By JOB TOLENTINO JUNIOR (PhD)
E-MAIL: jobtjr2000@yahoo.com
ORCID: http://orcid.org/0000-0002-8054-3237

PRELIMINARY STUDIES ON DIVERSE THEMES

By JOB TOLENTINO JUNIOR (PhD)

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E-MAIL: jobtjr2000@yahoo.com
ORCID: http://orcid.org/0000-0002-8054-3237

PRELIMINARY STUDY ON THE ECONOMIC PARTNER CONTEXT OF CO_2 EMISSIONS IN THE EARTH ATMOSPHERE.

Author: Job Tolentino Junior [1, 2, 3, 4, 5, 6]

1 – ORCID: http://orcid.org/0000-0002-8054-3237
2 – Centro Universitario Redentor (UNIREDENTOR – Itaperuna/RJ)
3 – Centro de Tecnologia Mineral (CETEM-RJ) / Laboratório de Argilas Aplicadas (LAA)
4 – Universiade Federal Fluminense (UFF) / Núcleo de Pesquisa e Extensão em Educação e Saúde Comunitária (NUPEESC)
5 – Universidade Federal Fluminense (UFF) / Grupo Saúde Integral da Mulher e do Recém Nascido
6 – Universidade Federal Fluminense (UFF) / Escola de Enfermagem Aurora de Afonso Costa (EEAAC/UFF) / Curso de Controle de Infecção em Assistência À Saúde (CIAS)

Abstract

Understanding the factors that lead to release into the Earth's atmosphere of carbon dioxide (CO_2), and how this atmosphere reacts to this rate of release are complex factors to be understood. In this preliminary study these topics are addressed, reviewed and criticized as well as the solutions proposed and applied by nations in different parts of the globe.

Keywords: CO_2; Rate; Heating; Atmosphere

By JOB TOLENTINO JUNIOR (PhD)
E-MAIL: jobtjr2000@yahoo.com
ORCID: http://orcid.org/0000-0002-8054-3237

I - Introduction

Carbon dioxide (CO_2) emissions on planet Earth have two origins: natural or anthropogenic. This growth has been strong in the last decades, which can be seen in the reports of the Intergovernmental Panel on Climate Change (IPCC). Currently the concentration of CO_2 in the atmosphere is around 387 ppm (0.0387%), with daily seasonal variations (by the anthropic part) and with localized pollution peaks. Ha 2.1 million years ago, atmospheric CO_2 content has never been so high. (Economic Affair Committe 2005).

The concentration of CO_2 in the atmosphere has increased since the late nineteenth century and the rate of this increase accelerated at the end of the twentieth century, from 0.5 ppm per year in 1960 to 2 ppm per year in 2000 (presenting a minimum value of 0, 43 in 1992 and a maximum of 3 ppm in 1998).

As of the year 2000, the annual rate of increase has only changed (IPCC AR4 SYR 2007) and global anthropogenic emissions have been growing every year. In 2007 CO_2 emissions were twice as high as in 1971 (IPCC AR4 WG1 2007).

In 1990, 20878 Gt / year of CO_2 was emitted and in 2005 it was 26402 Gt / year, an increase of 1.7% per year during this period. The combustion of one liter of gasoline generates 2.3 kg of CO_2 (IPCC AR4 WG2 2007) and that of one liter of gas oil 2.6 kg of CO_2. Although the Kyoto Protocol has been applied in some countries since the 1990s, carbon dioxide emissions have continued to increase. (IPCC AR4 WG3 2007) In 2008, third world countries accounted for more than 50% of global emissions, but partly due to the production of goods for first world countries (which represent 80% of the world's population, but only 20% of world emissions released from 1751 until the year 2007).

Due to non-compliance with the Kyoto Protocol in 2009, the Copenhagen Summit was held (the 2009 United Nations Conference on Climate Change), which was attended by 119 world leaders with the objective of reaching a pragmatic agreement on changes climate change and CO_2 emissions (IPCC TAR SYR 2001).

