

## **Scientific Report**

### **Exploratory Workshop**

#### **GEOLOGICAL, PALEOCLIMATICAL AND PALEOENVIRONMENTAL FLUCTUATIONS IN THE BLACK SEA SINCE THE LAST 30,000 YEARS**

Bucharest, the 4-8 October 2008

CNCSIS Code 44

#### **1. The Scientific Content of the Workshop**

##### **1.1. Realized objectives**

This Workshop took place in the Conference of the Salle Euro-Hotel Polizu, Bucharest, equipped with all the necessary facilities for this event. The presentations as well as the discussions were held in English.

The Workshop was held under the patronage of the National Council of Scientific Research (CNCSIS), within the frame of the National Plan of Research-Development and Innovation (PNCDI II), the Programme Ideas (Exploratory Workshops). This meeting was co-financed by INCD GEEOCOMAR (Project Ideas 364), as well as by the international projects IGCP-UNESCO 521 – The Black Sea-Mediterranean Corridor during the last 30 KY: sea level change and human adaptation and INQUA 0501 – Caspian-Black Sea-Mediterranean corridor during last 30 KY: sea level change and human adaptive strategies.

In order to discuss and analyze paleoclimatic and paleoenvironmental changes in the Black Sea region during the last 30,000 years, this workshop brought together specialists from various domains (geology, geophysics, geochemistry, paleontology, mathematics, archeology, and history) from the countries situated to the Black Sea coast, as well as from the circum-Mediterranean regions, and well-known specialists in the discussed topic. The main goal of the meeting was to decipher the influence of global/regional climate changes on the sea-level in the Black Sea basin since the last 30,000 years, and the relationship of these fluctuations with the anthropic activity.

At this workshop, 30 researchers from different countries as Romania, Republic of Moldavia, Bulgaria, Russian Federation, Ukraine, Turkey, Iran, France, Canada, USA, Australia, presented oral and poster communications, which analyzed the fluctuations of the water level of the Black Sea and of the environmental changes during the last 30,000 years, as well as changes in biodiversity, and correlation of the marine and brackish faunas and floras from different regions of the basin. Last but not least, the researchers discussed about the modifications in human activities on the coastal zone of the Black Sea in the last 30,000 years, related to the paleoclimatic and paleoenvironmental changes, as resulted from the archaeological discoveries from several areas on the Black Sea coast such as Turkey, Bulgaria, Romania, Russian Federation, Georgia, and Ukraine.

A special task of the Workshop was to encourage the participation of the young scientists, with PhD Student and post-doctoral positions. Hence, 7 young scientists from Romania and abroad participated in the Workshop dedicated to the Black Sea.

### **1.2. Research Themes**

The presented works (oral communications and posters) of the Workshop focused on several actual topics for the reconstruction of the Black Sea evolution in the past 30,000 years, such as:

- The Geology of the Black Sea basin;
- Paleogeographic and Paleoceanographic Reconstructions of the Black Sea basin since the last 30,000 years;
- Paleontology and Integrated Biostratigraphy (based on several marine and brackish faunal and floral biotas) of the sediments of the Black Sea since the last 30,000 years;
- Tectonic activity in the Black Sea during the Neogene-Quaternary interval;
- Archaeology, history and ethnology of the Black Sea since the last 30,000 years;
- GIS, Data Base and Mathematical Modelling of the Black Sea since the last 30,000 years;

Several business meetings of the Working and Regional Groups of scientists who work in different regions of the Black sea region were also achieved.

### **1.3. Conclusions/Results**

The data presented at the Workshop dedicated to the evolution of the Black Sea since the last 30,000 years led to the conclusion that the reconnection of the Black Sea with the Mediterranean Sea took place unequivocally at around 8,500 years ago. Therefore, there is no scientific argument to support the Ryan's theory, about the catastrophic reflooding of the Black sea, which is the promoter of the mythic Noah's Flood, due to a sudden sea-level rise of the Black Sea during Holocene times.

The corroboration of the geological and archaeological/historical data presented in this Workshop indicated also that the Neolithic Agriculture revolution in Europe began earlier than 8,500 years ago. This conclusion allows to realize important links among the early human habitat, the environment and the sea-level fluctuations, with implications in the evolution of the Modern humanity in the European and Asia Minor areas.

The new presented in the Workshop geological and geophysical data revealed new insights on the sedimentary processes from deep and abyssal zones of the NW Black Sea. As the Black Sea was in the proximity of the Russian-Scandinavian ice cap, the supply of melting water from the glaciers come into the Black Sea basin through the system drainage comprising large European rivers such as the Danube, the Dnieper, the Dniester and the Bug. At approximately 12,500 years B.C., after the deglaciation, this supply was so significant that it was able to raise the level of the Black Sea from -40 m up to -20 m.

The palynological data indicate that, during the Younger Dryas, an arid and cooler climate characterized the central and NE part of Europe. Consequently, the supply of the big rivers from this part of Europe was quite low; in any case much more lower than during and after the last deglaciation.

In agreement with these data, the new geological and geophysical results presented in the Workshop revealed the presence of some structures in the NW part of the Black Sea – a dune-filed mosaic, presenting coastal erosion at a level of -100 m. These dune structures are supposed to be deposited between 11,000-8,500 years B.C. Around 7,500 years B.C. the surface water of the Black Sea attained present-day conditions, but the beginning of the processes of the salinity recovery and that of the sea-level increase started already 8,100-7,900 years ago.

#### ***1.4. Contributions in future development/directions in the scientific topic of the Workshop***

##### In geology/micropaleontology/climate change/oceanography

1. Influence of climate change and active tectonics on sea level change and evolution of coastal zone.
2. Influence of sea level change and coastline migration on:
  - a. Hydrological regime in connected straits;
  - b. Transformation from lacustrine to marine environment;
  - c. Evolution of sedimentary and ecosystems;
  - d. Evolution of coastal geomorphology;
  - e. Evolution of prehistory and history human adaptation in the “Corridor”, in particular, initial spread of Anatomically Modern Humans as well as initial emergence and the subsequent crisis of early agriculture, Greek colonization and the collapse of early colonies.
3. Influence of Black Sea outflow on deposition of Eastern Mediterranean sapropels.
4. Beginning, character (gradual, fluctuating or catastrophic) and speed of Holocene transgression in the Black Sea and the Sea of Marmara.

##### In applied sciences and technology

- To prepare a database for quantitative modelling of the crises with the detailed identification of environmental factors involved and their behavior.
- To delineate main areas of environmental risk (e.g., inundation, erosion, flooding) towards sustainable development of the “Corridor” under global climate change anticipated in present century.

##### In respect of benefit to society

- To preserve human heritage by addressing and clarification of existing archaeological questions (e.g., inundation of Mesolithic, Neolithic, Eneolithic, Early Bronze, Antique, Middle Age settlements).
- To better understand human response to environmental change in terms of human and societal dynamics in order to improve human living conditions and wise management of the Earth as a human habitat.
- To better predict future sea level changes and its social, economic and political impact with practical recommendations for the areas of high environmental risk.
- To encourage East-West dialogue by integration of eastern and western scientists into international R&D community.