

Discussion Meeting
on
“Scale Issues in Hydrology”,
December 1-3, 2019

Coordinator: Prof. P. P. Mujumdar, Chairman, Interdisciplinary Centre for Water Research (ICWaR), IISc

Duration: 3 days (Dec 1-3, 2019)

Motivation for the Discussion Meeting:

Hydrological processes occur at a wide range of scales, from unsaturated flow in a 1 m soil profile to floods in river systems of a million square kilometres; from flash floods of several minutes duration to flow in aquifers over hundreds of years. Hydrological processes span about eight orders of magnitude in space and time. Precipitation is one of the forcings driving the hydrological cycle. Precipitation phenomena range from cells (associated with cumulus convection) at scales of 1 km and several minutes, to synoptic areas (frontal systems) at scales of 1000 km and more than a day. Many hydrological processes operate - in response to precipitation - at similar length scales, but the time-scales are delayed.

While scale issues in modelling the hydrologic processes have been recognised for some time now, the challenges on parameterisation across spatial and time scales remain. These are exacerbated by intense human interventions impacting the hydrologic processes. The land surface processes, for example, that are primarily governed by human activities, are known to significantly alter the hydrologic regimes at a range of space-time scales. The current geologic age – rightly termed the Anthropocene, with intense human signatures in most natural processes, but most significantly on the hydrologic processes – has imparted a great challenge to the hydrologists towards not just the process understanding at different scales but also on evolving sustainable water resource strategies. Increasing hydrologic extremes of floods and droughts across the globe – and more specifically in India – point to an immediate need of scientific understanding of the phenomena occurring at multiple scales.

This Discussion Meeting was motivated by the visit of Prof. M. Sivapalan (<https://cee.illinois.edu/directory/profile/sivapala>), at ICWaR as a Satish Dhawan Visiting Chair Professor. Prof. Sivapalan is a pioneer and an authority on scale issues in hydrology, with emphasis on changing hydrologic regimes in Anthropocene. He led the discussions to arrive at exciting research problems in India. Younger faculty and researchers from across the country engaged in stimulating discussions around the theme to develop the research agenda.