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DR. ANOOPKUMAR MISHRA
DR(ER.). KISHAN SINGH RAWAT
DR. G. RAMAMURTHY

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In recent decades many parts of Indian region experienced disasters such as floods, droughts, landslides etc. These events cause severe damage to human life and property. These events can't be prevented but mitigation and adaptation actions can minimize the loss due to these disasters. Near real time monitoring will be helpful for such mitigation and adaptation actions. Aim of this conference is to bring together researchers from various centers to share and exchange their research focusing on monitoring anthropogenic disasters. It will be very helpful for enriching our understanding on this topic and will be crucial for mitigation and adaptation strategies against such disasters.

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Examining recent heavy flooding over the desert state of Rajasthan in India from space

Anoop Kumar Mishra[1*], V. Nagaraju[1], Suhail Meer[1], Yashi Upadhyay[2], Mohammd Rafiq[3]
[1]Centre for Remote sensing and Geoinformatics, Sathyabama Institute of Science and Technology, Chennai-600119, India
[2]Land Resource Management, Central University of Jharkhand, Ranchi
[3] National Centre for Sustainable coastal management, Anna University, Chennai
*Email: daksha112@gmail.com

Abstract

Multiple days of very heavy rainy spells in Rajasthan, an arid state of India, during July and August 2019, have resulted in extreme flooding in several districts causing heavy damage to lives and property. Research described in this short communication focuses on examining this flood event using observations from satellite data. Baran, Bhilwara, Pali, Jhalawar, Jodhpur, Kota, Udaipur, Dungarpur and Banswara districts of Rajasthan were severely affected. Banswara, Dungarpur, Pali, Bhilwara, Kota and Jhalawar district of Rajasthan received cumulative rainfall in excess of 1000 mm during July and August. Peak rainfall in excess of 300 mm/day was reported during August 15, 16, 2019 over few of these districts. Pali district recorded maximum rainfall in excess of 50 mm/h on 15th and 16th August at 06:30 GMT and 05:00 GMT, respectively. Few of the regions of these districts experienced rainfall in excess of 150% during July-August 2019 from multiple rainy episodes which resulted in flash flooding. We also report that flood events are on rise during recent decades over Rajasthan. A proper flood management strategy is imperative to combat the risk of flood disaster.

Keywords: Extreme rain events; Floods; Space observations; Satellite

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Identification of Fresh Water – Salt Water Interface at Tsunami Afftected Keevalur Taluk, Nagapattinam District, Tamilnadu

Poongothai S, Ravisankar N and Priyanka P
Department of Civil Engineering,Faculty of Engineering & Technology,Annamalai University

Abstract

Nagappattinam district one of the coastal districts of Tamilnadu, was severely affected and devastated by Tsunami on 26th December 2004. Due to this natural disaster thousands of lives were lost, the ecology and coastal morphology were drastically changed. Apart from structural damages, run-up, back wash and seawater intrusion were noticed. Due to inundation by seawater, the coastal groundwater quality scenario was very much disturbed. Because of the impact on coastal aquifer system, the seawater got mixed with shallow fresh water aquifers, changing them to saline water. The salinity of soil too increased making them infertile in many areas. Thus the natural phenomenon- Tsunami played a havoc not only causing loss of lives but also deteriorating the coastal aquifer. Due to the impact of Tsunami the seawater might have intruded the pheratic coastal aquifer systems. Seawater intrusion is the movement of seawater inland into fresh groundwater aquifers as a result of higher seawater density than fresh water and heavy withdrawal of fresh water. A natural equilibrium exists between discharging fresh groundwater and seawater in a coastal aquifer. This interface is dynamic and depends on geological formations, hydraulic gradient, topography and the quantity of fresh water moving through the aquifer system. The density contrast between fresh groundwater and salt water leads to mixing and convective circulation at the saline interface. The depth to interface will vary from place to place depending upon the geomorphology, hydrogeology and topography of the area.

Electrical resistivity methods have been widely used to study the groundwater contamination and it is an indirect non invasive method. The coastal aquifers that are prone to saline water intrusion are identified by relatively low resistivity values indicating salt water intrusion. Resistivity soundings coupled with TDS measurements of shallow pheratic aquifers have been found to be good tools to ascertain the interface. Geoelectrical investigation is to study the fresh water salt water interface and to delineate the subsurface lithology. Geoelectrical investigations have been conducted only at the places of sampling i.e. near the groundwater abstracting structures, making a traverse from North to South along the coast within 1 to 1.5 kms from the sea shore. The available VES data, where VES have been conducted away from shore in the upstream directions in the distance range of 2 to 8 kms of Kollidam and Sirkali Unions, have been used for correlative study purposes. The salt water intruded due to Tsunami might have been diluted and leached by the subsequent rainfalls. The study will give a scenario of the depth to salt water- fresh water interface for the pre monsoon period, 2008.

Keywords: Tsunami;Electrical resistivity; geomorphology; hydrogeology

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GIS and Remote Sensing In Disaster Management

R.S Soundharya[1], K.Shakila[1]
[1]Department of Civil Engineering, Annamalai University, Chidambaram, Tamilnadu, India

Abstract

Remote sensing is the acquisition of information about an object orphenomenon without making physical contact with the object andthus in contrast to on-site observation. Remote sensing is used innumerous fields, including geography, land surveying and most Earth Science disciplines (for example, hydrology, ecology,oceanography, glaciology, geology); it also has military,intelligence, commercial, economic, planning, and humanitarianapplications. In order to study the areas, object or phenomenon on the surface of the earth, which is commonly known as target, remotesensing is the most popular technique. GIS refers to the system usedto define and characterize the earth and other geographical featuresover it, for the purpose of analyzing spatially referenced information. The information acquired is used to solve real-lifeproblems. This paper deals with remote sensing and GIS and itsapplication in disaster management.

Keywords:GIS; Remote Sensing; Disaster Management

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Analyzing the Quality of Rice Mill Effluents at Arani in Tamilnadu, India

A. Harish[1] and P. Mohana[2]*
[1]Department of Civil Engineering, Sathyabama Institute of Science and Technology, Chennai – 119
[2]Centre for Remote Sensing and Geoinformatics, Sathyabama Institute of Science and Technology, Chennai – 119
*Email:pmohanalenin@gmail.com

Abstract

The aim of this study is to analyze the characters of the effluent discharged from 10 out of 143 rice mills situated in the area Arani in Tamilnadu. The rice mills are causing a major water and soil pollution because of these discharges. The milling capacity is 10Mt/day; the rice mill generates effluent in an average 1,00,000 liter per day from the soaking, parboiling and boiler blow down operations. According to the Central Pollution Control Broad, Government of India, categories the rice mills are in red and orange category. In this study the surface water are collected from the source and it is characterized for pH, COD, BOD, TSS, Turbidity and other organic substances. With the help of these characters a pollution Regression model is developed using the Statistical Package for the Social Sciences (SPSS) software based on rank of the sample effluents of 1 to 10 from the best to worst sample within the permissible limit.

