

Title:/Titre:/Titel:

**Aerial Photography Use in National Land Reserve  
Monitoring and Conservation**

Author (s)/Auteur (s)/Autor (en):

Eng.Mihail Albotă, eng.Mihai Dumitrescu, eng.Olga Tanovici

Abstract:/Sommaire:/Zusammenfassung:

As a consequence of research development and enlargement, in the last years, a methodology regarding the national land reserve monitoring and conservation, using aerial photography, has been developed. Problems related to agricultural area growth, waste land put under crop, some lands temporarily out of crops, land slide, retirement and pollution monitoring, national land reserve planning and management project uses have been approached.

Title:/Titre:/Titel:

**DYNAMICAL ANALYSIS AND PREDICTION OF CHANGES  
IN NATURAL ENVIRONMENT OF DESERT USING AERIAL  
AND SPACE PHOTOS**

Author (s)/Auteur (s)/Autor (en): BABAEV A.

Abstract:/Sommaire /Zusammenfassung Studied the desert environment and predicted its changes in Turkmen SSR, the surroundings of Tedzhen river being as an example. Large and transient changes can only be checked by application of remote sensing which allows to study them quickly and systematically.

Space photos "Meteor" with low (600-1000m) and medium (250-500m) resolution, photos obtained by the orbital station "Salyut-4" and space ship "Soyuz-22" and aerial photos as well were used. Above that analysis was done by application of thematic and topographic maps compiled in different years.

"Meteor" photos were used for systematical analysis of changes. The band of 0,6-0,7 mkm is the most informative to study oases. Photos of repeated missions allowed to study the features and size of changes, to estimate their trends and rate. This information together with perspective plans of national economy development were used for prediction of changes in the region.

## SNOWCOVER AND THE OPEN PATCHES

Anil K. Bagchi

Satellite pictures provide a convenient method of determination of snow cover area (SCA) which is an input in a number of stream flow models. Methods of extraction of SCA vary widely, from simple manual methods to sophisticated digital techniques. The simplest method consists of determination of the transient snowline altitude; SCA can then be calculated from the area-elevation curve of the basin. This method is applicable in mountainous basins where the transient snowline is expected to follow the elevation contour, under the assumption that the open patches inside the snow covered area can be ignored. On the other hand one can measure SCA, patch by patch, by manual and digital methods. Manual methods are labourous where the open patches are not ignored; digital methods are costly. Interrelated to all these is the vexed question of determining where the snow ends.

Even a casual look reveals that there are, in general, many open patches inside the snow covered area and the question looks stark: what to do with these open patches? They are difficult to measure by manual methods, but can be taken care of adequately by digital techniques. But the real question is whether measurement of SCA, patch by patch, is necessarily better. Nobody measures snow cover per se; it is measured to estimate the amount of water that will be available from an area nominally under snow. Since the open patches contribute to water input in a basin through advection it is reasonable to enquire how to handle this phenomenon.

There are streamflow models which ignore open patches inside the snowcovered area and also there are others which use the net area under snow as the model input. It is necessary to enquire why and how both work.

The proposed paper deals with these points and suggests answer to the questions raised above. The conclusion is that the simple photo-interpretation technique ignoring the open patches is as good as sophisticated techniques.

Title:/Titre:/Titel:

MAIN CONTRIBUTIONS OF THE WORKING GROUP VII.3 TO REMOTE SENSING  
IN THE THERMAL INFRARED BANDS

Author(s)/Auteur(s)/Autor(en):

F. BECKER

-Abstract:/Sommaire:/Zusammenfassung:

The main results of the works in the thermal infrared bands performed by Working Group VII.3 and discussed during the two international colloquiums held in France at Avignon in 1981 and at Bordeaux in 1983 are reviewed. These works include fundamental researches, progresses in methodology and instrumentation as well as applications in climatology, geology, agronomy. More precisely, will be discussed :

- 1- The meaning of the thermal infrared radiances for an heterogeneous non flat pixel, such as a canopy, and their angular and seasonal variation as well as their spatial variability.
- 2- Properties of spectral emissivities and backscattering coefficients of various media.
- 3- Methods and results on the quantitative analysis of multi-source data in the thermal infrared bands (NOAA, HCMM and Meteosat), including improved classifications, texture analysis, spatial variability and inverse methods with their validation.
- 4- Various applications of thermal infrared bands in agronomy (stress indices, crop yield estimation, frost zones, evapotranspiration), geology (spectral analysis of geologic material, thermal inertia estimation), climatology (radiative and heat fluxes determination).

Title:/Titre:/Titel: Aerial Photo Interpretation of Forest Habitat Types

Author (s)/Auteur (s)/Autor (en): William A. Befort  
Joseph J. Ulliman

Abstract:/Sommaire:/Zusammenfassung:

Using classification systems developed by plant ecologists, foresters classify forest sites in the Rocky Mountains into several habitat types on the basis of the vegetation communities they support at climax; knowledge of the habitat type to which a given site belongs is useful in setting management goals and strategies. Lately, aerial photography taken at very large scales has emerged as an economical alternative to conventional field methods in the gathering of various kinds of forestry data. In an attempt to determine whether the habitat type of a forest stand could be accurately interpreted from such photography, 156 stands in northern Idaho and eastern Washington were photographed from the air at an average scale of 1:900. After ground checking, an identification key was assembled, and five interpreters were given some preliminary training and then asked to assign 111 sample stereoscopic plots--representing 16 out of a total of 21 different types--to their appropriate habitat type categories. A success rate of approximately 75 percent was achieved. Extreme misclassifications were infrequent, and interpretations were highly correlated with the positions of the types along an altitudinal gradient.

Title:/Titre:/Titel:

Remote Infrared Thermal Surveys, A Method of Monitoring Active Volcanism at Mt. St. Helens, Washington State

Author (s)/Auteur (s)/Autor (en):

Richard W. Birnie (Dartmouth College, Hanover, NH 03755 USA) and Robin T. Holcomb (U.S. Geological Survey, Vancouver, WA 98661 USA)

Abstract:/Sommaire:/Zusammenfassung:

Land-based thermal infrared surveys provide a useful means of monitoring active volcanism. These techniques are being used to monitor the growth and thermal regime of the growing dacite dome in the summit crater of Mt. St. Helens. Thermal measurements of the top two thirds of the dome were made on Sept. 9, 1983. Apparent temperatures ranged from  $-14^{\circ}\text{C}$  to greater than  $75^{\circ}\text{C}$ . A composite thermal map was produced from 648 individual readings. There is a strong correlation between the apparent temperature and age of the individual domal units. The hottest region is the lobe on the northeast flank of the dome; this lobe began to grow in May 1983 and was continuing at the time of the infrared measurements. The next hottest region was the lobe that grew between February and April, 1983. While no visible glow was observed during these daytime measurements, red incandescence is clearly visible at night.

Title:/Titre:/Titel: *Etude de la Mangrove au BANGLADESH à l'aide de simulations SPOT et de vérités terrain*

Author (s)/Auteur (s)/Autor (en): F. BLASCO, F. LAVENU (ICITV)  
G. BEGNI, Y. KERR (CNES)

Abstract:/Sommaire:/Zusammenfassung:

*Les mangroves jouent un rôle économique très important dans certaines régions tropicales. Cet article montre comment, à l'aide de simulations d'images SPOT, nous avons pu réaliser une cartographie précise des différentes variétés de mangroves et comment il sera possible de suivre l'évolution très rapide de ce milieu presque inaccessible par des méthodes de télédétection à haute résolution. Les résultats présentés portent sur trois zones où ont été effectuées des mesures terrain.*

Title:/Titre:/Titel: APPLICATION OF THE REMOTE SENSING TO THE CHARACTERIZATION OF SOME ONE BODIES (IRON, NICKEL, COPPER) IN ARID REGIONS OF MOROCCO

Author (s)/Auteur (s)/Autor (en): Alain BOTHEREL, Philippe BOUCHET, Bernard CERVELLE, Jean CHOROWICZ, Guy TAMAIN

Abstract:/Sommaire:/Zusammenfassung:

In the laboratory, Continuous Diffuse Reflectance Spectra (325-2100nm), with gaussian band-fitting, were drawn from the natural outcrop surfaces of collected and analyzed rock samples. Then, Spectrometric Field Measurements were performed on the arid mineralized areas, located in South Morocco, where the rock samples come from : an iron cap, a copper impregnation within red sandstones, and a cobalt-nickel bearing deposit linked with serpentized ophiolitic series. At least, the Treatment of the Landsat Datas of these mineralized areas was processed. The comparison of the results at the three scales leads to the following conclusions : 1./ The automatic mapping of serpentized ophiolitic bodies is easy by remote sensing but the faint nickel anomaly in surface has not been detected ; 2./ Favourable spectral conditions facilitate the remote prospection of the iron sulfide bearing deposits oxidized at the surface into an iron cap ; 3./ Difficulties were encountered for the remote sensing of the copper deposit, for which a set of optimizing spectral bands is proposed for the future sensors.

Title:/Titre:/Titel: SPOT SIMULATION PROGRAM

Author (s)/Auteur (s)/Autor (en): J.C. CAZAUX  
Administrateur du GDTA/France

Abstract:/Sommaire:/Zusammenfassung:

In the frame of the SPOT preparation we have undertake many simulations campaigns in France and also in fourteen others foreign countries. At this time we have made 14.000 square kilometers, 400 frames over 80 different areas, more than fifty laboratories and organization are associated for the data interpretation.

Two technical approaches for the simulations of SPOT parameters have been set up : are geometric and are radiometric. First results give an overview of SPOT capabilities in many applications fields as cartography, geology, land use, coastal studies, forestry ...

We shall summarize the SPOT simulations concepts, and will give some examples by concentry with different thematic applications.

Title:/Titre:/Titel: REGIONAL MORPHO-GEOLOGIC STRUCTURES IN PARTS OF HIMALAYA - FROM LANDSAT IMAGERIES

Author (s)/Auteur (s)/Autor (en): R. A. CHANSARKAR, Terrain Research Laboratory, Delhi, V. K. VERMA,  
Department of Geology, University of Delhi.

