CONTACT

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iirs newsletter

UN / ESA / COSPAR WORKSHOP ON SATELLITE DATA REDUCTION & ANALYSIS TECHNIQUES

An International Workshop on "Satellite Data Reduction and Analysis techniques", sponsored by UN/ESA/COSPAR was conducted in India organized by Indian Space Research Organization (ISRO), Dept. of Space, co-hosted by Indian Institute of Remote Sensing (IIRS) and Centre for Space Science Technology & Education in Asia-Pacific (CSSTE-AP), during November 27 -30, 2000.

Satellite data reduction and analysis techniques were applied covering broad topics of Space Science, Astronomy, Meteorology, Remote Sensing and Spatial Information System. The details of topics covered are :

- Satellite data reception
- Fundamentals of Satellite data, pre-processing, geometric corrections and image analysis for land resources
- Retrieval and analysis of UV spectra of stars
- Fourier and wavelet analysis techniques

Inauguration of the Workshop
Mr. Hans Haubold delivering UN Message. Sitting (L to R) : Dr. P.S. Roy, Dean, IIRS; Dr. D.P. Rao, Director, NRSA, Hyderabad (Chief Guest); Mr. Pascal Lacomte, ESA, and Dr. S.C. Chakravarti, Project Director, Space Science Departmment, ISRO, Bangalore

Inside this issue...

Group Photograph of Workshop participants

- Natural resource management and ocean applications based on optical, thermal and microwave data
- Integrated approaches of Spatial Information System

Experts drawn from UN/ESA and other organizations (majority from India) contributed to successful organization of the workshop.

Mr. Hans Haubold informed that the next workshop will be held in year 2002 on 'Satellite Data Analysis techniques at General Organization of Engineering and Research", and the feedback of this workshop will help in better organisation.

List of Guest Speakers/Indian Participants of UN/ESA/COSPAR Workshop

1. Dr. D. P. Rao
2. Mr. Willem Wamstaker
3. Mr. Hans Haubold
4. Mr. Pascal Lecomte
5. Mr. M.s. Narayanan
6. Mr. B. Paul
7. Mr. H. S. Mazumdar
8. Mr. Mukund K. Rao
9. Prof. B. L. Deekshatulu
10. Dr. P. S. Roy
11. Mr. C. Ramakrishna
12. Mr. R. K. Gupta
13. Mr. Shyam Lal

List of Participants of UN/ESA/COSPAR Workshop

Sl.No.	Name	Country
1.	Dr. Hafizur Rahman	Bangladesh
2.	Mr. VA Vireak	Cambodia
3.	Mr. Mohd. Reza Beheshtifar	Iran
4.	Mr. Mohd. Forohar	Iran
5.	Mr. Mohd. Reza Varastehmoradi	Iran
6.	Dr. Koki Iwao	Japan
7.	Mr. Daw Khin Aye Than	Myanmar
8.	Mr. Daw Sabai Phyu	Myanmar
9.	Ms. Josefina Sacapanio	Philippines
10.	Mr. Francis Canisius	Srilanka
11.	Mr. K. S. Kumara Wijayawardana	Srilanka
12.	Mr. Abdul Rahim Loulou	Syria
13.	Mr. Tuyen Bui Trong	Vietnam
14.	Mr. Diem Le Van	Vietnam
15.	Mr. Xuan Lam Nguyen	Vietnam
16.	Mr. Quoc Cuong	Vietnam

Important News :

Indian Institute of Remote Sensing (NRSA) signs Memorandum of Understanding with Andhra University, Vishakhapatnam

IIRS Post Graduate Diploma in Remote Sensing and Geographic Information can now be extended for M.Tech. (RS & GIS), with one year research project. The diploma will be equated with two semesters of Andhra University M.Tech programme. It is planned to implement this programme for new batch of P.G. Diploma programme commencing from August 2001. The exisiting IIRS PG Diploma programs will continue as such.

