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IMPACT OF GLOBAL WARMING ON ENVIRONMENT

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ABSTRACT

The level of carbon dioxide in the earth's atmosphere was higher than 1000 parts per million a few million years ago, and the average global atmospheric temperature during the evaluation of mammals and dinosaurs was approximately 22 degrees Celsius. In comparison, the average global temperature today is 15 degrees Celsius. There were large ice-free areas in the Arctic and Antarctica, which fostered the growth of several species of old trees and animals. Around 55 million years ago, the level of the sea was approximately 100 meters higher than it is today. Fossil evidence suggests that large pantodont creatures, trees similar to sequoias, and animals such as crocodiles once lived on the island of Svalbard in Norway, which is currently completely frozen over. It is projected that by the year 2100, the concentration of carbon dioxide in the atmosphere will have reached 1000 parts per million (ppm), primarily due to human activity. However, there is nothing new about the problem of global warming; it has been happening since prehistoric times. The warming that occurred in the past was caused by natural processes, specifically the actions of volcanoes and the melting of frozen methane. Recent observations of global warming have provided evidence to support the theory that an amplified greenhouse effect resulting from human activity is, in fact, the primary contributor to the warming of the planet. The paper provides an overview of global warming, discusses the factors that contribute to it as well as the risks it poses, and then discusses some potential solutions to this pressing problem. First and foremost, efforts should be focused on developing renewable energy sources such as solar, wind, hydro, geothermal, and bio mass. Discovering and making use of energy sources that don't deplete the earth's resources is one way to effectively tackle the ever-increasing effects of global warming.

Keyword: *global warming, environment, CO2*

INTRODUCTION

Sunlight causes global warming. Clouds, atmospheric particles, reflective ground surfaces, and ocean surfaces return 30% of sunlight to space, while the rest is absorbed by seas, air, and land. This warms the planet's surface and atmosphere, enabling life. As the Earth warms, thermal radiation and infrared rays radiate solar energy into space, cooling the planet. Some of the outgoing radiation is reabsorbed by carbon dioxide, water vapours, ozone, methane and other atmospheric gases and radiated back to Earth's surface. These heat-trapping gases are called greenhouse gases. This re-absorption process is good because without greenhouse gases, the Earth's surface would be exceedingly cold. Humans have artificially elevated greenhouse gas levels in the atmosphere at an alarming rate for two centuries. Over 8 billion tons of CO2 were pumped in 2004. Increased greenhouse gas levels reduce thermal radiation, causing human-induced global warming. Recent observations have confirmed that a human-enhanced greenhouse effect is causing global warming. Since 1900, the planet's surface temperature has risen the most. The Earth's average surface temperature rose 0.6 to 0.9 degrees Celsius between 1906 and 2006, but the rate of growth roughly doubled in the following 50 years. 20th-century sea levels rose 0.17 meters. Since 1978, Arctic sea ice has shrunk 2.7% each decade [1]. annually Landfills and agricultural decomposition of biomass and manure generate millions of pounds of methane. Various nitrogen-based fertilizers, including urea and diammonium phosphate, emit nitrous oxide. Once released, greenhouse gases last decades or more. Carbon dioxide and methane levels have risen 35% and 148% since 1750, according to IPCC.

Greenhouse effect

Sunlight drives Earth's weather and climate. Solar radiation heats the earth, which radiates the energy into space. Some atmospheric gases capture and hold heat. This causes global warming and weather pattern shifts. Greenhouse gases trap heat energy and can alter the atmosphere's energy balance. Global warming potential (GWP) of a gas measures cumulative radiative forcing induced by unit volume of gas over a certain time. GWP values for gases are measured with reference to CO2's GWP. If CO2's 100-year GWP is 1, methane's is 34. (see table 1).

