РЕЗЮМЕТА НА НАУЧНИ ТРУДОВЕ

на гл. ас. д-р Наталия Христова Станкова-Георгиева

представени за участие в конкурс за академичната длъжност „Доцент“, обявен в Държавен вестник бр. 45 от 03.06.2025 г. от Института за космически изследвания и технологии - БАН в област на висше образование 4. Природни науки, математика и информатика, професионално направление 4.4. Науки за Земята; научна специалност „Дистанционни изследвания на Земята и планетите“ за нуждите на секция „Аерокосмическа информация“ при ИКИТ-БАН.

В4.1

Stankova, N., Avetisyan, D. Postfire Forest Regrowth Algorithm Using Tasseled-Cap-Retrieved Indices. Application of Remote Sensing in Forest Fire, 16, 3, Remote Sensing, 2024, DOI:https://doi.org/10.3390/rs16030597, 597. SJR (Scopus):1.091, Q1.

Индексирана в: Scopus
Линк към публикацията: https://doi.org/10.3390/rs16030597

Abstract

Wildfires are a common disturbance factor worldwide, especially over the last decade due to global climate change. Monitoring postfire forest regrowth provides fundamental information needed to enhance the management and support of ecosystem recovery after fires. The purpose of this study is to propose an algorithm for postfire forest regrowth monitoring using tasseled-cap-derived indices. A complex approach is used for its implementation, for which a model is developed based on three components—Disturbance Index (DI), Vector of Instantaneous Condition (VIC), and Direction Angle (DA). The final product—postfire regrowth (PFIR)—allows for a quantitative assessment of the intensity of regrowth. The proposed methodology is based on the linear orthogonal transformation of multispectral satellite images—tasseled cap transformation (TCT)—that increases the degree of identification of the three main components that change during a fire—soil, vegetation, and water/moisture—and implies a higher accuracy of the assessments. The results provide a thematic raster representing the intensity of the regrowth classes, which are defined after the PFIR threshold values are determined (HRI—high regrowth intensity; MRI—moderate regrowth intensity; and LRI—low regrowth intensity). The accuracy assessment procedure is conducted using very-high-resolution (VHR) aerial and satellite data from World View (WV) sensors, as well as multispectral Sentinel 2A images. Three different forest test sites affected by fire in Bulgaria are examined. The results show that the classified thematic raster maps are distinguished by a good performance in monitoring the regrowth dynamics, with an average overall accuracy of 62.1% for all three test sites, ranging from 73.9% to 48.4% for the individual forests.

В4.2

Avetisyan, D., **Stankova, N.**, Dimitrov, Z. Assessment of Spectral Vegetation Indices Performance for Post-Fire Monitoring of Different Forest Environments. Fire, 6, 8, MDPI, 2023, ISSN:25716255, DOI:https://doi.org/10.3390/fire6080290, A290-1-A290-28. SJR (Scopus):0.78, Q1.

Индексирана в: Scopus

Линк към публикацията: https://doi.org/10.3390/fire6080290

Abstract

Although wildfires are a common disturbance factor to the environment, some of them can cause significant environmental and socioeconomic losses, affecting ecosystems and people worldwide. The wildfire identification and assessment of their effects on damaged forest areas is of great importance for provision of effective actions on their management and preservation. Forest regrowth after a fire is a continuously evolving and dynamic process, and the accuracy assessment of different remote sensing indices for its evaluation is a complicated task. The implementation of this task cannot rely on the standard procedures. Therefore, we suggested a method involving delineation of dynamic boundaries between conditional categories within burnt forest areas by application of spectral reflectance characteristics (SRC). This study compared the performance of firmly established for fire monitoring differenced vegetation indices—Normalized Difference Vegetation Index (dNDVI) and Normalized Burn Ratio (dNBR) and tested the capabilities of tasseled cap-derived differenced Disturbance Index (dDI) for post-fire monitoring purposes in different forest environments (Boreal Mountain Forest (BMF), Mediterranean Mountain Forest (MMF), Mediterranean Hill Forest (MHF)). The accuracy assessment of the tree indices was performed using Very High Resolution (VHR) aerial and satellite data. The results show that dDI has an optimal performance in monitoring post-fire disturbances in more difficult-to-be-differentiated classes, whereas, for post-fire regrowth, the more appropriate is dNDVI. In the first case, dDI has an overall accuracy of 50%, whereas the accuracy of dNBR and dNDVI is barely 35% and 36%. Moreover, dDI shows better performance in 16 accuracy metrics (from 17). In the second case, dNDVI has an overall accuracy of 59%, whereas those of dNBR and dDI are 55% and 52%, and the accuracy metrics in which dNDVI shows better performance than the other two indices are 11 (from 13). Generally, the studied indices showed higher accuracy in assessment of post-fire disturbance rather than of the post-fire forest regrowth, implicitly at test areas—BMF and MMF, and contrary opposite result in the accuracy at MHF. This indicates the relation of the indices' accuracy to the heterogeneity of the environment.

B4.3

Avetisyan, D., **Stankova, N.** Observation of spectral indices performance for post-fire forest monitoring. Aerospace Research in Bulgaria, 36, Space Research and Technology Institute Bulgarian Academy of Sciences, 2024, ISSN:1313-0927, DOI:10.3897/arb.v36.e06, 67-78. JCR-IF (Web of Science):0.1, Q4.

Индексирана в: Web of Science
Линк към публикацията: https://doi.org/10.3897/arb.v36.e06

Abstract

Monitoring post-fire forest disturbances and subsequent recovery is vital for the management and preservation purposes of the forest ecosystems. This study aimed to assess forests' damages and regrowth dynamics after fire using remotely sensed data and to compare its reliability for post-fire monitoring in different forest environments. This paper compared forest regrowth dynamics applying selected spectral indices – Differenced Normalized Difference Vegetation Index (dNDVI), Differenced Normalized Burn Ratio (dNBR), and Differenced Disturbance Index (dDI). The post-fire environmental impact and recovery processes were performed on the territory of the three fires in Bulgaria – Ardino, Bistrishko branishte, and Perperek.

B4.4

Stankova, N., Nedkov, R., Ivanova, I., Avetisyan, D. Integration of multispectral and SAR data for monitoring forest ecosystems recovery after fire. Proc. SPIE 10444, Fifth International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2017), 10444, SPIE, 2017, ISBN:978-9963-697-24-3, ISSN:0277-786X, DOI:10.1117/12.2277313, 104441J-1-104441J-9. SJR:0.216.