Dr. D. P. Rao, Director NRSA, who was a faculty of IIRS for more than sixteen years, has been conferred with "Padmashri" by President of India. He has also been elected as fellow of ITC, The Netherlands.

Retrieval of Suspended Sediment Concentration in the estuarine waters using IRS-1C WiFS data

The discharge of rivers into the ocean has major effects on coastal waters. These effects can be simplified as those originating from (i) the reduction of salinity as fresh river water is discharged into and mixed to varying degree with ambient sea water; (ii) the introduction of particulate and dissolved matter, such as sediment, pollutants, organic and nutrients; high sediment discharge reduce the optical transparency of coastal waters and cause sediment shoals to develop, thereby affecting navigation. The dynamics of river outflow is therefore crucial to an understanding of physics, chemistry and productivity of coastal waters.

The dynamics of the outflow of water and its sediment load at river mouths are controlled by large number of factors, chief of which are the characteristics of the out flowing river water, the coastal bathymetry and the energy of the receiving marine basin. Outflow dynamics vary not only between different river mouths, but also at the same river mouth during periods of low and high discharge. The particular dynamics involved at the river mouth controls the way in which the effluent is dissipated and therefore the patterns of sediment deposition on the estuary, fjord or sea bed. The presence of suspended sediment in the river water near the estuarine region almost whole of the year induces interest among the coastal oceanographers to study the river plume dynamics using remote sensing data. IRS-1C WiFS sensor which has a revisit cycle of 5 days can be used to study this river plume dynamics. In the present study an attempt has been made to retrieve suspended sediment concentration from the surface waters of Mahanadi estuary in the East Coast of India, Bay of Bengal using IRS-1C WiFS data. The Study indicates that the IRS-1C WiFS data can not be used where suspended sediment concentration is low and the cloud shadow acts as a contamination to the sediment retrieval from the IRS-1C WiFS data.

Atmospheric Correction

$$L_t = L_R + L_A + L_W T_\theta$$

L_t = Total Radiance received at Satellite Sensor

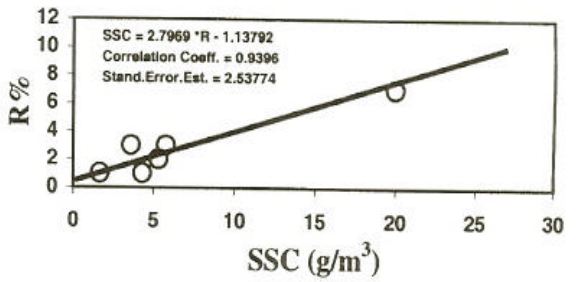
L_R = Radiance due to Rayleigh Scattering

