

TO SUSTAINABLE DEVELOPMENT OF EARTH'S ECOSPHERE

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Introduction

Despite of Divine's destination of Man, his Earth's history is quite dramatic. Especially today, in our post-modern epoch of global crises, catastrophes and involution! A shadow of Prince Hamlet asks again: "To be or not to be?" Is it really "sustainable development" of globalizing humanity? Let us discuss fundamentals of this existential stratagem. In our considerations, we can assume that the globalization as consolidation of national/regional economics is necessary (objective) historical process but it's conceptualization and management are subjective. Arising crisis looks as manifestation of inadequacy of last ones.

1. Towards the Advanced Geo-Climatology

Since the concept of "sustainable development" (SD) is partially grounded on the current scientific knowledge on Earth's climate and ecology, let us start from this issue. Its unbiased scientific analysis indicates that there are "the enormous gaps in our knowledge, the sparseness of our observations, and the superficiality of our theories. Many of the basic processes of planetary ecology are poorly understood" (F. Dyson, 2009).

For answering these fundamental questions, we have analyzed basic "anomalies" of regional weather (unexplained from the "standard" viewpoint) and found statistical correlations between "ozone holes" and "geological anomalies", from one site, and between weather and ozone "anomalies", from other site [1-3]. Analysis of these empirical correlations brings us to discovering the new geophysical mechanism of modulating Earth's ozonosphere that can be treated as a new geo-climatic subsystem (missed earlier). Thus, the current conventional climatologic system of Earth must be extended. It generates a new geo-climatic paradigm. In the frame of this paradigm, one can select two-fold impacts of the deep degassing on Earth's weather/climate:

- (l) Passing from the Earth's core to space, the gas flow affects each geochemical barrier. It results into two basic consequences as (a) intensification of seismic and volcanic activity and (b) ozone layer depletion (negative anomalies) over degassing centers (this natural process is alternative to the anthropogenic CFC hypothesis) – verified experimentally: Figure 1;

- (II) A surplus solar energy, arriving at the Earth's surface through these negative ozone anomalies, leads to abnormal heating of local parts of the Earth's surface. This causes an increase in frequency of short-term regional extreme meteorological events around the world and destabilization of the atmosphere and ocean that are known as weather "anomalies" and "global warming" (abrupt climate change).

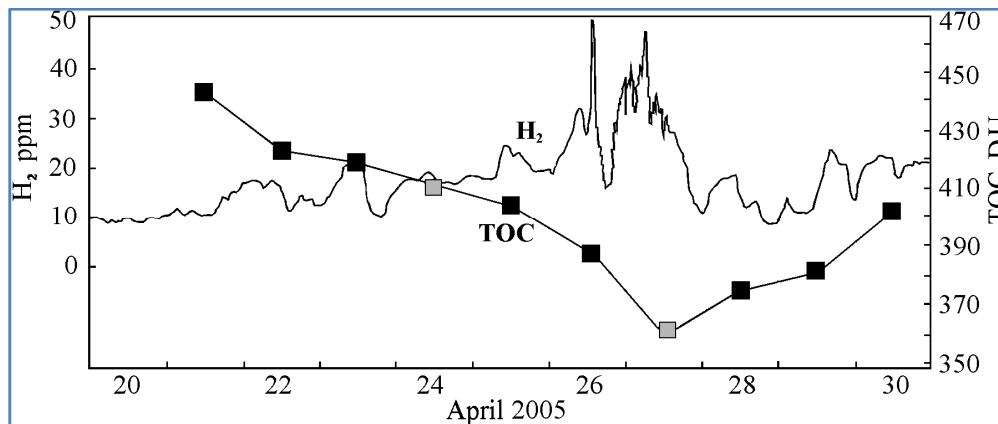


Figure 1. The Kola Peninsula: hydrogen release and Total Ozone Concentration (TOC) in April 2005. TOC data were obtained from the Murmansk ozone station (black squares) and the Earth Probe (gray squares). From [1].

- (III) Now, one can explain the common reason for abrupt climate change and intensification of natural disasters. It is the endogenic activation of Earth's core processes causing the increase of emission of reduced gases, primarily hydrogen, via degassing from deep within the Earth. The inner core crystallization leads to the release of hydrogen, which is then accumulated at the boundary of the liquid core and the mantle, moves outward to the Earth's surface. The Sun and Moon affect these geo-processes with energetic-gravitational interaction.

