



Non-Climatically Factors Causing Weather Changes

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Abstract- Climate change refers to the oscillations in earth global or regional climate in time interval and defines those changes that fluctuate with mean atmospheric conditions or average weather (common) in timescale intervals which fluctuate between decades to million years. These changes may have been resulted from earth internal processes or forces beyond it (like oscillations in sun light intensity) or in recent times due to activities related to the man-made climatically changes. Especially in recent application in the subject of environment policy, the expression of; climate change; often refers to the current changes in new climate. The subject of climate change and its possible effects on different social and educational sections has been raised as one of the human technological challenges. Recent studies show that radiations forces due to greenhouse gases are the main factors for global warming. Greenhouse gases also have an important role in understanding earth climate history. Based on these studies greenhouse effect which produces heat due to trapping of heat by greenhouse gases has a key role in adjusting earth temperature, This article has investigated the non-climatically factors causing weather changes.

Keywords: *Climate Change, Greenhouse Gases, Environmental Policy, Earth Warming*

I. INTRODUCTION

Climate change refers to the oscillations in earth global or regional climate in time interval and defines those changes that fluctuate with mean atmospheric conditions or average weather (common) in timescale intervals which fluctuate between decades to million years. These changes may have been resulted from earth internal processes or forces beyond it (like oscillations in sun light intensity) or in recent times due to activities related to the man-made climatically changes. Especially in recent application in the subject of environment policy, the expression of; climate change; often refers to the current changes in new climate such as mean temperature increase of earth surface known as earth warming. In some instances the expression of; climate change; also applies to the

human cause and effect relationship as used in climate change framework convention of united nation UNFCCC. UNFCCC convention uses the expression of; climatically oscillations; for those changes having non-human origin.

II. CLIMATICALLY CHANGE FACTORS

Climate change refers to the oscillations of inter-earth environment; existing natural processes around it and the effect of human activity. External factors which can form the climate are often called climatically forces including processes such as oscillations in sun radiations, earth revolution and the amounts concentrations of greenhouse gas.

A. Ocean Oscillations

Almost in timescales of some decades, climate change can also result from changes in oceanic-atmospheric intersystem. Most of the climate conditions the most apparent of all, EL NINO southern oscillation (ENSO) also includes ten years pacific, northern Atlantic Ocean and ataractic ocean oscillations known as special conditions in climate system that has at least been saved in the oceans due to their prescience by different warm methods and displaced between different sources. In longer timescales oceanic processes such as thermo hyaline revolution play key roles in redistribution of warmth and in the case of change can influence climate severely. Air contaminators which have been spread or formed in atmosphere can cause the rise of rainfall. This phenomenon occurs because small particles function as nuclei and reinforce the formation of rain droplets. This is the same principle existing about formation cloud. Much increase of rainfall especially in the air above urban centers in which spreading of particles occurs in a very high extent .This point has been approved that formation of mist in big cities is two times of that in undeveloped regions and formation of cloud in big cities is ten times more than that of cities' suburbs. High SO₂ concentration increases mist in industrial regions. The released NO and SO₂ are associated with acid rains.

B. Climate Memory (Restoration)

Most of the oscillation forms in a climate system can be considered as hysteretic; it means that current climate not only indicates its inputs but also the history of its emergence and reaching to this stage. For Example and decade drought can cause the destruction of lakes; complete drying of plains and desert development. Instead these conditions can cause less rainfall in current years. In short climate change can be a permanent self-regulating process because different environmental aspects respond to the inevitable fluctuations in different proportions and ways.

III. NON CLIMATE FACTORIES CAUSING WEATHER CHANGING

A. Greenhouses Gases

Recent studies show that radiation force by the greenhouse gases is the main factor for global warming. Greenhouse gases have an important role in understanding earth climatically history. Based on these studies the greenhouse effect which produces heat by greenhouse gases has a key role in adjusting earth temperature. During last 600 million years the amount of carbon dioxide has been probably changed from more than 500 to less than 200 ppm which is mainly due to the influence of geology processes and biology innovations.

