

CLIMATE CHANGE, INFRARED ENERGY, ORBITAL VARIATION AND THEIR IMPACTSDr. D. K. Awasthi*¹ and Gyanendra Awasthi²¹Dept.of Chemistry Sri J.N.M.P.G. College Lucknow U.P.²Dept.of Bio Chemistry Dolphin Institute Dehradun U.K.***Corresponding Author: Dr. D. K. Awasthi**

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ABSTRACT

Climate change occurs when changes in earth's climate system result in new weather patterns that last for at least a new decades ,may be for millions of years. come a widespread topic in recent years. This problem that resulted from the emission of greenhouse gases that affected our environment. Therefore, it raises question on whether the problem is caused by human activities or it's just a part of nature's cycle. The climate system receives nearly all of its energy from the sun, with a relatively tiny amount from earth's interior The balance of incoming and outgoing energy ,the passage of the energy through the climate system, determines Earth's Energy Budget. When the incoming energy is greater than the outgoing energy, earth's energy budget is positive and the climate system is warming .if more energy goes out, the energy budget is negative and earth experience cooling .climate can be measured at many geographic scales for example cities, countries, or the entire globe—by such statistics as average temperature, average number of rainy days, and the frequency of droughts .climate change refers to changes in these statics over years, decades, or even centuries. The overwhelming majority of climate scientists agree that human activities, especially the burning of fossil fuels (coal ,oil and gas),are responsible for most of the climate change currently being observed. Scientists have given information for more than century that emissions from the burning of fossil fuel could lead to increase in the Earth's average surface temperature .NASA'S Global surface temperature Record estimate that Earth's average surface temperature has increased by more than 1.4⁰F(0.8⁰C)over the past 100 years ,with much of this increase taking place over the past 35 years. The green house gases are carbon dioxide(CO₂),Methan (CH₄),Nitrous oxide(N₂O),and water vapour .Human activities--- especially burning fossil fuel---are increasing the concentrations of many of these gases, amplifying the natural greenhouse effect .Swedish scientist Svante Areehenius predicted that if human activities increased co₂ levels in the atmosphere, a warming treand would result.Green house gases trap more infrared energy in the atmosphere than occurs naturally .Heat(infrared energy)radiates out ward from the warmed surface of the surface of the Earth.

KEYWORDS: Earth's, Energy Budget., infrared energy, amplifying.**INTRODUCTION**

Climate change occurs when changes in earth's climate system result in new weathers patterns that last a few decades, and may be millions of years. Climate system comprises five interacting parts, the atmosphere (air), hydrosphere (water), cryosphere (ice and permafrost), biosphere (living things), and lithosphere (earth's crust and upper mantle). , refers to change in entire globe by such statistics as average temperatures, averagr number of rainy days, and the frequency of droughts. Human activities, especially the burning of fossile fuel (coal, oil and gas) are responsible for much of the warming and realted changes being observed around the world. Climate scientists agree burning of fossil fuel are resposible formost the climate change. The Climatesystem receives nearly allof its energy from the sun, with relatively tiny amount from the earth's interior .The balance of

incoming and out going energy, the passage of the energy through the climate system, determines Earth's Energy Budget. when the incoming energy is greater than the outgoing energy, earth's energy is positive and the climate system is warming. if more energy goes out, the energy budget is negative and earth experience cooling. climate can be measured at many geographic scales for example cities, countries, or the entire globe—by such statistics as average temperature, average number of rainy days, and the frequency of droughts .climate change refers to changes in these statics over years, decades, or even centuries. The overwhelming majority of climate scientists agree that human activities, especially the burning of fossil fuels (coal ,oil and gas), are responsible for most of the climate change currently being observed. The climate change is often used to refer specifically to Anthropogenic climate

change(also known as global warming)),is caused by human activity,as opposed to changes in climate that may have resulted as part of Earth's natural processes.A related term "Climate Change"was proposed by the WORLD METEOROLOGICAL ORGANIZATION (WMO) in 1966 to encompass all forms of climatic variability on time scales longer than 10 years,but regardless of causes to focus on anthropogenic causes,as it became clear that human activities had a potential to drastically alter the climate.climate change was incorporated in the title of the Intergovernmental Panel on Climate Change(IPCC)and the UN Framework Convention on climate change(UNFCCC).

Warming of Earth

The observed warming rate has varied from year to year, decade to decade,and place to place ,as is expected from our understanding of the climate system. These shorter term variation are mostly due to natural causes. Even as CO₂ is rising steadily in the atmosphere, leading to gradual warming of eath's surface ,many natural factor are modulating this long-term warming. According to NASA-Earth's average surface temperature has increased by more than 1.4⁰ F(0.8⁰ C)over the past 100 years,with much of this increase taking place over the past 35 years. NOAA-N spacecraft, launched in 2005,is the fifteenth in a series of polar orbiting satellites carry instruments that measure global surface temperature and other climate variables. In 1820 it was observed that certain gases in regulating the temperature of the earth .which are known as carbondioxide, methane and nitrous oxide and water vapour -act like a blanket in the atmosphere ,keeping heat in lower atmosphere.

