GLOBAL CLIMATE CHANGE AND CLIMATIC IDENTITY
CHANGEMENT CLIMATIQUE ET IDENTITE CLIMATIQUE

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ABSTRACT: The global climate change has become one of the most interesting issues in the literature related to atmospheric, research, meteorology, environment, hydrology, agriculture, and water resources management in general. In the last few decades, due to the potentially serious impacts upon the atmosphere, earth and ocean the climate change issue become internationally disputable subject among many scientists including various specialists such as climatologists, atmospheric researchers, oceanographers, hydro-meteorologists, agriculturalists, etc in particular and local administrators in addition to politicians, as well as the people at different aspects of the life. In order to determine and follow the existence and the local impacts of global climate changes for any country or region, reliable data in a comparative, illustrative, and visual format are needed essentially. In order to provide an effective basis, it is very appropriate to use internationally recognized scenarios in addition to national linguistic as well as numerical data and a common format for the meteorological observations and measurements. It is among the main aims of this paper to provide an extensive but crisp review about the climate change by considering "Climatic Identity", definition concerning which information should be reported in the commonly formatted records. The climate change implies changes in the climatic parameters such as temperature, wind speed, rainfall, humidity, evaporation, snow and snow melt. The climate change process varies temporally and spatially. However, in practical applications, local features are necessary by considering such variations for local implementations in adaptation and mitigation against the climate change impacts.

Keys words: Global warming, global climate change, temperature, climatic identity

RESUME: Le changement climatique est un sujet très discuté dans la littérature. Comme ce changement exerce d'importantes influences sur le Monde, il est discuté par les scientistes, les politiciens et le peuple au niveau national et international. Les renseignements comparés et visuels sont assez importants pour prendre des renseignements sur la présence du changement climatique dans une région ou dans un pays ou encore dans le monde entier. C'est pourquoi on doit avoir uner forme commune pour les observations météorologiques nationales ou internationales. Delà, on a, dans ce travail, discuté sur le changement climatique, puis la notion d'identité saisonnière a été abordée et enfin on a conseillé quels renseignements doivent se trouver dans cette identité. Les changements saisonniers impliquent la chaleur, le vent, la pluie, l'humidité, l'évaporation, la neige et la fonte des neiges. Les changements saisonniers climatiques sont à la fois spatiaux et temporels. C'est pourquoi, il est utile d'avoir des identités climatiques locales.

Mots-clés: réchauffement climatique, changement climatique, température, identité climatique.

INTRODUCTION

The global climate change has been internationally discussed among scientists, environmental groups, civil society organizations (non-governmental organizations), politicians, and stakeholders in the last four decades. There are many in the open literature that reflect the title and content of "global climate change" in addition to many others with titles including "global warming" according to 23 October 2010 information only in ISI Web Knowledge. Crucial issues are discussed on national and international scales by taking into account many previous and recent IPCC (2007) meetings that shed light generally as guides for executive groups, administrators and politicians. There is not enough scope in this paper to assess each one of such contributions and to make critical review. However, such previous studies are classified into three main categories on the basis of time slices. The first lots of studies concerning global climate change are completed prior to 1990, and these can be regarded as pioneering works for the attraction of attention by scientists, administrators and politicians all over the world at different countries. These studies gave preliminary information about the climate change introduction and its possible in future impacts based on simple black-box models. In the second category are the works between 1990 and 2000 concentrating on the question what might happen as haphazard on different sectors such as energy, environment, water resources, food security, agriculture, etc. In the last class are the

publications after 2000, which have the target and interrogation of "why", "how", and "how much". It is possible to say that in the third category more scientific conclusions are drawn and a global reaction plans for combating the climate change impacts are discussed. For instance, several national or international activities such Kyoto Protocol, Intergovernmental Panel on Climate Change (IPCC) is proposed to try and solve the problem.

Herein, all the previous researches are abstracted, discussed, and concluded briefly, than the problem has been re-defined according to its natural background leading to the "Climatologic Identity", which is introduced and defined as a new proposal in the determination of the global climate change.

A SHORT REVIEW ON THE GLOBAL CLIMATE CHANGE

It is necessary to question first to ask, what happened? According to most researches since the beginning of climate change (greenhouse effect, global warming) issues before even 1990 the answer can be found in the related literature I simply as "the earth has a fever". Among all the publications about 90 % of the scientific articles put forward evidences on the existence of the global warming or global climate change (Kickert and Krupa, 1990; Kondratyev, 1991; Schwartz, 1992; Fields and al, 1993; Buyukyildiz and al, 2009; Culley, 2010; Davis and al, 2010; Ekholm and al, 2010; Falk, 2010; Kreuzwieser and Gessler, 2010; Maynard and al, 2010; Schreurs, 2010; Thompson, 2010). Accordingly, the Kyoto Protocol and IPCC establishment in 1992 are among the outcomes of this question and answer though in a dubious manner in belief of such an effect.