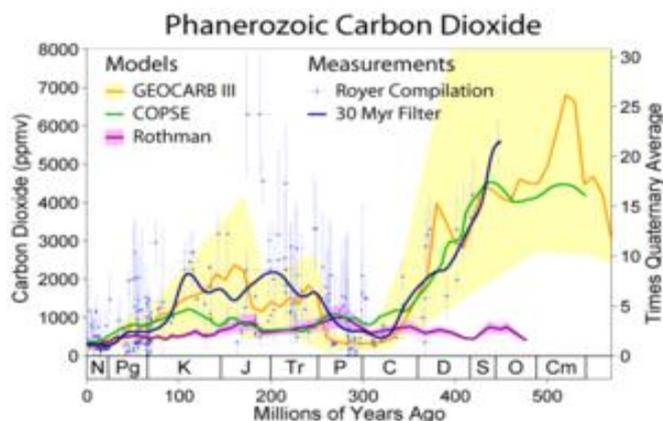


Figure 1: Phanerozoic Carbon Dioxide In Versus Time

But there are several samples of rapid changes in the amount of greenhouse gases in the earth atmosphere which has apparently a close relationship with severe warming such as Suzan Paterson's maximum period (Paleocene- Iverson, decline period of Permian-Terrassic), decline periods of creepers and dinosaurs and the end of earth frost period in Scandinavia region .During new period increasing level of carbon dioxide is regarded as the main factor causing global warming since 1950 till now.

B. What Are the Consequences of Earth Warming?

Temperatures and the amount of snow and rainfall both influence on weather. Temperature and the amount of rainfall in any region are influenced by its geographical width .height and oceanic currents which leave unfavorable effects. Some of known consequences caused by weather change are as follows:

1. Rising sea water level and decreasing fresh water source.
2. Changing the amount of rainfall and wind direction.
3. Increasing natural calamities such as storm Hurricane and flood.
4. Increasing the amount of drought and desert development.
5. Increasing air pollution in some regions due to increasing of warm winds.
6. The possible effect on spreading diseases such as malaria.

IV. THE PROPERTIES OF RECENT CLIMATE CHANGE

A. Human Effects on Climate

Human influential factors are those activities by which human beings change the environment and influence on climate. Now largest intended factor is increasing CO₂ level due to fossil fuel combustion by which aerosol suspended particles (suspended particles in the atmosphere) because cooling effect on climate. Other factors including using the earth, ozone destruction and deforestation also influence on climate.

B. Fossil Fuels

By the beginning of industrial revolution in 1950s and its fast spreading till now, fossil fuel consumption by human beings has increased CO₂ level from the amount of about 280 to more than 370 ppm .This amount is being increased to reach to more than 650ppm before the end of 21st century. Besides increasing amount of methane, it is anticipated that the above changes result in temperature increase of about 4.1-6.5 .C between 1990-2100. The areas of forests are now continuously reduced in most of the temperate region countries after several decades of tolerating substantial and congestion effects of air pollution. Air contaminating materials developed by fossil fuel consumption in transportation and power producing industries expand in an unprecedented rate over the forests and exert great pressure on them and the forests of tropical regions have recently been influenced by these materials-Air conditioning materials such as sulfates, acid producing nitrates, gaseous sulphur dioxide, ozone gas and heavy metals accompanied by natural tension are the main factors for this destruction. Air contaminators individually or collectively weaken the trees in several different ways. These materials directly cause the narrowing of trees and yellowing

ads or mature falling the wide and needle leaves from the branches. These trees lose their resistance against natural factors such as drought and intense temperatures variations. In sum these direct and indirect pressures, endanger the ability of forest for protecting aquifer uses and soil stability. The most clear and practical way of reducing the amount of contamination spreading, is increasing energy efficiency especially in houses, vehicles and factories. The more widespread use of natural gas will be effective in this respect, because the combustion of this gas almost does not produce any kind of contaminants. Finally reduction of main air contaminants will be enhanced by just transference from fossil fuel-based economy to renewable energies –based one such as sun energy, wind, water force and etc. There is an unseen and delicate layer of ozone in a far location above coldness protecting us against sun dangerous ultraviolet radiations. The ozone layer has been there for centuries. But now human destroys this protective shield. CFCS haloes and other synthetic chemicals are floating over our heads in 10-15 kilometers distance. They are dissolved and release molecules which destroy ozone.

