CSSTEAP Newsletter

Quarterly Newsletter of Centre for Space Science and Technology Education in Asia and the Pacific (Affiliated to UN)

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NEW DIRECTOR OF CSSTEAP

Dr. George Joseph, formerly Honorary Distinguished Professor, ISRO has taken charge as Director of CSSTEAP. Dr. George Joseph took over charge on December 6, 2006 from Dr. V.K. Dadhwal, Dean, Indian Institute of Remote Sensing (IIRS), Dehradun who was holding the additional charge of Director, CSSTEAP.

Dr. George Joseph started his research career in 1962 at the Tata Institute of Fundamental Research, Bombay, where he was involved in the study of cosmic rays. In 1973, Dr. Joseph was invited to join the Space Applications Centre, Ahmedabad to initiate the development of remote sensing technology particularly sensors of various types. He has been the guiding force in the design and development of all the earth observation cameras on board Indian Remote Sensing Satellites and INSAT, which have put India amongst the premier countries of the world with earth observing capability from space.

He served Indian Space Research Organisation (ISRO) in various capacities including Director, Space Applications Centre, during 1998-2003, as Satish Dhawan Distinguished Professor. One of the noteworthy contributions was the study report on Indian Mission to Moon in the capacity as Chairman, Lunar Mission Study Task Force. Dr. Joseph has served in a number of national and international committees/organizations including

Dr. George Joseph (R) taking charge as Director, CSSTEAP from Dr. V. K. Dadhwal (L)

President of Technical Commission (1) of the International Society for Photogrammetry and Remote Sensing (ISPRS) during 1996-2000.

He has published a number of scientific papers in national/international journals. He has authored a book titled 'Fundamentals of Remote Sensing', for beginners. He is fellow of number of National Academies such as: Indian Academy of Sciences, National Academy of Sciences, India, and Indian National Academy of Engineering.

In recognition of his outstanding contributions to electro optical sensor development and for his distinguished achievements in furthering the remote sensing utilization in the country, he has been

Inside this issue

Wishing all the readers a Very Happy & Prosperous 2007

METEOROLOGICAL AND OCEANOGRAPHIC SATELLITE DATA ARCHIVAL CENTER (MOSDAC) AT SPACE APPLICATIONS CENTRE (ISRO), AHMEDABAD

Introduction:

There is no doubt that environmental satellite data have grown to be the most important source of information for daily global weather forecasting. With the growing user needs for improved observations in terms of coverage, frequency and accuracy, the role of satellite observations have become crucial. In addition, these data are now used by innumerable professionals in applications as varied as atmospheric, oceanic, terrestrial and climate research. To provide high quality data products round the clock to these groups is one of the most important tasks.

With this background of space based observations to be available to users, a data archival and dissemination system, Meteorological and Oceanographic Satellite Data Archival Center (MOSDAC) has been established in March 2006 at Space Applications Center ISRO, Ahmedabad, to cater to the needs of research community engaged in meteorological and oceanographic fields. The data center aims to archive data products from Indian as well as International satellites and to disseminate these data products to registered users.

The major objectives of MOSDAC are:

- To facilitate the exchange of meteorological and oceanographic satellite data products to the research and academic users.
- To disseminate quality data products from all ISRO Satellite missions for meteorology and oceanography on near real time basis.
- To promote synergy of different sources of satellite data in to a practical and usable data sets for R & D in atmospheric and oceanic studies.
- To promote the use of satellite data for improvements in the applications of weather, climate and ocean forecast through numerical modeling.
- To ensure long term archival, management and services of all satellite based products and related information.

The scope of MOSDAC include:

- Facilitate the availability of Met & Ocean Geophysical data to the registered users for mainly research and academic purposes.
- Archival and dissemination of satellite data for Special Observation Periods (SOPs) for R & D purpose from national & international missions related to Meteorology and Oceanography.
- Providing a common platform for data exchange to development partners.
- Sharing of value added information obtained through applications of numerical models or process studies.

Key features:

- User friendly graphical interface.
- Easy availability of Met & Ocean data to the registered users.
- All the Met and Ocean data under single roof .
- Data for all listed missions can be extracted over Indian region, in original as well as in ASCII format.
- Extensive metadata for different types of search for ease of user selection.

