

Global Warming – A Threat to the Planet

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Abstract: *Presently, Global Warming is burning issue in all over the world and emissions of greenhouse gases and anthropogenic activities are considered as the main sources of Global warming. Fossil fuel burning and emission of CO_2 and CH_4 gas aggravate the problem by increment of Global temperature at about 1°C which results catastrophic effect to our climate. Methane (CH_4) is considered 20 times more effective than CO_2 in entrapping heat for its molecular structure. Ocean temperature rise also affect ecological balance and extinction of various species due to acidification.*

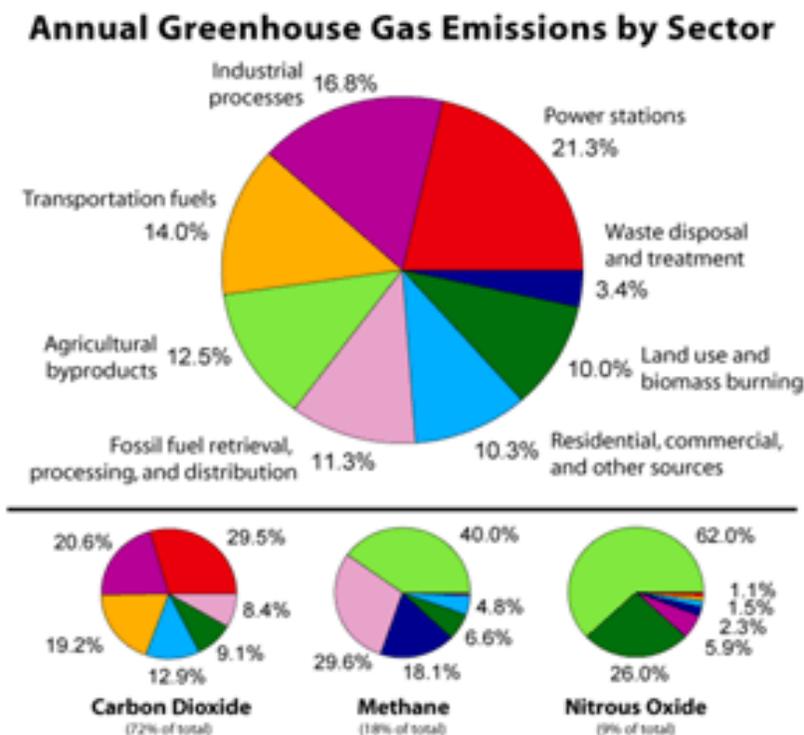
The opinions that came in favour of Global Warming would largely differ, as some of us would call Global Warming a theory which other would call it a proven set of facts. But the environment of the world is surely changing by increasing in overall air and water temperature which lead to challenge our lives on earth and earth will dynamically be affected. Global Warming and the climatic changes are the aspects which cannot early be encountered. Global Warming is a quantifiable set of results in our environment additional to any of normal change in climate. For this reason effect of Global Warming has a catastrophic potential to our planet. Global Warming as caused by greenhouse emissions will definite imbalance of nature. Industrial growth coupled with non-structured anthropogenic activities for our sustainable development has created an alarming situation where earth is getting hotter in progressive manner. By the cycle of harmful

processes we have negatively effected our environment to exponential increase the damage of our ecosystem. Global warming a chain effect of hundreds of environmental factors. Recently some premises think that depletion of ozone layer is the key factor for Global Warming. Ozone (O_3) is the molecular form of oxygen and exists as a relatively thin layer in lower portion of earth's stratosphere. Depletion of Ozone layer will cause the emergence of ultra violet radiation directly to the earth surface. But increments of UV rays are not the culprit of Global Warming because the depletion of Ozone layer results in cooling both stratosphere and troposphere. So Global Warming Should not be mentioned as an effect of depletion of Ozone layer.

The primary cause of Global Warming is the emission of Greenhouse gases. In our environment besides of Nitrogen, Oxygen and water vapor, very low percentage (below 1%) of traces of various gases making up the remainder. The trace gases are the Argon, Carbon-di- Oxide, Helium, Neon, methane, Nitrous Oxide and Ozone. Anthropogenic activities emit the principal gases resulting Global Warming potential and those are Methane, Carbon-di-Oxide Nitrous Oxide and halocarbon (a group of gases consisting of Chlorine, Fluorine and Bromine).

The incremental proportion of those greenhouse gases have stated significantly a few hundred year ago but rapid industrialization for the last 60 to 70 years turns but with an alarming potential to our environment by the process of burning of fossil fuels (coal) in large quantities.

