ISSN-0971-2156

IMPACT FACTOR (2020) 5.24

SPECIAL ISSUE ON
INTERNATIONAL E-CONFERENCE.
JANUARY-2020

RESEARCH CARE ASSOCIATION

International E-Conference on Social Science, Science & Technology, Management and Humanities (ICSSMH) 2020

Editors

Dr. A. Nageshwarrao

Mr.Shubham Ambhore

ISBN-0971-2156
Vol-10 Issue-02
Impact Factor(2020)- 5.24

INDEX

The Role of Physics in Environmental in its Global Warming Reduction

Mr. Datta Vasant Sarwade
Vaishnavi Mahavidyalaya Wadwani
Email id: sdatta_2007@rediffmail.com
Mob. No.: 9096054306

Introduction:

Physics also provides a basis for understanding the dynamic interactions between the atmosphere and the oceans and for the study of short-term climate and long-term climate change. Much of physics is the study of energy and its transformation, and energy is at the center of important environmental issues. In recent years, researchers have become increasingly interested in applying sophisticated modeling methods, as they are useful for understanding various environmental phenomena and solving some problems. But dynamic physicochemical models are complex formats and are a more theoretical weapon that allows an easier way of assessing risk and quality in the human environment. Usually, the quality of life in a particular environment is assessed by a number of parameters but observation of air, water and soil chemistry and biochemistry is crucial. Monitoring data are then presented with ease and relevant conclusions compared to specific samples of "acceptable" values for hazardous chemicals. Unfortunately, this approach does not match reality. It is homogeneous and provides information on only one potentially contaminated toxic compound. Nature is multifaceted and it is better to gather information and give interpreted information simultaneously on relationships and the effects of multiple chemicals or pollution. The idea of sustainable development, as defined by many scientists, needs to take into account as many environmental parameters as possible in order to achieve a credible path: what to do with a system, how to act on it, what requires the participation of officials, etc. It is absolutely inevitable to include a strong background around you and this background. Physics is a way of understanding environmental processes and combining principles with their applications to important environmental problems. Physical methods and physicists are needed to collect and analyze environmental information, to estimate environmental impacts, to assess the consequences of policy measures, to formulate government regulations, to handle a large database of computer-assisted methods related to the environment. The latter applies to the organization and visualization of experimental data and to the design of models from a more theoretical perspective. Environmental physics already known is more than the study of the physical environment. It actually includes aspects of atmospheric physics, soil and sedation, and applied physics and engineering. A very important part of modern environmental physics is ecology, which is the use of multivariate-eaten statistical methods to classify, model, and interpret large data sets from the physical, chemical, and biological monitoring of various ecosystems. This approach is currently the only way to explain the face-torus that affects environmental processes, types of pollution, air, soil and water pollution. Thus, they are a tool not only for good data transmission and abundant information but also for measuring the quality of human life. However, understanding the philosophy of ecology and its opportunities as a risk assessment tool is not complete and indisputable. The aim of the present study is to introduce some of the most popular and advanced environmental methods in environmental physics, to explain their ability to solve problems and risk assessment on various case studies[1].

Environmental monitoring and improvement:

A large part of the environmental challenges facing mankind includes issues that require good management of human activities to minimize harmful effects on natural systems. Due to the larger and more prosperous human population these types of problems arise with increasing frequency. But our in-depth understanding of the affected systems and improved capabilities can make them more successful. These types of problems come on all scales to detect human impact: from a separate room whose air is polluted by radon or organic pollutants, to urban airways under specific reasons in pollutants, in the global stratosphere, whose chemical composition is changing chlorofluorocarbons and nitrogen oxides. The discovery of chlorofluorocarbons destroying stratospheric ozone is a good illustration of how physics may be used to understand how the human natural system changes. Working on the details of this problem is a mixture of the chemistry of heterogeneous reactions

ISBN-0971-2156
Vol-10 Issue-02
Impact Factor(2020)- 5.24

and the physics of fluid and radiation transport. Global warming by burning fossil fuels is partly the result of changing the Earth's carbon cycle.

