UDC 911. 2/3:528. 9

A. S. BOLTAYEV

GIS IN THE ECOLOGY OF THE OIL AND GAS INDUSTRY

Branch of Gubkin Russian State University of Oil and Gas (NIU) in Tashkent,
Tashkent, Uzbekistan,
axrorboltayev001@gmail.com

Today, every oil and gas facility affects the environment to one degree or another. Therefore, the modern approach to the automation of such objects implies the widespread use of geoinformatio systems (GIS). It is necessary to find out how useful and effective the use of GIS.

Keywords: GIS technology, oil and gas industry, seismic profile, ecomonitoring, DBMS.

The extraction of "blue fuel" or hydrocarbon raw materials is always considered a priority direction of the economy of any oil and gas producing country. Any country that has large reserves of hydrocarbon raw materials can cover the needs not only of its own, but can also provide the external market with minerals to a certain extent, while receiving a certain profit. It is no secret to everyone that the budget of a state that produces hydrocarbons depends to a very large extent on the state of affairs in the oil and gas industry.

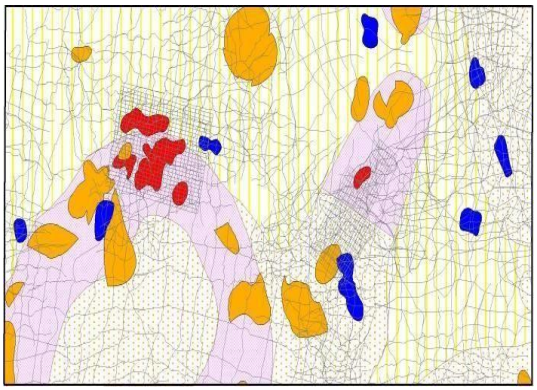
And the efficiency of this sphere directly affects the efficiency of the entire national economy as a whole. But, unfortunately, the use of oil and gas has and like all things has a negative side The impact of OGC facilities is due to the toxicity of natural hydrocarbons and related resources, the variety of chemicals used in various chemical processes, as well as the specifics of the extraction, storage, preparation, processing, transportation and diverse use of oil and gas. Therefore, monitoring the state of the environment in the oil and gas industries is of considerable importance. At the same time, GIS (geographic information systems) play a rather important role in the information support of enterprises in this industry.

Geoinformation System (GIS) is a system that collects, stores, analyzes and visualizes special dat a and related information about the necessary oil and gas facilities [1]. The term is also used in a narrower sense – GIS as a tool that will allow users to search, analyze and edit digital maps, as well as additional information about objects, such as environmental friendliness. GIS includes the capabilities of database management systems (DBMS), vector graphics editors and analytical tools and are used in geology, meteorology, ecology, municipal management, transport.

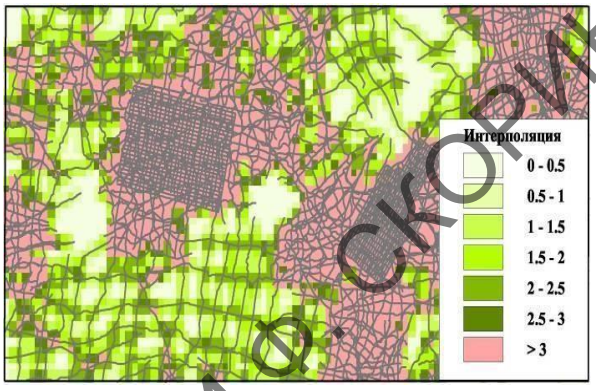
One of the main directions of GIS application in the oil and gas sector is: ecology (oil spill control, damage assessment, modeling). What is the advantage of GIS over other information systems? First of all, this makes it possible to visually display spatial information while preserving all the features of storing and pr ocessing information that the DBMS has. When developing. a field, extracting and transporting m inerals, an oil or gas company primarily faces the problem of collecting, accumulating and processing large volumes of spatial geological and physical information. All data obtained from geological exploration expeditions, obtained from images and other sources are co mbined in a single database, and then entered into a GIS map and processed in a single information complex [2] At the same time, GIS does not copy the DBMS functions, but complements it with new features, acting as an extended information superstructure over it. It all ows you to visualize any spatial geophysical object on the map, while maintaining the ability to work with its tabular information.

GIS is a means of creating new information based on the available source data with the presentation of results, which allows several times to reduce the time of searching and evaluating promising sites.

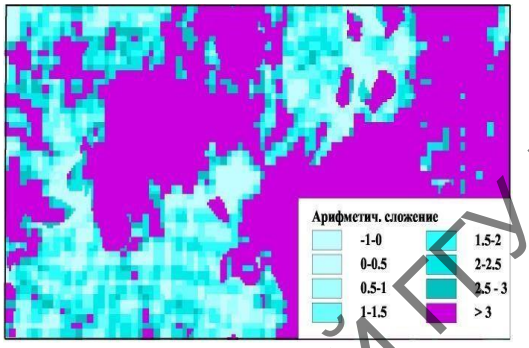
For example, figure 1 shows the process of determining the territories insufficiently studied as a result of geological exploration and its environmental friendliness, i. e. the figures show which areas have been studied sufficiently or even excessively, and where additional research is needed and which areas have not been studied at all [3]. At the same time, the criterion of study is the density of the location of wells and its effect on the atmosphere. Thus, based on the available information about the study of territories, a person receives data on the possible locations of oil and gas deposits and on the impact on the environment, as well as the necessary amount of work on seismic profiling in order to verify the data obtained.



