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Analysis of Climate Change Regions for Tourists in Ecological Balance with Origin City (Case Study: Guilan Province)

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ABSTRACT: Nowadays climate change and ecological sustainability are fundamental issues in any field of science and technology. Climate is more than any other factor influencing the type, function and conditions of human life. Today, forecasting meteorological data for future planning in natural areas, including tourism, is of great importance. The present study is a descriptive-analytical one with regard to the nature of the problem and the issue under study. This study is an applied study with emphasis on quantitative methods. Nervousness above 20 ° C and below 20 ° C and degree of comfort were determined by criteria such as (air temperature in degrees Fahrenheit, average relative humidity in percentage, mean minimum air temperature in degrees Celsius, wind speed in meters per second). Nerve Pressure Index from Weather Station Data Nasi of Gilan province was used and final output was calculated with thermal comfort factor in ArcGIS environment. All processes and data analysis in ArcGIS environment with geostatistical IDW model which predicts this unknown point's technique based on autocorrelation between measured points and their spatial structure. At the end, to show the final map of the final outlet, placed in 7 separate floors for both temperature ranges. The results of the Neural Pressure Evaluation showed that most of the year's central parts of Guilan province are in ecological comfort condition for human health.

***Keywords*:** Ecological Balance, Climate Oscillation, Thermal Comfort, Environmental Zoning, Guilan Province.

INTRODUCTION

Human thermal comfort conditions are a set of conditions that are at least 80% suitable for a temperature regime, that is to say, in those conditions, neither will feel cold nor warm. Some researchers have interpreted the term regime to be more neutral because the person does not feel the cold, heat, and local discomfort caused by climate problems (Ghobadian and Mahdavi, 2005). The best climate for living is that without much effort one can strike a reasonable balance between the heat produced in the body and the heat lost, that is, it does not receive any heat from the surrounding environment and does not give any heat back to the environment, so a very cold and warm climate for life It is inappropriate for the lowest metabolite to be carried out at 2 to 3 degrees Celsius, or more or less to increase the metabolism (Bahador, 1: 1). Under these conditions, the human organism can maintain its thermal balance in the best possible form without being deficient or over-energized. From the climatic point of view, temperature, humidity, wind and radiation are involved in the formation of human comfort conditions. Among these elements, temperature and humidity have the most influence on human health and comfort, and therefore most models of human comfort are based on these two elements (Golabi et al, 2013). Human bioclimates mean environmental conditions that are directly related to climate conditions and elements. In such an environment, various climatic elements, such as sunlight, air temperature, humidity, airflow, and rainfall, directly affect humans, and the only factor separating the human body from environmental conditions is its type of clothing and activity (Edington, 1996). Human heat and climate comfort is directly related to the body's thermal balance to the environment, which is determined by two groups of environmental and individual factors. The environmental factors are the four basic factors of climate, humidity, wind and radiation, and the individual factors are the level

of activity and the type of body cover (Hassanabadi & Lashkari, 2012). Recognizing climatic potentials as the basis of human activities constitutes the main basis of environmental planning and land use planning, if it guarantees the complete success of most urban development, civil, residential, architectural and tourism planning. When it comes to understanding the climate and using its various abilities, the question of how to build a climate-friendly and sustainable development architecture is that any building can interact with the natural environment in which it is located. What is challenging is the nature of this relationship. Today, the idea of sustainable architecture has emerged to answer this question. Sustainable development means development that meets the needs of the present generation without damaging the ability of future generations (Safaipour, 2013: 193). Bioclimatology is the science of studying and evaluating the impact of climate on living organisms, including plants, animals and humans. The state of thermal inactivity is also a condition in which the human organism can maintain its thermal balance to the best of its ability without deficiency or surplus energy. Climate, temperature, wind, humidity and radiation play a major role in shaping human comfort conditions. In these elements, temperature and humidity have a greater impact on human health and comfort, and therefore most of the models and indicators of human comfort are based on these two elements (Safaipour et al., 2013: 194). Although climate is just one of the variables that can affect tourism and travel, most tourists consider the weather conditions for their travel. Even people who do not travel in the right climate, such as cultural or educational tourists, try to choose the times when they want the best weather possible. Therefore, knowing the climate status of different regions can have an important role in tourism planning.

Comfort Climate:

Climate is an important part of a region's tourism capacity. In fact, climate and its diversity are considered as a source of tourism and most tourists pay attention to the choice of location and length of stay. In addition, when choosing a travel destination, they take into account the experience gained from it. But it may seem a little difficult to articulate climate quality conditions with regard to multiple elements. Climate data should therefore be presented in a way that reflects a person's reaction to the climate or climate and encompasses a range of degrees from excellent to unacceptable. These indices make it easier to interpret the complex effects of different atmospheric elements and allow comparisons of different locations from this perspective (Sunshine et al., 2004: 23-1). Air temperature has the greatest effect on the human body and comfort. But many other elements are climates that affect the air temperature and thus the human body. Humidity, sunlight, and air or wind currents are the most important elements. Comfort indices are diagrams and tables that illustrate the cumulative effect of all the factors affecting comfort. Thermal indices can be used to evaluate tourism conditions, inform tourists of the target climatic conditions and determine the climatic capacity of tourism in different regions. GIS software, with the capability of interpolating point-to-point data conversion and mapping combinations, provides the possibility to use the Comfort Climate Index based on the point data collected at the stations. Calculated tourism for a zone and analyzed it correctly (Roshan and Mohammad Nejad, quoted by Alizadeh et al., 2012: 88-69). Climate and tourism as the main components of a system affect each other in different ways and, in interaction with each other, raise a new issue as tourism climatology (Samiei et al., 2006: 39-27).

Thermal comfort:

A set of temperature and humidity conditions that most people feel comfortable in is called "comfort zone". Providing thermal comfort in man-made spaces is one of the major goals in colonial design because it is in such circumstances. In space, people can relax or work at their maximum efficiency, mental and physical ability. We get tired of work and activity and need healthy rest, rest and sleep to relieve fatigue and renewal. In the wrong environment, we are not able to work properly, get tired sooner, and then reapply again. Simply put, in adverse environmental conditions, the above three steps are not performed properly and failure to properly perform the above steps puts a strain on the human body and psyche, leading to impaired performance and ultimately impairing human health. The environmental, composition, or influence of the climatic elements is the temperature, humidity, humidity and air current, and the human response to the heat or cold of their environment does not depend on the air temperature. Of the four elements mentioned above, however, temperature and humidity have a major influence on human well-being (Tseliou A, 2010: 52).