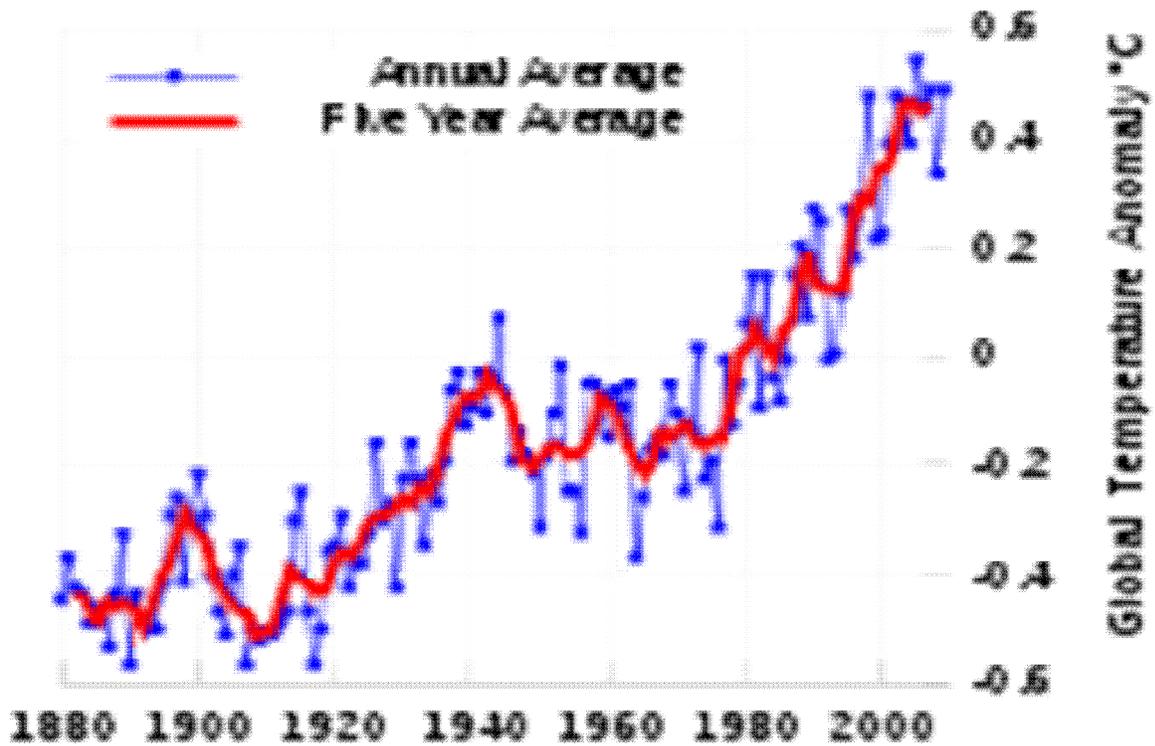
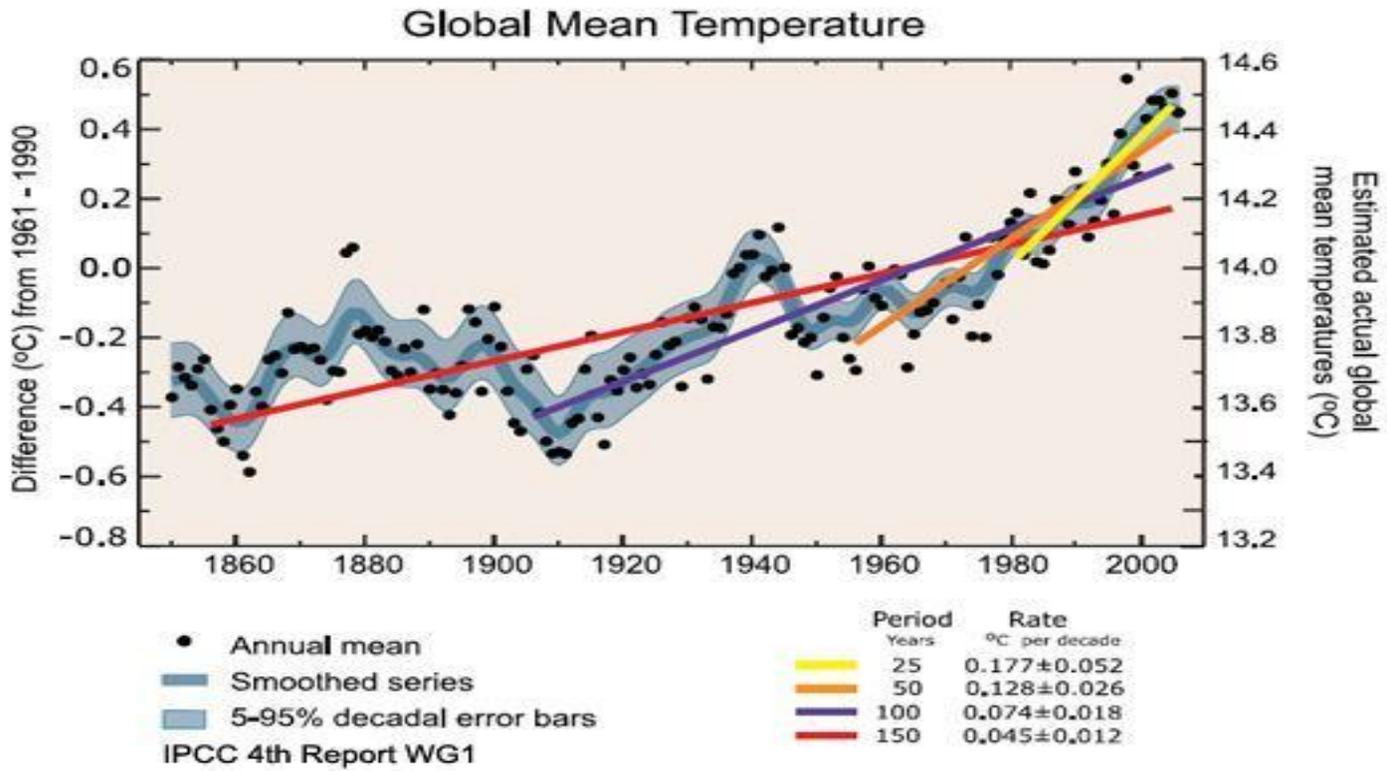
The growth below shows that carbon-di-oxide, nitrous oxide and methane all have increased significantly since 1800s. But in recent days the use of fossil fuel for town generation is thousand times more than 1800s.



