THE CLIMATE CHANGE AND THE EMERGENCY MANAGEMENT IN THE THIRD MILLENNIUM - THE CASE STUDY OF WATER FLOOD IN HAMBURG, GERMANY

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Abstract

The climate change is a natural phenomenon, which has been recorded in the history of the planet. Present global changes in nature, space and environment have been the result of a very complex system of biosphere reaction to the changes within important parts of the system. The consequence of climate change has been considered as second threat to humanity and the biosphere (nuclear technologies being first). Our civilization has to take active scientific, applied research, and practical day-to-day work for prevention of the consequences from climate change. The global changes in the emergency management should follow the challenges coming from the consequences of climate change and should focus on prevention, early warning systems, rescue operations and protection of the biosphere and human population.

Introduction

Climate change is a natural phenomenon which has been recorded in Earth history as follows: in Proterozoic 1000 - 600 Myr BP 4 times; Pleozoic - Silurian app. 430 - 410 Myr BP once; from Carboniferous - Permian app. 320 - 230 Myr BP larger period; and during Cenozoic - Tertiary. It includes major events and the associated climate change and smaller events as has been recorded in many periods and even in the recent past. The latest occurred after the eruption of Mt. Pinatubo in the Philippines in June 1991 and the mini climate change that lasted for two years.

The climate is the set of parameters, which regulates the condition within the biosphere. Major parameters are: temperature, precipitation and water cycle,

carbon dioxide cycle, oxygen cycle, ozone protection against cosmic and solar rays, ocean waters movements, air masses movements, and human developments. Also the major influence could be developed by: the development of the Earth mass, major earthquake, volcano eruptions, change in the revolutions of the planet Earth, other planets or Sun and the whole solar system, impact of cosmic bodies by passing or colliding with the planet Earth. Our civilization has caused an impact that was triggered by the industrial revolution and most likely influenced the commencement of the present climate change. Our intention is not to develop the list of all major, minor and other consequences of the climate change, but to initiate thinking.

According to the theory of the systems - and the climate change as natural phenomenon within the large system of the biosphere, responds as good as other parts of the system - in the case of the change/movement of any part within an system, regardless of how important or less the moving part has been, the whole system will be affected. The worst is that it is not possible to foresee or predict in which direction the new development of the system will go. The ability to adopt the theory of systems within thinking about the causes and consequences of climate change will contribute towards the understanding of present and future happenings.

Global changes underway because of the causes and consequences of climate change can be divided as follows:

- Changes within nature - hypothetically because the definition of nature is not yet scientifically completed - live beings or species extinction and development of new life forms, geographical changes due to land mass movements, mean sea level rise, movement of the beings towards north and south, movements of beings in higher altitudes in the mountains, and movement of beings because of the change of the basic conditions.

- Changes within human population from the nature and social aspects - many different possibilities among which the emigration of the population; the impact on the population due to the basic conditions in the nature, space and environment; limitation due to availability of fresh water; health hazards due to the life style and state of the environment - healthy people in healthy environment, development of the governing systems, social orders, knowledge exchange, information exchange and life system of humans, and

- Other changes due to the unknown reasons - changes in the Earth system as whole, solar system, cosmic influences etc.

The consequences from the climate change must be researched on a global and local level. The main impact will always affect local community life. Only suffering of the humans is within their own environment - family, and within their local community. The life style and the characteristics of the nature, space and environment of the local community are important parameters for emergency management in the third millennium.

Effective emergency management has to act in accordance with the local communities needs on all levels. As such it is an integral part of nature, space and environment protection of local community or municipality social organization.

At the Earth Summit in Rio 1992 where the Agenda for Change and other on global levels was prepared, and accepted, the authors feel it is a good opportunity to link emergency management and Local Agenda 21 Processes. This link can work hand and gloves for protection of the humanity from consequences of the climate change that are in progress and from other environmental hazards. We recommend the research done by number of authors in connection to the Local Agenda 21 Processes and interactions towards incorporation of the emergency management into documents, preparedness and effective action for protection of the people at local community.

Some of today's consequences that must be taken into account, and are not commonly known, are as follows:

- Protection against low level of oxygen concentration - the oxygen within the area of large cities sometimes is as low as 11 to 13%. If the concentration drops below 8% the human population within such area could die;

- Protection against synthetic chemical gasses in the atmosphere. This area requires additional research.

- The long term effect of synthetic chemical products in the lithosphere and atmosphere - additional research is needed for many existing and all new synthetic chemical product

- The long-term effects of synthetic chemical products on biosphere - teratogens, carcinogens, bio-toxins and toxins, etc.

From the weather events we have the following:

- Floods due to the intensity of precipitation, and synergetic effects from other parts of the nature, space and environment system,

- Construction damages due to high velocity of the wind - highest velocity recorded was over 400 km/hour,

- Landslides due to change of forest composition - during the second millennium of our civilization the percentage of pine trees has been increased, because of faster growing and on account of deciduous trees, second ones has higher power for land slides protection, and water cycling from surface into the underground due to dipper roots system, and the climate change intensity of precipitation at the limited time, etc.

From the temperature perspective, the storage capacity for carbon dioxide of open ocean waters, which is lower with temperature increase of open ocean water, and effect of the temperature increase onto landmass of the continents. Phytoplankton and eutrophication on large-scale influence and changes within the biosphere.

Not to have a holistic intention, we would like to deal with the case study of flood in the Northern Germany - The City of Hamburg area. During beginning of February 2000 we had in Europe two grave cases of the climate change consequences. The ice balls of up to 5 kilos were falling from the clouds in central Italy, Bologna area, and up to three meters sea tide which flooded the area of Hamburg city in Northern Germany.

Two major systems work together in Northern Atlantic. First was movement of the ocean waters due to the temperature and salinity difference, the so-called cold, salty, deep current moving ocean waters from North Atlantic, around Africa, Indian Ocean, South of Australia to North Pacific, from where the so-called warm, less salty, shallow current was moving ocean waters from North Pacific, north from Australia, over Indian Ocean, around Africa to North Atlantic. Second system was wind that may have moved shallow ocean waters in different directions. The third system, which has also possibility to affect the flood was intensive precipitation. All three systems acted synergistically and caused widespread suffering of the population and infrastructure in the city of Hamburg Germany.

A system, which has a lot to do with emergency management, is digital transmission of information and computing. With up to moment information transmission, modeling of the weather happenings, modeling of geographical data (GIS) it is possible to have good emergency management in the coming years. Of course we should not forget human dimension and education of the population. With the whole life education system (WLES), and effective Local Agenda 21 Processes, our civilization may make a new platform for combating the causes and consequences of climate change.

We hope that our contribution will initiate need for better thinking, because the quantity of the knowledge is great, and is increasing constantly, and what we need is supradisciplinary thinking for possibility of holistic approach towards complex problem solving of the emergency management in the third millennium.

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