Table 1 GWP lifetimes

Greenhouse Gas	Lifetime (years)	GWP time Horizon 100 years
Methane	12.4	34
HFC-134a (hydro fluorocarbon)	13.4	1550
CFC-11 (chlorofluorocarbon)	45.0	5350
Nitrous oxide (N2O)	121.0	298
Carbon tetra fluoride (CF4)	50000	7350

Since 1880, Earth has warmed by 0.8oC. (1.4o F). 2014 is an El-nino neutral year, however this peaked. In the previous three decades, global warming has accelerated (see figure 1). ('NASA,' 2015)

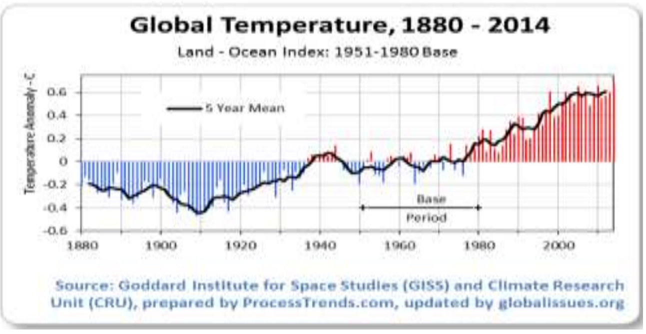

Figure1: 1880-2014 global temperature. ('Anup,'2015)

John Cook of the Skeptical Science blog (2010) identified 10 human-caused global warming signs. Shrinking thermosphere, increasing tropopause, less oxygen in the air, 30 billion tons of CO2 annually, nights warming faster than days, more fossil fuel carbon in coral, more heat return to earth, more fossil fuel carbon in the air, cooling stratosphere, and less heat escape to space (see figure 2).

Greenhouse gas increases warm the planet and change the climate. From laboratory experiments, studies of Mars and Venus' atmospheres, observations and studies of energy fluxes in the atmosphere and from space, and reconstructions of past climatic changes and their likely causes, it is clear that atmospheric concentrations and distributions of radiatively active gases determine the surface temperature of the Earth and other planets. Figure 1 shows how energy fluxes affect Earth's temperature (and climate).

30% of solar energy reaching the top of the atmosphere is reflected back to space by the atmosphere (mostly clouds) and the surface; 20% is absorbed in the atmosphere (mainly water vapor, clouds, and aerosols); and 50% is absorbed at the surface. To reach a steady state temperature, a system must balance the energy it absorbs with infrared (heat) radiation. Given the existing reflectivity of the Earth-atmosphere system, the Earth's average surface temperature would be close to 0oF (-18oC) if its atmosphere were transparent and its surface a simple radiator of energy to space. Such a frigid temperature would kill all known life.

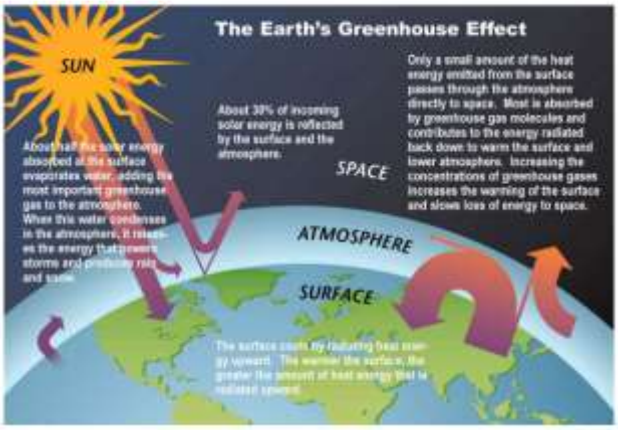

Figure 2. Schematic depiction of Earth's greenhouse effect, with arrows proportional to energy fluxes by process (NAST, 2000). 30% of incoming solar energy is reflected by clouds and the surface, 20% by the atmosphere, and 50% by the surface. Most of the surface's infrared (heat) radiation is absorbed by the atmosphere, which subsequently releases around 90% of it back to the surface, adding to its heat acquisition from the Sun.

The Earth's atmosphere is not transparent to infrared light, recycling some of it to warm the planet. Radiatively active gases in the atmosphere absorb much of the infrared radiation emitted by the surface, greenhouse gases, and low clouds. Less than 10% of the surface's infrared energy reaches space unabsorbed. Greenhouse gases and clouds radiate some of the absorbed energy back to the surface, warming it more. This radiation warms the surface, which causes more radiation to be sent upward, where it is absorbed and reflected back to the surface. This emission-absorption-reemission process is termed the greenhouse effect, but it's not how a greenhouse stays warm and humid. This natural greenhouse effect raises Earth's average surface temperature from -18oF to 15oF.