The increase in carbon dioxide has led to an increase in other greenhouse gases due to changes in the global hydrological cycle. The understanding of global warming and related climate change is based on a number of topics. Understanding the structure of the basic meteorological system requires geophysical fluid dynamics in which these climate changes occur. At the same time, chemical and biochemical cycles are active partners in the dynamics and thermodynamics of meteorological systems. Effective management of human interaction with the ecosystem requires simultaneous progress on several fronts: understanding of the system in the absence of human influence; Understanding of the mechanism of human influence system change; And an understanding of the measures available to mitigate this effect, such as changing the nature of one energy product to another. Much progress has been made over the past few decades in understanding the functioning of those ecosystems that are particularly vulnerable to human impact, from the thermal behavior of lakes to the chemistry of the stratosphere. Many of these systems are now well understood through a combination of measurement, modelling, simulation and theory. Identifying tiny amounts of tracer molecules in environmental samples is one of the finest methods for detecting human impact on the weather. Various long-lasting radioactive nuclei act as tracers just as short-lived radioactive nuclei act as tracers for the study of biological systems. The use of this tracer has increased with the understanding of the formation of radioactive elements and their decay and detection. This method has become more sensitive to environmental monitoring as more sensitive search techniques have been developed[2].

Monitoring the environment:

Accelerated mass spectrometry (AMS) is an important tool for environmental measurement. AMS uses atomic techniques to accelerate and identify small concentrations of tracer atoms in environmental samples. Measurements that would otherwise be difficult or impossible are regulated by its sensitivity.

Cosmic rays from other places in the galaxy constantly bombard the Earth's atmosphere and surface, creating long-lasting radioactive "Cosmo genic nuclei." Since the carbon in the organic matter does not once again kill the animal or plant from the atmosphere, the 14C current decays with a half-life of 5700 years, and the remaining amount provides a measure of the age of the object. Other Cosmo genic nuclei can be used in the same way that their contents are protected from cosmic rays and the atmosphere. The concentration of long-lived isotope 81Kr in the waters of the Great Artesian Basin in Australia is measured and used to determine how long its groundwater has remained contaminated by small groundwater[3].

How physics reduces global warming:

Climate change: - Climate can be described as the sum of weather. While the weather is quite variable, the trend over the long term, the weather is more stable. However, the climate still changes over time from decades to millennia. The ice age is a perfect example of long-term change. Internal dynamics of the climate system and changes in the external climate create natural climate change. Historical temperature records and proxy records of climate variables show fluctuations throughout the period. Some of these changes can be caused by external force, such as a minimum temperature of 1800í, which can be caused by a decrease in solar radiation. Aerosol particles on the Earth's surface due to the injection of light reflected into the stratosphere. Natural and human systems have adapted to the prevailing levels of sunlight, wind and rain. These systems can adjust to slight changes in climate, but if climate change is too quick or too large, adaptation will be difficult, if not impossible. Anthropogenic, or human-induced, is a causal concern on climate change. If climate change is happening too fast, many natural systems will not be able to adapt and will deteriorate, and societies will have to bear the cost of adapting to the changed climate.

The physics of climate change:

Climate and weather absorb solar radiation and then redistribute that energy through radioactive, adhesive and hydrological processes. The temperature of the earth's surface is determined primarily by the balance between the absorption and emission of radiation. This change in radioactive balance is called radioactive forcing, which is measured in watts per square meter. Naturally occurring greenhouse gases, mainly water vapor and carbon dioxide, trap thermal radiation from the earth's surface, keeping the surface warmer than others. Human activities are increasing the natural greenhouse effect by significantly increasing the

ISBN-0971-2156
Vol-10 Issue-02
Impact Factor(2020)- 5.24

atmospheric concentration of greenhouse gases. For example, carbon dioxide concentrations in the atmosphere have already increased by roughly 30% since pre-industrial times, but methane concentrations have increased by twice as much[4].

Greenhouse gas:

The main anthropogenic greenhouse gas is carbon dioxide, to which methane is a significant contributor. While chlorofluorocarbons (CFCs) are powerful greenhouse gases, their direct radioactive effect is partially reversed due to depletion of stratospheric ozone. Sulfate aerosols, formed from sulfur dioxide in the atmosphere, which are mainly formed by the use of coal, contribute significantly to climate change, although they act to cool the earth's surface. Carbon dioxide represents about 60% of positive anthropogenic radiation force. The largest source of carbon dioxide comes from the use of fossil fuels. Different fossil fuels vary in carbon content, natural gas has the lowest carbon content and coal has the highest.

