DOWNLOAD PDF REMOTE SENSING AND MODELING OF ECOSYSTEMS FOR SUSTAINABILITY III

Chapter 1 : Remote Sensing for Sustainability - CRC Press Book

Remote sensing and modeling of ecosystems for sustainability III: August, , San Diego, California, USA.

The EOS AIRS instrument is the first in a series of high spectral resolution infrared spectrometers that will allow improved characterization of the global atmospheric temperature and water vapor structure. These so-called advanced infrared sounders will have a vital role to play in the remote sensing of land ecosystems. This paper describes how the use of Advanced IR Sounder data can be used to improve the accuracy of atmospheric corrections in the thermal IR and provide detailed information on the spectral dependence of the infrared land surface emissivity. Results of a method for separation of infrared surface emissivity and effective surface skin temperature are presented also. Ikuko Fujisaki ; Patrick D. Evans Show Abstract This study examined the utility of polytomous logistic regression in pixel classification of remotely sensed images by the growth stage of forests. For a population of grouped continuous categories, the assumption of normal distribution of independent variables, which is often required in multivariate classification methods, may not be appropriate. Two types of polytomous logistic regression procedures, multinomial and cumulative logistic regression, were used to classify Landsat TM data by growth stage regeneration-immature, intermediate, and mature of loblolly pine Pinus taeda L. Multinomial logistic regression is typically used for analysis of unordered categorical data. Cumulative logistic regression is one of the most commonly used methods of ordinal logistic regression which is generally preferred to analyze ordered categorical data, although, it imposes restrictions on the data. Three hundred sample points were located randomly throughout the study site and vectors of pixel values of four bands of Landsat TM data were used to predict growth stage at each sample location. The results were compared to that of parametric and nonparametric discriminant analysis, k-nearest neighbor method. Non-normal distribution of independent variables indicated a violation of the assumptions for parametric discriminant analysis. Classification with cumulative logistic regression using four bands was performed first. However, the assumption of the model was not met. So, the classification was also performed using only band 4 which appeared to meet the assumption. The error rate of cumulative logistic regression was Although error rate with cumulative logistic regression with band 4 alone resulted in the lowest error rate, the improvement over other methods was marginal. The error rate of k-nearest neighbor method varied from Pedro Cabral ; Jean-Paul Gilg; Marco Painho Show Abstract In this article, a combined application of a segmentation method with a texturing procedure is employed for delimitation of urban areas in a temporal series of Landsat satellite images over the Sintra-Cascais municipalities. Selected spatial metrics are used for analysing the evolution of urban pattern for the whole study area and also inside and outside the PNSC. Broad-band multi-spectral sensors have been used primarily for mapping of broad land cover types, but have been less successful for identifying species-level variation. Hyperspectral sensors have had some success for species mapping, but these images often cover a small area and are not appropriate for large-scale land-use assessment. Phenological changes in crop broad-band spectral properties over the growing season offer a promising method of detecting species variation associated with growth rates, plant structure and cropping practices. This paper will present preliminary results of the use of multi-temporal optical imagery for mapping agricultural species. Three SPOT-4 multispectral scenes were acquired during early, middle and late season growth stages over an agricultural region in eastern Ontario, Canada in Three supervised classification methods were compared: The impact of atmospheric correction was explored to determine if statistical models using multi-sensor, multi-date inputs are sensitive to differences in atmospheric conditions during image acquisition. The success of each method is assessed based on classification accuracies determined using an independent set of ground measurements. Preliminary results indicate that multi-date information is essential to deriving accurate land use information, and that further inputs in addition to remote sensing data may be needed to define specific classes. Direct measurement of FMC in the field is very costly and time consuming. Therefore, remote sensing becomes the effective method to retrieve FMC at large scale. Short wave infrared

