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Evaluation the Effects of Climate Change on Iran's Environment

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ABSTRACT

According to the result of research on the effects of climate change, the most important challenge of climate change in the world is rising temperatures due to rising greenhouse gases. Rising temperatures have changed the pattern of rainfall throughout the planet on terms of type, spatial and temporal distribution. This process has the most negative impact on reducing freshwater resources. According to global models of climate change, Iran is oneof countries that will face severe water shortages in the coming decades due to rising temperatures, declining rainfall, declining frosty days, and increasing hot days. In Iran, in addition to rising temperatures, unbalanced population growth and increasing water consumption, will intensify the reduction of freshwater resources and increase dust. Also, agricultural and livestock activities in Iran are strongly dependent on climatic conditions, especially rainfall and temperature changes, especially since more than 50% of Iran's agricultural lands are cultivated in the dry season. For this reason, climate change will have severe negative and decisive effects not onlyon living conditions, the environment, drinking water supply, but also on the country's food security. In the presentstudy, with the aim of determining the outlook for future climatic conditions in Iran, research conducted in thefield of statistical exponential microscale output of ocean atmosphere circulation models to evaluation rainfall andtemperature parameters under different emission scenarios was collected. With the method of descriptive content analysis and scale of results, a comprehensive view of the climate, its risks and especially climate change in Iran should be presented.

Key words: *Climate change; Statistical exponential subscale; General atmospheric circulation model*

Introduction

Climate change has different causes (natural and unnatural). Natural causes, which are usually slow but long processes, include how the earth rotates relative to the sun, the movement of continents, the eruption of volcanoes and the movement of hot and cold oceanic waters. Long-term climate change has been attributed to the way the earth rotates relative to the sun and the movement of continents, which has long-term effects. Geological studies show that once every thousand years we have a glacial and global warming period. In addition, volcanic eruption brings large volumes of gas and heat to the earth's surface, which has short-term effects on rising surface temperatures. The movement of hot and cold ocean waters, known as golf streams and Elbador movements, is also impact in global warming and climate change. At present, sociology scientist attributes some of the natural causes of global warming to the movements of warm ocean water [1-3]. The volume of warm ocean waters is higher than that of cold ocean waters. Abnormal or human causes that are usually rapid but short-lived processes. The speed of human causes is so rapid that natural phenomena do not even have the opportunity to self-purify nature, and the state of nature is deteriorating day by day. These processes include over-consumption of thermal energy, increase in surface temperature, expansion of industrial and urban spaces and creation of heat islands, destruction of forests and green spaces, increase of evaporation and reduction of resources. These short-term climate changes could be due to excessive consumption of thermal energy, which in turn has led to an increase in greenhouse gases and, consequently, an increase in surface temperature. Increasing urban and spaces and deforestation have caused the sun to reflect more on the earth's surface, creating warmer islands. This in itself increases evaporation on earth. Increasedevaporation also leads to a decrease in water resources, and as water resources decrease, the earth's surface becomes drier and heat intensifies. Climate change has global and national effects on all countries, including our country. A country like Iran is more vulnerable to climate change due to environmental degradation. These changes can be assessed at the macro level of the country and the region [3,4]. The degree of impact also varies in different parts of the country. For example, in areas where there is irrational population growth and poverty, the effects and destructionof the environment are server. Also, not all countries are affected by lack of rain and dust, while in all countries, average rainfall has decreased, and average temperatures have increased.

Research Methodology

The study area in this research is the land of Iran where the involvement of various geographical factors and location in the transition system of the atmospheric circulation system has caused climatic diversity throughout. Due to this climatic diversity and the importance of climate discussion and its changes in Iran, the results of statistical microscale exponential measurements of rainfall and temperature parameters were performed in six geographical areas [4]. This study aims to achieve a comprehensive view of climate change, especially climate change in Iran, which, despite various studies, has not yet received a complete clarification. Therefore, descriptive content analysis and comparison of the results of statistical exponential microscale research in simulation of selected climaticparameters with statistical exponential microscale models of WG-LARS, SDSM, ASD and Gen-Clim Table 1 in the territory of Iran Figure 1 was performed. Although these are more researches in the field of research, in this study, only researches that have studied rainfall and temperature and also provide complete coverage of the territory of Iran have been selected [5]. Then, by selecting this research, the changes of temperature and rainfall elements are studied separately in each region and their results in predicting the climate of Iran with emphasis on climate change in selected areas are presented. The diffusion scenarios used as well as the output of the general circulation models usedin the studies are presented in Table 2.