L_A = Radiance due to Aerosol Scattering

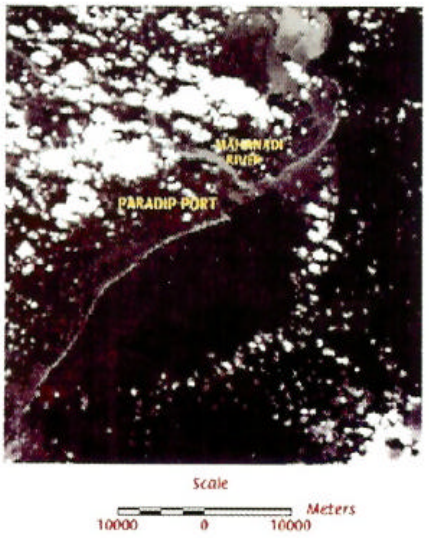
L_W = Water-leaving Radiance

T = Transmittance of the Atmosphere

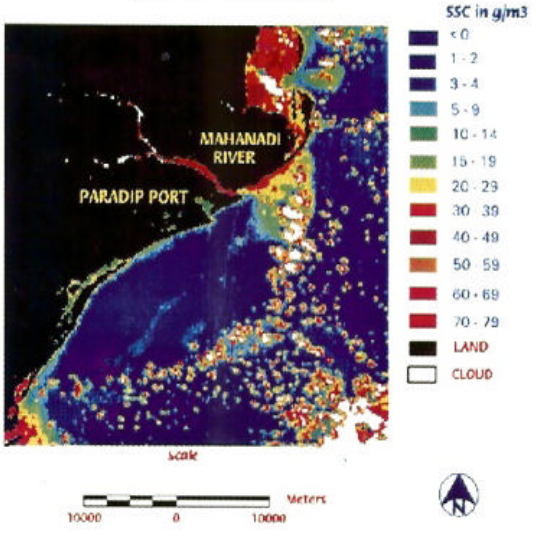
θ = Satellite view angle



IRS-1C WiFS Band-1 Image of Paradip, East Coast of India, bay of Bengal



Suspended Sediment Concentration of Paradip, East of India, Bay of Bengal (IRS-1C WiFS Data)



A.K. Mishra, IIRS

IRS LISS-III and PAN Data Fusion for Forest Cover Mapping in Pathri

IRS LISS-III and PAN data were fused using standard IHS transformation of LISS III bands 3, 2, 1 (RGB) and replacement of intensity image by PAN data. The advantages of this data fusion were tested in Pathri Reserve Forest in Hardwar district, Uttaranchal. Following advantages were noticed-

- Significant precision in overall forest boundaries delimitation
- Considerable improvement in forest type and density discrimination.
- Improvement in differentiation of various growth stages of *Eucalyptus* as well as degree of degradation of Taungya plantations.
- Improvement in delineation and demarcation of jamun, *Eucalyptus* plantations and linear plantations.

LISS-III

LISS-III+PAN

-S.P.S. Kushwaha, P. Rocky & S. Leima

Special Courses...

Agriculture & Soils Division organised a "Special Course in Remote Sensing & GIS Applications for Cropping Systems Analysis" during 11 -29 December 2000.

Water Resources Division organised a ***"Special course on Remote Sensing and GIS Application to Water Resources Management"*** for the Officials of Tamilnadu Water Resources Organisation during 11-22 December 2000.

Special training : Photogrammetry & R.S. Division organised a course of 8-weeks duration (8.1.2001 - 2.3.2001) named 'Short Course on Remote Sensing with special emphasis on Digital Image Processing" designed for middle level scientists engaged in supervising remote sensing applications, projects in their own area of specialization. This course was sponsored by Indian Technical & Economic Cooperation (ITEC) and Special Common wealth Africa Assistance Plan (SCAAP) of Ministry of External Affairs, Govt. of India, for the 25 participants from 15 countries.

Two weeks special course was organised on RS & GIS for ***Groundwater Studies*** for officers of Central Groundwater Board during 19th-30th March 2001 in Geoscience division of IIRS.

A 4-days ***Special Course on RS & GIS Application in Watershed Development*** for Integrated Watershed Development Project was organised during 19-22 March, 2001.

Special Course on ***RS & GIS Applications in Water Resources*** for TN-WRO officials, was organised during 19-30 March 2001.

Spatial Decision Support System (SDSS) tools and the Spatial Decision Model

Evolving from CAD packages, map displays, databases and spreadsheets; GIS technologies comprise of hardware and software that permit the acquisition, management, analysis, and display of spatially related information in a single integrated system. Each type of geographic information uses a unique language and conventions for defining real-world characteristics. GIS modeling also offers the ability to perform interactive spatial analysis based on the unique user. These spatial analysis tools help form the basis of spatial decision support systems (SDSS). Based on generic definition of DSSs, SDSS can be defined as an interactive, computer-based system designed to support a user or group of users in achieving a higher effectiveness of decision making while working a semi structured spatial decision problem. The concept of SDSS has evolved into a field of research, development and practice in the last 10 years or so. SDSS has many uses and can provide invaluable information when trying to reach a decision that includes information that is difficult to combine manually. SDSS systems help the user to formulate and define problems that more easily answer the question. The Spatial Decision model is made up of three distinct elements, ***Data***, ***Information*** and ***Knowledge***. Information is derived (using spatial analytical tools) from the individual data elements in a spatial database. Knowledge is the understanding of possible consequences based on the information derived from data and a specific line of reasoning.