Abstract:/Sommaire:/Zusammenfassung:

The follow up of tectonic lineaments and lithographic contacts by major drainage segments, variations in tones and phototextures on ridge slopes, their relationship with slope aspects and widths etc. have been utilised from multiband Landsat imageries at 1:1 million and 1:250,000 scales to map different litho-complexes and their tectonic set up. The combined stratigraphic, tectonic and climatic effects on morphology are analysed in two river valleys with respect to river widths, terraces and flood plain formations, rock types and tectonic lineaments. The peculiar geometric patterns of bottlenecking of major Himalayan rivers cutting across the foot hill Siwalik ranges are analysed with respect to Main Boundary fault and orogenic events. The longitudinal profiles of these rivers reflect rejuvenation.

Title:/Titre:/Titel:

APPLICATION POTENTIALS OF THE NIMBUS-7 COASTAL ZONE COLOR  
SCANNER REMOTE SENSED DATA TO COASTAL FISHERIES

Author (s)/Auteur (s)/Autor (en):

CHAO-CHIN, CHEN

Abstract:/Sommaire:/Zusammenfassung:

This study was to evaluate the potential of using satellite acquired remote sensing data to determine the probable locations of oceanic groundfish. This objective was explored through a series of correlations among aerospace (NIMBUS - 7, CZCS) imagery and sea-gathered reference data related to the marine environment and groundfish resources. Available NIMBUS-7, CZCS data were analyzed in conjunction with sea truth oceanographic measurements and oceanic groundfish distribution data from an 8,000 square nautical miles study area in the north-central Gulf of Mexico. Oceanographic parameters and surface radiance values from Channel 1, 2, 3, 4, 5 and 6 (ratio band) of the NIMBUS-7, CZCS data were used in the development of model for prediction of oceanic groundfish distribution. This model showed significant improvement over the models developed for the same time period solely from sea truth parameters.

Title:/Titre:/Titel:

Analytical Approach to Treat the Bidirectional Reflectance Distribution  
Function of the Rice Crop

Author (s)/Auteur (s)/Autor (en):

A. J. Chen and C. C. Lin

Abstract:/Sommaire:/Zusammenfassung:

Starting from a microscopic point of view, we propose an analytical approach to treat the Bidirectional Reflectance Distribution Function (BRDF) of the rice crop. It is suggested that the BRDF can be decomposed into two components, called "reflectance map" and "effective leaf area map". The former is reconstructed by the knowing optical properties of each small elements of the rice canopy. The optical properties are characterized by its surface normal vector and the phase function of the surface material. The "effective leaf area map" on the other hand, is determined by the geometrical orientation of the leaves with respect to the sensor. By solving the solution for those two maps, we are able to reproduce the observed "V" shaped BRDF. Our approach is particularly useful during the active tillering period when the leaves won't cast shadow on one another.

Title:/Titre:/Titel:

LANDSAT DATA FOR CARTOGRAPHY LAND USE

Author (s)/Auteur (s)/Autor (en):

MIGUEL A.CHICO (Dpto.Foto Cartografico)

Abstract:/Sommaire:/Zusammenfassung: U.P.L.R.

It is presented here the method to produce a map of use of soil 1:250.000 of La Rioja province (100.000 Km<sup>2</sup>), Argentina, arid zone of the country.

For its elaboration it's followed Anderson J.R., Hardy E.E. and Road J.T. "A Land Use Classification System for use with Remote Sensor Data (1972).

Satellite images were used of MSS and RBV Brasils INPE and MSS from Eros Data Center.

Title:/Titre:/Titel:

CARTE GEOLOGIQUE TELEANALITIQUE DU HAUT ATLAS OCCIDENTAL (MAROC).  
COMPARAISON AVEC LES DONNEES GEOPHYSIQUES ET DE FORAGES.

Author (s)/Auteur (s)/Autor (en):

Jean CHOROWICZ , Université de Paris VI. (France).

Fida MEDINA , Université Mohamed V , Rabat (Maroc).

Abstract:/Sommaire:/Zusammenfassung:

Pour établir la carte téléanalytique du Haut Atlas occidental, nous avons adopté la méthode de "l'analyse intégrale" qui cherche à reconnaître tous les objets géologiques observables sur les images spatiales (formations lithologiques, repérage des couches, estimation des pendages et analyse des fractures).

Dans le socle apparaît un réseau d'accidents de direction N070, correspondant à de profondes failles crustales ayant fonctionné plusieurs fois.

Dans la couverture, les accidents sont peu nombreux mais importants:  
-la Zone des dômes, à structures circulaires diapiriques, est bordée à l'Ouest par le "Linéament de Tafelney-Hadid" (N020), relayé par la "flexure de la Méséta" (N050). Le passage au bassin des Haha se fait par l'anticlinal d'Amsitten (N070), prolongé par cinq plis disposés en échelon.  
-La Zone axiale est dominée surtout par des plis et des accidents de direction N100.

Ces linéaments se superposent parfaitement à des anomalies gravimétriques et à des virgations d'isopaques construits d'après les forages.

MONITORING WITH THE AID OF AERIAL PHOTOGRAPHY.  
THE NATURAL ENVIRONMENTS OF A NEW TOWN

W. Gordon Collins.

Peter Collier

Milton Keynes is the most recent of the new towns established in the U.K., and in its development it was possible to benefit from the experiences - especially the mistakes - encountered in establishing previous new towns.

One factor, which is now accepted as of prime importance, is the need to preserve and maintain the quality of the natural environment, and to minimise the destruction of the natural habitat.

This need to preserve environmental quality imposes some constraints on the type and location of urban development which might take place in the new town site.

In order to plan effectively within these constraints it is necessary to acquire a suitable data base to map, measure and monitor the natural environment.

This paper outlines the methodology developed and the results obtained, when using vertical aerial photography as the sole data source, for carrying out an inventory of natural environments.

By using sets of aerial photography dated 1968 and 1979 it was possible to map and monitor changes in the natural environment of the developing town and its surroundings. This enabled the planning authority to identify where development might create environmental damage.

In addition to the mapping programme all the areas were measured using an electronic co-ordinate digitiser, and the magnitude of the changes were determined.

The town is still growing, and future monitoring is planned to assist the development corporation in its efforts in making Milton Keynes not only the most modern of English new towns but also the most environmentally desirable.

This paper clearly shows the substantial values of using aerial photography as the data source for guiding planners in the development and expansion of this exciting new town.

Title:/Titre:/Titel:

Investigation of Some Factors Affecting Digital Multispectral Classification

Author(s)/Auteur(s)/Autor(en):

Elisabeth Dennert-Möller

Abstract/Sommaire/Zusammenfassung:

The quality of the results of digital multispectral classification depends on the classification method, the definition of classes, the training areas and the features selected for the discrimination of the classes. The factors influencing the classification result are size and homogeneity of the training areas, the representation of each class by its training areas and the separability of the classes. The characteristics of classes and training areas should be investigated before doing classification. Statistical analysis leads to an optimal selection of training areas and features for digital multispectral classification. An adequate classification concept is presented. Its application is demonstrated with examples of tidal land mapping from remote sensing imagery of different sensors.



Title:/Titre:/Titel: Mapping the extent and intensity of forest fire in a reforestation area using Landsat 3 MSS data and 35 mm oblique aerial photographs

Author (s)/Auteur (s)/Autor (en): Attilio Antonio Disperati;  
Daniel Simionato Tozzini

Abstract:/Sommaire:/Zusammenfassung: This paper deals with the mapping the extent and intensity of a forest fire that burnt 672 ha of a 2.700 ha reforestation area with Pinus taeda. The area was located in the east part of Paraná State, Brasil. The 35 mm oblique aerial photographs and Landsat imagery were acquired, respectively, 8 and 25 days after the fire. The Landsat CCT data were processed in the GE I100 at INPE ;visual interpretation were carried out on the enhanced images of bands 5,7 and colour composites. The 35 mm photographs and Landsat image allowed the mapping of 4 and 2 damage levels due the fire. Analysis and results are given for the mapping using the two remote sensor data.

Title:/Titre:/Titel:

Evaluation of Entropy and J. M. distance criterions as feature selection methods using spectral and spatial features derived from Landsat images.

Author (s)/Auteur (s)/Autor (en):  
Luciano Vieira Dutra and Fernando Augusto Mitsuo Ii.

Abstract:/Sommaire /Zusammenfassung:

This research had the purpose of evaluating the performance of entropy and JM-distance feature selection methods, using LANDSAT satellite images. A study area near Ribeirão Preto in São Paulo states was selected, with predominance in sugar-cane. Eight features were extracted from the four original bands of LANDSAT image, using low-pass and high-pass filtering to obtain spatial features. There were five training sites in order to acquire the necessary parameters. Two groups of four channels were selected from twelve channels using JM-distance and entropy criterion. The number of selected channels was defined by physical restrictions of the image analyzer and computational costs. The evaluation was perfomed by extracting the confusion matrix for training and tests areas, with a maximum likelihood classifier, and by defining performance indexes based on those matrixes for each group of channels. The results showed that spatial features and supervised classification, the entropy criterion is better in the sense that allows a more accurate and generalized definition of class signature. On the

## Title:/Titre:/Titel:

Organisation superficielle et télédétection des  
sols de la région de Tataouine (Sud tunisien)

## Author (s)/Auteur (s)/Autor (en):

Richard ESCADAFAL

## Abstract:/Sommaire:/Zusammenfassung:

Dans les régions arides les valeurs de luminance spectrale enregistrées par les satellites Landsat dépendent essentiellement des caractères de la surface des sols. Dans la zone étudiée, ceux-ci évoluent lentement et nous avons pu, en utilisant une méthode d'échantillonnage au sol originale, comparer les "signatures spectrales" des surfaces de différentes unités de sols. Elles dépendent principalement de la texture superficielle au sens large (pierrosité, abondance des graviers et sables, battance), la végétation intervenant par l'ombre qu'elle crée.

En nous basant sur ces signatures, nous avons généré des cartes des types de surface de sols par classification multispectrale des données Landsat. Grâce aux relations sols-surfaces, ces cartes sont interprétées en unités morphopédologiques (pour la reconnaissance des ressources en sols), mais elles peuvent également être utilisées par les phytoécologues et les hydrologues.

