WHY IS POLLUTION STILL A PROBLEM?

E. Banu; M. Carpaciu; G. Manea; A. Dinca; N.Ochioiu; I.Plesa;
A. Raducan; L. Stan; D. Stanciu

POLITEHNICA University of Bucharest, e-mail: ldstanciu@yahoo.com

ABSTRACT

If we would try to gather all the pages written about pollution maybe we would have one of the largest books ever written. We hear about pollution on the radio, see its effect on TV, read about it in the papers, magazines, books. But is this enough? We have to talk about the results of our projects in protecting it. We have to stand up and take care of something that gave everything to us, of something we depend so much on. Nature is supposed to be our priority, to be the first thing we are thinking of when we are about to do something. Although the difference between human race and other beings is intelligence, men don't prove it by acting to his bad. Man has the possibility to choose in life. So man choused to focus his attention on developing technology, to make things as comfortable as possible for him.

Maybe this is the problem! Maybe man wasn't concerned enough about his future. He didn't evaluate the consequences that his facts could have upon nature. So as we are part from nature, it affects us too.

We take the resources materials we need from nature. We respond nature with pollution. We take what is good and we give in return what is bad: we think about today, but we forget to think about tomorrow. And if we do think about it, we show no interest on damages that could be tomorrow.
Maybe this is the respect that we have for ourselves, for each other, for environment.

INTRODUCTION

Industrial processes from the past and present have a bad influence over the environmental conditions local and global. The lack of an adequate control of pollutant emissions caused the creation of polluted areas in Romania. Because the problems regarding environment protection started being a priority for Romanian authorities, also because of the next integration into the EU structures, we propose, through this paper work, to meet this request by providing a large scale of information in the environment protection field.

Air pollution in the urban zone, acid rain and toxic emission are in the governments and peoples all over the world attention.

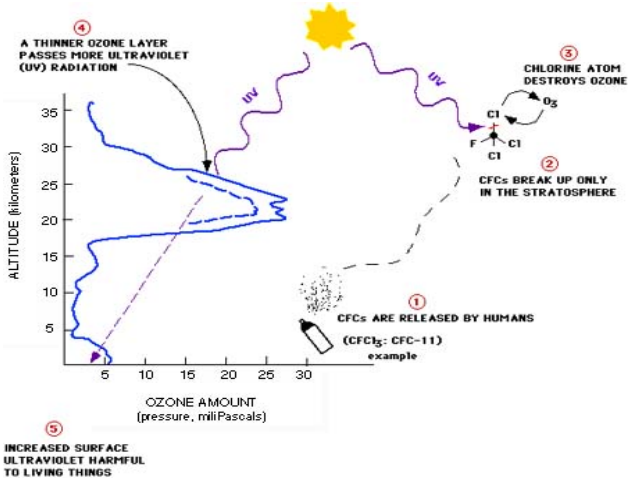
Most of the countries understood the importance of limitation and quantification of quantity of the polluted substances, like: ozone, carbon oxides, sulphur dioxide, nitrous oxides and heavy metals, which are released in the atmosphere.

International and national legislation includes pollution control. Testing's necessity of pollution level in water, ground and air should be a more important in production process. The tests should measure with high precision the level of volatile organics substances and other polluted elements.

HOLES IN THE OZONE LAYER

What is ozone and how is it formed? Ozone holes aren't like doughnut holes; they're not empty spaces in the sky. Ozone holes are much like the worn-out places in an old sock or sweater: there are still threads covering the worn-out area, but the fabric can be so thin you can see right through it. In the stratosphere, the region of the atmosphere between about 10

and 50 kilometers above the Earth's surface, ozone (O_3) plays a vital role by absorbing harmful ultraviolet radiation from the sun. Ultraviolet radiation may cause skin cancer and cataracts. Stratospheric ozone is threatened by some of the human-made gases that have been released into the atmosphere, including those known as chlorofluorocarbons (CFCs). Ozone in the Earth's atmosphere is generally created by ultraviolet light striking oxygen molecules, which consist of two oxygen atoms (O_2), creating two single oxygen atoms, known as atomic oxygen. The atomic oxygen then combines with a molecule of O_2 to create ozone, O_3. The ozone molecule is also unstable and when hit by ultraviolet light it splits into a molecule of O_2 and an atom of atomic oxygen, a continuing process called the ozone-oxygen cycle, thus creating an ozone layer in the stratosphere.



Chlorofluorocarbons and Ozone depletion: CFCs are used in a variety of industrial, commercial, and household applications. These substances are non-toxic, non-flammable, and non-reactive with other chemical compounds. These desirable safety characteristics, along with their stable thermodynamic properties, make them ideal for many applications, as coolants for commercial and home refrigeration units, aerosol propellants, electronic cleaning solvents, and blowing agents.