C. Making Use of Ground

Before extensive use of ground the largest human influence on regional climate may probably have resulted from ground use. Irrigation, deforestation and farming mainly cause environment change. For example they can change sun regional reflection by influencing on ground coverage and changing the amount of sun rays being absorbed. For example there are evidences confirming that the climate of Greece and other Mediterranean countries have constantly been changed by deforestation between 700 B.C till Christ birth the wood of these forests has been used for manufacturing ships, buildings and as a fuel by which the new climate in the region has mainly become drier and hotter and different species of trees used in the old age for making ships are no longer found in this region. William Radioman's clamorous and primary Anthrop son hypotheses assert that development of farming accompanied by deforestation because the increase of carbon dioxide and methane during last 5000-8000 years. These increases caused by last reductions can be responsible for the delay in next frost period initiation based on Radioman hypothesis.

D. Mutual Effect of Factors

If a special factor (such as sun oscillation) acts to change the climate so there can be some systems to cause its intensification and reduction. These cases are also called positive or negative feedbacks. Evidently climatically system is generally stable with regard to these feedbacks. Positive feedbacks are not controllable reason for that is because of the presence of a powerful negative feedback between temperatures and scatter radiation. Radiation increases

proportional to fourth power of absolute temperature but there are some important positive feedbacks. Frost cycles and periods from present frost period indicates an important sample. It is believed that circulation oscillations (earth) creates timetable for developing or recessing of ice sheets but these layers themselves reflect sunshine to the space and by this upgrade their cooling and development known as reflection-ice feedback. Besides; lowering of sea surface and ice development reduce plant growth and indirectly decreases carbon dioxide and methane. This factor causes more cooling. Thus for example, temperature increase due to manmade greenhouse gases can cause recession of ice which reveals earth beneath darker surface and consequently results in more absorption of sunshine. Water vapor, methane and carbon dioxide also can act as important positive feedbacks and with increasing their levels in response to warming trend thus accelerate that trend. Water vapor can surely act as a feedback (with the exception of its little amount in the stratosphere) contrary to other greenhouse gases. More complicated feedbacks include the possibility of circulation patterns in the ocean or atmosphere, for example new concern in new era is melting of Greenland's ice mass accompanied by sedimentation of water in the North Pole and development of obstacles for thermo hyaline circulation. This issue could affect on gulf current and warmth distribution to Europe and eastern shore of U.S.A, Other potential feedbacks are not understandable and may result in prevention or development of warmth trend. For example it is not clear whether temperature increase results in plant growth or may prevent it that may more or less decreases the amount of carbon dioxide Also temperature increase can more or less cause the development of cloud. Since this issue has chilling effect on cloud balance cover, any changes in development of clouds can affect on weather.

E. Evidences for Climatic Change

These evidences are obtained from a collection of sources which can be used for old climatic reconstruction. Most of these evidences are indirect weather changes which are inferred from existing oscillations in those indices which affect on climate such as plant growth. The knowledge of determining the age of plants by counting growth cycles, ice layers, sea level change and ice recession.

F. Examples of Climatically Change

Climatically change has been extended throughout the history. The field of climatology archeology has provided information about climatically change and also completes new climatically observations. Without doubt this prehistoric changes result merely from natural factors. There has been a discussion this issue that how climatically change affects on world economy. In his report of October 29th 2006, Nicholas Stern, the economist of World Bank asserts that climatically

change could have affected on economical development so that it can cause the bankruptcy of one fifth of its economy unless an efficient proceeding is performed.

V. EVALUATING THE EFFECT OF WEATHER CHANGE

A. *The Amount of Rainfall*

To evaluate the amount of vulnerability of country due to not controlling the emission of greenhouse gases, six different scenarios have been planned. These canaries are themselves a selective combination of models and different scenarios such as JCM, HadCM₂ and ECHAM, there are three distribution (IS92a, IS92b and IS 92C) and three different Climatically sensitivities. Three different situations have been considered for emission of greenhouse gases in these combinations which are as follows:

- A) Low distribution
- B) Keeping distribution stable in present condition
- C) High distribution

Finally the results of performed modeling between the combination of canaries and different climatically sensitivities shows that temperature increase is between 1-1.5 °c., 2.5-4.1°c and 5.9-7.7°c for case A, B and C respectively. Also the same combinations were used for presenting the changes in rainfall in the country, the results of which are as follows:

For condition a -11-19.1% reduction of rainfall comparing to base year.

