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Effects of Climate Changes on Tourism

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Abstract

This study investigates effects of the climate changes on tourism industry which causes environmental problems during the last several decades. The research aims to specify the precautions to reduce or prevent the problem of these effects while also exhibiting the effects of the climate change on the tourism industry.

As a result of global warming, the climate change may have several outcomes such as reductions in glaciers and snow cover, the rise in the sea level, storm and hurricanes which causes consequently natural disasters ending up essential changes in the life of the all inhabitants of the earth. It is irresistible that the mass tourism and other specific tourism types such as winter, sailing, golf tourisms which are determined by the climate conditions may not be affected by these climate changes.

All countries must take economic, sociologic and ecologic precautions against the outcomes of the climate changes. Moreover, educational programs must be considered so as to inform the public about these issues. The less CO₂ releasing and energy consuming equipment's must be produced to be used in the Tourism Industry and immediate and remedial precautions must be taken into consideration especially for the transportation sector and the energy needs of the tourism facilities. Besides, the tourism industry should pay more attention to the waste recycling issue and the local authorities must fulfill their responsibilities. The adequate educations and precautions must be provided to the administrations and personnel in the Tourism Industry. The government inspections in the Tourist facilities should be performed properly and the incentives must be promoted to the successful tourism businesses.

Keywords: *Climate change, global warming, tourism, sustainable development*

JEL Codes: *L83, Q01, Q26, Q54*

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1. Introduction

Human beings have been consuming the natural resources for their needs since very early time of the history. Due to this consuming process, they affected the nature and have been affected by the nature. The problems in the human and environment relations are being caused by the transformation of the environment caused by the humans in the way that they obtain benefit from it (Yaylalı, 2009). Following the Industrial Revolution, level of welfare and life quality of the people have been developed day by day. This development has brought the high level of need for the energy and raw materials in the 20th century. Fossil fuels for the heating, transportation and energy production utilities have been essential reasons for the environmental problems (Sevim, 2009).

The increase of the emission of the greenhouse gases based on the human consumptions affects the temperature of the earth. Rise of the proportion of the greenhouse gases in the atmosphere (carbon dioxide, water vapor, ozone, methane, nitrogen oxides and chlorofluorocarbon) causes the detainment of the sun heat rays which are reflected back to the space following their entry through the atmosphere and hitting the earth surface. This results in the rebound of the heat rays and eventually causes the rise in the average atmosphere temperature (Karakaya and Özçağ, 2003). The biggest environmental problem emerged by this transformation process is the “climate change” resulting from the “global warming” and its interactions with the other environmental problems (Yaylalı, 2009).

The global warming has several consequences which may affect negatively the habitats of the human and other creatures by causing melt of the snow covers, mountain and sea glaciers, rise in the sea level, replacement of the climate belts, heavy weather disasters and increasing the frequency of the natural disasters and intensifying their effects, scarce clean water source triggered by the drought and erosion, epidemic illnesses, decrease in the supply of the food due to the spread of the insects. These effects have also no geographic boundaries (IPCC, 2007).

Thus, the developed countries have been implementing several researches to anticipate that how the climate change may occur, and to foresee how the world might be affected by these in the next 30, 50 and 100 years, or even on the longer time span. Then, they are setting strategies for the coming future. According to the climate change anticipations, it is required to investigate,

determine the response degree of water resources, agriculture and forest, in general the whole eco-system in Turkey, then the proper solutions should be suggested (Kadioğlu, 2008).

In fact, climate events are rather complicated. Their aspects are multi dimensional. Perhaps, specialists in this area are stating that the many terms in the meteorology science is being used falsely by the notion of “the false perception of the weather and climate conditions are very common” (Kadioğlu, 2001 reported by Çepel, 2008). Therefore, firstly, it is needed to define the terms of weather conditions, climate, global warming and climate change.

a) Weather Condition; All the observed atmospheric events for a specific place on the earth on the specific time is called weather condition (Türkeş, 2007).

b) Climate; The average observed specifications of the all air conditions of the specific place on the earth and their time distribution of their frequency, extreme values, extraordinary events and all variability types for a long term is called climate (Türkeş, 2007).

c) Global Warming; According to Çepel (2008), the global warming represents the artificial temperature increase process in the solid earth layers and in the close atmosphere layers due to the greenhouse gases caused by the human activities.

d) Climate Change; In the United Nations Framework the Climate Change Contract (UNFCCC), the climate change was defined as “in the comparable time interval, in addition to the observed natural climate change, the change occurred in the climate because of the human effects which is damaging the composition of the global atmosphere directly or indirectly” (DPT, 2000).

In the narrow sense, Çepel (2008) states that this term includes dramatic changes in the all climatic elements of the terrestrial and water world due to the rise in the temperature.

Climate change affects number of industries for instance health, agriculture, energy and tourism (Sevim, 2009). In terms of the seasonal fluctuations, tourism is such an industry that it is sensitive to the changes and can be affected slowly from the positive domestic and foreign incidents; quickly from the adverse domestic and foreign events (Mathieson and Wall, 1982 reported by Sevim and Ünlüönen, 2010). Additionally, tourism can also be affected by the

climate elements such as temperature, precipitation, wind, humidity and their fluctuations. Particularly, many destinations where the sun-beach-sea oriented tourism packages were being offered own their popularity to the hot weather and suitable climate conditions during the holiday season (Amelung et al. 2007; Berritella, et al. 2006).

Climate change will have different effects on the distinct tourism types for example mass tourism, winter tourism, sailing tourism and golf tourism etc. In Turkey, although there has been several efforts to differentiate the type of the tourism offered and to expand the tourism season to the whole year round, a rise in the number of travels for other tourism types has been observed, however sun-beach-sea oriented mass tourism attracts more people compared to the others (Sevim and Ünlüönen, 2010).

In this paper, first of all, we explained the reasons for the climate change, their possible consequences and the relationship between climate change and tourism. Then, we emphasized the projects being performed against the effects of the climate change introduced and revealed the Turkey's disadvantages in the fight against the climate change and finally we made suggestions about the required precautions.

2. Reasons for the climate change

Climate change has been occurring for millions of years (Mitscherlich 1995 reported by Çepel, 2008). Since the climate changes have been happening in a long period of time, the adaptation of the eco-systems were easy (Sevim, 2009). As it can be understood from the arctic periods existed in the close geologic ages of the Europe, climate change is not an unfamiliar event. Lately, a common opinion has been occurred that the climate started to exhibit a change which is not similar to the one in the past geologic periods and there could be harmful effects on the all creatures (Çepel, 2008). Natural climate changes normally which can be observed in thousands of years is now being observed in just two centuries following the industrial revolution. There have been permanent and long term changes in the climate elements such as temperature, precipitation, wind and evaporation. Therefore, this process is being referred as "sudden climate change" or "human caused climate change" (USEPA, 2006). The governments have been concerning about this climate changes occurring around the world (Mitscherlich 1995, Kadioğlu, 2001 reported by Çepel, 2008). To carry out international studies and researches and to develop a policy about the climate change, Intergovernmental Panel on Climate Change (IPCC) was

founded.(http://unfccc.int/methods_and_science/other_methodological_issues/items/1077.php). IPCC is the most serious step at the international level for the climate change (Samur, 2007).

According to the United Nations Climate Change Frame Contract (UNFCCC, 2003) composed by the IPCC, although the climate change is term existed natural notion in the world history for a specific periods of time, the change occurred in the 21st century is so fast that it has not been observed at this pace before. The human effect has not ever played role this much before. In the world history, human started to change the climate for the first time.

Reasons in effect in the global warming process can be considered in the two courses: natural and artificial aspects.

2.1.Natural Reasons

The climate change has been occurring along with the world history (Çepel, 2008). Nevertheless, the systematic meteorological measurements have been performed only for a limited period of time. In this case, it is not possible to explain the climate changes emerging in the thousands of years with the measurement values belong to the limited years (Mitscherlich 1995 reported by Çepel, 2008). While scientists were developing different scientific methods, they tried to acquire historical data about the subject. The earth and animal and plant fossils were investigated by the radiocarbon, pollen analysis, and the ring chronology methods. Several results have been attained about the climate changes (Çepel, 2008). The natural events which cause the climate change can be mentioned as the natural greenhouse effect, effect of the sun, precision movements of the earth, volcanic effects and the sulphate particles and the variation of the nature.