## Title:/Titre:/Titel:

Geologic Mapping from Spaceborne Radar Images in Heavily Vegetated Tropical Environments

## Author (s)/Auteur (s)/Autor (en):

J. P. Ford

## Abstract:/Sommaire:/Zusammenfassung:

Spaceborne Shuttle Imaging Radar (SIR-A) images are compared with corresponding coverage acquired by airborne synthetic-aperture radar (SAR) over portions of Brazil and Colombia. Differences in feature perception and geologic interpretability are related to differences in imaging geometry, ground resolution, and wavelength of the respective imaging radar sensors. Interpretability of subdued drainage channels and canopy morphology in areas of low relief is critically dependent on radar incidence angle. High values ( $> 75^\circ$ ) used on the airborne SAR enhance subdued features due to shadowing. At lower values ( $< 55^\circ$ ) used on SIR-A there is insufficient image contrast for perception of subtle surface topography. Radar reflectivity from floodplains varies with wavelength. Bright response at a longer wavelength corresponds locally to dark response at a shorter wavelength. Corresponding Landsat multispectral scanner (MSS) coverage emphasizes the character of the vegetation cover. Our observations suggest that a variable incidence angle capability will improve the potential for geologic mapping with spaceborne imaging radars.

## Title:/Titre:/Titel:

Urban Feature Extraction from Thematic Mapper Data.

Author (s)/Auteur (s)/Autor (en): Dr. Bruce C. Forster,  
School of Surveying,  
Centre for Remote Sensing,  
University of New South Wales, Australia.

## Abstract:/Sommaire:/Zusammenfassung:

The increased resolution and number of spectral bands of Landsat Thematic Mapper data offers an improved capability for monitoring urban areas. Thematic data imaged over the St. Louis region of the United States is investigated to determine the most appropriate bands and band combinations for urban feature extraction. A maximum likelihood classification procedure is applied using different data set combinations from the increased number of bands as input, and these results and those derived from various ratio combinations and principal component analysis are systematically evaluated.

## Title:/Titre:/Titel:

Temporal Monitoring of a High Density City using Landsat Data.

Author (s)/Auteur (s)/Autor (en):

Dr. Bruce C. Forster,  
School of Surveying,  
Centre for Remote Sensing, University of New South Wales, Australia.

## Abstract:/Sommaire:/Zusammenfassung:

Many cities in the developing world are currently undergoing rapid expansion due to natural increase, industrialisation and a movement of rural workers to urban centres. In many cases urban administrators are unable to access up-to-date information on these changes because they are too rapid and an adequate data collection system is unavailable. Satellite remote sensing offers some prospects for monitoring these changes, or flagging where change has taken place for more detailed investigation. A study currently being undertaken of the city of Surabaya, Indonesia, examines techniques for monitoring changes in land use over a three period 1978-1981, using Landsat M.S.S. data. Difficulties arise because of the high density of the city and the low percentage vegetation cover which limits discrimination, and the different atmospheric conditions encountered between the two dates. Image to image registration of two October scenes was effected using six control points, with resampling by cubic convolution. Change detection was attempted using a number of methods with the best results in general being from a maximum likelihood classification of an eight spectral band composite image.

ETUDE DE L'EVOLUTION DES PAYSAGES NATURELS :  
 UN EXEMPLE EN REPUBLIQUE POPULAIRE DU BENIN .

C-M. GIRARD M-C. GIRARD A. NAEGELE R. OKIO

De nombreux pays ont un besoin urgent d'informations à petite échelle et rapidement actualisables sur l'état et l'évolution des paysages naturels. Par exemple, en zone intertropicale africaine, l'action conjuguée du climat (sahélisation) et de la pression démographique (défrichements, intensification de la culture) provoque une évolution extrêmement rapide du couvert végétal. La disparition des forêts et des savanes arborées, liée aux défrichements et feux répétés, risque de poser de graves problèmes d'érosion des sols et diminution des réserves en eau. Une étude des paysages a été entreprise en République Populaire du Bénin.

Parmi les données de télédétection facilement disponibles sur le pays, les données Landsat ont été utilisées. Des mesures de radiométrie sur le terrain montrent le bien-fondé de l'utilisation d'indices de végétation pour la distinction d'unités de pâturage à fonction chlorophyllienne plus ou moins active. Un premier zonage a été entrepris sur une image d'une scène Landsat, traitée par les indices de végétation. Sur l'image traitée, les pâturages encore chlorophylliens, les forêts galeries, les zones d'emprise agricole, ressortent nettement.

Une comparaison diachronique montre comment s'est fait l'évolution au cours d'une période de 6 ans.

Title:/Titre:/Titel:

Monitoring Tropical Forest Ecosystems  
 Using Remote Sensing Technology

Author (s)/Auteur (s)/Autor (en):

K. M. Green

Abstract:/Sommaire:/Zusammenfassung:

Tropical and subtropical forests have been declining as a result of numerous factors. In general, the available information on the status of tropical forests in conjunction with land use changes of converted forest areas is far from satisfactory. Quantitative information to document this loss is essential for management of these tropical ecosystems. The use of satellite remote sensing for tropical natural resource inventories is extremely promising. Finally, the need to pursue such applications in conjunction with an overall Land Resources Information System as envisioned by NASA will be highlighted.

Title:/Titre:/Titel:

AN INTEGRATED REMOTE SENSING AND GEOGRAPHICAL  
INFORMATION SYSTEM: THE JAMAICAN EXAMPLE.

Author (s)/Auteur (s)/Autor (en):

MARK D. GRIFFITH

Abstract:/Sommaire:/Zusammenfassung:

The collection and use of resource data in Jamaica, like most countries of the developing and industrialized world, exhibit a high degree of sectorial compartmentalization. Resource managers are constrained in the decision making process by sparse, fragmented and inadequate information for the rational exploitation, management and conservation of the country's resources. The institutionalization of a nationally consistent resource data base is a prerequisite to national planning and development. The establishment of a reliable data base is extremely critical to developing countries whose survival depends considerably on the exploitation of natural resources.

A critical analysis of the implications resulting from the transfer of the Comprehensive Resource Inventory and Evaluation System's (CIRES) Geographic Information and Analysis System is undertaken. ~~The potential of an integrated remote sensing and geographical information system is examined within the context of~~ existing institutional and infrastructural constraints.

Title:/Titre:/Titel:

REMOTE SENSING TECHNIQUES FOR THE ASSESSMENT  
AND SURVEILLANCE OF WATER RESOURCES ON THE ROMANIAN  
TERRITORY

Author (s)/Auteur (s)/Autor (en):

Dr. Horia Grumăzescu, dr. Cornelia Grumăzescu, Sorina Stănculescu,  
George Stăncălie

Abstract:/Sommaire:/Zusammenfassung: As far back as 1975 the research activity in the Institute of Meteorology and Hydrology-Bucharest began concentrating on the application of the remote sensing techniques to the assessment and surveillance of water resources in Romania. The ultimate objective of this activity was the achievement of an operative remote sensing system able to provide reliable information in due time to ground decision taking in certain fields of water management. This system, at higher hierarchical level, acts as a subsystem of the national hydrometeorological informational system. The structure of this system covers: a) a central unit provided with optical-electronic and electronic equipment performing the processing, storing and analysing the remote sensing data; b) a network of sampling areas and stations at the ground; c) communication channels with the sampling stations and areas on the ground. The data resulting are used in determining parameters, states and, partially, hydrological model inputs (water balance and runoff forecasting).

## Title:/Titre:/Titel:

Main conclusions of the activity of the working group VII.3 between 1980 and 1984

## Author(s)/Auteur(s)/Autor(en):

GUYOT Gérard

## Abstract:/Sommaire:/Zusammenfassung:

The working group VII.3 : spectral signatures of objects in remote sensing has organized two international colloquium, in 1981 in Avignon (170 participants, 20 countries represented) and in 1983 in Bordeaux (270 participants, 27 countries represented) and it has also participated to the symposium of Commission VII in 1982.

The aim of this group is to open discussions within the international scientific community on the relationships existing between the spectral properties of an object and the radiations which are reflected or emitted in different wavelength. ranges from visible to microwaves.

This paper presents the main conclusions and recommendations which can be deduced from the different meetings and which can be used for the orientations of works to come.

## Title:/Titre:/Titel:

ASSESSMENT AND MONITORING OF RENEWABLE NATURAL RESOURCES - CONCEPTS AND APPLICATIONS

## Author(s)/Auteur(s)/Autor(en):

Prof. Dr. H. Haefner, Department of Geography, University of Zurich

## Abstract:/Sommaire:/Zusammenfassung:

Today, the renewable natural resources in almost all parts of the world must be used to its full potentials. But it should be achieved without exhausting its stock or causing environmental damage. The assessment of the area, stock and condition of the resources is a basic requirement for a meaningful and effective management and planning. The monitoring capacity leads to a systematic survey of the changes in its time-spatial dimensions and an evaluation of the related ecological characteristics. Only an integrated approach combining remote sensing technology with other data sources will lead to the development of a consistent, timely and spacially defined resource inventory. A new concept is demonstrated to integrate various types of analog as well as digital remote sensing data into a spacially referenced information system and its combination with other data sources. Two main forms of geometric corrections allow a multistage and multitemporal sampling. Applications and examples are presented to demonstrate advantages and possibilities of such an integrated approach.

Title:/Titre:/Titel: Remote sensing Interpret. + Dig.Im.Processing

### Image Processing of Multispectral Data

Author (s)/Auteur (s)/Autor (en):

H. S. Helbig

Abstract:/Sommaire:/Zusammenfassung:

An overview is given of sophisticated image processing of multispectral data. The DIBIAS image processing system of the DFVLR is used for the following demonstrated examples:

Radiometric and atmospheric correction of image data for oceanographic research.

Supervised and unsupervised classification methods from spectral and textural signatures.

Synthetic channel generation for color display and thematic mapping.

Global and local geometric rectification of scanner imagery, mapping and mosaicking of scenes.

Generation of synthetic stereo image pairs and relief shadowing.

Title:/Titre:/Titel:

Digital Processing of The NIMBUS-7 CZCS Image in The Adjacent Waters of JAPAN.

Author (s)/Auteur (s)/Autor (en):

T.Hosomura, H.Shimoda and T.Sakata

Abstract:/Sommaire:/Zusammenfassung:

The amount of chlorophyll in the adjacent waters of Japan can be predicted by using the digital processing of the NIMBUS-7 CZCS image and sea truth data. Multiple regression analysis was used in this

analysis. In this paper, the method is explained precisely.