For condition B -30.9-50% reduction of rainfall comparing to base year

For condition C -58-80% reduction of rainfall comparing to base year

B. *Water Sources*

To investigate the effect of earth warming on water sources of Iran different studies have been conducted using hydro - meteorology data and different water current models which have been combined with emission canaries and temperature changes. The results of periodic water current data having been compiled from 398 hydrology station indicate that flood water index have changed in 47 percent of them. Besides; in 600 meteorology stations under study during 1990-2000 Climatically changes have been observed, Long -term water current model used for 30 river basins indicates that temperature development increases water current in winter due to converting snowfall to rainfall and in spring due to rapid melting of snow. Also it is clear that temperature development has affected on water current of water basins and reduces water current oscillations resulting from rainfall.

C. *Farming*

Anticipated temperature increase due to weather changes causes rice seedling fertility, maize longer life, wheat unlikeliness and potato germinating reduction. On the other hand weather changes along with reduction of the amount and time of rainfall causes reduction of wheat and cotton production based on chronological data, so that recent droughts during 1377-1378(1998-1999) causes reduction of 1050000 tons aquatic wheat product and 2543000 tons dry farming wheat product. These results indicate that agriculture section of Iran is most vulnerable against the phenomenon of weather changes.

D. *Forest and Ground Application*

Earth warming affects forest section sharply. Changing natural growth location of plant species of forest especially resistant ones and extinction of semi-resistant species are examples of these changes. Natural growth of forest plants will be disturber and results in reduction of wood production and non-wood products in the forest. A cattle rushing to forest domains and grasslands and intensification of plant diseases causes the development of ground erosion especially in dry and semi-dry regions. Increasing sea water level in Persian Gulf and Oman Sea causes the distraction of marine Hear forests (Mango). Living environment will become very harsh for wildlife in woodland regions rapidly due to reduction of forage in forests which can be a sign of desert development. Temperature increase and drought cause distraction of plant cover and as a result soil erosion accelerates that finally unpleasant social consequences such as migration will happen due to weakening of ecological capacities of the region because of these destructions.

E. *Coastal Regions*

The north part of Iran is the center of agriculture productions. Energy producing industries are located in the south part and are regarded as oil extraction center and its export. Most of the exporting ports for goods are located in the south. The presence of these industries in the north and south part of Iran indicates that how much coastal regions of the country are vulnerable to the effects of weather changes. With regard to the data gathered during ten years in different hours from three stations (Chahbahar, Bandar Abbas and Boushehr) the mean value of sea water level in Persian Gulf and Oman Sea has been 4.5 millimeter in years which conform to different canaries. Some of the effects of temperature increase and sea water level in coastal regions are: erosion of coastal borders in the north and south and filling with water of low lands such as peninsula and Gorgon Gulf, whitening of coral stones, penetration of sour water in fresh one due to filling with water of coastal lands, all of which are examples of vulnerability of Iran's northern and southern shores. From social and economical terms, climate change has a very harsh

and bad effect on families' health and welfare which can refer to providing fresh water in coastal regions. Penetration of sour water into underground and surface waters is considered as the most important consequences of climate change in the region especially in water shed Basin of Karoon River. Karoon River is the source of providing water for the cities with more than 1 million population and penetration of sour water due to increasing of sea water level and reduction of river water flow have been the issues discussed about this river.

F. Health

Climate change has a direct effect on human's health. It is expected that earth warming results in cardiovascular, respiration, inflectional and microbial diseases. Malaria is one of the diseases prevalent in equator regions and tropical provinces of Iran. Studies on incidence of Malaria during 1982-1988 in the country show that the disease has been growing in spite of increasing health facilities.

G. Sun Oscillation

Sun is considered as a mortal source which provides all the energy required for climate system and is a complete section in configuring of earth climate. In longest time scales, sun continues its main evolution trend and in the same time it becomes more brilliant. At the emergence of world history it was believed that the world had been too cold to be able to keep water on its surface which resulted in a subject known as the paradox of listless young sun. In newer time scales there are different forms of sun oscillations such as 11-year sun cycle and the period of longer variations but 11-year sun cycle of sun spot does not emerge brightly and automatically in climatologically data. These oscillations have been regarded influential in emergence of short period of frost and in some cases observing earth warming since 1900-1950.

