Seismoacoustic and geochemical triggers of geological processes

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Active mineragenesis, that takes place during metasomatism in the zones of mineral substitution by mineralized water and gas in permeable rocks in fault zones, is one of the sources of triggers of geodynamic processes. Physical properties and chemical composition of minerals that are produced in these processes differ from properties and composition of the primary enclosing rocks. This is inevitably accompanied by seismoacoustics and alteration of the balance of chemical elements due to nuclear transformations in correlated states of quantum particles.

Seismoacoustic fields can be treated as the broadband noise, the frequency band is estimated according to the specific size of mineral grains, of about 1-10mm, corresponding frequencies are of about 0.1-1 MHz, signal amplitudes of about 1e-15 mm. 'In situ' experiments in wells in the band of sonic frequencies show that the sound has a hierarchical, inhomogeneous structure, which is well recognized by audio methods. But the registering devices - the humans - have very different individual abilities, which have not been studied by the geoacoustics so far.

The effect of the processes of nuclear synthesis of elements on the mineragenesis should be reflected in anomalies of the chemical composition of minerals in the zones of metasomatism and gradual decrease of those anomalies in transition to the enclosing rock. The changes that take place in this transition sometimes can be detected visually. Studying the mechanism of these changes require serious analytical equipment to perform X-ray diffraction, alpha-track and mass spectrometric analyses of samples.

The experience of laboratory tests shows that some elements, that enter into the composition of such minerals as colemanite [1-2], bear mineral associations, that reveal the presence of nuclear synthesis of elements.

In order to detect regularities of the processes under investigation, one should perform in certain time intervals the analysis of samples of both minerals and underground water for a maximum wide spectrum of elements, with a mandatory statistical processing of the results to obtain reliable data.

Thus, the question is put forward on studying the fine space-temporal structure of geological (and geodynamical) processes including the mineragenesis and the nuclear synthesis of elements, that have geophysical and geochemical manifestations in acoustic, chemical and transmutation fields, whose scales are nanometers, nanoseconds and nanograms. In their turn, these fine processes are embedded in slow modern geological processes, "dominoes of interactions "storms of triggers whose scale and hierarchy are to be assessed.

References

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