Keywords:GIS; Remote Sensing; Disaster Management

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Influence of elevated temperature and low pH on hatching success of the cyclopoid copepod *Oithonarigida*: Implication to predicted climate change

UmerKhalifa, Vinitha Ebenezer*
[1]IRC, Sathyabama Institute of Science and Technology, Chennai-600119, India
*E-mail: vinithaebenezer@gmail.com

Abstract

Atmospheric carbon dioxide (CO_2) levels have been increasing at an accelerated rate, since the industrial revolution. This leads to ocean warming (OW) and a shift in seawater pH, a process known as ocean acidification (OA). Copepods are a dominant member of the zooplankton in the marine ecosystem that links the primary producers and secondary consumers in the food chain. However, the genus *Oithona* is among the most dominant copepods in the marine ecosystem, having important ecological (bridge between phytoplankton and fishes), and economic importance (in aquaculture industry). Therefore, it is essential to understand how they will be affected under predicted climate change conditions. In the present study, we investigated the effect of elevated temperature and low pH on the hatching success of *Oithonarigida*collected from the tropical waters of Covelong coast, South India. After acclimation under experimental conditions, eggs were isolated from the *O. rigida* and was subjected to different temperature (28 ± 0.5°C, 30 ± 0.5°C, 31 ± 0.5°C, 32 ± 0.5 °C) and pH (8.1, 7.9, 7.7) conditions for 48 hours. The hatching success under temperature treatments ranged from 54% at 28 ± 0.5 °C to 73% at 32 ± 0.5 °C with maximum hatching observed at 30 ± 0.5 °C (72.3 ± 2.1 %) and showed significant variation (F=3.388, *p*=0.016) between the treatments. Whereas, under pH treatments the hatching ranged from 54% at pH 8.1 to 77% at pH 7.7 and there was no significant difference between treatments (F=1.335, p=0.270). The combination of temperature and pH did not pose any significant interactive effect on hatching (F=1.743, *p*=0.139), rather, nullified the temperature effect. Our findings suggest that temperature rather than pH may have effect on hatching when exposed separately. Although, the hatching percentage of eggs in interactive exposure was fairly higher than individual stressors, it was clear that low pH may offset the effect of higher temperature when interacted. However, further work is required to substantiate this theory.

Keywords: Ocean warming, Ocean acidification, Copepods, *Oithona*, Hatching success.

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Anthropogenic impact on mangroves of Godavari Wetland Andhra Pradesh, India using the Socio Economic Survey

Jayakumar.K[1]*, Selvam.V[2], and Prabavathy. V. R[3]
[1]Centre for Remote Sensing and Geoinformatics, Sathyabama Institute of Science and Technology, Chennai – 600 119
[2]Coastal System Research, M. S. Swaminathan Research Foundation, Chennai – 600 113
[3]Microbiology, M. S. Swaminathan Research Foundation, Chennai – 600 113
*Email: jaikumar.gis@gmail.com

Abstract

Mangroves are salt tolerant plant species, occurring primarily at 30º N and 30º S latitudes, in intertidal areas on tropical and subtropical coasts.This work is initiated in the Godavari mangroves, which is in East Godavari District, Andhra Pradesh, India. Due to the distribution of flora and fauna, the Godavari mangrove is exceptional and is the second largest mangrove and river-dominant network on India's eastern coast.While Godavari's mangroves are unique and provide numerous benefits to local community, but anthropogenic activities from them in Godavari's mangrove wetland, including house building tools, fencing, firewood, fishing, cattle grazing, are a serious threat to Godavari mangroves.A total of 39 mangrove user villages with a population of 40,000 depend on the mangrove forest for the collection of juvenile shrimps, prawns, shells, crabs and fish.In addition, people are also engaged in agriculture, salt farming, aquaculture, industrial and other activities. Apart from this, some species of mangroves are still used as dying and as medicines to treat body pain, tooth problems and wound healing.It needs time to study local community understanding of mangrove forests.The aim of the questionnaires was to obtain information on the regional use of mangrove trees, the connection between the use of mangrove trees, the nature of forests and issues related to the preservation and security of mangrove forests.In this regard, 39 villagers in and around Godavari mangrove wetlands visited and collected socio-economic data through a questionnaire survey in June 2012.Interviewed fishermen who were long-term residents to recognize and track the use of mangroves by locals between 30 and 70 years of age.The topics are chosen randomly from all areas of the villages.Only one person per household was questioned to avoid a repeat of the data. The interview was conducted in Telugu, (regional language) and later translated into English during the analysis. The data was evaluated and the different responses from each village and the findings were obtained in order to obtain an estimate for the entire study area.

Keywords: Wetland; Mangroves; Socio-economic; Restoration

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Mapping of Urban Heat Islands and Land Cover Changes–A Case Study in Chennai City, India

P. Mohana[1]*, G. Raghul[2] and S. Muthusamy[3]
[1]Centre for Remote Sensing and Geoinformatics, Sathyabama Institute ofScience & Technology, Chennai – 119
[2]Department of Applied Geology, University of Madras, Chennai – 25
[3]Department of Geology, V.O.C College, Tuticorin, Tamil Nadu
Email: mohanaperumal@yahoo.com

Abstract

Urban Planning processes are strongly influenced by the environmental issues arising due to land use transformations. These land use changes often includes replacements of natural surfaces with highly reflective parking lots, concrete masses, asphalt roads etc affecting the thermal environment in cities. Researches show that urban places are warmer than surrounding rural environments and are generally termed as "urban heat island". The aim of this paper is to analyze the variations in the thermal environment that exists throughout the Chennai city due to different land cover conditions. This study analyses the temperature differences in the city of Chennai and compares the relationship between the surface temperature and land cover types using ETM+ data of 2006 and 2016. The ETM+ data shows the increase in urban built up areas and the reduction of vegetated areas. The thermal bands of Land sat ETM are used in identifying the specific locations of micro urban heat islands within the city. The various land cover types such as dense vegetated areas, barren land and industrial areas, dense built up spaces, water bodies etc., contributes to the variation in temperatures leading to the formation of urban micro heat islands. With the increasing energy demand it is possible to reduce the energy needs by mitigating the effects of these micro urban heat islands. This study can be a source data for the urban planners and designers in improving the environmental quality by planning green lands, altering the surface cover and formulating urban design guidelines.