Unfortunately, it will be a long time before we see the ozone layer repaired.

Environmental effects of ozone depletion:

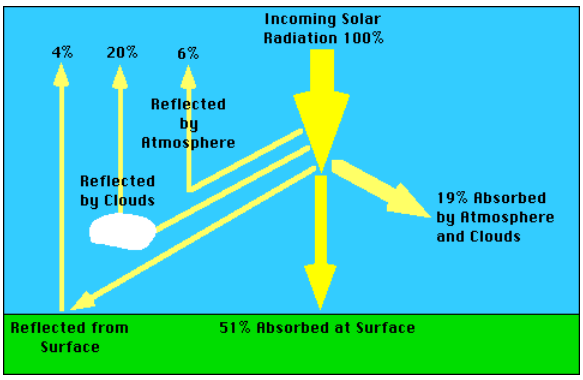
Several possible Ultraviolet-B Effects on Terrestrial Plants have been investigated, including reduction in yield, alteration in species competition, decrease in photosynthetic activity, susceptibility to disease, and changes in plant structure and pigmentation.

Most field studies of Ultraviolet-B Effects on Aquatic Ecosystems. Phytoplankton are sensitive to increased UV-B doses, resulting in decreased mobility and orientation, and changes in photosynthetic and enzymatic reactions.

Global climate may also be influenced by Changes in Tropospheric Chemistry. Studies have suggested that the recent slowdown in the rate of increase of methane levels in the atmosphere may be due, in part, to increased UV-B irradiance in the lower atmosphere.

GREENHOUSE EFFECT

Atmospheric scientists first used the term 'greenhouse effect' in the early 1800s. At that time, it was used to describe the naturally occurring functions of trace gases in the atmosphere and did not have any negative connotations. It was not until the mid-1950s that the term greenhouse effect was coupled with concern over climate change. And in recent decades, we often hear about the greenhouse effect in somewhat negative terms. The negative concerns are related to the possible impacts of an enhanced greenhouse effect. It is important to remember that without the greenhouse effect, life on earth as we know it would not be possible.



While the earth's temperature is dependent upon the greenhouse-like action of the atmosphere, the amount of heating and cooling are strongly

influenced by several factors just as greenhouses are affected by various factors.

In the atmospheric greenhouse effect, the type of surface that sunlight first encounters is the most important factor. Forests, grasslands, ocean surfaces, ice caps, deserts, and cities all absorb, reflect, and radiate radiation differently. Sunlight falling on a white glacier surface strongly reflects back into space, resulting in minimal heating of the surface and lower atmosphere. Sunlight falling on a dark desert soil is strongly absorbed, on the other hand, and contributes to significant heating of the surface and lower atmosphere. Cloud cover also affects greenhouse warming by both reducing the amount of solar radiation reaching the earth's surface and by reducing the amount of radiation energy emitted into space.

Scientists use the term albedo to define the percentage of solar energy reflected back by a surface. Understanding local, regional, and global albedo effects is critical to predicting global climate change.

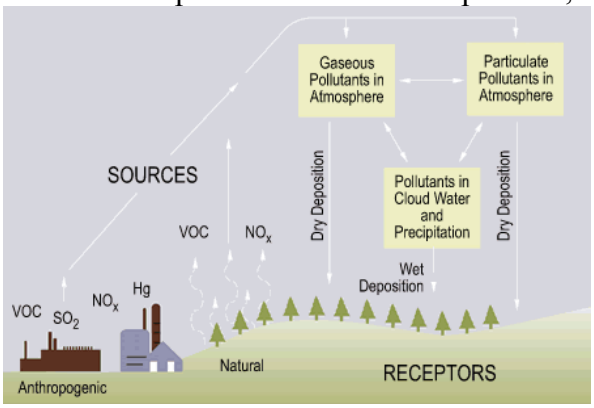
The natural greenhouse effect is a phenomenon created by the heat energy radiated by the sun and greenhouse gases normally present in the atmosphere. In simple terms, sunlight passes through the atmosphere, warming the Earth. In turn, the Earth radiates this energy back towards space. As it passes through the atmosphere, greenhouse gases (water vapor, carbon dioxide, methane and nitrous oxide) absorb part of the energy, while the remainder escapes into space. This means that some of the sun's energy becomes trapped – thus making the lower part of the atmosphere, and Earth, warmer.

