Environmental monitoring atmosphere of mining territories

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Abstract

Scientific-practical results of monitoring anthropogenic influence upon environment of mining-industrial territories were discussed. Evaluating risk of negative influence is very important phase of environmental monitoring. The first is evaluating probability of appearance negative anthropogenic influence to environment, which more then maximal level. The second is evaluating probability of failure at the environmental protection system. The third is evaluating detriment of negative anthropogenic influence upon environment.

Key words: MONITORING, FORECASTING, ENVIRONMENTAL PROTECTION, ANTHROPOGENIC INFLUENCING, POLLUTANT

Introduction

Global environmental problems of the present are connected just with anthropogenic polluting atmosphere. Protection of atmospheric air is key problem of environmental sanitation, because air has special rule among others components of biosphere. Atmospheric air realizes different protective ecological functions too. Sphere of influence upon atmosphere and increasing negative changing environment becomes wider with development of social production. It is especially typical of mining-industrial region territories. One of modern society most topical problem is improvement of management and industrial efficiency rise. Industrial rise and material welfare already are not

considered without taking into account environmental influencing these processes [1-3]. Important conception environmental-economical system appeared. It is combination of interconnected economical, technical, social and natural factors in visual environment. The search of scientific substantiated forms and scale of industrial human activity providing rational using natural resources and getting necessity useful productions without pernicious influence upon natural environment acquires specific significance [3-5].

Materials and methods

Geoecology is theoretical foundations of environmental (or geoecological) monitoring. Geoecology is interdisciplinary scientific direction, which connecting researches by composition, constitution, properties, processes for physical and geochemical fields of Earth geospheres as human environment and the environment of other organisms.Abstract theorems of geoecological monitoring are based on fundamental physical principals [4]. Detailed analysis of environmental situation has shown that necessary taking into account follow important system principals: the territories of industrial regions are complex socio-economical and technical systems; management of environmental situation of territories demands efficient information about consequences of made decisions.

Authentic evaluation of environmental condition under consideration region bases at the regularities existing between environmental and population life quality indexes, which reflecting socio-economical background of the specified territory. Solving this problem makes with using follow methods:

- algorithm is created for territorial structure of region as finite aggregate of territorial subdivisions, which entered into regional composition and where environmental and demographic indexes evenly distributed and depending only time.
- compartmental systems of mathematical models are created for describing population size, changing age and sexual structure and lifetime with taking into account environmental indexes reflecting anthropogenic influence in even subdivision.
- computing experiments are organized and made with using government statistical information.
- legislative acts are created and practical tested for limitation level of anthropogenic influence with using evaluation method of environmental condition by physical-chemical, biological, demographical and epidemiological indexes at the specified territory of mining region.

Structure and objects of geoecological monitoring mining region can be shown follow Table 1. There are three kinds of monitoring in this structure. These are monitoring environmental conditions, sources and factors of influence. Such structure and objects of geoecological monitoring make possible realization effective prognosis scheme. This scheme of links at monitoring system has got major goal of management by quality of environment (Fig. 1). There are three stages at the process getting and using knowledge. These are observation, mathematical modeling and evaluating adequacy. Scheme of the process getting and using knowledge about environmental condition of concerned territory is universal [5-8].

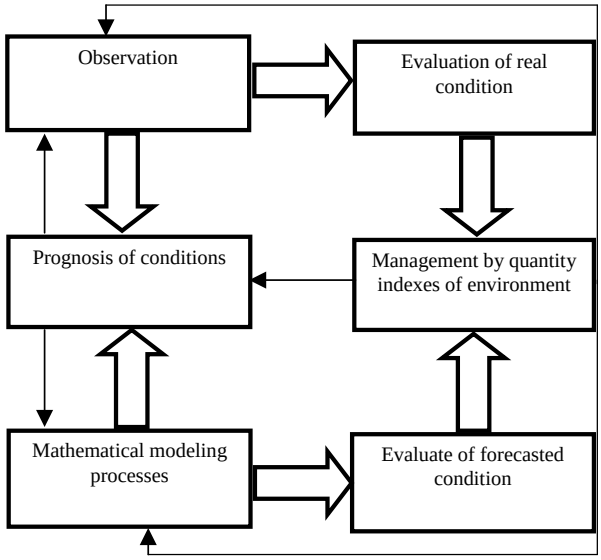

Figure 1. Scheme of links at the system of geoecological monitoring

Evaluating influence upon environment (EIE) is practical base of geoecological monitoring. evaluating influence upon environment consists of nine parts. EIE involves follow basic phases: assembling and analyzing necessary information; identifying sources, kinds and objects of influence; forecasting condition variation of natural environment; evaluating probable emergency situations and there consequences; evaluating environmental, social and economical consequences; identifying prevention or decreasing negative anthropogenic influences methods and substantiating of methods there controlling; realizing environmental-economical evaluation of projects or operating enterprises; analyzing and choosing alternative variants for realization under consideration

project; generating new variants of under consideration project [9-14].

Table 1. Structure and objects of geoecological monitoring mining region

<table>
<tr><td>№</td><td>Kind of monitoring</td><td colspan="6">Object of monitoring</td></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Monitoring sources of influence</td><td colspan="6">Sources of influence</td></tr>
<tr><td>Mining enter-prises</td><td>Metallurg ical enter-prises</td><td>Power enter-prises</td><td>Chemical technological enterprises</td><td>Enterprises of construc-tion complex</td><td>Enterprises of machine-building complex</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Monitoring factors of influence</td><td colspan="6">Factors influencing environmental condition of mining region</td></tr>
<tr><td colspan="2">Biotic factors characterizing condition of ecological systems</td><td colspan="2">Abiotic factors characterizing condition of human environment</td><td colspan="2">Social factors char-acterizing demographic situation and public health condition</td></tr>
<tr><td rowspan="3">3</td><td rowspan="3">Monitoring environmental condition</td><td colspan="6">Components of environment</td></tr>
<tr><td colspan="4">Components of natural environment</td><td colspan="2">Components of social environment</td></tr>
<tr><td>Atmos-phere</td><td>Water resources</td><td>Soil stratum and litho-sphere</td><td>Energetic human en-vironment</td><td>Population of the territory</td><td>Regional system of manageme nt</td></tr>
</table>

Evaluating risk of negative influence is very important phase of environmental monitoring. Algorithm of evaluating risk of negative anthropogenic influence upon environment consists of the following parts. The first is evaluating probability of appearance negative anthropogenic influence to environment, which more than maximal level. The second is evaluating probability of failure at the environmental protection system [6]. The third is evaluating detriment of negative anthropogenic influence upon environment.

Conclusion

Conditions of Human Environment define quality of their life. Improving environmental monitoring system and creating effective technological actions by neutralization wastes are based on adequate mathematical models of environmental condition for a territory. These models have to reflect connection between indexes of public health, influence upon environment and basic demographic characteristics. Consequently, it is environmental rationally and economical reasonably considering atmospheric air as natural resource of mining-industrial region. Proposed methodical principals of complex evaluating atmosphere of mining-industrial region allow realizing integrated approach to forecasting intensity of polluting atmosphere, economical efficiency of production and atmospheric air condition control with using basic demands of environmental imperative for considered territory.

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