Индексирана в: Scopus
Линк към публикацията: https://doi.org/10.1117/12.2277313

Abstract

The aim of this study is assessing the impacts and monitoring the condition and recovery processes of forest ecosystems after fire based on remote aerospace methods and data. To achieve this goal, satellite imagery in microwave and optical range of the spectrum were used. A hybrid model for assessing the instantaneous condition of forest ecosystems after fire that uses parallel data from optical and Synthetic Aperture Radar (SAR) was developed. Based on the three Tasseled Cap components (Brightness-BR, Greenness-GR and Wetness-W), a vector describing the current condition of the forest ecosystems was obtained and used as input data from the optical range. Results obtained by implementation of the proposed approach show that the integrated composite images of VIC and SAR represent the degree of recovery.

B4.5

Stankova, N., Nedkov, R., Ivanova, I., Avetisyan, D. Modeling of forest ecosystems recovery after fire based on orthogonalization of multispectral satellite data. Proc. SPIE 10790, Earth Resources and Environmental Remote Sensing/GIS Applications IX, 10790, SPIE, 2018, DOI:10.1117/12.2325643, 107901R-1-107901R-7. SJR:0.234.

Индексирана в: Scopus
Линк към публикацията: https://doi.org/10.1117/12.2325643

Abstract

The aim of this study is to monitor the post-fire recovery of forest ecosystems on the basis of remote aerospace methods and data. To achieve this goal, a hybrid model for studying the dynamics of recovery processes of forest ecosystems after fire was developed. Based on the Greenness Tasseled cap component, Normalized Differential Greenness Index (NDGI) was obtained and used as input data in combination with vegetation indices (NDVI, MCARI2). NDGI is an index for vegetation dynamic assessment based on orthogonal transformation of satellite images from Sentinel-2. NDGI shows the vegetation dynamic change depending on temporal periods. The values of this index range from +1 to -1. Using NDGI assessment can be made of negative and positive changes of the vegetation. This study uses a new approach for forest ecosystems assessment, based on this index using the Greenness component obtained from orthogonalization of satellite images in combination with generated vegetation indices (NDVI and MCARI2). Optimization of model performance and automatization of Sentinel-2 MSI data processing were conducted. Sentinel-2 MSI model for orthogonalization of multispectral data was used for Tasseled

cap transformation. Results obtained by implementation of the proposed approach show that the integrated composite images of NDGI, NDVI and MCARI2 represent the condition of forest ecosystems.

B4.6

Stankova, N., Avetisyan, D. Modeling post-fire forest regrowth using tasseled cap-derived indicators. Earth Resources and Environmental Remote Sensing/GIS Applications XIV, 12734, SPIE, 2023, DOI:https://doi.org/10.1117/12.2679783, SJR (Scopus):0.17.

Индексирана в: Scopus
Линк към публикацията: https://doi.org/10.1117/12.2679783

Abstract

Wildfires are natural processes in the ecosystem, some of them causing significant environmental disturbances. The remote aerospace methods and data can provide an efficient, easy and cost-effective tool for monitoring the recovery of burnt forests which is an essential task in the ecological research. The aim of this study is to monitor post-fire forest regrowth introducing an approach using the tasseled cap derived Disturbance Index (DI), Vector of Instantaneous Condition (VIC) and Direction Angle (DA). The high accuracy of the methodology is based on the linear orthogonal transformation of multispectral satellite images (Tasseled cap transformation (TCT)), which increases the degree of identification of the three main components changing during fire – soil, vegetation and moisture. The proposed method was tested on the territory of three test fires with different forest environments, located next to Bistritsa, Ardino, and Perperek, Bulgaria. For the purpose of post-fire regrowth monitoring Landsat and Sentinel-2 satellite imageries have been used for the study period – 2012-2022. For the purpose of validation very high resolution (VHR) satellite data have been used that include World View (2/3) and GeoEye (1) sensors as well as aerial images. Results obtained by the implementation of the proposed approach represent the post-fire regrowth dynamics. The DA follows the change trends of the VIC, however, more clearly represents the changes of the Greenness TC component for the studied period.

B4.7

Станкова, Н. Мониторинг на възстановяване след горски пожар с използване на Direction Angle. Proceedings SES 2023, Space Research and Technology Institute Bulgarian Academy of Sciences, 2023, ISSN:2603-3313, 281-285.

Линк към публикацията

Абстракт

Извършен е мониторинг на възстановителните процеси след горски пожар с използване на получения чрез tasseled cap индекс – Direction Angle (DA). Обектът на изследване се намира в Североизточните Родопи, в близост до с. Черньовци (област Кърджали), България, където през 2012 г. избухва горски пожар. Извършен е 10-годишен мониторинг на възстановяването след горския пожар (2012–2022 г.).

В4.8

Станкова, Н., Иванова, И. Оценка на степента на увреждане на горски екосистеми след пожар. Proceedings SES2017, Space Research Technology Institute - Bulgarian Academy of Sciences, 2017, ISSN:1313-3888, 275-279.

Линк към публикацията

Абстракт

Целта на настоящата работа е оценка на степента на увреждане на горски екосистеми след пожар на базата на дистанционни аерокосмически методи и данни. Използвани са спътникови изображения от Sentinel-2A и Terra MODIS. За целта на изследването се извършва проследяване на състоянието и степента на увреждане на горски екосистеми след пожар на територията на пожара от 24/08/2017г. в района на с. Стара Кресна. Благодарение на подходящата пространствена разделителна способност на Sentinel-2A е направено прецизно дефиниране на границите на изгорялата от пожара територия. Използвани са композитни изображения от сензора Sentinel 2A от следните дати – преди пожара (07/08/2017г.) и след пожара (06/09/2017г.). За целта на изследването е направена класификация на базата на dNBR или т. нар. „burn severity map" на територията на цялата опожарена площ като са дефинирани четири класа според степента на изгаряне – висока, средна, ниска и незасегнати.

В4.9

Станкова, Н. Оценка на следпожарните екологични ефекти с използване на дистанционни методи: преглед. Екологично инженерство и опазване на околната среда, 2023, 3-4, Националното дружество по екологично инженерство и опазване на околната среда, 2023, ISSN:1311–8668, 44-51.

Линк към публикацията

Abstract

Forest fires are an increasing problem for European Union countries located in the southern parts of Europe. Climate change is believed to be one of the main reasons of the fires. Since field research requires both time and money and is focused on a specific fire-affected area, the aim of this paper is to present an alternative approach using remote sensing methods to assess post-fire ecological effects. An overview of existing remote sensing methods used to assess the consequences and post-fire ecological effects is reviewed. Remote sensing methods have great potential for studying the heterogeneity and spatial distribution of burned areas. Satellite data allow researchers to conduct multi-scale and spatially detailed analyzes of fires in terms of topography, structure, and vegetation before and after the fire.

Г7.1

Richter, A., Kazaryan, M., Shakhramanyan, M., Nedkov, R., Borisova, D., **Stankova, N.**, Ivanova, I., Zaharinova, M. Estimation of thermal characteristics of waste disposal sites using Landsat satellite images. Comptes rendus de l'Académie bulgare des Sciences (Proceedings of the Bulgarian Academy of Sciences), 70, 2, "Prof.Marin Drinov" Publishing House of Bulgarian Academy of Scinces, 2017, ISSN:1310-1331, 253-262. SJR:0.21, ISI IF:0.251, Q2.