Thermal comfort conditions and energy consumption optimization:

Thermal comfort conditions and energy consumption are two inseparable categories, so that improving thermal comfort conditions in a building is often associated with increased energy consumption and vice versa. Therefore, solutions should be sought to reduce energy consumption in addition to maintaining comfort within an acceptable range. One of the most effective ways to reduce energy consumption in a building is by adjusting the temperature of the ventilation chambers so that energy consumption is minimized. This reduction in consumption should be within the permissible temperature range so that the thermal conditions of the site may be tolerated by the resident. This suggests the need to examine the factors that influence the thermal comfort of the human body and to predict the response of the human body to changes in these factors (Yahia MW, 2013: 30). Establishment of human comfort for tourism and development: Human comfort is a set of conditions that are thermally suitable for at least 80% of the population, in other words, human beings do not feel cold or warm. Some researchers in the so-called

thermal neutrality term more accurately interpreted because man does not feel the cold, heat, and local discomfort caused by climate problems. It is under these conditions that the human organism can maintain its thermal balance to the best of its ability without deficiency or excess energy. In terms of human comfort, climate, temperature, humidity, wind, and radiation play a role in these four elements. Temperature and humidity have a greater impact on human health and comfort, and therefore most of the indicators and models of human comfort are based on this element. Tourism is a key part of the global economy. Tourism is projected to become the world's highest-grossing industry in the coming decades, as the World Tourism Organization predicts that by 2020 the world's tourist population will reach $ 1 billion and $ 1.6 billion in revenue. Currently, 210 million people, or 3.8% of the world's employees, work in the tourism industry and earn an average of 4 to 5% of their revenue through tourism revenue sources (Ismaili et al., 2010 : 2). Tourism is a multipurpose activity that takes place outside the normal tourist environment and does not take more than a year for the purpose of recreation, business or other activities. The coastal tourism and marine environment, if considered for such an activity, would be called coastal tourism. Coastal tourism requires traveling from a place of residence and focusing on the marine environment. In this definition, the marine environment has two aspects: it is biologically encompassed by marine features (water, tide and fashion) and physiologically encompasses land and water as coastal areas within the coastal towns within. Count (Gharkhlo et al., 2009: 3).يكي One of the most important end points in good design is thermal comfort. Heat and coolant sizes, thickness of insulation and material of material, as well as energy and energy consumption. The main purpose of air conditioners is to provide the occupants with thermal comfort. Relative Humidity: The ratio of water vapor to air vapor that the air can hold at a certain temperature and pressure. While the body has sensors to sense the cold and heat, the humidity is indirectly felt. Sweating is one of the mechanisms by which the body repels heat through evaporation of sweat-induced moisture. Relative humidity has a direct effect on this mechanism. When the relative humidity is high, the possibility of evaporation decreases and the body is unable to withstand its heat easily. In very dry air (relative humidity less than 20%), the evaporation rate is strongly increased, causing a feeling of discomfort due to its effect on the mucous membrane (Heidari, 39: 2010).

Temperature:

They are key elements of climate recognition. The sun has both radiation and heat effects on humans. The thermal effect of sunlight on the comfort zone, previously characterized by two factors of temperature and relative humidity, may extend the comfort zone under conditions where the air temperature is below 25 ° C. (Yousefi & Hijam, 2012). Forecasting meteorological information will help planners, managers, and officials in these matters. Different models have been proposed by researchers to predict meteorological information. WGEN models (Richardson & Wright, 1984), WXGEN (Sharpley & Williams, 1990), USCLIMATE (Johnson et al., 1996), CLIGEN (Arnold & Elliott, 1996), CLIMAX (Danoso, 1997) and CLIMGEN (Stockwell et al., 1998) can be named. Most of these models use meteorological data to predict meteorological data. IDW Interpolation (IDW) method: The IDW interpolation method is based on the assumption that the effect of the phenomenon decreases with increasing distance. The surrounding area should be more involved than those farther away. In this model, distance is used as the weight of the known variable to predict unmeasured points because the role of the continuous variable in influencing the location of the unknown point is diminished. Therefore, as the known data distance increases from the unknown point, the weights must be reduced by distance, so the distances are reversed. That is why this model is called Inverse Distance Wighted. On the other hand, the effect of the spatial dependence of the data intensity can be applied using the inverse distance power. The second power inverse distance from this model has been used repeatedly by researchers. Interpolation is thus estimated to be a matrix with cells of equal size. The spatial coordinates of this matrix are clear and have a unit of measurement. For example, it has 50 × 50 m cells. In this network, the variable value is known or measured in cells, and in other cells this value is unknown cells whose value is unknown using cells It is estimated around a certain radius. (Alizadeh, 2002). Point data: Point data are data that are measured at specific locations (such as meteorological stations) in order to prepare spatial distribution maps and study spatial pattern, point data during the interpolation process to the general level. Find the word interpolation consists of two Latin words inter means and poiler means clipping and refining Spatial interpolation is a process in which the values of unknown points are estimated using measured values at unknown points. For example, using interpolation can set the temperature at points where the station is Estimates are not available using nearby stations in the area. Geographic Information System (GIS) capabilities are nowadays interpolated to extract the spatial distribution of meteorological and hydrological variables in the form of cellular networks or vector models. There are various methods for spatial data interpolation. Unfortunately, most users are usually the simplest or best known method. And, without comparing the accuracy of the methods, extract the spatial distribution maps. Any shortcomings in selecting the appropriate spatial distribution method and neglecting the accuracy of the interpolation methods can lead to an error in the estimation design (Method Guide). Spatial Distribution, Climatic Factors Using Point Data, Deputy of Supervision and Strategy, 2011). Understanding environmental capabilities and potentials, given the current and potential constraints, plays an important role in environmental planning. Since ancient times, the impact of climate on human phenomena has always been studied and studied by philosophers, scholars and even the general public, and many have aroused scientific curiosity in this area, and have conducted research in this area. The description is as follows: Pinglin et al (2011), in a paper entitled "Climate Information Tourism Based on Human Thermal Perception: A Case Study: Taiwan and East China",