According to International Energy Agency projections, CO_2 emissions will increase by 130% by the year 2050. (IPCC TAR WG1 2001) The estimated and necessary investment to halve emissions and thereby develop an "international revolution in energy technologies "would be $ 45 billion by 2050.

II – CO_2 Emissions.

It is a fact that CO_2 emissions are usually accompanied by various emissions of various aerosols (of soot, smoke, heavy metals and other contaminants) that directly and indifferently affect most living organisms, the effects of nanoparticles are still the subject of studies.

In homeothermic animals CO_2 is not toxic at low doses, unlike carbon monoxide (CO), but kills by asphyxiation from a certain concentration threshold and a certain exposure time. Its chemical properties become able to rapidly cross various types of biological membranes (because it is approximately 20 times more soluble in human body fluids than oxygen), and therefore

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E-MAIL: jobtjr2000@yahoo.com
ORCID: http://orcid.org/0000-0002-8054-3237

produces rapid effects on the central nervous system. In humans, CO_2 is only toxic at concentrations above 0.1% (1000 ppm) (IPCC TAR WG2 (2001); IPCC TAR WG3 2001; IPCC SRES 2000). From this limit CO_2 becomes one of the factors of asthma. This concentration is the maximum allowed for the design of air conditioning systems within buildings and houses. Above 0.5% (5000 ppm), it is the maximum occupational exposure allowed in most countries, and also the maximum allowed in aircraft air conditioning equipment designs. And therefore it should not be exceeded. From 1.5% (15000 ppm) is the maximum occupational exposure for a time of up to 10 minutes. The threshold of irreversible health effects (the minimum threshold for the immediate evacuation of the premises) is reached from 4% of CO_2 in the air (40000 ppm). Of 10% in an exposure greater than 10 minutes without a rapid resuscitation device, death occurs. Our respiratory and circulatory system is very sensitive to CO_2 concentrations. A small increase in CO_2 concentration in the inspired air accelerates the respiratory rate almost immediately. This rate, which is normally 7 liters per minute (with 0.03% of CO_2 in inspired air), increases to 26 liters per minute (with 5% CO_2 in inspired air).

In low-dose plants, CO_2 stimulates growth, but greenhouse experiments and a natural environment enriched with CO_2 have shown that this is only valid to a certain extent, beyond which growth remains relatively stable or even decreases. This threshold varies according to the species of plants considered. It is not known whether this effect is long-lasting. After a few years, the phenomena of environmental acidification can act in the opposite direction (IPCC SAR WG1 1996).

Anthropogenic CO_2 emissions from anthropogenic sources tend to have well-known sources. It is the means of transport that use petroleum based fuels (otto, brayton or wankel cycle internal combustion engines). There are also large industrial parks and factories, although it is estimated that the air pollution produced by the vehicles is larger.

On the nature side, the highest CO_2 emissions occur when there are forest fires, and also during volcanic eruptions (especially those that had certain volcanoes for millions of years), eventually altering the Earth's climate.

The possible consequences are mainly: the contamination of the oceans, which leads to the acidification of the sea, affecting many species; and air pollution, which results in the greenhouse effect (IPCC SAR WG3 1996).

China has surpassed the United States of America (USA) as the largest emitter of CO_2 since the year 2009, mainly due to the proliferation of coal-fired power plants. However, this is also the most populous country in the world and its CO_2 per capita rate is much lower than that of the USA, Canada, Australia, the Netherlands, Russia, Germany. Currently, the ten countries that emit the largest quantities of CO_2 in the atmosphere (in millions of tonnes per year) are:

China (10684.29 MT of CO_2 representing 22.44% of total issued);

USA (5822.87 MT of CO_2 representing 12.23% of total emitted);

EUROPEAN UNION (4122.64 MT of CO_2 representing 8.66% of the total issued);

INDIA (2877.68 MT of CO_2 representing 6.06% of total issued);

RUSSIA (2254.47 MT of CO_2 representing 4.73% of the total emitted);

INDONESIA (1981 MT of CO_2 representing 4.16% of total issued);

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ORCID: http://orcid.org/0000-0002-8054-3237

BRAZIL (1823.15 MT of CO_2 representing 3.83% of the total emitted);

JAPAN (1207.30 MT of CO_2 representing 2.53% of total issued);

CANADA (856.28 MT of CO_2 representing 1.79% of total issued);

MEXICO (748.91 MT of CO_2 representing 1.57% of the total emitted).

