CLIMATIC CONDITIONS AND THEIR INFLUENCE ON MARITIME SHORES

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ABSTRACT

The shore or the sea coast, as separation lines between land and sea, is subject to the permanent action of internal factors (tectonic movements and volcanism) and of external factors (processes of erosion, wind, waves, currents, tides, living organisms and humans), issues that complicate their development.

A good quality, stability and consolidation of shores or coasts have a special importance in the socio-economic life of each country limitary to the sea or navigable rivers. This is in view of the benefits arising from the safe operation of maritime and river ports, which, across time, transformed neighboring villages in great national or international port cities.

Keywords: *climatic conditions, maritime shores, geo-climatic factors*

1. INTRODUCTION:

The shore represents the separation line between land and sea, which permanently subject to internal factors (tectonic movements and volcanism), as well to external factors (wind, waves, currents, tides, living organisms and humans).

The total length of the shores of the world is of 299,000 kilometers, 109,000 kilometers of which represents the shores of inner seas. The shores length does not depend on the size of the continent or of the country; therefore, Europe has an area of 10,000,000 km and shores of almost 38,000 kilometers, and Africa has an area of 30,000,000 kilometers and 30,000 kilometers of shores.

Europe is surrounded by nine sea basins: the Mediterranean, the Black Sea and the Azov Sea, the Caspian Sea, the White Sea, the Barents Sea, the Norwegian Sea, the Baltic Sea, the North Sea and the North Atlantic Ocean. Human activities are often concentrated in the coastal regions that are least able to assimilate these activities and where their adverse effects are most visible [1].

The main problems of the European coastal areas are: water pollution and eutrophication, loss of biological diversity, land use and landscape damage, salt water inflowing the drinking water resources and soil erosion and coastal erosion affecting global commercial activities.

Sea shores have also a direct influence on human development. In time, the local populations that were established around sea shores and that have invested in economic exploitation by means of soil fertilization were not always successful, as there are situations in which people were poisoned because they used the waters which were crossing these soils. One can appreciate that the waters of the subsoil close to the zero altitude, the reference point of seas and oceans, have, through their collection from the spring to their flow, a certain pollution level.

In terms of genesis, shores are subject to natural and anthropic factors and they are classified into two broad categories: high and low.

2. GLACIERS' MELTING CONSEQUENCES ON SHORES

Glaciers are enormous masses of persistent ice, formed in polar and high mountainous regions, which, under the influence of gravity, move slowly down the valleys or on slopes. They are the largest reservoirs of fresh water and their cumulative surface area is equivalent to the surface of South America.

Glaciers began to retreat all over the world at the end of the Little Ice Age (around 1850), but since a few tens of years, they began to melt at a rate that cannot be explained. The expected climate changes in the next century will further affect the rate of glaciers' melting.

The average world temperature will increase by 1.4 - 5.8°C by the end of the XXI century. By 1970, only in the Alps there was lost about one third of the glacier area and half of their volume. Dramatically, the phenomenon of floods caused by glaciers' melting illustrates the possible impact of the climate change at the local scale.

Although only a small quantity of the permanent ice of the planet is situated outside Antarctica and Greenland, glaciers are important because they respond immediately to the effects of climate change and their loss affects all the shores of the planetary ocean – also called the world ocean- and also its people and ecosystems. If the warming process continues at the same pace, glaciers' melting in the next century will cause devastating floods, the loss of several water reserves that benefit millions of people and rising sea levels will threaten to destroy entire coastal communities.

2.1. The Consequences of Sea Level Rise on Shores

The main reason of the sea level rise is represented by the extension of waters, as a consequence of the increase of water temperature - a simple physical phenomenon. The additional factors contributing to this increase are glaciers' melting and the melting of the ice cap, caused by the increase of air temperature.

The sea level rise which is due to climate change is not a negligible risk in the process of soil and sea shores erosion. Also, sea level rise could cause the flooding of coastal and littoral areas or even of coastal towns situated at the oceans and seas of the world.

However, the damage caused by the sea level rise may lead to the irreversible degradation of soil shores and to the degradation of several complex ecological systems (coral reefs, the arctic region, coastal wetlands).

The effects of the sea level rise may affect the good running of port activities. The vulnerability of port structures, built on sea and river shores, will have a negative effect and will constitute a threat to international economic life, the ports themselves being indispensable elements of international transportation activities.

The side effects of the degradation of the structure of world ports will be devastating in developing countries, due to their climatic and geographical conditions, to the high degree of dependence on natural resources from other continents and to their reduced capacity of adaptation.

2.2. Regional Differences

The sea level does not increase equally in all geographical regions. Therefore, in some regions it is expected that the sea level will rise more than in others, because the increase in water temperature in water layers (vertically) takes place in different stages. Independently of global warming, regional changes of the sea level can be caused also by continental movements. For example, the soil level from the deltas of certain rivers drops a few millimeters per year because the sediments are retiring. In these cases, an increase in the sea level intensifies the existing regional effects. In other regions, an increase of the sea level remains subtle, because the soil level increases with the same value, or even at a higher rate than the one of the increase of the sea level.

Over one quarter of the population of Africa lives at distances less than 100 km from the shore and the largest cities are located on the coast, being vulnerable to sea levels rise, soil erosion and shoreline erosion and to extreme weather events.

2.2.1. Asia

In Asia, extreme weather events have multiplied in the area of temperate climate, including floods, drought, spontaneous fires and tropical cyclones. Areas which are at risk include the sectors of agriculture, water and food resources, biodiversity conservation and natural resources management, coastal zones and infrastructure management. Sea level rise and the frequency of tropical cyclones will result in the displacement of tens of millions of people living in low areas along the coast, in areas with tropical and temperate climate from Asia.