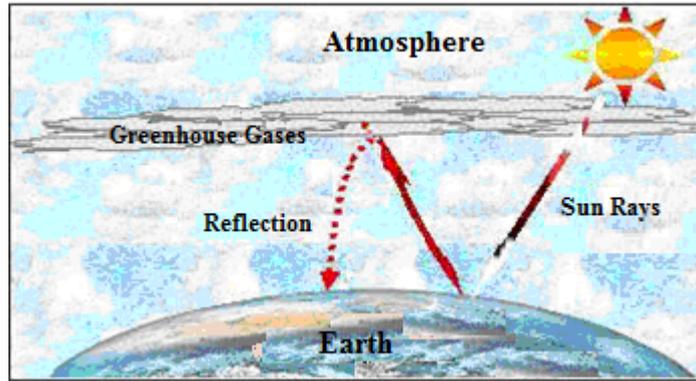
2.1.1. Natural Greenhouse Effect

The atmosphere, an essential environment for all life formations in the earth, basically is composed of mixtures of several gases. The nitrogen (78.08%) and the oxygen (20.95%) the primary gases in the atmosphere consist of 99% of the clean and dry volume. The rest of the dry air includes ineffective gas Argon (0.93%) and other gases in trace amount. One of the effective greenhouse gas, CO₂, has very less percentage of accumulation with 0.0377%. This rate puts it on the fourth order due to the sequence of percentage. The important greenhouse gases are primarily water vapor H₂O and carbon dioxide

(CO₂), and the others methane (CH₄), dinitro-monoxide (N₂O) and ozone (O₃) gases (Türkeş, 2007).

In the text of the “Understanding the Climate Change: United Nations Frame Agreement and the Kyoto Protocol”, the greenhouse effect is being defined as follows: the sun power reaches to the earth as a radiation with short wavelength. Part of this energy is being reflected back to the space by the atmosphere and the earth. The large part of this radiation heats the earth surface while passing through atmosphere. The radiation of the long wavelength reflection from the earth to the space is called greenhouse effect (Yeşil Atlas, 2008-2009).

Figure 1. Illustration of the effects of the greenhouse gases on the global warming



Source:

http://www.tema.org.tr/Sayfalar/CevreKutuphanesi/Pdf/KureselIsinma/EM_Konu12.pdf

As it can be seen from the Figure 1 taken from the archive of the Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats (TEMA), the larger part of the infrared radiation reflected by the surface of the earth is being absorbed by the several gases in the atmosphere known as the “greenhouse gases” such as water vapor, carbon dioxide, methane and other gases occurring naturally. These gases prevent this reflected energy to go back to the space. Several processes (radiation, air streams, evaporation, cloud forming and rain...) which are interacted to each other carries this energy to the higher levels of the atmosphere and finally the energy is being disposed

out to the space. This slow and indirect process is a chance for the life. Because the reflected energy from the earth surface would have gone back to the space directly, in this case there could have been a cold and naked planet not giving chance for the present life formations (Yeşilatlas, 2008-2009).

If there was no natural greenhouse effect, the earth's average temperature would have been around -18°C instead of 15°C . Thus, the natural greenhouse effect of the atmosphere increases the air temperature by 33°C . Therefore, the life on the earth has been shaped according to this temperature. However, after the industrial revolution, because of the greenhouse gases released to the atmosphere, the average temperature of the world has been increased by 0.6°C from 15°C to 15.6°C . This results show that the life formation on the earth which is shaped according to average 15°C degree has been changed (Kadıoğlu, 2008).

2.1.2 Effect of the Sun

The scientist Paal Brekke from the European Space Agency (ESA) stated that they are investigating the cyclic movements of the sun spots for an 11-year period and the change in the magnitude of the sun's brightness in the periods of century (Spence, 2007 reported by Ateş, 2008). Therefore, the magnetic area of the sun and the sun storms which is emerging in the forms of protons and electrons are acting as a shield against the cosmic radiations. This shield which might get weak due to the fluctuating activities of the sun and also let the cosmic radiation pass through itself. The increase of the cosmic radiation may change the clouding and the radiation rate coming from the sun. Consequently this causes temperature rise in the world. (Uzmen, 2007 reported by Ateş, 2008).

2.1.3. Precision Movement of the Earth

The Serbian researcher Milutin Milankoviç proved that the orbit of the earth around the sun is becoming slightly flattened in every ninety-five-thousand years in 1930 (Marda and Şahin, 2007 reported by Ateş, 2008). Moreover, it is reported that in every forty-one-thousand years, a linear shear and every twenty-three-thousand year a cyclic deviation in the axis of the earth were found. Majority of today's scientist imply that because of the mentioned earth movements, a cold periods had been experienced time to time and among these hundred thousand years-long cold periods there have been ten thousand-long

hot periods. This circumstance constitutes one of the natural reasons for the global warming (Aksay, 2005).

2.1.4. Volcanic Effects and Sulphate Particles

The volcanoes cause global warming by pumping large amount of silicates (quartz sand) and sulfuric acid aerosols (dispersion of a liquid or a solid into a gas environment) into the atmosphere (Kadıoğlu, 2001 reported by Akyel, 2009). Especially when the sulfuric acid aerosols enter the stratosphere, it causes long-term effects in the global climate in a short time. When these aerosols were moved into the stratosphere, they become in effect as they reflect the sun rays back into the space and they absorb the infrared heat rays on their way to the space following their reflection from the earth surface. Because of this absorption, together with the rise of the temperature in the stratosphere, lower level of the atmosphere starts to cool down since the aerosols block the radiation coming from the sun. there are several studies presenting that the volcanic emissions caused by the great volcanic explosions can decrease the temperature of the earth for couple of years on the global scale (Akyel, 2009).

2.1.5. Variability of the nature

The relationship between cycles of the deep and surface seaic streams can create effect on the climate over the time (Mazi, 2003). Another reason affecting the global climate is seaic stream system called 'the conveyor band' (Denhez, 2005 reported by Ateş, 2008). This system carrying 20 times more water than the whole river system in the world cools down around the Iceland and submerges to the deep. The conveyor band function to exchange temperature and water between the seas. In this system, while the hot waters were being carried, the air right above the surface stream gets warm and it moderates the climate of the continents where it passes through. In the southern hemisphere, the cold waters of the melting glaciers in the Antarctica go down in the summer time and join the conveyor band then head towards to the north (Aksay, 2005).

Another natural event, El Nino also called "Southern swinging warm movement" (Aksay, 2005), as a result of the complicated relationship in the atmosphere, causes regular changes in every 4.5 years by warming the surface waters in the Eastern Pacific (Mazi, 2003). However, events in the North hemisphere, El Nino and in the Southern hemisphere, La Nina are happening more frequently because of the global warming and their damaging effects are increasing. Especially, in the tropical and sub-tropical regions, it constitutes an

important source which changes the climate along with the years (C'Neill, Mackellar, Lutz, 2001 reported by Akyel, 2009).

2.2 Artificial Effects

Climate change has been continuing for thousands of years. However, it has taken more attention of the public and scientist in last couple of decades with some experienced climate events and results of the relevant meteorological measurements (Mitscherlich 1995; Kadioğlu, 2001 reported by Çepel, 2008). The reason for this attention was that the climate started to present a change unlike the earlier geological periods and the thought that there is possibility to harm whole creatures as a result of this change. The most dominant factor which accelerates the global warming is the strengthened greenhouse effect which is accepted as the main reason for the climate change. Besides this effect, we can mention increasing population and consequently conurbation and narrowing forest areas among the other reasons causing the climate change (Çepel, 2008).

2.2.1. Strengthened Greenhouse Effect

In the last 150 years, because of the gradually increasing and excessively consumed fossil fuels such as oil, coal and natural gases and changes in the land cover, the great amount of poisonous gases and particles are being released to the atmosphere (Kadioğlu, 2008).

According to the Mauna Loa measurements which are being implemented since 1958, the CO₂ accumulation in the atmosphere has been increased so fast. When the latest published measurement results were analyzed (Keeling, 2005 reported by Türkeş, 2007), we saw that the annual average CO₂ accumulation in the atmosphere before the industrial revolution was 280 ppm and in 1958 was about 315 ppm. In 2004, this result has been reached to the level of 377.4 ppm. Today's CO₂ accumulation level is much more above the registered CO₂ accumulation changes (between 180-300 ppm) of the past 420,000 years. This increase in the greenhouse gases weakens the earth's cooling capacity provided by means of the long wavelength radiation. This causes positive radiation stress which tends to increase the warming. Therefore, "the positive contribution to the earth/atmosphere mutual system" is called strengthened greenhouse effect (Türkeş, 2003 reported by Türkeş, 2007). This situation means that the natural greenhouse effect which has existed for millions of years is getting stronger with the help of the natural greenhouse gases in the atmosphere (Türkeş, 2007).

