

# **TECHNOLOGY OF ON-LINE ENVIRONMENTAL MONITORING IN PREMISES OF THE FUEL AND ENERGY COMPLEX BASED ON REMOTE SENSING DATA**

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Conception of spatial environmental monitoring which includes system of regulated repeating observations based on remotely sensed data was elaborated at VSEGEI. The main monitoring purpose is observation of environment state and its changes under influence of natural and technogenic factors. Remote sensing provides operative information on environmental changes which allows in good time correct landusing character or take measures to predict of unfavorable processes.

In accordance with large variety of technogenic influence forms and types, important moment is wording of requirements to remotely sensed data. The requirements include type of data acquisition (photographic, multispectral, radar, infrared), ground resolution, scale, season, time, hydrometeorologic conditions, route direction.

The main form of registration of environmental state is a map compiled on the basis of satellite images and ground geological and landscape data. For monitoring aim the following maps are compiling: basic maps showing environmental state by using the most early materials, in termidate maps showing dynamics of natural environment and its components based on different times images, as well as forecast maps on certain time intervals. Objectivity and quality of map making are stipulated both estimation of natural environment state and reliability of its changes forecast i.e. the main task of monitoring. In interactive regime separated contour are outlined, that promise to increase or to enlarge initial image either summarize or make detailed of each contours.

Analysis of revealed contours of ecological content and examination of cause-consequence connections of environmental changes under technogenic factors is carried out based on Database and Knowledge base by means laying on and comparison of compiled schemes with geological, landscape and other data. Before starting of interpretation process the legend project based on Knowledge base and analysis of ecological situation is developed for schematic ecological maps. The map of environment state shows natural and technogenic objects.

The map of environment dynamics shows changes of environment components in space and in time under influence of technogenic factors is compiled on the basis of remotely sensed data, acguired by different years surveys. The scheme of pollution sources and zones of its impacts includes technogenic objects and trends of pollution migration: aerial (taking into account wide-rose, waterway-lake and riversnet. Aerial thermal-infrared survey is more effective for revelation and outlining of polluted area with waste water from nuclear power plants.

The erosion net scheme are putted on all waterways, including ravines. The lineament scheme are compiled best of all using radar images and as the result of this scheme analysis, fracture zones and large lineament, which may be zones of underground water unloading and gases penetration, are revealed. The technogenic load scheme includes all technogenic objects (industrial, agricultural, transport, mining production and others). The zoning scheme of areas with different degree of technogenic load are compiled on the basis of this scheme with the special reference to

predominant type of influence (industrial, mining production, agricultural, transport, forestry, water managing).

Stages of the Work: 1. Order of a Satellite image on a certain Date. 2. On-line receiving of the Satellite Images. 3. Geometric and radiometric correction of Satellite Images. 4. Thematic Interpretation of Satellite Images. 5. Studying the Ecological situation based on the Interpretation of Satellite Images. 6. Estimation of the ecological situation dynamics in premises of the Fuel and Energy Complex based on the Analysis of on-line Spase Images and Data obtained earlie.

Similary geocological investigations with compilation of maps at the different scales were carried out in several regions of Russia with intensive technogenic load. Based on GIS new contemporary technologies of processing and interpretation of remotely sensed data combined with geological and landscape information are begun active development to study the following tasks of environmental monitoring: - renovation of thematic large scale maps;- control of felled areas and overgrown felled areas;- control of soil erosion at the agricultural regions;- estimation of spatial/time changes of environment at the mining and oil/gas exploitation regions and prediction of its development at the different geographic zones;- landusing control;- estimation and forecast of shore zones changes at the Volga's water reservoirs;- control of oil and gas pipelines at the Northern regions of Russia;- control of water reservoirs pollution by industrial and agricultural waste with the special reference to the Ladoga and the Onega lakes;- revelation of polluted sources, ways of pollution migration and polluted areas with the special reference to water system the Ladoga lake - the Neva river - the Gulf of Finland;- control of under mudrush danger areas at the mountain regions, for example at the Caucasus.