The efficiency of a particular generation also varies greatly. Combined-cycle natural gas generating plants are the preferred mode of production today due to their high efficiency, while the traditional use of non-commercial fuels such as wood is generally inefficient. Land use changes, particularly tropical deforestation, account for one-fifth of current carbon dioxide emissions; however, deforestation's importance relative to fossil fuel emissions is predicted to decline in the future. Unlike other greenhouse gases, carbon dioxide is not destroyed in the atmosphere, but instead in the atmosphere, terrestrial life, and the cycles in the oceans. Due to this complex cycle, carbon dioxide has no atmospheric lifespan. Only half of the carbon dioxide generated today is still in the atmosphere, with some of it lasting decades. The rest is absorbed into either the ocean or terrestrial biosphere. This carbon dioxide is divided by the ancient forests that we burn today as fossil fuels. There are numerous sources of anthropogenic methane emissions, including fossil fuel use (natural gas) and production, ruminant animals, waste disposal, and rice farming. Methane is a powerful greenhouse gas, with twenty-one times the radioactive effect of carbon dioxide per molecule, and its atmospheric life is very short. While methane is oxidised in the atmosphere for about a decade, carbon dioxide is virtually indestructible and remains in the atmosphere until absorbed by the ocean or the terrestrial biosphere. Carbon dioxide is therefore the primary greenhouse gas of concern, as it has a long atmospheric life and is widely released into the atmosphere.

Sulfate aerosols are light-colored particles, part of the smoke seen in industrial areas. They act against greenhouse gases, reflecting light and cooling the earth's surface. The best estimate of the cooling effect of sulfate aerosols is that they have offset a little more than a third of the global-average global warming caused by the anthropogenic greenhouse gases they have released to date. However, the radioactive effects of aerosols are very uncertain and their cooling effects may differ significantly from the current best estimated value. Sulfate aerosols are expected to have indirect effects by acting as condensation nuclei and thus make clouds thicker and more reflective. The magnitude of the indirect effect is very uncertain. Although these aerosols, including the atmosphere caused by the burning of biomass, tend to cool the atmosphere, even if they have the same magnitude of the two effects, they cannot exactly reverse the warming caused by greenhouse gases. Greenhouse gases such as carbon dioxide and methane are distributed lightly in the atmosphere, while aerosols are concentrated near their source. Thus sulfate aerosol cooling effects are largely concentrated near industrial areas, especially in the eastern United States and Western Europe. The climatic effect of these compounds can be considered beneficial, when sulfur dioxide and sulfate aerosols are finally removed from the atmosphere they acidify the soil, which harms natural and agricultural systems[5].

Weather results:

The importance of the problem of climate change arises due to the impact of climate change on human and natural systems. The two most famous effects of climate change are global warming and rising sea levels. The primary factors for sea level rise are thermal expansion and melting of small (continental) glaciers. However, other changes in the climate may be more or less significant than changes in the average weather condition. These include changes in rainfall and climate variability, especially the severity and / or intensity of severe events such as droughts, floods, or tropical storms. The extent to which any of these changes can occur is still uncertain.

The level of damage caused by climate change is also uncertain. Although climate change will be beneficial in some areas, the increase in greenhouse gas emissions is

ISBN-0971-2156
Vol-10 Issue-02
Impact Factor(2020)- 5.24

expected to result in net costs. Coastal regions are overpopulated and particularly vulnerable to climate change, especially rising sea levels. Agricultural activities are highly penetrating to the weather. However, the estimate of damage in this area is uncertain as it is not clear to what extent the rising levels of carbon dioxide in the atmosphere will increase crop growth. Other areas affected by climate change include forestry, air quality, water resources, human health and energy use.

The expected rate of anthropogenic climate change is higher than the natural rate at which climate has changed in the past. This has raised some concerns that the rate of anthropogenic climate change will be higher than some natural systems are able to adapt to. If the climate changes in a state that is beyond the tolerance of an individual, the species must migrate to the right area. Plant species migrate very slowly and the migration of many animal and plant species is severely limited by human development. Many ecosystems, such as wetlands, are particularly vulnerable to climate change or sea level rise[6].

Responding to climate change:

There are two main retorts to climate change, mitigation and adaptation. The rate at which carbon dioxide, methane and other greenhouse gases are released into the atmosphere can be reduced. This is called mitigation and will reduce the rate of future climate change. Emissions can be reduced by reducing energy demand, using more efficient energy production technologies, and / or using energy sources that do not emit pure greenhouse gases. Carbon-free energy sources contain renewable energy, geothermal energy and nuclear energy.

