Formation of electromagnetic systems in geoactive zones

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Abstract. In this work the mechanisms of generating electromagnetic systems by the lithosphere, the mantle and the core in minerals and rocks at the transitions phase. Direct human activity is one of the reasons for intensifying the education of electromagnetic systems in nature.

1. Introduction
During all its history a man was transforming, conquering and mastering the nature, affecting all its elements. With the development of science and technique man began to penetrate deeper into the earth and water, and higher into the air. Of course, human interference in natural processes cannot remain unnoticed. That’s why now we are reaping the fruits of our mindless interference in normal live process: various natural disasters, catastrophic geological processes, changes of geophysical fields and as a consequence, magnetic storms and so on. The consequences of negative human activities can also include such phenomenon as self-organization of electromagnetic system (EMS) [1]. Electromagnetic systems all objects of real and field structure in the form of plasmoids of different shape, which are present in the atmosphere, lithosphere, space, emitting electromagnetic impulses in a wide range, from gamma rays to radio band, light and heat. Based on evidence of witnesses, visual observations, chemical, physical studies we have made conclusions that permit us to prove that one of the reasons of EMS is human activity. Generalization of available data permitted to separate 4 groups of reasons of formation of electromagnetic systems: climatic, geological, geophysical, technology-related [2].

Climatic reasons, such as excessive thunderstorm activity, abrupt change of weather lead to formation of EMS in atmosphere. Typical example of it is ball lightning which, as we know, is formed during or just after heavy thunderstorm and represents stable formation. Studies in this field revealed that ball lightning appears due to electromagnetic pollution of environment. Witnesses also noticed that ball lightning leans toward the source of electromagnetic field: television antenna, power lines etc (Figure 1, 2). Presence of electromagnetic field is not the only reason of EMS formation and ball lightning in particular. Geological processes are, as we think, the main reason of EMS formation. We have separated the following geological preconditions of EMS formation: 1 – presence of geological heterogeneities (splits, abrupt changes of lithologic members etc.); 2 – excessive tectonic activity (earthquakes, dangerous geological processes etc.); 3 discharge of underground sources, river terraces; 4 – ore fields, occurrences.

In general, geological reason of EMS formation comes to the presence of splits, cracks in lithosphere, through which accumulated electromagnetic energy can come out on the surface, forming electromagnetic systems. What is the physical mechanism of electromagnetic energy accumulation in rock masses? It is assumed that as a result of geological processes (tectonic,
physical-chemical), or human activity in whole structure of lithosphere we observe phase transfer of first or second genus, which come with accumulation of electromagnetic energy.

![Image](image1.png)

**Figure 1.** Formation of toroidal system of electromagnetic field. First (on the left) two small illuminated balls appeared, then in the field of discharge they formed the third bigger illuminated object which relaxes due to the more powerful discharge. Near Vilnius city. Morning, fog. Photo by V N Salnikov

![Image](image2.png)

**Figure 2.** Chromacoding of the photo 1 by the method of equidensite. Toroid structure of electromagnetic system begins to appear. Computer processing is done by V K Zhuravlev

We have specified two mechanisms of EMS generation:

- Adhesive-cohesive – fragile braking of solid body due to physical impact (splitting and cracking in cleavage plane or in the place of contact of two different materials); explosion of gas and liquid inclusions when heating or radiation; plastic deformation with formation of micro cracks; explosion load on solid body etc.[3].
- Fluctuating – elastic strain of solid body, decay and formation of new compounds, dehydration, phase transfers, polymorphic transformations, etc.

Physicochemical processes, happening in the depth of the Earth, encourage the formation of
electromagnetic energy. When released energy accumulates till large volume, it moves through the natural waveguides and comes out on the surface, in the atmosphere and in space. Waveguides can be represented by geological heterogeneities, splits, places of outcrops of underground sources and other geological heterogeneities. It is important to notice that waveguides can be represented by human-made structures located below the surface and compromised the integrity of lithosphere. It can be different excavations, subway, etc. While moving through geological structures, electromagnetic energy goes through changes on the exit on the surface as well, and due to self-organization it takes properties of quasicrystal. At locations of EMS coming out on the surface of the Earth, we have noticed strange voids in form of pits with disappearance of earth, uprooted and burnt forest, melt sand, illuminated or, on the contrary, black objects in the atmosphere [4].

As it was mentioned above, electromagnetic systems, as any other phenomenon, appear due to set of reasons. Next reason of EMS appearance is geophysical and space factors. As we know, Earth is a part of large Solar System. Solar-terrestrial relations have a great influence on physical shell of our planet, changing the potential of magnetic, electric and gravity fields. Researchers noticed that many EMS appearance happened at the time of unstable geophysical situation in the appropriate region (for instance, magnetic storms). And the other way around, at locations where electromagnetic systems come out the surface we have noticed geophysical abnormalities (abnormalities of magnetic, electrical and radiation fields). Human activity also provokes the changes of geophysical fields. Universal development and application of electronics provoke the rise of electromagnetic field potential, which can lead to the appearance of EMS. Undertaken study showed that there is a set of reasons for it: geological, technology-related, geophysical situation.

All above-mentioned reasons are connected. Under technology-related reasons we will understand everything that is somehow related to the human and its activity. Here we can also specify several groups of reasons: 1 – direct technology-made human activity; 2 – structural and ecological; 3 - psychophysical human energy.

Direct human activity is one of the reasons of electromagnetic systems appearance, because human has an influence on all the aspects of environment. Human enforces natural phenomenon by its activity, as well as represents stimulatory factor of new ones. Thus, for example, underground nuclear explosions lead to the destruction of rock masses integrity, which, as we already mentioned above, leads to the rise of electromagnetic energy generation and creates additional waveguides for its movement. The same role belongs to the oil and gas wells. The extraction of natural resources from lithosphere itself cannot be the reason of electromagnetic energy generation. High-rise buildings provoke rock masses compaction, which leads to the violation of their integrity. Another one of the largest stimulation factor of EMS appearance is space studies, both in space and the preparation on Earth. Space vehicles during their orbit insertion and their launch violate natural geophysical field of our planet, let alone chemical pollution of atmosphere, Earth surface and World Ocean. Scientists notice more and more often that environment pollution can not only be visible and measurable, as for example oil pollution, rise of hazardous substance concentration in the atmosphere or ozone holes, but it also can be hidden, as, for instance, electromagnetic pollution. Electromagnetic energy coming from electronics working in every house, from power lines, electric transport, personal computers, cell communication and so on go nowhere. According to energy conservation law it converts into another form or accumulates, attracting or forming new electromagnetic systems [5].

We have specified another type of reasons for EMS appearance, which is called technology-related structural ecological group. It means that application of materials which did not initially existed in nature (concrete, linoleum, synthetic materials) change general ecological situation. Certainly, processes of generation and coming out of electromagnetic energy accumulated in lithosphere, happened also before the beginning of technological progress [6]. Since then the quantity of electromagnetic energy in the atmosphere became bigger, so the frequency of EMS appearance rose as well. Now it is reliably known that electromagnetic fields, including closed electromagnetic systems, have a bad influence on human’s health, and primarily on psycho emotional state.
Electromagnetic systems are simultaneously derivate from electromagnetic fields and their generator. It also can be said that electromagnetic systems, to a greater extent, is the result of ecological problems on our planet, and the ecological problem created by EMS remains unsolved.

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