Temperatures fall with altitude up to the tropopause (approximately 8-10 miles up) before rising again in the stratosphere, which is warmed by ozone (O3) molecules. When greenhouse gas concentrations rise and the atmosphere becomes more opaque to infrared radiation, lower and warmer layers absorb and reemit infrared radiation to the surface. Infrared energy emission is proportional to the fourth power of temperature, increasing downward emitted radiation and enhancing the natural greenhouse effect. When greenhouse gas concentrations rise, higher, colder layers emit into space. The surface-atmosphere system must warm further to balance incoming solar radiation.

Water vapor is the most important greenhouse gas (to be radiatively active, molecules need to have at least 3 atoms so that various rotational and vibrational bands can be activated by the radiation). Water vapor absorbs both Earth's and Sun's infrared radiation. Under the right conditions, water vapor can condense into clouds that absorb, emit, and scatter infrared and solar radiation. In addition to water vapor, other significant greenhouse gases in the atmosphere include CO2, CH4, N2O, and many chlorofluorocarbons, whose concentrations are directly affected by human activities, and O3, whose tropospheric and stratospheric concentrations are indirectly affected by chemical reactions caused by other gases. Because of human activity, these greenhouse gases are called anthropogenic (strictly speaking, their concentrations are being anthropogenically modified).

Space-based instruments show that rising anthropogenic greenhouse gas concentrations augment the natural greenhouse effect. Even while the human greenhouse gases' effect is exceeded by water vapor's, it is not overcome. Instead, a positive water-vapor feedback mechanism amplifies the heat produced by anthropogenic greenhouse gas increases. Positive feedback occurs because a warmer atmosphere can hold more water vapor, causing greater warming. Changes in atmospheric water vapor and circulation can influence cloud size and distribution, which can affect solar radiation absorption and scattering and infrared absorption and reemission through complicated and unclear cloud feedback mechanisms. Increases in anthropogenic greenhouse gas concentrations will tend to raise the Earth's average surface temperature. The main questions are by how much and how quickly.

Since the Industrial Revolution, greenhouse gas concentrations have risen, causing global warming.

Since the Industrial Revolution, greenhouse gas concentrations have risen dramatically, and increasing them would warm the Earth's climate. A major test of scientific understanding is whether the time history and amplitude of climatic changes match those expected based on previous emissions and changes in atmospheric composition. Radiativeforcings, which change the Earth's radiation balance, complicate this approach. These radiativeforcings include natural impacts, such as variations in solar radiation or volcanic particle loadings, and human-induced changes, such as stratospheric ozone depletion, tropospheric ozone enhancement, land cover changes, and atmospheric aerosol changes. The longest climatic data can help identify human effect. Large-scale temperature records date to the mid-19th century. These records show a 1oF (0.6oC) warming throughout this time. Extensive proxy data (tree rings, ice cores, coral development, etc.) for the Northern Hemisphere going back around 1000 years also show considerable warming during the 20th century compared to natural changes in earlier decades. Figure 1c shows a sharp rise in temperature in the late 19th and 20th centuries. This warming seems more permanent than earlier natural swings generated by the ocean-atmosphere system's underlying natural variability (i.e., internal variability), natural variations in solar radiation, and infrequent volcanic eruptions (i.e., external variability). Rising temperatures in boreholes (dry wells), retreating mountain glaciers and sea ice, increasing atmospheric water vapor, rising sea level due to melting mountain glaciers and thermal expansion in response to recent warming (adding to the natural rise due to the long-term melting of parts of Antarctica), and related changes in other variables all confirm that warming is occurring.

The question is whether these changes are natural or caused by human activities. The effect is attributed largely to human activities because of the coincidence in timing with changes in greenhouse gas concentrations, the large and unusual magnitude of the changes compared to past natural fluctuations, the warming of the lower atmosphere and cooling of the upper atmosphere (a sign of a change in greenhouse gas concentrations rather than solar radiation), and the global pattern of warming. Some warming occurred before the steepest spike in greenhouse gas concentrations in the 20th century. 20-40% of the overall warming may be attributable to a coincidental increase in solar radiation, while other factors, such as land cover or soot emissions, may also have had an influence. The rise in tropospheric temperatures during the previous two decades may have been slower than surface temperatures. Whether this discrepancy is real or due to satellite calibration difficulties, natural oscillations in Earth-surface temperatures, ozone depletion, volcanic eruptions, or atmosphere-ocean interactions is not clear.

