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CLIMATE CHANGES OF THE LAST TEN YEARS

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ABSTRACT

According to the last report of the World Meteorological Organization (WMO), it was stated that the period between 2011 and 2020 was marked by the increase in record-breaking land and ocean temperatures, more than expected loss of melting of glaciers and the rise in sea level, resulting in increased greenhouse consumption. Unexpected natural events occur in many parts of the world. Most of these events were unchanging events that occurred every 100 years. More countries reported record high temperatures between 2010 and 2020 than in previous years, WMO's Annual State of the Climate report said. The emergence of reducing greenhouse gas emissions for the control of climate change has emerged as the most important and luminous brightness for the planet. While carbohydrates in the atmosphere remained almost constant for about 10,000 years before the beginning of the industrial age, CO₂ levels have changed by almost 50% since the end of the industrial revolution in the 19th century. The main reasons for this are the increase in the use of fossil fuels, the decrease in forest areas and negative changes in land use. There are opportunities both in terms of type and divisions among natural disasters that cause many losses in resilience around the world and cause large economic losses. According to the WMO, of the 13 disasters with more than 1,000 known deaths during this period, six were heatwaves, four were monsoonal floods or landslides entrenched by such vendors, and three were tropical cyclones. In 2022, economic losses exceeded \$10 billion, 16 of which occurred in the United States and eight in East Asia. Of these 27 events, 13 are tropical cyclones, eight are floods, and three are wildfire events. While there have been significant decreases in the amount of precipitation in Turkey, especially in the last three years, there has been a transition from winter months to temperatures like spring months.

Key words: Climate change, world temperature increase, carbon emissions, fossil fuels.

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MANAGEMENT OF BIODIVERSITY IN THE EMERALD SITE "POHREBENI"

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ABSTRACT

The object of this study is the Emerald Site "Pohrebeni" which was created to conserve the biodiversity and natural habitats of European importance. The research is focused on establishing the protection status and level of growth and development of flora and fauna species in their natural habitats, and served as scientific source in the creation of the Management Plan of this Site. In order to achieve this goal, field and laboratory researches were carried out. As a result, twelve rare plant species and nineteen animal species protected through national and international instruments were highlighted. Among the animal species, five of them are also protected at European level. The level of development of herbaceous species is dependent on the density of the trees, season, climatic conditions, etc. At the end of spring, the layer of herbaceous species in the referenced area registered a rich development. The abundance of rare species ranges from *Very numerous specimens* (75-100%) to *Very few specimens* (<10%). The species *Delphinium fissum* and *Cephalanthera longifolia* were only reported once, which warns of their vulnerability. Based on the results, the Management Plan of the Emerald Site "Pohrebeni" was developed. The Plan included the management actions for the sustainable conservation of biodiversity, such as the integrated conservation of the rare species together with their natural ecosystems and the monitoring of the level of conservation of species recorded only once and those protected at European level. Another important measure included in the Plan is the continuous informing of the general public about the importance of biodiversity conservation.

Key words: Emerald Site Pohrebeni, biodiversity management, European protected species, Management Plan.

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THE DYNAMIC OF PLASTIC AND MICROPLASTIC WASTE IN THE ISHMI RIVER WAS ANALYZED USING VIBRATIONAL METHODOLOGY, THE FTIR NICOLET 6700, AND RAMAN SPECTROSCOPY