2.2.2. The Other Effects

The accelerated population growth brings several sociologic, economic and ecologic problems. The amount of the natural resources and the capacity of the habitats of the world are limited. As a result of population growth, firstly people are required to share their food, habitat, common health services and education opportunities with the increasing population. Although, technology has been essentially developed to better off the quality of the human life, it causes this problem by increasing the consumption speed of the resources and their capacities. This situation runs out of the resources and destroys the ecologic balance.

Another reason is the excessive damage done to the forest around the world and their decreasing amount of area. The primary reason for this is that the personal interests of the people, the second reason is that the importance of the forests have not been comprehended yet by the public. Considering the forests as a source of wood or additional useful land for different land use purposes is an improper point of view toward the forests. The real value of forests is fact that they are a natural system producing economic and ecological benefits. Forests have several functions such as producing oxygen, consuming carbon dioxide, preventing erosion and floods and balancing the climate. Therefore, forest has special position in terms of the functional aspect among the natural flora coverage (Çepel, 2008).

3. The Effects of the Climate Changes

Recently, because of the global climate change, observed changes in the weather and climate parameters can be increase of the evaporation and rainfall, observing shower in the larger portion of the rains, thawing of tundra, whitening of the corals, retreat of the glaciers, shrinkage of the glaciers in the seas, increase in the level of the seas, increase in the number of the forest fire and increase in the number of weather disasters such as storm and floods (Kadioğlu, 2008). Besides, among the signs of the global climate changes, we may include the decrease in the climate migrations and in the rare bird species (Samur, 2007).

Depending on the global warming, changes in precipitation and temperature result in melting of the glaciers and ice layers in the poles. Accordingly, some increases of sea levels have been already observed. Regular transition periods between downfalls have been disappeared and while a region can experience a

thunder squall, another region can have a heavy drought season with no any precipitation (Çınar, 2007).

The potential danger of these changes is not only their sweating effect on the people because of the hot weather. Actually, people can adapt themselves quickly to a climate change and they can save themselves. However, the entire eco-system composing the food chain is in jeopardy since the vegetation and animal cannot accommodate these changes (Kadioğlu, 2008).

The computer simulations (scenarios) created based on starting data of the scientist, give enough idea about the possible ecologic disasters caused by this process. The consequences of these disasters are being explained below based on the scientific data (Çepel, 2008).

1) As the temperatures increases, evaporation from the large water surfaces will increase. As a result, precipitations and humidity in the climate will increase in the neighborhood of these places. In closed basins and in central continental regions, drought and desertation events will take place. The underground water reserves will fall down (Çepel, 2008).

Based on the World Bank data, in 80 countries housing 40% of the world population, the water scarcity has already been started. This situation has an adverse effect on the economic development of the mentioned countries. Because, the drought reduces the agricultural productivity, and agricultural and forest land shrink (Flavin, 1996 reported by Çepel, 2008). As water lessens, hydro-electric energy production will fall (Çepel, 2008).

2) Owing to the higher temperatures, glaciers on the poles and high mountains will melt down and this will eventually cause higher water levels on seas, sea, lakes and rivers. The coastal lands and the lands along with the rivers will submerge (Çepel, 2008).

These excess waters will cause soil erosion and landslides causing the substantial damages. All these incidents will end up with mass immigrations (Kadioğlu, 2001 reported by Çepel, 2008). According to the UN Intergovernmental Climate Change Panel (IPCC), the environmental refugees in 2050 will sum up to 150 million people (Torunoğlu, 1997 reported by Samur, 2007). Not to have a residential place for this amount of immigrants will cause serious social problems (Samur, 2007).

Because of the rise in the sea level, lowland cities such as Amsterdam, Shanghai, Washington can submerge under water. Currently one third of the world population is living on the coastal belt with 55 km width (Hertsgaard, 2001 reported by Çepel, 2008). As the water level rises, death tolls and economic losses will be experienced in these regions (Çepel, 2008).

As a result of thawing glaciers, beside the rise in the sea level, several bacteria which has been kept frosted in $-80, -90\text{ C}^{\circ}$ will appear again. However it is not known how to deal with these bacteria yet. Based on the experiments with samples from the glaciers, scientists are warning that those bacteria may cause deadly illnesses and that there is a possibility of being conveyed by the migrating birds around the world (Sunay, 2000 reported by Samur, 2007).

3) Unbalanced global warming will eventually increase hurricane formation in both number and in strength; and will cause substantial damages (Çepel, 2008).

At the end of global warming, horizontal and vertical air movements will emerge between atmosphere and hydrosphere. Accordingly, there will be major differences in the formation of the tropical cyclones, hurricanes and storms. Referring the findings from the computer simulation models, specialists explained that when the temperature increase by $2-3\text{ }^{\circ}\text{C}$, potential damaging effects of hurricanes could increase by 50% and their velocity could reach to 350 kilometer per hour (Flavin, 1996 reported by Çepel, 2008).

4) With the climate change, zoological and botanical species and their biologic diversity in the water and continental habitats differ. Creatures that cannot accommodate themselves to the new conditions are forced to immigrate to other regions or else they are erased from the earth. For instance, today, certain corals and zooplanktons sensitive to the water temperature are nearly extinct already (Flavin, 1996 reported by Çepel, 2008). It was also stated that some species which are not observed in the sea before started to exist (Çepel, 2008).

5) Owing to the global climate change, the tundra soils in Siberia and Canada would be thawed and at the end, and large swamp areas would occur. The methane gases originating from these swamp lands would flow into the atmosphere massively. The mass amount of methane gas may increase the global warming (Mitscherlich, 1995 reported by Çepel, 2008).

According to the fourth assessment report of the Intergovernmental Panel on Climate Change published in 2007, as a result of climate change, the global average atmosphere temperature increased by 0.74 °C degree. The biggest part of this increase took place after 1991. Due to the predictions in the report, in case if there is no any precautions taken, scenarios exhibiting the possible consequences present that the average temperature will rise by 2.4–6.4°C in year 2100 bound to the greenhouse gases and the sea level will rise by 0.26–0.59 m (IPCC, 2007).

As Sunay (2000) stated, in the latest ice age which ended 10.000 year ago, the average global temperature value was lower only 5 °C than today's average. These temperature changes which could be seen small in numbers but they have great influence on the global climate system, natural habitats of creatures and human life (Sevim, 2009).

The temperature extremes and record high values kept since 1860 when the first temperature values were recorded below (Kadioğlu, 2008):

- Since 1860, 19 out of the hottest 20 years were observed after 1980.
- Since 1860, 11 out of the hottest 20 years were observed after 1990.
- The last 50 years, according to the glacier registries, is the hottest half century observed in last 6,000 years.
- According to the sea temperature recordings, from the mid-1950s till mid-1990s, a significant warming has been seen.

Because of the climate change, a large number of growths in the extreme weather events (flood, drought, etc.) are being expected. This situation gives the opinion that the possible losses caused by the natural disasters will increase substantially in the 21st century. For example, the global economic losses emerged from the natural disasters in 1990s have been sum up to more than US\$ 608 billion. Because of the climate change, for example till the year 2050, the economic losses are expected to reach US\$ 300 billion annually (Kadioğlu, 2008).

3.1 Effects of the Climate Change in Turkey

On the global scale, the studies about the human borne climate changes have been investigated in Turkey up until today. However, researchers remained incapable during the consideration of the effects of this change.

Nevertheless, reduction of the climate change scenarios from the global scale to the local scale by means of the climate models and investigation of the results deal closely with planning of the energy, agriculture and water resources of the country (Kadioğlu, 2008).

According to the results of the Önol's (2007) study, in the period of 2070-2100, the average expected temperature rise in Turkey is between 2.5-4°C. Especially in the Aegean and Eastern Anatolian regions this rise would reach up to 4°C. The reason for the temperature change in the Aegean region is the hot air wave's effect sourced from the Europe in the summer season. During the summer time, temperature changes up to 6°C were being expected. It is obvious that this amount of increase in the average temperature may have wide range of effects on different areas such as forest fire, animal and floral diversity and human health. The temperature rise will also influence the seasonal transition and the summer season in Turkey will expand into the spring and fall seasons (Kadioğlu, 2008).