All transformations of data into information and then into knowledge have to be done to arrive at a specific goal, which is the search for an optimal solution to a specific spatial problem. GIS can be seen as the discipline of spatial data transformations. GIS users are constantly transforming spatial data from one cartographic state to another, and with each transformation they are obtaining additional information. A broader perspective suggests that all these spatial information systems have a common aim: to improve the performance of decision makers and managers when they confront semi structured spatial decision problems. A significant contribution of the SDSS concept to geographic information science is that it integrates previously separate tool sets (data & models) into a unified whole more valuable than the sum of the parts. Indeed, SDSS can be viewed as computer based systems that lie at the intersection of two major trends in the spatial sciences: GISci (geographic information sciences) which have resulted in a significant body of knowledge about spatial and attribute data processing in a GIS environment, and broadly defined spatial analysis, which has generated a significant body of knowledge about modeling. The confluence of these two trends forms the two major resources with which decision makers interact in the process of dealing with semi structured spatial problems.

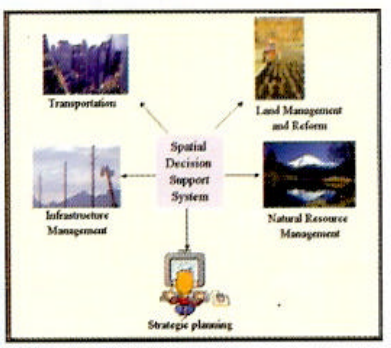
As the technology continues to enable us to perform an ever-increasing number of combinations of spatial data transformations, the decision environment is going to play an increasingly important role in determining which transformations are in fact useful. All transformations lead to more available information, however, not all information might be of use to the decision process. SDSS tools help to define the end goal of the user and provide an easy to use interface to help arrive at the decision. It has a wide range of uses in many sectors including:

Transportation: DSS tool is changing the way we navigate everything from super tankers to taxi cabs. For example, DSS models can be used to create electronic maps of road networks, which can improve rush-hour traffic management, delivery routes and road repair and construction projects.

Infrastructure Management: DSS can be used to record, monitor and manage information about pipelines and electricity grids, power lines, generating and distribution stations and helps to support the planning and sustainable development of infrastructure generating facilities.

Land Management and Reform: Given its ability to integrate information from different sources, this technology is being used extensively in land management and reform and to support land-use planning, development and monitoring services.

Natural Resource Management: Spatial Decision Support System can be routinely used in a full range of natural resource applications - from supporting mineral exploration and development to monitoring forest regeneration, wasteland reclamation, agricultural crop yields, the impact of climate and soil on vegetation growth, and wildlife movements.



Sameer Saran, P.L.N. Raju and P.S. Roy

Refreshers' Course

"Spatial Information management for sustainable Forestry"

In the era of development efforts are on for providing better life and this has necessitated increased in flow of information and technological advancement for sustainable management of natural resources. Sustainability has been the buzz word in the recent past. More and more approaches, methods and tools have been designed and developed to handle the vast amount of information. There has been great concern world over on the deforestation and forest degradation. And to address these issues, a Refresher's Course to natural resource managers was organized jointly by International Aerospace Survey and Earth Sciences (ITC), Netherlands, Indian Institute of Remote Sensing (IIRS), Dehradun and Forest Survey of India (FSI), Dehradun. The theme of the course was 'Spatial Information management for sustainable Forestry". Majority of the participants were alumni of ITC and IIRS and were sponsored by ITC. The course was designed to update the resource managers knowledge with respect to latest technological advancement in the field data gathering and analysis using Remote Sensing, Geographic Information System, Global Positioning System and management issues for sustainable Forestry. Some of the topics like, mapping and information requirement, conservation issues related to biodiversity, indicators of Sustainable forestry, fuel-wood and fodder demand & supply analysis, management of protected areas etc. were delivered to the participants.