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ABSTRACT

Albania is considered one of the countries with the highest percentage of untreated plastic in the Mediterranean, about 73%. Approximately 14% of total waste in our country is plastic which consist in a daily production of plastic waste amounts to 198 tons of low-density and 111 tons of high-density plastic. Plastic - a "silent invader" can stay in the environment for hundreds of years, slowly breaking down into pieces smaller than 5mm called microplastics (MP). MP can seep into ecosystems, contaminate water sources, soil and biota consequently all food chains. Furthermore, the widespread use of plastic in everyday products means that plastic pollution affects almost every corner of the globe, making it an insidious and widespread threat. There is a pressing need for enhanced monitoring and information regarding microplastic pollution in both freshwater and marine environments in Albania, along with an evaluation of the primary sources of plastic pollution in rivers and lakes. The Ishmi River, stretching 74 km and flowing through Rinas, Fushë Kruja, ultimately reaching the Adriatic Sea via Cape Rodoni, is identified by the National Environmental Agency as the most polluted basin. The primary contributors to pollution in the Ishmi River are plastic and primary microplastic waste originating from domestic products, local activities along the river basin, and natural processes. Through this paper, the reader is presented with the dynamics of plastic polymers and microplastics present in five different stations of the river, involving specific steps such as collection, chemical treatment, density separation, and sample filtration. This study aimed to evaluate the importance of using vibrational methodology in determining the dynamics of plastic polymers in freshwater ecosystems by using comparative techniques, such as the FTIR Nicolet 6700 and Raman Spectroscopy.

Keywords: Plastics /Microplastics, sampling, vibrational methodology, Ishmi river.

SOIL LOSSES FROM OLUR MICRO-CATCHMENT IN THE CORUH RIVER BASIN USING GEOWEPP MODEL

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ABSTRACT

Soil is a very important resource for protecting productive agricultural lands and for ensuring their sustainable use. In this context, it is important to take the necessary measures to prevent the losses of soil by erosion and to determine amount of soil losses with relevant models. In this study, by using the Geo-Spatial Interface for Water Erosion Prediction Project (GeoWEPP) model, both surface (hillslope) and channel erosions were estimated to evaluate the total soil loss from the Olur Micro-catchment (37517 ha) within the Coruh River Basin. Additionally, for the conservation purposes, areas with high erosion potential in the micro-catchment were also identified and mapped by the model. The land uses of Olur Micro-catchment, which has a slope of 28.07%, consist of approximately 45% grassland, 19% forest and 14% agriculture. In this study, GeoWEPP model was run with 2 different simulation programs. In the first run, only one-year climate data from the year 2018 was utilized for the soil loss estimation. The total precipitation amount for the 2018 was 561 mm/yr. In the second run, 20-year climate data were utilized and the estimated soil loss values were obtained for 20 years. The recorded average precipitation over 20-year period was 426 mm/yr, which was much lower than in 2018. Based on this information, the total soil loss (sediment yield) in 2018 determined by the GeoWEPP model from the catchment was found to be 89123 tons/yr (2.8 tons/ha/yr). As for the 20-year simulation, a soil loss of 9501 tons/yr (0.27 tons/ha/yr) was estimated by the model. Results revealed that the higher amount of precipitation in 2018 caused soil loss to be 10.4 times higher than the 20 years average soil loss. The surface erosion (136525.2 ton/yr) was found to be almost 7 times higher than the channel erosion (19989.4 ton/yr) indicating the dominant pathway of erosion in the Olur micro-catchment. Additionally, the areas with high erosion risk in the study area were predicted very accurately and showed in the produced soil loss map. In conclusion, an idea with the study was obtained about the amount of soil loss from the Olur Micro-catchment to Ayvalı Dam, and the recommendations were made for soil protection measures to reduce the amount of soil loss in the erosion-sensitive areas that were identified over the the Olur micro-catchment.

Key words: GeoWEPP model, Surface and Channel Erosion, Soil Loss, Sediment Yield.

DETERMINE THE MODERN REQUIREMENTS FOR ARCHITECTURAL DESIGN, DEPENDING ON THE LOGISTIC CENTER

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ABSTRACT

Introduction: Logistics depends on a set of features that are related to the nature of its work, whether it is at the level of a country, an establishment, or a small business environment, and the most important of these features: a study of the proximity of important places, which contribute to providing resources to the company, or the state. Identify potential means of communication and transportation that can be used to communicate with other parties, or to obtain appropriate resources. *Materials and Methods:* When studying the design and the mechanism for forming the architectural environment of the logistic centers associated with the process of developing types of food supplies taking into account modern considerations of the market economy, then the scientific and theoretical approaches, methodologies and practical recommendations necessary for this matter must be studied such as : analysis of scientific, normative, methodological and design studies; Conducting a full study of the mechanism of work of the agricultural logistics centers Modeling agricultural projects, taking into consideration innovative techniques. *Results:* This research was provided an architectural design based on the use of a logistic center. This is to represent the logistics center itself in global practice, which proposes to provide a local business-oriented logistics center with its own guiding method.