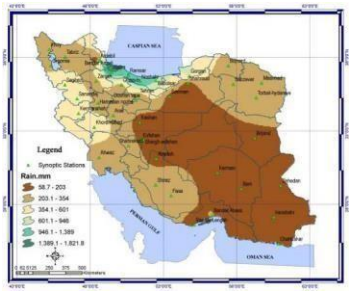

Figure 1: Annual rainfall pattern changes based on the second climate change report (1976-2005).

Table 1: Statistical microscale model and the frequency of their use.

Area / Model	South Alborz and the center	East and Northeast	South and Southeast	West and Southeast	North-west	North Coast	Total
WG-LARS	8	5	3	10	11	7	44
SDSM	1	1	8	2	5	1	18
Gen-Clim	1	1	1	2	1	1	7
ASD	2	1	2	**	1	**	6

Table 2: Microscopic studies performed using the output of public circulation models under different scenarios.

Statistical microscale model	Macroscale model	Affluence	Scenario	Affluence
WG-LARS	HADCM 3	27	A 1 B	
	MIHR, ECHO-G, MPEH5	2	A2	20
	IPCM 4	6	B1	23
	BCM2, INCM3	4		17
	GFCM 21	3	A1	3
	NCCCSM	5		1
	CCSM4, FGOALS, CSMK3, HADGEM, GIAOM, CGMR, NCPCM	1	RCP4.5	
SDSM	HADCM3	15	B1	2
	CGCM1	3	A2	14
	CGCM3	1	A1	8
			B2	1
ASD	HADCM3	2	A2	3
	CGCM3	1		
Clim-Gen	HADCM2	1	A1BAIM	1

In this study, in order to facilitate and categorize the results and according to the climatic geographical areas, a regional approach has been considered to present the findings. Due to the fact that the output of different general and circulation models and different emission scenarios have been used in each of the exponential microscale researches and also due

to the involvement of local factors, the results in each geographic region have different oscillations, increments, decreases and decreases to be. These results indicate the incremental, decreasing, oscillating changes in rainfall and the increasing and decreasing changes in the transitional northwestern region of temperature fluctuation for future periods [6].

Theoretical Foundations

General atmosphere cycle

Regarding climate modeling of future periods, there are various methods, the most comprehensive of which are general atmospheric circulation models. Ocean atmosphere simulations are used on a variety of scales. The purpose of these models is to simulate all three-dimensional features of the climate. Therefore, these models are the most comprehensive atmospheric models for predicting the future. Climatic models are classified according to the type and degree of accuracy. These models range from small scales involving the climate of a region to large scales involving climate change on a continental scale. Although large-scale models are general and represent general changes, the use of small-scale models for regional applications and the conversion of GCM model results to regional phenomena are necessary. One of the most important challenges in studies of general atmospheric circulation models is the large-scale spatiality of the simulated variables. Therefore, the outputs of these models cannot be used at the station scale and even in the watershed. Therefore, it is necessary to scale the outputs of these models. The microscale of data obtained from general atmospheric circulation models is usually done in two ways, statistically and dynamical [7]. In order to examine the issue in more detail, in 1988 an organization called the intergovernmental panel on climate change was jointly established by the world meteorological organization and the United Nations Environment Program to assess and study the scientific, technical, economic, socio-economic aspectsand risks. Created by man-made climate change. The IPCC began by providing special reports assessing the causesof climate change. To conduct climate change studies on different sources in future periods. Climate variables under the influence of greenhouse gas changes must first be simulated. There are several ways to do this, the most valid of which is the use of atmospheric circulation model data. Climate forecasting and climate change assessments face problems such as estimating emissions of greenhouse gases and other pollutants in the coming decades, large-scale spatial and temporal segregation of atmospheric circulation models and so on. Another problem with appropriate climate model designs is the integration of all the feedback contained in the community's oceanic biosphere mating system. Some of these feedbacks are initially parametrized even in the most advanced public circulation models. Another problem is the method of modeling the aforementioned systems. This requires multiple simulations to separate human effects from natural oscillations. Climatic models require a lot of time to evaluate, test and perform and may take many months or years to design, perform and detect a proper set of experiments. In addition, they require high computational capacity. For these reasons, climate scenario models are good options for this purpose, provided.