In the IPCC report, the essential point about the results relevant to Turkey is that all regions of Turkey except the north-east part of the country would be under the effect of a dry and hot climate by 2030. The maximum winter temperatures of Turkey have been increased by 1.0 °C between 1997 and 2007. In the Aegean and Mediterranean regions, there is an increase in the temperature of both day time and night time. Relevant to this fact, evaporation will increase; seasonal distribution and strength of the precipitations will vary; and the snow cover will eventually reduce. All of these results show that the stress over the water will increase (IPCC, 2007).

Besides, there will be important changes in terms of precipitation. Particularly in the winter season, precipitations are decreasing by 20% to 50% in the Aegean, Mediterranean and Southeastern regions of Turkey. Based on the data, the water basins in these regions are in severe danger. On the other hand, the Black Sea region will be confronted by decrease in the downfall but not at the same rate. The changes in the wind patterns will slow down the humidity entrance into southern regions of Turkey and then eventually cause decrease in precipitation. In the fall season when the change in the precipitation is apparent, particularly in the Southeastern and Eastern Anatolia regions, an increase exceeding 50% is being expected. It could be wrong to consider this increase in the precipitation alone in this region including the upper and middle Euphrates and Tigris basin and also essentially important region for the water-energy policy of Turkey. Because, when we take into to account the downfall scarcity

occurring in the winter and the expected high-level evaporation due to the increasing temperatures, there is no perfect scenery about the future (Kadioğlu, 2008).

Following the draught encountered in Turkey in 2008, majority of the country regions took precipitation more than the average in 2009. Consequently, flood incidents have been experienced in Bartın, Zonguldak and Giresun during July; and in Tekirdağ, İstanbul and Çanakkale during September. Beside the economic losses caused by the floods, there were also many death incidents. Especially the flood in İstanbul has given the largest economic damage after the 1999 earthquake (Sevim, 2009).

In April 2011, the average rainfall in the Aegean region was 62.9 mm, the normal value was 53.9 mm. In April 2010, the average rainfall was 36.4 mm. An increase has been observed in the rainfall by 16.8% in proportion to the normal value and by 72.8% in proportion to last year's rainfall. (<http://www.dmi.gov.tr/veridegerlendirme/yagis-raporu.aspx>)

There could be many industries which could be affected adversely by the abnormalities in the temperatures and precipitations caused by the climate change. There will be scarcity in drinking water, utility and agricultural irrigation in Turkey which is carrying drought risk. Eventually, there will be water stress. In 2007, the fall of the overall wheat production in Turkey is an impressive proof of the condition. The possible consequences of the climate change could be drought, desertation, forest fires, change in the land use and the necessary immigrations relevant to the mentioned issues. Moreover, the decreases in the regimes of the river caused by the variations in the precipitations may affect Turkey negatively whose considerable part of its energy is being produced by the hydroelectric power plants. As a result of the imbalanced precipitation regime, floods, flash floods and epidemic diseases are the other adverse effects which may emerge in the regions where over precipitation takes place (Öztürk, 2002).

3.2. The United Nations Climate Change Frame Contract (UNFCCC) and the Kyoto Protocol

Together with the development of a worldwide environmental understanding and realizing that the environmental degradation has serious threats over the all creatures, several important measures have been taken in the international aspect. In this way, the first step was taken in 1988 with

foundation of the “Intergovernmental Panel of Climate Change” (IPCC) by the support of the United Nations Environment Program and World Meteorology Organization. This panel aims to consider the scientific, technical and socio-economic information toward understanding the human borne climate change risk (Karakaya and Özçağ, 2003).

As an established independent body at the international level, The Intergovernmental Panel of Climate Change (IPCC) is the most serious step toward performing climate change studies and developing policies (Samur, 2007).

The second step, The United Nations Climate Change Frame Contract has been finalized with the opening for the signature in United Nations Conference for Environment and Development between June 3rd and 14th, 1992 in Rio de Janeiro, Brazil. According to the first paragraph of the 23rd article of UNFCCC, it is entered into force on 21 March 1994, after 90 days following the signature of 50 countries.

(http://unfccc.int/essential_background/convention/status_of_ratification/items/2631.php).

The foundation of the agreement goes back to 1970s when the sense of environmental understanding started. The agreement requires the signing countries to make preparations firstly to reduce the greenhouse gases which cause the climate change; and at the same time to adapt different effects of the climate change; and to execute studies to reduce their response levels toward the change (Akyel, 2009).

The essential principles of the agreement are (Öztürk, 2007):

- Protecting the climate system based on equality between the members, proper to responsibility sections which are joint but different;
- Taking into account of the special conditions of the developing countries that would possibly be affected by the climate change;
- Taking the precautions more effectively and with less cost to prevent climate change;
- Supporting the sustainable development and integrating policy and required precautions to the national development programs; and

- The measures taken against the climate change should not be discriminative, arbitrary, unfair or a concealed limitation for the international trade.

According to the UNFCCC (2011) data, there are 195 member countries including Turkey. (http://unfccc.int/essential_background/items/2877.php).

In the climate congresses held until 1997, the international society were just agreed on a consensus to prevent the climate change's hazardous threats against the humanity and their future (Samur, 2007). To the extent of this agreement, to slow down the climate change by decreasing the greenhouse release into the atmosphere, with the Kyoto Protocol made in 1997, parties went one step further and objective targets were set for the developed countries (Akyel, 2009) for instance, in the 2008 – 2012 period, industrious countries were asked to decrease their greenhouse emissions 5.2% less than from their values in 1990 on average. During the process between 1997 and 2005, the protocol has not come into the effect. Protocol signing countries' total emissions should not exceed the 55% of the global greenhouse emission. China and the U.S. did not sign the agreement. Therefore, the protocol has been come into the effect till 2005. Following the Russia's signature, the protocol became valid on 16 February 2005 (Samur, 2007).

Despite Turkey adopts the objectives of the UNFCCC and wants to be included into the process, Turkey did not sign the UNFCCC protocol until 2003 because there was an obligation to reduce the greenhouse gases back to the level in 1990; and another obligation to supply economic and technical support to the developing countries because of Turkey's position among the Organization for Economic and Development (OECD). With the 21 October 2003 dated and 4990 serial numbered law, Turkey also took part in this agreement. This law was published in the Official Newsletter with 25266 serial number on 18 December 2003 and came into effect. Thus, Turkey joined the UNFCCC as 189th member country on 24 May 2004. (<http://iklim.cob.gov.tr/iklim/AnaSayfa/BMIDCS.aspx?sflang=tr>).

By joining the UNFCCC, Turkey gained the privilege of being part in the Kyoto Protocol legally. The draft law which is approving the Turkey's participation into the Kyoto Protocol was accepted by the Turkish Grand National Assembly (TBMM) on 5 February 2009. By this means, Turkey gained the opportunity to participate into the groups formed by the countries

part of the Kyoto Protocol
(<http://iklim.cob.gov.tr/iklim/AnaSayfa/Kyoto.aspx?sflang=tr>).

Tourism is one of the important sectors for the Turkish economy. Turkey is being visited by millions of tourists and making billions of dollars every year from the tourism industry today. Thus, important steps will be taken along with the studies in the climate changes in the name of the sustainability of this sector. The World Tourism Organization invited the all countries interested in the relationship between tourism and sustainable development. First of all, Kyoto Protocol to be signed then all kinds of international and multilateral declarations and agreements which is preventing occurrence and expansion of the effects of the climate change to be approved (WTO, 2003a). With its decision taken in the beginning of 2009 about being part of the Kyoto Protocol, Turkey accepted the invitation of the WTO (Sevim, 2009).

4. Climate Change - Tourism Relationship

As the world having warmer atmosphere, all creatures will not be easily keep up with quick change; thus, substantial amount of plant specie will be extinct, forests, in other words lungs of the world, will disappear quickly because of the human effect and climate change. Since these factors will eventually cause the extinction of the flora and fauna, observatory tourism type will fade away (Lovejoy, 2000 reported by Sevim, 2009). Today, population of two thirds of the bird species is now decreasing in the world. 11% of the all bird species in the world is under the risk of extinction. The most important parameter damaging the bird population is that disappearance of their natural habitats (Youth, 2003 reported by Samur, 2007). Disorientation of the tropic climate out of the equatorial belt will convey malaria, meningitis and other insect borne infections to the temperate climate belt. Other dermatological diseases specific to the tropical zone will spread to the many places currently in the temperate climate today. Hence, the tourism popularity of the destinations contaminated with a disease will be affected adversely. As it is understood, since climate changes will cause substantial physical modification in the world, present tourism balance will totally vary and some types of tourism will fade away (Lovejoy, 2000 reported by Sevim, 2009).