H. Circulation Variations

Circulation oscillations in some cases in their influence on earth climate cause sun oscillation development because trivial oscillations in earth situational revolution cause variations in the distribution and frequency of sun light which reaches ground surface. Such circulation oscillations called Melancholic cycles are completely predictable trends based on physics principles and due to mutual interactions of earth and sun and other planets. These oscillations are considered as existing stimulant in frost cycles and present frost period. There are other complicated oscillations too such as repetitive development or recession of desert in reaction to deviation of circulation direction.

I. Volcano Eruption

Any eruption happening in different times in any century can affect on weather which take some years to become cold

for example the eruption of Pinato Mountain in 1991, the effect of which can rarely be seen in the world temperature. Large eruptions known as volcano big domains occur just sometimes in any 100 million years but are able to alter earth climate for million years and cause total extinction. At first scientists imagined that dispersed dust in the atmosphere due to volcano large eruptions via trivial blockage of sun radiation to the earth surface has been responsible for its cooling but assessments show that most of the scattered dust in the atmosphere returns to earth surface within six months.

J. Side Effects of Weather Changes on Iran

Based on conducted studies and assessments in the plan of enabling weather changes under supervision of united nation weather change convention and by using the raised canaries, if the concentration of carbon dioxide doubles until 2100, the mean temperature of Iran will increase within the rate of 1.5-4.5, Which develops sensible narrations in water sources, energy demand, agriculture and dietary production, deforestation drought intensification and periodicity and treat for human's health are the direct harmful effects of weather changes. Economical damages are referred to as indirect effects of climate change due to interacting proceedings of developed countries.

VI. CONCLUSION

One of the worrying consequences of climate change is emergence of clash and war for possessing the natural and environmental resources. For example regional clashes for access to water in many parts of the world specially middle east. To investigate this issue first some cases were mentioned to familiarize the audience with weather phenomena such as greenhouse gases and earth warming and then the physical effects of these climate change on the earth was declared among which we can refer to soil erosion ,increasing sea water level and dissertations. Many natural calamities such as storms and tsunami's result from climate change because these changes accelerate the formation of calamities and are considered as factors for their occurrences. The range of these changes is so pervasive that involves world security and endangers it by destructing peace signs. In current terms whenever people are afraid of lack of providing subsistence and living necessities, human security is endangered. Security borders in today world not only become unstable during war and evident threats but also climate change can also be regarded as a threatening factor for human security , a threat that encounter human with big challenges and endanger security in different domains such as economical and hygienic seriously. Generally the shortage of healthy fresh water sources is a factor for probable clashes in future.

A. Presenting Strategies

The presented strategies in this part are as follows: preventing from negative climatically change necessitates developing an organization like united nation for forming the cooperation of countries, an organization that compiles an obligatory commitment for not harming the nature and considers effectual and penal guarantees for them. The recommendations presented are not my mental thought but they are the opinions of thinkers and existing references are reliable. Kyoto treaty is just valid until 2012 which causes the member countries to leave their obligations, for this reason today world needs a new treaty about living environment which specially impose limitations for carbon dioxide producers. On the other hand Kyoto treaty is not regarded as a complete treaty because it resulted just to stabilization of greenhouse gases .Now the world needs a treaty which challenges the production of greenhouse gases seriously and cause its reduction. The most fundamental problem in performing international treaties is the lack of a superior authority for obliging all governments to accept international treaties to observe regulations about living environment and we must say: Now there is no superior authority for obliging countries such as America to observe regulations of treaties and the only effective factors in this field are moral considerations and world general thoughts.

B. Controlling Air Pollution

Atmosphere such as brook or river has natural processes which have a role in its cleaning. Without such processes transfer will immediately turn into an unsuitable environment for human living. Scattering, gravitational precipitation, coagulation, absorption (along with washing and rewashing) are considered as the most important natural mechanisms of contaminants in the atmosphere.

C. 5.3. Atmosphere Cleaning Processes

Scattering: Scattering of contaminants by wind currents, reduces the concentration of contaminator's in any place.

Gravitational Precipitation: Gravitational precipitation is one of the most important natural mechanisms in separating the particles especially those particles which are bigger than 20 μm .

