Land surface processes in the tropics in context of high impact weather systems and climate resiliency

(03 - 10 July 2018)

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Overview

The motivation for this course is the need for meteorology, earth science, hydrology, remote sensing, disaster resiliency, and engineering students to **understand the role of land surface process within the hydro-meteorological, weather and climate system**. The need for this course is that currently across the Indian institutes, such a course is not offered, despite the documentation of a need in various research communications and practicum workshops. This course is developed following discussions with various faculty members, researchers, and students.

A **one-week long, intensive course** will be offered organized in **three modules** that should be taken together. The course will **introduce the role of land surface as part of a system** that is intimately coupled with over lying atmosphere through exchange of energy, moisture and momentum. Elements of drivers of land feedback in the context of the growing population and increasing demand for agriculture, and how the land surface characteristics are changing rapidly as manifested via deforestation, urbanization, and agricultural intensification will also be discussed. In addition to the changes in the global climate and global warming, **how the complex interaction between land-air modifies microclimate to regional scale and beyond** will be tackled next. Examples and exposure to studies that highlight the importance of land feedbacks within Indian domain and how it is one of the hotspot for the land-air interactions will be synthesized. **The students will also work with aforementioned aspects of land use land cover changes (LULCC) including urbanization**. Changes in land characteristics change surface energy balance terms and thereby surface hydro-meteorological characteristics. The increased LULCC has been cited as a reason for increased local/mesoscale rainfall activity and associated heavy rains and flood potential and how these studies come to this conclusion will be presented with examples.

This course will help in providing a scientific platform on understanding the land surface processes and their impact on extreme weather events and climate systems. This is thus expected to provide a timely, and excellent platform for students, research scientists and enhance the capacity building of the academic institutions, NGOs, city planners, disaster managers. The proposed course will provide an integrated end-to-end systems perspective involving understanding, observation and modeling of land surface processes.

Course participants will learn these topics through lectures and hands-on experiments. Also case studies and assignments will be shared to stimulate research motivation of participants.

Modules	**A: Land surface processes** **B: Observation and Modeling of land surface processes** **C: Applications, case studies** **Number of participants for the course will be limited to fifty.**
You Should Attend If…	▪ You are an agriculture/atmospheric/climate/hydrology/geotechnic/urban planning scientist, scholar from research/operational/academic institutions and interested in land surface processes. ▪ You are a student (B.Tech/M.Sc./M.Tech/Ph.D.) or faculty from academic institution interested in learning about science of land surface and impacts. ▪ You are a NGO, governmental administrative authority, disaster manager, forecasters, policy makers and smart city managers.
Fees	The participation fees for taking the course is as follows: **Participants from abroad: US $500** **Industry, NGOs/ Research Organizations: Rs. 10000** **Academic Institutions (outside IIT BBS): Rs. 3000** **In-house Participants: A nominal fee of Rs. 1000** The above fee includes all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

The Faculty

Prof. Dev Niyogi is a Professor in Departments of Agronomy- Crops, and Water Sciences and the Earth, Atmospheric and Planetary Sciences at Purdue University, USA. He is a well-known expert on Land Surface Processes and has coauthored over 170 for peer – reviewed papers, 17 book chapters, and led several projects for NSF, NASA, USDA etc. According to Google Scholar, his research has been cited over 8700 times (h-index of 49; i-index of >130) and his work has been read over 20,700 times per Research Gate statistics. His work has been highlighted in various media outlets including in the popular press such as Yahoo!, MSNBC, Wired, CNN, LiveScience, National Geographic, Tedx Talk, and NASA press releases. Additional details regarding the projects and the activities of land surface modeling group can be found at http://landsurface.org/.

Prof. U. C. Mohanty, Professor, after about 34 years of experience in teaching and research in Indian Institute of Technology (IIT) Delhi, India is currently serving as a Visiting Professor in the School of Earth, Ocean and Climate Sciences, IIT Bhubaneswar. Prof. Mohanty received his Doctoral Degree in Tropical Meteorology from Odessa Hydro-Meteorological Institute, USSR in 1978. His research areas of interest are Tropical Meteorology, Monsoon Dynamics, Climate studies and Meso-scale Modelling of Extreme Weather Events such as Tropical Cyclones. Prof. Mohanty has guided 34 PhD students and has more than 259 publications in peer reviewed national and international journals. Prof. Mohanty has received several awards and honors for his significant research contribution in atmospheric sciences.

Dr. Meenu Ramadas received the Ph.D. degree in 2015 from School of Civil Engineering, Purdue University, USA. She is currently working as an Assistant Professor in School of Infrastructure at IIT Bhubaneswar. Dr. Ramadas's teaching and research interests include surface and ground water hydrology, water resources engineering, unsaturated flows, climate change impact assessment, and probabilistic and statistical modeling in hydrology. More recently, she has worked on projects related to drought modeling such as developing probabilistic drought indices, identifying hydrological drought triggers, and drought prediction models.

Additional Resource Person:

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