Global average temperature are estimated in every month by individual thermometer and these measurements taken every day in several thousand stations located over the land area of whole world and combined with thousands more measurement of sea surface temperature taken from ships moving over the oceans. From those records it is seen that Global temperature is high within the period 1997- 2008 since around 1880. The total Global temperature increase from 1850 to through out to 2005 is 0.76° C and the

rate of warming average over the last 50 years is nearly twice that for the last 100 years.

For last 25 years an increasing trend of rate of warming has taken place. Since late 1950's the troposphere (upto about 10 Km) from the surface has warmed at a slightly greater rate than the surface, while the stratosphere (about 10-30Km) has cooled remarkably since 1979. This is in accordance with physical expectation and model results.



Global temperature being the cause of increase in ocean water temperature, rising sea water level, Glacial melt sea ice retreat in Arctic demolition of snow cover in northern Hemisphere. It is forecasted that the end of 21st century the Global average temperature will rise 4° C and even if we begin to stop all greenhouse gas emissions from today it-self we would not be able to stop the temperature rise around 2° C by 2090-2100.

Global warming is a burning issue as it also affects the ecological imbalance. Due to the rise in temperature in ocean water, some aquatic species die off while others become extinct.

Production of mild Carbonic acid results slight change in temperature and acidification ocean water as a result various other species, prefer warmer water will increase tremendously. The most disturbing change is expected in the coral reefs that are expected to die off due to production of mild carbonic acid resulting slight change in ocean water pH and less production of fishes. Due to acidification of ocean water the marine food chain is effected and to extinction of *foraminifera*, belonging to phylum protozoa. As an effect of Global warming species like golden toad, harlequin frogs of Costa Rica has already become extinct. Due to rise of Global temperature some new disease occur very frequently as the bacteria can survive better in warmer condition and multiplies faster in the favorable condition.

Global warming also will start to meltdown the permafrost which is a condition where segment of earth to surface remain at a temperature below the freezing point for at least two years i.e. permafrost is the permanently frozen soil. Actually for this large portions of the arctic region have been frozen thousand of years.

This permafrost on frozen strata locks away huge amount of carbon-di-oxide and methane gas. An increment of 1° C of Global temperature will defrost permafrost and release huge amount