At the result, the distribution pattern of the chlorophyll can be extracted.

## Title:/Titre:/Titel:

Application of Remote Sensing Techniques to the Study of Coastal Engineering Problems

## Author (s)/Auteur (s)/Autor (en):

J. M. Hubertz  
Coastal Engineering Research Center

## Abstract:/Sommaire:/Zusammenfassung:

The Coastal Engineering Research Center has a program in remote sensing to research and apply remote sensing techniques in the solution coastal engineering problems. The objective and methods of this program will be discussed.

A number of experiments have been conducted in this program which demonstrates the effectiveness of various techniques in measuring coastal oceanographic parameters such as waves and current. These experiments have employed ground based imaging radar, synthetic aperture radar (SAR), high frequency radar (CODAR) and continuous wave radar. The experiments will be discussed and examples of the results will be shown.

## Title:/Titre:/Titel:

INFORMATION NEEDS IN FORESTRY - SCOPE AND STATUS OF SATELLITE REMOTE SENSING WITH SPECIAL REFERENCE TO INDIAN CONDITIONS

## Author (s)/Auteur (s)/Autor (en):

R.N. Jadhav

## Abstract:/Sommaire:/Zusammenfassung:

The forest area in India is about 22.7 percent of the total geographical area as against 33 percent of the world coverage. There is a need of a technique which can provide reliable and essential data with a reasonable quick turn around time. This paper discusses in detail the information needs for preparing forest working plan using remotely sensed data. Though discussions in this paper are based mainly from the experience gained through Landsat studies, the projection of information needs and feasibility of satellite imagery to fulfil them is aimed to utilise data from future Indian Remote Sensing Satellite (IRS).



## Title:/Titre:/Titel:

LANDSAT MSS DATA IN PREPARATION OF FOREST WORKING PLAN - A CASE STUDY IN DANGS, GUJARAT AND HIMACHAL/HIMALAYAN REGION

## Author (s)/Auteur (s)/Autor (en):

R.N. Jadhav and A. Narain

## Abstract:/Sommaire:/Zusammenfassung:

Map showing the areal extent of forest cover as depicted by density classes or growing stock is used in preparation of forest working plans (also known as treatment plans). The working plans are usually prepared at 10 years rotation. The conventional method of collecting data inputs required for preparing working plans is time consuming and by the time, the working plan is implemented, the area under forest itself changes. This paper illustrates the use of Landsat MSS data in providing this information as specified by the foresters through the examples of studies conducted in deciduous (Dangs, Gujarat) and temperate (Himachal/Himalayan region) forests.

## Title:/Titre:/Titel: Remote Sensing of Forest Dynamics in Tropical Regions

Author (s)/Auteur (s)/Autor (en): Armond T. Joyce and Steven A. Sader

Abstract:/Sommaire:/Zusammenfassung: A research project for the remote sensing of forest dynamics in tropical regions as conducted by the Earth Resources Laboratory of the National Space Technology Laboratories is outlined and discussed. The project addresses two general objectives: (a) to develop an ecologically-oriented classification scheme utilizing information from remotely sensed data, and (b) to design an inventory/sampling system based on remotely sensed data.

Study sites have been selected in Louisiana, Mississippi, Puerto Rico, and Costa Rica. The research conducted on the study site in Puerto Rico is closely coordinated with the Institute of Tropical Forestry and the U.S. Forest Services Southern Forest Experiment Station. The research in Costa Rica is coordinated with the Organization for Tropical Studies, the Tropical Science Center, and several Costa Rican government Agencies.

In consideration of the persistent cloud cover of tropical regions, one research task investigates the use of synthetic aperture radar. Due to the continuous nature of the tropical forest canopy and the importance of the canopy height variable, another research task focuses on the use of laser profilers for estimating canopy height.

Title:/Titre:/Titel:

SEASONAL CHANGES AND TEMPERATURES DISTRIBUTION IN THE REGION OF INTERACTION OF LA PLATA RIVER AND THE OCEAN.

Author (s)/Auteur (s)/Autor (en):

H.Karszenbaum, D.A.Gagliardini, V.Klemas and R.Legeckis

Abstract:/Sommaire:/Zusammenfassung:

In the external zone of La Plata River and in particular in the region where its oceanic front interacts with the Malvinas Currents, large annual fluctuation in the temperature field are produced. These changes are due to the variations in the northern limit of this current. In this paper, a study on this region using information obtained with the satellite system TIROS N-Advanced Very High Resolution Radiometer during the period July 1979-February 1980 is presented. The surface temperature distributions in Winter, Spring and Summer are shown and analyzed.

Title:/Titre:/Titel: APPLICATION OF REMOTE SENSING FOR COMPILATION OF NATURE CONSERVATION MAPS IN THE DESERT ZONE

Author (s)/Auteur (s)/Autor (en):

N.Kharin

Abstract:/Sommaire:/Zusammenfassung:

The nature conservation maps are divided into two groups: complex and one-purpose. Desertification maps belong to the first group, they are prepared at small, medium and large scale. One-purpose maps show only one process (wind erosion, water erosion, soil salinization etc.).

A desertification map of Turkmenistan arid lands was prepared on the base of Salut-4 space photos. The map contains the following criteria: desertification classes (very severe, severe, moderate, slight), desertification types (degradation of vegetative cover, wind erosion, water erosion, soil salinization), desertification causes (overgrazing, tree and shrub cutting, construction works etc.). The areas are also shown where melioration of natural environment has been done.

## REMOTE SENSING OF WILDLIFE HABITATS IN A COASTAL ENVIRONMENT

S. Khorram and H.M. Cheshire

Substantial increases in human population and industrial growth have had severe impacts on the environment. Development and industrialization have had particularly adverse impacts on wildlife. In an effort to protect the state's wildlife resources, the North Carolina Wildlife Resources Commission has been investigating procedures for making a statewide habitat base map to be used in habitat evaluation, conservation, and management. Repetitive remotely-sensed data from Landsat satellites have the potential of providing a cost-effective and timely procedure for mapping habitat types. The objective of this study is to demonstrate the usefulness of Landsat Multispectral Scanner (MSS) digital data in mapping wildlife habitat types based on land use and land cover categories. The study area covered about 1,000,000 acres in North Carolina's Coastal Plain.

The cover types chosen for mapping were selected and reviewed by personnel from the Wildlife Resources Commission. The categories constituted a basic inventory of wildlife habitats found in the Coastal Plain. Analysis of Landsat digital data was performed by personnel from NC State University at facilities located at the Computer Graphics Center. Landsat-4 MSS digital data collected September 24, 1982, were used in the study.

Training sites of approximately 100 acres (10 pixels X 10 pixels) were selected to represent land use and land cover categories. An "unsupervised" classification algorithm was used for clustering of the MSS digital data into spectral classes which could be identified as categories of interest. A few of the categories chosen for mapping tended to occupy very small areas and were spectrally very similar. For example, forest types dominated by cypress and tupelo tended to follow major drainages or lake margins and were bounded by forested riverine types in which cypress and tupelo were less prevalent or were absent. Where possible, single pixel spectral count values and very small training sites (3 pixels X 3 pixels) were used to identify these types. Supporting data were collected from existing cover maps and crop inventories, ground surveys, and color infrared high altitude photography. The spectral signatures established from clustering and ground truth and their statistical parameters were used as input to a "supervised" classification algorithm to classify the entire area under consideration.

Title:/Titre:/Titel:

THE RECORDING AND DETERMINATION OF VECTORS  
OF MOVEMENTS ON THE HANS GLACIER / SPITSBERGEN /  
SURFACES AND EXTENSION OF ITS FRONT

Author (s)/Auteur (s)/Autor (en):

Leszek KOLONDRÁ M.Sc./Eng: /

Abstract:/Sommaire:/Zusammenfassung:

The determination of extension the glacier's front and knowledge of vectors of movement on its surfaces are parameters necessary for define balance of the ice mass.

Various terrstrial photos of the Hans Glacier <sup>have</sup> made during two expeditions / 1982 and 1983 / and their elaborate by means analitical and analogue photogrammetrical methods were allowed to obtain essential results.

## Title:/Titre:/Titel:

Forest damage classification based on  
signatures-and clusteranalysis

## Author (s)/Auteur (s)/Autor (en):

G. Kritikos, D. Kübler, J. Dörfel, A. Kadro, B. Koch

## / Abstract:/Sommaire:/Zusammenfassung:

In order to get more information on the spectral reflectance values of forest canopies, a research project entitled "Remote Sensing and Forest Damages" undertook to gather data through the use of a modified 11 channel Bendix Scanner including the 2 TM channels.

The objectives of the study were:

- the extraction of the spectral reflectance values of healthy and unhealthy conifer stands from various altitudes
- the quantitative and qualitative assessment of the influential parameters (age-class, understory vegetation, shade, etc.)
- the undertaking of single tree based and area-wide based supervised maximum likelihood classification.

Spectral and clusteranalysis were made of single trees from 300 m altitude and of forest areas from 300 m, 1000 m, 4000 m altitude, as SPOT-Simulationdata.

Results:

Unhealthy but still green trees compared with healthy trees have a higher reflectance value in the visible spectrum. In the near infrared this effect is reversed. With respect to the thematic mapper channel 5 the reflectance of unhealthy conifers trees is higher than that of healthy trees. The result of the classification showed positive results.

## Title:/Titre:/Titel:

The effect of the spatial resolution of remotely sensed imagery on the numerical interpretation methods

## Author (s)/Auteur (s)/Autor (en):

Kuittinen, R., Parmes, E., Rauste, Y.

## Abstract:/Sommaire:/Zusammenfassung:

Satellite images of different spatial resolution as well as aircraft multispectral scanner data were used to compare and develop numerical interpretation methods used in land use classification. The use of spectral and textural information were also studied. In the interpretation best results were achieved when spatial and spectral data and different spatial resolutions were used.

Title:/Titre:/Titel:

Selection of Optimum Combination from Different Forms of Aerial and Satellite Data for Groundwater Studies in Indian Gondwana and Crystalline Environments.

