

СЕКЦИЯ 3

ТЕРРИТОРИАЛЬНАЯ ОРГАНИЗАЦИЯ ГЕОСИСТЕМ И ЛАНДШАФТНО-ЭКОЛОГИЧЕСКОЕ СОСТОЯНИЕ РЕГИОНОВ

EVALUATION OF THE NATURAL ENVIRONMENT CHANGES IN UKRAINIAN POLISSIA BASED ON SPACE IMAGERY DATA

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Ukraine is in the process of deep environmental crisis, which is associated with excessive anthropogenic impact on its natural environment. All environmental problems, irrespective of which industries they were generated, inextricably linked with a certain territory. This is always a spatial problem. Their intensity depends on the economy structure developed on the corresponding territory in dependence of the presence of appropriate natural resources.

The territory of Ukrainian Polissia is rich in natural resources. Before the Second World War, Ukrainian Polissia was one of the most prosperous regions of Europe with clean forests, rivers, lakes, unique representatives of the plant and animal world. Today Polissia is the region with the most terrible ecological situation in Ukraine and Europe. Intensive deforestation, ungrounded volumes of swamps drainage and peat extraction, negative impacts of the development of granite quarries and, ultimately, the nuclear accident of the Chernobyl have led to a critical ecological state of the natural environment of the region. Therefore, it is necessary to recognize the urgent and important needs for realization of sustainable development of the natural environment of our State by studying the ecological problems of the Ukrainian Polissia.

In these conditions operational monitoring control over the ecological state of the environment is required. This task can be solved preferable with the use of multiband aerospace imagery data with the minimum cost of forces and means. Such studies can promptly detect changes in natural ecosystems at the initial stages of development in sufficiently large areas, despite the complexity of their landscape. The experience of conducting such works, both in the territory of the Ukrainian Polissia and abroad, is staffed by the Scientific Center of Aerospace Research of the Earth that has been reflected in many publications.

The aim of the study is providing in accessible form examples of environment violations detected with the use of remote sensing methods.

The object of research is the natural environment of the Ukrainian Polissia.

The subject of the research is the impact of anthropogenic activity on the natural resources of the Ukrainian Polissia territory.

Materials and methods: the data of remote sensing of the Earth were used, as well as the numerous publications on ecological problems of the Ukrainian Polissia. They served as material for the generalization of research data obtained by systematic methods.

The catastrophic impact on the ecology of the area at present is illegal mining of amber in the territories of the Ukrainian Polissia. As a result, the forest area and agricultural land are violated first and the fertile soil layer is destroyed. On damaged sites, the forest dies, and it is simply impossible to reestablish a new one.

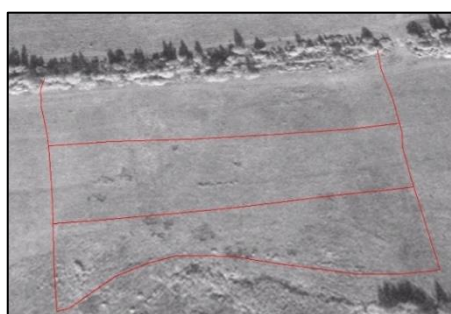
In figure 1 clearly shown the location of amber sites in 2014, which were absent in 2011. In the 2011 image, by red is shown the roads that arose in the process of amber extraction.

Thinking about the relation to the natural environment, the ecological consciousness, responsibility and the preservation of Polissia biodiversity, changes in society, in the ecological policy of the state and in relation to the Ukrainians towards the country's natural resources should take place. Application of preventive actions, namely, if the development is planned on wooded areas, then, the farm will be allocated a plot, the forest is removed, the fertile layer of soil is removed. Amber will be produced, reclamation will take place, the fertile soil layer will be turned back. And most importantly, there should be no violations of water balance, waterlogging, or drying out, since amber is harvested.

Ukrainian Polissia as well as the Carpathians are the "lungs" of Ukraine. Figure 2 shows an example of a territory where forest cover losses (cutting down) are only visible for four years from 2012 to 2016, in addition to the fact that Ukraine is a country with a low-deficit land. In this region, it is necessary to plant new forest trees.

Another problem of Polissia is the consequences of the mineral deposits development for the ecology of the area. In figure 3 visible alluvial dumps associated with the development of a titanium deposit. On the banks of the river after that appear hills of sand. The dumps occupy a considerable area and are not yet recultivated. The river has undergone significant ecological changes and is practically destroyed.

Throughout the territory there are quarries in which granites were extracted and now extracted gabbro, labradorites and other fossils. In figure 4 shows a quarry for mining crushed stone. The image shows clearly how the career depth increased from 2010 to 2017. And the quarries in which the work ceased turned into a lake.



September 27, 2011



September 06, 2014

Fig. 1. Detection of environmental changes in the Olevsky area of Zhytomyr region as a result of amber extraction by means of space photographs from the QuickBird satellite



March 19, 2012

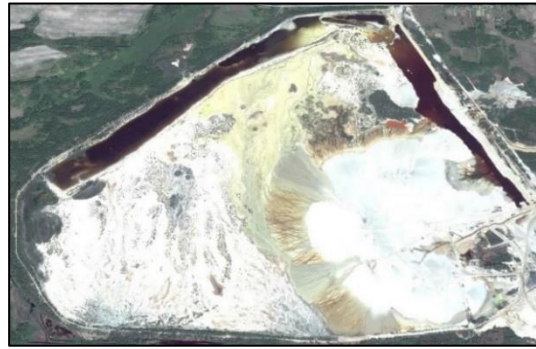


August 08, 2013



October 14, 2016

Fig. 2. Changing the area of forest cover in the Volodymyrets area of the Rivne region with the help of space photographs from the QuickBird satellite



July 18, 2015

Fig. 3. Alluvial dumps associated with the development of a deposit of titanium in the south of Korostensky area of Zhytomyr region, QuickBird satellite image



June 11, 2010



April 19, 2017

Fig. 4. Quarry of crush stone in the city of Malin, Zhytomyr region, QuickBird Satellite

In addition, the Ukrainian Polissia has scientifically unjustified problems related to both irrigation and drainage of land. Irrigated land in large areas leads to increasing of groundwater levels and changes in their chemical composition. There appear salinization of soils and waterlogging. The swamps drainage changes the regulation of river runoff in significant areas, reducing their area that led to the loss of wealth of swamps plant and animal species. In general, the conditions for the reproduction of wildlife and fauna have been violated in this territory. All these problems require further scientific investigation.

Conclusions. It is important to take into account that the ecological crisis in Ukraine in time and space coincides with the economic crisis. As a result, both of them strengthen each other and complicate their overcoming. Large resources are needed to solve the problem, but an economy affected by systemic crisis cannot provide availability of such resources. On the other hand, the ecological crisis negatively affects the state of economy, exhausting it with its acute problems. In our study, it has been shown that satellite information is an additional source of data that can be used to normalize the situation in the national economy, and will contribute to more effective achievement of the goals of sustainable (balanced) development of the natural environment of Ukraine. Solving the tasks of improving the ecological state of Ukraine's territories should begin with the introduction of a system of environmental protection measures in those regions where today the ecological situation is the most intense and that have a socioeconomic significance for our state, in particular in the region of Ukrainian Polissia.