NATURAL AND TRANSFORMED GEOSYSTEMS OF THE TUNKINSKAYA DEPRESSION

Introduction

The objective of the study is to assess the spatial and temporal variability in natural and anthropogenic factors within the Tunkinskaya Depression, a major depression in the Western Siberia. The study was conducted over a period of 10 years, from 2010 to 2020, to assess the changes in the geosystems of the depression, which is located in the Yenisei-Kuznetsk Basin.

Methods

We compiled a series of water management, agro-ecological, and soil characteristic maps to assess the changes in the depression. The maps were based on multispectral satellite data from Landsat, IRS P6 LISS-IV, and IRS P6 LISS-III satellites. The data were processed using the ENVI 5.3 and PCI Geomatics 7.1 software. The analysis included the assessment of changes in land cover, soil types, and water bodies.

Study area

The Tunkinskaya Depression is a large and shallow region located in the Southern Urals, Russia. The depression is characterized by a flat terrain with a maximum relief of 50 meters. The study area covers an area of 1,500 square kilometers, and the depression is characterized by a high degree of waterlogging and poor soil quality.

Object

We investigated the spatial and temporal variability in the depression's hydrology, soil types, and land cover. The study was conducted using satellite images from the period of 2010 to 2020, and the results were compared with the data from the period of 1980 to 1990.

Results

The first period of water management (1980-1990) was characterized by a significant increase in the area of water bodies, accompanied by a decrease in the area of agricultural land. The second period of water management (2010-2020) was characterized by a decrease in the area of water bodies and an increase in the area of agricultural land. The results showed that the transformation of the water bodies has been significant, and the depression is undergoing a transformation from a waterlogged region to a more agricultural region.

Conclusions

The study showed that the transformation of the Tunkinskaya Depression is a result of the changes in water management practices and land use. The results highlighted the importance of sustainable land use practices and the need for effective water management to prevent the transformation of the depression into a more waterlogged region. The study also highlighted the importance of monitoring the changes in the depression to assess the impact of human activities on the environment.

References


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Zhanna V. Atunova

The V.B. Sochava Institute of Geography, Siberian Branch, Russian Academy of Sciences, Irkutsk, Russia

664633, Russia, Irkutsk, Ulans-Batorskaya Str. 1
E-mail: atunova@mail.ru