SWIR band reflectance has been found negatively related to leaf water content and most of the researches are conducted at leaf level. It is also found that forest fires prone to spread along the dryer area. Xianglian Li; Xiusheng Yang Show Abstract An integrated hydrological, ecological, and economical model HEE was developed at basin scale to evaluate the interactions among resources, agriculture, and rural development. Hydrological module in the integrated model was adapted from SWAT, the Soil and Water Assessment Tool, to simulate the water balance in terms of soil moisture, evapotranspiration, streamflow, and groundwater table change. Ecological module was integrated into the hydrological module to compute the ecosystem production of biomass and yield for different land use types. Economical module estimated the monetary values of crop yield and other ecosystem services. The model was implemented in a holistic approach, and able to produce simulation results at daily time steps with a spatial resolution of hydrological response unit HRU. The integrated model was calibrated by data for the period of , and run for the period of with the calibrated parameters for the upper and middle parts of the Yellow River basin, a semi-arid area in northwest China. The average efficiency of the model in simulating monthly streamflow was 0. Preliminary simulation results revealed that water use in the study area had largely reduced the streamflow in many parts of the area except for that in the riverhead. Spatial distribution of biomass, crop yield, and water productivity showed a strong impact of irrigation on agricultural production. In general, the simulation results from this study indicated that the model was capable of tracking the temporal and spatial variability of pertinent water balance variables, ecosystem dynamics, and regional economy, and provided a useful simulation tool in evaluating long-term water resources management strategies basin scale. Stork ; Bradley C. Autrey Show Abstract Remote spectral sensing offers an attractive means of mapping river water quality over wide spatial regions. While previous research has focused on development of spectral indices and models to predict river water quality based on remote images, little attention has been paid to subsequent validation of these predictions. In conjunction with the CASI acquisitions, ground truth measurements of chlorophyll-a concentration and turbidity were made for a small set of locations in the Ohio River. Partial least squares regression models relating the remote river images to ground truth measurements of chlorophyll-a concentration and turbidity for the Ohio River were developed. Employing these multivariate models, chlorophyll-a concentrations and turbidity levels were predicted in river pixels lacking ground truth measurements, generating detailed estimated water quality maps. An important but often neglected step in the regression process is to validate prediction results using a spectral residual statistic. For both the chlorophyll-a and turbidity regression models, a spectral residual value was calculated for each river pixel and compared to the associated statistical confidence limit for the model. These spectral residual statistic results revealed that while the chlorophyll-a and turbidity models could validly be applied to a vast majority of Ohio River and Licking River pixels, application of these models to Little Miami River pixels was inappropriate due to an unmodeled source of spectral variation. Raja Reddy ; James Slusser ; Kenneth Kunkel Show Abstract GOSSYM is a comprehensive crop growth model that has been continuously developed since the late s and widely applied to assist cotton growers, crop consultants, and researchers. The state-of-art CWRF Climate-Weather Research and Forecasting model demonstrated skillful simulations of regional water and energy cycle processes that are keenly important to cotton growth. This study presents the preliminary results of the GOSSYM driven by the CWRF simulated climate conditions and discusses the model performance on cotton yield, leaf area index and height and their responses to water stress under the irrigation and non-irrigation conditions. Meili Zhou; Qian Ye ; Zhihui Liu Show Abstract Viewing hydropower as a clean energy source and an important part of overall energy strategy in the years ahead, China has put priority on hydroelectric projects as part of its sustainable development strategy to reduce pollution as well as CO2 emission resulting from burning coal. Although the economic importance of hydropower plants cannot be underestimated, their construction also has brought inevitable negative effects on the environment. Moreover, because the efficiency of operating hydropower plants is heavily dependent on precipitation condition which is very sensitive to climate variation and climate change, and the reservoirs built for hydropower plants are also discovered as one of greenhouse gases sources, the climate impact on