Oceanic and marine environments as a whole absorb one-third of the CO_2 emissions produced by emissions produced by human society. Thus 9x109 tons of CO_2 became part of the marine environment in 2004 and since the beginning of the industrial era a total of $120x10^9$ tons of CO_2 due to the combustion of fossil fuels.

The massive contribution of CO_2 in the oceans causes a decrease in the pH of the water, making it more acidic, reducing the concentration of carbonates and affecting the marine ecosystem, as it is one of the essential components in the calcium carbonate ($CaCO_3$) system used by crustaceans and Clams to make your limestone exoskeleton. Acidification of sea water has an immediate effect on several species. The discoloration of the corals is linked to a decrease in calcification, but also in the North Atlantic the explosion of coccolithophors under the effect of light due to a higher partial pressure of atmospheric CO_2.

Acidification has a greater effect on cold water than on hot seas. At the end of the 21st century, calcification will become impossible in the Antarctic Ocean and Antarctic coast, making it impossible to manufacture aragonite (a form of limestone found in the bark of gastropods), which are the basic diet of zooplankton (a staple food of many fish and marine mammals).

One of the consequences of global warming is the possibility of blocking (or slowing down) ocean circulation. If the ocean currents stop circulating, the surface layers of the water will be saturated with CO_2 (and will no longer be able to absorb it as it is today).

It is known that the amount of CO_2 that a liter of water absorbs decreases, as the water temperature increases. Thus, atmospheric CO_2 can accumulate faster if ocean water does not circulate according to current standards. However, the hypothesis of a rupture of certain ocean currents is considered "highly unlikely" in the 2007 IPCC report.

III – CO_2 Emissions by country.

The Netherlands Environment Agency conducted a study where it was made in an initial estimate of 31.6 million tonnes of CO2 released in 2008, including 7.55 million from China and 5.69 million from the United States (decreasing because of the economic crisis of 2008). In this study, several factors explain how CO_2 emissions are linked to the socioeconomic profile of the country.

For the United States it can be said that the country is vast (the third in the world in the world in area), because they are a country as big as the whole European continent. This causes great energy consumption in transport. The daily movement of the passenger is based on cars, while rail transport is limited to consumer goods. Urban sprawl also leads to high fuel consumption. The country is very populous (it is 167 in population density), but the third in population (only behind China and India), and has a high standard of living, which implies a high expenditure on emissions. As complicating factors, it can be observed that certain zones of the country present a great thermal amplitude (they occur in summer heat waves in some regions whereas in other regions it reaches temperatures well below 0°C. The deserts of the west present points of high concentration of population (such as the cities of Phoenix and Las Vegas). The use of

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E-MAIL: jobtjr2000@yahoo.com
ORCID: http://orcid.org/0000-0002-8054-3237

air conditioning is very widespread, which increases energy expenditure. When winter is less severe, the production of greenhouse gases declines (as observed in winter in 2006, according to the USA Energy Information Agency's CO_2 emissions, leading to a decrease of 1.3% in 2006. The USA is a major producer of capital goods (the country produces almost fourth of all the riches of the planet).

China is experiencing rapid industrial and urban development, leading to increased air pollution, especially in large urban agglomerations in China. China emits more CO_2 (6.2 Gt) than the United States since 2006 (5.8 Gt) (Stern 2015). This large increase is linked to its population of approximately 1,350,000,000 people, or 4 times more than the United States of America. As of 2010 it has become the world's largest exporter of consumer goods. The standard of living has improved and economic growth is faster than in the United States and other countries.