Keywords:LULC;Remote sensing; GIS

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An integrated approach to estimate surface soil moisture in agricultural lands

Kishan Singh Rawat
Centre for Remote Sensing and Geo-Informatics, Sathyabama Institute of Science and Technology (SIST), Chennai-119
Email:ksr.kishan@gmail

Abstract

An algorithm of using Sentinel-1 and Landsat-8 data for retrieval of soil moisture of topsoil surfaces (0-5 cm depth) in cropped (or agricultural) land is proposed. After pre-processing of remote sensing data and removal of vegetation influence (σ^o_{veg}) using Water Cloud Model (WCM), total backscattering coefficient (σ^o_{total}) and Normalized Difference Vegetation Index (NDVI) were used to simulate backscattering from soil (σ^o_{soil}). A Modified Dubois Model (MDM) was used for inverting dielectric constant (ε), and a Topp's Model was used to retrieve soil moisture using ε. Further, this soil moisture was evaluated using in-situ soil moisture measurements. The algorithm is applied in Bathinda district of Punjab state of India, known as wheat crop dominate area where soil moisture was measured using a Time Domain Reflectometer (TDR, Field Scout^{TM} TDR 300) during the satellite (Sentinel-1) overpasses (24 January, 25 February and 13 March 2018). The performance of the used methodology is tested with statistical analysis. Statistical testsshowed that an integrated approach using Sentinel-1 and Landsat-8 satellite data can be used for improving soil moisture estimates over the vegetated/cropped area for agricultural and hydrological studies.

Keywords: Backscattering; Landsat 8; Sentinel-1; Soil Moisture; NDVI

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Rainfall Threshold and Effect of Cumulative Rainfall for the Landslide Occurrence in India Using Satellite Data

Manoj Kumar Thakur[1,2*], T.V. Lakshmi Kumar[1]
[1]Atmospheric Science Research Laboratory, Department of Physics,
SRM Institute of Science and Technology, Kattankulathur,603203, India
[*]Email: thakurmanoj2003@yahoo.com

Abstract

In present study, rainfall estimates from TRMM and GPM constellation of satellites is analyzed in the context of rainfall induced landslide occurrence over Western Ghats (WG) of India along with the gridded rainfall data developed by the India Meteorological Department (IMD) and ARW- Weather Research and Forecasting (WRF) numerical model simulations. This study aims to analyze the pattern of change in rain rate and total rainfall triggering large landslides over WG in TMPA and IMERG data sets. As a case study, performance of IMERG V5 is assessed during *Malin* landslide occurred on 30 July 2014 (initial GPM era) with two other rainfall induced large landslides in TRMM era over WG. As the performance of newly released IMERG V5 rainfall data sets are less explored over WG, IMERG shows significant increase in rain rate (> 60mm/h in half-hourly data) during *Malin* landslide occurrence. Near real-time IMERG V5, underestimates rain rate but increasing pattern of rain-rate is similar to that of final version. TMPA 3B42product is able to capture the increasing rain rate peaked (> 10mm/h in 3 hourly) around landslide occurrence time in the grid of landslide. Spatial pattern of ARW-WRF rainfall output is also close to the satellite and IMD rainfall pattern.IMERG V5 half-hourly near real-time rainfall successfully captures the higher rainfall conditions during the *MALIN* occurrence. Further we have studied the cumulative rainfall pattern to access the landslide over India and we propose that IMERG V5 can be used as the indicator to reliably depict the higher rainfall scenarios over the sites that are vulnerable to rainfall induced land slide occurrence.

Keywords: IMERG, TMPA, rainfall inducedlandslides, Western Ghats

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Exploring land use and land cover changes over north Kashmir and their linkage with climate change

Mohammad Suhail Meer[1]*, Anoop Kumar Mishra[1]
Centre for remote sensing and Geoinformaticssathyabama institute of science and technology
Email: mohdsuhailrs@gmail.com.

Abstract

Climate change is heaving adverse effect on land use land cover. Understanding different aspect of climate change on land use land cover is very significant. The climate change effects the distribution, composition and condition of different ecosystems of land use land cover. The land use land cover is initial phase where story of climate change begins. Natural calamity and androgenic activities are the primary agents for land use land cover change. Natural calamity are impossible to stop but, anthropogenic activities can be dated and the effect can be stopped. The anthropogenic activities as primary source for land use land cover change resulting climate change.However the effect of climate change is expected to exacerbate and accelerate impacts on terrestrial, hydrological and climatic regimes. The variation in precipitation and temperature towards extremes will exacerbate the impact stress of land use land cover on nature and natural resources. Hence multiple crises will arise on the surface of earth.

This study emphases examining regional climatic change and explore its linkage with observed land use land cover changes. So, that the drastic change which exceeds the rate of climate change is monitored. So, that adaptation and mitigation plan are framed.

Keywords: Climate change; land use land cover

An integrated approach to estimate surface soil moisture in agricultural lands

Kishan Singh Rawat
Centre for Remote Sensing and Geo-Informatics, Sathyabama Institute of Science and Technology (SIST), Chennai-119
Email.com: ksr.kishan@gmail.com

Abstract

An algorithm of using Sentinel-1 and Landsat-8 data for retrieval of soil moisture of topsoil surfaces (0-5 cm depth) in cropped (or agricultural) land is proposed. After pre-processing of remote sensing data and removal of vegetation influence (σ^o_{veg}) using Water Cloud Model (WCM), total backscattering coefficient (σ^o_{total}) and Normalized Difference Vegetation Index (NDVI) were used to simulate backscattering from soil (σ^o_{soil}). A Modified Dubois Model (MDM) was used for inverting dielectric constant (ε), and a Topp's Model was used to retrieve soil moisture using ε. Further, this soil moisture was evaluated using in-situ soil moisture measurements. The algorithm is applied in Bathinda district of Punjab state of India, known as wheat crop dominate area where soil moisture was measured using a Time Domain Reflectometer (TDR, Field Scout^{TM} TDR 300) during the satellite (Sentinel-1) overpasses (24 January, 25 February and 13 March 2018). The performance of the used methodology is tested with statistical analysis. Statistical testsshowed that an integrated approach using Sentinel-1 and Landsat-8 satellite data can be used for improving soil moisture estimates over the vegetated/cropped area for agricultural and hydrological studies.

Keywords: Backscattering; Landsat 8; Sentinel-1; Soil Moisture; NDVI

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Characterization of GroundwaterusingStatistical Techniques

Kishan Singh Rawat
Centre for Remote Sensing and Geo-Informatics, Sathyabama Institute of Science and Technology (SIST), Chennai-119
Email.com: ksr.kishan@gmail.com