The two week course attended by 19 participants from 7 countries began on 4 December 2000 and culminated on 15 December 2000. The participants were from Myanmar, Thailand, Philippines, Indonesia, Vietnam, Sri Lanka and India of Asia and the Pacific region. The course was inaugurated by Guest of Honour Dr. D.P. Rao, Director, National Remote Sensing Agecy, Dr. P.S. Roy, Dean, IIRS welcomed the audience and Dr. J.K. Rawat, Director, FSI and Mr. M.F. Gelens also addressed the august gathering.

The resource persons for this course were from IIRS, the faculty were Dr. P.S. Roy, Dr. S.P.S. Kushwaha and Dr. Sarnam Singh, from ITC Mr. M.F. Gelens and Mr. Robert Albricht and from FSI were Dr. V.N. Pandey and Dr. Sandeep Tripathi. Two guest faculty, Dr. J.S. Grewal, Maharashtra Forest Department and Mr. H. Malhotra, Andhra Pradesh Forest Department, actively involved in forest management using modern tools also shared their experiences in handing data and decision making using these tools.

The course was designed to give it a participatory dimension. Participants from all the countries shared their experiences through presentations of their work related to conservation and forest management. Participants were familiarized with forestry related activities and visited Forest Survey of India, Forest Research Institute and Indian Institute of Remote Sensing. Participants were also taken to field to see the eco-restoration in and around Mussoorie.

For many participants it was a reunion of friends after a gap of many years. With a "hope to be reunited soon" the course ended on 15 December 2000 after distribution of certificates by Chief Guest.

Alumni Response...

Dear Sokhi,

I must thank you most sincerely for sending me a copy of Contact Newsletter issue of March, Vol. 2, No. 1. As a former student of IIRS (1991), I would like to thank all at the Institute and pass my warm regards. My other request is if you can print a short notice to all the former students, particularly those of 1991, to provide their contacts (especially e.mail addresses) so that we can start communicating. Lastly, I would be glad if for old students some refresher courses, workshops or seminars could be organised. This will expose the old students to new technologies being developed.

I am happy to learn that most of those I met there are still in good health. Keep up and lets keep in touch.

Frank Msafiri,
Department of Resource Surveys and Remote Sensing,
P.O. Box 47146,Nairobi. Kenya.

Dear Sir,

May I request you to record my mailing address to send your Newsletter "CONTACT" regularly. This is informative which would be of immense help for all students since Remote Sensing is a topic in our P.G. Course.

May I also request you to send me some literatures/ topic/publication/ Newsletter having publication on Remote Sensing & its application in Biological sciences.

I hope your regular publications may be sent to me for the academic purpose.

With warmest regards

Dr Prafulla K. Mohanty, Faculty
Post-Graduate Dept. of Zoology, Utkal University,
Vani Vihar, Bhubaneswar- 751 004, Orissa.

Special Training Program (STP) at IIRS, Dehradun

Application of GIS for Groundwater Exploration for Groundwater Surveys & Development Agency, Maharashtra

Groundwater : Precious than Diamond!

Groundwater is a precious and the most widely distributed resource of the earth and unlike any other mineral resources, it gets its annual replenishment from the meteoric precipitation. Out of the world's total water resources estimated at 1.37 x 10 Million ha m, 97.2% is salt water, 2.15% is fresh water in glaciers and icecaps, 0.6% is groundwater and 0.05% is the water available in streams, lakes, reservoirs, water vapour and soil moisture. Hence groundwater is the largest source of fresh water on the planet excluding the polar icecaps and glaciers.

Groundwater : Problem in India?

In India, more than 90% of rural and nearly 30% of urban population depends on groundwater for meeting their drinking and domestic requirements. In addition, it accounts for nearly 60% of the irrigation potential created in the country. Being the second-most populous country in the world, India has the ample requirements for groundwater exploration and management. Therefore scientific management has become essential for sustainable and conjunctive use of groundwater.

