

## THE ROLE AND PLACE OF GEOINFORMATION TECHNOLOGIES IN ENVIRONMENTAL MONITORING OF THE MOSCOW.

E.I. Pupirev, P.D. Butakov, N.P. Dronina.

*Russia, Moscow, 107005, Pleteshkovskij per, 22*

### 1. Introduction.

The specific problems of environmental monitoring produce particular demands to cartography due to analysis and treatment of acting information. Monitoring system is first of all information system. An important place in it has a map as the most clear and expressive means of image of ecological information. Monitoring system is operative environment control system. Monitoring is analytical and simulating system. So, we can see an actuality and importance of geoinformation systems (GIS) in application to ecology.

### 2. Structure of Moscow monitoring system.

The joint-stock company "Prima" has developed the general project of creation Moscow ecological monitoring system's.

Moscow monitoring objects are: atmospheric air, surface and ground waters, soil, waste, radiation situation, environmental and population's health.

There are many organizations in Moscow (federal, municipal, departmental), occupying specialised monitoring (air, emission, water pollution, etc.). Received information subdivides into operative (daily indexes of air and water, information about accidents) and regular (quarter indexes of condition ground waters, annual summaries about soil pollution). It is the problem to integrate specialised monitorings into unity system for complex valuation of Moscow.

There are two levels in the Moscow monitoring system.

The lower levels consist of:

1. Specialised monitorings;
2. Local centres of data collection.

The subsystems specialised monitoring provide the collection information on every environment parameter all over the Moscow, its analysis and selection for transfer on the high level.

Every district of Moscow (10) has local centre of data collection. It provides data accumulation on emission sources and ecological dates of territorial department of federal agency.

The high level of Moscow monitoring system is inform-analytical centre, connected with lower level by communication network. The tasks of high level monitoring system are:

- operative valuation of ecological situation in a city;
- account of integrated valuations of a ecological situation;
- forecast of development of ecological conditions (operative, long-term);
- preparation of the projects of managing effects and valuation of consequences of the accepted decisions.

### 3. Geographic information technology in the Moscow monitoring system,

Effective use of accrued data on all parameter's environment demand availability of software for storage, updating, processing and representation, analysis and modelling. Geographic information system is realise this functions. It is optimum means for representation and analysis ecological dates.

However, the choice of GIS software for the high and lower level of Moscow monitoring system made individually and depends on character of soluble problems.

The subsystem specialized monitoring has a number of departments of federal agency equipped by GIS-software. Other departments have not similar software. So, there are two ways to integrate specialized monitorings into uniform system:

1. By convert file format to uniform standard format;
2. By choice of the uniform software for those, who have not software.

Local centres of data collection have not GIS software. The joint-stock company "Prima" has developed the project of creation of a program complex for a local centre, and has begun to realise of this project.

Program complex, providing the decision of problems of local centres or committees on protection of a nature of large cities, allow to perform following functions:

#### 1. Formation and management of databases:

- Formation and management of ecological database on:
  - territories;
  - enterprises;
  - environment (air, soil, water);
- Management of a database legislative ecological documents;
- Management of a database of standards to regulate the contents of harmful substances in environmental objects;

- Management of a database of instruments for ecological control.
2. Modelling, analysis and account.
    - Account of payments for use of natural resources;
    - Account of fields of concentration of polluting substances in atmosphere, water and soil;
    - Modelling of ecological situation.
  3. Work with a map:
    - Input, storage, editing, representation cartographic dates, formation and management of semantic characteristics database;
    - Representation on a map of the information from bases ecological dates;
    - Formation of a various inquiries on a map;
    - Overlay of various theme layers of map and reception thus new ecological information.
  4. Communication with high level monitoring system.

GIS' software of high level Moscow monitoring system providing a reception of digital and graphic dates from subsystems specialized monitorings as well as local centres, permits to conduct the analysis of ecological situation, to reveal correlation connections between various parameters, and to prepare measures for prevention of adverse situations.'

Moscow monitoring system assumes dates' exchange between its participants. So, one of the main requirements to software subsystems' is files converting to standard form (format dbf for databases' files and format dxf for graphic files).

Another moment in Moscow monitoring systems' creation is uniform coordinates system for all monitoring divisions. All ecological dates should have uniform coordinate agreement. The map's scales for different monitoring subsystems may be various (1:50000 for high level system and 1:2000 for local centres). Then, there will be no problems at the exchange of dates.

So, GIS have an important role in Moscow monitoring system's creation. GIS allow to put on different information layers to analysis of extracting processes, to fix attitudes between different parameters and ingredients, to plan measures for preventing unfavourable situations. Received new synthetic maps can give new information about analysed processes and objects.