Physical Research Laboratory

Tuesday Seminar

Speaker: Dr. Soumendra Nath Bhanja

Date & Time: 25th August, 2020 @ 16:00 Hrs

Venue: Online Platform (Google Meet)

Title: Groundwater storage quantification and biogeochemical model development for water quality applications

Abstract

The Indian Sub-Continent (ISC), which hosts the largest and densest global population, faces acute shortage of mostly drinking water and other usable waters as it is witnessing rapid rise in population, urbanization, and change in societal water use and lifestyle. Therefore to ensure groundwater sustainability across the parts of the ISC, the groundwater resources should be studied in detail. My research has been aimed to delineate the details of long-term patterns of groundwater recharge, storage change and quantification, spatio-temporal variability of groundwater storage, groundwater-surface water interaction, and also the effect of water management strategies on groundwater storage in ISC using in situ, satellite-based and numerical model simulations. Depletion of usable groundwater storage is linked with the increase of irrigated area linked with water intensive crops. The large-scale depletion of groundwater resources in Ganges basin has been found to be linked to the summertime drying of the Ganges river in recent years. A ray of hope still exists as it is found that the application of proper water resource management practices in parts of the ISC leads to groundwater storage replenishment. Oxidation-reduction reactions associated with oxygen diffusion and soil organic matter decomposition influence a number of soil biogeochemical cycles. The processes are responsible for controlling oxidation reduction potential (ORP), pH and chemical balance in the soil-water medium. My research also focuses on developing a process based model including microbial kinetics and thermodynamics for simulating the regional scale biogeochemical processes. The model is capable of simulating multiple water quality parameters at one run, for the first time in regional-scale. Water quality being an important component of water security, the approach can be widely used in Indian sub-continent and other parts of the globe for different water quality applications.

The Speaker

Soumendra Nath Bhanja is currently working as a C. V. Raman Postdoctoral fellow at the Indian Institute of Science from August, 2019 after completing a 2-year postdoctoral stint at the Athabasca University, Canada. He is interested in working on developing regional-scale, biogeochemical model for water quality applications, regional-scale groundwater recharge and storage quantification, water resource management and other emerging topics in earth sciences. He has obtained his PhD from the Department of Geology and Geophysics, Indian Institute of Technology (IIT) Kharagpur in June, 2017. He has also worked at the NASA Goddard Space Flight Center being a recipient of Fulbright fellowship. He has won many awards and recognitions such as National Postdoctoral Fellowship, Fulbright fellowship, CSIR-Shyama Prasad Mukherjee Fellowship and Shastri Indo-Canadian Institute's Student Mobility Grant. He has published in well-reputed scientific journals, and his research has been highlighted in several national and international media agencies including coverage in NASA's "Image of the Day" and Nature Asia.

All are invited to attend and participate in discussion

A .K. Sudheer, Geosciences Division