developing mega-hydropower projects needs to be studied. Xulin Guo ; Wei Gao ; John Wilmshurst Show Abstract An action plan for recovering species at risk SAR depends on an understanding of the plant community distribution, vegetation structure, quality of the food source and the impact of environmental factors such as climate change at large scale and disturbance at small scale, as these are fundamental factors for SAR habitat. Therefore, it is essential to advance our knowledge of understanding the SAR habitat distribution, habitat quality and dynamics, as well as developing an effective tool for measuring and monitoring SAR habitat changes. Using the advantages of non-destructive, low cost, and high efficient land surface vegetation biophysical parameter characterization, remote sensing is a potential tool for helping SAR recovery action. The main objective of this paper is to assess the most suitable techniques for using hyperspectral remote sensing to quantify grassland biophysical characteristics. The challenge of applying remote sensing in semi-arid and arid regions exists simply due to the lower biomass vegetation and high soil exposure. In conservation grasslands, this problem is enhanced because of the presence of senescent vegetation. Results from this study demonstrated that hyperspectral remote sensing could be the solution for semi-arid grassland remote sensing applications. Narrow band raw data and derived spectral vegetation indices showed stronger relationships with biophysical variables compared to the simulated broad band vegetation indices. Huaimin Guan ; Qian Ye ; Zihui Liu Show Abstract Due to the rapidly process of urbanization, the water consumption is increasing speedily in Beijing, the capital city of China, during recent decades. Despite great efforts have been done, the daily life of residents and economic construction is threatened continuous in the city. Because of the limitation of sound water management in Beijing the water resources exploitation and utilization are not rational, economically efficiency. The water environment has been degraded in vary levels. The aim of this study is improvement of water management in Beijing. An investigation and collection of the data related to the water management was carried out. The study has made appraisal on the amount of water available and water demands in the region. The reasonable policies, feasible alternatives and institutional management measures have been drawn out from the study for the water management strategies. They can be considered as a base of decision making and macroscopic management for the long-term planning of Beijing. Huailiang Chen ; Xiangde Xu; Yujie Liu ; Yusheng Li; Shitao Wang Show Abstract Soil moisture is an inegligible physical variable in agrometeorology, climatology, hydrology, ecology and crop cultivation and predicted normally by use of the Penman formula for meteorological records from a single or a few stations and weather forecasts. This method, however, allows to make the prediction only for a limited number of stations rather than regional gridded predictions. For this reason, we developed a scheme of satellite sensings retrieval, the regional climate model RegCM2 and a soil water predicting model in combination for moisture in fields of staple crops over the Huang-Huai Plains, by which to establish a drought warning system, of which 1 the soil water predicting model makes use of the soil moisture balance equation applicable to fields of winter wheat and summer corn in the Plains, whose central component is the Penman formula revised by FAO; 2 the needed NWP products are offered by NCAR RegCM2 and 3 the initial field of soil moisture comes from the retrieval of polar-orbiting meteorological satellite data that are corrected through vegetation cover correction and a variational technique. Results show that the proposed scheme is able to improve the precision of the prediction and to better monitor and predict changes in the moisture and the distribution of drought-hit crop areas over the study plains. The development of rGIS-ET enables quick processing of large amount of remote sensing and other spatial data. It also provides user-friendly interfaces for modeling, output display and result analyses. We apply rGIS-ET to Luancheng County, a typical agricultural region in NCP, to demonstrate its utility for calculating regional ET and estimating agriculture water needs and ground water usage, both of which are critical to the design of an effective water resources management program for achieving sustainable development. Li Zheng; Qun Zhang ; Yuping Lei ; Hongjun Li Show Abstract Accurate estimation of water consumption requires detailed information on vegetation types, including vegetable that is increasingly becoming one of the most important crops in China and many parts of the world. In current paper, a technique for rapid and accurate extraction of vegetable field both greenhouse and open field information from Landsat

TM image is developed and tested. Through conducting field experiments and analyzing the Landsat TM images, we obtain the spectral characteristics of the film covered greenhouse vegetable and build a model to extract vegetable fields from the Landsat TM images. Applying this technique to Luancheng County of Hebei Province, China, we calculate the total area of the vegetable field being ha. This number compares well with the result of our field survey. Based on the vegetable field area and the vegetable water consumption rate, we arrive at an estimation of the total vegetable water consumption in Luancheng County being 2. The technique developed here provides an effective way for deriving vegetable field area from Landsat TM data and estimating the regional vegetable water consumption. The primary goal of this paper is to provide empirical-based evidence on the impacts of urbanization and industrialization on cultivated land. The results produce findings that are both expected and those that are fairly surprising. Although cultivated area decline between and , the net decline was about 1. Industrialization and population growth were largely responsible for the fall in Moreover, contrary to the conventional opinion, after holding constant the effect of industrialization and population growth, regardless of whether urban area expansion occurs in large, medium or small cities or towns, such urbanization is land-saving when compared to leaving rural residents in rural areas. Two of major implications of our analysis are: Yunmei Li Show Abstract A modeling approach is used to assess the applicability of the derived equations which are capable to predict chlorophyll content of rice leaves at a given view direction. The study is consisted of three steps: The result shows that the accuracy of prediction is affected by different under storey configurations and, however, the accuracy tends to be greatly improved with increase of LAI.