Индексирана в: Web of Science
Линк към публикацията: http://www.proceedings.bas.bg/

Abstract

The aim of this work is to develop a thermal model of waste disposal sites /WDS/ as a part of the complex analysis of the WDS using Landsat satellite images. In the paper an integrated thermal model of WDS is proposed. In the model a lot of thermal parameters such as temporal temperature variations of WDS surface, thermal risks, epicenters and thermal isolines, temperature forecasting, and thermal stabilization are included. The temporal temperature variations as seasonal and chronological changes are represented. The following approaches are proposed: assessment of the fire risk and the decay risk in WDS through calculating the surface temperatures; detection of the thermal isolines and the thermal epicenters; estimation of the temperature stabilization and the time stabilization in the WDS. An algorithm for applying the images as time-series of temperatures in the surroundings of the specified WDS for the specified thermal characteristics of the WDS and displays the thermal model of the landfill. A method of converting the sensor data into the temperature values, the methods of regression analysis (the estimation of the regression line, the estimation of periodic and trend components of the temperature time- series), the limit filtering method, method of risk assessment of fires and decay in WDS are presented and applied. The proposed methods and algorithms are tested for two WDS near Moscow – Kutchino and Torbeevo. The general classification of the thermal characteristics of the WDS is presented.

Г7.2

Kazaryan, M., Shakhramanyan, M., Nedkov, R., Richter, A., Borisova, D., **Stankova, N.**, Ivanova, I., Zaharinova, M. Research of generalized wavelet transformations of Haar correctness in remote sensing of the Earth. Proc. SPIE 10427, Image and Signal Processing for Remote Sensing XXIII, 10427, SPIE, 2017, ISSN:0277-786X, DOI:http://dx.doi.org/10.1117/12.2278572, 104271U-1-104271U-13. SJR:0.228.

Индексирана в: Scopus
Линк към публикацията: https://doi.org/10.1117/12.2278572

Abstract

In this paper, Haar's generalized wavelet functions are applied to the problem of ecological monitoring by the method of remote sensing of the Earth. We study generalized Haar wavelet series and suggest the use of Tikhonov's regularization method for investigating them for correctness. In the solution of this problem, an important role is played by classes of functions that were introduced and described in detail by I.M. Sobol for studying multidimensional quadrature formulas and it contains functions with rapidly convergent series of wavelet Haar. A theorem on the stability and uniform convergence of the regularized summation function of the generalized wavelet-Haar series of a function from this class with approximate coefficients is proved. The article also examines the problem of using orthogonal transformations in Earth remote sensing technologies for environmental monitoring. Remote sensing of the Earth allows to receive from spacecrafts information of medium, high spatial resolution and to conduct hyperspectral measurements. Spacecrafts have tens or hundreds of spectral channels. To process the images, the device of discrete orthogonal transforms, and namely, wavelet transforms, was used. The aim of the work is to apply the regularization method in one of the problems associated with remote sensing of the Earth and subsequently to process the satellite images through discrete orthogonal transformations, in particular, generalized Haar wavelet transforms. General methods of research. In this paper, Tikhonov's

regularization method, the elements of mathematical analysis, the theory of discrete orthogonal transformations, and methods for decoding of satellite images are used. Scientific novelty. The task of processing of archival satellite snapshots (images), in particular, signal filtering, was investigated from the point of view of an incorrectly posed problem. The regularization parameters for discrete orthogonal transformations were determined.

Г7.3

Stankova, N. Post-fire recovery monitoring using remote sensing: A review. Aerospace Research in Bulgaria, 35, 2023, ISSN:1313-0927, 192-200. JCR-IF (Web of Science):0.3, Q4.

Индексирана в: Web of Science
Линк към публикацията: https://doi.org/10.3897/arb.v35.e19

Abstract

Wildfires are a common disturbance factor, while climate change is thought to be one of the main causes of the fires. The detection of disturbance and post-fire recovery monitoring are vital for ecological research. This article aims to provide a review of current research of post-fire recovery monitoring based on remotely sensed data. While a close relationship between vegetation indices (VIs) and physiological parameters of vegetation has been established, VIs have become the main tool for assessing and monitoring vegetation status. Research on the effects and recovery from fires has been conducted by a number of authors, with VIs being used mainly in the methodologies. Tasseled Cap Transformation (TCT) method is also used to assess the state of the ecosystem before and after a fire. When viewed in series, Disturbance Index (DI) images provide an immediate way to recognize the pixels of the forests affected by the fire, different from those characteristics of the normal state of forests. The incorporation of various remote sensing data with field data is able to support the monitoring of post-fire effects and forest recovery.

Г7.4

Ivanova I., **Stankova N.**, Borisova D., Spasova T., Dancheva A. Dynamics and development of Alepu marsh for the period 2013-2020 based on satellite data. Proc. SPIE 11863, Earth Resources and Environmental Remote Sensing/GIS Applications XII, 1186315, 11863, SPIE, 2021, ISBN:9781510645707, ISSN:0277-786X, DOI:https://doi.org/10.1117/12.2597726, 1186315-1-1186315-9. SJR (Scopus):0.192.

Индексирана в: Scopus
Линк към публикацията: https://doi.org/10.1117/12.2597726

Abstract

Alepu marsh is a protected area in the category of natural landmarks, part of the Ropotamo Ramsar site and sand dunes Alepu. It is situated on the Bulgarian Black Sea coast, within Burgas Province, south of the resort town of Sozopol. It is also situated within the territory of the protected area of the European ecological network Natura 2000 under the Birds directive – Ropotamo Compex. Alepu marsh is covered with reeds and other swamp vegetation. The area is habitat for many rare animals and plant species. The main problem of this area is the overgrowing with reeds and the gradual swamping that leads to reduction

of the open water areas in the protected area. This leads to the loss of valuable habitats, and respectively their inhabiting animal and plant species. In the study paper assessment of the dynamics of the marsh for a period of eight years (2013-2020) was done. Data from Landsat 8 and Sentinel 2 were used. Classification of NDVI was made for this study period. Sentinel 2 data were also used to apply an orthogonal transformation model that classifies and analyzes the processes associated with the dynamics of change affecting the main components of the earth's surface: soil, water and vegetation. The NDGI model was also used, which evaluates the dynamics of the vegetation in the marsh. The results obtained show a monitoring of the wetland for a sufficiently long period of time, which gives an idea of its condition and the need to take the necessary conservation measures for its protection.