Abstract

Groundwater quality of Chennai, Tamil Nadu (India) has been assessed during different seasons of year 2012. Three physical (pH, EC, and TDS) and four chemical parameters (Ca^{2+}, Cl^{-}, TH, Mg^{2+} and SO_4^{2-}) from 18 bore wells. The results showed that pH of majority of groundwater samples indicate a slightly basic condition ($7.99_{\text{post monsoon}}$ and $8.35_{\text{pre monsoon}}$). TH was slightly hard ($322.11\text{mg/l}_{\text{premonsoon}}$, $299.37\text{mg/l}_{\text{postmonsoon}}$ but lies under World Health Organization (WHO) upper limit). EC, TDS, Ca^{2+} and Mg^{2+} concentrations were lies under WHO permissible limit during post monsoon (1503.42 µs/cm, 1009.37 mg/l, 66.58 mg/l and 32.42 mg/l, respectively) and pre monsoon (1371.58 µs/cm, 946.84 mg/l, 71.79 mg/l and 34.79 mg/l, respectively). EC shows a good correlation with SO_4^{2-} ($R^2= 0.59_{\text{Pre monsoon}}, 0.77_{\text{Post monsoon}}$) which indicates that SO_4^{2-} plays a major role in EC of ground water of bore wells. SO_4^{2-} has also showed a positive correlations with TDS ($R^2= 0.84_{\text{Pre monsoon}}, 0.95_{\text{Post monsoon}}$) and TH ($R^2= 0.70_{\text{Pre monsoon}}, 0.75_{\text{Post monsoon}}$).The Principal Component Analysis (PCA)/Factor Analysis (FA) was carried out; $Factor_1$, explains 59.154 % and 69.278 % of the total variance during pre and post monsoon, respectively with a strong positive loading on Ca^{2+}, Mg^{2+}, SO_4^{2-}, TDS and a negative loading on pH. $Factor_2$ accounts for 13.94 % and 14.22 % of the total variance during pre and post monsoon, respectively and was characterized by strong positive loading of only pH and poor/negative loading of EC, Ca^{2+}, Mg^{2+}, SO_4^{2-}, TDS and TH during pre and post monsoon. We recommend routine monitoring and thorough treatment before consumption. Further, this study has demonstratedd the effectiveness of PCA/FA ro assess the hydrochemical processes governing the groundwater chemistry in the area.

Key words: MultivariateAnalysis, Correlation coefficient matrix, PCA; PenninsularIndia

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Estimation of Reference Evapotranspiration of district, Haryana, India using Penman-Monteith Model and metrological inputs

Kishan Singh Rawat
Centre for Remote Sensing and Geo-Informatics, Sathyabama Institute of Science and Technology (SIST), Chennai-119
Email.com: ksr.kishan@gmail.com

Abstract

Reference evapotranspiration (ET_o) is an important indicator of atmospheric evaporation demand and has been widely used to characterize hydrological change. However, sparse metrological observatories prohibit the accurate meteorological parameters estimations and their characterization such as temporal patterns of ET_o over large spatial scales. In this study, we have estimated ET_o of two wheat growing districts of Haryana, India through the Penman-Monteith (PM) method driven by metrological datasets to analyze the decadal variations of ET_o of period 1998–2008. Overall the result shows that ET_o values are generally low in the months of January and December and very high in the month of March.

Key words: ET, Kc, Penman-Monteith Model

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Use of Water Quality Index to Assess Long Term Groundwater Quality

Kishan Singh Rawat
Centre for Remote Sensing and Geo-Informatics, Sathyabama Institute of Science and Technology (SIST), Chennai-119
Email.com: ksr.kishan@gmail.com

Abstract

The objective of this study was to determine the Water Quality Index (WQI) of groundwater (GW) for drinking and irrigation, through systematic sampling during post monsoon seasons 2005 to 2013 from forty four fixed wells of study arae. A total of thirteen GW parameter: Calcium (Ca^{2+}),Magnesium (Mg^{2+}), Sodium (Na^{+}), Potassium (K^{+}), HCO_3, Nitrate (NO_3^{-}), Chloride (Cl^{-}), Fluoride (F^{-}), Sulphate (SO_4^{2-}), Total Hardness (T.H),Total Dissolved Solids (TDS), Hydrogen ion concentration (pH) and Electrical Conductivity (EC)were taken for statistical analysis of GW. In this study examining of GW WQI for drinking (WQI_1 and WQI_2) and irrigation (WQI_3) based on hydro chemical parameter. The analysis reveals that the groundwater of the some area needs some degree of treatment before consumption, and it also needs to be protected from the perils of contamination. The results of this study are useful to highlight one of the most important environmental problems, namely the degradation of the water quality, and may serve to alert and encourage local and national authorities to take substantial steps and actions to protect and manage GW quality.

Key words: Water Quality Index (WQI);water quality; Kanchipuram district

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Investigating the Effect of Malaria Transmissionthrough Temporal Variability in Uttar Pradesh with Reference to Climate Change

Shambhavi Krishna[1*] and Shailendra Rai[1]
[1]K Banerjee Centre of Atmospheric and Ocean Studies and M N Saha Centre of Space Studies, University of Allahabad, Prayagraj-211002
Email:shambhavi.krishna2908@gmail.com

ABSTRACT

Malaria is a potentially life threatening endemic and parasitic disease.At present, malaria affects all population groups in the country, regardless of gender or age, although children and pregnant women are at higher risk. The occurrence and transmission of malaria is a big public health issue in Uttar Pradesh. The occurrence of malaria and its sensitivity basically depends on the regional climatic variables such as temperature and rainfall. During the months from June to September, the state experiences the monsoon season characterized by heavy rains across different districts of Uttar Pradesh. It is during these months that maximum transmission of malaria takes place. In the immediate post-monsoon period from October to December, collection of rainwater in pits and puddles promotes mosquito breeding and subsequently the transmission of malaria. But, only few attempts have been made to study the relation between the recent climate change variability with malaria transmission.

Many districts in Uttar Pradesh have reported cases of the 'deadly' plasmodium falciparum (PF) malaria this year.According to data issued by the state's health department, a total of 852 PF cases were detected from January to August this year and of these, the highest were reported from Bareilly (707).The other districts where PF was detected are Pilibhit, Badaun, Shahjahanpur, Bahraich, Kanpur Dehat, Kushinagar, Mirzapur, Sonbhadra,Maharajganj,Lalitpur and GautamBuddh Nagar, Gorakhpur.Officials said that 39,135 cases of the plasmodium vivax (PV), the most widespread and common form of malaria, and 852 cases of PF were reported in Uttar Pradesh from January to August this year.Out of total 852 persons tested positive with PF, 707 were in Bareilly, 106 in Budaun, 23 in Sonbhadra, five in Shahjahanpur, three each in Pilibhit and Bahraich and one each in Kanpur Dehat, Kushinagar, Mirzapur, Lalitpur and GautamBuddh Nagar.

The Vector-borne disease community model (VECTRI) of the International Centre of Theoratical Physics, Trieste is a model with a new surface hydrology scheme which has been used to study the effects of weather and climate change temporal variability in malaria transmission across different districts in Uttar Pradesh.The model is driven using temperature and rainfall datasets from ECMWF over different districts such as Kushinagar, Gorakhpur, Baharaich, Bareilly and Maharajganj for a period of over 30 years. The analysis is carried out over above mentioned districts to understand the effect of regional and seasonal climate change over different parts of Uttar Pradesh.

From the present work, it is seen that the malaria transmission occurs during the post-monsoon season with minimum transmission during the winter season. While investigating the temporal variability in the malaria transmission the parameters are also studied namely, EIR, parasite ratio, CSPR, vector to host relation etc. It is found that the properties of the malaria transmission depends sensitively on the climatic conditions (temperature and rainfall) and they vary greatly among different districts of Uttar Pradesh.

Keywords:VECTRI, Parasite ratio, CSPR, Malaria transmission.