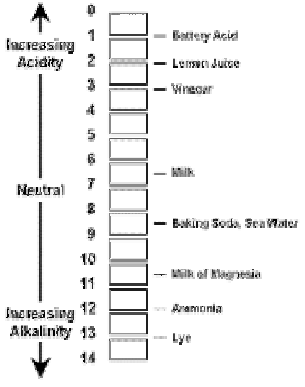
If the atmosphere accumulated all the trapped heat, then the Earth's temperature would just rise and rise, but it doesn't. The temperature only rises until the amount of infrared or long wave radiation leaving the Earth balances the amount of energy coming in from the sun. As long as the amount of greenhouse gases in the air stays the same, and as long as the amount of heat arriving from the sun is constant, equilibrium is established. This is a steady state where as much energy is lost to space as is gained from the sun. In equilibrium, the natural greenhouse effect maintains the average temperature of Earth at 16°C.

The greenhouse effect is important. Without the greenhouse effect, the Earth would not be warm enough for humans to live. But if the greenhouse effect becomes stronger, it could make the Earth warmer than usual. Even a little extra warming may cause problems for humans, plants, and animals.

ACID RAIN

"Acid rain" is a broad term used to describe several ways that acids fall out of the atmosphere. A more precise term is acid deposition, which has two parts: wet and dry.





Acid rain is measured using a scale called "pH." The lower a substance's pH, the more acidic it is. pH=7 is the neutral point in the middle of the scale. The smaller the number on the pH scale, the more acidic the substance is. Rain measuring between 0 and 5 on the pH scale is acidic and therefore called "acid rain."

The evolution of three indicators (sulphur dioxide, nitrogen dioxide and ammonia) of the quality of precipitations has been registered by the monitoring network. The observation period started in year 1995. For the most of the observations the maximum values were measured in 1998 or 1999, afterwards the level of pollution decreased slightly.

Nr. crt.	Zona	Perioada	pH	Conductivity (µS/cm)
1	Arad	Martie-Mai	5,40	132,30
2	Brasov	Noiembrie	5,0	149,50
3	Bucuresti	Iulie	4,39	113,02
4	Oradea	Ianuarie-Februarie	4,40	78,75
5	Medias	Iunie-Decembrie	5,40	124,00
6	Falticeni		4,36	108,19
7	Zalau		4.41	258,00
8	Herculane		5,00	522,00
9	Baia Mare		5,15	503,50

Table 1: Zones with powerful acid rain

Nr. crt.	Area	The annual variation of pH	Conduc-tivity (µS/cm)
1	Oradea	5.12 - 6.77	396.0
2	Copsa Mica	5.00 - 6.50	290.0
3	Medias	5.00 - 6.70	200.0
4	Rovinari	6.20 - 6.60	340.0
5	Tulcea	5.15 - 6.80	1707.5
6	Caransebes	5.10 - 6.80	411.0
7	Bozovici	5.00 - 6.80	290.0
8	Ramnicu Sarat	4.00 - 6.10	645.0
9	Craiova	5.35 - 6.60	309.0

Table 2: Zones with acid rains

Acid deposition has a variety of effects, including damage to forests and soils, fish and other living things, materials, and human health. Acid rain also reduces how far and how clearly we can see through the air, an effect called visibility reduction.

Acid rain causes acidification of lakes and streams and contributes to damage of trees at high elevations (for example, red spruce trees above 2,000 feet) and many sensitive forest soils. In addition, acid rain accelerates the decay of building materials and paints, including irreplaceable buildings, statues, and sculptures that are part of our nation's cultural heritage.

Prior to falling to the earth, SO2 and NOx gases and their particulate matter derivatives, sulfates and nitrates, contribute to visibility degradation and harm public health.

There are several ways to reduce acid deposition, more properly called acid deposition, ranging from societal changes to individual action.

To understand acid deposition's causes and effects and track changes in the environment

- Clean up smokestacks and exhaust pipes
- Use alternative energy sources
- Restore a damaged environment

WHAT DOES POLLUTION MEAN FOR MEN?

Air Pollution May Alter Sperm DNA.

Mouse study finds mutations in offspring of males: Men breathing in high levels of industrial pollutants and car exhaust may be passing pollution-linked genetic mutations along to their children, a new study claims.

In a study pitting city mice against country mice, Canadian researchers found that mice pups born downwind of industrial plants and busy highways displayed double the amount of genetic mutations compared to their country cousins.

Furthermore, those gene mutations appeared to originate with the father, suggesting that sperm is particularly vulnerable to pollution-linked DNA damage. It remains unclear as to whether the results of the study will be replicated in humans. However, "the main concern here is that particulate air pollution can induce changes in DNA that can be passed from one generation on to the next generation," said lead researcher James S. Quinn, a biologist at McMaster University in Hamilton, Ontario.