Chapter 2 : Center for Spatial Technologies And Remote Sensing :: Khanna, Shruti

PROCEEDINGS VOLUME Remote Sensing and Modeling of Ecosystems for Sustainability II. regional climate modeling in China by using the remote sensing data.

She is interested in wetlands and river floodplains and the impact of anthropogenic stress factors on these boundary ecosystems that can disrupt their natural functioning. After working on the invasive aquatic macrophyte, water hyacinth, in the Sacramento-San Joaquin Delta for her PhD, she is currently looking at oil spill damage on Louisiana coastal wetlands as a result of the Deepwater Horizon BP Oil Spill. Impact and Recovery Latest Paper: PLoS One, 8 Bachelor of Engineering, Computer Science, M. Project goals include determining the impact of oil contamination from the Deepwater Horizon BP Oil Spill on salt marsh vegetation and monitoring wetland recovery. Stress indices, change detection, and PROSAIL model inversion techniques used to detect plant stress and study trajectory of stress relative to distance from oil. Project goals included classification of two invasive species, Eichhornia crassipes and Egeria densa, change detection of species distributions from to , and determination of impact of chemical control of both species Hestir et al. Field surveys typically included participants with more than survey points collected each year. A team of undergraduate and graduate students and postdocs worked on the project every year. Surveys included characterization of the geology and ecology mainly invertebrates and fishes of streams http: Aerial Photo Interpretation and Remote Sensing: Advanced Topics in Remote Sensing: Presented as a guest lecturer on decision trees and object-oriented classification. Responsibilities included grading, holding study sessions, overhauling lab assignments, giving presentations on concepts covered in the lab, preparing exam questions, and guiding students in lab projects. Identification of invasive vegetation using hyperspectral remote sensing in the California Delta ecosystem. Remote Sensing of Environment, Remote Sensing of Environment, 2: An integrated approach to a biophysiologically based classification of floating aquatic macrophytes. International Journal of Remote Sensing, 32 4: Plant Community dynamics relative to the changing distribution of a highly invasive species, Eichhornia crassipes: Spectroscopic remote sensing of the distribution and persistence of oil from the Deepwater Horizon spill in Barataria Bay marshes. Remote Sensing of Environment Image spectroscopy and stable isotopes elucidate functional dissimilarity between native and nonnative plant species in the aquatic environment. Invasive Plant Science and Management, 2: Remote Sensing of Environment, 1: Diverse approaches to detection and mapping of aquatic invasive species using hyperspectral remote sensing imagery. Remote Sensing and Hydrology Symposium. Quantifying severity of plant stress induced by oil spill contamination in the Gulf of Mexico using hyperspectral remote sensing. Contributions of HyspIRI science to monitoring global coastal wetlands and near shore aquatic environments. Monitoring coastal wetlands and near shore aquatic environments in response to the BP Horizon oil spill. Wetland plant physiology exhibits controls on carbon sequestration processes in restored temperate peatland of California, USA. Detecting water quality and trophic transitions in the Sacramento-San Joaquin river delta using hyperspectral imagery. Ecosystem-scale aquatic weed detection in the Sacramento- San Joaquin Delta. Change detection of water hyacinth and Brazilian waterweed following herbicide application in the Sacramento-San Joaquin Delta in California. Science for a Changing Environment, Sacramento. Patterns of change in water hyacinth distribution in the Sacramento-San Joaquin Delta. California Invasive Plant Council Symposium. State of the San Francisco Estuary. Synergistic effects of disturbance and control in the decline of Eichhornia crassipes in the Sacramento-San Joaquin Delta. Vegetation Community dynamics relative to the changing distribution of water hyacinth in the Sacramento-San Joaquin Delta. Cotton phenology analysis with the new remote sensing spectral angle indexes AS1 and AS2. Identifying and classifying water hyacinth Eichhornia crassipes using the HyMap sensor. Identifying egeria Egeria densa density in Sacramento-San Joaquin delta region. Geospatial tools for freshwater conservation: Bringing hyperspectral methods to applied science: Ecological Society of America. Weeding out the invaders: Spatio-temporal dynamics of a submerged landscape: Use of