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Flood Risk Prediction Using 3D and SWAT in Kancheepuram Watershed

Aiswarya Rani Mahanta[1*], SmrutiRanjan Sahu[2], Kishan Singh Rawat[3]
[1,2,3]Centre For Remote Sensing and Geoinformatics, Sathyabama Institute Of Science And Technology, Chennai-119
[*]Email: aiswaryamahanta777@gmail.com

ABSTRACT

The Palar river catchment area in Kancheepuramdistrict has been flooding and causing great problems to the inhabitants as well as the environment frequently from past ten years. This study uses the real-time simulation in ArcGIS 10.3 and 3D in ArcScene 10.3, and the variables obtained from the soil and water assessment tool (SWAT) such as the land use, soil and slope are the parameters measured to induce the flood. When certain portions of the Hydrologic response unit (HRU); land use land cover (LULC), soil or slope is changed due to temporal adjustment and climate change, then the model can predict zones of low, moderate and high flood risk. The 3D simulations appear to produce a visual model for decision-making, planning, management, and mitigation. The simulation helps in determining the extent of the flood by using animation.

Keywords: Modeling; Flood; Simulation; 3D; GIS

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Spatial and Temporal Analysis of Drought 2002-2014 Years Using Vegetation Temperature Condition Index (VTCI) and Normalized Difference Vegetation index (NDVI) for Maharastra (India)-A case study

SmrutiRanjan Sahu[1*], Aiswarya Rani Mahanta [2], Kishan Singh Rawat[3]
[1,2,3]Centre For Remote Sensing and Geoinformatics, Sathyabama Institute Of Science And Technology,Chennai-119
*Email:hellopupu02@gmail.com

Abstract

Maharastra is a state of the western peninsular region in which a series of droughts and famines in the years 2004, 2006, 20010, 2012/13. Absence/decline of rainfall in the rainy seasons as being the major fact behind drought. Besides, lacks of Automatic Weather Stations(AWS) based monitoring system aggravate the situation of drought in the study area (at block level). In a region where the numbers of meteorological stations are not sufficient enough to monitor the onset and extent of drought, remotely sensed (RS) data presents fast and economical way of information as the ground condition reflects the overall condition of rainfall (RF) and soil moisture (SM). In this case study, the drought monitoring approach is based on MODIS Normalized Difference Vegetation index (NDVI) and Land surface Temperature (LST) products. The approach integrates the LST and thermal properties as well as the NDVI changes to identify the extent and pattern of the past drought years. From the NDVI versus LST scatter plot, we extract Vegetation Temperature condition index (VTCI) to map the variability and trend of the drought years. We used ArcGIS10.3 for produced the map.

Keywords: AWS; Drought; NDVI; LST; VTCI; Soil moisture

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Zoning and Maping of Landslide Hazard InturungMamring (GPU), South Sikkim, Sikkim, India

Aneesah Rahaman[1]and V Madha Suresh[2]
[1]CNHDS, University of Madras, Chennai 600025
[2]CNHDS, University of Madras, Chennai 600025
*Email:aneesah0786@gmail.com

Abstract

Landslides comprise a variety of mass movement and processes encompassing moderately rapid-to-rapid down-slope transport of debris or soil and rock material enmeshes by means of gravitational stresses.Sikkim Himalaya faces numerous landslides per year resulting in thousands of fatalities. A basic study for the demarcation of landslide hazard zones using Weighted Overlay Analysis in ArcGIS software, have been done for the part of TurungMamring (GPU) region, South Sikkim District, Sikkim, India. The objective of this present study is to Identify places of landslideoccurrence over TurungMamringon the basis of a set of physical parameters and ranking these according to the degree of actual or potentialhazard and also understand the application of LHZ map of the disaster management. In this present study total 10 landslides have been collected from the Department of Mining and Geology, Government of Sikkim among them 6 are active and remaining 4 are dormant landslides. slope, aspect, elevation, relative relief have been taken from the CARTOSAT 1 DEM data. Land use / land cover map has been prepared from the LISS III satellite image. Soil and geology map has been taken from the Geological Survey of India, Sikkim. All the thematic layers have been overlaid according to weightage value in GIS platform by applying Weighted Overlay Analysis. The results of this study shows the five landslides hazard zones such as very high, high, moderate, low and very low. 11.55% of the study area comes under very high hazard zone, 29% area high hazard zone, 41% of the total study area has moderate risk of landslides, 18% of this suburb considered as low to very low landslide hazard zone. The resulting landslide hazard zonation map of TurungMamring can be used as base data to support land-use planning and managing the stability of the slope in this area and also the final map will be helpful for the local people, engineers, planner for mitigating the hazard.

Key words:weighted overlay analysis; GIS; landslide; hazard zonation;Turung

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Mapping MODIS LST NDVI Imagery for Drought Monitoring in Maharastra, India

SmrutiRanjan Sahu[1*], Aiswarya Rani Mahanta [2], Kishan Singh Rawat[3]
[1,2,3]Centre For Remote Sensing and Geoinformatics, Sathyabama Institute Of Science And Technology,Chennai-119
*Email:hellopupu02@gmail.com

Abstract

A near-real-time drought monitoring approach termed as vegetation temperature condition index (VTCI) were applied to investigate drought over the Maharastra state of India. We identified the warm edges (LSTmax) and cold edges (LSTmin) as well as determined and validated the drought on a time series (2003_2014) of satellite MODIS data products. We assessed 13 years of drought conditions during the wheat growing period and determined the effects of the record breaking drought during 2013. The VTCI drought monitoring approach is based on the integration of the Normalized Difference Vegetation Index (NDVI) and Land Surface Temperature (LST) for complete coverage of current drought determination. The geospatial approach, which utilizes the VTCI imagery and daily precipitation data, was used for the validation of drought over 35 districts. It was established that the VTCI results major drought in some area and some area having minor or no drought, during the 13-years time period. Our results suggest the capability of the VTCI for near-real-time drought monitoring as a better indicator of vegetation and thermal conditions over the regions in both rainfed and irrigated covenant areas.

Keywords: VTCI; LST; MODIS; NDVI; Drought

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Space-based Measurement of Extreme Rainfall over India and Nearby Regions For Disaster Monitoring

Yashi Upadhyay1, Anoop Kumar Mishra[2], Mohammad Suhail[2], Vanganuru Nagaraju[2]
[1]Centre for Land Resource Management, Central University of Jharkhand, Ranchi, 835205
2Centre for Remote Sensing and Geoinformatics,Sathyabama Institute of Science andTechnology, Chennai-119

Abstract
Extreme precipitation is among the major factors highly responsible for disasters like floods and droughts. These disasters are the most common and affect a majority of the India's population. In recent decades, climate change has led to a striking increase in extreme precipitation events which are responsible for the increased intensity and frequency of these disasters in India.In order to manage and reduce the loss from these catastrophic disasters, precipitation information at high temporal and spatial resolution is crucial. Recent researches focus on improving precipitation estimation for disaster forecasting and management. Most of these studies are based on space-borne technologies because of wider coverage and availability as compared to conventional methods. Global precipitation products provide inaccurate rainfall estimates over Indian region due to complex topography of the region. This study focuses on review of recent researches on extreme rainfall estimation over Indian region using satellite observations. This will be very helpful for exploring near real time floods and droughts over India which is very crucial for disaster mitigation and adaptation strategies.

