Global Warming - an Aspect of Destruction

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Abstract: ***Global warming is the rise in average temperature of the atmosphere of the earth due to the increase in greenhouse gases, solar variation, aerosols and shoot effect. Here we discuss effect of global warming effect on environment and its solution.***

Keywords: ***Global Warming, Environment and Its Solution***

I. INTRODUCTION

Global warming refers to an average increase in the earth's temperature which in turn causes climatic change. With increased temperature, earth may lead to changes in rainfalls pattern, a rise in sea level. Rising Sea Levels, drought, flash flooding, massive crop failures, rising air pollution levels, uncontrollable fires and the extinction of animal and plant species which in turn place additional strain on our environment. Retreat of glaciers, permafrost and sea ice is expected, increases in intensity of extreme weather events species extinctions, changes in agricultural yield some causes are due to our action, bad habits and lack of awareness e.g. deforestation.

Due to Global Warming the Global surface temperature increased 0.74 ± 0.18 °C during the last century. The Intergovernmental Panel on Climate Change (IPCC) concludes that increasing greenhouse gas concentrations resulting from human activity such as fossil fuel burning and deforestation caused most of the observed temperature increase since the middle of the 20th century. The variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward.

The global surface temperature will probably rise a further 1.1 to 6.4°C during the twenty-first century. The uncertainty in this estimate arises from the use of models with differing sensitivity to greenhouse gas concentrations and the use of differing estimates of future greenhouse gas emissions. Some other uncertainties include how warming and related changes will vary from region to region around the globe. Most studies focus on the period up to the year 2100. However, warming is expected to continue beyond 2100 even if emissions stop, because of the large heat capacity of the oceans and the long lifetime of carbon dioxide in the atmosphere. An increase in global temperature will cause sea levels to rise and will change the amount and pattern of precipitation, probably including expansion of subtropical deserts. The continuing retreat of glaciers, permafrost and sea ice is expected, with warming being strongest in the Arctic. Other likely effects include increases in the intensity of extreme weather events, species extinctions, and changes in agricultural yields. Political and public debate continues regarding climate change, and to take action accordingly, The available options are mitigation to reduce further emissions; adaptation to reduce the damage caused by warming.

II. CAUSES OF GLOBAL WARMING

A. Greenhouse Gases

The greenhouse effect is the process by which absorption and emission of infrared radiation by gases in the atmosphere warm a planet's lower atmosphere and surface. The question is instead how the strength of the greenhouse effect changes when human activity increases the concentrations of greenhouse gases in the atmosphere.

Naturally occurring greenhouse gases have a mean warming effect of about 33 °C. The major greenhouse gases are water vapor, which causes about 36–70 percent of the greenhouse effect; carbon dioxide (CO_2), which causes 9–26 percent; methane (CH_4), which causes 4–9 percent, and ozone (O_3), which causes 3–7 percent. Clouds also affect the radiation balance, but they are composed of liquid water or ice and so are considered separately from water vapor and other gases.Human activity since the Industrial Revolution has increased the amount of greenhouse gases in the atmosphere, leading to increased radiative forcing from CO_2, methane, tropospheric ozone, CFCs and nitrous oxide. The concentrations of CO_2 and methane have increased by 36% and 148% respectively since the mid-1700s. Fossil fuel burning has produced about three-quarters of the increase in CO_2 from human activity over the past 20 years. Most of the rest is due to land-use change, particularly deforestation. CO_2 concentrations are continuing to rise due to burning of fossil fuels and land-use change. The future rate of rise will depend on uncertain economic, sociological, technological, and natural developments. As per the, IPCC Special Report on Emissions Scenarios. CO_2 concentration will rise from 541 to 970 ppm by the year 2100. Fossil fuel reserves are sufficient to reach these levels and continue emissions past 2100 if coal, tar sands or methane clathrates are extensively exploited. The destruction of stratospheric ozone by chlorofluorocarbons is sometimes mentioned in relation to global warming. Although there are a few areas of linkage, the relationship between the two is not strong. Reduction of stratospheric ozone has a cooling influence, but substantial ozone depletion did not occur until the late 1970s. Tropospheric ozone contributes to surface warming.

B. Aerosols and Soot

Global dimming, a gradual reduction in the amount of global direct irradiance at the Earth's surface, has partially counteracted global warming. The main cause of this dimming is aerosols produced by volcanoes and pollutants.

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These aerosols exert a cooling effect by increasing the reflection of incoming sunlight. It has been proposed that the effects of the products of fossil fuel combustion—CO_2 and aerosols—have largely offset one another in recent decades, so that net warming has been driven mainly by non-CO_2 greenhouse gases. Soot may cool or warm, depending on whether it is airborne or deposited. Atmospheric soot aerosols directly absorb solar radiation, which heats the atmosphere and cools the surface. Regionally (but not globally), as much as 50% of surface warming due to greenhouse gases may be masked by atmospheric brown clouds. When deposited, especially on glaciers or on ice in arctic regions, the lower surface albedo can also directly heat the surface. The influences of aerosols, including black carbon, are most pronounced in the tropics and sub-tropics, particularly in Asia, while the effects of greenhouse gases are dominant in the extratropics and southern hemisphere.