hyperspectral remote sensing to evaluate efficacy of aquatic plant management. Imaging spectroscopy elucidates functional dissimilarity between native and non-native plant species in the aquatic environment. Mapping invasive aquatic plant species in the Sacramento-San Joaquin River Delta using hyperspectral imagery. Pages in Geoscience and Remote Sensing Symposium, Mapping invasive plant species in the Sacramento-San Joaquin Delta using hyperspectral imagery. Center for Spatial Technologies and Remote Sensing. Submitted to Chevron Inc.

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Remote Sensing and Modeling of Ecosystems for Sustainability III. Edited by Gao, Wei; Ustin, Susan L.. Proceedings of the SPIE, Volume , pp. ().

This objective requires description of demographic, economic, and societal changes in the region as well as biophysical landscape changes and the changes in forest and other ecosystem health and productivity. The work seeks to describe the primary determinants of change in the amount and pattern of forest and the consequences that those changes have on habitat, water quality, and amenity value of land. The work is placed at the intersection of society, natural resources, and the environment. Second, the project seeks to develop tools that can be used to understand the interactions and feedbacks between society and environment. These tools are developed to describe the spatial and temporal dynamics of landscapes. The work further deals with the data requirements for such an understanding and develops tools and methodologies for building better data sets and making more intelligent use of those data sets. It also requires the integration of multi-temporal and multi-sensor remotely sensed data with ground data on the forest resource and data on societal changes. Therefore, we work to integrate data on society and environment within a spatial analysis and modeling framework. The remote sensing work seeks to develop methods that can be used to accurately map both ecologically significant land cover types and biophysical quantities that can be used in studying and modeling system interactions. For example, we seek to map tree cover, not simply as discrete classes by pixel, but also as a sub-pixel percentage resulting in a continuous field representation. To integrate social data with remote sensing and other environmental data, we are exploring a variety of methods to sample the landscape based on societal variability, map societal quantities in a way that they can be better integrated, and address the semantic differences between data definitions in social and environmental sciences. We are working to develop spatial pattern statistics that describe both the inherent spatial pattern of land cover as it relates to forest and habitat fragmentation and the spatial relationships between habitats and cover types and other landscape features e. The modeling work involves spatial simulation approaches to describing and modeling landscape change. We are develop computer-based systems for scenario development and landscape change forecasting. In order to relate observed forest cover changes to the processes driving them we are working with two broad types of land cover change process models. We are using geostatistical methods to characterize the space-time patterns inherent in observations of land cover change. These patterns can be related to space-time patterns in variables that represent various driving forces. The second type of model we are working on is bottom-up models, so-called because they develop a detailed agent-based description of how people make decisions about land cover change, and simulate the space-time patterns of land cover that emerge through the collective effects of those individual decisions. Ultimately, we seek to strenghten our understanding of land cover change processes through the comparative contributions of both top-down and bottom-up models. Not relevant to this project. Impacts Our work improves our understanding of the processes driving landscape change, and provides tools for planners and policy makers to generate scenarios that can be used to select among multiple options for achieving particular objectives related to the amount and pattern of land cover Publications Brown, D. Stochastic simulation of land-cover change using geostatistics and generalized additive models. Photogrammetric Engineering and Remote Sensing. Modeling the effects of greenbelts at the urban-rural fringe. Lugano, Switzerland, June Using neural nets and GIS to forecast land use changes: Computers, Environment and Urban Systems. Spacial and temporal dynamics of ownership parcels and forest cover in three counties of Northern Lower Michigan USA, ca to Measuring the abruptness of patchy ecotones: Plant Ecology, 1 , A spectral unmixing approach to leaf area index LAI estimation at the alpine treeline ecotone. Impacts Our work improves our understanding of the processes driving landscape change, and provides tools for planners and policy makers to generate scenarios that can be used to select among multiple options for achieving particular objectives related to the amount and pattern of land cover.