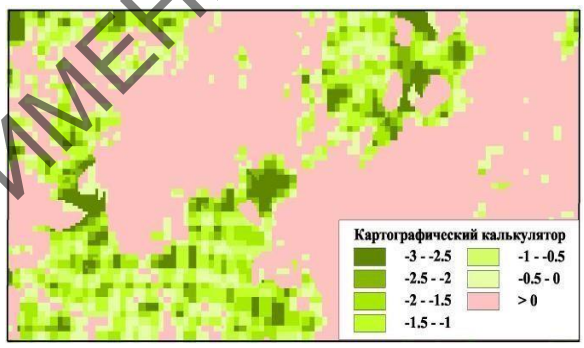
License area and source layers for modeling



The density of seismic profiles on the site



The result of arithmetic addition of grid- themes



The result of arithmetic addition of grid- themes

Figure 1 – Data analysis in GIS. Determination of the study of territories and planning of the required volume of seismic profiling

In conclusion, it should also be noted that the data obtained from alternative methods of monitoring the condition of objects (environmental monitoring, etc.) has its own specifics. With the expansion and deepening of environmental protection measures, one of the main areas of GIS application is monitoring the consequences of actions taken at the international level. Prospects for the expanded use of GIS technologies to solve complex environmental protection problems in the oil and gas industry are associated with the development of the proposed approach to improving the ecological condition of the territory based on the use of aerospace information. The use of GIS is also effective for monitoring the living conditions of lo cal and introduced species, identifying cause-and effect chains and relationships, assessing the favorable and adverse effects of environmental mea sures taken on the ecosystem as a whole and its individual components, making operationall deci sions to adjust them depending on changing external conditions.

List of literature

1 Krasovskaya, O. Ya. GIS in the system of territorial planning and territory management / O. Ya. Krasovskaya, S. Tablecloths, S. Tyasto // ArcReview. – 2020. – № 3 (38). – P. 20–30.

2 Danilenko, A. GIS in the oil and gas industry [Electronic resourse] / A. Danilenko // NefteGazRU. – URL: https://neftegaz. ru/science/development/332617-gis-v-neftegazovoy-otrasli. – Date of access: 20. 04. 2022.

3 Smirnov, N. P. Geoecology: textbook / N. P. Smirnov. – St. Petersburg : Publishing house of RGGMU, 2006. – 307 p.

А. С. Болтаев

ГИС В НЕФТЕГАЗОВОЙ ПРОМЫШЛЕННОСТИ

Филиал Российского Государственного Университета нефти и газа (Национальный исследовательский университет) имени И. М. Губкина в Ташкенте, г. Ташкент, Узбекистан, axrorboltayev001@gmail.com

Сегодня каждый нефтегазовый объект в той или иной степени оказывает влияние на окружающую среду. Поэтому современный подход к автоматизации таких объектов подразумевает широкое использование геоинформационных систем (ГИС). Необходимо выяснить, насколько полезно и эффективно использование ГИС.

Ключевые слова: ГИС-технологии, нефтегазовая отрасль, сейсмический профиль, экомониторинг, СУБД.

УДК 911. 3:312 (476)

Е. А. АНТИПОВА, А. В. ДЫДЫШКО, ЧЭНЬ ЛИ

ИСПОЛЬЗОВАНИЕ ГИС-ИНСТРУМЕНТАРИЯ ДЛЯ СОСТАВЛЕНИЯ И АНАЛИЗА КАРТ ДЕМОГРАФИЧЕСКОГО ХАРАКТЕРА

Белорусский государственный университет, г. Минск, Республика Беларусь, antipovaekaterina@gmail.com, alesyadydyshko@gmail.com, 1914391266@qq.com

В статье охарактеризован опыт авторов в использования программного обеспечения ArcMap 10.7 и ArcScene 10.7 для составления картографического материала демографического характера. На примере показателей возрастной структуры населения Беларуси и Китая показаны алгоритмы создания 2D и 3D демографических карт распределения населения в возрасте моложе трудоспособного возраста, 0 – 14 лет.

Ключевые слова: географическая информационная система (ГИС), картографический материал, демография, возрастная структура населения.

В настоящее время в условиях необходимости обработки BigData в демографии, важно оперативно анализировать и обрабатывать сведения. Данной необходимостью обусловлено широкое применение географических информационных систем (ГИС). ГИС предназначены для сбора, хранения, анализа и графического отображения различных пространственных данных. Благодаря использованию ГИС процесс визуализации пространственной информации