For decades, experts have known exposure to airborne pollution can raise risks for genetic mutations linked to cancers, especially lung cancer. But pollution's links to "germ line mutations" -- DNA changes within sperm or egg -- have remained a mystery.

Air Pollution May Up Lung Cancer Risk : Long-Term Exposure and Serious Pollutants Lead to a Small Risk Increase.

A new theory appeared: exposure to either nitrous oxide or sulfur dioxide alone would not cause lung cancer. High levels of these compounds likely indicate a cocktail of unknown particles and carcinogens that could indeed cause the lung cancer. Even after age, smoking habits, and occupation were factored in, the men's exposure to high levels of nitrogen oxide from air pollution was a contributing factor to their lung cancer.

Respiratory function in female workers occupationally exposed to acid air pollution: One category of people exposed to pollution is female workers.

Our data suggest that long term exposure to acid fumes and aerosols in industrial environment may cause the development of acute and/or chronic respiratory symptoms and lung function changes.

Acid air and Alzheimer's disease: Don't forget the 'acid rain' effect due to SO_2 and NO_2 in polluted air. Dry acid air penetrates the stomata on plant leaves and accesses the soft underbelly of the brain at the back of the nose. There it speeds formation of SiF_6 - the 'active' form of fluoride which leaves and diatoms use to make their glassy skeletons and we use to carry apatite to make bones and teeth. In the toothless brain, fluoride is trapped by the 'blood-brain barrier' and poisons the mind - 'Alzheimer's disease'.

CONCLUSIONS

Regarding all that we have said on the fact that the most affect by pollution is man, we wonder: how come that pollution is still a problem now a days? All around, all that you see, all that you hear is about pollution. For so many years we have struggled pollution and with the modern technology we ask: Why the pollution is still a problem?

What makes pollution to be a problem? How and why we should fight it? These are some of the questions that we tried to answer in this paper.

REFRENCES:

1. “Mediul înconjurător in România” – Institutul național de Statistica
2. http://royal.okanagan.bc.ca/mpidwirn/atmosphereandclimate/greenhouse.html
3. http://www.ucar.edu/learn/1_3_1.htm
4. http://www.enchantedlearning.com/subjects/astronomy/planets/earth/Greenhouse.shtml
5. *http://www.pbs.org/wgbh/nova/ice/greenhouse.html*
6. http://www.physicalgeography.net/fundamentals/7h.html
7. http://liftoff.msfc.nasa.gov/academy/space/greenhouse.html
8. http://csep10.phys.utk.edu/astr161/lect/venus/greenhouse.html
9. http://earthguide.ucsd.edu/earthguide/diagrams/greenhouse/

10.http://yosemite.epa.gov/oar/globalwarming.nsf/content/climate.html
11. http://www.niwa.co.nz/services/uvozone/
12. http://sci.newsfactor.com/perl/story/15776.html
13. http://www.al.noaa.gov/WWWHD/Pubdocs/Assessment98/executive-summary.html#A
14. http://www.all-science-fair-projects.com/science_fair_projects_encyclopedia/Ozone_hole
15. http://www.ozonelayer.noaa.gov/
16. http://www.ciesin.org/TG/OZ/oz-home.html
17. http://www.sciencemaster.com/jump/physical/ozone.php
18. http://focus.aps.org/v8/st8.html
19. http://www.wordiq.com/definition/Ozone_layer
20.http://hq.unep.org/ozone/Public_Information/4Aii_PublicInfo_Facts_OzoneLayer.asp
21.http://www.wordiq.com/definition/Ozone_depletion
22. http://www.ourplanet.com/imgversn/104/sarma.html
23.http://www.ocdsb.edu.on.ca/General_Info/Conservation/docs/ozone/Ozone%20Layer.htm
24.http://www.healthscout.com/template.asp?page=newsdetail&ap=1&id=518960
25. http://www.spiked-online.com/Articles/0000000CA627.htm
26. http://www.sciencedaily.com/directory/Science/Earth_Sciences
27.http://weather.about.com/gi/dynamic/offsite.htm?site=http%3A%2F%2Fwww.epa.gov%2Fairmarkets%2Facidrain%2F
28.http://weather.about.com/gi/dynamic/offsite.htm?site=http://www.ec.gc.ca/acidrain/done%2Deurope.html
29.http://weather.about.com/gi/dynamic/offsite.htm?site=http://www.ec.gc.ca/acidrain/done%2Dyou.html
30.http://www.grida.no/enrin/htmls/romania/brasov_2001/eng/aer/aer3.html#a1