Chapter 4 : Remote Sensing and Modeling of Ecosystems for Sustainability IV | () | Publications | Spie

PROCEEDINGS VOLUME Remote Sensing and Modeling of Ecosystems for Sustainability IV. Editor(s): Wei Gao; Susan L. Ustin. Format Member Price Non-Member Price.

Raymond Hunt ; M. Tugrul Yilmaz Show Abstract Vegetation water content is an important biophysical parameter for estimation of soil moisture from microwave radiometers. One of the objectives of the Soil Moisture Experiments in SMEX04 and SMEX05 were to develop and test algorithms for a vegetation water content data product using shortwave infrared reflectances. The regression standard error of the y estimate is 0. Based on modeling the dynamic water flow through plants, the requirement for detection of water stress is about 0. However, this standard error is accurate for input into the tau-omega model for soil moisture. Twenty nine observation sites, which had continuous measurements during the recent six years, are selected for this study; twenty seven of them are distributed in the United States, including one in Hawaii and one in Alaska, and two of them are located in Canada along the United States border. The measurements were taken using the Yankee Environmental Systems Inc. This work focuses the data from the recent six years of and the measurements during summer months June-August are emphasized. For each day, the measurements are integrated from sunrise to sunset to produce the daily UV dosage, which is then averaged for different seasons or for the whole year over the six years to generate the average daily UV dosage. A multivariable regression technique is exploited to characterize the dependence of UV dosages on geographical parameters, including latitude and altitude. The results show that, although there are many factors, such as clouds, ozone, aerosols, air pollutants, and haze, that affect the UV radiation intensity at a location, the latitude and altitude of the site are the primary factors that regulate the average daily UV dosage. Longitude is not statistically significant in predicting UV irradiance. Nonlinear relationships can be statistically established between averaged daily UV dosage and latitude and altitude. The effects of latitude on UV radiation are much more significant than the altitude. The average daily UV dosages decrease exponentially with the latitude. While an increase of one degree in latitude may lead to a decrease of more than Jm-2day-1 in the averaged daily dosage in the low latitudes, the decrease is around Jm-2day-1 in the mid latitudes and less than 50 Jm-2day-1 in the high latitudes. The averaged daily UV dosage increases with altitude almost linearly until up to meters. Then it increases gradually and no significant increases can be detected above meters. Although the regression against latitude and altitude is statistically highly significant, notable deviations from the regression predictions are observed in the lower and mid latitudes and lower altitudes. These discrepancies are most likely due to the intense anthropogenic activities and natural events occurring in this area, including natural fire, industrial production, driving, and farming. These locally dependent activities will generate more UV absorbers into the air. Fusion techniques have then arisen as an alternative to integrate this information, which result in new images that contain better spectral and spatial information in terms of contents and resolution. As an alternative, we have introduced an algorithm based on an undecimated Hermite transform HT that preserves these properties, with better image quality. In this paper, fused images are analyzed in the framework of biophysical-variables such as leaf-area- index and sparse-fractional-vegetation-cover, all of them derived from reflectance values in the visible-red and near-infrared bands, from multi-temporal SPOT-5 images []. Multi-temporal analyses are conducted to test the consistency of these variables for different illumination conditions, and vegetation amount, in order to determine indicators of land-cover-change. Results were used to characterize a change vector analysis, by differentiating land transformation from modifications based on the results with fused and original images. Results also showed how the HT algorithm resulted in the smallest modification of the bi-dimensional space of the vegetation and soil isolines after fusion. This method also preserves the information integrity necessitated to obtain similar biophysical variable values. By improving spatial resolution, while preserving spectral characteristics of the resulting images, the HT-based algorithm is able to better characterize land-cover-change. Zhangyan Jiang ; Alfredo R. Huete ; Youngwook Kim ; Kamel