Г7.5

Lubenova M., Nedkov R., Ivanova I., Shikalanov A., Georgieva N., Zaharinova M., Dimitrova M., Ivanova E., Yanchev V., Radeva K., **Stankova N.**, Tsoneva R. Study on ecological dynamics of forest vegetation in the region of East Rhodope on the base of satellites and terrestrial data. Ecological Engineering and Environment Protection, 1/2011, 2011, ISSN:1311-8668, 45-51.

Линк към публикацията:
https://ecoleng.org/archive/2011/45-50.pdf

Abstract

In this paper a study of forest vegetation in the territory of East Rhodope based on satellites, GPS and other terrestrial data is presented. The local areas of forest communities in classes and their distribution depending on the topography are defined. In this study we analyzed the Normalized Deferential Vegetation Index (NDVI) between forest classes. The study is the result of cooperation between specialists from SSTRI-BAS and Sofia University. This study is the initial stage of a comprehensive research on the dynamics and development of natural systems in Bulgaria.

Г7.6

Stankova, N., Spasova, T. Postfire forest disturbances and initial regrowth using direction angle. SPIE Future Sensing Technologies 2024, 13083, SPIE, 2024, DOI:https://doi.org/10.1117/12.3023275, SJR (Scopus):0.15.

Индексирана в: Scopus
Линк към публикацията: https://doi.org/10.1117/12.3023275

Abstract

Wildfires considerably disturb the structure and forest ecosystem functioning. The disturbances estimation as well as the extent of damage to the soil and vegetation soon after the fire is crucial information for planning of restoration efforts. Because of the financial resources needed for field work and the involvement of experts, remote aerospace methods and data are extensively employed in monitoring ecological research. The aim of this paper is to assess postfire forest disturbances and initial regrowth processes using the tasseled cap derived Direction Angle (DA). DA is an index introduced by the authors in previous research – the angle between the Greenness component from the TCT (tasseled cap transformation) and VIC (Vector of Instantaneous Condition). The proposed method is based on linear

orthogonal transformation of multispectral satellite images and is characterized with higher accuracy compared to standard methodologies using vegetation indices. The higher accuracy of the methodology is based on the linear orthogonal transformation of multispectral satellite images (TCT), which increases the degree of identification of the three main components changing during fire – soil, vegetation, and moisture/water. The methodology proposed in this paper is characterized by high accuracy in assessing the recovery of undergrowth, that is difficult to differentiate using standard monitoring methodologies based on vegetation indices. The DA raster images show the direction of change of the green tasseled cap component (TCG) relative to the VIC, which allows to estimate the degree of recovery of the vegetation component for different moments of the study period. The variations observed in DA values illustrate the pattern of the green component at various points during the investigation period, enabling the assessment of disturbances and the monitoring of regrowth processes. The test area is located in the Middle Rhodopes, near the village of Hvoyna (Smolyan region), Bulgaria, where on 28/08/2023 a wildfire broke out. 1,500 decares have been burnt by the fire, including deciduous and coniferous forest. The wildfire affected 100-130 years old black pine (Pinus nigra) forests.

Г7.7

Иванова, И., **Станкова, Н.**, Спасова, Т. Използването на индекси за мониторинг на плаващите тръстикови острови в езерото Сребърна по данни от Sentinel 2. Proceedings SES 2023, Space Research and Technology Institute Bulgarian Academy of Sciences, 2023, ISSN:2603-3313, 193-198.

Линк към публикацията

Абстракт

Мониторингът и инвентаризацията на влажните зони са важни за управлението на техните ресурси и запазването им като устойчиви местообитания за редки и световно застрашени видове. Изследванията в работата са свързани със приложението на индекс класификация за мониторинг на плаващите тръстикови острови в езерото Сребърна. Плаващите тръстикови острови имат изключително важно значение като местообитания на световно застрашени видове птици. Те са уникални за Европа местообитания, представени единствено в езерото Сребърна и Делтата на р. Дунав. За извършване на мониторинга на местообитанията се използва единствената възможност, която предоставят високотехнологичните методи, базирани на дистанционни изследвания от космоса с помощта на сензори с подходящи за целта параметри на регистрираните от тях данни. За целите на изследването са използвани спътникови данни от Sentinel 2 A/B (Коперникус, ЕКА) с помощта на които са получени резултатите за динамиката на растителността върху плаващите тръстикови острови в езерото.

Г7.8

Ivanova, I., Spasova, T., **Stankova, N.** Using Sentinel-2 data for efficient monitoring and modeling of wetland protected areas. Proc. SPIE 12786, Ninth International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2023), 12786, SPIE, 2023, ISSN:0277786X, DOI:https://doi.org/10.1117/12.2681790, 127861U-1-127861U-8. SJR (Scopus):0.17.

Индексирана в: Scopus
Линк към публикацията: https://doi.org/10.1117/12.2681790

Abstract

Wetlands are ecologically vital habitats that play a crucial role in supporting biodiversity and providing essential ecosystem services. They are considered to be among the most productive ecosystems on the planet that provide numerous benefits. For the purposes of this study, Straldzha Complex Protected Area, Bulgaria was chosen as the object of investigation. Straldzha Complex Protected Area includes a reservoir and surrounding wetlands and meadows, the remains of the eastern part of the former Straldzha Plateau (the largest plateau ever in Bulgaria). The wetland is sensitive to human activities, related to the water management and unsustainable use of the former plateau as agricultural land. For the purposes of this study, data from Sentinel-2 satellite of the European Space Agency were used. The monitoring was carried out during the study period 2017 – 2022. An index-based classification was used in the study, utilizing NDVI, NDWI and MSAVI2 indices for classifying the contents within the wetland's boundaries. NDGI model was applied as well, evaluating the vegetation dynamics in the marsh. The obtained results showed successful mapping and monitoring of wetlands. The wetlands are of high importance and should be protected and conserved to maintain the benefits they provide to the environment and society. The data and results of this research will be able to serve Destination Earth (DestinE), which is an ambitious initiative of the European Union to create a digital model of the Earth that will be used for monitoring the effects of natural and human activities on our planet, prediction of extreme events and adapting policies to the climate challenges. The data and models will serve the Bulgarian initiative for the construction of the Digital Twins, which is being pilot developed in the department of Aerospace Information, Space Research and Technology Institute – Bulgarian Academy of Sciences. Open Data were used in this study, with the aim of promoting the Open science policy and FAIR principles as much as possible.

Г7.9

Spasova, T., Gotchev, D., Ivanova I., **Stankova, N.** Monitoring of Short-Lived Snow Coverage Based on Aerospace Data on Svalbard in Norway. Proceedings SES2018, Space Research Technology Institute - Bulgarian Academy of Sciences, 2018, ISSN:2603-3313, 306-315.