Coagulation: Gravitational precipitation has an important role in several other processes of atmosphere natural cleaning for example the particles smaller than 0.1 μm are perceptible with the help of coagulation. In this phenomenon bigger particles function as receivers of small ones. Two particles coincide and connect with each other and make a unit. This process continues until a small coagulation particle is formed so that this coagulation becomes big and heavy enough to precipitate.

Absorption of Particles: In natural processes of absorption, particles and gaseous contaminators are gathered in rain or fog and precipitate along with moisture. This phenomenon called washing occurs in a level lower than clouds' surface. The necessary potential for washing the particles and gases based on recent studies has indicated that for small particles having the diameter lesser than 1 μm . washing will not be effective. Gases may dissolve without chemical changes and in some instances enter reaction with rain like SO_2 gas which is easily dissolved in rain and comes down with rain droplets. In spite of this SO_2 may react with rain and develop H_2SO_3 dusts H_2SO_4 popular as acidic rains and have potentially more deleterious effects comparing to initial SO_2 .

D. 5.4. Washing via Rainfall

In this condition washing occurs in a lower level than clouds and when rain falling droplets absorb contaminators washing phenomenon occurs in the clouds. Thus the particles smaller than micron dimensions function as condensation cores around which water droplets are formed, This phenomenon in urban regions cause more rainfall and mist formation. Superficial absorption happens in an atmosphere frictional layer namely the nearest layer to the surface. In this phenomenon gaseous liquid and solid contaminators are absorbed by a surface and remain there after becoming concentrated. Natural surfaces such as soils ,cliffs, leaves and grasses are able to absorb and retain the contaminators, Particles may come in to contact with absorption surfaces by gravitational precipitation or inertia effect during which gaseous contaminator particles are transferred to the surface by the wind currents .Inertia effect is more for particles in dimensional ranges of 10-15 μm of smaller surfaces such as grasses and the leaves of trees comparing to bigger surfaces in order to separate particles.

E. 5.5. Diluting

Diluting in the atmosphere is possible through the use of tall chimneys. Tall chimneys can penetrate into inverse layer and scatter the contaminators so that the concentration of the contaminators on the ground surface is reduced to a large amount. Diluting in its best condition is defined as a short term means to control pollution and in its worst condition is a means for transferring unwanted effects of contaminators to the far places.

F. 5.6. Controlling in the Production Source of Contamination

In order to control air pollution in very vast ranges to far points, controlling this materialism the very source of their production is more favorable and effective. At first it seems that the first and most effective method is preventing the

production of contaminants. In the case of produced contaminants via combustion processes, replacing one energy source can prevent the production of contaminants. The remaining methods for controlling contaminants in the source can cause the reduced scattering of contaminants but it cannot result in the complete omission of a means for example a car having a dirty air filter, an unsuitable system for conditioning the engine, incorrect function and adjustment of motor revolution comparing to a car working with the best efficiency, the former scatter more contaminants. Changing the used process is applied like another method for controlling the scattering of contaminants in the very production source. For example, replacing open furnaces with controlled oxygen or electrical ones and one of the other methods having the most pervasive application in controlling air contaminants is to install planned controlling equipment according to some of the basic principles by which natural mechanisms of committing contaminants function.

REFERENCES

- [1] K., Heydari, N., and S. Ashrafi "Management of agricultural water consumption, drought, and supply of water for future demand in Iran", Proceedings of 7th Int'l Conference on Sustainable Development and Management of Dry-lands in 21 century.2003.
- [2] United Nations," The Demand for water: Procedures and methodologies for projecting water demands in the context of regional national planning, Nat. Resource, Water Ser. 3, United Nations Publications, New York."
- [3] Herbert son, P.W. and E.L. Tate,." Tools for water use and demand management in South Africa," World Meteorological Organization, Technical Reports in Hydrology and Water Resources, 1993
- [4] World Energy Council (WEC), "Energy Efficiency Policies around the World: Review and Evaluation Executive Summary", a Report by the Word Energy Council, London, United Kingdom, 2008
- [5] Interlined M.A., et.al, "Integrated Evaluation of Energy Conservation", National Report for the Netherlands, Energy Research Center of the Netherlands, 1999