Considerations on Air Quality in South Dobrogea.
Analysis of Climatic Conditions and the Emission of
Greenhouse Gases

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Abstract

The specialized literature indicates that emissions of greenhouse gases, by their nature variable in time and space, are responsible for the emergence and manifestation of the phenomenon of climate change or global warming. It was found that with the increase in air temperature, wind event changes occur, atmospheric precipitations, extreme weather etc. These changes in the weather condition also put over time their mark on the health of people, actively participates in the destruction of ecosystems also bring serious damage to businesses in an area.

Key words: air, development, quality, environment, climate condition, greenhouse gas emissions, South Dobrogea.

JEL Classifications: Q50, Q54

The results of scientific research that focused on air quality confirmed and confirms theories regarding the greenhouse effect, phenomenon discovered by Joseph Fourier, since 1824. It is known that the natural greenhouse effect regulates the Earth's temperature maintaining living conditions, but also the fact that the temperature of the atmosphere increases, in the first place, due to accumulation of carbon dioxide – CO₂, methane – CH₄ and nitrous oxide – N₂O. This increase is made possible by the phenomenon of the heat storage in air. Appearance and quantitative variation of the layer is due, generally, to the activity of human society, nature responsible for the appearance of the phenomenon named, in the scientific literature, climate change or global warming. With increase in air temperature changes in weather are observed, such as the wind, of atmospheric precipitations, type and frequency of extreme weather events. It has been scientifically proven that the effects of air pollution are harmful to human health, and ecosystems, but bring different economic harm.

South Dobrogea territory by its geographical position in the South – East Romania, through appearance and low altitudes (70 – 250 m), through its specific climate and topoclimate fits in the semiarid temperate climate, with continental

The way of combination of climatic factors determines the values and rules of each meteorological element. For example, aquatic surface affects the climatic elements regime because the surface of the water is a constant source of air humidifier, due to the evaporation process with an effect of reducing air temperature in the lower layer of the atmosphere. Aquatic surface through the smooth appearance speeds up moving air resulting an intensity in the eastern wind, which decreases towards the inside of the plateau as a result of increased friction of the air moving with land surface. The Black Sea is considered a thermal moderator, because its climatic influence limits frequency of some climate risks due to extreme temperatures which intensifies, for example, wind that generates major storms. Regarding the spatial distribution and global solar radiation regime small differences are found, being highlighted the increase from south to north and from east to west, value differences due more to differences in relief, variation in atmospheric transparency (which depends on the variation of cloudiness, and this by the variation of the relative humidity of the air due to evaporation sources), the installation of fog etc. Layout of the isotherms reveals that the temperature increases slowly from the central-continental part to the west and east of the analyzed region. It can also be noticed that the value of the air temperature decreases with altitude towards the central and highest areas of the plateau. It is known that atmospheric air always contains water vapor, which gives air moisture forming hydrometeors and participate in determining the state of weather.

Regarding air humidity, cloud formation depends on its values, production and the amount of rainfall, air opacity, direct absorption of solar radiation, insolation regime etc. The amount of water vapor is closely linked to processes of evaporation and condensation which, in their turn, depend on the existence of water sources, their temperature and the movement of the air masses above them. On the territory of South Dobrogea average annual relative humidity values remain relatively high over 77%, and ongoing away from the seaside and the influence of sea they decrease sensitive. Characteristics and rainfall distribution depend directly on the nature of air movement, thus explaining local differences. The amount of rainfall is influenced by the Black Sea, by the Danube at a smaller scale, by the layout in increments of relief subject to more continental influences. The spatial distribution shows a gradual decrease of the annual average rainfall from the southern to the northern region analyzed both by the sea as well as along the Danube, and from east to west increases ongoing away from the Black Sea. Also the analysis of the values of air pressure indicates that within the South Dobrogea plateau there is a gradual decrease with the increase of relief altitude, different heating of the adjacent underlying surface are causes of differences in atmospheric pressure recording, differences underlying local air movements, for example the breeze type developed on the eastern side of the plateau. Regular local air movements are recorded even in the eastern region, on the side of Danube, but are
much lower compared to the coastal, of course, due to the smaller extension of the surface water compared to aquatic sea surface.

Regarding the generating sector of the emissions of greenhouse gases, in South Dobrogea, this is due to sources related to the activities of human society. For example, carbon dioxide is emitted by the electricity and thermal industry (production activity), mining (Black Sea continental shelf), petrochemical industry (refining and processing of crude oil), plastics industry, densely populated areas and transport activity. The emission of methane is due to agriculture (livestock, changing land use), existence of bulk goods storage areas, of organic materials and decomposing plants and waste, and nitrous oxide emissions due to heating homes (use of fossil fuel at burning and biomass), agriculture (use of nitrogen fertilizer), and road transportation. In terms of percentage activities responsible for emissions of greenhouse gases has the following structure: 35% production and distribution of electricity and heat, 30% remaining industries, 20% transport activity and 15% living sector and other activities. Annual emissions (in tons per year) of greenhouse gas are calculated in order to highlight those emissions causing the increase in air temperature at the earth's surface (Fig.nr.1).

![Figure 1](image)

**Figure 1 Annual emissions (in tons per year) of greenhouse gas**


Measures required to prevent and mitigate the effects suppose financing the reforestation, reducing the polluting effects, modernization of agricultural works, measures to improve soil, raising awareness and educating people to...
achieve environmental protection. The most important actions and measures taken by the South Dobrogea territory are related to the location of wind farms and photovoltaic parks for power generation (being used in this way renewable sources, wind and solar radiation), replacing fossil fuel of fuel oil type or CLU with low-carbon fuels, respectively natural gas at the thermal power plants.

Climatic implications are already manifesting by extreme events such as: increased frequency, intensity and rapid alternation of extreme phenomena such as storms, heavy rainfall, coastal flooding; severe heat and accentuated drought; direct and indirect consequences on agriculture and the overall state of the environment; loss of human lives due to heat wave; altered meanings of traditional seasons.

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