

# ABOUT THE ROLE AND PLACE OF GEOPHYSICS IN THE FIELD OF ENVIRONMENTAL PROTECTION

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In the current context of general environmental concerns and specific environmental geophysics concerns, Prof. Liviu Constantinescu's book – "Mesaje ale Pământului în descifrări actuale" ("Current Decoding of Earth Messages"), Editura Științifică Publishing House, 1974, can be appreciated now as a true and important environmental planetary geophysics work, the first Romanian environmental geophysics book. And the author can be regarded as a Romanian pioneer of this field of applied geophysics. The concept of the Vital Natural Atmospheric Calotte is resumed and summarized, as the limited space of planet Earth where people live freely, naturally, without support. Its components are only air and earth. Several potential consequences of this concept upon human activities are presented. Some aspects are presented regarding the connections between the human senses and the physical fields of the planet, the latter's influence upon human life and the planet's biodiversity, although not directly perceived by humans. The author debates and presents the planetary natural geophysical fields, as a whole, as the fourth environmental element of the planet, which conditions life and the quality of life on planet Earth, together with air, earth and water as we understand them now. Several development directions of applied geophysics are given for such a conceptual framework, which would entail the progress, development and diversification of knowledge, in order to better understand what is to be done to preserve the planet condition, in such circumstances as would be required to maintain a quality life for HUMANS and the whole planet biodiversity cohabiting with humans.

*Key words:* calotte, environment, natural geophysical fields, planetary element.

## THE BEGINNING OF ENVIRONMENTAL GEOPHYSICS IN ROMANIA

Liviu Constantinescu, Professor of Geophysics at the Oil, Gas and Geology Institute and at the University of Bucharest, corresponding member of the Romanian Academy, published in 1974, at the Editura Științifică, the work: "Mesaje ale Pământului în descifrări actuale" ("Current Decoding of Earth Messages").

The author presents in different chapters information and comments on the physical messages of the Earth, terrestrial expressions of universal attraction, Earth as a magnet, terrestrial radioactivity, Earth heat, elastic waves in the Earth, the dynamic image of Earth structure.

When reading this book now, it appears as a real manual of planet Earth environment and as **the first Romanian environmental geophysics work.**

Professor Liviu Constantinescu should be acknowledged today as a visionary and should be regarded as a forerunner of Romanian environmental specialists, as a father of Romanian environmental geophysics.

Here is what the PROFESSOR was saying towards the end of the book's foreword:

".... This brochure aims to serve, despite its modest size and contents, the interests of the public and of the Earth sciences alike – first of all, of course, geophysics, which deserves as many friends as possible both among non-specialists and among the specialists of other geosciences; this brochure is the first of a series designed in a larger perspective which hopes to contribute, to a small extent, given its nature, to clearing a debt to our planet, which supports us and ensures our living conditions.

**This debt is our obligation to have an ever better knowledge and understanding of the Earth structure and dynamics, in order to get a correct view of the world, a sounder use of the resources made available by the Earth to humans and a wiser behaviour of the latter towards what is mostly known today as environment – particularly when it comes to unsound attitudes towards the Earth, considered – as a whole or in parts – as humans' environment."**

These ideas (highlighted by us), first expressed by the PROFESSOR in the past, are extremely valuable, concentrated, synthetic and visionary, full of meanings unsuspected at that time, and have a continuity over years and a partial development below.

### PLANET EARTH

The planet we live on, which we call EARTH (TERRA) consists only of air, water and earth.

Each of these constitutive elements of the planet is inhabited by specific living beings, which together form a “planetary biodiversity”.

These include HUMANS as well.

The three constitutive elements of the planet existed, exist and may/will exist during geological/planetary eras with or without planetary biodiversity; however the latter, which means life as we know it now, cannot exist without the three planetary elements air, earth and water.

### THE PLANET’S LIMITATIONS

The planetary area where humans can live naturally, freely, without support, is however strictly limited.