Brief description:

The data center is in possession of various Indian and International satellite data products, analyzed data from models and observed data. It has past as

Figure 1: Portal Home page

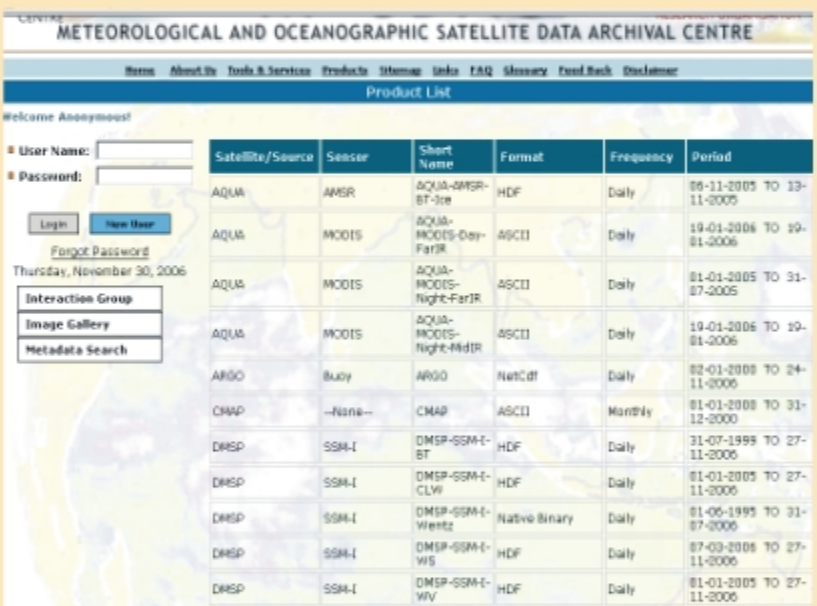

Figure 2: Sample Products list

well as current satellite data and will also have data from future ISRO satellite missions for weather, ocean and climate.

Presently, the data center contains data products from OCEANSAT-I, INSAT-3A, Kalpana, ERS-1, TOPEX/POSEIDON, SEASAT/NIMBUS, NOAA, METEOR-3, TERRA, AQUA, Quickscat, JASON-1, TRMM, DMSP, etc. The database consists of geo-physical parameters like Cloud Liquid Water, Perceptible Water, Rainfall, Temperature & Humidity Profile, Sea Surface Temperature, Sea Surface Wind, Sea Surface Wave, Earth Radiation Budget, etc. The database also contains numerical model analyses from NCEP, NCMRWF etc and associated observations like ARGO (Buoy), WOCE, GPCP, CMAP, etc.

The access to MOSDAC is through a web-based portal (mosdac.gov.in). It supports mainly two types of users (1) Registered users and (2) Anonymous users. Figure 1 shows the portal homepage.

Anonymous users can go through various pages of the portal including the general information and the list of metadata. They can search the data using our extensive metadata information through two mechanisms (1) search by satellite/ sensor and (2) search by geo-physical parameters.

If users wish to have access to these archived products, they need to register by completing a Registration Form (available on MOSDAC Web page). The registration of users is effected through submission of an on-line request form, which is scrutinized to ascertain that the data is used for research and academic purposes only. The user id and password is intimated, after scrutiny via e-mail, to complete the registration process. All users have to provide an undertaking that they will not use MOSDAC data for any commercial use directly or indirectly.

Registered users can browse the metadata and place request for the data. Depending on the policy, these users are categorized into various groups. The user request is executed after security checks. The requested data is placed on separate file system on ftp server (ftp.mosdac.gov.in) for a stipulated time (generally 7 days) for the user to download the data.

Data Available on MOSDAC Satellite Based Data

Sr. No.	Satellite	Sensor	Geo-Physical Parameters
1.	IRS-P4/ Oceansat-1	MSMR	BT, CLW, SST, Total Precipitable Water
2.	INSAT/ KALPANA	VHRR, CCD	CMV, OLR, Rain, UTH & SST
3.	AQUA	MODIS	SST
4.	DMSP	SSMI	Rain, Wind Speed, CLW & TPW
5.	ERS-1	Scatterometer	Sear Surface Wind Vector
6.	JASON-1	Altimeter	Sea Surface Wind , Waves & SSH
7.	NOAA	AVHRR	SST, Cloud Imagery
8.	Quickscat	Scatterometer	Sea Surface Wind Vector
9.	SEASAT/ NIMBUS	Altimeter	Sea Surface Wind , Waves & SSH
10.	TERRA	MODIS	SST

Data Available on MOSDAC From observations and Analysis

Sr. No.	Observations/ Analyses	Parameters
1.	NCEP Reanalysis	Temperature & Humidity Profile
2.	NCMRWF Reanalysis	Temperature & Humidity Profile
3.	Reynold Analysis	SST
4.	ECMWF Analysis	Surface met data & Temperature & Humidity Profile
5.	ARGO (BUOY) & WOCE Salinity	Temperature & Profile
6.	GPCP & CMAP	Rain
7.	AWS	Temperature, Pressure, Humidity, Sunshine & Rainfall

ELEVENTH POST GRADUATE COURSE ON REMOTE SENSING AND GIS

The Eleventh Post Graduate Course on Remote Sensing and Geographical Information System (RS & GIS) of CSSTEAP commenced on October 1, 2006 at Indian Institute of Remote Sensing, Dehradun. The course was formally inaugurated by Dr. B. N. Suresh, Director, VSSC, Thiruvananthapuram and Chairman, Science and Technology sub committee of UN-COPUOS on 20th November, 2006 at IIRS, Dehradun.

