

Using atomic-clusters component of ground air for diagnostic of overlapping fracture structures

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Positive results of using the atmogeochemical methods for mapping and differentiating of fracture structures are in the main connected with the data carried out in the regions of neotectonic activity. But at the platforms where the fracture structures are often characterised by unclear geological features and are not differed by intensive energy processes, obtaining such results as for the activated regions unfortunately is practically very difficult. According the mentioned above it is more expedient to use the term — zones of increased tectonic activity (ZITA), meaning fractures and zones of increased cracking or infringed uniformity of rocks, often overlaid by loose deposits. Diagnostic of similar activated fractures, especially those are overlaid by loose deposits, acquires large theoretical and practicable interest, even in the case of carrying out the ecological works.

Atmogeochemical research works on the ZITA for many years are being conducted by a group of employees the Institute in regions with various geological conditions. Multicomponent atmogeochemical mapping was developed, includes emanation, helium ore gaseous filming with the use of express equipment's gas-mercury and radiowave filming the method of absorption of microelements from ground air.

The use of a purification system of clearing of ground air from silty (aerosol) constituent and sorption of atomic-cluster (steam-gas) constituent of the air has allowed to elucidate under the ZITA the distribution of elements such as antimony, arsenic, bismuth, gold, tungsten and number of others. The division of air samples is connected with a completely different geochemical load which is conditionally exceeding 0.05 mkm and having atomic-cluster form including separate atoms, molecules or groups (cluster) of

atoms and molecules. The first of forms characterises the gross composition of microelements in the ground horizon, the second is closes to the most mobile their existed forms. Approximately 800 samples of ground air was selected and analysed. The analysis was conducted by neutron-activation and atomic-absorption methods. Practically the selection of all samples was accompanied by simultaneous measurements of the concentration of gases and gas-mercury. As a whole the behaviours of separate elements adhere to the following laws. The law of instability in time and current migration of substances.

The use of multicomponent atmogeochemical of mapping has allowed to reveal various linear zones distinguished by characteristic stable geochemical parameters. This is displayed in various combinations of elements and connections with the abnormal contents. For separation of structures the relationships between components are characterised by unique levels of correlation connections.

As a whole the processes of emanation gases and mobile elements in atomic-cluster form, in the temporary plan, have a discontinuous character and to a large extent have been subjected to the influence of atmospheric conditions. Data obtained by monitoring separate points and profiles prove that factors influencing the hoisting of atomic-cluster components are not limited only to the change of atmospheric pressure, temperature and humidity of air. The change in concentration with time on one point of sampling may be up to ten times more, which is difficult to be explained only by the influence of external factors. It seems that the change of concentration is determined by more complex schemes including, first of all, modern geodynamic processes.

The use of multielements atmogeochemical mapping allows the differentiation of structures according to their geochemical and respectively their geodynamic characteristics, assumes the effective use of these researches in the future.

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