Keywords: Rainfall: Remote Sensing; GIS

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Agricultural Drought Modelling Using Remote Sensing in Maharastra, India.

SmrutiRanjan Sahu[1*], Aiswarya Rani Mahanta [2], Kishan Singh Rawat[3]
[1,2,3]Centre For Remote Sensing and Geoinformatics, Sathyabama Institute Of Science And Technology,Chennai-119
*Email:hellopupu02@gmail.com

Abstract
Maharashtra is one of the worst drought affected states in India, and as a result the agricultural productions have kept low. In the present study Standardized Precipitation Index (SPI) and Normalized Difference Vegetation Index (NDVI) obtained from remote sensing data and it has been considered for drought modelling in Maharashtra. The model for predicting agricultural drought are developed for Kharif season, based on the data for a period of 13 years from 2002 to 2014. In the model, NDVI and SPI values are used as variables. The correlation between NDVI and SPI has been utilized in the study. Crop yield model was developed from the predicted NDVI for the major crops and was validated with the actual yield.

Keywords: SPI; Drought; NDVI; MODIS; Crop yield

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Monitoring Spatio-Temporal Pattern of Drought Stress Using Vegetation Cover Index OverMaharastra, India

SmrutiRanjan Sahu[1], Aiswarya Rani Mahanta [2], Kishan Singh Rawat[3]
[1,2,3]Centre For Remote Sensing and Geoinformatics, Sathyabama Institute Of Science And Technology,Chennai-119
*Email:hellopupu02@gmail.com

Abstract

Monitoring of drought and associated agricultural production deficit using meteorological indices is essential component for drought preparedness. Remote sensing based NDVI also plays a key role in drought assessment, but alone it fails due to time lag of 3–4 weeks. In view of improving drought monitoring in Maharastra state of India, it was proposed to use combination of meteorological and remote sensing-based approach. The study aims to monitor and assess inter-annual variability in spatial drought and related crop loss in Maharastra using time series of daily rainfall of Climate Prediction Centre (NOAA) and MODIS based Normalized Difference Vegetation Index. Instead of NDVI, vegetation condition index (VCI) was used to normalize geographical differences in vegetation types and physiographical setting. VCI found to be significantly related to drought stress in terms of rainfall anomaly for majority of decades. VCI determines the departure of current NDVI from the minimum NDVI with respect to long-term NDVI.

Keywords: VCI; Drought; NDVI; Vegetation

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Comparative Analysis of Cartosat, Aster and SRTMDigital Elevation Models For Kancheepuram Watershed Parameters

SmrutiRanjan Sahu[1*], Aiswarya Rani Mahanta[2], Kishan Singh Rawat[3]
[1,2,3]Centre For Remote Sensing and Geoinformatics, Sathyabama Institute Of Science And Technology,Chennai-119
*Email:hellopupu02@gmail.com

Abstract

The Digital Elevation Models (DEMs) can represent three-dimensional space in various forms. It is mainly used to characterize the topography and to develop the watershed boundaries thereby to study the landscape within the watershed. Researchers are using DEMs from satellite imageries like ASTER, SRTM, Cartosat etc. They are concerned with the accuracy of DEMs generated from the satellite imageries. This study emphases on comparing the accuracy of DEM generated from three different satellite sources, 1) Optical based sensory satellite data – Cartosat-DEM. 2) Microwave based sensory satellite data – SRTM-DEM and 3) Thermal based sensory satellite data – ASTER-DEM. Study was conducted over Kancheepuram Watershed of Palar river. Shuttle Radar Topographic Mission (SRTM) (30 m), optical stereo pair from ASTER (30 m) and CARTOSAT (10 m) were used for the study. The studies shows that the stream parameter values of Cartosat-DEM are higher than SRTM-DEM and ASTER-DEM but elevation values of Cartosat-DEM are lower as it is geoid based model.

Keywords: Cartosat-DEM; SRTM-DEM; ASTER-DEM; Accuracy; Elevation; TerrainDerivatives

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Fusion of High-Resolution DEMS To Improve Hydrological Interpretations at Kancheepuram Watershed

Aiswarya Rani Mahanta[1#], SmrutiRanjan Sahu[2], Kishan Singh Rawat[3]
[1,2,3]Centre For Remote Sensing and Geoinformatics, Sathyabama Institute Of Science And Technology, Chennai-119
[*]Email: aiswaryamahanta777@gmail.com

Abstract

Digital Elevation Models (DEMs) represents the earth surface in three-dimensional form. Several open sources for DEMs are available for Kancheepuram district, each method adopted has advantages and disadvantages of its own. All DEMs comprises some amount of error. Refining the accuracy of digital elevation is vital for reducing hydrotopographic derivation errors pertaining to, e.g., flow direction, basin borders, channel networks, depressions, flood forecasting, and soil drainage. DEMs covering the same area but have different quality, grid sizes, generation time or production methods, are titled as multi-source DEMs. The coverage of DEM has to be classified according to slope and visibility in advance, because the precisions of DEM grid points in different areas with different slopes and visibilities are not the same. Next, difference DEM (dDEM) is computed by subtracting two DEMs. It is presumed that dDEM, which only contains random error, obeys normal distribution. Therefore, student test is implemented for blunder detection and three kinds of rejected grid points are generated. First kind of rejected grid points is blunder points and has to be eliminated. Another one is the ones in change areas, where the latest data are regarded as their fusion result. Moreover, the DEM grid points of type I error are correct data and have to be reserved for fusion. The experiment result shows that using DEMs with terrain classification can obtain better blunder detection result. A proper setting of significant levels (α) can detect real blunders without creating too many type I errors. Weighting averaging is chosen as DEM fusion algorithm. The priori precisions estimated by our national DEM production guideline are applied to define weights. Fisher's test is implemented to prove that the priori precisions correspond to the RMSEs of blunder detection result.

Keywords: Cartosat-DEM; SRTM-DEM; ASTER-DEM; Accuracy; Elevation; Terrain Derivatives

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Distribution of Trace Metals in Sediments and Their Link with Benthic Community of Seven Tropical Estuaries along The West Coast of India

M. Nageswar Rao[1 2 3*], Anirudh Ram[2], Santosh Gaikwad[2], Angad Gaud[2], Meena Chauhan[2], Laxman Kumbhar[2], Deepika Jagdale[2], Soniya Sukumaran[2], Sabyasachi Sautya[2], Umesh Kumar Pradhan[2] and V. Siddaiha[3]

[1]National Center for Sustainable Coastal Management (MoEF&CC), Anna university campus, Chennai-25
[2]CSIR-National Institute of Oceanography, Regional Centre, Mumbai-400053, India
[3] Department of Organic Chemistry & FDW, Andhra University, Visakhapatnam 530 003
[*]Email: nageshmcr@gmail.com

Abstract

Spatial and seasonal variations of eleven trace metals relative to benthic fauna composition were studied in the surface sediments collected from seven tropical estuaries along the west coast of India in order to understand the environmental quality status related with ecological changes in the study area. The overall abundance of trace metals in sedimentwere in the order of Fe>Al>Mn>Cr>Cu>Zn>Ni>Co>Pb>Cd>Hg in all the estuaries. Suit of geochemical indices such as Enrichment Factor (EF), Contamination Factor (CF) and Pollution Load Index (PLI) highlight that the sediments in these estuaries are polluted with respect to trace metals during pre and post monsoon seasons. The diversity of the macrofauna (Ma-S and Ma-H'($\log_2$)) was hampered with increasing concentration of toxic metals (Cr, Ni, Zn, Cd and Hg) suggesting anthropogenic impact on benthic biota. The meiofaunadiversity did not show any relationship with trace metals, indicating the tolerant adaptive characteristics of some particular meiofaunal species in the study area.

