

Theoretical overview of atmosphere and its phenomenal change

Ms. Aishwarya Dhara,

Assistant Professor – PSN College of Engineering and Technology, Tirunelveli
 innovaengineering100@gmail.com

Abstract:

Our atmosphere as we know it has been with us until the dawn of the creation of earth and its components. The atmosphere is the reason earth is able to sustain life on earth as we know it. Earth as a whole is able to change its routine pattern of climate and give a much decided function of seasons and temperature change thus making earth one of the only places in our milky way to be more life friendly than any planets out there. In this article we will see the facts governing our Atmosphere and how in time the composition of our Atmosphere has changed and also see what these changes has brought to the table in a perspective of everyday human condition on our planet and dear mother nature.

Keywords: Atmosphere, Ozone Layer, Oxygen cycle

1. The layers of our atmosphere

At first the atmosphere of our planet is made up of chemical composition of gases which blankets our earth and protects life on earth by creating pressure and allowing water to exist on earth. The chemical composition of Air itself is 78.09%nitrogen, 20.95% oxygen, 0.04% carbon dioxide. Just like the water below us the pressure of air does change according to the layers of atmosphere. Earth atmosphere has four layers of atmosphere

- Troposphere (0-7 miles)
- Stratosphere (7-31miles)

- Mesosphere (31-50 miles)
- Thermosphere (50-440 miles)
- Exosphere (440-6200 miles)

The troposphere is the first layer from the solid ground and contains 80% of the mass of the earth’s atmosphere. Here is where water is sucked into water vapour thus creating rain as we know it.

Altitude Region (m)	Lapse rate (Kelvin/km)	Lapse Rate (°F/1000 feet)
0 – 11,000	-6.5	-3.57
11,000 – 20,000	0.0	0.0
20,000 – 32,000	1.0	0.55
32,000 – 47,000	2.8	1.54
47,000 – 51,000	0.0	0.0
51,000 – 71,000	-2.8	-1.54
71,000 – 85,000	-2.0	-1.09

Fig 1. Environmental Lapse rate [1]

The stratosphere is the next layer from the ground, this is where one of the most important layer of our solar system is found as it not only supports life but also keeps heat flares and harmful gases not to pass through, the name of this beautiful gem is called ozone layer in this article we will mostly focus on the stratosphere and ozone layer as they have gone through phenomenal changes in rapid succession over a period of only a 100 years. Fig 1 shows the environmental lapse rate.

Next after the stratosphere is the Mesosphere which is one of the coldest places in the atmosphere and has an average of -85 degree

Celsius. The mesosphere is also the place most meteors burn up and do not enter our atmosphere directly.

After the mesosphere is the Thermosphere, this layer is completely cloudless and free of any water vapour; to put it in simple English it's just void. But it also has high proportion of molecules with high energy.

And at last we have the outermost layer of our atmosphere the exosphere, the exosphere is the only thing keeping us out of space. The composition of it is basically hydrogen, helium, nitrogen, oxygen and carbon dioxide.

2. The drastic change in our atmosphere

As far as we could see from the layers of atmosphere I have mentioned we are going to cover the incredible changes in our stratosphere and especially the ozone layer in it. The composition on ozone layer is O_3 which stand for three agents of oxygen which help our planet from all the heat waves and ultra violet rays from penetrating the earth atmosphere through the troposphere. But in recent studies conducted scientist are baffled that the composition of the ozone layer has been changing in a way that the three agent of oxygen composition has been depleting over a period of time, over a 70-year period to be exact. Fig 2 shows the Ozone-Oxygen cycle. Scientist has come with the theory that harmful gases and waste set up into the atmosphere is the single major reason in the depletion of ozone layer and its components. What could all this mean? Think about oneself sleeping in the polar region with a heavy blanket protecting him/herself from the cold, then slowly destroying the blanket with fire now and then, in time the

person inside is going to be burned and upon that when the blanket is no more he is going to suffer from cold and die. In this little story the blanket is the ozone layer, the person is earth, the fire is the pollutant gases and finally the death is but a metaphor of the extinction of our planet. As dangerous this may sound that is the fact of what's going on right now and for 70 years.

Over this period of time scientist have proved that the harmful gases like carbon monoxide, methane and some of gases which has more volume of hydrogen are responsible for the depletion of the ozone layer hence taking the blanket that is protecting us thus far. It is very common to see cyclones, hurricanes and typhoons these days, these happens because of the shift in our atmosphere composition and thus bringing erratic climatic change and calamities. In a recent survey it is said that japans most dormant volcanoes have been becoming active and also Japanese survey says that typhoons which was a rare occurrence in the mid 40's are a common occurrence today. Disasters like slow process of photosynthesis have also come under question due to the pollutants and the kind of changes our atmosphere has been going through in this century. Another big reason is the testing of hydrogen and atomic bombs which exposes pollutants like plutonium, ether and carbon monoxide in a bunch load to the atmosphere when these bombs are tested. Pollutants like the release of carbon monoxide through the combustion of natural resource such as petrol and diesel is another major reason as us human being depend too much on them in our day today life. Rocket propulsion to the atmosphere is another damping evidence to the depletion of ozone layer not only does it cut through our atmosphere to reach space but also on its way dusts all the pollutants and radiation into our atmosphere, especially the

ozone layer thus creating a major depletion in the composition of the ozone layer as we know it. Another major risk is the growth of aerodynamics which has brought in variety of aeroplanes and they too are part of the problem for the troposphere and its surroundings as they pollute the atmosphere through the combustion of fuel which is very harmful to the atmosphere and nature as a whole, as aeroplanes are becoming bigger and powerful so is the amount of fuel needed to power them which is also attributed to the destruction of the atmosphere, which can also be attributed with the technological advancement itself.