Линк към публикацията

Abstract

The mapping of snow covered areas and wet snow dynamics in the Arctic is important for many applications such as flood forecasting, snow drain modeling, water supply for irrigation and hydroelectric power plants, weather forecasts, and climate change understanding. Year-round snow cover monitoring through land surveys is almost impossible in the Svalbard area, aerial photography surveys are also insufficient due to the specific conditions of sunshine. Due to the presence of cloud cover and different climatic conditions, the snow cover information is insufficient or very limited. Microwave images have the advantage over visible and NIR techniques as they are sensitive to changes in surface moisture and thus provide useful information about changes in their physical states. The study evaluates the usefulness of C-band SAR images for data mining only for wet snow from other surfaces, but also uses optical indices and indicators. TCT (Tasseled Cap Transformation) was used as a moisture indicator, as well as NDVI (Normalized Difference Vegetation Index), which was used to quantify the presence or absence of vegetation during wet snow periods or after melting. The subject of the study is the dynamic during the different seasons in Svalbard, Arctic. The objects were analyzed and mapped according to the European Space Agency (ESA) data acquired by sensors Sentinel-1 SAR, Sentinel 2 MSI and GIS. Results have been obtained for changes in snow coverage during the spring-summer transition and its dynamics. The

data used is with high time-spatial resolution, which is an advantage when looking at the snow cover. The changes of the environmental objects are shown with different processing approaches. The results clearly show that snow melting can be registered by using SAR data via different polarization, TCT and NDVI. The effect of the research on aerospace data and technology enables us to obtain different digital models, structuring and analyzing results excluding the subjective factor.

Г7.10

Richter, A., Kazaryan, M., Shakhramanyan, M., Nedkov, R., Borisova, D., **Stankova, N.**, Ivanova, I., Zaharinova, M. Quality enhancement of satellite images and its application for identification of surroundings of waste disposal sites. Proc. SPIE 10444, Fifth International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2017), 10444, SPIE, 2017, ISSN:0277-786X, DOI:http://dx.doi.org/10.1117/12.2277309, 104441N-1-104441N-7. SJR:0.228.

Индексирана в: Scopus
Линк към публикацията: https://doi.org/10.1117/12.2277309

Abstract

The paper proposes a method for fuzzy interactive enhancement of objects identification in the image which allows identifying hidden or no defined details and objects in the images. The application of the method and its difference from other image enhancement techniques are shown. The paper presents the algorithm and describes the basic processing procedures (sampling, scaling, convolution, contrast). The main processing parameters (increasing and reduction of dimensions, convolutions, brightness, and thresholds contrast) are demonstrated. The results from the applied algorithm are explained on an example related to landfill Kutchino in the Moscow region, on the satellite images with low and high spatial resolution.

Г7.11

Станкова, Н., Аветисян, Д. Мониторинг на състоянието и възстановителните процеси след три горски пожара в България с използването на дистанционни методи. Географ, VII – VIII, 7, СНЦ „Български географски портал – Географ БГ“, 2023, ISSN:2534-949X, 62-68.

Линк към публикацията:
https://geograf.bg/sites/default/files/emagazine/emagazine2023.pdf

Абстракт

Горските пожари са все по-голям проблем за страните от ЕС, разположени в южните части на Европа, като изменението на климата се смята за една от основните причини за повишаването на техния брой. Горските пожари са природни екосистемни процеси със значително въздействие върху околната среда, затова навременното им откриване, както и мониторингът на възстановителните процеси са жизненоважни за екологичните изследвания. Екологичните последствия от горските пожари са многостранни – обезлесяване и ерозия на почвите; унищожаване на уникални находища на редки, защитени видове и ендемични видове, ограничаване на биологичното разнообразие; влошаване на санитарното състояние на горите; промяна на водния отток, нарушаване на топлинния и водния баланс на екосистемите; нарушаване на цикъла на CO2 в природата. Дистанционните аерокосмически методи са инструмент, който

играе роля в четири различни направления: прогнозиране, мониторинг, картографиране и възстановяване на изгорелите площи. В комбинация с бързо развиващите се Географски информационни системи (ГИС), дистанционните изследвания предоставят възможности за създаване на екологични модели в широк мащаб – изучаване на последствията след пожарните ефекти и възстановителните процеси, протичащи в екосистема след пожар. Аерокосмическите дистанционни методи са високотехнологичен инструмент за надежден и мащабен мониторинг на възстановителните процеси, протичащи в горските екосистеми след пожар. Мониторингът на възстановяването на изгорелите горски екосистеми е по-труден в сравнение с идентифицирането им, основно заради по-малкия мащаб на възстановените участъци, сравнени с общата площ, както и заради едва забележимата промяна в сигнатурата в началните възстановителни етапи.

Г7.12

Spasova, T., Avetisyan, D., Ivanova, I., **Stankova, N.** Assessment of mosses in Antarctica based on remote sensing and chlorophyll fluorescence. Proceedings Volume 13191, Remote Sensing for Agriculture, Ecosystems, and Hydrology XXVI; 131910V, SPIE, 2024, DOI:https://doi.org/10.1117/12.3031486, SJR (Scopus):0.15.

Индексирана в: Scopus
Линк към публикацията: https://doi.org/10.1117/12.3031486

Abstract

Chlorophyll fluorescence refers to the emission of light by chlorophyll molecules when they are excited by absorbed light. Chlorophyll is the pigment responsible for photosynthesis – the process through which plants and other photosynthetic organisms convert light energy into chemical energy. The intensity of chlorophyll fluorescence can vary based on geographical latitude as well as other environmental factors. In Antarctica, where the extreme climatic conditions define the ecosystem, mosses are one of the few land-based organisms that can survive and thrive. The Antarctic Peninsula is especially known for its sparse but resistant vegetation, including several moss species that have adapted to extreme conditions like low temperatures, intense ultraviolet (UV) radiation, and repeated freeze-thaw cycles. These mosses are essential for maintaining the ecological balance in the region and offer important insights into how extreme environments affect plant physiology. This research aims to compare the spectral properties of mosses and lichens, with a focus on differences in their fluorescence intensity on Livingston Island, Antarctica, during the summer season. Field research in Antarctica was carried out in order to validate data obtained from Sentinel 2 MSI satellite images, drone photography, and photogrammetry. A spectrometer was used to analyze the visible spectrum ranging from 380nm to 780nm, corresponding to the spectral ranges utilized by the Sentinel 2 MSI and Sentinel 3 SLSTR satellites. The main research methods involve evaluating chlorophyll fluorescence response and applying various optical indices for remote sensing, including Normalized Difference Vegetation Index (NDVI), Normalized Difference Water Index (NDWI), and Moisture Stress Index (MSI). A radar index generated from processing Sentinel 1 data is utilized as well. These methods enable a thorough analysis of photosynthetic activity and plant health in extreme conditions, providing insights into the adaptive mechanisms of mosses in polar environments.

Г7.13

Ivanova I., Gigova I., Spasova T., **Stankova N.** Durankulak Lake actual state and monitoring using Sentinel 2 satellite data. Ecological Engineering and Environment Protection, 2/2019, 2019, ISSN:1311-8668, DOI:10.32006, 53-58.