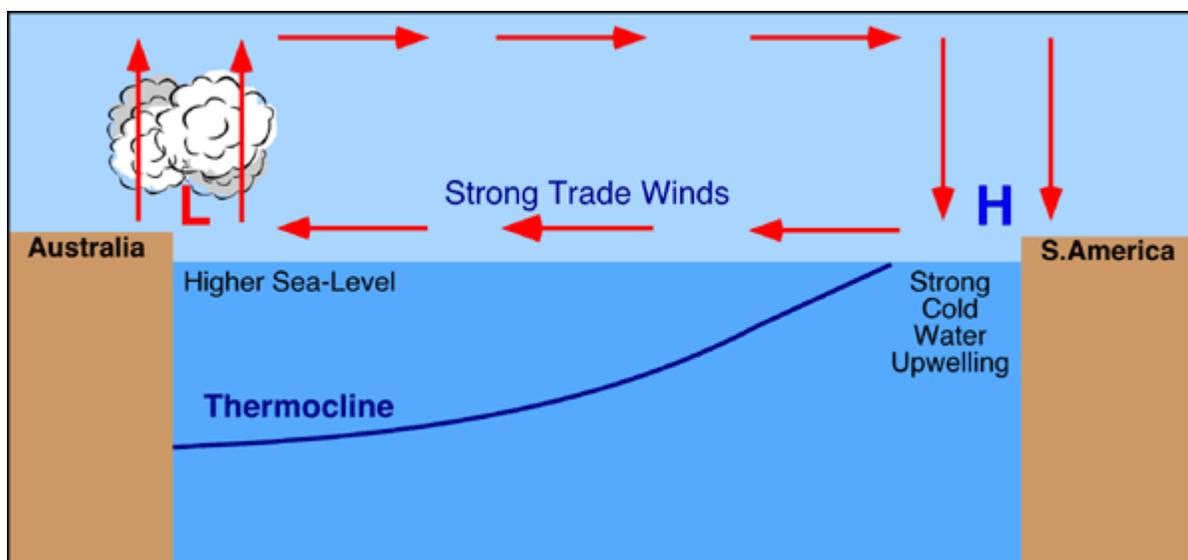
of greenhouse gases. On a molecule-for-molecule basis the direct radiation effects of methane is about 72 times stronger than carbon dioxide over a 20 year time frame but it is present in much smaller concentrations so that its total direct radiation effect is smaller, and it has a shorter atmospheric lifetime. On the other hand, in addition to its direct radiation impact methane has a large indirect radiation effect because it contributes to ozone formation. Shindell *et al.* (2005) argue that the contribution to climate change from methane is at least double previous estimates as a result of this effect. Methane is known as 20 times more effective than carbon –di –oxide in entrapping heat in the atmosphere only due its molecular structure. The global warming potential (GWP) depends on both the efficiency of the molecule as a greenhouse gas and its atmospheric lifetime. GWP is measured relative to the same mass of CO₂ and evaluated for a specific timescale. Thus, if a gas has a high radiation forcing but also a short lifetime, it will have a large GWP on a 20 year scale but a small one on a 100 year scale. Conversely, if a molecule has a longer atmospheric lifetime than CO₂ its GWP will increase with the timescale considered. Carbon dioxide is defined to have a GWP of 1 over all time periods.

Methane has an atmospheric lifetime of 12 ± 3 years and a GWP of 72 over 20 years, 25 over 100 years and 7.6 over 500 years. The decrease in GWP at longer times is because methane is degraded to water and CO₂ through chemical reactions in the atmosphere.

The two factors namely EL Nino & La Nina greatly affect the Global Warming. The Surface Sea temperatures become warm due to El Nino effect and formation of El Nino reduced the upwelling of cold, nutrient rich deep sea water significantly and the cycling of the Pacific Ocean circulation pattern is changed.

A surface low pressure develops in the region of Northern Australia and Indonesia and high pressure system in the coast of Peru, as a result the strong movement of warm trade wind from east to west bringing convective storms to Indonesia and Coastal Australia. Cold water at the bottom along the coast of Peru wells up to the surface to replace the warm water that is pulled to the west. Dropping of air Pressure in the large area along the coast of South America in Pacific Ocean resulting low pressure zone which is replaced by the high pressure of

western Pacific causing reduction of trade wind due to change in pressure patterns. This reduction allows the equatorial counter current to accumulate over warm ocean water in the coast line of Peru and Ecuador causing the thermocline to drop in the eastern part of the Pacific Ocean which cuts off the upwelling of the cold deep Ocean water along the coast of Peru. The effect of El Nino thus brings a drastic change in the climate which causes drought in the western Pacific, rains to the eastern coast of South America and convective storms and hurricanes to the central Pacific.



After an El Niño occurrence the weather conditions usually return to normal. However in some years due to extremely strong trade wind abnormal accumulation of cold water occur in the Central and Eastern Pacific which is called La Niña. The effect of La Niña is same as the El Niño. Drought, Hurricanes, tropical storm, abnormally heavy monsoon in India and South

Asia, cool and wet winter in South Eastern Africa and Western Canada are developed due to La Niña effect. Prior to 1980's and 1990's, strong El Niño occurs on an average every 10 – 20 years. Surface sea temperature in some region of Pacific Ocean rose 6 degree Celsius above normal. The warm water had a devastating effect on the marine life.

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