

# Air pollution and global warming

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**RÉSUMÉ:** Dans l'article en question nous essayons de mettre en évidence et d'éliminer certaines ambiguïtés, souvent rencontrées dans la littérature de spécialité, concernant la définition de la notion de „pollution”, et de contribuer à la compréhension des causes du soi-disant „réchauffement global” et de sa manière de se manifester. En ce qui concerne la pollution, nous considérons qu'elle est causée seulement par des éléments nocifs résultés à la suite de l'activité humaine, de la société humaine, éléments qui ont pénétré dans le milieu naturel ce qui a détérioré ses qualités spontanées (voir aussi V. Tufescu, dans Petit dictionnaire encyclopédique, 1978). Les gaz et les cendres volcaniques, les gaz résultés à la suite de la décomposition des substances organiques, le pollen et les spores etc., ne sont pas des éléments polluants, ils font partie intégrante de la composition atmosphérique, de la lithosphère et de l'Océan Planétaire. On ne peut pas parler de pollution sur la Terre avant de l'apparition de l'homme, de la diversification de son activité. En ce qui concerne le réchauffement global, il ne peut être provoqué que par l'énergie du Soleil, qui l'a coordonné dès l'apparition de la Terre en tant que planète, mais aussi par la désintégration radioactive et l'interconditionnement réciproque des processus et des phénomènes qui ont lieu entre l'atmosphère terrestre et l'Océan Planétaire. L'effet de serre peut avoir un rôle mineur, de courte durée, local et, tout au plus, régional. On a constaté que la succession de certaines périodes plus froides avec d'autres plus chaudes de l'évolution géologique de la Terre ne correspond pas à la variation de la concentration de CO<sup>2</sup> de l'atmosphère. Il ne faut pas, quand même, exclure certains effets négatifs sur le milieu naturel dûs à l'augmentation, sur des durées différentes, de la concentration du CO<sup>2</sup> dans l'atmosphère, au-dessus de la limite normale (0,033%).

**KEY WORDS:** air pollution and global warming, causes, definitions.

## 1. Related to pollution

The term derives from the Latin word “polluere”, to which many meanings are attributed: to pollute, to befoul, to stain, to bespatter.

At the United Nations Conference on the Human Environment, Stockholm – 1972, pollution was defined as “the modification of natural components in the presence of foreign components, called pollutants, as **a result of human activities**, and which through their nature, concentration or time of action cause **harmful effects to health, create discomfort or prevent the use of environmental components essential to life...**”. At the mentioned Conference there was determined the existence of primary and secondary pollutants, and the notion of noxa, as being a harmful action, or a physical, chemical or biological agent with harmful action. Also, the differences between biodegradable and non-biodegradable pollutants and smog, acid rain and radiations were defined.

In the last decades, as revealed by many studies (dictionaries, articles on the environment, university courses, textbooks and, especially, from popularization in magazines and free press), the notion of pollution and its causes are, often, explained differently, comprehended ambiguous, presented confusing. For example, in the dictionaries made by Neacșu and Zoe Stoicescu (1982), Ciulache and Nicoleta Ionac (2000), Grozavu and Kocsis (2005), it is considered that every substance that pervades in the environment and has undesirable effects is polluting, including the substances that belong to the natural environment (volcanic ashes, the desert sand during a dust storm etc).

A similar concept is also found in *Geografia mediului inconjurator (Geography of the Environment)* (Roșu and Irina Ungureanu, 1977); to quote: “To the natural sources of air pollution (soil erosion, earthquakes, volcanism, the decomposition of organic matter), by means of which the atmosphere receives dusts, ashes, water vapors, gases (carbon dioxide, methane, hydrogen sulfide, ammonia, sulfides, mercaptans), pollen and spores etc., the modern society and its technical-productive dowry added a multitude of artificial sources, harmful both on the aspect of toxicity of the products emitted, and also on the quantity, persistence and the possibilities of dispersion” (p. 167).