Линк към публикацията: http://dx.doi.org/10.32006/eeep.2019.2.5358

Abstract

Durankulak Lake is one of the most important wetlands in Bulgaria and Europe. It is included in the Ramsar Convention and is recognized as an important bird area of world importance. The subject of protection within the protected zone is the condition of the natural habitats and the habitats of the species, including the natural species composition, the typical species and the conditions of the environment. Remote sensing methods provide opportunities for characterization and monitoring of the wetland on various scales that have not been done so far. In the present study satellite multispectral images from the European Union Copernicus Satellite Program, Sentinel 2 are used for assessment and monitoring of the actual state of the lake. Based on these satellite images, the boundaries of the protected wetland are derived. An index classification of the wetland was made. Normalized Difference Vegetation Index (NDVI) is used to classify sites within the protected area. Sentinel-2 satellite data to implement the orthogonal transformation model called Tasseled Cap Transformation (TCT) has also been used. The model is an effective method for classifying and analyzing of the processes related to the dynamics of changes, affecting the main components of the earth's surface: soil, water and vegetation. The spring survey of 2019 was selected for the present study. The results will show successful mapping and monitoring of the wetland, which will give a real idea of the state of the Durankulak Lake and the need to take conservation measures to protect it.

Г7.14

Spasova, T., Dancheva, A., Ivanova, I., Borisova, D., **Stankova, N.** Monitoring of surface water bodies by Sentinel and open data. Proc. SPIE 11863, Earth Resources and Environmental Remote Sensing/GIS Applications XII, 118631B, 11863, SPIE, 2021, ISBN:9781510645707, ISSN:0277-786X, DOI:https://doi.org/10.1117/12.2600282, 118631B-1-118631B-8. SJR (Scopus):0.192.

Индексирана в: Scopus
Линк към публикацията: https://doi.org/10.1117/12.2600282

Abstract

The main purpose of this research is interoperability of data from different sources and creation of innovative models with high value data such as satellite information and Earth data and solutions for public administrations, business and citizens. Building base data to inform and train stakeholders and promote the adoption of good practices and innovations in environmental monitoring is also a leading goal. An assessment was made of several surface water bodies that have acquired personal types of permits for use and construction. The methodology contains a model of Open data processing steps, which are published in the Open Data Portal of the State Agency "E-Government" in Bulgaria, satellite data from Sentunel-1 and Sentune-2 and terrestrial data from many different monitoring devices. Different formats are integrated, and for this aim there must be transdisciplinary knowledge and a complex approach. Composite images of optical and SAR data, TCT and terrestrial data from Environmental assessments and

data from Basin Directorates in Bulgaria are combined. The model is further verified by the spectral characteristics of the objects, transformed images into dD (decibels) and statistical data. The interoperability of the data in this model will be a tool for restoring cooperation, coordination and communication between central and local administration, supply of services from the public sector, academia, business, NGOs and IT companies, development of solutions or information processing, in case of geospatial information and Environmental monitoring.

Г7.15

Richter, A., Kazaryan, M., Shakhramanyan, M., Borisova, D., **Stankova, N.**, Ivanova, I. Information modeling of waste disposal sites. Ecological Engineering and Environment Protection, 1, 2017, ISSN:1311-8668, 15-21.

Линк към публикацията: http://ecoleng.org/archive/2017/1/15-21.pdf

Abstract

The paper proposes a methodology for developing information model or database of waste disposal sites /WDS/ or landfill sites, applying received remotely and in-situ data from Earth surface monitoring, especially including procedures of morphological processing, data normalization and visualization models. The overall structure and composition of the information model, described subsystems, classes, objects, and attributes (properties) of the data, are presented. The possibility of formation of new information relations, that arise between different kinds of information, through morphological (in particular, the morphemic) processing "raw" information at the input, for example, between the classifiers (waste products, settlements, economic activities, etc.), is described. The paper used methods of system analysis, methods of mathematical linguistics, space monitoring methods. For example a structure of constructing the database, the archive and the classifier of unauthorized waste disposal facilities (solid waste landfills, waste piles, municipal landfills, and others) is presented. The scheme of data model describes the components (tables) as part of the model: general information, geometric and geographic parameters of geo-referenced data, including data for adjacent territorial-administrative facilities, etc.

Г7.16

Ivanova, I., **Stankova, N.**, Zaharinova, M. Seasonal monitoring of Durankulak Lake using Sentinel 2 Data. Proceedings of 2nd National Workshop with International Participation on EU Copernicus Programme, 2021, ISSN:978-619-7490-09-1, DOI:https://doi.org/10.5281/zenodo.6497337, 16-24.

Индексирана в: Web of Science
Линк към публикацията: https://doi.org/10.5281/zenodo.6497337

Abstract

Durankulak Lake is part of the European Ecological Network of NATURA2000 and a Ramsare Convention Site for the wetlands. The protected site covers an area of 446.5 ha. It is one of the well-preserved coastal wetlands in Bulgaria with international importance for the protection of over 260 endemic, rare and endangered species of plants and animals. One of the problems of the lake, as well as of many other wetlands in Bulgaria is the excessive reed overgrowth. Regular monitoring is necessary for protection and maintenance of this wetland therefore satellite data have a great advantage. This study

monitored the lake for the period – December 2019 - July 2020, including three seasons - winter, spring and summer. Satellite data from Sentinel 2A and Sentinel 2B were used. One satellite image was used for each month. Pre-processing of the satellite data was made and spectral indices were generated. The results obtained show the development and condition of the vegetation in Durankulak Lake. NDVI was generated in order to assess the vegetation in the lake. The orthogonal transformation model called Tasseled Cap Transformation (TCT) has also been used. This is a model for classifying and analyzing the processes related to the dynamics of changes, affecting the main components of the earth's surface: soil, vegetation and water. The results show the development of Durankulak Lake for the period of the observed three seasons, which assess its condition and changes that occur in a short monitored period.

Г7.17

Станкова Н., Иванова И., Недков Р., Павлова Н., Захаринова М. Екологични въздействия и последствия от наводнения в района на р. Марица чрез използване на спътникови, GPS и наземни данни за периода 2005 – 2014 г.. Екологично инженерство и опазване на околната среда, 4/2015, 2015, ISSN:1311-8668, 5-14.