Total 22 participants from 14 countries of Asia Pacific region (Azerbaijan-1, Bangladesh-1 China- 1, India- 1, Indonesia- 1, Kazakhstan- 1, Kyrgyz Republic- 1, Mongolia- 2, Myanmar- 4, Nepal- 2, Sri Lanka- 2, Thailand- 2, Uzbekistan- 1, Vietnam- 2) are attending the course. The course duration is of 9 months and is divided into two Semester. Semester - I consist of Module - IA of 3 months and Module - IB of one months and semester - II consist of Module - II of 2 months and Module - III of 3 months duration. In the first week of the course an induction module consisting of lectures on overview of Satellite Meteorology, Satellite Communication, Space Science and Technology and Remote Sensing & GIS applications in Natural Resources Management and Environmental Assessment followed by an introduction of Social, Cultural and historical aspect of India were organized. Participants were also familiarized about Dehradun city and surrounding by conducting one day local sight seen trip. The module - IA covering theory, Practicals and tutorials on principal of Remote Sensing, GIS & GPS is now in progress and completing on 31st December 2006.

The course participants also attended one day technical workshop on the occasion of 40 Year Commemoration Function of IIRS-ITC

Course participants at Taj, Agra

collaboration in Capacity building held at IIRS Dehradun on 29th November 2006. Three during this module for ground truth collection utilized for interpretation and participants one each from Myanmar, Indonesia and Thailand participated at ISPRS Symposium held at Goa during 26-29 September, 2006. The course participants visited Taj Mahal, Agra and various historic places as part of educational tour to Delhi and Agra. Several field excursions were also arranged during this module for ground truth collection utilized for interpretation and analysis of satellite data.

To improve the English Communication and writing skills of the course participants, evening English classes are organized beyond office hours. These classes is conducted by an English teacher of Dehradun having experience in teaching national and international students. On the social front, the participants had glimpses of Indian festivities by their active participation in various festivals such as Dussehra, Diwali, Id-ul-Fitr,

FIFTH POST GRADUATE COURSE ON SATELLITE METEOROLOGY & GLOBAL CLIMATE

The fifth SATMET course of CSSTEAP commenced on August 1, 2006 at the New SAC Campus, Bopal, of Space Applications Centre (SAC), Ahmedabad. The course is being attended by 18 participants from 11 countries of Asia Pacific region.

The Participants completed the first 3 months module on October 31, 2006. This module covered the basic concepts in Remote Sensing, Meteorology, climatology, mathematical & statistical techniques etc. The afternoon sessions were devoted to meteorological Satellite data processing and analysis. INSAT-VHRR and NOAA-AVHRR data sets were extensively used by the participants. Periodic tests were conducted as part of the evaluation process. A number of tutorial sessions involving computations, problem solving etc by the participants were conducted. The follow up discussions with faculty were very lively and interesting. At the end of the module - I, examinations (both theory and practical) were conducted. The faculty of the module consisted of Senior Scientists of SAC, India Meteorological Department, Indian Institute of Tropical Meteorology, Pune, Cochin University and National Institute of Oceanography, Goa.

Participants enjoying and performing in a cultural evening

Department, Indian Institute of Tropical Meteorology, Pune, Cochin University and National Institute of Oceanography, Goa.

Dr. Allen Huang, Senior Scientist, Cooperative Institute for Meteorological Satellite Studies, SSEC/University of Wisconsin-Madison visited the Centre during November 6-9, 2006 and delivered a number of lectures. The topics included Infrared RT Theory, Sounding theory, Multi-spectral measurement characteristics, air quality monitoring etc. The participants had lively discussions and found the interaction very useful.

At the end of the Module 1 that concluded on the 31 October, 2006, the participants proceeded towards North India on their first Study tour. The visit to India Meteorological Department (IMD) New Delhi gave the participants an insight to various aspects of operational weather forecasting, involving extensive utilisation of INSAT and other Satellite Data. National Centre for Medium Range Weather Forecasts (NCMRWF) Noida, gave an exposure to operational modeling activities and high computing in general and medium range weather forecasts in particular.

The participants during their stay in New Delhi visited the symbol of modern architecture - Lotus Temple; and also places of historical importance in Delhi like - Jama Masjid, Red Fort (Lal Quila) and Qutub Minar. Delhi was a shopping bonanza as the participants were staying in the middle of the famous Karol Bagh market.