In the first progress report issued by the IPCC in 1990, the tourism subject was not included. After the late 1990s, an increase in the number of published article in the tourism sector has been observed. In the second progress report issued by the IPCC in 1996, the tourism subject was mentioned for the first time

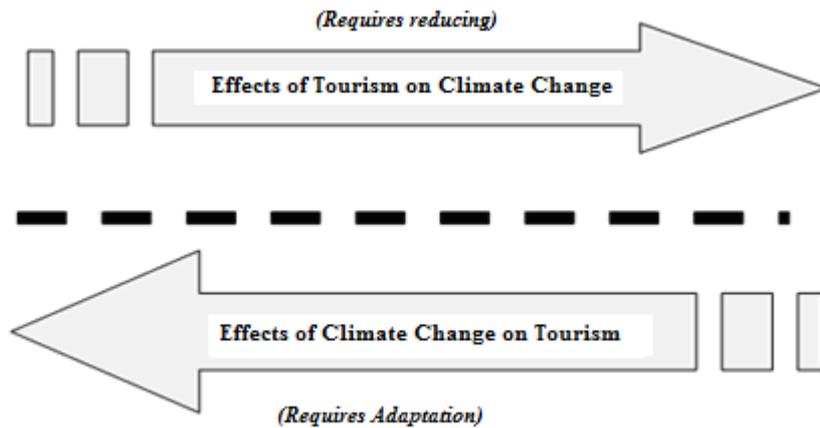
and it is stated that the tourism activities in the island-countries and coastal regions are vulnerable to the rise in the sea level (Hall and Higham, 2005 reported by Sevim, 2009).

In the Djerba Declaration published at the end of “1st International Climate Change and Tourism Conference” organized by the WTO in the city of Djerba of Tunisia in 2003, the following article was included “within the close cooperation with the international organizations, government bodies, academic institutions, non-governmental organizations and local residents, to promote implementing advance studies toward the purpose of investigating the relationship between tourism and climate change; and especially to pay attention to tourism while working jointly with the IPCC and to include tourism specifically into the 4th Evaluation Report (WTO, 2003a).

On the other hand, in Turkey, there is no much study found about the climate change and their effect on tourism. In the beginning of year 2007, in the First Climate Change National Report published by the Ministry of Environment and Forestry, the tourism industry was not mentioned. Besides, there has not been found any study organized by the Ministry of Culture and Tourism in this subject (Sevim, 2009). When we consider the certain facts such as Turkey was visited by 28.5 million foreign tourist in 2010; more than US\$ 15.5 billion revenue acquired; (http://www.tursab.org.tr/tr/istatistikler/turist-sayisi-ve-turizm-geliri/1963-sayi-gelir-ve-degisim_68.html) and hundreds of thousands workers are being employed in the industry, it is understood that the necessary attention must be paid to the subject and must be worked harder for the future of the industry.

As it is illustrated in the Figure 2, there is bilateral relationship between tourism and climate change. The first aspect of this relationship includes the effect of tourism on the climate change. To reduce this stress caused by tourism, its greenhouse emissions should be decreased. The second aspect of the relationship is the effect of the climate change on tourism. This especially refers the risk that the destinations may face in the future because of the climate change. As a precaution, some adaptation strategies might be developed against those risks (Sevim, 2009).

Figure 2: The Bilateral Relationship Between Tourism and Climate Change



Source: Patterson, T., Bastianoni, S. and Simpson, M. (2006). Tourism and Climate Change: Two-Way Street, or Vicious/Virtuous Circle. Journal of Sustainable Tourism.

4.1 Effects of Tourism on the Climate Change

As one of the largest and fast-paced growing industries and having relationship with many other industries in the world, tourism has extensive environmental effects (Enssle and Kreft, 2008 reported by Sevim, 2009). We may classify these effects into two separate categories: accelerating and retarding.

4.2 Accelerating Effects of Tourism on the Climate Change

Settlements of tourism facilities harm the environment and ruin the physical balance. Tourism attractions usually start and develop at the places where the natural balance is rather sensitive. Then if the required precautions are not taken, this disturbs the natural balance quite easily. In addition to the settlements' pollution in the water sources, they damage the agricultural lands and the regional flora and fauna structure. Destruction of the forests, hunting in the forest lands, constructions and transportation investments and activities, and fishing ports on the coasts, concourse trails conduce to extinction of several animal species (Yağcı, 2000). Overcrowding caused by the settlements and intense tourism activities occurred due to the unregulated planning, causes modification in the environment somehow. In addition, greatness of this

modification differs according to the intensity of the tourism development; type of the tourism; and alterations in the environmental resources and their capacity to stand by (Akdoğan, 1996).

We can consider the effects of tourism on the climate change under three different headings: transportation in tourism and emission release; usage of the water resources and pollution; and other damages to the nature.

4.2.1 Transportation in Tourism and Emission Release

The effect of tourism on human borne climate change process could not have been determined for a long time. CO₂ emissions released by the tourism industry were measured for the first time by the WTO on the scale of the three basic sub sectors of tourism (transportation, accommodation and activities) as of year 2005. Although, other greenhouse gases have serious role on the global warming, CO₂ has the biggest adverse effect compared to the other human borne activities. As it is seen from the Table 1, emissions especially caused from the airway transportation in tourism industry have an increasing effect on the global warming (altitude of the flight is important) (WTO, 2007).

Table: 1. 2005 CO₂ Emission Caused by Tourism as of Year 2005

	CO ₂ (Mt)
Airway Transportation	517
Other Transportation	468
Accommodation	274
Activities	45
Total	1304
Overall World	26400
Percentage (%)	4.94

Source: WTO (World Tourism Organization). Climate Change and Tourism: Responding to Global Challenges (http://www.unwto.org/climate/support/en/pdf/summary_davos_e.pdf).

By the WTO (2007), a scenario case was developed to illustrate what could take place if there is no any precaution taken in the future, and if everything continues in this way. This scenario was established according to data about the international tourism movements published by the WTO. It was assumed that these movements will grow by 4% annually until year 2020. Based on the scenario, CO₂ emissions emerging from the international tourism movements will increase by 152% until year 2035 (Sevim, 2009). There is no any study found in Turkey about the greenhouse emissions directly related to the tourism industry. However, in the 1st Climate Change National Report, total CO₂ emissions were published relevant to the transportation sector which is a subsector of the tourism industry. The transportation sector borne emission was 0.46 ton CO₂ per person in 1990. This rate has been raised to 0.56 ton CO₂ per person in 2004. However, while CO₂ emissions rate of this sector was 15% of the overall CO₂ emission in 1990, it was decreased to 12% in 2004. This drop means that the sector has been using energy more efficiently (Apak and Ubay, 2007 reported by Sevim, 2009). The factors behind this productivity are the consumption of the fuels containing less carbon ingredient and increasing number of the motor vehicles using LPG and diesel fuel (Sevim, 2009).

In transportation sector, the CO₂ emission percentage of the highway transportation compared to the overall CO₂ emissions is 84% in year 2004. The civil aviation (12%), shipping (3%) and railways (1%) borne emissions are following this number (Sevim, 2009).

In the 1990–2004 period, the average drop in the CO₂ emission per motor vehicle was 8.7%. Besides, in 2003 and 2004, by offering tax incentives to the consumers, approximately 320.000 old model motor vehicles were retired from the traffic. Thus, CO₂ emissions decreased by 4.9% (Apak and Ubay, 2007 reported by Sevim, 2009).

4.2.2. Usage of the Water Resources and Pollution

Usage of the water resources and the problems resulting from this usage are one of the essential issues of the tourism industry. Pollution of the water resources and their excessive consumption are the leading consequences of this instability. Since the annihilation of the water resources relates directly with evaporation, precipitation and vegetation, this can be thought as an accelerating effect of the global warming (Çimen et al. 2007). Decrease in the water resources causes decrease in the saline screening and consequently narrows the agricultural lands; and problems would arise in the forest or floral lands (Perry,

2006). On the other side, pollution and annihilation of the water resources for the crowded tourist groups draws an unfavorable picture for both consumption and the existence of the health problems (Şahin and Bilim, 2007).