Keywords: Trace metals; Sediment; Pollution Index; benthic fauna; Tropical estuaries

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Assessing the Status of Groundwater Aquifer in and Around Marshy Land Area, Chennai, India

S.Packialakshmi[1], S.Shrimathy[2]
[1]Department of Civil Engineering, Sathyabama Institute of Science and Technology, Deemed University, Chennai 119
[2]Department of Civil Engineering, Sathyabama Institute of Science and Technology, Deemed University, Chennai 119,
Email:bagyaram@gmail.com, shrimathy1018@gmail.com

Abstract

The importance of groundwater for the existence of human society cannot be overemphasized. Groundwater is the major source of drinking water in both urban and rural India. Groundwater crisis is not the result of natural factors in general. It has been caused by anthropogenic actions. During the past two decades, the water level in several parts of the country has been falling rapidly due to an increase in unplanned mining of aquifers. As far as the quality and development of of groundwater is concerned, many states in the country have been identified as semi critical to critical stage. Hence, spatial and temporal evaluation of groundwater is very cruicial for providing monitoring and protection measures especially for the areas located in the urban fringes. Wetlands are considered as the most significant life-supporting ecosystems that offers numerous ecosystem services. It is a transition between aquatic and terrestrial system where the land is completely occupied with standing water and soil is rich in biomass and nutrients. Pallikarani Marshland is located in the urban fringe of Chennai Metropolitan Area, has affected severely due to the dumping of solid and liquid waste transferred from urban Chennai. Further, majority of land is occupied with urban related construction activities which arrested the natural flow of the system created the induced flooding issues in Chennai. The present study examines the groundwater level fluctuations and the prevailing status of groundwater quality by conducting detailed water quality analysis and fluctuation study using primary and secondary data sources. Pallikaranai marshland is compactly surrounded with hard rock terrain in the western direction, and coastal belt in the eastern direction exhibits the complex hydrogeological system. Groundwater level fluctuations are significantly varies with coastal region, marsh land and hard rock terrain. The water quality parameters such as EC, pH, Ca, Mg, Na, HCO_3, CO_3, SO_4, CL, NO_3, TDS, TH and TA were analyzed and the outputs were mapped using GIS to evaluate the spatial variation in groundwater quality. Water quality mapping for the selected study area shows that wells located in the eastern direction (coastal area) having the higher ranges of Na,Cl,SO_4,TDS,EC. The parameters such as Ca and HCO_3 which causes hardness of water is exceeded in the wells located in western direction. Hence, the Study recommended the conservation strategy and coastal zone regulation to protect the resource base for future.

Keywords: Groundwater; Aquifer; Marshland

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Characterization and Stabilization of Silty Organic soils using Good Earth and Surkhi– Ganderbal, J&K

NaveedNazir Denthoo[1] and AadilManzoor Qazi[2*]
[1]Department of Environment, College of Engineering, Anna University, Chennai
[2]Department of Transportation, College of Engineering, Anna University, Chennai
Email:aadilqazi10@gmail.com

Abstract

We have examined the soil at Central University of Kashmir, Ganderbal J&K as the site is selected for the construction of a University campus. Initial observations depict the soil to be organic in nature which is believed to be formed due to the deposition of organic materials. As the strength of these soils are highly susceptible. The study area also comes in the seismic zone IV and possesses a high risk of liquification during an earthquake. In order to evaluate the strength of this soil and recommendation of guidelines for construction a number of tests was carried out to test its strength. These included, in-situ tests, gradation of soils, DST(Direct Shear Test), UCT(Unconfined Compression Test), CBR(California Bearing Ratio), Compaction and various other strength tests for soil. From insitu tests and soil gradation results, we get a clear picture of the problems encountered. The main problem lies in high organic content as well as its high water content. However, an addition of the filler (good earth) material, will raise its strength, as the clay content gets increased the gradation of soil is improved, also with the addition of surkhi the gradation is further enhanced . On addition of filler and surkhi we saw that the MDD (Maximum Dry Density) of the soil increases with OMC (Optimum Moisture Content) shifting towards left. Filler also increases the cohesion also increasing its unconfined compressive strength. However, from the CBR test we observed CBR value of the untreated sample increased manifold on the addition of filler. It was also observed that due to the addition of surkhi we could reduce the amount of filler to be used and enable quick drying of the soil that can reduce the cost of construction and the construction period.

Key words: Shear; compaction; organic content; compressive strength

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Implication of Rapid Urbanization in North Chennai Industrial Area: Assessing the Impact

S. Muthusamy[1], PM. Velmurugan[2]and M. Jayaprakash[3]
[1]Department of Geology, V.O.C. College, Tuticorin, Tamilnadu, India
[2]Centre for Earth and Atmosphereic Sciences, Sathyabama Institute of Science and Technology, Chennai –119
[3]Department of Applied Geology, University of Madras, Guindy Campus, Chennai, Tamilnadu, India
Email:muthu.geo@voccollege.ac.in

Abstract

Northern Chennai is highly urbanized due to rapid increasing in industrialization. In this Manuscript, we are presenting a comprehensive set of indicators and put forward a new evaluation method for measuring environmental impacts of urbanization. With the effective use of GIS tool in remote sensing data, the Land Use and Land Cover change strategies of north Chennai industrial area were analyzed and discussed. Landsat TM images of this area was downloaded and processed in GIS tool for the year 1992, 2005 and 2015 to derive the LULC change maps. These maps were used to assess the area of four types of classes, such as Water bodies, Barren Land, Vegetations and Built-ups. From this analysis, it is concluded that the barren land is drastically occupied, constructed and converted into buildup lands from 1992 to 2015. The rapid urbanization due to industrial expansions in this area has maximized in the last two decades, some portions of water bodies and vegetative lands have been converted into build-up land. This leads to increase of livelihood demands and various types of pollution. Effortless use of remote sensing and GIS technique is helpful in understanding the situation that exists in this type of complex zones. The information derived from this type of studies can be utilized in future management of Urbanization towards sustainable development.

Keywords: Remote sensing, GIS, Urbanization, Industrialization, Environmental Impact.