This is how the planet’s nature has determined and conditioned this limitation:

- Humans LIVE naturally, freely, without support, only in the lower atmosphere, until about 6000 m above sea level, as well as in areas with an atmosphere below sea level.
- Humans LIVE naturally, freely, without any support, only on the solid surface of land, of the earth, of the geological environment.
- Humans do NOT naturally live:
  - on water,
  - in water,
  - in the higher atmosphere, above 7000 m altitude,
  - in the ground, in the soil and subsoil, in the geological environment.

The figure (scheme), a partial section through the planet, illustrates these limitations.

### THE VITAL NATURAL ATMOSPHERIC CALOTTE

A comparison between the natural restrictions of the planet upon the natural area where humans can live freely, with no additional support, and the known data on the planet Earth, leads to a surprising conclusion.

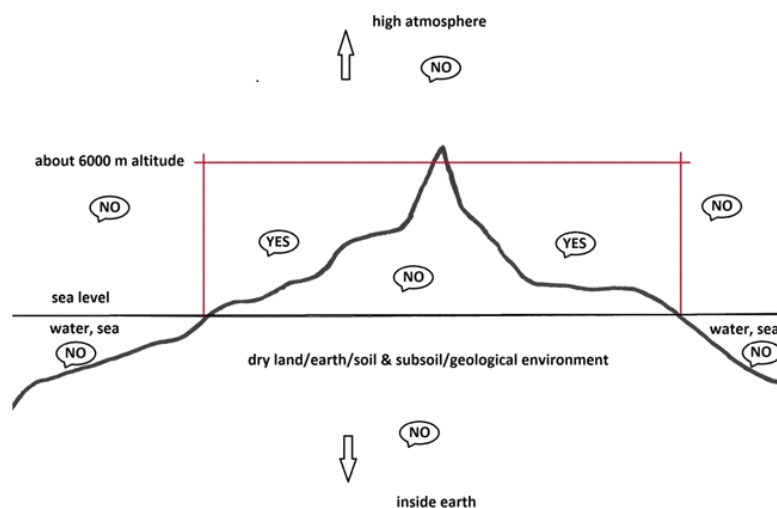


Fig. 1 – Planetary conditioning for human life and the natural vital atmospheric calotte.

Humans can live naturally, freely, with no additional support only in an atmosphere with variable thickness, until about 6000 m altitude above sea level, located only above mainland areas.

This atmospheric area forms a VITAL NATURAL ATMOSPHERIC CALOTTE, with varying thickness, fragmented in large blocks of calotte associated with the earth, mainland, continents and islands.

The VITAL NATURAL ATMOSPHERIC CALOTTE is always supported by and based on the mainland surface, the earth surface.

The essential planetary elements for the presence of the Vital Natural Atmospheric Calotte are AIR and EARTH.

Without these two elements the calotte, the natural area where humans live naturally, freely, without support, cannot exist.

Understanding the conditions, quality and stability of the calotte requires the understanding, as complex and complete as possible, mainly of air and earth.

Water is only of secondary importance, as an element necessary for life, present inside the Vital Natural Atmospheric Calotte and as planetary element, and also as part of the planet's wildlife biodiversity living together inside the calotte and cohabiting with humans.

#### ENVIRONMENT AND HUMANS

It is inside and from this infinitesimal area of the Natural Vital Atmospheric Calotte, as compared to the size and volume of planet Earth, that humans endeavour to dominate the entire planet environment and all other living species.

The evolution of humanity, equivalent until nowadays with a struggle to dominate nature of any kind, has led humans to generate negative effects upon all planet's sections, the higher atmosphere, the planetary ocean, the soil and subsoil and particularly upon the Natural Vital Atmospheric Calotte, as well as upon wildlife planetary biodiversity.

Inside the calotte as well as outside it humans alter by their actions the equilibrium status of the calotte, of the planet's environmental elements

as well as of the wildlife planetary biodiversity with which we share the earth.

The planet itself also generates new equilibriums, new conditions by its own processes, specific for geological eras but occurring during the life of humanity; however we generally perceive these processes as natural disasters, as hazards for the life/ existence of humanity and wild biodiversity.