2.2.2. Latin America

In Latin America, glaciers withdrawal will cause landslides in the coastal area and the reduction of water resources, particularly in areas where the water from the melting snow is vital. Coastal settlements, production activities, infrastructure and mangroves will be negatively affected by the rise of sea levels.

2.2.3. The Island States

In the Island States, the expected increase of the sea level by 5 millimeters per year over the next 100 years will cause the soil erosion of sea shores, which will deepen the poverty, will lead to the displacement of communities, to increased risks of flooding, to the reduced resistance capacity of coastal ecosystems, to salt water inflowing into the drinking water resources and to high costs for adapting to changes. Also the coral reefs will be negatively affected by the oxidation process and by the low calcification degree, caused by high levels of CO2; the mangroves, the phytoplankton and other coastal ecosystems, as well as the biodiversity associated to them, will be affected by the temperature increase and by the rapid rise of the sea level.

2.2.4. The European Shores

In order to know the European shores, we must know the geographical characteristics which are in a continuous evolution.

Our continent is surrounded by oceans and seas to the west, south and north, and it is closely related to the Asian continent through the Ural Mountains. Since it is surrounded on three sides by water, the European continent has the appearance of a large peninsula. The length of the continent from east to west is of 5600 km and from north to south, in a straight line, is of 3900 km. It has an area of 10,000,000 km^2 and a population of 700,000,000 inhabitants.

Europe is considered the cradle of a civilization of 5 millenniums, where illustrious thinkers who opened the era of large geographical discoveries lived. The cultural and civilizing influence of the Europeans was felt in all the corners of the Earth.

Seen within the continental unity of Eurasia, Europe has the appearance of a huge peninsula which goes forward into the Atlantic Ocean. It stretches from the Ural Mountains and to the Atlantic Ocean (the Roca Cape) and from the Mediterranean Sea to the Arctic Ocean (the Nordkyn Cape). From north to south, the continent is spanning on a distance of about 4000 km, and from west to east- for about 6000 km. Europe is entirely located in the northern hemisphere. The first meridian (the 0° meridian) passes in its western part.

European shores are strongly stripped, forming many large gulfs, islands and peninsulas. The northern part is bathed by the seas of the Arctic Ocean: the Norwegian Sea, the Barents Sea, and the White Sea. The White Sea goes deeply into the dry land, forming the Kola Peninsula.

The southern part of Europe is bathed by the waters of the Mediterranean Sea, the Black Sea and the Azov Sea. The Mediterranean Sea is differentiated in the following seas: Liguria, Tyrrhenian, Adriatic, Ionian and Aegean. The last one communicates with the Black Sea through two clutches: Bosporus and Dardanelles. The space between these two clutches is formed by the Marmara Sea.

The most important peninsulas in Southern Europe are: the Iberian Peninsula, the Italian Peninsula (Apennine), the Balkan Peninsula and the Crimean Peninsula.

The western part of the continent is bathed by the seas of the Atlantic Ocean: the Narrow Sea, the North Sea and the Baltic Sea.

The European maritime shores are also directly affected by the rise of the sea levels.

2.2.5. The Romanian Shores at the Black Sea

A separate problem is given by the effects of the heating process of Danube River. However, taking into consideration the wider space of the Danube Meadow, the climate has several particularities.

The climatic nuances that Danube has during its course (sub-Mediterranean influences until Zimnicea; transition climate between Zimnicea and Oltenița; climate with shades of aridity until Tulcea, climate with pontic influences in the Delta) belong to the surrounding regions and not to the course itself. However several climatic elements have defining characteristics, partly influenced by Danube and by the low meadow relief. The average annual temperature is, for the Danube Meadow, the highest in the country (over 11°C) due to higher average temperatures in July (24°C) and in January (-1°C in the south, -2°C in the Delta).

Tropical days, like those in the southern part of the Romanian Plain and Baragan, are softened by the higher humidity of the air, caused by the water evaporation along Danube, but also from its meadow (where the underground water is at the surface).

Precipitations decrease towards the east, with their regional decrease, and the prevailing winds (the Dry South Wind in the western part of the Romanian sector of Danube and the Icy North Wind in the eastern part) are considerably softened by the relief "shelter" of the Danube Meadow.

Precipitations produced on the European continent are largely collected by the Danube River and the floods caused by its increased flow from the last period primarily affected its banks. This illustrates the possible impact of the climate change at the level of each river-side country and for the most part, on our country, where Danube covers a considerable distance until it flows into the sea. Basically, the hydrographic level - the essential element of the physical and geographical characteristics- affects, in the most aggravating way, the Danubian banks on the territory of our country, where it has the greatest flow of its entire route.

Danube increases its flow (to over 900 mc./sec. at Patlageanca), largely because of the direct tributaries of our country (Nera, Cerna, Topolnita, Drincea, Desnatui, Jiu, Olt, Vedea, Arges, Ialomita, Calmatui, Siret, Prut).

The solid flow at the entrance to the Delta is of 58.7 million tons of alluvia per year, which are deposited on the territory of the Delta or in the sea.

The process of covering a long-shore area, on the one hand with the sediments brought by the sea, and on the other hand with objects deployed from the impacts, but especially from the mixture of sea water with the water of Siutghiol and Techirghiol lakes, could cause irreparable consequences by altering the salinity and, in general, of the very different physic-chemical properties.

Coastal structures will also suffer, at the time of their construction, if seismic events or their consequences, determined by the endurance of coastal soils are not taken into account.

3. REFERENCES

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