Using PET (Physiological Equivalent Temperature Temperature) and TPCS (Thermal Comfort Classification) Index Have taken action. The results of this study showed that Taiwan and East China have favorable conditions for people living in temperate regions in spring and autumn and for people living in subtropical regions, southern region in spring and north in summer. (2007) study and determine bioclimatic comfort conditions in Arzum in three rural, urban and urban urban areas of Turkey and conclude that urban urban areas are more compatible with the thermal indices used. Buden and Grab (2005)) Also examined thermal comfort in five Tunisian cities from two climatic zones. The results of their study showed a significant relationship between the declared thermal comfort conditions and thermal comfort indices. Morlone Gallows et al (2004) prepared the Mexican bio-climate Atlas based on the definition of the comfort zone (Elsimus Proposed Equation) along with the Oligi bio-climate chart and the Givonian diagram for indoor climate control (Tavusi et al., 2004). , 1387: 98). Givoni (1976) identified the comfort zone and biomass in relation to the two elements of temperature and humidity, and used the mean maximum temperature and minimum relative humidity to determine biomass conditions and building requirements (Kasmaie, 1994: 166). Olgie (1973) proposed a diagram in which the role of atmospheric phenomena in human comfort was clearly distinguished. Temperature and relative humidity were the most important factors that directly affect human comfort in the Olighe bioclimatic table. Is emphasized. Mahaney (1971), using special tables, measures the comfort and climate architecture. Mohammadi (2014), in a study entitled "-Estimation and Analysis of Temporal - Spatial Climatic Conditions in Kurdistan Province", used daily data and standard effective temperature indices and physiological equivalent temperatures. The results showed that the highest climatic comfort is in November, October and May. Also the highest amount of climate comfort is related to Zarrineh station in summer. (2013) Golabi et al. (2014) predicted the climate characteristics of Abadan city using time series analysis. The 10-year period was determined and then the time series were estimated using Box-Jenkins time series models for three climatic factors ،maximum temperature ،minimum temperature and relative humidity and the best model was fitted. Hashemi Nassab (2011), in a thesis entitled "Human Bioclimatic Zoning of the Province of Semnan", assessed and zoned the province's bioclimatic conditions. He concluded that most of the stations located in the south, east and west of the province in the months of April and November, the northern stations of the province in the months of May, June, September and October are in the comfort zone. Ismaili et al. (2010), in a study using the predicted mean temperature-physiological indices (PMV) and heat stress (HIS), evaluated daily comfort climate of Chabahar port. The results of this study showed that climatic conditions are available in December, January, February and March. Finally, according to the researches mentioned in this section, which can be stated in the field of present research, it can be stated that the difference between the present study is that this study, in addition to the criteria evaluated in the previous research, to index measurement. The physiological stresses have been investigated in order to facilitate the absorption and desorption of heat by the neural pressure method in Arc GIS software. Also, 27 years of temperature, wind and humidity data have been used in this study. At the end of previous research we have helped us to achieve the goals of the research so that we can better identify issues related to environmental change that we can finally address.

Methodology

The present study is a descriptive-analytical one with regard to the nature of the problem and the issue under study. This study is an applied study with emphasis on quantitative methods. Nervousness above 20 ° C and below 20 ° C and degree of comfort were determined by criteria such as (air temperature in degrees Fahrenheit, mean relative humidity in percentage, mean minimum air temperature in degrees Celsius, wind speed in meters per second). Climate is the data of meteorological stations N Gilan was used with (27-year period between 1970-1909) when first the data were obtained from meteorological sites, then the average of 27 years was calculated and final output was calculated with thermal comfort coefficient in GIS. All processes and data analysis In GIS environment, geostatistical IDW model that predicts the unknown points technique based on the autocorrelation between the measured points and their spatial structure was evaluated so that the data obtained from the station statistics were first determined again in the Excel software environment.The IDW model was interpolated for each data set and finally, after interpolating each criterion by thermal comfort index neural pressure index in the form of a zoning map for areas above 20 ° C and below 20 ° C in 7 floors. Was done. Reason for using geostatistics: In some cases geostatistical analysis in ARC GIS can be considered as complementary to geostatistical. The following are some of the capabilities of geostatistical analysis that geospatial analyst lacks such capabilities: (Most interpolation methods Available in geospatial analyzer Geostatistical analysis is also available, although the geospatial analyzer has preliminary interpolation methods but the geostatistical analysis also includes advanced geometric and deterministic methods. There are statistical tools and tools in the geostatistics analyst that you can By manually modifying their parameters, the effect of each parameter was observed to extract the best map, but the spatial analyzer lacks such statistical analysis, so the parameters needed, especially in the IDW method, cannot be determined as inputs alone. Introduced software: Ability to analyze exploratory spatial data, Ability to evaluate best interpolation using error criteria, Ability to present drawings in different output formats).

Research Area

Guilan province is one of the northern provinces of the country with an area of 14711 km2. The province lies 36 degrees 34 minutes to 38 degrees 27 degrees north latitude 48 degrees 53 minutes 50 degrees 34 minutes east of the meridian. Guilan

province is located in the north of Iran in the vicinity of Ardabil, Qazvin, Mazandaran and Zanjan provinces and is one of the small provinces of Iran. In terms of climate, Gilan is located in temperate Caspian Sea Rasht, Bandar Anzali, Lahijan, Lahijan, Rudsar, Astana Ashrafieh, Siahkal, Amlash, Talesh, Rezvananshahr, Masal, Shaft, Fouman, Monastery, Astara, Rudbar are cities of Gilan province and also has 40 districts and approximately 110 villages (Management and Planning Organization Guilan Province, 2016).

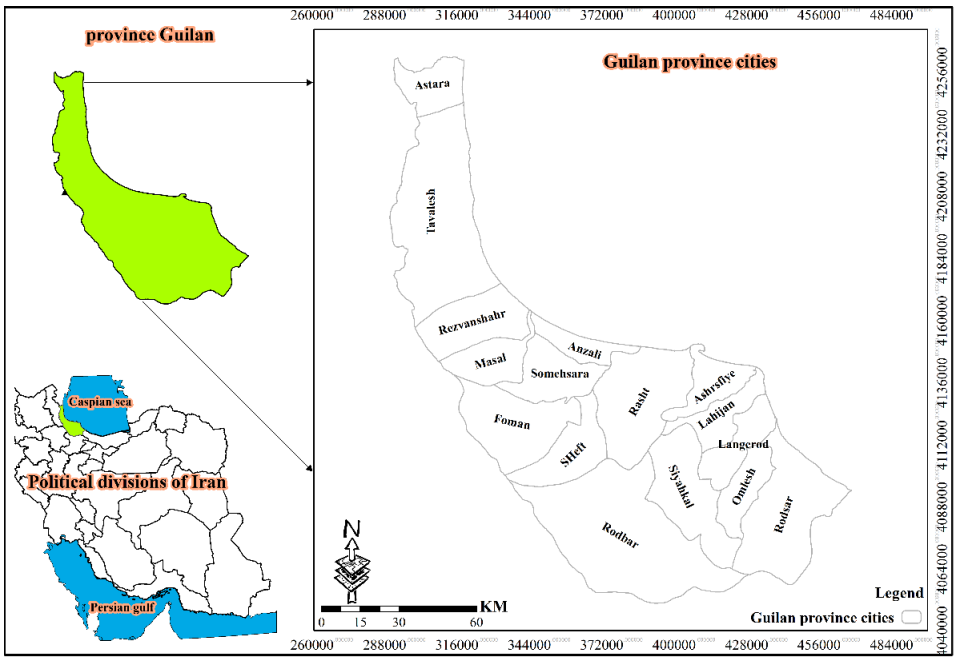


Figure 1. Location map of Gilan province in the political divisions of Iran

Discussion and findings

The analytical software mentioned in the research method was used to measure the factors affecting the thermal comfort zone of the province and also to determine the effective indicators in determining the thermal areas in order to identify the degree of comfort for different activities and the importance of each of these criteria to each other. Considering the current situation and the information collected, as well as reviewing books, previous plans, and experts' opinions, these have finally been incorporated into the GIS environment in the next step to achieve these indicators. , Need a head Maps and databases, which were prepared in GIS environment.

