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Author: Ms. Natavan Jafarova
Azerbaijan National Academy of Sciences, Azerbaijan

CREATION OF A DIGITAL MODEL OF THE APSHERON PENINSULA BASED ON SATELLITE
INFORMATION TO ANALYZE THE CONTAMINATION OF THE TERRITORY WITH OIL WASTE.

Abstract

The Apsheron Peninsula, situated at the crossroads of the Caspian Sea and the Caucasus region, is a critical ecological and geopolitical hotspot. With its strategic importance in the energy sector and diverse ecosystems, understanding and mitigating environmental threats, such as oil waste contamination, is imperative. This article presents a comprehensive digital model of the Apsheron Peninsula based on satellite information, aimed at analyzing and addressing the extent of oil waste contamination across the territory. Utilizing state-of-the-art satellite technology, our study employed high-resolution imagery, multispectral data, and advanced remote sensing techniques to create a detailed digital representation of the Apsheron Peninsula. The model encompasses the entire geographical area, capturing intricate details of the landscape, vegetation, and water bodies. By integrating data from various satellite sources, we achieved a holistic and dynamic visualization, facilitating a nuanced analysis of environmental changes over time. The primary focus of our investigation is the contamination of the Apsheron Peninsula with oil waste, a critical issue resulting from the extensive oil and gas infrastructure in the region. Our digital model allows for the identification and mapping of areas affected by oil spills, leakages, and other forms of pollution. Through spectral analysis, we can differentiate between natural features and oil-contaminated areas, providing a reliable basis for quantitative assessment. Furthermore, the digital model serves as a powerful tool for monitoring and predicting the spread of oil waste, enabling timely intervention and mitigation strategies. By integrating historical satellite data, we can trace the evolution of contamination patterns, helping to identify sources and understand the factors influencing the dispersion of oil pollutants. This temporal dimension enhances our ability to implement proactive measures to safeguard the environment. The spatial and temporal aspects, our digital model incorporates machine learning algorithms to predict potential future contamination scenarios based on various environmental variables. This proactive approach facilitates the development of targeted policies and remediation plans to mitigate the impact of oil waste on ecosystems, and human health. In conclusion, the digital model of the Apsheron Peninsula presented in this article offers a sophisticated framework for assessing and addressing oil waste contamination. By leveraging satellite information, advanced remote sensing techniques, and predictive modeling, our study contributes to the development of sustainable strategies for environmental protection and conservation in this crucial region. The findings are not only valuable for the Apsheron Peninsula but also serve as a blueprint for similar assessments in other ecologically sensitive areas worldwide.