Didan Show Abstract The enhanced vegetation index EVI has been found useful in improving linearity with biophysical vegetation properties and in reducing saturation effects found in densely vegetated surfaces, commonly encountered in the normalized difference vegetation index NDVI. However, EVI requires a blue band and is sensitive to variations in blue band reflectance, which limits consistency of EVI across different sensors. Youngwook Kim ; Alfredo R. Huete ; Zhangyan Jiang ; Tomoaki Miura Show Abstract Current earth observing satellite sensors have different temporal, spectral and spatial characteristics that present problems in the establishment of long term, time series data records. Conversely, any reprocessing of the AVHRR record should consider steps to allow forward compatibility with newer sensors and products. In this study we evaluated the use of sensor-specific enhanced vegetation index EVI and normalized difference vegetation index NDVI data sets, using a time sequence of Hyperion images over Tapajos National Forest in Brazil over the and dry seasons. We also analyzed the influence of different atmosphere correction scenarios to assess noise in the phenology signal. Our analyses show that EVI2 maintains the desirable properties of increased sensitivity in high biomass forests across all sensor systems evaluated in this study. Obviously the mis-registration, or the BBR shift, could impact the quality of MODIS science data products that are produced using multiple spectral bands. Because of the mis-registration, measurements over slightly different areas by different spectral bands, when used together, will cause undesired effects, and consequently, lead to less accurate data products. As expected the mis-registration of Aqua MODIS produces small but potentially non-negligible impact on the science products, particularly at the mixed areas with various surface cover types. Varying illumination due to atmospheric conditions such as clouds and shadows cause different pixels belonging to the same class to present different spectral vectors, increasing the within class variability and hindering classification. This is specially serious in precision applications such as variety discrimination in precision agriculture, which depends on subtle spectral differences. In this study, we use machine learning techniques for supervised classification, and we also analyze the variability within and among plots and within and among sites, in order to address the generalizability of the results. Di Menno Show Abstract The solar electromagnetic radiation flux is one of the important factors to evaluate the energy balance of the planet. It is important in the studies on the properties of the atmosphere and its components as AOD, on the energy requirements for anthropogenic activities as agriculture, industry and so on. The ever-increasing interest about the effects on the biosphere as consequence of anthropogenic activities has contributed to develop further studies about the solar radiation and in particular the UV band, nm. The consequence has been a growing of instrumental site and radiometric networks. Many decisions affecting on civil society are taken using the data of these nets and consequently it is very important to study the effect of the environmental factors on the instrument output. The classical electromechanical equipments have good sensibility and resolution but their handicap is the time of the measure, generally some minutes. In this time, the sun is moved and the clouds in the sky too. The new generation of spectrometer based on solid state technology avoid the long time measurements. The paper show a new radiograph fast spectroradiometer for solar UV band nm. It is based on CCD array and optical fiber. The performance are compared with a Brewer spectrophotometer during a comparison campaign close to Rome, Italy. It is extremely important to monitor efficiently the locust damage to vegetation in order to control this kind of insect pest. In this paper, taking Huanghua County of Hebei province, China as the study area and based on the in situ hyper-spectral data, the differences in canopy reflectance spectra and the characteristic parameters of hyper-spectra were analyzed and compared for the reeds at normal growing and for those under encroaching from locusts. In addition, five models were developed to simulate the relations between the characteristic parameters of hyper-spectra and Leaf Area Index LAI of reeds. The result showed that among those indices the locust damage spectra index LDSI is mostly applicable to reflect the intensity of locust damage in the study area. Finally, a scheme for the intensity distinction of locust damage to reeds was suggested based on LDSI data, i. The preliminary simulation studies show that: During the last 9 years, the vegetation degradation is popular in most regions of the study area. Though there are some regions where vegetation cover is increasing, the increasing amplitude is smaller than