The reason for this is that we are unable to adapt human life times easily, on the fly, to such new equilibriums occurred and established during geological eras.

In order to fully understand these aspects and hence to adopt new human behaviours, a better understanding of the concept of environment is necessary.

On the one hand we speak about the planetary environment of planet Earth, which comprises many areas inaccessible to humans, but also areas which are part of the Natural Vital Atmospheric Calotte, subject to direct or indirect impacts of human development.

The report, interconnection and reciprocal influences between these two categories of planetary environmental elements will be studied and known.

On the other hand, a direct perception of the environmental elements of the Calotte is obvious for humans now, particularly of those elements in human habitats, influenced by diverse activities such as living, production, transport, human resource extraction, etc.

The two categories of environmental elements mentioned require however distinct understandings and monitoring by humans.

The expansion of negative impacts starting from human habitats towards the rest of the planetary environment, as a result of human activities, with significant impacts inside and around communities or traffic routes, should lead to decisions to ensure that human efforts are not directed to protecting the environment but rather to reorganizing, modifying human activities, which should be designed, organized, performed and concluded differently than they were so far.

### POTENTIAL CONSEQUENCES DERIVED FROM THE “CALOTTE” CONCEPT

A first and most important consequence of the CALOTTE concept is the understanding that HUMANS cannot consider themselves masters of the planet Earth, cannot be its owners or owners of its elements, air, earth and water or of the other cohabitants of the planet, the wildlife biodiversity of the planet, regardless of where they are located, outside or inside the Calotte.

Secondly, among other consequences, we could note and highlight the need for a change in human attitude by new responsible practices towards the planet’s environmental elements and towards the environmental elements of the Vital Natural Atmospheric Calotte.

Examples of responsible changes inside and outside the Vital Natural Atmospheric Calotte include:

- humans should waive their ownership upon the environmental elements earth and water, their ownership upon wildlife biodiversity, forests, pastures, fauna, etc. for a responsible management of these elements; amending the environmental law in this line;
- reconsidering and revising the relationship between humans/planet/environmental elements of the planet/wildlife biodiversity, in relation with “dwelling”, with using and occupying environmental elements and setting firm, compulsory criteria, restrictions and limitations for human use;
- studying, understanding and respecting the natural functions of planetary environmental elements and their use functions, identified and used by humans;
- closing the design – production – distribution – use chains for any human-manufactured products or human activities, with product management elements upon the end of their life cycles and their recycling in reusable elements or component materials, former raw materials, and with no waste generated during or after use;
- protecting and preserving all components of planetary environmental elements which humankind, along its evolution, should identify, define and respect, to ensure support for life and the development of

humankind, outside the natural framework created by the Natural Vital Atmospheric Calotte.

### HUMAN SENSES AND THE PHYSICAL FIELDS OF THE PLANET

None of the five known human senses perceives any of the physical fields of the planet similarly to the way how water and earth can be seen, water can be tasted, air can be smelled or water and earth can be touched.

Only the gravitational field is perceived overall by humans by their “bonding” to the firm, hard surface of the earth.

This finding further reduces the volume of the vital space where humans live inside the calotte naturally, without support, limiting it to a thin layer of about 2 m of air, only above the firm, solid earth.

**Thus we actually live naturally, freely, without support, only on a shell of the planet - the shell of planet Earth – and not on the whole planet, which we mistakenly, deliberately or not, call “ours”.**

However it does not mean that what we do not perceive through our own senses – the influence of the planet’s natural physical fields – does not exist.

I believe that the life of humans and the whole planet biodiversity depends on the natural physical fields of the planet, even if we do not know and we do not understand now in whole and in detail how this relationship is expressed.

Their changes may alter in part or in whole, up to extinction, the life of humans and the planet biodiversity known, contemporary to humankind, at least insofar as we know now about the negative effects of water or air quality impairment upon life.