C. Solar Variation

Solar variation has also been a cause of climate changes though to a lesser extent. As per the studies in the troposphere both increased solar activities and increased Greenhouse gases should warm it while the former should warm the stratosphere and later should cool the stratosphere

III. FEEDBACK

A positive feedback is a process that amplifies some change. Thus, when a warming trend results in effects that induce further warming, the result is a positive feedback; when the warming results in effects that reduce the original warming, the result is a negative feedback. The main positive feedback in global warming involves the tendency of warming to increase the amount of water vapor in the atmosphere. The main negative feedback in global warming is the effect of temperature on emission of infrared radiation: as the temperature of a body increases, the emitted radiation increases with the fourth power of its absolute temperature.

A. Water Vapor Feedback

If the atmosphere is warmed, the saturation vapor pressure increases, and the amount of water vapor in the atmosphere will tend to increase. Since water vapor is a greenhouse gas, the increase in water vapor content makes the atmosphere warm further; this warming causes the atmosphere to hold still more water vapor (a positive feedback), and so on until other processes stop the feedback loop. The result is a much larger greenhouse effect than that due to CO_2 alone. Although this feedback process causes an increase in the absolute moisture content of the air, the relative humidity stays nearly constant or even decreases slightly because the air is warmer.

B. Cloud Feedback

Warming is expected to change the distribution and type of clouds. Seen from below, clouds emit infrared radiation back to the surface, and so exert a warming effect; seen from above, clouds reflect sunlight and emit infrared radiation to space, and so exert a cooling effect. Whether the net effect is warming or cooling depends the type and altitude of the cloud.

C. Lapse Rate

The atmosphere's temperature decreases with height in the troposphere. Since emission of infrared radiation varies with temperature, longwave radiation escaping to space from the relatively cold upper atmosphere is less than that emitted toward the ground from the lower atmosphere. Thus, the strength of the greenhouse effect depends on the atmosphere's rate of temperature decrease with height. Both theory and climate models indicate that global warming will reduce the rate of temperature decrease with height, producing a negative *lapse rate feedback* that weakens the greenhouse effect.

D. Ice-Albedo Feedback

When ice melts, land or open water takes its place. Both land and open water are on average less reflective than ice and thus absorb more solar radiation. This causes more warming, which in turn causes more melting, and this cycle continues.

E. Arctic Methane Release

Warming is also the triggering variable for the release of methane in the arctic.

F. Reduced Absorption of CO2 by the Oceans

Ocean ecosystems' ability to sequester carbon is expected to decline as the oceans warm. This is because warming reduces the nutrient levels of the mesopelagic zone (about 200 to 1000 m deep), which limits the growth of diatoms in favor of smaller phytoplankton that are poorer biological pumps of carbon.

G. Gas Release

Release of gases of biological origin may be affected by global warming, Some of these gases, such as Nitrous oxide released from peat, directly affect climate Others, such as Dimethyl sulfide released from oceans, have indirect effects.

IV. GLOBAL CLIMATE MODEL

The main tools for projecting future climate changes are mathematical models based on physical principles including fluid dynamics, thermodynamics and radiative transfer. Although they attempt to include as many processes as possible, simplifications of the actual climate system are inevitable because of the constraints of available computer power and limitations in knowledge of the climate system. All modern climate models are in fact *combinations* of models for different parts of the Earth. These include an atmospheric model for air movement, temperature, clouds, and other atmospheric properties; an ocean model that predicts temperature, salt content, and circulation of ocean waters; models for ice cover on land and sea; and a model of heat and moisture transfer from soil and vegetation to the atmosphere. Some models also include treatments of chemical and biological processes.

Warming due to increasing levels of greenhouse gases is not an assumption of the models; rather, it is an end result from the interaction of greenhouse gases with radiative transfer and other physical processes in the models. Although much of the variation in model outcomes depends on the greenhouse gas emissions used as inputs, the temperature effect of a specific greenhouse gas concentration (climate sensitivity) varies depending on the model used. The representation of clouds is one of the main sources of uncertainty in present-generation models.

V. EFFECTS OF GLOBAL WARMING ON ENVIRONMENT

It usually is impossible to connect specific weather events to global warming. Instead, global warming is expected to cause changes in the overall distribution and intensity of events, such as changes to the frequency and intensity of heavy precipitation.

Broader effects are expected to include glacial retreat, Arctic shrinkage, and worldwide sea level rise. Some effects on both the natural environment and human life are, at least in part, already being attributed to global warming. Sea level rise, changes in rainfall patterns, and increased intensity and frequency of extreme weather events are attributable in part to global warming. Other expected effects include water scarcity in some regions and increased precipitation in others, changes in mountain snowpack, and some adverse health effects from warmer temperatures.

Social and economic effects of global warming may be exacerbated by growing population densities in affected areas. Temperate regions are projected to experience some benefits, such as fewer cold-related deaths.

