International Course on

Earth Observation Data for Forest and Agriculture Carbon Modelling

18-22 February 2019 (1630-1830 Hrs Lecture/ 1900-2100 Hrs Tutorial)

at

Centre for oceans, Rivers, Atmosphere and Land Sciences (CORAL)

Indian Institute of Technology Kharagpur

Kharagpur, West Bengal, India-721302

by

Prof. Jadu Nandan Dash & **Prof. Mukunda Dev Behera**

(University of Southampton, UK) **(Indian Institute of Technology Kharagpur)**

Why to Attend? **This course proposes to discuss various methodologies and potential of the satellites sensor and models to quantify forest and agriculture carbon stock with examples from India and the World. This course will provide useful insights to upscale these methods (/models) to the country/regional/global scale, thereby would provide understanding to Earth observation data utilization for forest and agriculture carbon modeling.**

How to Apply? **Mention the followings and E-mail to [bdcc2018@gmail.com]**

1. **Name and Affiliation**:
2. **Address:**
3. **Email ID/ Contact Tel/ GH Preference.:**
4. **Why you wish to apply for the course** (Maximum 50-Words) **?:**

Important Dates:

Application Deadline: 31st January 2019

Confirmation Intimation: 01**st February 2019 with details of Fee Transfer**

Deadline for Couse Fee Transfer: 07**th February 2019**

It is a 1-Credit and the same can be transferred to other Univ./Inst. on Request

Prof. Anil K Gupta, Head CORAL, IITKgp [Course Co-Coordinator and Patron]

Overview

The role of forests and agriculture in carbon storage and the potential shifts due to climate change has not been adequately understood and explained. The Primary Production products from MODIS platform provide an accurate measure of the growth of terrestrial vegetation indicating carbon stock. The product is a cumulative composite of GPP values (generated using Biome-BGC model) based on the radiation use efficiency concept that may be used as inputs to calculate terrestrial energy, carbon, water cycle processes, and biogeochemistry of vegetation. The Southampton Carbon flux (SCARF) model predicts terrestrial gross primary productivity at regional to global scale using satellite data. The model based on the quantum yield of vegetation improves on the previous diagnostic model by using (i) the fraction of photosynthetic active radiation absorbed by the photosynthetic pigment (FAPAR {ps}) and (ii) direct quantum yield by classifying the vegetation into C3 or C4 classes.

Course Objectives

-To improve scientific understanding of the impacts of global climate change on forest and agriculture carbon using satellite data, models, and findings

-To train students in the theory, technology, and practical applications behind imaging and non-imaging sensors for environmental monitoring such as understanding the operational aspects of remote sensor technologies, experiment design and data collection techniques using various aspects of remote sensing and field data collection protocols.

-To enhance fundamental understanding of various aspects of modeling including different types of models, calibration and validation, and scaling-up activities using a carbon model.

-Conducting an efficient and intensive remote sensing curriculum that complements the existing curricula at the host institution.

-Capacity building- Preparing future remote sensing scientists by training students and engaging them to participate in ISRO/ESA-related research

-Providing exposure to practical problems and their solutions, through case studies and live projects in remote sensing of forest and agriculture for carbon accounting

-Building in confidence and capability amongst the participants in the application of remote sensing technologies for forest and agriculture for carbon accounting

Who can attend? **Executives, Engineers and Researchers from manufacturing, Service and government organizations including R&D laboratories. Students (BTech/ MSc/ MTech/ PhD/ Post-Doc) or Faculty from reputed academic /Technical institutions / Industry interested to learn how to quantify forest and agriculture carbon stock using technologies.**

Course Fee Details:

Students: 6000 INR; Industry/ Research/Academic Organizations: 9000 INR [ID-Proof Required]

[Concession of 500 INR for Candidates having ISG (Indian Society of Geomatics) Membership]

Accommodation: Available on Payment basis [http://www.tgh.iitkgp.ac.in/]

New Technology Guest House (NTGH): Single 1200 INR / Double 1500 INR per day

Ashutosh Mukherjee Guest House (SAM): Single 300 INR per bed on Twin sharing basis per day

(N.B.: Participants can have food in GH or in other Eateries in the campus on Payment basis. However, Snacks and Water Bottle will be served during Lecture/Tutorials)

·*Number of participants for the course will be limited to 35; and Deadlines will be followed strictly

 # Participants need to carry their own Laptops, though Computers will be provided during Tutorials

For Further INFO, Contact: Dr. RM Panda/ rmp.iit.kgp@gmail.com (M- 9434353045)

Course details (18-22 February 2019): Duration: 10 hrs lectures and 10 hrs Tutorials

Lecture Schedule

Day 1

Lecture 1 : 1 hrs: MDB

Terrestrial ecosystem processes and the carbon cycle

Lecture 2: 1 hrs : JD

Basic remote sensing of vegetation

Tutorial 1: 2 hrs: MDB

Estimation of vegetation biophysical variables from optical data

Day 2

Lecture 3 : 1 hrs: MDB

Estimation of vegetation biophysical variables from optical data

Lecture 4: 1 hrs: JD

Estimation of vegetation biophysical variables from Microwave data

Tutorial 2: 2 hrs: JD

Estimation of biomass and carbon using optical data

Day 3

Lecture 5 : 1 hrs: JD

Terrestrial carbon models

Lecture 6: 1 hrs: MDB

Estimation of vegetation biophysical variables from Lidar data

Tutorial 3.: 2 hrs: JD & MDB

Estimation of vegetation biophysical variables from Microwave data

Day 4

Lecture 7 : 1 hrs: MDB

MODIS GPP product

Lecture 8: 1 hrs: JD

Currently available model - SCARF model

Tutorial 4: 2 hrs: MDB & JD

Estimating gross primary productivity using a SCARF model

Day 5

Lecture 9: 1 hrs: JD

Time series analysis

Lecture 10: 1 hrs: JD

Currently available model - SCARF model

Tutorial 5: 2 hrs: JD

Estimating gross primary productivity using a SCARF model