL ENGINEERING
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Observing the Terrestrial Water Cycle from Space

Prof. Venkataraman Lakshmi

Engineering Systems and Environment, University of Virginia, USA

Date: November 25, 2019 (Monday)
Time: 5:30 p.m. - 6:30 p.m.
Venue: Room 6-12B, Haking Wong Building, HKU

ABSTRACT

Land surface hydrology is a collection of complex processes. Precipitation is partitioned into infiltration and runoff depending on antecedent soil moisture conditions, the properties of the soil, the slope of the land surface and the atmospheric demand for evapotranspiration. The spatial variability both the land surface properties (soil and vegetation) as well as the meteorological inputs (precipitation and radiation) play an important role in hydrology. Land surface hydrology is heterogeneous in space and time - making observation and modeling activities very difficult. Satellite remote sensing has a broad spatial view of the land surface and is able to provide data for use in hydrology such as soil moisture, surface temperature and vegetation density. Satellite sensors include microwave observations for soil moisture and precipitation; visible/near infrared for vegetation and evapotranspiration, gravity for groundwater/total water and thermal observations for surface temperature. Soil moisture is a key variable in hydrology. However, the spatial resolution of soil moisture observations is on the order of 10 km and this is very coarse for catchment hydrological applications. I will discuss an innovative method for downscaling soil moisture to 1km and its validation with ground and aircraft observations at a regional scale and high spatial resolution soil moisture for the continental United States. I will show how the satellite observations and model outputs can be used to close the water budget for continental river basins. From a societal context, satellite observations are instrumental in determining the available water resources in regions of the world where observations are lacking and local economy is tied closely to water.

ABOUT THE SPEAKER

Dr Lakshmi graduated from University of Roorkee in 1987 with a Bachelor degree in Civil Engineering and a Doctorate in Civil Engineering in 1996 from Princeton. He is a Full Professor of University of Virginia, USA. His research interests are in the area of hydrometeorology and hydro-climatology, land-atmospheric-ecological interactions through modeling and remote sensing. He has also been involved in using satellite data to predict the role on global change on the health of intertidal organisms. He has numerous publications. He has served as Editor EOS, and Associate Editor of Water Resources Research, Journal of Hydrologic Engineering and Journal of Geophysical Research, and currently is serving as Associate Editor of Journal of Hydrology and Vadose Zone Journal. He has served on the board of directors of the Consortium of Universities for the Advancement of Hydrological Sciences, Hydrological Executive Council of the AGU, and the Executive council for AGU Heads and Chairs of Geosciences.

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