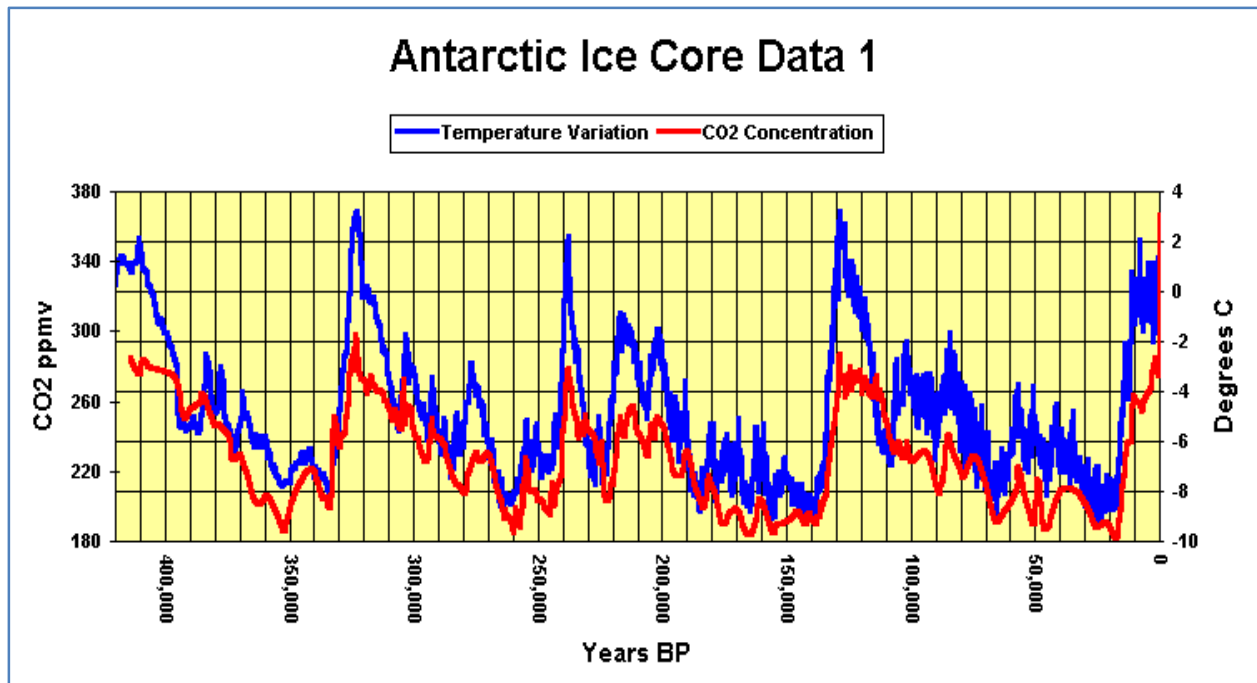


Figure 2. Changes of temperature on Earth and concentration of CO₂ in its atmosphere during last 420,000 years. From: http://www.daviesand.com/Choices/Precautionary_PLanning/New_Data

- (IV) This interpretation is consistent with the paleoclimatic ice-core data gained recently at Greenland and Antarctic. There, by applying modern methods of investigation, with a high accuracy, one established a content of CO₂, O₂ and other components of the relict atmosphere, as well as the corresponding temperature. It was found that the very essential periodical increases of CO₂ in the Earth atmosphere during 420,000 years always followed by corresponding increases of temperature (with the time delay of 200-800 years) – Figure 2. I.e., the essential variations of CO₂ in the atmosphere were/are consequences of Earth's warming but not its causes.
- (V) Dynamic structuration of these mass-energy fluxes (passing through geospheres) defines various weather driving forces and meteorological phenomena, such as formation of cyclones, hurricanes, tornado, El Nino (ENSO), etc. [1-3].

1. Breakthrough in Novel Green Technology and Its Economic Impact

Natural environmental disasters and weather “anomalies” bring permanent threats and great economic losses to humanity. As one of effective approaches to prevent or minimize some meteorological-environmental threats is cloud/fog “seeding” (“weather modification”). The suppression of hail clouds by applying WM technique could result into saving about 500 M \$US annually in the USA only, while the suppression of one tropical hurricane could save a few

thousands lives and 1 Billion \$US! Increasing rain precipitation on 10% during crops vegetation could increase the annual gross of farmers in the State of North Dakota(USA) on about 400 M \$US annually!