In *The Encyclopedic Dictionary of Physical Geography* (SUA, 1985) and in *Le Petit Larousse* (Paris, 1994) there appear opinions on pollution belonging to several authors, emphasizing, in general, the pollutant role of the anthropogenic natural factors. Pollution is defined here, in general, as a degradation of the natural environment through the intervention of noxious factors, such as chemicals, industrial waste etc.). There are mentioned, however, authors, such as Mellanby (1972), who talks about natural pollutants, like volcanism.

We also retain two definitions where it is pointed out that pollution is due to artificial factors only (anthropogenic). These are found in *Micul dictionar encicopedic (Little Encyclopedic Dictionary)*, Bucharest, 1978), the definition belonging to V. Tufescu, where it is specified that pollution is contaminating air with gases, steam, solids of **artificial provenance** and of surface water and groundwater with **domestic wastewater, industrial** etc., and also in *Dictionarul de termeni fizico-geografici (Dictionary of Physical-Geographical Terms)*, Brânduș and collab., 1998), where the contamination process (degradation of geographical environment) is the result of **human activities**.

In our opinion, pollution has to be understood as a dirty work, vitiation, degradation of the natural environment due to activities led by human society. Volcanic eruptions, wind storms of dust and sand, decomposing of dead organic matter etc., are natural processes, physical and chemical, on Terra, which led to the appearance and the evolution of the geographic scenery itself throughout the geographic periods. **Consequently, we cannot speak of pollution on Terra before the appearance of man, before the diversification and intensification of activities led by the human society. In our conception, humans are the only manufacturers of waste, the only pollutants on Terra.**

## 2. Concerning the global warming

Ambiguities mentioned above regarding the understanding of “pollution” in general, or of air pollution in particular, or regarding the causes of pollution, whether natural or anthropogenic, might explain, to some extent, the erroneous understanding, of the so called “global warming”, a phrase often used today. We believe that the erroneous understanding of the process of global warming is due to, in the first place, the absolutization of the role played by the “greenhouse effect”, which has a local importance, and not taking in the account properly the role played by the radioactive disintegration inside the Earth on the paleo-evolution of the terrestrial climate and, especially due to ignoring the determinant role of the Sun in all the physical-chemical processes on Terra, respectively the insufficient knowledge of mutual inter-relationships of the phenomena and processes that take place in and between the Earth atmosphere and the Planetary Ocean.

The greenhouse effect was mentioned at the end of the 19<sup>th</sup> century by Chamberlain and Arrhenius, who found out that the CO<sub>2</sub> from the atmosphere absorbs much of the infrared radiation issued by the terrestrial crust, not allowing it to get lost in the outer space, a partial returning to the crust, contributing to heating. In the last decades the greenhouse effect has been paid a special attention, being permanently reported to the increase of CO<sub>2</sub> in the atmosphere, a consequence of the constantly increasing consumption of fossil fuel (coal, oil, natural gas) by human society.

Currently it is known that the regional and global warming of the Earth climate, that alternated with cooling periods, were recorded quite frequently throughout its paleographic evolution, warming and cooling periods that didn't depend on the variety of CO<sub>2</sub> amount in the atmosphere.

According to the American author Holand (1983) it is the interaction between radioactive disintegration (Endogenous cycle) and nuclear reactions in the Sun (Exogenous cycle), interaction in which the Sun has the main role, which are responsible of the history of natural phenomena on Earth and, of course, of the climate changes on a global scale.

A conclusive example in support of this opinion is the climate variation during the Holocene period in Europe, a period of time of about 10,500 years, when we can't talk about an increasing amount of CO<sub>2</sub> in atmosphere due to human society (see *Holocene Chronology*, The Blytt and Sernander, 1898), a period when it was remarked a cold subarctic-climate (in Pre-boreal, from 9,500 BC), warm and dry climate (in Boreal, from 9,000 BC), warm and moist climate (in Atlantic, from 6,000 BC), warm and dry climate (in Sub-boreal, from 3,800 BC) and cold and moist climate (in Sub-Atlantic, from 800 BC).