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Monitoring Drought OfMaharastra, India By Using Standardized Precipitation Index

SmrutiRanjan Sahu[1*], Aiswarya Rani Mahanta[2], Kishan Singh Rawat[3]
[1,2,3]Centre for Remote Sensing and Geoinformatics, Sathyabama Institute of Science And Technology,Chennai-600119
*Email:hellopupu02@gmail.com

Abstract

This study shows the drought affected area of Maharastra. Drought mainly causes damages in agricultural land and affect livestocks, human activity. This study mainly dealt with the drought during the kharif season (June- Oct) in Maharastra state. Drought of Maharastra measured by using values of Standardized Precipitation Index (SPI),which is the precipitation based drought indices. During the kharif season some area of Maharastra having less rainfall and high temperature. For calculation of Standardised Precipitation Index 16 days average. precipitation data are collected from National Oceanic and Atmospheric Administration (NOAA). According to the ranges the SPI classified into different classes. There are seven classes in which above than +2 showing extreme wet conditions and less than -2 showing extreme dry conditions. We collected all SPI values of kharif season for 2013, and put those values in ArcGIS software for showing the results in the map. The resulted area which are affected by drought measures by taking only the value of SPI in kharif season. According to the SPI values many area of Maharastra affected by the drought during 2013 kharif season. And those area which are affected by drought having year's lowest rainfall which affected agricultural land. The major crops affected by the drought is wheat. Decrease in crop production also affects socioeconomic changes. In the map we can see the variation of the area with 16 days interval from June to October.

Keywords:SPI, Drought, Rainfall, metrology data

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Droughts and Floods–Overall Case Study with Kanchipuram District Rainfall Data Set

A.Amuthini Sambhavi[1], *K.Nagamani[2], E.Priyadarshini[3] andAnoopkumar Mishra[4]
[1]Sathyabama Institute of Science and Technology, Chennai.
[2]Centre for Remote Sensing and Geo-informatics, Sathyabama Institute of Science and Technology, Chennai.
[3]Department of Mathematics, Sathyabama Institute of Science and Technology, Chennai.
[4]Centre for Remote Sensing and Geo-informatics, Sathyabama Institute of Science and Technology, Chennai
*Corresponding Author: nagamaniloganathan@gmail.com

Abstract

The core concept of this paper lies in forecasting Kanchipuram district's rainfall data set ranging over hundred years starting from 1901 to 2002 (CGWB) using ARIMA model which is Auto-Regressive Integrated Moving Average model. Hence, for this case study, ARIMA Model (2,0,2) (1,0,1) was developed. Statistical assistance was satisfactorily supplied by Autocorrelation and Partial correlation analysis to account for optimum accuracy. Standard statistical techniques accounted for the validity check of the model. Kanchipuram rainfall forecast prediction for the successive two years, that is, till 2004 was carried out with this ARIMA model and hence, for the rainfall forecast values MAPE (Mean Absolute Percentile Error) estimation was also successfully done. Thus, this traditional time series ARIMA model perfectly justifies all the requirements of the decision-makers, researchers and water resources departments related with the construction of any artificial recharge structures to manage and mitigate the drought and flood disasters with sound water conservation. Hydrology and environmental management fields' applications are satisfied by this ARIMA Model.

Keywords: ARIMA, ACF, PCF, MAPE, forecast, rainfall

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Hybrid Recommendation System Based on Product Rating and Reviews for Online Shopping

R. Shanthi[1],S.P.Rajagopalan[2]
Sathyabama Institute of Science and Technology
G.K.M. College of Engineering and Technology, Chennai.
Email: sha_raju2003@yahoo.co.in, sasirekaraj@yahoo.com

Abstract

Of late, recommender systems (RS) have offered an astonishing jump forward to customers. It reduces the client time cost in this manner conveying quicker and better outcomes. In the wake of acquiring an item there are suggestions as indicated by the various remarks given by clients. Inside a limited capacity to focus item use and quality, the clients get an item suggestion. However, this doesn't work out great so to improve it much, criticisms, directions and audits are brought based on top to bottom directions, all inclusive like and ordinary keys. The present paper proposes mixture suggestion framework (HRS) that utilizes rating and audit to prescribe any item to client. To execute item suggestions following are fused that is recovering individual information, Logical Language based Rule Generation (LLRG), positioning and integrated proposal framework. The phases included in the proposed suggestion framework incorporate, Data Gathering, preprocessing, sifting and ranking. The technique of ranking calculation positions the items in connection to the business check. The top rundown shows the item having most prominent tally number. In the LLRG system, the rationale rule age approach recovers helpful and compulsory information from surveys, directions, items unique state and from there on comes the suggestion. The HRS upholds 2 procedures specifically, area based and heterogeneous space based. Additionally the proposals exhibited for the client are in setting to the client's exercises, decisions and lead which are as per client's close to home likings and helps in basic leadership. When looking at the result, obviously the proposed strategy is better than the customary with respect than lucidity, viable suggestion and inclusion rate. It is assessed that Hybrid Recommendation System provides more prominent outcomes contrasted and rest of the current suggestion strategies

Keywords: Web mining; web search; items; positioning; proposal framework; Hybrid approach; E-business

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Evaluating the effects of increasing of building height on the environment

Usamah Derwaish[1*], P. Vijayalakshmi[1] and Mohammd Rafiq[2]
[1]Department of Civil Engineering, Sathyabama Institute of Science and Technology, Chennai-119
[2]Centre for Remote sensing and Geoinformatics, Sathyabama Institute of Science and Technology, Chennai-119
*Email: usamahderwaish@gmail.com

Abstract

Land Surface Temperature (LST) is a significant parameter for anthropogenic heat production and also for cooling systems, precipitation and etc. increase in temperature and energy consumption forms the urban heat island. Increased urban population leads to increase in the built-up which in turn is responsible for the increases in the height and density of buildings, particularly in metropolitan areas. These factors lead to vast changes in the environment and meteorological parameters including the urban geometry, pollution and heat exchanges. This study combines the techniques of remote sensing and geographic information system to detect the spatial variation of LST and determine its quantitative relationship with building parameters like height, pattern and density. Study aims to examine the impacts of urbanization on the environment. Different kinds of structures are identified and their impacts on environment are examined. The Kanchipuram district of Tamil Nadu is selected as a study area and 3 hotspots are identified for different structural changes. There is 38% increase in the build-up area from (2005-2011) in Kanchipuram which has resulted in various environmental risks including increases in the runoff, LST, heavy precipitation events. This has increased the risk of floods in poorly planned areas, development and inadequate disaster preparation also contributed to a worsening of the flood conditions. The pattern of build-up also governs the environment as the increase in the height and density of buildings increase the LST. It was reported that the LST both night and day time over the district (from 2002 to 2019) has increased significantly by 0.2^0C and 0.35^0C per decade respectively. There are almost 30 to 35% differences in the LST between the areas with high density and height as compared to low density and height. Also the runoff is more in the congested places and soil moisture has decreased as compared to open areas. This increase in the building density and the height will increase LST and lead in the risk of floods and other environmental disasters.

Keywords: Urban Heat Island; Building height and density; LST;Kanchipuram

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