Additional anticipated effects include sea level rise of 0.18 to 0.59 meters in 2090-2100 relative to 1980-1999, new trade routes resulting from arctic shrinkage, possible thermohaline circulation slowing, increasingly intense (but less frequent) hurricanes and extreme weather events, reductions in the ozone layer, changes in agriculture yields, changes in the range of climate-dependent disease vectors, which has been linked to increases in the prevalence of malaria and dengue fever, and ocean oxygen depletion. Increased atmospheric CO_2 increases the amount of CO_2 dissolved in the oceans. CO_2 dissolved in the ocean reacts with water to form carbonic acid, resulting in ocean acidification. Ocean surface pH is estimated to have decreased from 8.25 near the beginning of the industrial era to 8.14 by 2004, and is projected to decrease by a further 0.14 to 0.5 units by 2100 as the ocean absorbs more CO_2. Heat and carbon dioxide trapped in the oceans may still take hundreds years to be re-emitted, even after greenhouse gas emissions are eventually reduced. Since organisms and ecosystems are adapted to a narrow range of pH, this raises extinction concerns and disruptions in food webs. One study predicts 18% to 35% of a sample of 1,103 animal and plant species would be extinct by 2050, based on future climate projections.

VI. RESPONSES TO GLOBAL WARMING

The broad agreement among climate scientists that global temperatures will continue to increase has led some nations, states, corporations and individuals to implement responses. These responses to global warming can be divided into mitigation of the causes and effects of global warming, adaptation to the changing global environment, and reengineering to reverse global warming.

A. Mitigation of Global Warming

Mitigation of global warming is accomplished through reductions in the rate of anthropogenic greenhouse gas release. Models suggest that mitigation can quickly begin to slow global warming, but that temperatures will appreciably decrease only after several centuries. The world's primary international agreement on reducing greenhouse gas emissions is the Kyoto Protocol, The Protocol now covers more than 160 countries and over 55 percent of global greenhouse gas emissions. As of June 2009, only the United States, historically the world's largest emitter of greenhouse gases, has refused to ratify the treaty. The treaty expires in 2012. International talks began in May 2007 on a future treaty to succeed the current one. UN negotiations are now gathering pace in advance of a meeting in Copenhagen in December 2009.

Many environmental groups encourage individual action against global warming, as well as community and regional actions. Others have suggested a quota on worldwide fossil fuel production, citing a direct link between fossil fuel production and CO_2 emissions.

Adaptation to global warming

A wide variety of measures have been suggested for adaptation to global warming. These measures range from the trivial, such as the installation of air-conditioning equipment, to major infrastructure projects, such as abandoning settlements threatened by sea level rise.

Measures including water conservation, water rationing, adaptive agricultural practices, construction of flood defences, Martian colonization, changes to medical care, and interventions to protect threatened species may be put into service.

In addition to above following few practices may be put into service in day to day life for controlling the emission that will definitely affecting the global warming:

- Protect and conserve forest worldwide- Forests play a critical role in global warming: they store carbon. When forests are burned or cut down, their stored carbon is release into the atmosphere- deforestation now accounts for about 20% of carbon dioxide emissions each year.
- Do not eat meat-Mehane is the second most significant greenhouse gas and cattles one of the greatest methane emitters. Their grassy diet and multiple stomachs cause them to produce methane, which they exhale with every breath.
- Plant a tree- A single tree will absorb one ton of carbon dioxide.
- Choose products that come with little packaging and can be refilled-the wastages and energy can be controlled.

B. Global Warming Controversy and Politics of Global Warming.

Increased publicity of the scientific findings surrounding global warming has resulted in political and economic debate. Poor regions, particularly Africa, appear at greatest risk from the projected effects of global warming, while their emissions have been small compared to the developed world. The exemption of developing countries from Kyoto Protocol restrictions has been used to rationalize non-ratification by the U.S. and criticism from Australia. Another point of contention is the degree to which emerging economies such as India and China should be expected to constrain their emissions. The U.S. contends that if it must bear the cost of reducing emissions, then China should do the same since China's gross national CO_2 emissions now exceed those of the U.S. China has contended that it is less obligated to reduce emissions since its per capita responsibility and per capita emissions are less that of the U.S. India, also exempt, has made similar contentions. Over a third of the world's population were unaware of global warming, developing countries less aware than developed, and Africa the least aware. Awareness does not equate to belief that global warming is a result of human activities. of those aware, Latin America leads in belief that temperature changes are a result of human activities while Africa, parts of Asia and the Middle East, and a few countries from the Former Soviet Union lead in the opposite. In the western world, the concept and the appropriate responses are contested.

VII. CONCLUSION

The Global warming as discussed is a direct threat to the nature and its content. Increased publicity and awareness will de finitely reduce the Co_2 emissions. The Kyoto Protocol is a step in a direction for uniting the developed and developing countries for restricting the emissions. Global warming is not a localized phenomenon. If somebody country is committing the mistake in the matter. The result will have to be faced by each and everybody. There is a growing need of propagating the awareness among the individuals and the countries so that the gradual destruction may be avoided.

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