Author (s)/Auteur (s)/Autor (en):

Seelan Santhosh Kumar & K Seshu Babu

Abstract:/Sommaire:/Zusammenfassung:

Investigations were carried out for an area of 6000 sq.kms. in Gondwana and Crystalline environments of Godavari basin in India, to develop a methodology package for effective utilisation of remotely sensed data for targetting groundwater in such environments. Satellite and airborne MSS data in raw and enhanced form, black and white, normal colour and false colour IR aerial photographs were used in an integrated manner for the first time in India. Detailed information on geology, geomorphology, location of existing openwells and their command areas were demarcated. Recommendations on the best combinations of data in such environments for extraction of groundwater information were made based on a comparative evaluation of different data.

Title:/Titre:/Titel: Evaluation of SIR-A (Shuttle Imaging Radar) images from the Tres Marias region (Minas Gerais, Brazil), using derived spatial features and registration with MSS-LANDSAT images.

Author (s)/Auteur (s)/Autor (en): Hermann Kux, Luciano V. Dutra

Abstract:/Sommaire:/Zusammenfassung: Two image processing experiments were described using a MSS-LANDSAT scene from the Tres Marias region and a SIR-A image digitized by a Vidicon scanner. In the first experiment the study area was analysed using both the raw data of the SIR-A image and pre-processed data (filtering techniques). The following thematic classes were obtained: water, dense vegetation ("cerradão"), sparse vegetation ("cerrado") and moist areas (floodplains). In the second experiment, the SIR-A image was registered together with both MSS-LANDSAT 5 and 7 bands, and the same 4 classes mentioned were obtained. These results were compared with those obtained using solely MSS-LANDSAT data. Concluding it can be stated that the spatial information, as well as co-registered SIR-A and MSS-LANDSAT data can increase the separability between classes, as compared to the use of raw data solely.

Title /Titre /Titel: Ecological studies within the "Pantanal Matogrossense" (Mato Grosso State, Brazil), using remote sensing techniques.

Author (s) /Auteur (s) /Autor (en): Hermann Kux, Dagoberto Silva

Abstract:/Sommaire /Zusammenfassung: The objective of this study, which is part of a larger research project at the lower section of the rio Cuiabá and its' surroundings, is to identify the vegetation cover of an area of about 500 km<sup>2</sup>, using remote sensing techniques. The methodology used to study this partially flooded region, consisted in the interpretation of color infrared aerial photographs and the digital processing of MSS-LANDSAT scenes from two different satellite overpasses: november 1980 (dry season) and may 1981 (end of rainy season). For the latter, two classification algorithms, implemented at INPE's system IMAGE-100 were used: non-supervised (K-means) and supervised. Using these procedures, five main classes were obtained: dense forest, gallery forest, wetlands I ("campos inundáveis"), wetlands II and water. The remote sensing techniques used, specially in a multi-temporal approach, allow a small scale mapping of the main natural environments and give an overall view of the flooding process within the area under study.

Title:/Titre:/Titel: Extraction du parcellaire par segmentation d'image : Une nouvelle voie pour l'analyse des images de satellite à haute résolution.

Author (s)/Auteur (s)/Autor (en): H. LE MEN Ingénieur géographe

Abstract:/Sommaire:/Zusammenfassung: La nouvelle génération de satellites à haute résolution (Landsat TM puis Spot) permet d'envisager une nouvelle approche pour l'analyse numérique des images : l'élément à analyser n'est plus le pixel mais un ensemble connexe de pixels (parcelles ...) obtenu par segmentation de l'image.

La classification de chaque zone se fait en utilisant les propriétés de radiométrie moyenne et de texture sur la zone. Elle évite ainsi les effets de pixels impurs, et incorpore ensuite une information de forme qui permet d'obtenir une identification plus précise du contenu thématique, que celle qu'on obtient avec les méthodes classiques de classification utilisées jusqu'ici sur les images Landsat.

Title:/Titre:/Titel. MICROWAVE REMOTE SENSING : MAIN CONTRIBUTIONS OF THE WORKING GROUP 'SPECTRAL SIGNATURES OF OBJECTS IN REMOTE SENSING"

Author (s)/Auteur (s)/Autor (en): Th. LE TOAN\* and E.P.W. ATTEMA\*\*

\* Centre d'Etude Spatiale des Rayonnements, Toulouse, FRANCE

\*\* Delft University of Technology, Delft, THE NETHERLANDS.

Abstract:/Sommaire:/Zusammenfassung:

It was pointed out during the two colloquiums of the Working Group that great emphasis must be put on microwave spectral signatures programs, in consideration of the potentialities of microwave space sensors planned for the 1980's and beyond.

The paper will summarize the main points of the contributions in this domain over the last few years, in particular those concerning land resources. Experimental investigations as well as model development will be considered.

The potential value of the work in relation to future space systems will be outlined and finally recommendations suggested by the Working Group for future work will be reported.

Title:/Titre:/Titel:

Photogeological Interpretation of the Gulf of Suez Area.

Author (s)/Auteur (s)/Autor (en):

Hans-Werner Linke

Abstract:/Sommaire:/Zusammenfassung: An area of about 15.000 km<sup>2</sup>, framing the Gulf of Suez, was mapped at a scale of 1:100.000. We used a time-saving and low cost combination of conventional interpretation of aerial photography and processed Landsat imagery as geometrically corrected planimetric base-map. The methodology applied turned out to be useful for mapping of large areas at a high level of accuracy.

Title:/Titre:/Titel: TELEDETECTION ET ANOMALIES DE SUBSURFACE  
EN BRESSE (FRANCE)

Author (s)/Auteur (s)/Autor (en):

A. MARIE (IFP) - G. GESS (IFP) - C. LALLEMAND (IFP)

P. DUTARTRE (BRGM) - G. WEECKSTEEN (BRGM) - P. GRUNEISEN (SNEA)

Abstract:/Sommaire:/Zusammenfassung:

L'observation de l'imagerie MSS LANDSAT sur la Bresse permet de déceler des phénomènes linéamentaires et curvilignes de grande étendue dont la présence ne peut être expliquée par la Géologie de Surface essentiellement représentée par des dépôts de recouvrement.

Nous avons donc mixer des données de subsurface (gravimétrie) à l'image satellite et les corrélations ainsi obtenues ont permis de démontrer que l'agencement de la physiographie, seul accessible par la Télédétection dans le spectre du visible, peut révéler des phénomènes géologiques profonds.

Title /Titre/ Titei Cloud Cover Impact Analysis on LANDSAT Data from Brazil.

Author (s)/Auteur (s) Autor (en) José Antonio Maurício

Abstract:/Sommaire:/Zusammenfassung Data registered by orbital sensors are strongly affected by the atmosphere between the sensors and the ground surface. Clouds, particularly, are major constraints on earth-viewing satellite systems operating in the visible and infrared bands, sensibly diminishing their potential value. Therefore, in analysis of required temporal resolution for specific applications, the *effective temporal resolution* has to be calculated taking into consideration cloud coverage. The objective of this study has been the analysis of the impact of cloud cover on the utilization of LANDSAT data by month and covering all regions of Brazil and classified according to their potential and real use. Brazil has considerable cloud cover throughout the year, as indicated by meteorological statistical data. Preliminary results indicate that effective use of LANDSAT in Brazil is much lower than it has been anticipated. This fact is based on the analysis of nine years of data collected by the LANDSAT satellites.



FOR THE JOINT ISPRS/IUFRO SESSIONS ONLY

Title:/Titre:/Titel:

Aufbau einer Datenbank mittels aero-terrestrischen Aufnahmemethoden als Grundlage für die forstliche Planung und Kontrolle auf der Betriebs- und Landesebene

Author(s)/Auteur(s)/Autor(en):

Dr. Hočevar Milan, Forsting.

Abstract:/Sommaire:/Zusammenfassung:

Mit 50 Prozent der Gesamtfläche Sloweniens, des nördlichen Landesteiles Jugoslawiens, ist der Wald ein wichtiges landschaftliches Element, und zusammen mit der Holzindustrie auch ein bedeutender wirtschaftlicher Faktor. Die höchstmögliche Holzproduktion ist die wichtige Aufgabe der slowenischen Forstwirtschaft, die aber nicht zum Schaden anderer Waldfunktionen darf erfüllt werden. Dies verlangt ein gutes Überwachungssystem, das Daten für die Planung, Arbeitsdurchführung und die Kontrolle auf der Betriebs- und der Landesebene liefert.

Das Kernstück des vorgeschlagenen Überwachungssystems ist die Datenbank, die terrestrisch und durch die Luftbilddauswertung gewonnene Informationen enthält. Die Daten sind absolut räumlich orientiert (Gauss-Krüger Koordinatensystem) und horizontal und vertikal (von Betriebs- zur Landesebene) integrierbar. Die Datenorganisation gestattet automatisierte kartographische /

Title:/Titre:/Titel: DETECTION OF CHANGE IN THE RIVER NILE USING LANDSAT-MSS DIGITAL IMAGERY

Author(s)/Auteur(s)/Autor(en): Dr. Maarouf A. Mohammad

Abstract:/Sommaire:/Zusammenfassung: This paper examines the possibility of employing simple rectification and classification methods for Landsat MSS digital data, and investigates the usefulness of the obtained information for monitoring downstream changes in the Nile River course. Two Landsat MSS imageries taken in November 1972 and in February 1981 for a section of the Nile to the south of Cairo were analysed digitally to detect changes over that period. Also, the processed MSS data was compared with the 1:100,000 topographic maps compiled in 1951 in order to assess changes over a longer period. Unsupervised classification methods were used and main frame computer output facilities were employed for displaying and recording the obtained information. The investigation shows that useful products can be obtained from Landsat MSS digital images by using simple processing techniques and with simple equipment.

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Title:/Titre:/Titel:

Determination of aerial photographic image patterns of  
 • natural vegetation cover

Author (s)/Auteur (s)/Autor (en):

Ivan Suarez da Mota

Abstract:/Sommaire:/Zusammenfassung:

This paper has the aim of determining the photographic image patterns between the humid tropical hillside forest and the Araucaria and Podocarpus forest; high brushwood and low brushwood; grassland and grassland with pteridophytes. Aerial photos in the scale of 1:8,000 were compared with aerial photos in the scale of 1:45,000 considering the photointerpretation concepts used by several authors in studies of vegetation.

Title:/Titre:/Titel:

An application of NOAA-AVHRR data for an oceanic structure  
 analysis at the sea of OKHOTSK.