On the other hand, why, how, and how much? questions are among the second set of questions. Almost all scientists believe that the problem is present, but there is not a clear or strong agreement on the sizes, depths, dimensions and the effects as well as the reasons of the existing global problem. Kempton states that most informants had heard of the greenhouse effect, however, they conceptualized global climate change very differently from scientists because they interpreted it in terms of four pre-existing categories: stratospheric ozone depletion; plant photosynthesis; tropospheric pollution; and personally experienced temperature variation (Kempton, 1991). Furthermore, Hammerle and al. (1991) indicated that currently there is very limited evidence that man's activity has caused global warming. Mathematical models of the earth's heat balance predict warming and associated climate changes, but their predictions have not been validated with actual data. Horness states that currently, climate studies in particular require a much broader knowledge of the world ocean system than is now

available (Horness, 1991). Besides, Feldman proposes that effective international cooperation is the result of an incremental and iterative learning process among scientists, environmental groups, and political leaders who hold divergent perceptions and stakes in resource controversies (Feldman, 1991). Human activities are currently responsible for a species loss rate that is the most extreme in millions of years, and an alarmingly increasing rate of transformation and fragmentation of natural landscapes as suggested by Jutro (1991) He adds that in the case of both global warming and reduction of biological diversity, man is affecting nature in an unprecedented fashion, on a global scale, and with unpredictable and frequently irreversible results. Runge, insists on saying that much concern is felt about global warming and many debates have ranged widely on this subject without as yet arriving at a precise answer (Runge, 1992). The 'best guess' at present is a 60% chance of a global average change in the 1.5 ^{o}C - 4.5 ^{o}C range, if carbon dioxide concentrations are doubled. However, regional temperature changes are still more speculative depending on the heat retaining properties of the oceans and the continents. Expected results of the global climate change are not scientific, but they are ethic and politic says Jamieson (1992). Read's idea is that subjects had a poor appreciation of the facts that (Read and al, 1994)

1) if significant global warming occurs, it will be primarily the result of an increase in the concentration of carbon dioxide in the earth's atmosphere, and

2) the single most important source of additional carbon dioxide is the combustion of fossil fuels, most notably coal and oil. In addition, their understanding of the climate issue was encumbered with secondary, irrelevant, and incorrect beliefs.

On the other hand, IPCC reports have not been interrogated sufficiently, the reports represent several intellectual's idea, the media effects the civil society organizations and governments; the reality is not terrible as exaggerated as stated by Beckerman and Malkin (1994). Krupa indicates that our knowledge of global climate change has many uncertainties (Krupa, 1997). Whether global air temperature will increase, by how much, and when, are subject to debate, but there is little doubt that tropospheric concentrations of several trace gases are increasing. A group of internationally reputable specialists stated in the second Assessment Report (SAR) by IPCC (1995) on the basis of the meteorological observations since 1862 that in the last century, increasing in global temperature is about 0.7 ^{o}C– 0.8 ^{o}C. However, due to the complexity in the global climate system,

the correlation between the temperature and CO_2 has not been clearly determined yet. From IPCC (2007), and many other researches, it can be easily understood that the other guess reasons of global warming can be accounted by El Nino, climatic period, astronomic processes, volcanoes, and natural and man-made greenhouse effect. Karl and Trenberth wrote that modern climate change is dominated by human influences, which are now large enough to exceed the bounds of natural variability (Karl and Trenberth, 2003).

Now it is possible to say that humans live global climate change environment and the globe warms up. However, there is not any consensus on its reasons, dimensions, and effects.

As for the solution of the problem, it can be said that there is a global (intergovernmental) agreement on solving the problem on the basis of IPCC recommendations. For instance, Kyoto Protocol is generated after the Third Assessment Report (TAR) of IPCC. As of October 2010, 191 states and one supranational union (the EU) have signed and ratified the Kyoto Protocol to the United Nations Framework Convention on Climate Change, which aims at combating global warming collectively. Concerning these points the related approaches can be classified into two categories as follows.

- Reduction in the greenhouse gases, and
- Adaptation to the Blue Planet's new conditions.

In 2007 IPCC report, it is indicated that man's activity has caused 98% of global warming. However, as mentioned previously, the scientists are not sure that man's activity has caused global warming with such high percentage. Kyoto Protocol seems to be a reason of the believing in the human activities that affect the global warming or global climate change. However, behind all global or regional reliable problems, it is possible to see one or more global or regional self-seekers, who exaggerate the problems bigger than usual, more effectible, and more dangerous. Scientists should present a systematic effort, to build a bridge between science and policy in a global or regional climate change as well as among different sectors (i.e. civil society organizations, governments, politicians, and people).

CLIMATIC IDENTITY

As it can be extracted from the above mentioned literature, many scientists have agreement on the global climate change. However, there are still several doubts on the scientist' expertise. For a more reliable solution, the problem should be realistically determined. So the scientists have to interrogate the literature on the subject. At the same time, they have to have impartiality and unprejudiced on the problem as well as on its solution.