Reductions in energy use can be achieved directly through strategic measures, such as carbon taxes, and by improving the efficiency of using and manufacturing equipment. Modern energy production technologies, such as combined-cycle power plants, are significantly more efficient than older power projects. However, in the long run, stabilization of carbon dioxide concentrations requires the development of a non-fossil energy supply, i.e. renewable and / or nuclear energy. The second choice is adaptation, which is adapting to the consequences of future climate change. Rich countries can build sea walls or change agricultural production, but these actions will divert resources from other activities. Poor countries are more vulnerable to climate change because they are generally more dependent on natural resources and lack the economic resources to bear the losses.

Efforts to reduce anthropogenic effects on the climate are strongly subjective by the inertia present in the climate and human systems. The effect of increasing attentiveness of greenhouse gases is strongly measured by the thermal inertia of the oceans. On the human side, the systems by which we generate and use energy, including society in general, are slowly changing. Wise people are also needed to respond to climate change. The study of public-environmental values has received widespread support for environmental protection and there is also a general desire to reap economic benefits in favour of the environment. Public perception of the problem of climate change, however, is flawed. The relationship between energy use and climate change is practically non-existent in people's minds. In addition, the majority of people complicate climate change with pollution and ozone depletion - often expressing the view that climate change can be moderated through pollution control[7].

Conclusion:

Many public discussions on climate change have confused the issue of climate change detection with the inevitability of climate change. The consensus of the scientific community is clear: increasing greenhouse gas emissions will inevitably increase the level of greenhouse gases in the Earth's atmosphere, which will change the Earth's climate. Although the inevitability of climate change is generally accepted, the magnitude and nature of these changes are still uncertain. Although anthropogenic climate change has not been clearly identified, evidence of human impact on climate is growing. The Earth's surface temperature has risen by about half a degree centigrade in the last century. This rate of change is similar in magnitude to natural climate change but also in the range of potential effects of a historic increase in the concentration of greenhouse gases.

It is not possible at the moment to clearly detect climate change through global average temperature records, but when we can detect global warming, we cannot attribute anthropological effects to normal global warming. Fingerprint detection is a more promising technique. The plan involves using GCM to identify specific local patterns caused by anthropogenic effects. Several studies using this technique have recently found evidence of human effects on the climate. This study, due to other

ISBN-0971-2156
Vol-10 Issue-02
Impact Factor(2020)- 5.24

changes in climate and temperature patterns, led IPCC Working Group I to conclude that, while there are still many uncertainties, - the balance of evidence suggests that there is a clear human impact on global climate. How much the weather will change in the future is still uncertain. However, climate change can cause significant damage to both human and natural systems. Estimates of the cost of reducing greenhouse gas emissions are also uncertain, and a definite cost-benefit calculation comparing climate change losses to mitigation costs is not possible at this time.

With the removal of goods related to political and economic interests, much of the debate over climate change is fueled by differences in values. The general increase in wealth through technological change and economic growth will make the world more capable of tackling this problem in the future. However, some, perhaps small, amounts of losses will accrue intermittently. The risk-averse approach argues to reduce greenhouse gas emissions as quickly as possible to avoid the possibility of harm. A contrasting approach supports waiting until the consequences of climate change (and more capable of change) become more certain. This part of the debate will be better understood by improved science, but will not be resolved.

References:

1. J. Lean, A. Skumanich and O. White, Estimating the suns radioactive output during the Maunder minimum *GRL*. **19** (15), 1591-1594 (1992).
2. J. Hanson, A. Lacis, R. Ruedy, M. Sato and H. Wilson, How sensitive is the world's climate? *Natl. Geog. Res. Explore*. **9**, 143-158 (1993).
3. The Intergovernmental Panel on Climate Change (IPCC), *Climate Change 1995: IPCC Second Assessment Report, Working Group I, Summary for Policymakers* (1995). Available at: http://www.unep.ch/ipcc/ipcc95.html
4. Kempton, W. J. S. Boster, and J. A. Hartley, *Environmental Values in American Culture* (Cambridge: MIT Press), (1995).
5. *Climate Change 1995: The Science of Climate Change, Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change*, J.T. Houghton et al., Eds. (Cambridge University Press, Cambridge, UK, 1995).
6. *Climate Change: The IPCC Scientific Assessment* J.T. Houghton, et al., Eds. (Cambridge University Press, Cambridge, UK, 1990).
7. Lochinov, Vasil and Tsakoski, Stefan: 'Multivariate statistical approaches as applied to environmental physics studies', pages 277-298 of The Central European Journal of Physics 4(2),2006: *www.degruyter.com/downloadpdf/j/phys.2006.4.issue-2/s11534-006-0012-3/s11534-006-0012-3.pd*