Author (s)/Auteur (s)/Autor (en):

Kei MUNEYAMA, Ichio ASANUMA, Yasunori SASAKI, (JAMSTEC)

Sei-ichi SAITO, Masa-aki AOTA, (HOKKAIDO UNIV.) Yoshio TOZAWA (IBM)  
 Abstract:/Sommaire:/Zusammenfassung:

A temporal sequence of the SOYA warm current was observed by NOAA-AVHRR data at the sea of OKHOTSK. Some concurrent sea-truth experiments were also carried out. A variation of the SOYA warm current were interpreted in relations with subsurface oceanographic structure. The satellite data are clearly showing a meandering of the current. An observed landward displacement of a frontal boundary is not just surface phenomenon but oceanographic processes involving a procession and retrocession of two different water masses.

## Title:/Titre:/Titel:

Pine-nematoda monitoring by LANDSAT data in Japan.

## Author (s)/Auteur (s)/Autor (en):

NAKAJIMA IWAO; WATANABE HIROSHI

## Abstract:/Sommaire:/Zusammenfassung:

About 11,800 km<sup>2</sup> area of Kanto district was investigated in 1982 as the pilot works of the operational LANDSAT data use in forestry. The attacked territories with each of their damaged degree in three classes have firstly revealed in two periods of from 1972 to 1980 and 1980 to 1981.

The investigated results have readed out the bio-ecological analysis and pine-nematoda protection system for forest conservation works in Japan.

## Title:/Titre:/Titel:

Monitoring of Sea Surface Phenomena in Coastal Area by Remote Sensing

## Author (s)/Auteur (s)/Autor (en):

HIROAKI OCHIAI

## Abstract:/Sommaire:/Zusammenfassung:

Using satellite and airborne remote sensing data, the author tried the monitoring of sea surface phenomena in coastal area of Japan. Based on the digital analysis of MSS data obtained by Landsat and airborne, river effluent, industrial pollution, red tide and water characteristic were investigated as the distribution pattern in color imagery.

AVHRR data obtained by NOAA is also recognized as very useful for the monitoring of sea surface phenomena especially in investigation the relation between water change between inlet and off shore.

As to the most effective analysis technique, the multi stage remote sensing is concluded as very useful. For example, the composit imagery processed by Landsat MSS and NOAA AVHRR is very effective to imvestigate the detail of sea surface phenomena in coastal area.

In this report, the author described the several results of above mentioned satellite and airborne remote sensing.

Title./Titre./Titel: Lithological Discrimination by Digital Processing: A Case Study in Serra do Ramalho, Bahia

Author (s)/Auteur (s)/Autor (en): Waldir Renato Paradella, Ícaro Vitorello, M.D. Monteiro

Abstract./Sommaire./Zusammenfassung: Enhancement techniques and thematic classifications have been applied to the metasediments of Bambuí Super Group (Upper Proterozoic) in the Semi-Arid region of Serra do Ramalho, in the SW portion of the state of Bahia. Color composites of contrast stretched Band Ratios and Principal Components allow lithological discrimination through tonal gradations, of several metasedimentary sequences to a level superior to reconnaissance mapping. Supervised (maximum likelihood classifier) and non-supervised (K-means classifier) classifications of the limestone sequence host to fluorite mineralization have shown satisfactory results.

Title./Titre./Titel: Translocation of surface mass of waters in Admiralty Bay / King George Island , Arch. South Shetland /

Author (s)/Auteur (s)/Autor (en):

Irajs Jerzy

Abstract./Sommaire./Zusammenfassung:

Aerial photographs taken in 1978/1979 by K. Furmańczyk during the third Antarctic Expedition of Polish Academy of Science were used in our reaserch .

Interpretation of sequence of aerial photographs enabled us to determine the distribution of surface water currents in the bay .

That was based on examination of structures of melt waters containing mineral suspension against salty waters of the bay, and translocation of growlers and small icebergs in the bay .

Title:/Titre:/Titel: Remote Sensing of Moisture Status in Soybeans

Author(s)/Auteur(s)/Autor(en): Ramana Rao, T. V., B. L. Blad and B. R. Gardner. Graduate Assistant (and Bolsista do CNPq, Professor do Depto. de Ciencias Atmosfericas, UFPb, C. Grande, PB, Brasil), Professor and Research Associate, respectively: CAMaC, IANR, Univ. of Nebraska, Lincoln, NE, USA.

Abstract:/Sommaire:/Zusammenfassung:

The monitoring of water-stressed vegetation in arid, semi-arid and sub-humid regions of the world is important for the efficient management and utilization of valuable water resources. Remote sensing offers the potential for evaluating the moisture stress conditions of crops over a large area.

The temperature of water-stressed vegetation is warmer than that of non-stressed plants. There is evidence that the reflectance of solar radiation in certain selected visible, near-infrared and mid-infrared wavebands is also affected by water stress.

In this paper, plant temperatures measured with infrared thermometers and reflected radiation in the wavebands of Thematic Mapper are examined to evaluate their potential for monitoring water stress in soybeans. Data were collected during 1982 and 1983 at the University of Nebraska Sandhills Agricultural Laboratory located in central Nebraska, USA. Vegetation indices for estimating plant phytomass parameters and for indicating plant water status are presented and evaluated.

Télétection Landsat et aménagements en Picardie (France) : le littoral au nord de la Somme.

R. REGRAIN et J. RUDELLE - Université de Picardie.

La cartographie automatique des données de télédétection par satellites permet de compléter les informations obtenues à partir des photographies aériennes et des observations sur le terrain.

Alors que les aménageurs sont familiarisés avec les derniers types de documents, ils rencontrent à la fois curiosité et appréhension pour l'utilisation des données satellite.

L'expérience menée sur le littoral picard, plages, dunes forestées et marais, a permis de tester la pertinence de ces trois types de documents dans le processus de prise de décision en aménagement. On tente ici le bilan de cette expérience, où les notions d'échelles spatiales et temporelles, de continuité et de discontinuité des phénomènes naturels et l'évolution des idées en matière d'aménagement se sont combinées pour assurer le démarrage et le suivi d'autres utilisations de l'espace.

## Title:/Titre:/Titel:

Remote Sensing Technology Development and Application for  
Digital Land-Cover Mapping in Hungary

## Author(s)/Auteur(s)/Autor(en):

REMETEY F.Gabor, CSORNAI Gabor, BÜTTNER György, CSILLAG Ferenc

## Abstract:/Sommaire:/Zusammenfassung:

Natural terrain conditions and general landuse distribution supports the use of Landsat MSS in Hungary, concerning eg. pixel-size vs. average field size, thus providing unique possibilities in Europe. Experimental projects on agricultural thematic mapping, regional planning and DTM/land cover study illustrate promising preliminary results of R+D, done in the fields of remotely sensed data analysis, image processing and pattern recognition. The common approach in all cases is the application and combination of these elements for thematic mapping purposes. Based on the research and development a multicomponent software was developed to support applications.

/For a more detailed abstract please turn the page/

Fire from Space: A Systems Framework for Monitoring Global  
Biomass Burning Using Satellite Remote Sensing

Jennifer Robinson, Department of Geography, UCSB, Santa Barbara,  
California, 93106 USA (805)961-4291 or -3663

## ABSTRACT

Atmospheric scientists need global-scale data on biomass burning, particularly area burned. Fire is sensible as heat (circa 3 micron wavelength), smoke (visible, IR and thermal), char (visible, reflected and thermal IR) and scar (altered vegetation: visible, reflected and thermal IR, microwave). Expected fire sizes, frequencies and duration of fire signals varies by two or more orders of magnitude, depending on ecosystem type and land-use practices. E.g., in a savanna system, the average fire may be of several thousand hectares, with a return interval of 1 to 5 years, and a signal (char and scar) duration of 2 weeks to 4 months, while fires in a boreal forest may average ten to a hundred hectares, with a return interval of 50 to 500 years, and a signal (scar) duration of around 50 years.

A systems framework is presented for matching multi-platform/multi-temporal statistical sampling strategies to the spatial-temporal characteristics of different fire signals as manifested in different major fire regimes. Sensors considered include meteorological satellite sensors (NOAA6-8:AVHRR and GOES:VSSR), Landsat MSS and perhaps TM, satellite borne radar (SEASAT, SIR-A and SIR-B), and aerial photography, thermography and air-borne radar platforms (e.g., project RADAM data).

Title:/Titre:/Titel: Factors that Affect Multitemporal LANDSAT MSS Classification Performance of Sugar Cane.

Author (s)/Auteur (s)/Autor (en): Bernardo F. T. Rudorff, Getúlio T. Batista

Abstract:/Sommaire:/Zusammenfassung: The objective of this study was to determine the effects of site characteristics, acquisition dates, and number of features on multitemporal classification performance of sugar cane. Four segments (9 x 11 km approx.) located at two different sites (high and low crop density) were classified using a maximum likelihood classifier based on 40 pixels for training and 60 for bias correction. Combinations of four acquisition dates available for each segment were analysed varying the number of features per date. CIR photographs and field check were used for labelling in the training procedure and for assessment of classification performance. Preliminary analyses indicate that acquisition date selection is very important for accurate classification of sugar cane. Accuracy of classification varied from site to site indicating that a more site independent training procedure is required for high accuracy overall results.

Title:/Titre:/Titel:  
REMOTE SENSING AND THE TREE SPECTRAL SIGNATURES

Author (s)/Auteur (s)/Autor (en):  
Prof.dr.eng.Aurel Rusu, asist.dr.eng.Gheorghe Chițea

Abstract:/Sommaire:/Zusammenfassung: The reflectance value, that is the spectral signature, special to species, phenomenon and a site, is not a constant. The researches related to this growth factor modification as regards the tree leaves using spectrophotometers, have covered some seasonal vegetation in different ecosystems, for a few years. The spectral signature values and variations for the most important species of the Romanian forestry stock, are presented in this paper. We can draw a conclusion, that besides the maximum reflectance regions in the infrared and visible spectra, some maximum reflectance regions in the microwave lengths are spotlighted. Forestry zones interpretations were made analogically and digitally, using the spectral signature. The visual 1:200 000 scale enlarged image interpretation give the possibility to establish the forestry stock field use categories, and forestry formations delimitation. Digital processing applied to the thematic maps, emphasizes the main forest types within the forestry stock, where clear cuttings and windfalls were obviously visible.