Линк към публикацията: https://www.ecoleng.org/Sadarjanie4.2015.html

Abstract

The aim of this study is monitoring of environmental impacts after the flood from 2005 in the region of Maritsa river by monitoring the consequences, the recovery of the vegetation and the current condition of the region in 2014. Four significant floods were registered in Bulgaria during 2005 caused by torrential rains, rising of groundwater and overflow of rivers and dams. The proposed methodology was applied to part of the flood area from 08-12 August, 2005 in the region of Parvomay municipality. The methodology is based on satellite, GPS and terrestrial data. Satellite images with high resolution were used and an accurate assessment of the water bodies location and the river system which may be one of the main reasons for floods. By applying GIS as a tool for analysis and monitoring of floods results with sufficient accuracy concerning the impacts on the environment were obtained. Based on the results and after applying the methodology vegetation restoration was observed which provides conditions for development of new habitats. A process of vegetation canopy recovery was observed in areas which are characterized with high drought and increases in NDVI values which indicate better condition and increase the volume of leaf biomass.

Г7.18

Stankova, N., Spasova, T., Ivanova, I. Monitoring post-fire forest regrowth using differenced disturbance index classification. Proceedings of SPIE, 12786, 2023, DOI:https://doi.org/10.1117/12.2681787, SJR (Scopus):0.152.

Индексирана в: Scopus
Линк към публикацията: https://doi.org/10.1117/12.2681787

Abstract

Forest fires are natural ecosystem processes with significant environmental impact. Monitoring the recovery processes is vital to ecological research. The aim of this study is monitoring post-fire forest regrowth using remote aerospace methods and data. To achieve this goal, Differenced Disturbance Index classification was applied for quantitative assessment of the post-fire forest regrowth. The study area is situated in the northeastern part of Rhodope Mountains, near Chernyovtsi village, 15 km from the city of Kardzhali, Bulgaria. A fire took place on October 1, 2012 and affected an area of 15 ha with mixed forests and coniferous forests. For the post-fire forest regrowth monitoring Landsat (ETM+, OLI and OLI-2) satellite imageries were used once per year in August for the 10-year study period – 2012-2022. After applying the proposed methodology, the results are classified maps exhibiting the post-fire regrowth. The data and results of this research will be able to serve Destination Earth (DestinE), which is an ambitious initiative of the European Union to create a digital model of the Earth that will be used for monitoring the effects of natural and human activities on our planet, prediction of extreme events and adapting policies to the climate challenges. The data and models will serve the Bulgarian initiative for the construction of the Digital Twins, which is being pilot developed in the department of Aerospace Information, Space Research and Technology Institute – Bulgarian Academy of Sciences. Open Data were used in this study, with the aim of promoting the Open science policy and FAIR principles as much as possible.

Г7.19

Ivanova, I., Nedkov, R., Borisova, D., **Stankova, N.** Using SAR and optical data from Sentinel satellites for precise modeling of seasonal floating reed islands dynamics in Srebarna Lake. Proc. SPIE 10790, Earth Resources and Environmental Remote Sensing/GIS Applications IX, 10790, SPIE, 2018, ISSN:0277-786X, DOI:10.1117/12.2325703, 107900E-1-107900E-7. SJR:0.234.

Индексирана в: Scopus
Линк към публикацията: https://doi.org/10.1117/12.2325703

Abstract

The present study is a continuation of the previous monitoring studies on floating reed islands based on remote sensing methods, but this time the study is much more precise in order to create a sustainable operating model for subsequent monitoring studies on this specific type of habitats. The aim of this study is to create a precise model for the movement and dynamic of the floating reed islands in Srebarna Lake. This was done by creating a hybrid model (based on optical and SAR data), assessing the actually condition of floating reed islands, and applying it to quantify of the movement of floating reed islands to perform an actual and seasonal habitats monitoring. To create the hybrid model, the advantages of SAR data – Sentinel-1 for the hydrological dynamics monitoring of Srebarna Lake were used. The SAR data used were obtained for different time periods, within the observed seasons. Multispectral satellite data from Sentinel-2 was also used in order to apply an orthogonal transformation model called Tasselled Cap Transformation (TCT). The Tasselled Cap model is a very effective method for classifying and analyzing processes related to the dynamics of changes affecting the main components of the Earth's surface: soil, water, and vegetation. This model proved to be very effective in recognizing specific types of vegetation and habitats, such as floating reed islands and their transformation over a period of time. The results for the reconciliation of TCT images and SAR data define very well the precise boundaries of both the central water body in Srebarna Lake, and the floating reed islands. The results obtained by means of comparative

analysis confirm both methods as being equally effective to determine the floating reed islands dynamics in the hybrid model proposed in this study.

Г7.20

Nedkov R., Ivanova I., Zaharinova M., **Stankova N.** Actual state of Poda Protected Area using SAR data. Proceedings of the Third European SCGIS Conference ”Geoinformation technologies for natural and cultural heritage conservation", 3, 2016, ISSN:1314-7749, 192-198.

Линк към публикацията

Abstract

Poda Protected Area is a marshy wetland, which is a part of the Bourgas-Mandra firth, located at the seacoast. Management of the vegetation and reedbeds is needed to preserve the area as a key site for the Black Sea coast and the country. In this paper the actual state of Poda Protected Area is shown using combinations of optical and SAR data for the period of three different seasons of the year (winter, spring and summer). NDVI values for each of the seasons were calculated. The aim of the study is to create new approaches and data-processing methods for analyses. The results show spatial distribution of vegetation NDVI and water in Poda Protected Area.

Г7.21

Shakhramanyan, M., Richter, A., Kazaryan, M., Nedkov, R., Borisova, D., **Stankova, N.**, Ivanova, I., Zaharinova, M. Evaluation of chemical process parameters in waste disposal sites by satellite images. Ecological Engineering and Environment Protection, 2017, 1, National Society of Ecological Engineering and Environment Protection, 2017, ISSN:1311-8668, 22-28.

Линк към публикацията: http://ecoleng.org/archive/2017/1/22-28.pdf

Abstract

The presented paper proposes a method for estimating parameters and characteristics of the chemical processes in large municipal landfills and solid waste disposal sites according to the waste monitoring from space. The model of chemical transformations in the waste disposal sites is described based on the idea of waste biochemical degradation in the form of the “transformations tree”. The presentation of chemical transformations in the form of statistical integrated chemical equations allows us to describe the chemical system "a waste disposal facility" in the analytical form. The paper presents the main types of physical (volume and mass, thermal) and chemical (filtrate) characteristics which assessment could be made by data from satellite images. As an example the obtaining of the volume and mass characteristics of landfills in their 3D-models is described. Results of the algorithm on the example of a polygon of solid municipal and industrial waste in Salaryevo (Leninsky district of the Moscow region) are presented. As an example the assessment of volume and mass of landfill gas and its main component – methane is shown. An airborne image from year 2000 is compared with the satellite images in visible spectral range closed to its date. The main sources of errors in the evaluation of volume and mass characteristics are defined. The error which source is the spatial and spectral resolution of the satellite image is calculated.

Г7.22

Иванова, И., **Станкова, Н.** Динамика на плаващите тръстикови острови в езерото Сребърна за периода пролет – лято 2017 г. с използването на SAR данни. Proceedings SES2017, 2017, ISSN:1313-3888, 269-274.