Table 1. Position of the stations to be measured

Station	Longitude	latitude
Rasht	*49/62*	*37/32*
Anzali	*49/45*	*37/47*
Astara	*48/85*	*38/35*
Manjil	*49/40*	*36/72*
Jirandeh	*49/80*	*36/70*
Lahijan	*50/00*	*18/37*
Rhodes	*50/32*	*37/12*
Talesh	*48/88*	*37/83*
Masouleh	*48/98*	*37/15*
Kianshahr	*49/88*	*37/38*

Nervous Pressure Index:

Understanding the effect of climatic elements on how heat is exchanged between humans and the root environment has a wide variety of ways that can be done in terms of climate for human health and comfort, what is known as Nerve Pressure Indicators. These indices are the type of physiological pressure applied to establish comfort between absorption and excretion of heat, partly dependent on specific activity and partly dependent on thermal and humidity gradients between body and environment (Safaipour, 2013) to determine effective temperature for measuring conditions. Ambient Comfort A variety of digital models are also used, one of the most valid being the Neural Pressure Index, which was originally designed and proposed

to investigate thermal comfort conditions inside US buildings. The neural pressure index for temperatures above 20 ° C is calculated by the following equation:

I = (0/5 + U2 * 10-4) (T-80 + 0 / 11U)

In the above equation:

= I effective temperature index

T = air temperature in degrees Fahrenheit

= U relative humidity in percentage

The neural pressure index can be used for the following temperature conditions below 20 ° C:

H = (0/57 * V0.42) (36/5-T) 36

In the above equation:

= H The cooling power of the environment

T = air temperature in degrees Celsius

= V Wind speed in meters per second

The ratings of thermal comfort coefficients are based on the neural pressure index as a table.

Table 2. Thermal comfort coefficients for the neural pressure formula

Comfort coefficient for temperatures below 20 ° C (H)		Comfort coefficient for temperatures above 20 ° C (I)	
Cool	396 to 540	Cool with uncomfortable conditions	Less than -5
Very cool	541 to 790	Cool	-5 to -1
Cold	791 to 999	Comfort	0
very cold	1000 to 1199	Warm with comfort conditions	1 to 5
Stinging cold	1200 to 1429	Warm with uncomfortable conditions	6 to 10
Skin frostbite begins	Above 1430	Very uncomfortable conditions	11 to 15
		Complete discomfort	Above 15

Table 3. Temperature below 20 degrees Celsius for the following months for the Nerve Pressure Formu

Air temperature in degrees Celsius								
Station	J	F	M	A	M	O	N	D
Rasht	*6/7*	*7*	*9/4*	*14/3*	*19/2*	*17/7*	*12/9*	*8/9*
Anzali	*7/3*	*7/1*	*8/9*	*13/5*	*18/8*	*18/3*	*13/6*	*9/7*
Astara	*5/7*	*6/1*	*8/6*	*13*	*17/9*	*17/4*	*12*	*7/9*
Manjil	*7/3*	*8/9*	*12/1*	*16/7*	*20/0*	*19/7*	*13/5*	*9/2*
Jirandeh	*7/1*	*8/1*	*11/5*	*16/0*	*20/0*	*18/8*	*12/5*	*8/5*
Lahijan	*2/0*	*2/6*	*7/2*	*11/9*	*17/2*	*14/1*	*7/6*	*3/9*
Rhodes	*7/9*	*7/6*	*11/2*	*15/0*	*19/9*	*18/8*	*13/3*	*9/6*
Talesh	*8/2*	*7/8*	*10/6*	*14/0*	*19/5*	*19/2*	*13/7*	*9/9*
Masouleh	*4/0*	*3/6*	*7/4*	*10/7*	*15/8*	*12/8*	*8/3*	*5/5*
Kiashahr	*8/4*	*7/8*	*10/7*	*14/4*	*19/1*	*18/9*	*13/6*	*9/9*
Dilman	*3/0*	*3/4*	*7/6*	*11/9*	*16/7*	*13/9*	*8/0*	*4/9*
Wind speed in meters per second								
Station	J	F	M	A	M	O	N	D
Rasht	*1/6*	*1/6*	*1/4*	*1/4*	*1/3*	*1/2*	*1/3*	*1/4*
Anzali	*2/5*	*2/4*	*2/2*	*2/0*	*2/0*	*2/4*	*2/4*	*2/4*
Astara	*1/2*	*1/3*	*1/5*	*1/5*	*1/4*	*1/0*	*1/1*	*1/1*
Manjil	*2/6*	*3/6*	*4/7*	*5/2*	*6/4*	*4/9*	*2/7*	*2/2*
Jirandeh	*5/7*	*7/1*	*8/8*	*7/4*	*8/2*	*8/0*	*6/0*	*5/1*
Lahijan	*1/3*	*1/6*	*1/9*	*1/7*	*1/8*	*1/2*	*1/1*	*1/1*
Rhodes	*2/2*	*2/4*	*2/6*	*2/2*	*1/7*	*1/6*	*1/6*	*1/8*
Talesh	*1/7*	*1/4*	*1/8*	*1/7*	*1/9*	*1/7*	*1/8*	*1/6*
Masouleh	*2/9*	*2/0*	*2/2*	*1/8*	*1/6*	*1/3*	*1/7*	*2/2*
Kiashahr	*3/8*	*3/7*	*4/0*	*3/8*	*3/4*	*2/6*	*2/8*	*3/1*
Dilman	*2/6*	*2/6*	*3/0*	*2/7*	*2/3*	*2/1*	*1/9*	*2/2*

Table 3.1 Above 20 degrees Celsius for the following months for the Nervous Pressure Formula

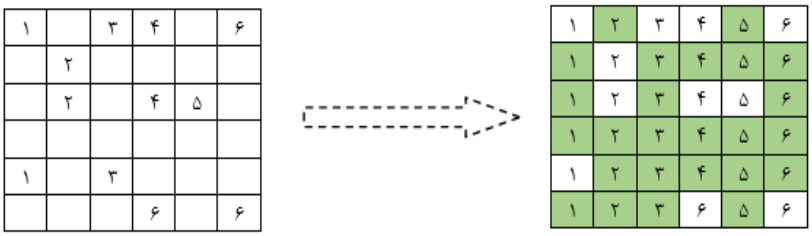
Relative humidity in percent				
Station	J	J	A	S
Rasht	*60*	*59*	*62*	*68*
Anzali	*66*	*64*	*67*	*73*
Astara	*60*	*57*	*60*	*69*
Manjil	*39*	*36*	*40*	*43*
Jirandeh	*65/2*	*67/4*	*69/9*	*72*
Lahijan	*70/5*	*70/2*	*70/3*	*78/3*
Rhodes	*72/8*	*72/8*	*74/0*	*76/0*
Talesh	*68/2*	*68/2*	*68/1*	*69/1*
Masouleh	*71/8*	*71/8*	*74/0*	*66/0*
Kiashahr	*59/2*	*59/2*	*59/9*	*64/8*
Dilman	*70/2*	*70/2*	*70/3*	*78/3*
Air temperature in degrees Fahrenheit				
Station name	J	J	A	S
Rasht	*73/8*	*77/5*	*77/5*	*72/0*
Anzali	*74/1*	*78/4*	*78/4*	*72/7*
Astara	*73/0*	*77/7*	*77/9*	*71/2*
Manjil	*76/6*	*81/0*	*81/9*	*75/4*
Jirandeh	*76/9*	*80/9*	*81/7*	*74/7*
Lahijan	*69/4*	*69/4*	*70/6*	*68/2*
Rhodes	*77/2*	*80/4*	*80/9*	*74/7*
Talesh	*77/8*	*81/2*	*81/4*	*75/9*
Masouleh	*69/3*	*68/3*	*69/0*	*68/1*
Kiashahr	*78/1*	*81/2*	*80/9*	*75/3*
Dilman	*68/8*	*69/7*	*69/1*	*64/8*

