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# Information-hardware support of systems of the automated electromagnetic monitoring of geodynamic objects

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**Abstract**

In article the structure of an informational-hardware support of the automated system of data processing at electromagnetic monitoring of geodynamic objects is considered. The structure of interrelations of the object-oriented and serving subsystems realizing methodological, program and technical and information support of processes of filing and data processing of geodynamic monitoring is defined. It is noted that increase of geodynamic sensitivity due to selection of the abnormal components of signals and obligation of monitoring of variations of separate geodynamic objects in the studied environment results in need of expansion of informational saturation and a variety of geoelectric models. In this case the applied algorithms of informational processing can be focused only on the analysis of the abnormal signals, and the geodynamic assessment will be defined by structure of the models of geodynamic objects used at interpretation. It is defined that the problem of prediction of geodynamic processes can be solved on the basis of expected model operation.



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*Keywords:* Algorithms for data processing; monitoring system; geodynamic objects; forecasting

## 1. Introduction

Currently, due to the necessity to solve the problems of protection and prevention of accidents in the natural and man-made objects, the urgency of creation of geodynamic objects automated control systems greatly increased[1].

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This is particularly important in cases of location of complex economic assets in seismically active areas, and also in areas of natural and artificial unstable geodynamic structures (landslides, slide rocks, devolutions and karst development zones).

The current systems of automated electromagnetic control and monitoring of geological objects are intended primarily for scientific research and are based on comparative time-series analysis with the filtration of natural and man-made rhythms and on the useful geodynamic component allocation[2]. In most cases, this approach is useful for research purposes, and in implementation of control function designed for rapid response to critical geodynamic changes in the object, it is extremely inefficient

Moreover, in their practical use a serious problem occurs, associated with the need to determine small geodynamic variations of certain volumes of geological environment. Increase in geodynamic sensitivity by determining abnormal component signals and necessity of control over variations of certain geodynamic objects in the environment under study results in the need to expand the information richness and diversity of geoelectric models. In this case, the information processing algorithms used may be focused only at the analysis of the abnormal signals, and geodynamic evaluation shall be determined by the structure of models of geodynamic objects used in the interpretation[3].

The objective of this paper is to review and analyze the organization methods of the automated electromagnetic control systems, which provide methodical, algorithmic, software and technical and information support of collection and processing of geodynamic information.

## 2. Organizational structure of the automated electromagnetic control of geodynamic objects

The complexity and diversity of manifestations of geodynamic environments leads to the need of increasing the number of monitored parameters of geodynamic objects with electromagnetic monitoring, which greatly increases the flow of the measurement information. These quality factor improvements, reducing the time of research and, accordingly, increasing of the geodynamic control efficiency are the main objective of development and application of automated systems of geodynamic studies exactly[4].

Figure 1 shows a generalized structure of the electromagnetic control system that reflects the characteristics of geodynamic impacts on the object under study and the basic processes of information processing.

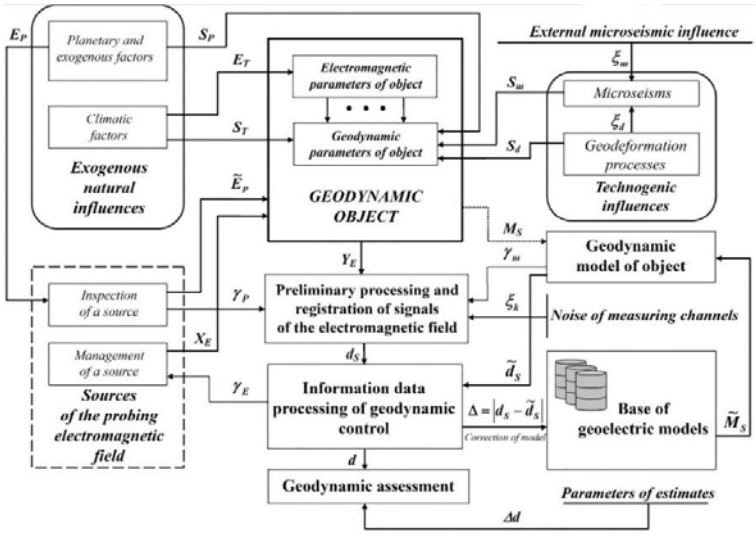


Fig. 1. The generalized structure of system of electromagnetic inspection of geodynamic objects.

The geodynamic object is under the influence of natural and anthropogenic factors determined by the combined geodeformational effects $S_d$ and $S_m$ (geodeformational processes and microseisms $\xi_d$, $\xi_m$), as well as under the influence of climatic and planetary factors $S_T$ and $S_p$. In addition, under the influence of climatic factors $E_T$ the electromagnetic parameters of the survey target are changed.