### THE NATURAL GEOPHYSICAL FIELDS AS A WHOLE, THE FOURTH ENVIRONMENTAL ELEMENT OF THE PLANET IN ADDITION TO EARTH, WATER AND AIR

We know now the planet’s natural geophysical fields, the gravitic field, the magnetic, electric, electromagnetic fields, the field of elastic waves,

the thermal, radioactive fields which we have monitored instrumentally for only the last few decades.

We use the natural geophysical fields as well as some human-generated geophysical fields for researching the planet interior.

We monitor and study them in order to know the planet composition, structure and dynamics, as Professor said, its dangerous phenomena, in order to discover its natural geological resources, to know the geological structures close to the earth surface, all these being necessary elements for the development of humankind.

However it may be that what we know now is not all that the planet generates.

Perhaps what we know now does not mean knowing a planetary geophysical field to generate / to foster life, as we know it to exist on planet Earth.

**It is now time to consider the entirety of the planet's natural geophysical fields as a fourth environmental planet element together with earth, water and air, which we could therefore study and place it, as it should be, in the context of environmental protection, among its priority areas.**

#### NEW FUTURE KNOWLEDGE DIRECTIONS

New research and study opportunities in this direction are foreshadowed and take shape by using what is generically called Key Enabling Technologies, mainly nanotechnologies, that is, nanomaterials as detectors and nanoelectronics, for new categories of instruments.

The use of organic detectors will also create new study possibilities, considering the human observations on the perception of some of the natural geophysical fields by some wildlife species on the planet.

Both instrumental paths open the perspective for much better and perhaps different geophysical measurements than those performed so far, for a better knowledge of the planet's known geophysical fields and perhaps also for discovering new ones, not known so far, and their relationship with life on earth.

The interior knowledge of planet Earth will advance, will progress, extend and diversify in

order to understand what should be done to maintain the planet condition required for ensuring the quality of life for HUMANS and the entire biodiversity with which we cohabit on the planet and in the Vital Natural Atmospheric Calotte, **by studying and understanding the fourth environmental planetary element, natural geophysical fields of the Earth:**

- at least it will be possible to better and more completely study and perhaps valorise one of the issues related to the planet's interior: the earth's inner energies;

The reason for this is that we live between the two strongest energy sources in the closer universe: the Sun and the inside of planet Earth, and the inside of the Earth is much, much closer to us than the Sun.

- at least it will be possible to discover and understand some of the issues related to the interaction of the planet's natural geophysical fields with the planet's components: the influence of the natural geophysical fields upon all types and categories of chemical and biological reactions and the physical phenomena generated by human activities;
- at least humankind will be able to discover, to understand, to use the effects of the planet's natural geophysical fields, some of which are assumed to be constant in relationship with the life time of humankind, but specific to the Earth, in conjunction with the effects of cosmic fields assumed to be variable as a result of the pathway of the planet / the solar system through the space;
- at least identifying, discovering, understanding some of the natural functions of the mainland, the geological environment, of oceans and the atmosphere, will be fully known by geophysical studies and interpretations, in the context of the final understanding of the natural functions of planet Earth system, and also in order to be able to define as correctly and as responsibly as possible the use functions used by humankind;

We will continue to be wrong if we create use functions of planet elements for the humankind, as we did before, without first knowing the

natural functions of our planet's overall system, as well as the detailed functions of each of their components.

- and perhaps we will also know and understand the influence of natural geophysical fields or of some of them (not known to date) upon the occurrence, existence and end of the life of a human organism, of a living organism, on our planet.

### CONCLUSIONS

- HUMANS are neither masters nor owners of the planet Earth, of its environmental components, neither at planet level nor inside the Vital Natural Atmospheric Calotte, at the level of the cohabiting planet biodiversity.
- It is necessary more than ever to change human attitude towards their own actions and activities by increasing their responsibility towards environmental elements of the calotte and the planet, towards the planet's biodiversity, their own species and their own fellows.
- The natural geophysical fields of planet Earth represent a fourth planet

environmental element together with the earth, water and air, with an essential but still unknown role in the occurrence and evolution of humans and biodiversity, in the existence of the planet's geological life.

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