Table 4. The ultimate nerve pressure index for temperatures above 20 ° C

Station name	J	J	A	S
Rasht	*0/3*	*3/4*	*3/9*	*-0/5*
Anzali	*1/3*	*5/3*	*5/5*	*0/7*
Astara	*-0/3*	*3/3*	*3/9*	*-1/1*
Manjil	*0/6*	*3/1*	*4/1*	*0/1*
Squeaky	*3/7*	*7/9*	*9/3*	*2/6*
Lahijan	*-2/8*	*-2/8*	*-1/6*	*-3/6*
Rhodes	*5/1*	*8/6*	*9/4*	*3/3*
Talesh	*4/8*	*8/4*	*8/6*	*3/4*
Masouleh	*-2/7*	*-3/9*	*-3/0*	*-4/3*
Kiashahr	*3/8*	*6/6*	*4/6*	*2/2*
Dilman	*-3/5*	*-2/6*	*-3/2*	*-7/4*
RMS	*0/43*	*0/61*	*0/49*	*0/63*
MEAN	*-0/03*	*-0/01*	*-0/01*	*-0/01*

Table 5. The final nerve pressure index for temperatures below 20 ° C

Station name	**J**	**F**	**M**	**A**	**M**	**O**	**N**	**D**
Rasht	*750/3*	*737/4*	*645/1*	*525/2*	*393/2*	*412/2*	*533/2*	*653/0*
Anzali	*876/4*	*860/7*	*796/6*	*630/5*	*489/4*	*538/4*	*680/4*	*789/7*
Astara	*685/3*	*690/4*	*682/3*	*569/7*	*441/7*	*394/0*	*521/4*	*610/8*
Manjil	*888/7*	*967/2*	*958/0*	*612/5*	*737/0*	*672/5*	*716/3*	*780/7*
Jirandeh	*1256/0*	*1330/6*	*1278/6*	*976/0*	*817/9*	*867/2*	*1046/8*	*1133/6*
Lahijan	*800/1*	*843/6*	*789/1*	*636/5*	*503/9*	*492/7*	*620/7*	*708/2*
Rhodes	*812/2*	*855/4*	*777/5*	*615/6*	*428/3*	*438/6*	*581/7*	*708/7*
Talesh	*717/0*	*681/7*	*679/9*	*572/9*	*458/0*	*448/4*	*592/1*	*660/9*
Masouleh	*1036/4*	*910/6*	*829/3*	*671/6*	*512/1*	*551/9*	*726/6*	*892/5*
Kiashahr	*1014/9*	*1016/1*	*948/3*	*796/6*	*571/5*	*542/1*	*720/5*	*870/4*
Dilman	*1032/6*	*1025/5*	*940/4*	*763/7*	*575/2*	*636/8*	*773/4*	*901/7*
RMS	*0/63*	*0/58*	*0/53*	*0/59*	*0/56*	*0/64*	*0/63*	*0/55*
MEAN	*-0/01*	*-0/01*	*-0/01*	*-0/01*	*-0/01*	*-0/01*	*-0/01*	*-0/01*



Due to the above forms, each of the final indexes in Arc GIS environment was collected as dot file. Where we have data that is point-based or is actually sampled The values of the measured pure samples (known values and known coordinates). Increasing or decreasing the dependence of unknown cells on the surrounding cells is regulated by the inverse distance power. The appropriate power (ρ) is determined by calculating the Root Mean Square Error (RMSE), which is the least squared prediction error and the best power (ρ) is the value that best estimates the unknown cells. Or, in other words, have a minimum prediction error. Predictive error is obtained by comparing the actual sizes with the predicted values at different capacities. The closer the zero squared coefficient is to the better the estimation of the variations, the higher the value of 1 will in fact not be appropriate.

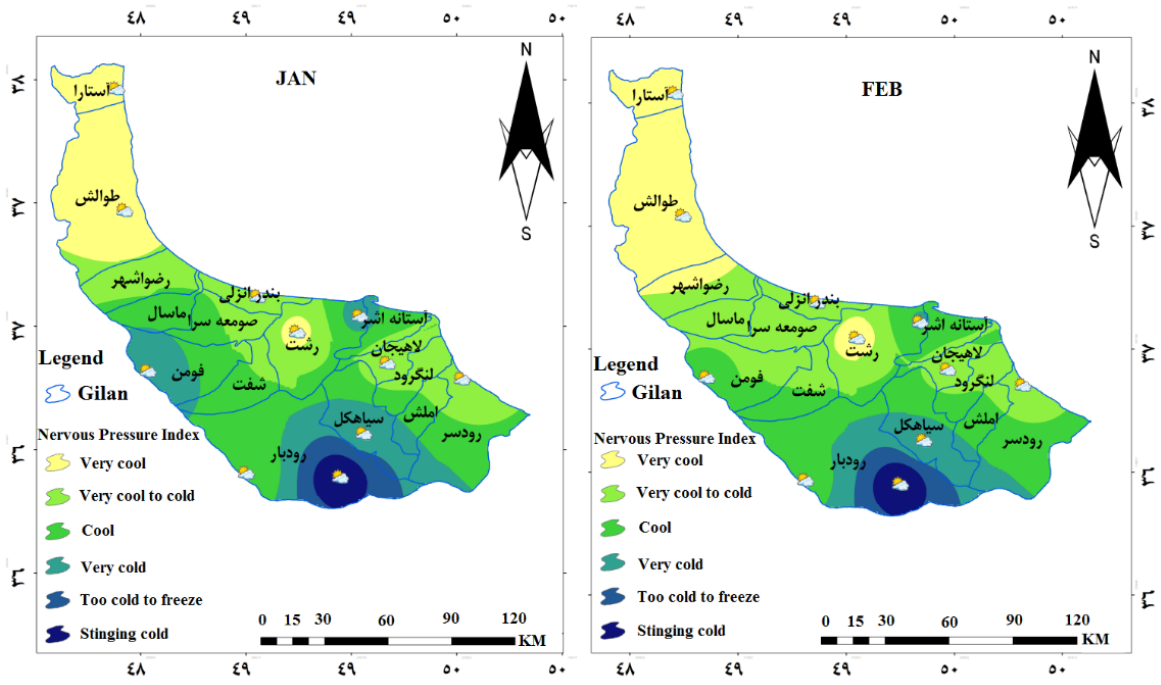


Figure 2. Final Map of Neural Pressure Index Threshold for January and February (below 20 ° C)