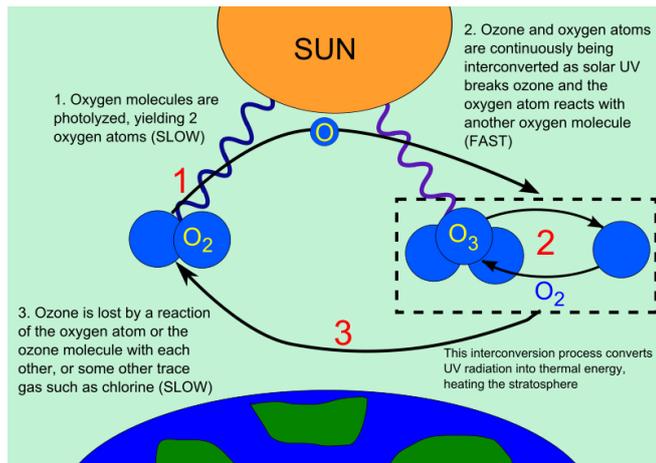


Fig 2. Ozone – Oxygen Cycle [1]

More over wars and conflicts between human beings has also proved dangerous to the atmosphere to say the least. Wars have devastating impact on the subject of polluting the environment. The bombing of Hiroshima and Nagasaki is a prime example of how war can not only devastate lives but the atmosphere as whole, as scientific study prove that much part of Hiroshima is still a radiated zone polluting the atmosphere. Other man made systems like the meltdown of nuclear power station is also a big concern as we know of the nuclear power

meltdown in Chernobyl which brought tremendous radiation to the populace and thus destroying Chernobyl by making it a hot spot for radiation. There are many ways we are polluting our atmosphere but it's hard to put a finger on it is a wider subject.

3. The reach of human and its consequence

It's safer to say that our reach exceeds our own grasp, it's very true in that way as mankind over a period of time has evolved into the major player in invention, idealism, brilliance, intellect, evolution, era mover, creator and off course the destroyer. For all our accomplishment we have also left a mark on our own grasp, our grasp is too much for our planet, it's safe to say our planet has been a subject to human conscience of wear and tear. But more than that what is more disturbing about us humans are we are not fore seeing the future for our future ancestors, and never ask the questions of what will be. Still nuclear testing is in full swing in most countries, rocket launching is an everyday matter, factories dumping their waste in the skies are stopped when the sirens are sounded and begin the next day as usual. Technological advancements are growing heavily causing harm to nature as whole, we are pioneers of our own doom, is what I can come up with. Our consequence is that we may not leave behind a legacy of growth rather than utter destruction, if government and its pupils don't wake up as to the human nature of growth.

4. The hit back consequence

The hit back consequence is my own theory of how nature is going to strike back in time. Since the composition of the ozone layer has changed drastically, very soon it's my own theory

that in over a period of another 100 years there is a clear chance that our atmosphere is going to be so unstable that we cannot survive as we do today. It's clear that we can see that the earth is changing, the polar ice caps have started to melt away due to greenhouse effect which brings unwanted radiation into our midst causing tsunami's, un periodic plate shifts, which can be attributed to the pollution of the atmosphere which brings earth quakes and typhoons. Test of nuclear devices not only affect the atmosphere but also bring in radiation which centres the place for centuries and radiation is a big atmosphere killer.

Slowly but steadily the ozone layer has been depleted bringing in harmful gases and rays from the sun, the sudden bump of skin cancer in a Swedish survey confirms that cancers are more prone today than a 100 years ago. This is how the hit back consequence works, it's like a match of tennis when one side hits the other side hits back too. Same concept here, as we hit nature and atmosphere with our hand, nature too strikes back and gives its best. These days seasons and climates don't show up in time, making crops useless and bringing a land full of famine and poverty. Natural calamities are now extremely common we see them coming about every year and more strong than the last. Scarcity of natural recourses has also started to show their ugly head up. Soon prominent cities and countries are going to have turmoil of a time. Famine, poverty, diseases, death due to natural calamities and even premature death are all part of our recipe due to how we have treated our planet in the past 100 years. Fall of technology, civilization, economy and mankind itself is attributed to what we have done to the nature and its atmosphere. This shouldn't be taken lightly as there is a saying when Mother Nature is angry, she cannot be tamed. It's not complicated to say that the Hit

back consequence would only be dangerous to mankind and mankind only.

5. Conclusion

From this article I have written, we come to one point that is ozone layer is giving away its charm of protecting us and the consequence if not dealt with will be severe and brutal. We may take every day for granted but there will be a day, one day all we can do is expect the inevitable. But there is still time for us, if we try to conserve the atmosphere and not pollute it in a way we are doing right now then we may have a second chance or else, it's sad to say we won't even have another 100 years to figure out the problem. So I urge we be eco-friendlier and find a way to convince our government in changing its policies in things that our hurting our atmosphere. Only then there is a bright future for our children and their children. There are ways we must change and be more conservative, if we don't think about helping our planet now then she will surely turn her back on us when we need her the most.

6. Reference

1. Wikipedia:
https://en.wikipedia.org/wiki/Atmosphere_of_Earth
2. Carbon-dioxide, NOAA Earth System Research Laboratory, (updated 2013-03). Methane, IPCC TAR table 6.1 Archived 2007-06-15 at the Wayback Machine.,
3. Vaughan, Adam (2015-05-06). "Global carbon dioxide levels break 400ppm milestone". *The Guardian*. ISSN 0261-3077

4. Joe Buchdahl. "Atmosphere, Climate & Environment Information Programme".
Ace.mmu.ac.uk
5. "The height of the tropopause".
Das.uwyo.edu. Retrieved 2012-04-18.