4.2.3. Other Natural Damages

In addition to the natural effects of tourism, it involves to the climate change with its long-term adverse effects on the nature. Human intervention into the natural balance around the tourism areas has irreversible negative influence on the ecologic structure (Holden, 2004 reported by Bilim et al., 2008). These negative effects can be mentioned as: destroying the forest land to construct tourism facilities (Çimen et al. 2007); intense electric consumption (Perry, 2006); using agricultural lands for tourism purposes; decreasing number of wild animals as a result of the misuse of the forest and agricultural lands (Çimen et al. 2007; Perry, 2006); and heavy stress caused by the intense population centralization. The consequences of these effects destroy the ecosystem (Yurik and Türksoy, 2006 reported by Çimen et al., 2007).

4.3. Retarding Effects of Tourism on the Climate Change

New tourism types respecting the nature and with sustainable structure are now on the world's agenda. The new approach has been commenced upon the demand of the people who wishes to enjoy the nature; green lands and water sports. It was understood that this type of tourism depends on the accessibility and the quality of this regions, therefore, proper strategies should be developed to preserve and maintain of natural lands (Ross and Wall, 1999 reported by Çimen et al., 2007). The new tourism understanding developed under this concept will constitute one of the factors retarding the climate change. For instance, hunting areas, natural parks, blue-flag beaches and bays, winter tourism spots, mountain tourism destinations, several sports and health facility areas and cultural tourism activity areas can be preserved. Owing to the nature-respecting tourism understanding, the natural regions will be under protection and therefore narrowing of the forests will be prevented, destruction of the natural life will be decreased, unnecessary tourism constructions will be eliminated and less harmful tourism means and equipments will be employed. Since the environmental consciousness will be adopted by the both local community and tourists, sensitivity toward environment will improve and there will be developments in the people's attitudes and in their behaviors in the favor of the environment. Hence, although the factors causing the global warming are

not dismissed completely, by means of the nature-respecting tourism, there could be precautions taken to retard the fast climate change (Çimen et al., 2007).

4.4. Effects of Climate Change on Tourism

Tourism industry is sensitive to the temperature, precipitation, wind and humidity elements of a climate. Particularly, many destinations in which sun-beach-sea oriented tourism products are being offered, owe their popularity to the suitable climate conditions during the holiday season (Berrittella et al., 2006; Amelung et al., 2007). In terms of their reflection to the tourism industry, possible changes which may occur in the climate can be classified in two different sub titles as positive and negative effects.

4.4.1. Positive Effects of Climate Change on Tourism

Fast climate change endangers the humanity. However, as the wars contribute to the fast technologic development, similarly tourism might be affected positively by the climate change in terms of several aspects. Especially, meetings held to debate the climate change is alone type of a tourism movement. Recently, increasing number of the meetings at the domestic and international level is indicating this point (Çimen et al., 2007).

It is also thought that certain changes caused by the climate change could provide some innovations in tourism industry in the close future. According to the increase in the temperatures caused by the climate change there will be some changes in the tourism attraction spots. For instance, the sea season of the Black Sea shores known as cold climate, will be longer, this place will be preferred as much as Mediterranean shores. Besides, bound to the newly formed natural changes, tendencies such as scientific will increase and eventually different types of tourism movements will commence. For example, interests of tourist toward plateau and national parks which preserve their natural properties will increase in time and tourism developments will be in this course. (Çimen et al., 2007).

4.4.2. Adverse Effects of Climate Change on Tourism

Global warming is the reason for climate change; consequently climate change causes warming of the world; the rise in the sea level; and increasing the frequency of extreme weather events. Tourism industry is being influenced by these variations in both directly and indirectly. It is possible to list the direct

effects of the climate change on the tourism industry below (Giles and Perry, 1988 reported by Sevim, 2009):

- While the tourism attraction areas are warming, their structure turns inadequate for tourism activities;

- The beaches submerge due to the rise in the sea level;
- Defection of the coastal ecosystems;
- Interrupted tourism activities by the extreme precipitations and floods;

The indirect effects of the climate change on the tourism industry can be listed as follows:

- Because of the warming effect, summer season might extend and the demand for tourism could increase. But, on the long run, this could bring more environmental problems and warming effect (Giles and Perry, 1988 reported by Sevim, 2009).

- According to the draught, the imminent water stress; epidemic illnesses resulting from the scarcity of the clean water; and illnesses due to the over-heat may emerge (Giles and Perry, 1988 reported by Sevim, 2009).

- Because of the flexible structure of the demand for tourism, the form of the decrease in the demand could be very sharp due to the negative situations caused by climate change (Sevim, 2009).

- The products and services produced by the tourism industry are outsourced from the many sectors such as agriculture and livestock (Olali and Timur, 1988). Therefore, tourism industry will also be affected by means of the changes occurring in the other sectors and industries outsourcing to tourism industry (Sevim, 2009).

The effects of the climate change may shape differently due to the regional locations. Many of these effects are being observed indirectly on the environmental systems as an increasing stress. It is anticipated that there is a risk of epidemic illnesses for the many places in the world due to the climate change. This situation is serious threat for the universal tourism movement because of the vulnerable structure of the tourism. Moreover, one of the most important factors of the climate change is the rise in the sea level. This will have substantial influence over the small island-countries (Viner and Agnew, 1999).

The rise in the sea level will cause shore erosion. According to the Bruun rule: a single unit rise in the sea level will cause hundred times more shore erosion (Kadioğlu, 2006). In the light of the Bruun rule, it can be said that 0.18–0.38 mm, the most optimistic forecast about the sea level rise will lead 18–38 m shore loss; and 0.26–0.59 mm, the most pessimistic forecast about the sea level rise will lead 26–59 m shore loss (Sevim, 2009) in the future.

Buzinde, Navarrete and Morais (2009), in their study about the tourists' perception about the climate change, they stated that 70% of the world coasts will be affected negatively by the shore erosion. It was also shown that shore lines of the Point Reyes beach of California, Isle of Palms beach of South Carolina and Waikiki beach of Hawaii can not be seen now. Besides, similar conditions occurred in Asia, Africa and Caribbean's. The tourism investors in these regions are now trying to fix the erosion-damaged beaches with the filling method to provide customers access to the sea and sunbathe on the shore.

As a result of the study implemented in the Playacar region of Mexico, it was determined that customers have developed three basic points of views toward the filling of the beaches for the restoration purposes. Part of them approaches to the restoration positively; some negatively; and the third and agreeable part sees from the both ways. The third group agree with the positive ones because it is a necessary work to be able to use the beach; and they agree with the negative ones because the filling work is not being performed suitable to the natural structure of shore line (Buzinde and et al., 2009). This study shows that tourists may develop different points of views even in the tiniest part of the results of the climate change. Therefore, while working for reducing the climate change's effect, the efforts should be well detailed and planned as much as possible.

In accordance with the report issued by the Research and Development Department of Türsab, the possible effects of the global warming on tourism will be as follows: the temperatures in Europe will increase, as a result of this it will be possible to swim for example on the southern shores of England where today it is not probable. Besides, countries residing on the shores of Atlas Ocean such as Germany, Holland, Belgium will be used as beach destinations. Moreover, snow of the ski centers on the southern region will be thawed and winter sports will not be possible anymore. Global warming will cause longer holiday seasons then the holiday facilities will expand toward the north. As the northern Europe become more moderate in the climate, today's demand for the southern Europe will be experienced for the northern Europe in the future. Hot

winds will decrease the demand for the Mediterranean region; until year 2050, the Mediterranean will rise by 50 cm and this will affect the tourism in the region. The variations which would be experienced in the climates will change the balance of competition among the holiday destinations. Especially, ruining of the corals in the tropical regions will affect the diving tourism adversely. Recently, due to the observed decreasing snowfall in the winter sport destinations, they will be under risk and consequently there will be changes in the preferences of the tourists interested in winter sports. According to the data from the World Tourism Organization, in the period of 2006-2007, since the British tourists were not satisfied from the snow level on the Alp Mountains, they mostly preferred to spend their holiday on the Rocky Mountains for ski (Yücel, 2009). In the world, the overall expenditure for the winter tourism is about US\$ 150 billion. This amount is almost one fourth of the total annual tourism expenditures. For instance, the Alp Mountains is one of the most significant destinations. Each year, more than 100 millions of tourists visit the Alp Mountains. Particularly for Switzerland and Austria and other many countries in the Central Europe, the winter tourism is essential source of income. The winter season has already started to be shorter in these countries. On the other hand, it can be expected that if the required investments would be made on the Caucasian and Himalaya Mountains, these untouched areas would also be an attraction spot (<http://www.sedefed.org/default.aspx?pid=45996&nid=34493>).