Keywords: guiding method, economy, architecture, mechanism, logistic, global.

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OPTICAL PROPERTIES OF $\text{BaTi}_{0.99}\text{Sr}_{0.01}\text{O}_3$ SOLAR CELLS: A MOLECULAR MODELING STUDY

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ABSTRACT

Nowadays, energy resources (oil, coal and natural gas) are limited, studies on turning to alternative or sustainable energies have increased in recent years. Among the sustainable energy sources, solar energy attracts the most attention. Researchers in many industries are engineering all kinds of better-performing materials, about solar cells. The most important point in using solar energy is the efficient conversion of sunlight into electrical energy. In this study Sr doped BaTiO₃ candidate has strong photorefractive sensitivity and large electrooptic coefficients, making it a suitable crystal for use as a semiconductor in photovoltaic systems. In this study, optical properties of BaTiO₃ were calculated with Density Functional Theory (DFT).

Keywords: energy resources, solar cells, optical properties, density functional theory (DFT).

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RAINFOREST VEGETATION TYPE: A LEVERAGE TO PANGOLIN HABITAT ENHANCEMENT IN DENG-DENG NATIONAL PARK, EASTERN REGION, CAMEROON

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ABSTRACT

Rainforest vegetation type plays a critical role in providing suitable habitat and resources for pangolins, and understanding the relationship between rainforest vegetation and pangolin ecology is essential for conservation efforts. This study is aimed on assessing the influence of rainforest vegetation type on the enhancement of pangolin habitat within deng-deng national park. However, the research methodology involved conducting field surveys to collect data on pangolin distribution across different forest vegetation within the park. Also, habitat assessment was carried out to evaluate the structural characteristics, vegetation composition, and microhabitats available in each forest vegetation type. Data analysis techniques, included chi-square (X^2) and correlation statistical models were employed to identify association between forest vegetation type and pangolin ecology. The forest vegetation type demonstrated a significant association on wildlife species $X^2=10.002$ $df=12$ $P<0.05$, presence of human activity $X^2=18.806$ $df=9$ $P=0.027$, and forest vegetation canopy $X^2=6.183$ $df=6$ $P<0.05$ respectively. Forest vegetation types determine the composition and diversity of wildlife communities, including species that may interact with pangolins. The study also recorded liana-rich vegetation 38% and dense forest vegetation 32% as highest, while marshy forest 17% and open forest vegetation 13% as least respectively. The rainforest vegetation undergrowth recorded a significant correlation association on the vegetation type $r=0.398$ $P=0.000$. More so, the rainforest vegetation visibility showed a significant association on forest type $X^2=6.552$ $df=11$ $P<0.05$. Additionally, forest vegetation landscape and forest type showed a significant association $r=0.240$ $P=0.038$. The findings of this study contributes to our understanding of the importance of rainforest vegetation in shaping the sustainability of pangolin populations. Different forest vegetation types offer varying levels of resources, microhabitats, and ecological interactions that influence pangolin behavior and population dynamics. The implications of this study are crucial for pangolin conservation and management strategies. By identifying the forest vegetation types that support thriving pangolin populations, conservation efforts would focus on protecting and restoring these habitats. Finally, by integrating this knowledge into conservation plans and forest management practices, we would effectively safeguard pangolin populations and contribute to the overall biodiversity conservation in the national park.

Keywords: Rainforest vegetation, Pangolin ecology, Conservation efforts, Microhabitats.