By

Iraj Mellanadeh Sadeghioon

Projects accomplishedA. Projects in the field of Forestry

## 1. Two projects in this field titled

Estimation of the area occupied by forest and the investigation of its changes " Covering the Eastern and Western region of sofid Rud area was accomplished.

Each project was executed in three stages as follows.

- a) Measurement of the area under forest-from Aerial photographs scale 1:55 000 - year 1955 based on the first inventory of the forest .
- b) Measurement of the area under forest -from Aerial photographs scale 1:20 000 -year 1967 -land on the latest-Aerial photograph.
- c) Measurement of the area under forest-based on Statistical analysis of Satellite data, by the use of instruments such as Vidar, pd p 11,05, EP 3000-101 A(1975) .

After the completion of the 3 stages, the results were correlated and the changes that had taken place during 20 years( 1955-75) in the forest and the Cause of it was investigated . in each case of the project separate report has been written which is available at the headquarters of statistical and information bureau of the Ministry of agriculture.

2. a) Total area occupied by forest was estimated under the Joint project of the Department of Statistics and Information of the Ministry of Agriculture and the college of Natural Resources by the implementation of

Title:/Titre:/Titel: Relationship Between Forest Clearing, Biophysical Factors and Transportation Infrastructure in Tropical and Sub-tropical Regions

Author (s)/Auteur (s)/Autor (en): Steven A. Sader and Armond T. Joyce

Abstract:/Sommaire:/Zusammenfassung: The focus of this research was to analyze the relationship between forest clearing, biophysical factors (e.g., ecological zones, slope gradient, soils, geomorphology) and transportation network. The country of Costa Rica was selected as a study site because of the ecological diversity present within a relatively small area, and the availability of maps depicting biophysical information.

The location of forested areas at five reference dates (1940, 1950, 1961, 1968, and 1977) as derived from aerial photography and Landsat MSS data was digitized in polygon format and entered into a geographically-referenced data base through the use of a computerized information system. Ecological zones as portrayed by the Holdridge Life Zone Ecology System, the location of roads and railways, information on slope gradient, soils, and geomorphology were also digitized. The relationship between forest clearing (over four decades) and ecological zone and the influence of topography, soils, and transportation network were analyzed within the data base. Results are presented and discussed. It is anticipated that the resulting information on these relationships will form the basis for predictive modeling of changes in the forest environment in tropical and subtropical regions.



Title:/Titre:/Titel:

RESEARCH ORIENTATIONS FOR USE OF FUTURE SATELLITE REMOTE SENSING SYSTEMS.

Author (s)/Auteur (s)/Autor (en):

G. SAINT - CNES - FRANCE

Abstract:/Sommaire:/Zusammenfassung:

In preparation of the use the satellite remote sensing systems that will be flown in the next decade, their principal characteristics are reviewed, especially to present the new orientations in data acquisition that could bring new types of information : the following aspects will be analysed : high resolution and its influence on the use of spatial variability of radiometric measurements, short wave infrared measurements related to visible and near infrared, spectro imaging capabilities, high temporal frequency analysis at regional scales, new radar systems.

For each aspect, the state of the art will be presented and research orientations of the remote sensing community will be discussed.

Title:/Titre:/Titel: Aerial photographs interpretation of ice cover in the southern part of the Szczecin Bay

Author (s)/Auteur (s)/Autor (en):

Siedlik Krzysztof

Abstract:/Sommaire:/Zusammenfassung:

VIS and IR band of spectrum aerial photos were taken to forecast the ice cover evolution in the southern part of Szczecin Bay. Interpretation of ice cover state was done , and based on it the attempts were made to qualify photointerpretation features of ice cover surface forms.

Name/Titre/Title: Attempt of analysis of oil spills in port waters of Szczecin , based on aerial photographs

Author(s)/Auteur(s)/Autor(en):

Siedlik Krzysztof

Abstract/Sommaire/Zusammenfassung: Within our search for the remote sensing oil spill detection system , a remarkably effective record of oil spills was obtained in 500 - 700 nm band of spectrum, i.e. in the band that is not commonly used for that purpose. Our studies on usefulness of different spectral bands/VIS and IR/ for oil spill detection resulted in conclusion that the highest contrast was obtained for wavelength at 520-560 nm. Simple method of picture analysis is presented ,which final result is a map - " Surface oil pollution of port waters in Szczecin" / on the day of record/, which contents are: existence, extent and thickness of oil spills, sewage outfalls , directions of their translocation and existence of another pollutions.

THE ROLE OF REMOTE SENSING IN RESOURCE EVALUATION AND LAND USE DECISIONS  
(Summary)

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Man's impact due to uncontrolled industrial, residential and population growth has already altered the ecosystem, for gain and profit severely damaging the resources. Although history records of earlier civilisations realising man's dependence on keeping the balance of nature, modern man seems to ignore that his survival depends on a balance in his environment. He has set up patterns of life which, due to ignorance of the cumulative effect of changes enforced on the global ecosystem and poisonous residues of his efforts, may lead to his destruction.

Advances in civilisation and technology have resulted in extreme and often drastic changes in the environment, thus it is a pressing necessity to provide a systematic global monitoring method for the environment to aid in the control of pollution events. Increasing pollution of the air, land and water are now matters of concern for everyone.

During the past twenty years, the state of environment has become one of the major concerns of industrial societies. Continued growth in industrial development and in the waste from an ever-increasing number of sources, together with the need to preserve nature in its many forms have found attention focused on the burgeoning problems of environment and the demand for the early and reliable detection.

Pollution can be defined as any direct or indirect alteration of the

Landsat image enhancement by histogram modification techniques for mapping  
tropical forest cover

By

Ashbindu Singh  
Department Of Geography  
University Of Reading  
Reading, U.K.

ABSTRACT

Image enhancement techniques are applied to improve the visual quality of the pictorially presented data. The major image enhancement techniques used in digital processing of Landsat data are based on histogram modifications, spatial filtering and transformation of two or more bands data-sets.

In this paper spatial domain enhancement techniques based on histogram modifications such as linear contrast stretch, histogram equalisation and histogram specification have been used for mapping different forest types in two areas of north-eastern India using Landsat MSS data. The algorithms have been implemented on a micro-computer system.

The different histogram manipulation techniques emphasised different aspects in the images with varying degree of success. The balancing of extremes of the linear contrast stretch and histogram equalisation was satisfactorily achieved by the specification of particular histograms capable of highlighting certain grey-level ranges in an image.

Title:/Titre:/Titel:

Environmental Evaluation of Forest Tree Vitality from  
remotely sensed Airborne MSS Data

Author (s)/Auteur (s)/Autor (en):

Prof. Dr. Taichi Oshima  
Dr. Shoji Takeuchi  
Atsushi Rikimaru

Abstract:/Sommaire:/Zusammenfassung:

This paper describes on the results of the experimental studies for the monitoring of tree vital change using airborne multi-spectral scanner ( MSS ) data. This paper discusses on an analysis method for the detection and the evaluation of the vital change. This report also describes the results of basic experiments about the relationship between tree vital change and the spectral change of tree using some tree samples. These results reveal the effective MSS channels for the detection of tree vital reduction.

Title:/Titre:/Titel:

AN ALGORITHM FOR SEDIMENT RETRIEVAL IN COASTAL WATERS FROM CZCS DATA , WITH LOW SENSITIVITY TO THE ATMOSPHERIC CORRECTION UNCERTAINTIES.

Author (s)/Auteur (s)/Autor (en): S.TASSAN, B.STURM

Abstract:

An algorithm for the retrieval of sediment content of coastal waters from Coastal Zone Color Scanner (CZCS) data has been developed through a theoretical approach and tested versus experimental data.

The numerical simulations and sensitivity studies performed were focused on the search for a variable with low sensitivity to other matter present in the water (e.g. phytoplankton) which may not be co-varying with sediment, and to uncertainties in the atmospheric correction procedure.

The analytical expression of the selected variable is :

$$X = [R(550)-R(670)]^a [R(520)/R(550)]^b \quad (1)$$

where  $R(\lambda)$  is the subsurface irradiance reflectance at wavelength  $\lambda$ .

With an appropriate choice of the numerical values for a and b, the phytoplankton concentration index  $R(520)/R(550)$  tends to compensate for the weak chlorophyll-dependence of the sediment-sensitive term  $R(550)-R(670)$ , meeting the first requirement set above.

More specifically, the sensitivity analysis predicts that, with  $a \sim 1$ ,  $b \sim 1$ , the X-variable is practically unaffected by chlorophyll concentrations up to  $10 \text{ mg/m}^3$ , so that the corresponding sediment retrieval algorithm

$$\log \text{ Sed.} = A + B \cdot \log X \quad (2)$$

can be effectively used over the above mentioned chlorophyll concentration interval with single-valued A and B constants. The validity range extends up to  $b(550) \sim 8 \text{ m}^{-1}$  ( $b$ =total scattering coefficient).

The algorithm defined by equations 1 and 2 has the advantage that even in turbid water the approximation of zero waterleaving radiance for  $\lambda = 670 \text{ nm}$  can be made in the atmospheric correction calculation, so avoiding the necessity to iterate on the waterleaving radiance at  $\lambda = 670 \text{ nm}$ . The corresponding error in the retrieved sediment was evaluated to be within 20% over the concentrations range; sediment  $1 - 10 \text{ mg/l}$ , chlorophyll  $0.6 - 6 \text{ mg/m}^3$ .

The proposed algorithm has been applied to a set of CZCS-scenes from the Adriatic Sea and the German Bight.

The results of these experimental tests have confirmed the theoretical predictions.

Title:/Titre:/Titel:

A COMPARATIVE STUDY OF AERIAL PHOTOGRAPHS AND SATELLITE PHOTOS IN SOIL AND LAND USE STUDIES OVER A PART OF NE BRAZIL.

Author (s)/Auteur (s)/Autor (en):

H.S.TEOTIA, CCA/UFPB, AREIA, PB, BRAZIL.

LUIZ E.MANTOVANI, EMBRAPA/CPATSA, PETROLINA, PE, BRAZIL.