Emission scenarios

Emission scenarios include information on the socio- economic status and emissions of greenhouse gases in the earth's atmosphere. In 1992, the first IPCC emission scenarios, called IS92, were developed for use in the input of atmospheric circulation models to model climate change scenarios. IS92 scenarios include population estimates, GDP, energy consumption by trade, industry, transportation and housing, energy production, production and consumption of secondary fuels, energy production from liquid, solid, hydrogen gas, nuclear fuel Solar, biomass, carbon dioxide emissions, Carbon monoxide, nitro oxide, nitrogen oxides, methane through combustion, methane emissions from mines and many sources of greenhouse gas emissions for ten regions of the globe including the Americas, Western Europe and Canada, Asia and Southeast Asia, Central Europe, Central Asia, Africa, the Middle East, Latin America, Southwest Asia and Russia for 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2050, 2075, 2100 years. In 2000, IPCC developed a new series of emission scenarios, entitled SRES, to be presented in the third Special Report on Emission Scenario. Group SRES used three families of scenarios named A1, A2 and B1, B to describe the relationship between greenhouse gas emission processes and aerosols and how they changed during the IPCC scenarios in key regions of the globe. Additional information from each of scenarios developed in important regions of the globe was used. Additional information on each of scenario's IPCC and developed by other organizations is available in the form of a database coded at site IPCC.

Environment

Nature and the environment are a diving gift that arises from the set of beings, resources and factors and conditions of harmony that exist around every living being and on which survival depends. Environmental pollution affects the quality and natural cycle and has detrimental consequences for human, animal, plant and building life. Currently, environmental issues are one of the most important challenges at the global and national levels, and so far, important international conferences and meetings have been held in this regard, and countries have entered into numerous treaties and conventions to prevent deterioration status are committed [2-4]. Having sufficient information about the given environmental status of countries and examining the trend environmental change has been one of the topics of concern to world forums in recent years. This issue plays a very important role in understanding the current situation determine

the necessary changes in the way of management and presentation of management programs. For this reason, several environmental indicators have been proposed by international organizations and associations and universities to monitor the processes of environmental degradation.

Findings

Iran is a vast country with high climatic diversity and due to the relatively large latitude difference between north and south of the country, conflicting and heterogeneous topography and also various weather systems that affect Iran's climate, the ratio of maximum daily rainfall to annually varies throughout Iran. Iran's average annual rainfall is estimated at 250 mm, which is less than a third of the global average rainfall. According to the results of many climatic classifications, this land has an arid and semi-arid climate. Low rainfall, high variability, server fluctuations in rainfall from year to year, are the prominent features of Iran's climate. Obviously, this ratio is not a simple indicator, due to its multivariate nature, it is related to various factors and usually relates to factors such as altitude, longitude and latitude.

Results and Discussion

Given the potential for climate change and its dangerous consequences, which we are witnessing in the present era, the application of atmospheric circulation models, which is one of the tools for assessing future climate, has been very important. But these models do not perform well in small-scale areas because of their low resolution. Therefore, methods statistical and dynamic are used to micro-scale the output of these models using observational values of climatic variables in stations. Despite the fact that a lot of research has been done on the conditions of climate change and the future climate of Iran. However, due to scattered research in different areas and at different times, so far, no clear results have been obtained from these studies in relation to future climate conditions, especially climate change in Iran. The main of this study was to investigate the future climate change of Iran using the results of research obtained from statistical exponential microscale that use the output of atmospheric circulation models and different emission scenarios [4-6]. The results of these studies indicate the homogeneous behavior of increasing temperature in the coming years throughout the country expect the northeastern region. In contrast the weather, to temperature rainfall will show heterogeneous behavior in the land area. Although in some areas center, southeast andwest there is an increasing behavior that is more volatile, but in most areas the amount of precipitation will decrease. Taking into account all aspects of the complex behavior of the climate system and the uncertainty of forecasts, these results confirm that the future climate will be warmer and drier than the current situation.

Conclusion

Due to this issue, we can expect the occurrence of droughts and drought conditions and due to the current behavior of rainfall and its change to less but more severe occurrence, hydrological hazards floods will also increase. In this research an attempt has been made to provide a summary of the results of future climate change studies using microscale statistical methods of exponential output of atmospheric circulation models. Providing an overview of what has been done so far is an important step in asking questions and exploring new challenges. It seems that an important factor to hinder the rapid and timely progress in an important issue such as climate change and its consequences that can have a significant impact on the future of the country, the dispersion of research work and the largely duplication of some of this research Which is sometimes done by not paying attention to the results of previous work in determining important goals and has led to a lack of coherence and coordination among research work in this field. Therefore, in this article, we have tried to take a small step in this direction.

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