The decisive role of the Sun also results from the influence of the episodic solar cycles on the terrestrial climate, as well as from the fact that (according to some researches) in Riss-Wurm interglacial the air temperature was higher with 4- 5 degrees C in Canada and with 9 - 14 degrees C in Siberia than in the present, a period when CO<sub>2</sub> values were lower, estimated at approx. 300 p.p.m.

Regarding the variation in time and space of CO<sub>2</sub> amount in Earth atmosphere it is known that: - through photosynthesis a part of the CO<sub>2</sub> quantity located in the atmosphere is fixed into green plants; - through decomposing of dead organic matter CO<sub>2</sub> is released in the atmosphere; - through burning of fossil fuels humans determine the increase of CO<sub>2</sub> in the atmosphere; - the volcanic eruptions bring appreciable amounts of CO<sub>2</sub> in the atmosphere; - a part of the CO<sub>2</sub> found in the atmosphere dissolve in water through rainfalls (especially at high temperatures) and, mostly, in ocean and marine waters, where it is fixed through photosynthesis (by phytoplankton) These

processes are still going on, making difficult the assessments regarding to quantitative, local, regional and global evaluation of CO<sub>2</sub>.

Some aspects concerning this variation of CO<sub>2</sub> quantity in the atmosphere are tackled by Holand (1983). He states that photosynthesis is extremely fast, both on land (on green plants), and in the Planetary Ocean (due to phytoplankton); however, accurate answers about the photosynthesis rate are difficult to give. From some researches it results that approximately 7% of the CO<sub>2</sub> found in the atmosphere is converted annually through photosynthesis in organic matter on land, and in the Planetary Ocean another 4%, therefore a total of 11%. If from this quantity of CO<sub>2</sub> nothing would return back into the atmosphere, in one form or another, the whole quantity of CO<sub>2</sub> from the atmosphere would be exhausted within 9 years, and the whole quantity of the CO<sub>2</sub> from the atmosphere would be recycled in almost 10 years.

It's known that the burning of fossil fuels by man results in CO<sub>2</sub> which doesn't contain isotope C<sub>14</sub>, a reality that allowed effective measurements on the increase of CO<sub>2</sub> content in the atmosphere resulted by burning fossil fuels, especially in the 19th and 20th centuries, along with the industrialization period. According to some assessments, the average content of CO<sub>2</sub> in the atmosphere in the pre-industrial period was approximately 190 p.p.m in volume, in 1970 was of 325 p.p.m, and in present the estimation is 440 p.p.m.

Regarding the variation in time and space of air temperature, respectively of Earth climate, it is necessary not to lose sight of other causes, such as the change of thermohaline circulation in the Planetary Ocean mass of water, raising and lowering its general level, as well as the "El Nino" and "La Nina" phenomena, that with their variation can determine regional and global climate changes (Bălțeanu and Mihaela Șerban, 2005).

In this context, some questions emerge, for example: - is the proportion of the CO<sub>2</sub> content of the Earth atmosphere currently increasing and in what extent? -- how does the content of CO<sub>2</sub> vary in time and which are the causes? - can there be a greenhouse effect on a global scale due to the increase of CO<sub>2</sub> content in the atmosphere? The answers we can give now cannot be other way but partial. Considering the complexity of these causes and processes, the global warming caused by the greenhouse effect still includes more questions without answers, or answers that are incomplete or unsatisfactory.

From our point of view, we consider that the greenhouse effect caused by the temporary increase of CO<sub>2</sub> content in the atmosphere can be produced only at the local level, rarely regional, with insignificant durations of time, in the sense that it cannot conduct to spontaneous changes of natural vegetation layer. This opinion does not exclude the possibility of some negative effects on the natural environment, on human life, emerging from the increase (even temporary) above the normal concentration (of 0.033%) of CO<sub>2</sub> in the atmosphere.

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