Sun's energy hits earth, some of its reflected back to space,but most of it absorbed by land and oceans.

This absorbed energy is radiated upward from the earth's surface in the form of heat. In the absence of greenhouse gases,this heat would simply escape to space, and planate's temperature would be below freezing.but green huosegases absorb and redirect some of the this energy downward,keeping heat near theEarth's surface.

As concentrations of heat-tapping green house gases increase in the atmosphere, earth's natural green house effect is enhanced(like thicker blanket) Reducing the levels of greenhouses gases in the atmosphere would cause a decrease in surface temperatures.

Green House Gases: The green house gases are carbon dioxide(CO₂),Methan (CH₄),Nitrous oxide(N₂O),and water vapour .Human activities---especially burning fossil fuel---are increasing the concentrations of many of these gases, **amplifying the** natural greenhouse effect .Swedish scientist **Svante Areehenius** predicted that if human activities increased co₂ levels in the atmosphere, a warming treand would result.Green house gases trap more **infrared energy** in the atmosphere than occurs naturally .Heat(infrared energy)radiates out ward from the warmed surface of the surface of the Earth.Green

house gases such as carbon dioxide(CO₂) absorb heat(infrared radiation)) emitted from earth's surface. sunlight brings energy into the climate system,most of it is absorbed by oceans and land..Heat(infrared energy) radiates outward from the warmed surface of the earth. Some of the infrared energy is absorbed by green house gases in the atmosphere, which re emit the energy in all directions.Some of th infrared energy further warms the earth.some of the infrared energy is emitted into the space. Greenhouse gases are referred to as 'forcing agents' because of teir ability to change the planet's energy balance. A forcing agent can 'push' Earth's temperature up or down.

Greenhouse gas differ in their forcing power. single Methan molecule has about25 times the warming power of a single carbondioxide.howevercarbndioxide has much larger overall warming effect because it is much more abundant and stay in the atmosphere for much longer periods of time.

Some forcing agents pushEarth's Energy balance towards cooling,offsetting some of the heating associated with green housegases eg.some aerosolswhich are tiny liquid or sold particles suspended in the atmosphere,such as those that make up most of the visible air pollution-have a cooling effect because they scatter a portion of incoming sunlight back into space.Human activities,especially the burning of fossile fuels,have increased the number of aerosol particles in the atmosphere over and urban and industrial areas. Some aerosol particle such as dust and soot,actually absorb some solar energy and thus act as warming agents.Many nations,staates and communities have taken action to reduce the concentrations of certain pollutants such as sulphate aerosol responsible for acid rain.Changes in land use and land cover are another way that human activities are influencingEarth's climate.

Orbital Variations: Slight variations in Earth's motion lead to changes in the seasonal distribution of sunlightreaching the earth's surface and how it is distributed across the glob.There is very little change to the area-averaged annuallyaveraged sunshine;but there can be strong changes in geographical and seasonal distribution.The three types of kinematic change are variations in earth's eccentricity, changes in the tilt angle of Earth's axis of rotation,and precession of earth's axis. Combind together,these produce Milankovitch cycleswhich affect climate and are notable for their correlation to glacial and interglacial periods.

Impacts: GLOBAL WARMING-having a significant impact on snow and iceespeciallyt in response to the strong warming across the Arctic.Many of the world's glacier's and ice sheets are melting in response to the warming trend,and long-term average winter snoefall and snowpack have declined in many region as well,such as the Sierra Nevada moutain range in the western United States. Roughly one- third of the total sea-level rise over

the past four decades can be attributed to ocean expansion, due to ice melt. GLOBAL WARMING has had a significant impact on snow and ice, especially in response to the strong warming across the Arctic. Many of the world's glaciers and ice sheets are melting in response to the warming trend, and long-term average winter snowfall and snowpack have declined in many regions as well, such as the Sierra Nevada mountain range in the western United States. Roughly one-third of the total sea-level rise over the past four decades can be attributed to ocean expansion, due to ice melt. As the climate has changed, many species have shifted their range towards the poles and to higher altitudes as they try to stay in the same ambient temperatures. Several plant species are blooming earlier in spring, and some birds, mammals, fish, and insects are migrating earlier while other species are altering their seasonal breeding patterns. Animal breeding and breeding time is reduced. LAST 50 YEARS 30C Temperature has increased in ANTARCTICA., was discovered in 1820. 12% of ice is already melted. Sea level is also increased 40%. Milk production is reduced 20%. Wheat production reduced 05%. Rice production is reduced. Wild fire in AMAZON forest due to Global warming, Winter becoming shorter but Sevier cold. Most of the cities will be under the sea if global warming is not controlled. Viral infections will increase. Human body immunity will decrease. Lung cancers and asthmatic problems will increase.

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