the decreasing amplitude on the whole. Fang Huang; Ping Wang ; Yangzhen Zhang Show Abstract In the past several decades, land cover in the region underwent dramatic changes and the progressive loss and conversion of wetlands has become a key conservation issue. The results showed that area of marsh decreased from Calculated from change dynamic model, the annual loss rate of marsh was Due to shortage of water supply, marsh land were turned into dry grassland and degraded to saline-alkaline land. The number and size of marsh patch decreased significantly which indicated that the wetland landscape became more fragmental. The grassland decreased by The study indicates that the loss and degradation of wetlands was closely related to warmer and drier regional climate during the past 50 years. Intensive human activities including irrational reclamation, overgrazing, and ditches drainage and road construction accelerated the process. The effects of cloud cover, visibility, and relative humidity on UV radiation are also quantified using regression techniques. Results show that the annual averages of UV irradiances are high in central and southern Henan province. In winter, the seasonal averages are high in northwestern Henan, while there are two high regions in the summer, one is resided in the western part and the other is located in the eastern Henan, where two high centers can be identified. The seasonal averages in summer and spring are higher than in fall and winter. Weidong Liu ; Yaoting Wang Show Abstract Land surface albedo is one of most important parameters in weather and climate numeric models. The albedo differences between urban and rural land surfaces and the albedo variations due to urbanization have not been well studied. In this study, temporal comparisons of albedoes in the urban, rural and hill regions of the Beijing area in China were analyzed by converting broad albedoes from narrow band reflectances using NASA pathfinder released reflectance and NDVI data. Results showed that with increased urbanization the original albedoes exhibited a decreasing trend and the urban areas had lower albedoes than the rural areas. In the hill area with dense vegetation, there were the lowest albedoes. Monthly measurements of albedo variation in the urban and rural regions showed that the albedoes have obvious seasonal unimodal trends. In the summer the albedoes are the highest while in the winter, the albedoes are lowest. For the hill area, results also showed that the albedoes have obvious seasonal characteristics. The maximal value occurs during May and July. The results can be used to adjust numerical model parameters to improve urban land surface simulation. Results suggest that the area shows a more significant warming trend and less distinct aridization, on the whole, with annual mean NDVI displaying a marginally increasing trend. On a yearly basis, NDVI is the most sensitive to climate factors, and annual temperature, rainfall and relative humidity evaporation exert positive negative effect on the dynamic variation in vegetation NDVI. On a seasonal scale, temperature and rainfall are the most strongly influencing factors, with autumnal climate having heavier impact on yearly mean NDVI. Natural vegetation is predominantly sensitive to rainfall and, to a less degree, to temperature; agricultural vegetation is sensitive dominantly to temperature and, to less extent, to rainfall. April - September vegetation response to climate has the space patterns as follows. The anomaly field of NDVI has 1 the same structure as that of temperature, 2 an anti-correlation structure with anomalies of evaporation, 3 a see-saw distribution with positive negative correlation in the north south with that of rainfall anomalies, and 4 an opposite distribution with positive negative correlations in the south north to that of relative humidity. The assessment of ecological capital is a new research area emerged from the challenge in the interdisciplinary research of ecology and social development. It is fundamental to establish a green national economy accounting system. Scientific evaluation of ecological capital is helpful for considering ecological cost in making the decision for economic development, and it is demanded for sustainable development. In this study, a quantitative assessment model of ecological property has been developed based on the analysis of per unit yield in the conventional ecology together with the utilization of remote sensing data from the Landsat TM, CBERS, MODIS, and NOAA database, land use and land cover data, and field measurements. The study area covers Changji Autonomous District, Xinjiang, China on the northern slope of Tianshan Mountain that is located in a typical arid area. Dynamic monitoring of ecological capital was performed using remote sensing techniques. Spatial distribution and temporal variation of ecological properties were characterized.

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Chapter 5 : Remote Sensing and Modeling of Ecosystems for Sustainability II | () | Publications | Spie

The Center for Spatial Technologies and Remote Sensing, University of California, Davis (USA) International Center for Desert Affairs-Research for Sustainable Development in Arid and Semi-arid Lands/Urumqi (China).

Chapter 6 : WG III/ Agriculture and Natural Ecosystems Modelling and Monitoring - ISPRS

Remote sensing was a powerful addition to landscape modeling because the entire landscape was used for the analysis increasing its statistical power, whereas field data collection would be limited in scope and would be more costly.

Chapter 7 : Remote Sensing | Special Issue : Earth Observation for Ecosystems Monitoring in Space and T

Terms of Reference: Development of new methodologies and algorithms for improving the contribution of remote sensing towards knowledges related to agriculture and natural ecosystems.