The concentration of ethylbenzene in atmospheric air is close to zero. In 2010 and 2011, no excess of the MPC was recorded. In 2012, 5 % of days marked ethylbenzene content above the maximum permissible and reached 3.5 MPC.

In 2010, there was an increase in methanol concentration above the maximum permissible threshold, which indicates a significant negative impact of anthropogenic sources of the substance on the quality of atmospheric air in the city. The content exceeded the MPC in 2010 44 % of the days, in 2011 – 17 %, 2012 – 30 %. The methanol content for the period under review decreased by 73 %.

During the period under review, the content of 1,2-dichloroethane decreased by 100 %. In 2010, the content of the substance in the atmospheric air exceeded the MPC for 2 days and amounted to 3.5 MPC. In 2011, an ex-cess was noted for 4 days and the concentration reached 2 MPC. In 2012, the content of 1,2-dichloroethane varied within the permitted limits.

The ethylene content for 2010–2012. exceeded the maximum permissible value of 4 days in 2010 and 2011, when the concentration of ecotoxicant reached 3 MPC. In 2012, the concentration of the substance was lower than the MAC.

For 2010–2012. there is a tendency to increase the concentration of vinyl chloride. The concentration of the substance exceeded the maximum permissible values in 2010 16 % of the days, in 2011 – 28 %, in 2012 – 16 %. The highest content of vinyl chloride was recorded in 2010 and amounted to 77 MPC.

The content of phenol in the air of Sterlitamak tends to increase. The concentration of the substance ex-ceeded the MPC in 2010 45 % of the days, in 2011 – 34 %, 2012 – 40 %.

The contents of toluene, α-methylstyrene, m, p-xylene, o-xylene, n-pentane in the atmospheric air of the city are close to zero. The concentration of substances recorded in 2010–2012. did not exceed MPC.

The quality of atmospheric air in Sterlitamak is mainly determined by the concentration of substances such as benzene, chloroform, methanol, vinyl chloride, phenol. The content of ethylbenzene, 1,2-dichloroethane, eth-ylene, toluene, α-methylstyrene, m, p-xylene, o-xylene, n-pentane is quite small, so their study is not advisable.

BIOINDICATION AS THE BASIC METHOD OF ANALYSIS OF THE ECOLOGICAL CONDITION OF THE DISTRICTS OF MINSK

T. Kulesh, A. Makarevich, I. Andronchik

Secondary school № 64,
Minsk, Republic of Belarus
sch64.edu.minsk.by

In this research the ecological state of the Sovietsky district of the city of Minsk on the example of the territory of the Druzhby Narodov Park was analyzed using the bioindication method. The result of the research has shown that Druzhby Narodov Park in its condition has 2 out of 3 possible points. The ecological condition of the has park also been estimated, and the ecological assessment of the park as a recreational area has been given.

Keywords: bioindication, assessment, ecological status, city park.

In recent decades, society has increasingly used in its activities information about the state of the environment. This information is needed in people's daily lives, in housekeeping, in construction, in emergency situations.

Nowadays the state of the environment increasingly depends on the development of public consciousness, understanding of the relationship between the natural environment and humans, the involvement of citizens, especially young people, in solving local and global environmental problems.

Green plantations are an integral part of urban area. They fulfill very important functions. Green plantations are the main means of city air renewal. They also have recreational functions. The main issue is the connection between Minsk parks and air pollution. As its commonly known, green plantations clean the air from harmful emissions, gases and aerosols and make the technological method of air protection more efficient.

Druzhby Narodov Park has attracted our attention as it is located near our school.

The relevance of our research is in the estimation of the ecological condition of this recreational area.

As it was mentioned before the aim of our research is our personal estimation of the greenery and trees based on public ecological monitoring of environmental condition in Minsk Druzhby Narodov Park.

For accomplishment of our aim we have set the following tasks:

– To estimate the ecological condition of green plantations in Druzhby Narodov Park using botanical methods.