Nevertheless China is also a developing country. They are in agreement with other countries (the developed countries) that must act with priority, since they have a historical responsibility in the increase of the present concentrations of gases of greenhouse effect. Germany produced 3% of global CO_2 emissions in 2007 and in June 2008 approved the second part of its climate plan, a comprehensive program to reduce its CO_2 emissions by 40% by 2020 compared to 1990. This series of measures, primarily focused on energy economy and a decisive commitment to renewable energy, is summarized as follows: increased taxes on heavy freeway transportation from 13.5 to 16.2 cents per kilometer, and up to 28 cents for the most pollutants; increase in the extension of the electricity distribution network produced from wind in the North Sea and on the Baltic coast; modification of building standards for new buildings in order to reduce their energy consumption by 30%; encourage the creation of current "smart" meters to better assess private energy consumption.

IV – Containment policies and emission controls.

The policies of containment and control of emissions pass through the awareness, education and training, with the objective of implementing a more sober and rational behavior of the individual and society. Necessary subsidies, voluntary obligations or compensatory measures, or restoration or conservation measures, possibly based on eco-tax systems, are the most commonly used tools from the 1990s to the present (2017). Approaches vary: donation, voluntary support for carbon consumption, behavior and sustainability, and allocation of carbon credits (quota system) (US NRC 2001).
Quotas and the market for pollution rights are more recent. They are based on the "classic" mechanisms of economics and the market. Individual card programs are being studied or tested locally (ROUSSEAUX 2009). They consist of measuring the environmental impact of individuals by encouraging them to mitigate or reduce the total (in terms of overall assessment) through compensatory measures. These cards generally (quantitatively and possibly qualitatively) are responsible for personal emissions, to encourage the individual, for financial instruments (premiums, fines for the amount of greenhouse gas emissions in the individual ecological class). In 2009, dozens of credit cards were able to provide more detailed monitoring of emissions, with voluntary contributions to some NGOs.

Monitoring of CO_2 emissions is currently done by several countries (including the USA). These countries carry out measurement procedures, however these are aimed at the whole planet and not at individual countries. Measurements by country are more common in Europe.

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ORCID: http://orcid.org/0000-0002-8054-3237

The geographic breakdown of CO_2 allowances in Europe is as follows: Germany with 23% of the total; United Kingdom with 11% of the total; Italy with 11% of the total; Poland with 11% of the total; Spain with 8% of the total; France with 7% of the total; the others with 29% of the total.

The Kyoto Protocol is a UN Protocol on Climate Change (UNFCCC) and an international agreement to reduce emissions of six global warming gases: carbon dioxide (CO_2), methane (CH4) and oxide (CFN) and sulfur hexafluoride (SF6), at an approximate rate of at least 5% over the period 2008 to 2012 compared to the 1990 emissions.
The protocol was initially adopted on December 11, 1997 in Kyoto, Japan, but did not come into force until February 16, 2005. In November 2009, 187 states ratified the protocol. The United States, the largest emitter of global greenhouse gases on that date, did not ratify the protocol.

The instrument is part of the United Nations Convention on Climate Change (UNFCCC), signed in 1992, within the so-called Earth Summit in Rio de Janeiro. The protocol has given binding force to what the UNFCCC could not do at that time.

V - Conclusions

It is possible to conclude from the exposed and discussed panorama that the interests tied to the emissions of gases that can lead to global warming are numerous. All these interests are directly tied to the economic power of their countries.

Thus, the vision of a clean and healthy atmosphere is being considered as a new commodity. And this way attributed to this economic value.

Certainly emissions control and emission reduction policies will avenge if countries and their populations consider this commodity as something to be valued financially. And in this way open or close doors to international free trade. In isolationist or even unstable scenarios (which may lead to armed conflict), these protocols and their good intentions will be placed in the background.

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By JOB TOLENTINO JUNIOR (PhD)
E-MAIL: jobtjr2000@yahoo.com
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