The participants while in Delhi visited nearby places of tourist importance such as, Agra and got a glimpse of the magnificent Taj Mahal, Agra Fort and Fatehpur Sikri. Participants also visited the CSSTEAP headquarters in the IIRS campus at Dehradun. The participants met Director CSSTEAP in his office and visited the facilities at IIRS. The participants also got the opportunity to meet the course participants of Remote Sensing and GIS. Many of them were happy to meet some of their country men and women on a foreign land. The participants also visited the near by hill station Mussorie, and spent a day there. At Dehradun the participants also visited the famous Forest Research Institute and other places of tourist importance.

The Second module dealing with advanced topics like Radiative Transfer, Geophysical parameter retrievals, Satellite data applications with emphasis on monsoon studies and tropical cyclones, Green House gases and global warming etc began from November 2, 2006. The foreign faculty would include Dr. Masami Tokuno of Japan Met Agency and Dr. Henk Verschuur of EUMETSAT.

FIFTH POST GRADUATE COURSE ON SPACE AND ATMOSPHERIC SCIENCE

The 5th PG Course in Space and Atmospheric Science of CSSTEAP started on August 1, 2006 at Physical Research Laboratory, Ahmedabad, the host institution.
The course in being attended by 13 participants from 7 countries namely India - 3, Lao PDR - 1, Mongolia - 3 , Myanmar - 1, Philippines - 1, Uzbekistan - 1, Vietnam - 3 of Asia - Pacific region.

The first semester of the course ended on Dec 15 and the Second Semester started on Dec 18, 2006.The examination for the first semester was conducted in the last week of Semester - I. Mr B L Agrawal and Mr U N Das, both ex ISAC Group Directors, have been

Course participants at Taj Mahal

Participants at Solar Infrared Gurushikhar Observatory, Mount Abu

invited to deliver lectures in Space Technology. Prof G S D Babu, Director Birla Institute Bangalore,Dr S Sampath from CESS Trivandrum and Prof Tom Gehrels from USA are among the distinguished faculty invited to deliver the lectures during semester II. The participants are busy in selection of pilot project along with the lectures currently going on.

The Semester - I break from September 22, 2006 to October 8 2006, has been utilized for educational tour during which, the participants visited Mount Abu, Gurushikhar Observatory as well as Udaipur Solar Observatory and conducted some of the experiments. The group also visited CSSTEAP Headquarters, Dehradun and on the way saw Taj Mahal, apart from city of Jaipur. The second break from Jan 31 to Feb 17 2007 would be utilized for visiting Andhra University Visakhapatnam,

BACKGROUND OF CSSTEAP

In response to the UN General Assembly Resolution (45/72 of 11th December, 1990) endorsing the recommendations of UNISPACE-82 the United Nations Office for Outer Space Affairs (UN-OOSA) prepared a project document (A/AC.105/534) envisaging the establishment of Centres for Space Science & Technology Education in the developing countries. The Objective of the Centres is to enhance the capabilities of the member states in different areas of space science and technology that can advance their social and economic development. The first of such centres, named as Centre for Space Science & Technology Education in Asia & the Pacific (CSSTEAP) was established in India in November 1995.

CSSTEAP Building

Department of Space, Government of India has made available appropriate facilities and expertise to the Centre through the Indian Institute of Remote Sensing (IIRS) Dehradun, Space

Applications Centre (SAC) & Physical Research Laboratory (PRL) Ahmedabad. The Centre is an education and training institution that is capable of high attainments in the development and transfer of knowledge in the fields of space science & technology. The emphasis of the Centre is on in-depth education, training and application programmes, linkage to global programmes / databases; execution of pilot projects, continuing education and awareness and appraisal programmes. The Centre offers Post Graduate level and short courses in the fields of (a) Remote Sensing and Geographic Information System, (b) Satellite Communications and GPS, (c) Satellite Meteorology and Global Climate, (d) Space and Atmospheric Sciences. A set of standard curricula developed by the United Nations is adapted for the educational programmes.

Onging Courses

- Fifth 9 month Post Graduate course in Satellite Meteorology & Global Climate at SAC, Ahmedabad from August 1, 2006.
- Fifth 9 month Post Graduate course in Space & Atmospheric Science at PRL, Ahmedabad from August 1, 2006.
- Eleventh 9 month Post Graduate course in RS & GIS at IIRS, Dehradun from October 1, 2006.

Forthcoming Courses

- Short course on Application of Space Technology for Disaster Management support with special reference to flood at IIRS, Dehradun during Aug - Sept, 2007.
- Sixth 9 month Post Graduate course in Satellite Communication at SAC, Ahmedabad from August 1, 2007.

India's second cartographic satellite "Cartosat-2" has been launched successfully and placed in orbit by PSLV rocket on January 10, 2007. More

CSSTEAP welcomes the views and opinions of the readers of Newsletter. Short communications on space science and technology education which may be relevant to Asia Pacific Region are also

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