Need of Groundwater management in India:

Groundwater occurrence in any area is controlled by rainfall, terrain condition, lithology, structure and weathering pattern etc. in that area. In India spatio-temporal variations in rainfall, lithology, geomorophology and structures have led to an uneven distribution of groundwater in different parts of the country. This disparity in occurrence of groundwater is a major challenge, which compels us to come out with a suitable and effective groundwater management plan.

GIS : An easy solution?

Geographic information system is the easiest tool which not only can handle the above problem but can also guide us about groundwater prospective zones, recharge areas and quality of the water available in a particular area.

IIRS, being the premier training organization in transferring Remote Sensing and GIS techniques to the user community, has taken the responsibility to train 52 hydrogeologists from GSDA, Maharastra in the field of *"GIS application for Graoundwater exploration"*. The objective of this course is not only to apprise the participants with the recent trends in the field of RS and GIS but also to enable them to use Remote Sensing data in conjunction with the ancillary field data in a GIS environment for identifying groundwater target areas, recharge zones and groundwater pollution zones. The training course is designed by the highly experienced and well trained faculty members of IIRS in an integrated manner incorporating the basic technology topics of Remote Sensing and GIS along with the application topics for groundwater exploration. The first batch of 13 participants were trained during 4 to 29 September, 2000 in which trainees participated in audio-visual classroom discussions, PC based practical demonstrations, interactive field trainings and guest lectures from renowned hydrogelogists.

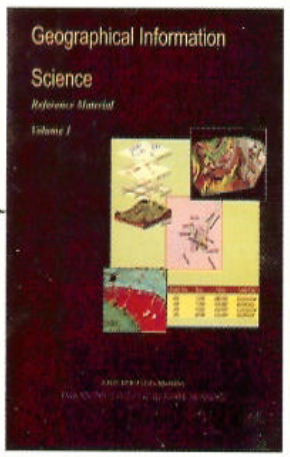
-I.C. Das

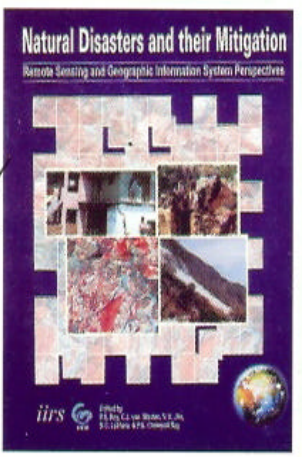
New Arrivals...

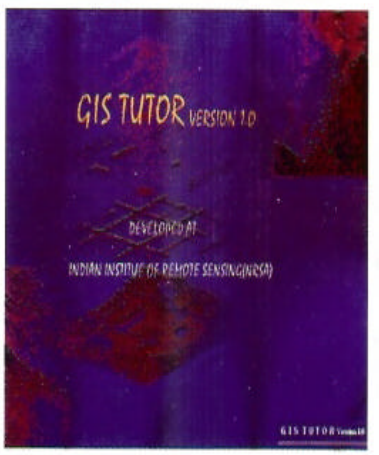
IIRS has developed a Multimedia Package 'GIS TUTOR' version 1.0. This self learning Tutorial covers the basic and advance trends in Geographic Information Systems.

IIRS has at its credit two books published in these last six months. The first book "Geographical Information Sciences" covers the Basic concepts & trends in GIS.

The second book entitled "Natural Disasters and their mitigation pertains to IIRS-ITC workshop on the same topic. The main themes covered are related to Mountain, Urban, Agricultural and Coastal Hazards.







The above material can be purchased by sending a Demand Draft in favour of Accounts Officer, IIRS, Payable at Dehradun.

The GIS tutor costs Rs. 500/- per C.D. and the books are priced at Rs. 200/- each. Please include Rs. 50/- towards postage.