In 1995, the Intergovernmental Panel on Climate Change (IPCC, 1996a) stated that "the balance of evidence implies a noticeable human effect on the global climate." This result is equal to a civil conviction criterion. In its Third Assessment Report (IPCC, 2001), the IPCC said the amount and timing of 20th-century warming, notably in the last 50 years, closely match what would be expected from human and natural forces.

Warming causes

Greenhouse gases cause global warming. Carbon dioxide, methane, nitrous oxides, and chlorine and bromine-containing chemicals are examples. These gases influence the atmosphere's radiative balance. Greenhouse gases warm the Earth's surface and lower atmosphere by re-radiating part of the planet's outgoing radiation. Carbon dioxide contributed 60% to the net warming from 1850 to the end of the 20th century, methane 25%, and nitrous oxides and halocarbons the rest. Joe Farman of the British Antarctic Survey published an article in 1985 indicating ozone depletion across Antarctica in the 1980s. Large-scale international scientific programs were launched to prove that CFCs (used as aerosol propellants in industrial cleaning fluids and refrigeration tools) were the problem. International action to reduce CFC emissions was also crucial. Ozone depletion is a second cause of global warming. Mostly due to chlorine-containing source gases. These gases breakdown in UV light, generating chlorine atoms that destroy ozone. Aerosols in the atmosphere cause global warming in two ways. They reflect and absorb solar and infrared light and may change the microphysical and chemical properties of clouds, affecting their duration and extent. Solar radiation scattering cools the earth, whereas aerosol absorption warms the air instead of the Earth's surface. Humans contribute variously to atmospheric aerosols. Agriculture creates dust. Burning biomass creates organic droplets and soot. Depending on what is burned or manufactured in production, several industrial processes emit aerosols. Transport emissions produce a rich variety of pollutants that are either aerosols from the start or are converted into aerosols in the atmosphere.

Effects of global warming

Climate researchers struggle to predict global warming's effects. Rain, snowfall, hailstorms, and sea level rise depend on various things. It's challenging to anticipate future greenhouse gas emissions because they depend on technical advances and political actions. Global warming has many harmful repercussions. First, additional water vapour in the atmosphere falls as rain, causing flooding in various locations. Warmer weather increases land and sea evaporation. This causes drought in locations where greater evaporation isn't compensated by rainfall. This will cause crop failure and starvation in some areas, especially where temperatures are already high. Extra atmospheric water vapour will fall as rain, producing flooding. Towns and villages relying on snowmelt may experience drought and water shortages. Because glaciers around the world are receding rapidly and ice melting is faster than expected. IPCC estimates that one-sixth of the world's population lives in locations where melting water will decrease. The warmer environment will generate more heat waves, furious rain, and severe hailstorms and thunderstorms. Global warming's greatest catastrophic effect is rising sea levels, caused by melting ice and glaciers. This will cause oceans, rivers, and lakes to flood.

Fig. 3 shows that temperature anomalies are expected to rise. Before the 20th century, the situation was under control, but it worsened with the start of this century. New companies and power plants started emitting hazardous gases, which increased global warming. Climate and environmental research agencies gathered these data.

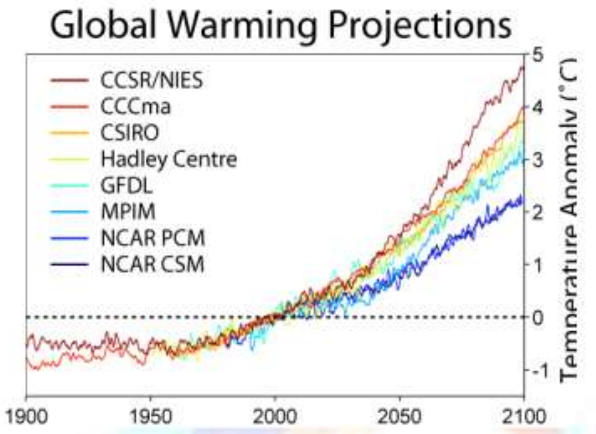

Fig. 3 Projections of global warming by science and engineering agencies

Fig.4 shows future global warming risks and implications. As shown in picture, we are experiencing severe thunderstorms, floods, and earthquakes. If nothing is done to curb this threat, destruction will increase.

NASA's Fig. 5 shows recent world mean temperature (NASA). The tendency is concerning. How will we survive if temperatures rise?