Abstract:/Sommaire:/Zusammenfassung:

The present study was undertaken in order to know the better utility of aerial photographs and satellite photos for soil and land use inventories over a part of NE Brazil (Brejo Paraibano), lying between  $36^{\circ}21'W$  to  $36^{\circ}54'W$  longitude and  $6^{\circ}42'S$  to  $7^{\circ}12'S$  latitude, having some conclusions as: small scale satellite photos (Landsat) can satisfactorily be used for macro land use mapping while the aerial photos are more superior for detailed studies of present land use. Also, the delineations of broad soil groups could be clearly identified by the Landsat imagery whereas the landscape/landform, erosion and other geomorphological features are studied far better by the aerial photographs rather than the imagery.

Title:/Titre:/Titel:

SMALL SCALE LANDSAT IMAGERY IN DETECTION AND MAPPING OF GRAY BROWN ALLUVIAL SOILS, HILL SOILS AND YELLOWISH BROWN SOILS OVER ARID AND SEMI-ARID PART OF NW INDIA.

Author (s)/Auteur (s)/Autor (en):

H.S. TEOTIA, CCA/UFPB, AREIA, PB; BRAZIL.

Abstract:/Sommaire:/Zusammenfassung:

The present work was realized in the KUL, Belgium for a part of arid and semi-arid India, in order to know the better delineations of Gray Brown Alluvial soils, Hill soils and Yellowish Brown soils and present land use over these soils. The area falls between  $72^{\circ}50'E$  to  $75^{\circ}10'E$  longitude and  $24^{\circ}20'N$  to  $30^{\circ}15'N$  latitude respectively. At the conclusion, a good correlation was found between the existing physiographic boundaries and soils. The hill soils of Aravalli range divide the whole area into two regions: on the west side of the Aravalli range a zone of the Gray Brown Alluvial soils (Aridisols, Inceptisols and Entisols) is encountered while on the east side, is a zone of the Yellowish Brown soils (Entisols, Alfisols, Ultisols). Also, some deficiency of moisture, high gradient, shallow depth, low available moisture and low fertility were marked during the study which require some effective measures of soil and water conservation for better management and proper utilization of the lands.

Title:/Titre:/Titel:

UTILIZATION OF LANDSAT DATA FOR LAND EVALUATION AND MANAGING SOIL RESOURCES UNDER SEMI-ARID CONDITIONS OF NORTH-EAST BRAZIL

Author (s)/Auteur (s)/Autor (en):

H.S. TEOTIA, CCA/UFPB, AREIA, PB, BRAZIL,

LUIZ E. MANTOVANI, EMBRAPA/PETROLINA, PE, BRAZIL.

Abstract:/Sommaire:/Zusammenfassung:

The land capability classification and detection of Agro-technical limitations through the Landsat data for land evaluation studies and their management is urgently needed for arid and semi-arid regions of NE Brazil, in order to get high production and to raise the economical and rural status of the area. The area studied lies between  $37^{\circ}36'W$  to  $38^{\circ}46'W$  longitude and  $6^{\circ}30'S$  and  $7^{\circ}00'S$  latitude. For the final studies the area was divided into 6 land capability classes out of 8 classes of the classification as: A. Cultivable land (Arable): Classes, II, III, IV. B. Non cultivable land (Non arable): Classes, V, VI, VII.

The soil classes were further subdivided into various sub classes and units in accordance with their specific agro-technical problems. Also some simple conservation and reclamation practices were explained for the area studied in order to get better utilization of the land.

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Title:/Titre:/Titel:

Scale Determination on Vertical Aerial Photographs

Author (s)/Auteur (s)/Autor (en):

Joseph J. Ulliman and Michael L. Hoppus

**Abstract:/Sommaire:/Zusammenfassung:** The common way of determining scale on aerial photographs or other imagery is relatively time consuming and fraught with errors; it involves the measurement of a distance on the photograph and a ground distance which is most often determined from a map. Since most areas in the world have good topographic maps, we strongly advise the use of the "point scale" method which would require: (1) an accurate aircraft altimeter reading at the time of photography; (2) the camera focal length; and (3) the elevation of the ground point or area of interest--parameters that may be more easily and accurately gotten. Given other special circumstances there is another way of obtaining scale, especially for areas where there are no maps available or for large scale aerial photographs. It is the "photo distance ratio" method which does require two photographs of the same area taken at two different altitudes in which the difference in altitude is recorded; the other variables required for calculation are two photo distance measurements between the same two points for both altitudes. Ground checking this method showed an average error of 1.3% with a standard deviation of 3.5% for flat ground and 5.4% for sloping ground.

Title:/Titre:/Titel: Land observation by aerial photographs:  
 photointerpretation and automatic classification.

Author (s)/Auteur (s)/Autor (en): Anna Della Ventura and Anna Rampini  
 Istituto di Fisica Cosmica - CNR  
 Via Bassini 15/a, 20133 Milano Italy

**Abstract:/Sommaire:/Zusammenfassung:** An aerial photographic survey was carried out on a test-site in the North of Italy with the purpose of investigate the possibility of automatic land classification and monitoring under specific constraints. The colour photographs covering an area of about 62 sq. Km., were first submitted to photointerpretation, and a map was drawn in which the area was subdivided into nine classes of interest for the end-user. Each photograph was then digitized and three digital images, one for each fundamental colour, were obtained. An analysis has been carried out in order to obtain a classification of the pixels into the nine classes of interest. The main problem arose in the discrimination of sown fields from urban agglomerates whose spectral characteristics are very similar in the visible range. The analysis was therefore made using structural techniques together with multispectral ones and the final result was a photointerpretation comparable map.

Title:/Titre:/Titel: Spectral reflectance as estimate of wheat LAI in tropical savana

Author(s)/Auteur(s)/Autor(en): Juan José Verdesio, Jose da Silva Ma-deira Neto, Luiz Joaquim Castelo Branco Carvalho, Reinaldo Lucio Gomide.

Abstract:/Sommaire:/Zusammenfassung: The objective of this study was to relate spectral reflectance (400, 500, 550, 575, 600, 700, 750, 850, 950 and 1050 nm) with LAI for three varieties of wheat under different moisture conditions on a acriortox. The results indicated the existence of good correlation between spectral response and LAI as well as between varieties and reflectance. The physiological changes, under different soil moisture conditions, could be detected by the radiometric measurements. The data suggested also a good possibility of discrimination between varieties studied through remote sensing.

Title:/Titre:/Titel:

Monte Carlo Simulation of the Bidirectional Reflectance Distribution Function of the Rice Paddy

Author(s)/Auteur(s)/Autor(en):

H.T. Wang and L.Y. Chen

Abstract:/Sommaire:/Zusammenfassung:

As the geometric features of the rice paddy are quite different from those of a plane stratified medium, previous models are not directly applicable to the rice paddy. We, therefore, propose a Monte Carlo model to simulate the radiation-rice paddy interaction. In our model we will follow the path of each incident photon until it is absorbed or escaped. The shape and the arrangement of the leaves can be constructed as similar to real rice as possible. The phase function of upper and lower epidermis, ground reflectance and absorption coefficient for each medium are treated as input parameters (or functions). Our results show that except the final growing stage of rice, the simulated bidirectional reflectance distribution function agrees quite well with the observed "V" shape.

## Title:/Titre:/Titel:

The Status of Land Use/Cover Mapping from Remotely Sensed Data

## Author (s)/Auteur (s)/Autor (en):

Welch, R.

## Abstract:/Sommaire:/Zusammenfassung:

Developments related to land use/cover mapping in the last four years are reviewed. Particular emphasis is placed on the role of satellite data and the extent to which it is being used to monitor land use/cover. Topics considered include; mapping techniques, types and scales of map products, classification systems, accuracy considerations and data quality requirements.

APPLICATIONS OF LAND USE AND LAND COVER INTERPRETATIONS OF REMOTELY  
SENSED DATA TO THEMATIC MAPPING FOR ENVIRONMENTAL ASSESSMENT

James R. Wray  
Office of Geographic and Cartographic Research  
National Mapping Division, U.S. Geological Survey  
521 National Center, Reston, Virginia USA 22092

## ABSTRACT

More than a decade of research and development at the United States Geological Survey (USGS) into geographic applications of remotely sensed data suggests bright prospects when linked to corresponding developments in geographic information systems, spatial analysis, and automated cartography. Inspiration for pursuing these linkages is illustrated by such pressing environmental problems, and corresponding thematic maps, as the following:

Correlation of land use and day/night distribution of population in the vicinity of nuclear reactor sites (Map of Three Mile Island).

Assessment of wildlife habitat (Map of Puget Sound Region).

Inventory of vegetation and land cover, and assessment of environment, prior to oil exploration in a national wildlife refuge (Map of Alaska NWR).

Estimation of ground water used for irrigation in a large area of high crop-production potential and low dependability of annual rainfall (Map of U.S. High Plains).

Regional inventory of amount, kind, and location of exterior building material surfaces susceptible to acid deposition from airborne pollutants (Map of Northeastern U.S.).

One key to the understanding of such problems can be provided by computer-aided analysis of spatial and temporal data acquired from remote sensors aboard aircraft or satellite and used in conjunction with data acquired by more conventional means. The spatial and temporal data may be displayed as thematic maps which contribute to an understanding of the problem. The applications cited include maps at larger scales for map series production as well as for special-purpose National Atlas-type maps at smaller scales. Useful byproducts of these endeavors include advances in the automated design, compilation, reproduction, and update of thematic maps. All such maps are accompanied by surface measurements of map theme areas.



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Title:/Titre:/Titel:

THE CAPABILITIES OF COLOUR INFRARED FILM AS A NEGATIVE

Author (s)/Auteur (s)/Autor (en):

VICTOR ZSILINSZKY and DUSAN KLIMES

Abstract:/Sommaire:/Zusammenfassung:

The Ontario Centre for Remote Sensing has conducted experiments in the processing of colour infrared film as a negative, using the Kodak C-22 process, with the following results:

1. Colour prints made from the colour infrared negative appeared to be superior in colour range and saturation to reversal prints made from a positive colour infrared film of the same flight line;
2. The production of black and white prints from the colour infrared negative film, using subtractive filters, provided a means of enhancing selected ranges of the spectrum.

An interpretation test was also conducted to compare the quality of prints made from colour infrared negative film with that of standard panchromatic prints for operational forest inventory photo interpretation.

The general conclusion drawn from this research is that the negative processing and printing technique permits a degree of quality control which may overcome many of the barriers standing in the way of extensive use of colour infrared film, particularly in forest inventory.