4.5. Effects of Climate Change on the Turkish Tourism Industry

Climate changes will have different influences on several types of tourism such as mass tourism, winter tourism, sailing tourism, golf tourism and etc. These influences must be analyzed separately for the each type. There have been several attempts to expand the tourism season along with the whole year and to increase the number of tourism alternatives in Turkey. Although, these attempts started show positive results, so the preferences for the different types of alternatives have been increased recently. But, still the most attracting tourism type is mass tourism based on the beach-sun-sea ternary. The country of which three sides of it surrounded by the seas, beach-sun-sea types of tourism movements basically orientated in the shores of Mediterranean and Aegean regions. In these regions, particularly Antalya, Muğla, Aydın and İzmir are important tourism centers consisting of thousands of tourism establishments, hundreds of thousands of employee. The losses which would be experienced by

Turkey in the future due to the climate change have threatening structure against the country economy and job security of the industry workers (Sevim, 2009).

As it will be experienced in all over the world, Turkey also will be affected adversely in terms of winter tourism. Especially, this situation will affect popular winter sports destinations particularly Uludağ and Kartalkaya. However, the regions such as Palandöken-Sarıkamış could take advantage of this circumstance.

Since the northern Europe will also be warmer, Atlantic and Baltic shores will meet the specifications of tourism regions. Then, Turkey and Mediterranean region will lose its former importance. On the contrary, season of the Black Sea will extend, as of shore tourism, it will own adequate condition and quality (<http://www.sedefed.org/default.aspx?pid=45996&nid=34493>).

The most important effects of climate change on the mass tourism are the submerging risk of beaches and the tourism establishments on the shores because of the rise in the sea level; danger of extinction of beaches because of the coastal erosion; floods, flash floods, increasing number of hurricanes, draught, desertation according to the extreme weather events; less access to the clean water sources which might lead to the increasing number of diseases, health problems caused by the extremely high temperatures (Sevim and Zeydan, 2007).

According to Viner and Agnew (1999), toward the end of the 21st century, in the Mediterranean coasts of Turkey, the number of day in which the extreme temperatures are measured over 40 °C will increase substantially. Because of these extreme temperatures, a characteristic specification of the mass tourism would not be provided anymore. In the final report published at the end of “1st International Climate Change and Tourism Conference” organized by the WTO in Djerba, Tunisia in 2003, there are supporting anticipations for these opinion about the Mediterranean basin. In the report, it was stated that the temperatures will increase by between 0.3 – 0.7 °C in every ten years. Besides, the temperature index and the number of days above 40 °C will increase; and owing to the rise in the sea level, there will be deformation on the structure of shore lines and on the natural texture; tropical diseases such as malaria will spread, flash floods may happen; and the air quality of the cities will decrease over the time (WTO, 2003b).

In the summary report of the 2nd

International Climate Change and Tourism Conference organized by the WTO in Davos, Switzerland in 2007, the anticipations expressed for the Mediterranean in 2003 were repeated again and warmer summer seasons, water scarcity, decrease in the bio-diversity of the basin and increase in the number of disease cases were anticipated for this region.

4.6. Strategies and Precautions to be Developed Against the Climate Change

In the years ahead, following the environment, energy and agricultural industries, the tourism industry, has been carrying a great importance for the Turkish economy, also would have required to be modified its structuring due to the global warming. Negative effects of the climate change resulted by the global warming on tourism in several regions of Turkey such as varying the tourism destinations and concepts, facing some current favorite tourism destinations to the risk of losing their appeal are the global warming's reflections on the tourism industry on the midterm. (Demir, http://www.turizmdebusabah.com/haber_detay.asp?haberNo=47680).

Environmental “all inclusive” application can be given as a sample for the concepts expected to be modified due to the climate change. “Environmental” “environment friendly” tourism establishments whose numbers are increasing everyday are started to show up in many countries of the world today. We may summarize the applications performed in these facilities in four main subject (<http://www.ekoturist.com/ekoturizm-makaleler-bilgi/14-vreci-all-inclusive.pdf>);

1. Among the applications performed for the water saving, following precautions can be mentioned: usage of automatic taps, usage of two-stage flushes, saving drinking and utility water, keeping the bath tube stopper unplugged, adjusting the toilet reservoirs to hold less water, implementing water-saver landscaping and preventing the water leaks.

2. Among the applications performed for the electric saving, following precautions can be listed: using the energy-saver bulbs in the rooms, plugging in the electric appliances only during the usage, applying optimal lightening in the areas such as rooms, lobby, dining rooms and etc, building a heat-reflector roof, popularizing the usage of solar energy water heaters, not to leave computers on the stand-by conditions, necessitate the isolation of the buildings and usage of automatic electric fittings.

3. Among the applications performed for the protection of the environment, following precautions can be mentioned: by written memorials, reminding the environmental chemical damage to the guests in case if the extra laundry done, incensing less gas consuming cars by providing them free parking spot to decrease the air pollution, instead of using plastic and pvc packaging materials in kitchen and in general areas, preferring usage of the glass bottles and packages, using recycled sewage water in the landscape irrigation system which requires high amount of water, preferring environmental-friendly chemicals in cleaning, usage of decomposing toilet papers, preventing unnecessary usage of the printers, instead making inter-departmental communication over the computer system with no paper, decreasing the usage of the commercial vehicles of the hotel, preferring environment-friendly pesticides and increasing the green areas.

4. Among the applications performed for the recycling of the used products, following precautions can be listed: separating the wastes into the plastic-paper-glass-organic groups, preferring the recyclable food products, purchasing recycled paper and office products.

In addition, to perform all of those mentioned activities with no any problem, campaigns which both inform the guest and reduce the consumption must be developed. Meetings with whole personnel should be held for the saving precautions. The guests and the personnel should be informed about the region and how to protect the environment (<http://www.ekoturist.com/ekoturizm-makaleler-bilgi/14-vreci-all-inclusive.pdf>). These precautions should be taken as an example by all of the tourism facilities and to be extended to reduce the effects of the climate change.

Several technical basic infrastructures can be founded to reduce the adverse effects of the tourism on climate changes. New regulations could be developed about the intensively used transportation vehicles in tourism. It should be provided to use the CO₂ emission decreasing materials in these vehicles (Dubois and Ceron, 2006 reported by Bilim et al., 2008). The World Tourism Organization (WTO, 2007) is suggesting the implementation of the new technologies to develop new strategies to consume less energy to benefit from the new developments reducing the adverse effects. Water storage systems, sustainable energy technologies (solar energy, chemical substrate energy, using solid and liquid waste), environment-friendly new herbal pesticides and protection systems are the frontiers of these technologies. For example, between 1988 and 1995, Inter Continental Hotels dropped its energy

costs by 27% by implementing new technologies. Using different chemicals in the water treatment is the major one among these techniques. 7% water saving achieved per hotel by means of this system (Mastny, 2007 reported by Bilim et al., 2008). Every hotel business management can employ less energy consuming equipments (energy saving and less water consuming washer and dishwasher machines, energy saving air conditioners and cleaning machines), tap and shower systems assisting less water consumption, energy saving bulbs used in the indoor and outdoor lightening with little technical changes (Bilim et al., 2008). All of these applications also decrease the operational costs.

To prevent the both effect of climate change on tourism and the effect of tourism on climate change, tourism management, investment and planning studies for the future are required. To protect the natural sources used as an economic mean, new consumption plans are required to be developed (Perry, 2006).

In this sense, the main principles can be presented as follows: tourism facilities should be established on the poor lands not suitable for agricultural purposes; certain plans minimizing the energy consumption should be developed for the construction of the buildings; while establishing a sewerage system, environment-friendly materials should be preferred and their construction project should be set away from the water sources (Dubois and Ceron, 2006 reported by Bilim et al., 2008).