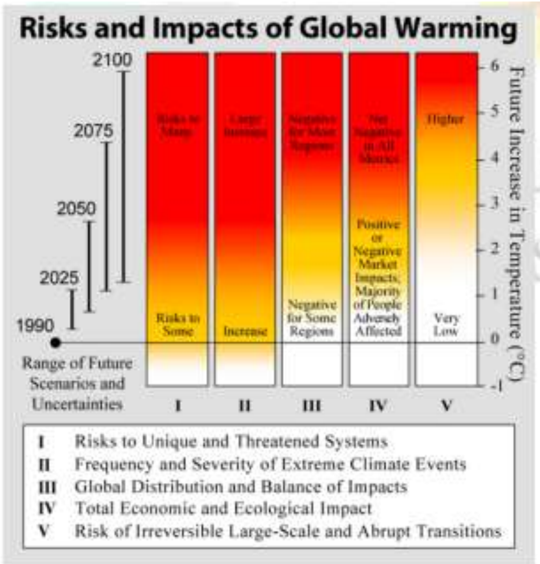

Fig. 4 Global warming risks and impacts. Assessed are five categories. The color-coded bars reflect each factor's impact/concern as temperature rises.

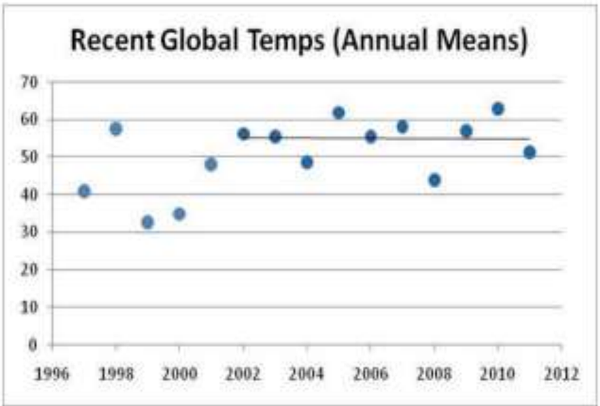

Fig. 5 NASA's worldwide mean temps

Lives affected

Global warming harms living things. Heat stress can induce high blood pressure and heart disease. Crop failures and famines, caused by global warming, can lower the body's resilience to viruses and diseases. As people move from warmer to cooler places, global warming may spread diseases. Warmer oceans and surface waters may cause cholera outbreaks and dangerous infections in seafood.

Warmer temperatures create dehydration, which causes kidney stones. The Children's Hospital of Philadelphia compared the health of 60,000 Americans to meteorological statistics. Three days after a fever spike, people were most likely to get kidney stones. Since 1994, kidney stones have affected 1 in 11 persons. As the world warms, this pattern may worsen. Valley fever is generating a peculiar pattern, says Dr. Luis Ostrosky of the University of Texas Health Science Centre at Houston Medical School and Memorial Hermann-Texas Medical Centre. "We used to see this fungal infection only in California, Arizona, New Mexico, and Texas, but last year we detected it in Washington State," he said. This potentially lethal disease prompted concern in California in 2010 and 2011. Warming climates and drought-caused dust storms may increase valley fever infections. Dry soil and wind spread viral spores. Warmer and longer summers could increase mosquito-borne diseases like dengue fever and malaria. West Nile Virus cases have risen sharply in recent years. 2012 was the worst West Nile season on record, according to the CDC. Summer's heat and drought were possible causes. Lyme disease is another tick-borne illness. Fig. 6 shows how global climatic changes can effect human health. It can induce infections and starve people.

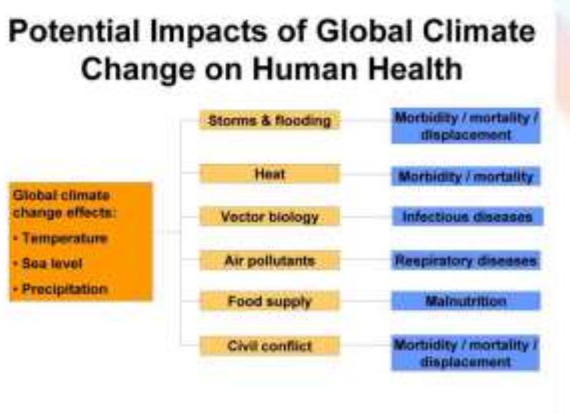

Fig.6 Potential health effects of global warming.