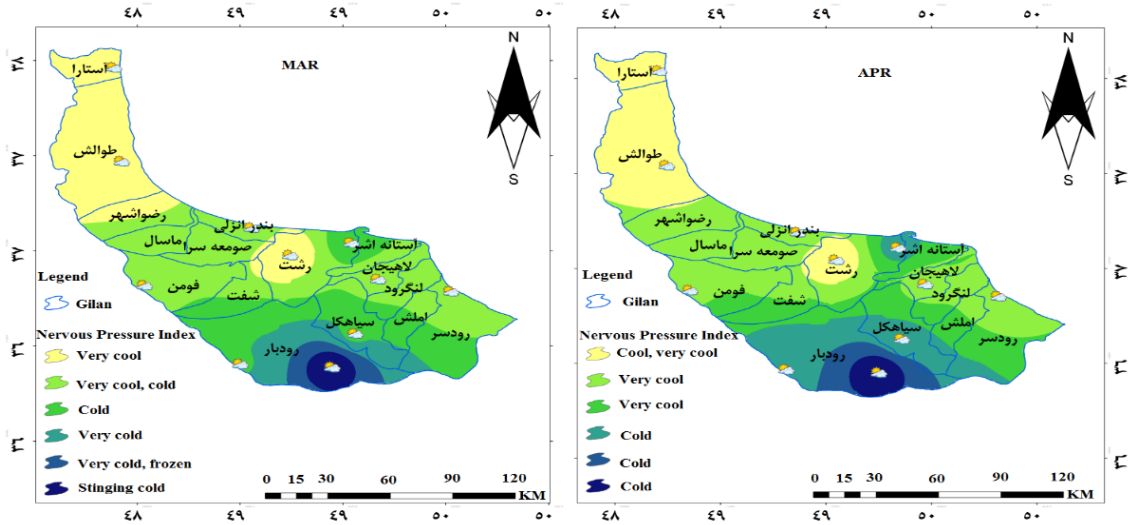


Figure 3. Final Map of Neural Pressure Index Threshold for May and October (below 20 ° C)

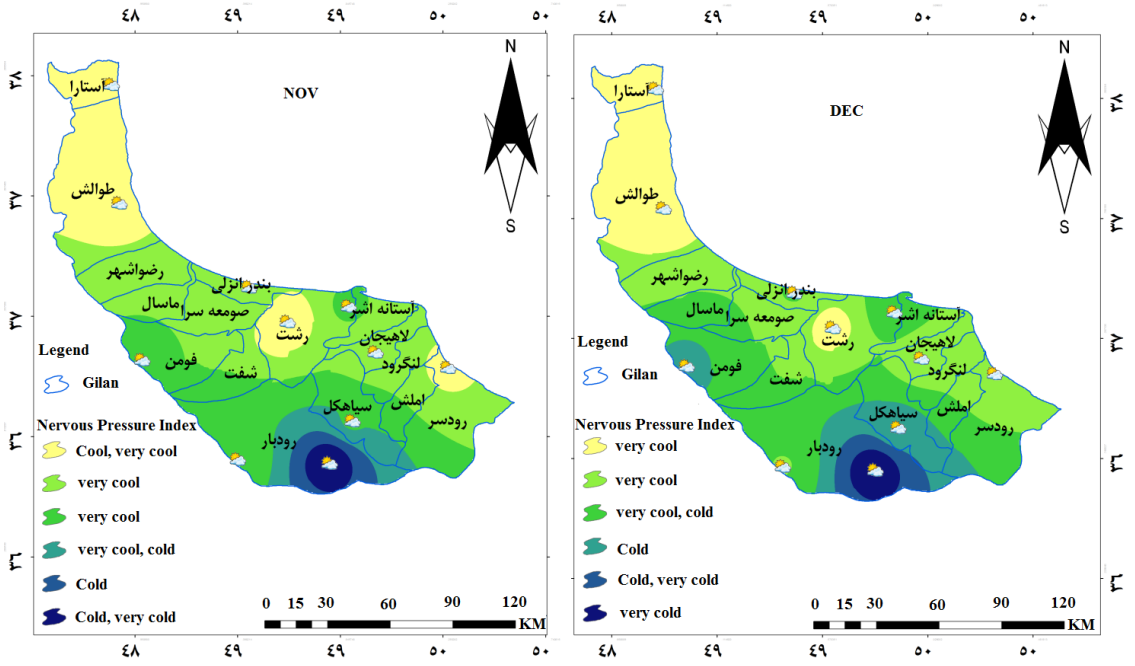


Figure 4. Final map of the threshold of the neural pressure index for November and December (below 20 ° C)

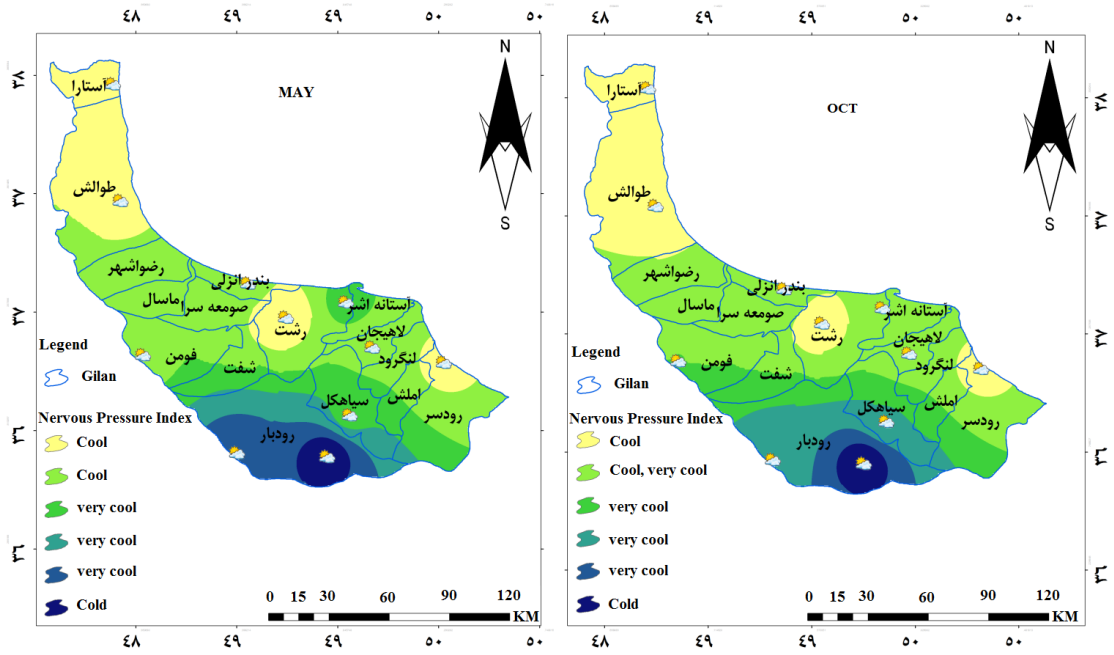


Figure 5. Final Map of Neural Pressure Index Threshold for May and October (below 20 ° C)