– To study the species of green plantations in Druzhby Narodov Park and to make the lists of general and most frequent species.

– To identify the index of anthropogenic load.

– To identify the level of air pollution in Minsk Druzhby Narodov Park using bioindicational method.

For solving these problems we have used the methodologies and tasks from the self-guided practicum for first year students of the faculty of ecological medicine of Minsk State ecological university by E. U. Zhuk, O. V. Kolesneva, A. V. Kamornikova.

Methods where use:

– routing method of research

– the method of green plantation estimation

– lichenoindication method

Routing method of research was used for revealing the presence of life forms of organisms, ecological groups, phytocenosis, their diversity and occurrence on the researched territory. The main techniques were: direct observation, estimation of condition, description and mapping.

Using the bioindication method with lichens, the projective cover and the degree of coverage on the tree stands of the park were assessed.

As the result of our research have been identify that Druzhby Narodov Park in its condition has 2 out of 3 possible points. We also have estimated the ecological condition of the park, and have given the ecological assessment of the park as a recreational area. It's necessary to improve the infrastructure of the park as a recreational area that will protect trees plantations and reduce the level of anthropogenic load on the park biotypes.

GAMMA-RAY BURST AS POSSIBLE CAUSE OF LATE ORDOVICIAN MASS EXTINCTION

V. Kutas, O. Boyarkin

Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
kutasvlad@mail.ru

The study considers the phenomenon of gamma-ray bursts, their classification, main characteristics and origin. The biological effect of gamma-ray bursts occurring in our galaxy relatively close to the Earth, atmospheric and other changes caused by them are also considered. Causal links between gamma-ray bursts and Late Ordovi-cian mass extinction have been constructed.

Keywords: gamma-ray bursts, cosmic rays, Ordovician extinction, biosphere.

Gamma-ray burst (GRB) is an extremely energetic flux of electromagnetic radiation with an energy of the order of 10–1000 keV. This radiation propagates in interstellar space. The main parameters of GRB is the fre-quency of occurence, intensity, duration, spectrum of radiation and evolution during the burst, and also the total flux of energy and . the direction of propagation of radiationю

There are two general subclasses of GRBs. The first subclass is the "short" GRBs which appears as a result of two neutron stars fusion. The second subclass is the "long" GRBs. These GRBs emit the two relativistic jets in result of massive stars gravitational collapse.

Recent observations have shown that the total flux of energy by impulse account on average 10^{-4} erg/cm^2. The range of observed fluxes lies in the region of $3\cdot10^{-6}$–$5\cdot10^{-4}$ erg/cm^2. The frequency of occurrence is about five times per year in celestial sphere. Obvious anisotropy of GRBs is not detected. Duration of GRBs varies from 0,1 to 80 seconds. The time of intensity fluctuations can reach 0.01s. The spectra of GRBs can be approximated by exponential function $F(E)\backsim\exp(-E/E0)$, where is $E0 \sim 150$ keV.

Based on various estimates, the dangerous approach of the Earth to GRB occurs on average 2–3 times per billion years. X-ray and γ-radiation of GRB can be detected on Earth by the effect on atmospheric layers. Ioniza-tion is created in the lower ionosphere which should lead to phase shift of long-wave radio signals and additional absorption of radio waves. The effect on the upper atmosphere is also manifested in fluorescence. In the upper atmosphere, during interaction of cosmic radiation with nuclei of atoms included in molecules of atmospheric gases, flows of secondary particles are created. Some of these particles are involved in the creation of 14C and 10Be radioactive isotopes that reach the Earth 's surface by carbon cycle (14C) or by rain and snow (10Be). Ions created by cosmic radiation increase the number of low-altitude clouds that occur. Atmospheric "rains" of charged particles created by cosmic rays cause lightning discharges in the atmosphere. These "showers" create NO and NO_2 by direct ionization of molecules that destroy ozone faster than it is created in discharges. Decreasing ozone in the atmosphere results in increased UV-radiation on the surface. The decay of secondary mesons created by streams of