In the climate change subject, it is quite important to emphasize ensuring the public interest and participation of the individuals, authorities and managers. Human element is found in the base of the strategies developed to reduce the adverse effects of tourism. Thus, with the joint activities of public, private and civil society will provide the most important and effective contribution to accomplish the result. Since the most painful process in the effects of tourism on the climate change is the decision making part, it is quite obvious that there should be joint contribution while developing and implementing policies (Çimen et al., 2007).

Besides, following strategies will contribute on the long term (Bilim et al., 2008): government rewards and incentives to the businesses and operators sensitive to the effects of climate change; performing educational activities to raise the public awareness in the schools, regional education facilities in the relevant destination about the protection of the natural environment and the

climate change; movie presentations in the quality of introductory lessons in the different regions (Mastny, 2007 reported by Bilim et al., 2008); against the deforestation, tree planting campaigns with the opinion that each tourist leave a memorial behind and the tree will be their contribution to the natural life (Becken, 2004 reported by Bilim et al., 2008).

In terms of rewarding sensitive businesses, an investigation carried out on the hospitality industry to evaluate the effects of climate change on tourism reveals that relevant campaigns has just started in Turkey in 2008: the Green Star and the White Star which are still in effect. Having this study into two different campaign aspects is an indicator that the sensitivity toward this issue is increasing. In addition, the two campaigns are in the nature that they support each other. However, when we observe the application of the campaigns being maintained under two different names and under two different authorities (The Ministry of Tourism and the TUROFED), the applications seem prone to any possible disorder in the future. In addition, implementation of one of the campaigns (the Green Star) is being carried on by an official institution and this fact improves the reputation of this campaign. To prohibit the possible disorder which may arise in the future, it is suggested that both of the two campaigns must be compounded in one campaign and continued by a single authority. Moreover, it is also understood that the Green Star campaign is a voluntary project and businesses should make an application in case they wish to be part of it. But, the subject is so important that participation should not be left to the businesses' free will. Therefore, it is suggested that there is need to be a legal foundation for the application and the business should be forced by law to accommodate the requirements of these stars. There must be also penalties for the businesses confronting with the requirements (Sevim and Ünlüönen, 2010).

Serious attempts such as signing the Kyoto Protocol points out the importance of legal aspect of climate change. Gas emissions released by the establishments should be minimized with the legislations issued by the local governments (Karakaya and Özçağ, 2007). In addition to these general applications, special strategies and legal applications were developed by the several countries. For instance, in Cuba, to establish a new tourism facility, first of all the central government must prepare an environment effect report and then this should be approved by the relevant government body. The Namibian government authorized to the local people to protect their own agricultural and natural wild areas and made relevant legislations and regulations. In certain countries, to reduce the movements to the tourism regions and to show sensitive

attitudes there are several fee and charges being applied such as usage tax and entrance fee. In Himalaya Mountains, the Kingdom of Bhutan is permitting only high-quality visitors by applying expensive entrance fee so as to keep their numbers limited (In year 2000, 7500 tourist were admitted and they paid US\$ 250 admission fee per day per person). According to the decision taken by the Union of the Antarctic Tour Operators with its 40 members, it is not allowed to accept more than 100 visitors per travel and frequent controls are made not to let any harm to the local nature by the visitor groups (Mastny, 2007 reported by Bilim et al., 2008).

13 Golf ranges in Turkey consume 2.25 million tons of water annually. This amount of water is almost three times more than the Tuz Lake (National Geographic Türkiye, 2010). This water should be saved. The “paspalum” grass offers a good alternative for the regions on the coasts since it likes hard water, endures the short term draught (Gwin, 2010).

5. Conclusion and Suggestions

Since the very early time of the history, human beings have been used the natural resources greedily. Together with the industrialization, the green lands were destroyed unconsciously. Soil and the atmosphere were polluted with wastes. Particularly, upon the recent developments in the technology all over the world, global warming occurring as a result of unrestrainedly consumption of the resources, caused irreparable changes. Majority of these changes are human borne. Therefore the solution for this problem will be provided by human beings themselves again.

Since the world population grew 4 times, the world economy grew 17 times compared to the last century, life resources is being consumed very quickly. Beside the growth in population, the consumption patterns of individuals are also growing. In addition, taking effective population policy, economic, social and ecologic precautions, specifying education policies targeting to educate the residents how to use natural resources are important toward the solution of this issue. As it can be seen from the study of Aksoy (2008), environmental conscious is among the education subjects that the employees need. Environmental conscious of the workers and managers must be developed. New management systems including these precautions to supply all requirements of the world population without destroying life resources must be developed. While arranging these regulations, it must be paid attention that the load

capacity of all natural resources such as oceans, seas, lakes, rivers, forests, meadows and agricultural lands should not be exceeded while having benefit from them.

Further, new consumption patterns should be adopted by the principals such as renewing the old production processes causing over-pollution and over-consumption of the resources, purchasing just enough for the needs, using the goods long term and carefully, when the goods get old transforming into another useful form, and finally sending them to the garbage recycle and stave the residuals properly.

To prevent the global warming, fossil fuel dependency, energy consumption and released CO₂ emissions should be lowered. To accomplish this, all individuals should alter their way of life at home, in the garden, at work, at shopping, on the travel, in the society, shortly in every part of their life. To meet with the energy requirements, sustainable energy resources should be developed such as solar and wind power. Serious measures should be taken about the current water consumption and current fresh water resources. As it is mentioned frequently in the public, in the incoming century, there are possible water-wars because of the decreasing water resources. There should be alternative solutions developed for the water scarcity. For example, in Peru, Bellavista village where the Pacific Sea can not be seen because of the fog and where the air humidity is so high, there were no enough fresh water sources. Therefore, the local people were expending 15% of their income to bring water from a distance with water trucks. After 2006, upon the construction of a new system which is catching the fog via multiple-level webs and condensing the water aerosols into fresh water, the village started to produce more water than their overall consumption.

When the effects of tourism on the climate change were considered, as it was stated in the conference in the subject of climate change and tourism held in Davos, 2007, tourism industry contributes the general CO₂ emission with its transportation activities and energy consumption. 75% of the whole CO₂ emission caused by the tourism industry is a result of the transportation activities performed during the tourism movements. According to the data from the Resort Periodical, urgent precautions should be taken for the tourism in which more than 1 billion people traveling, and constituting 7-8% of the whole sales figures of the world. Particularly for the transportation sector, while the required technology for the tourism industry was being developed, it must be supported to supply, purchase and usage of equipments and goods with less

CO₂ emission, less energy consuming, built up from the recycled materials and recyclable.

Another issue is that solid and liquid wastes of the tourism industry and the facilities supplying goods for the tourism industry are affecting the nature adversely. These wastes damage the agricultural lands and habitats of animals and the vegetation. In addition, they cause destruction of the forest lands. The government should take serious precautions which is including costly sanctions. After issuing the precautions, they should be followed with regular controls. Currently, in the subject of waste and recycling, several precautions toward the hospitality establishments is already being applied by the government such as collection of the used cooking oils, bulbs, florescent bulbs, batteries, and pressured containers; separation of the wastes as organic and recyclable ones. The issue relating with these applications is that the education of the workers and the managers about this subject. In the investigation of this subject conducted in Antalya upon the participation of the managements of 326 hospitality establishment by Sevim (2009), it was determined that the half of the establishments took precautions against the climate change and the rest did not. In this case, it was thought that it is required to educate the businesses about the climate change. To ensure all of the hospitality establishments to take proper measurements for the climate change, the required sanctions should be provided by the legal regulations.

In this way, local governments should act more sensitively, and fulfill their obligations completely.

The primary effect of the climate change on the hospitality establishments is water scarcity due to the draught experienced in the recent years. It is inevitable to experience increase in air conditioner usage due to the increasing temperatures. As a solution to this problem, the established air conditioners should be replaced with the new energy saver A and A+ class air conditioners.

Another effect of the climate change on the hospitality establishments is that the increase in the number of reported sicknesses of both tourists and the personnel due to the elevated temperatures. In case the anticipations about the climate change could come true, it is apparent that these complaints will increase. Thus, a specialist doctor should definitely be employed in the large hospitality establishments, and medicines and equipment for these cases should be held ready for treatments in the emergency infirmaries. The official medical

institutions should also be prepared for such circumstances in the tourism attraction destinations.

For the purpose of reducing the pace of the global warming, in terms of tourism, required precautions should be taken and the studies should be performed for the tourism models which are sensitive to the nature and which can be adapted itself to the varying climate conditions.

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