Линк към публикацията

Абстракт

Във връзка със загубата на местообитания вследствие антропогенни и неантропогенни фактори, което води до изчезване на световно застрашени видове животни и растения е необходимо непрекъснато извършване на мониторингови изследвания. Основна цел на изследването е насочена към оценка и мониторинг на приоритетни типове местообитания в защитени територии, каквито са плаващите тръстикови острови в езерото Сребърна. Целта на настоящето изследване е да покаже как такъв мониторинг може да бъде извършван сезонно с помощта на използването на радарни изображения като изследванията се базират на извършените с помощта на оптични изображения наблюдения през годините, с цел установяване на динамика на местообитанията. Мониторингът е извършен за периода пролет-лято на 2017 г. Което показва динамиката на местообитанията през пролетта, когато езерото е пълноводно, и през лятото – при ниско ниво на водата в езерото. Резултатите показват значителни изменения в тяхната площ и местоположение, което може да се вземе под внимание с цел тяхното опазване за в бъдеще.

Г7.23

Ivanova, I., Nedkov, R., **Stankova, N.** Studying the process of vegetation in Poda Proteted Area using aerospace data. Proceedings of the Fifth International Conference Ecological Engineering and Environment Protection, National Society of Ecological Engineering and Environment Protection, 2017, ISSN:1311-8668, 201-210.

Линк към публикацията

Абстракт

В работата е проследено развитието на растителността в защитена местност „Пода“ за един достатъчно дълъг период от време – 1992 – 2016 г. Това дава възможност за период от 24 години да се направи количествена оценка за развитието на една влажна екосистема. Предложената методика е последователност от няколко процедури, които са свързани с количествена и качествена оценка на изменението на растителността в защитена местност „Пода“. Комбинираното използване на сателитни данни в оптичния и радио диапазона повишава обективността и прецизността на мониторинга на растителната покривка, водните площи и влагата в почвата. Използван е вегетационния индекс NDVI за разграничаване на растителността от водата и друга постилаща повърхност, която не е растителност. Той е добър показател, че върху влажната зона в ЗМ „Пода“ има налична суша, върху която вирее тази растителност и това спомага за правилното разпознаване и класифициране на обектите. За оценка на наличието на влага в листната маса е използван Нормиран Разликов Воден Индекс (NDWI). На базата на получените резултати се проследява развитието на растителността в ЗМ „Пода“, което е важен фактор в управлението на защитената

зона. От тази оценка може да се направят препоръки дали и през кои сезони е необходима човешка намеса, за да се запазят основните местообитания в защитената зона.

Г7.24

Иванова И., Недков Р., **Станкова Н.**, Захаринова М., Димитрова М., Николова С., Радева К. Анализ на наводнението от месец Февруари 2012 на територията на с. Бисер на базата на спътникови и GPS данни в ГИС среда. Space, Ecology, Safety, Space Research and Technology Institute – Bulgarian Academy of Sciences, 2012, ISSN:1313 – 3888, 432-442.

Линк към публикацията

Абстракт

В работата е показано съвременното приложение на геоинформационни технологии и използването им в при анализ на едно от най-опасните бедствия - наводнението. Възможностите на съвременните геоинформационни технологии позволяват прилагане на нови методи при обработката и интерпретацията на различни пространствени данни. Предложена е методика, която изисква използването на спътникови, наземни и GPS данни. В качеството на спътникови данни са използвани изображения с висока разделителна способност. Те дават възможност за прецизна оценка на местоположението на водните тела, разположени на територията, които са основната причина за възникване на наводнението.

Г7.25

Traykov, I., Tosheva, A., Stoyanova, T., Doykin, N., **Stankova, N.** Spatial heterogeneity of chlorophyll-a and some physicochemical parameters in Pancharevo Reservoir. Младежка научна конференция "Климентови дни", 1, Съюз на учените в България, 2010, ISBN:978-954-397-019-3, 32-35.

Линк към публикацията

Abstract

Longitudinal differences in physical and chemical parameters lead to a trophic gradient in reservoirs. Marked differences in abiotic parameters and trophic response were observed between the two morphometrically distinct sub-basins of Pancharevo reservoir in relation to nutrients loading. The relatively small size and short retention time determine the absence of typical lacustrine part in the reservoir. The theoretical residence time, the morphometry of the basins and the nutrient input influence the response variables to the eutrophication in the reservoir. This emphasizes the problem of how a rather limited sampling program, based on one or a few annual samplings, can provide an adequate and correct definition of the ecological state in the future. According to our results, Pancharevo reservoir should be separated into a separate type. Future studies are needed before the establishment of reservoir specific maximum ecological potential and a consequent calculation of the EQR values for the individual biological quality elements.

Г7.26

Станкова, Н. Оценка на пораженията след горски пожар до село Хвойна (Средни Родопи) с използване на дистанционни методи. Proceedings SES 2023, Space Research and Technology Institute Bulgarian Academy of Sciences, 2023, ISSN:2603-3313, 286-290.

Линк към публикацията

Абстракт

Извършена е оценка на последствията и степента на засегнатост след горски пожар чрез използване на Disturbance Index (DI). Обектът на изследване се намира в Средни Родопи, в близост до с. Хвойна (област Смолян), България, където на 28/08/2023 избухва горски пожар. Използвани са многоспектрални спътникови изображения от Sentinel 2 – преди и след пожара.

Г7.27

Ivanova, I., Spasova, T., **Stankova, N.**, Dancheva, A. Shabla-Ezerets Lake monitoring for the period 2017-2024 using Sentinel data. Aerospace Research in Bulgaria, 37, 2025, ISSN:1313-0927, 94-107. https://doi.org/10.3897/arb.v37.e09. JCR-IF (Web of Science):0.3, Q4.

Индексирана в: Web of Science
Линк към публикацията: https://doi.org/10.3897/arb.v37.e09

Abstract

This study presents an 8-year monitoring assessment of the Shabla-Ezerets Lake Complex, located on Sarmatian limestones in northeastern Bulgaria, approximately 5 km northeast of the town of Shabla. The lake complex is part of the protected area “Shabla Lake” and comprises two adjacent coastal estuarine lakes — Shabla and Ezerets — which are interconnected by an artificially excavated canal. In recent years, high-resolution satellite imagery and data from the European Space Agency's Sentinel satellites have been instrumental in monitoring the ecological and hydrological dynamics of the complex. These data provide valuable long-term information on water resources, enabling the analysis of trends such as fluctuations in water levels, changes in vegetation cover, and the identification of potential pollution sources. This study utilizes data from Sentinel 2 and Sentinel 3 satellites to evaluate the spatiotemporal dynamics of the area over the period 2017–2024, offering insights into environmental changes and contributing to effective conservation and management strategies.