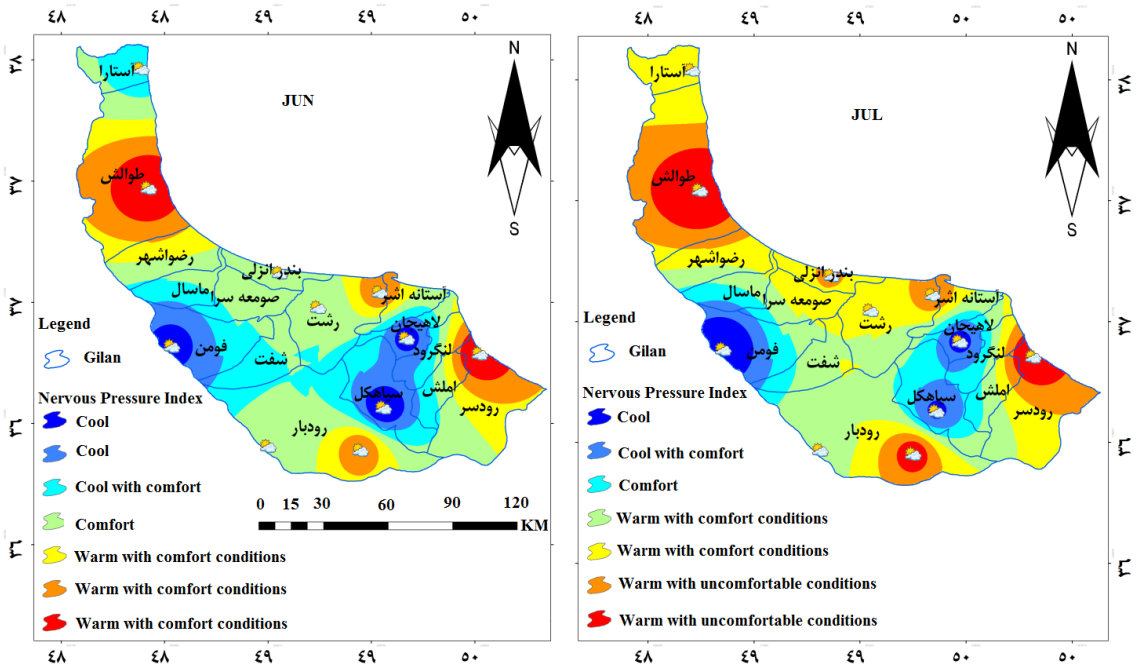


Figure 6. Final map of the threshold of the neural pressure index for June and July (above 20 ° C)

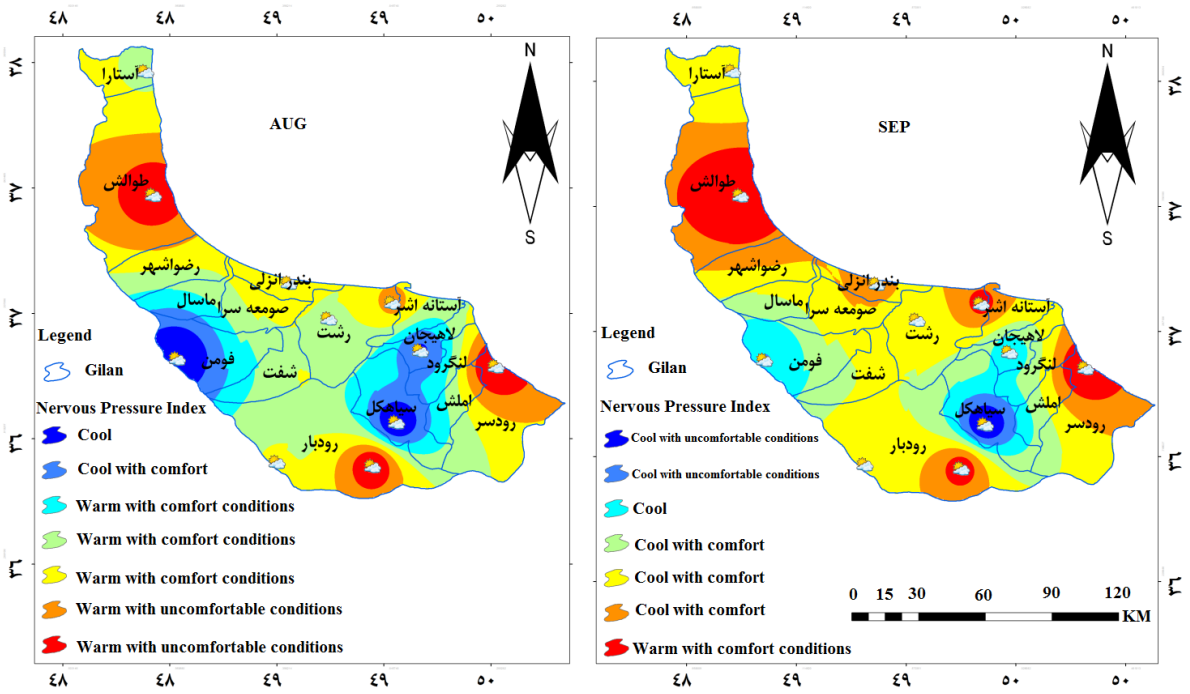


Figure 7. Final map of the threshold of neural pressure index for August and September (above 20 ° C)