In order to determine and follow the existence and the local impacts of global climate changes for any country or region, reliable data in a comparative, illustrative, and visual format are essential preliminary requirements. It will be more appropriate to use internationally common format in the meteorological observations and measurements records. For this aim, in the present study, "Climatic Identity" has been defined concerning which information should be reported in the commonly formatted records for further discussion and data base preparation prior to climate change modeling. The changes in climate are expressed by the climatic parameters such as temperature, wind speed, rainfall, humidity, evaporation, snow, and snow melt esc. The climate change processes vary according to both location and the time period, which necessitates local identifications.

In the international literature, although there are not "Climatic Identity" concept including studies, among some researchers such as Bauer and Adler (2003); Bender (1991); Stejner and Madsen (2005), and Schroer (2006) mention about the "Temperature Identity". However, it is observed that these researchers did not use "Temperature Identity" as defined in this work. The first introduction of "Temperature Identity" into the literature is due to Toprak et.al. (2009).

In the present study, "Climatic Identity" is defined as "the distinction of a region from any other based on the climatic properties at a certain time or duration (period, cycle)". After the identification of each climatic parameter, their synthesis leads to "Climatic Identity". In other words, "Climatic Identity" includes the identity of whole climatic variables (temperature, rainfall type and intensity, humidity, snow, and its melt, wind, air pressure, evaporation, etc.). Accordingly what should be included in such an identity?

Table 1. An example for climatic identity

Climate Variable		Temperature													
Country		Turkey													
Station		Diyarbakir Ctiy Center (number)													
Date		(record date)													
TIME PERIOD		STATISTICS							DEVIATON FROM POPULATION				VISUAL		
		Max	Min	Mean	S. Dev.	C. Skew.	C. Var.	Corr. C.	MARE	MSE	RMSE	SE	C. Map	Time Series	F. Histogram
LONG TERM	January														
	February														
	March														
	April														
	May														
	June														
	July														
	August														
	Semptember														
	October														
	November														
	December														
	Winter														
	Spring														
	Summer														
	Fall														
	Annual														
CURRENT YEAR	January														
	February														
	March														
	April														
	May														
	June														
	July														
	August														
	Semptember														
	October														
	November														
	December														
	Winter														
	Spring														
	Summer														
	Fall														
	Annual														

In this study, the constant features of the station, statistics magnitudes (i.e. maximum, minimum, mean, variance or standard deviation, skewness coefficient, coefficient of variation, correlation coefficient), deviation from the population (in terms of the mean absolutely relative error (MARE), mean square error (MSE), root mean square error (RMSE)), and the plots and graphs (i.e. the contour maps, frequency histogram, time series with linear, logarithmic, and polynomial tendency curve) for both the population and the samples are proposed to be placed in the identifiable common records. The above mentioned information should include monthly, seasonal, and annual mean statistics if possible. Table 1 shows an example sheet of “Climatic Identity.”

CONCLUSSION AND DISCUSSION

Any future study that may be based on the concept of "Climatic Identity" should include the following steps for successful assessments and conclusions.

- ✓ Herein, the researches made on the global climate change are abstracted, discussed, and concluded briefly, rather than the problem has been re-defined according to its background, and finally the "Climatic Identity" is introduced and defined to propose a new way of determining the global climate change.
- ✓ It is possible to say human beings live global climate change and the atmosphere warms up. However there is not any agreement on its reasons, dimensions, and effects.
- ✓ "Climatic Identity", is defined as "the distinction of a region from any other based on the climatic properties at a certain time or duration (period, cycle)".
- ✓ In any "Climatic Identity" there should be at the least level all the statistical quantities, one yearly samples and long-term averages, time series, histograms, contour maps information and graphs.
- ✓ "Climatic Identity" applications are thought as suitable for regional reflections of the global climate change impacts in a healthier manner, interpretations, the solution methodology that must be persued at micro scale climate zones.
- ✓ As possible as all climatic parameters (temperature, rainfall, humidity, snow, etc.) must be extracted and their priority effects must be searched on the temperature.
- ✓ According to the purpose for more real and unbiased measurements climate identifications are more suitable for university researches, measurement station establishments and development of the existing ones must be done.
- ✓ In order to follow global climate change trace it is thought that such studies must be affected on global scale with international team workers and a suitable technically supported association for the management of such researches.
- ✓ In this study, "Climatic Identity" definition, procedure, and the title can be discussed. For instance, instead, "Climatic Report" or "Temperature Report" can be suggested. However, report includes

data after some work but meteorological events occur frequently randomly and therefore, report title is not convenient.

- ✓ It is also possible to discuss the data that should be in the identity. For instance, suitable statistical tests, etc. can be added.
- ✓ According to meteorological parameters the purpose of the knowledge in the identity may be private or aim-full, and hence it is possible that they are different from each other.
- ✓ Will the identities be generated on the basis of basins, settlement units, micro or macro-climatic regions?

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