Warming affects animals. They must live in cooler places. This is seen in the Alps, mountainous Queensland, Australia, and misty Costa Rican forests. North Sea fish are also moving north. Their travels can be used as an indication of a warmer planet due to the impacts on species. They silently witness Earth's rapid changes. Scientists and academics believe that global warming is destroying ecosystems and causing extinctions. Orang-utans, Asia's only ape, are in dire straits. Its last remaining strongholds in Indonesian rainforests are threatened by a number of stressors, including climate change, threatening extinction within a few decades. As global warming increases droughts and bushfires, the orang-habitat utan's is progressively fragmented. In Africa, elephants confront dangers include shrinking living space, which increases conflict with humans. With less living space, elephants can't escape changes to their native habitat induced by global warming, such as more frequent and longer dry seasons.

Control of Global Warming

Global warming may modify atomic attributes like mobility, valency, magnetic, electrostatic, conduction, electronic structure, crystalline structure, electropositivity, and electronegativity. Global warming affects earth's magnetism, gravitation, glacier melt, sea overflow, weather, bacteria-virus explosion, etc. Changes in atomic nature and properties due to temperature rise would affect human and plant life, producing nature pollution. We must be more careful to maintain natural temperature and pressure worldwide. We must develop a pollution-free zone within and outside the factory. Today's living patterns are complicated by global warming. Industries, refineries, excessive electromagnetic wave propagation through air, transport vehicles (road and airways), and rapid growth of entertainment equipment (A.C. machine, refrigerator, TV, mobile phone, computer, MP3, CD, DVD-player, etc.) are the main causes of rising global temperatures. Our bodies and minds don't work together naturally to produce the finest work.

CONCLUSION

In 1992, 153 nations signed the Earth Summit convention on climate change to reduce CO2 and other greenhouse gas emissions (2009 A.D) World Climate Summit for Checking Green House Effect conducted in Copenhagen with Presidents, Prime Ministers, etc. To control global warming, Industrialization (Industry should grow with minimum working space effecting least environment pollution) and Naturalization (maximum portion of earth must be covered with agricultural green trees or clean water) must be provided side by side, and people must cut short all types of entertainment equipment, finding alternative sources of energy like renewable energy, manufacturing fuel, or alternative fuel. Nobel-poet Tagore urges, "Give back those trees, take these cities" It means that our city-oriented industrial living pattern is destroying natural climate and woods, causing the environment to heat up quickly. It's our obligation to maintain natural harmony and restore tree plantations and lush forests with little industrial waste damage. Global warming may be controlled or tempered in the coming days.

Reference

[1]. Albrecht, B. A. (1989) Science 245, 1227–1230.

[2]. Andreae, M. (1995) in World Survey of Climatology, ed. Henderson-Sellers, A. (Elsevier,Amsterdam), Vol. 16, pp. 347–398.

[3]. Ausubel, J. H. (1995) Energy Policy 23, 411–416.

[4]. Battle, M., Bender, M. L., Tans, P. P., White, J. W. C., Ellis, J. T., Conway, T. &Francey,R. J. (2000) Science 287, 2467–2470.

[5]. Bolin, B. (1998) Science 279, 330–331.

[6]. Brown, L. R., Renner, M. &Halwell, B. (2000) Vital Signs 2000 (Norton, New York).

[7]. Charlson, R. J., Schwartz, S. E., Hales, J. M., Cess, R. D., Coakley, J. A., Hansen, J. E. &Hofmann, D. J. (1992) Science 255, 423–430.

[8]. Charney, J. (1979) Carbon Dioxide and Climate (Natl. Acad. Press, Washington, DC).

[9]. Christidis, N., Hurley, M. D., Pinnock, S., Shine, K. P. & Wallington, T. J. (1997) J. Geophys.Res. 102, 19597–19609.

[10]. Chuang, C. C., Penner, J. E., Taylor, K. E., Grossman, A. S. & Walton, J. J. (1997) J. Geophys.Res. 102, 3761–3778.

[11]. Cicerone, R. J. &Oremland, R. S. (1988) Global Biogeo. Cycles 2, 299–327.

[12]. Denier Van der Gon, H. (2000) Global Biogeo. Cycles 14, 61–72.