In January, most of the area is very cold, with the area south of the province extending westward, with the January NI being divided into 7 groups, which include Siahkal, Roudbar, Fouman County. (Very cold to bitter cold) Shaft, Masal, Monastery, Amlash, Roudsar, Astana Ashrafieh and parts of Lahijan and Langroud city in (cold) Tawalesh and Astara and part of Rasht in (very cool) has covered. ¬ In February, most of the area is cool to cold, with the north and east of the province more broadly divided into 7 groups, with the February NI being divided into 7 groups, which are the cities of Siahkal, Roudbar (very Cold to cold weather) Shaft, Amlash, Rudsar, Astana Ashrafieh and parts of Lahijan and Langroud city in (cold to very cold) area of Tawalesh and Astara and part of Rasht and Razvanshahr in (very cool) area. . In March, most of the area is very cold to cold, with the area in the middle of the province expanding to the north, with the March NI being divided into 7 groups, with the city of Rudbar (very cold to Stinging cold) Shaft, Amlash, Roodsar, Siahkal and parts of Lahijan and Langrood city in a region (cold to very cold) in Tawalesh and Astara and part of Rasht and Razvanshahr in a (very cool) area. In April, most of the area is very cool, with the area north of the province extending eastward, with the April NI being divided into 7 groups, which are Siahkal, Rudbar (very cold to bitter). Shaft, Amlash, Rudsar, Astana Ashrafieh and parts of Fouman (cold) city of Tawalesh and Astara and part of Rasht and Razvanshahr in a (very cool) area. In May, most of the area is very cool, with the north and middle parts of the province more eastward, with the May stress index divided into 7 groups, which is the city of Roodbar (very cold to cold). Bite) Shaft, Amlash, Roodsar, Astana Ashrafieh and parts of Fouman (cold) Tawalesh and Astara and part of Rasht and Roodsar in a cool area. In October, most of the area is cool, with the north and middle parts of the province extending eastward, with the October NI being divided into 7 groups, which include Siahkal, Roudbar (many). Cold to bitter cold) Shaft, Amlash, Rudsar and parts of Fouman (very cool) city of Tawalesh and Astara and part of Rasht and Rudsar in a cool area. In November, most of the area is very cool, with the area north of the province extending eastward, with the November Neuroscience Index divided into 7 groups, with the cities of Siahkal, Roudbar (very cool to very cold). Shaft, Amlash, Roodsar, Astana Ashrafieh and parts of Astana Ashram and Fouman (very cool) city of Tawalesh and Astara and part of Rasht and Roodsar in an area (cool to very cool). In December, most of the area is very cool - much to the north of the province, to the east, with the December NI being divided into 7 groups, with the cities of Siahkal, Roudbar and part of Fouman (cold). Shaft, Amlash, Roodsar, Astana Ashrafieh and parts of Fouman County (very cold to cold) Tawalesh and Astara and part of Rasht in a (very cool) area. In June, most of the area is very cool, with the area north of the province extending further south, with the NI being divided into 7 groups, including Tawalesh, Roudbar, and Rhodesar (Grass with comfort (Shaft, Amlash, Masal, Langroud) Parts of Astana city Ashrafieh, Fouman and Lahijan (cool with comfort) include Tawalesh Rudbar, Rudsar and part of Ashtar in an area (hot with uncomfortable conditions) . In July, most of the comfort is in the northern part of the province to the south, with the July stress index divided into seven groups, including Tawalesh, Rudbar, and part of Rudsar. Shaft, Amlash, Roodsar, Astana Ashrafieh and parts of Astana Ashar and Fouman (hot in comfort) Fouman, Lahijan and part of Siahkal in a (cool with comfort) area. In

August, the warmest part of the area is warm and comfortable, with the area in the center of the province widening to the south and west, with the NRP divided into seven groups, including Tawalesh, Roudbar and Part of Roodsar in the area (warm with uncomfortable conditions) Shaft, Amlash, Roodsar, Astana Ashrafieh and parts of Masal and Monastery city (warm with conditions) Fouman, Lahijan and part of Siahkal and Langrood in the area (cool with Comfort) Included. In September, the coolest part of the area is in the cooler part of the province, with the north of the province extending further south, with the September NI being divided into seven groups, including Tawalesh, Roudbar, and part of the city. Roodsar, Bandar Anzali, Astana Ashar in Shaft, Amlash, Roodsar, Astana Ashrafieh and parts of Rasht, Monastery, Razvanshahr and Fouman (Cool with Comfort) Fouman, Siahkel and part of Lahijan There is an area (cool with no comfort).

Conclusion

Using bio-climatic or bioclimatic indices in different geographical areas can help tourism planning to make better use of leisure time attractions. Today, no one denies the climate and its effects on human daily life. If our cities are looking to tackle climate-related challenges, an effective solution can be sought to change the current approach to governing cities. This can change urban planning and policy norms to create effective investment in urban infrastructure and management, and ultimately achieve comprehensive urban governance for climate change adaptation. After identifying the temperature zones, the frequency of occurrence of the data at the stations of the province was firstly investigated and the results showed that the highest temperature level belonged to Astara, Talesh and Lahijan, Roudsar and Manjil stations with the lowest recorded temperature. And overall, by evaluating the temperature range, it was concluded that the frequency of temperature anomalies in the stations of the province does not show much difference. Also, the correlation between the values of the same degree and shows significant results. It can be concluded that the surface temperature of the earth at Talesh, Astara and northeastern part of Rudsar city in Guilan province are relatively high due to changes in land use and vegetation or atmospheric radiation, removal of forest areas and expansion of residential land use and occurrence. Periodic drought data in the area and lack of atmospheric precipitation were sufficient. The results of this study also showed that the parameter of coherent rainfall and surface temperature was in agreement with the atmospheric rainfall. A humid soil is heated because the specific heat of the water is greater than the soil, also due to the capacity to store moisture between Soil elements are different so the soil temperature is effective at each level, which is a factor in the environmental disadvantage of the area. The results of this study showed that between the months of the month (June-September-August-July)) Has higher temperature fluctuations than other months. These fluctuations are in Talesh, Astara, Rudsar, Bandar Anzali. The lowest temperature also occurred in May-January, February, October, December, November, April and March. These fluctuations are in the western, central and southern regions of Gilan province, including Rudbar, Fouman, Siahl, Lahijan. And Langrood has generally been in cool and comfortable conditions. The final results of the Neuroscience Index classification showed that most of the year in central parts of the province are in conditions associated with comfort and absorption of heat for human health. Finally, the results of this study show a significant relationship with the results of researchers such as Ping Line et al. (2011), Being and Grab (2005), Mohammadi (2014), Pear and et al. (2013). This study was also not consistent with the results of researchers such as Madani et al. (2012), Karami and Kazemi (2012), Azari et al. (2013) in assessing human physiological conditions in urban environments.

At the end of the research, according to the findings of the research, the following suggestions for better planning as well as controlling the increase in surface temperature and maintaining comfort conditions for the human being in the study area are presented:

1. The necessity and importance of conservation and conservation of vegetation and green space use, especially in urban areas, is considered as a very important variable to modify the climate conditions for institutions responsible for urban management.
2. Store underground aquifers in areas with suitable soil.
3. Identify areas with high temperature zones to avoid vegetation depletion using GIS.
4. It is recommended for urban managers to consider, in addition to the horizontal expansion of cities, the direction of expansion of the city with respect to the surface land surface in the high land surrounding the city and to develop the city in the same direction as its surface temperature before development Lower areas.
5. Increasing the average global temperature has created anomalies in the meteorological variables, especially in temperature, so it is necessary to manage the various sectors, especially in the agricultural sector, to know the meteorological changes and to identify the temperature anomalies and the factors causing these changes.
6. Explaining the relationship between climate change patterns and the structure of climate anomalies can help mitigate the effects and foresight of climate risks.

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