Today, effective weather modification technology (for environment management and protection) is wanted in many countries, a real market is huge. But previous methods of cloud/fog seeding based on the silver iodide or “dry ice” systems are found as insufficient for real commercial applications (excepting applications on hail cloud suppression). Recently, a breakthrough in this field was done by Prof. N. Fukuta, a co-founder and a president of a company “Weather, Climate and Environment Management, LLC” (USA). The developed technology is unique, pure, patented and tested in the USA, Japan and China. Comparing with the silver iodide technology, e.g., in hail suppression experiment, the new approach is more effective by about 50 times; in other applications, the new method is incommensurably greater. Today, this initial heritage is sufficiently upgraded; also, a series of typical eco-programs were elaborated for commercialization [4].

In part, the programs concern: (1) preventing power lines icing caused by “freezing rains”, at regional scale, (2) making artificial rains for agriculture, (3) gaining fresh water in mountain canyons, (4) suppression of forest fires by artificial rains, (5) making “good snow weather” for mountain ski resorts, (6) suppression of cold winter fogs over airports and highways, (7) suppression of developing tornado, etc.

All applications are quite effective economically. e.g., the investment into a typical eco-protective program is less than 0,001 of potential loss caused by natural hazards (“freezing rains”, forest fires, droughts, land erosion and slides, etc.).Further, the mean coefficient of economical efficacy of typical eco-program varies in a range 100-1000! i.e., investing 1\$US returns pure profit of about 100-1000\$US!

One can see that due to great economic and practical efficacy, in the nearest future, initiating of such eco-protection programs will stimulate the forming of new branches of “green technology” and corresponding “green industry”, catalyze socio-economic activity at regional and larger scales. Planning, realization and developing of such programs in different countries needs in governmental and private, national and international support, coordination and collaboration.

2. The Ecological Imperative – Towards the Ecological-Economic Systems!

A modern synthesis of such close notions as “economy” and “ecology” (“mega-ecology”) defines ecology as the science of “housekeeping”, and economy as the science that postulates the organization rules of “housekeeping”. And therefore, it explains an obvious nature of subordination of “economy” to “ecology”. Indeed, economy is a basis of societal development while ecology is a basis of development of economy! The present epoch is accompanied by comprehension of exclusive importance of problems facing mankind, drops the antagonism between ecology and economy, and promptly puts forward ecology on a primary position in its relation to economy.

During a short historical period, a current economic paradigm must be changed: in modern society, the “economic” systems must be replaced with the “ecologic-economic” systems. There, the calculating of fundamental economic indexes must account amortization of environment (nature). It will lead to changing priorities and structural transformations in economy.

Thus, the “ecological imperative” is demanding to revolt the current “dictatorship of economy” onto the “dictatorship of ecology”. Therefore, on a question: “What is driving force of global crises and human involution?” we know an answer. The problems are caused due to the dominating of the part (“quasi-economy”) over the whole (“mega-ecology”)! One has to reverse this relation - from atomized “economical ecology” to holistic “ecological economy” (without any unclosed links). It is one of the most essential parts of the adequate management in the globalization! Realizing this revolution will open for Humanity beginning of a new era – without global crises – in the paradigm of Sustainable Development of Ecosphere.

3. Concerning Environmental Management in the Frame of Ecological Economy

But what are mechanisms and working algorithms of this revolt in our case of weather and environment management? A solution is found in fundamentals of new “ecological economy”. One of the most promising developing branches of “ecological economy” is the “ecological insurance” (the insurance from environmental threats). Indeed, the “ecological insurance” (EI) recovers the lost link between the whole (“eco-infrastructure”) and the part (finances).

We have investigated the problem of synergistic combining the eco-protection technology with EI – for the holistic environmental protection, management and development at different scales. This system was called as the “Protected Ecological Insurance” (PEI). There, we integrated (a)

the eco-protective system (green technology), (b) the eco-insurance company, and (c) the protected “eco-techno-infrastructure”. Unlike the bank or venture investment, the PEI can help to grow capital, minimize prices and enliven the socio-economical dynamics of region!

4. Towards the Holistic Paradigm of Sustainable Development of Earth's Ecosphere!

A synergistic combining and generalization of discussed scientific, eco-technological and “eco-economical” approaches in the context of globalization scenario, leads us to the Holistic Paradigm of “Sustainable Development of Earth's Ecosphere” (PSDEE), that has to replace the current non-holistic concept of SD.

Here, “Ecosphere” is defined as a sum and a result of interaction of three planetary hyper-systems: Biosphere, Geosphere and Techno-Sphere. “Ecosphere” is a “Space Home” for Man in his Divine destination. In the Holistic Paradigm of Sustainable Development of Earth's Ecosphere - through thorns to Stars!

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