

Temporal and Spatial Distribution of Tourism Climate Comfort in Isfahan Province

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Abstract. Isfahan Province is located in central of Iran. It has changing climate conditions including arid in the East, central and North of the province, Mediterranean Climate to humid in the West and Southern part. Generally, this province has a hot and dry climate in summer and cold in winter.

This province has natural and cultural attractions, it has a high potential in attracting visitors. But this potential has not been well exploited. To promote tourism in this area, we need to specify proper times and places for visitors. Among the visitors' basic needs knows about the climate and proper times for travelling.

In this study, proper times and places for visitors have been specified through using Tourism Climate Index (TCI) and GIS potential in interpolation, generalizing point data to scatter data and combining maps.

The aim of this research is make the temporal and spatial calculator for tourism climate index on Isfahan province.

The findings of this study indicate that the best time of year to attract visitors to this province is October, followed by May and April. January, December, February and July are the worst months. Also, the central part of the province has better conditions to attract visitors than the other part as far.

Base on spatial distribution, Central regions of the province are the best conditions for presence of tourists and areas in the eastern province in cold months and Western and southern regions of the province warm months of the year are suitable for the presence of tourists.

Keywords: Isfahan Province, Tourism Climate Index, Climate Comfort

1. Introduction

Although the climate is merely one of the variables that can be effective on the travelling of tourists; however, the majority of tourists take the climate conditions into consideration. The Tourism Comfort Climate Index (TCI) can provide the tourists with required information. If a tourist wants to choose a specific place of the world to travel to, she tries to do this when that place has the best climate condition, and if s/he is limited in selecting a specific time for travelling (like vacations) s/he tries to choose a place that has the best climatic condition at that time.

The Tourism Comfort Climate Index (TCI), is the Index that determines the effect of climate factors on tourism in a systematic way. This Index uses climatic factors such as air temperature, rainfall, dampness, sunshine and wind [1]. To use such Index, the recorded statistics in the climatology stations are required. Using such statistics is suitable for the analysis of the condition of tourism comfort climate Index just in a small city or area. However, the analysis of Index only based on the statistics obtained from the stations cannot represent the actual condition of this tourism Index in an area. To achieve this aim, it is necessary to evaluate and analyze the climate condition in the areas that lack such statistics [2]. The GIS software that has the capabilities of middle finding and the conversion of pointed data to width data, provide the opportunity for calculation and correct analysis of tourism comfort climate Index for a wide area based on the point data taken from stations. In recent years, this method has been used to determine tourism comfort climate Index in areas such as northern America, the coasts in northern Europe, and Europe and north of Africa [3] has been used and is emphasized by scholars such as Freitas [4].

In Iran, too, a number of studies have been conducted regarding climate and tourism in different provinces. Such studies have been done by climatology organization in 28 provinces and through the use of

long-lasting data and statistics got from Iran's synoptic stations network. In these researches, the gathering tension Index has been used to evaluate the comfort.

The tourism comfort climate Index uses seven climatic parameters to evaluate the tourists' comfort regarding climate in an area and determine the suitable times and places for tourists regarding climate [5].

Freitas[6], in a research titled as "Theories, concepts, and study models of tourism climate" obtained these results:

- Only standard data must be used when studying tourism climate.
- The data mean must be used less, and mostly actual observations in different times must be used.
- All the related inputs to the data of atmospheric environment must be used.
- To determine heat coordinates, the quality of balance in the atmosphere energy must be employed cohesively.

Perry investigated the condition of tourism climate in hot and dry areas, especially Mediterranean areas and came to the conclusion that: in these areas, the worst conditions occur for tourists when a wave of hot weather is blown to these areas and that the subsequent dangers must be reduced through the prediction of such conditions and declaring required warnings.

Daniel Scott & Geoff Mc Boyle did a research entitled "The use of Tourism Comfort Climate Index for Evaluating the Effects of Climate Change on Tourism Attraction" they came to the conclusion that considering the procedure of climate change in the world till 2050, the condition of tourism comfort climate Index for majority of areas in Canada would be better than now. [7]

Shayan; et al, did a research investigating tourism comfort climate Index in Kish and came to the conclusion that the January, February, March, October, November, and December have the best conditions for tourist attraction, and June, July, August, and September have the worst environmental conditions, and May has a moderate condition in this regard [8]

The main purpose of this research is to determine the suitable times and places regarding climatic conditions in Isfahan province for attracting tourists. This research has used the tourist comfort climate Index and GIS software.

2. Methodology

To evaluate the comfort climate Index in Isfahan province using GIS software, at first, the required statistics of seven climate parameters in synoptic stations in and around the province (Figure 1), within 30 year period and every month were extracted and then the necessary conversions based on TCI model was applied. Then, the dispersion map of each parameter for 12 months of the year was prepared for the province. Later, by combining the maps in the GIS environment, the dispersion map of TCI Index for every month in Isfahan was prepared.

In this model and based on the obtained scores, the condition of comfort climates is determined based on Table No.1.

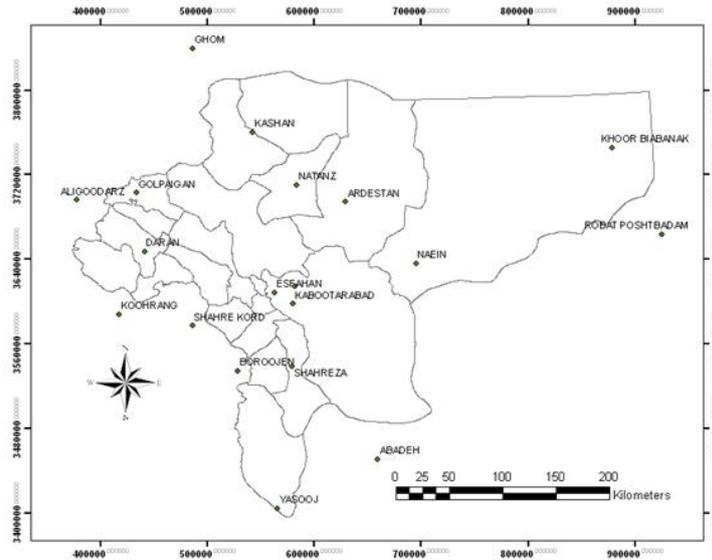


Fig. 1: Synoptic Station Dispersion in and around Isfahan Province.

Table 1. Tourism Climate Comfort Index Range

Numerical Value of Indices	Code	Descriptive Category
90-100	9	Ideal
80-89	8	Excellent
70-79	7	Very Good
60-69	6	Good
50-59	5	Acceptable
40-49	4	Marginal
30-39	3	Unfavorable
20-29	2	Very Unfavorable
10-19	1	Extremely Unfavorable
0-9	0	Impossible

3. Results and Finding

Using the Kriging and middle finding models and based on the statistics of present stations, at first the scattered map of seven effective factors in TCI model for 12 months of the year was prepared in Isfahan. Then, taking benefit of the GIS ability in combining maps, the present maps were combined with each other and consequently the map of TCI Index consisting of twelve parts was prepared for Isfahan.

Based on the prepared maps, and Table No.1, it was determined that in January, due to the cold weather all over the province and snow in the western and southern parts, generally no part of city had a favourable condition for attracting tourists. In this month, southern and western parts are in unfavourable conditions, the central parts are acceptable, and the eastern parts are in good condition. Generally, Isfahan, in this month does not have a good climate condition for the presence of tourists.

In February, the condition becomes a bit better than before, and the western and southern parts, the province is in marginal condition, and the eastern and central parts are located in good condition, but still the general condition is not suitable for the presence of tourists.

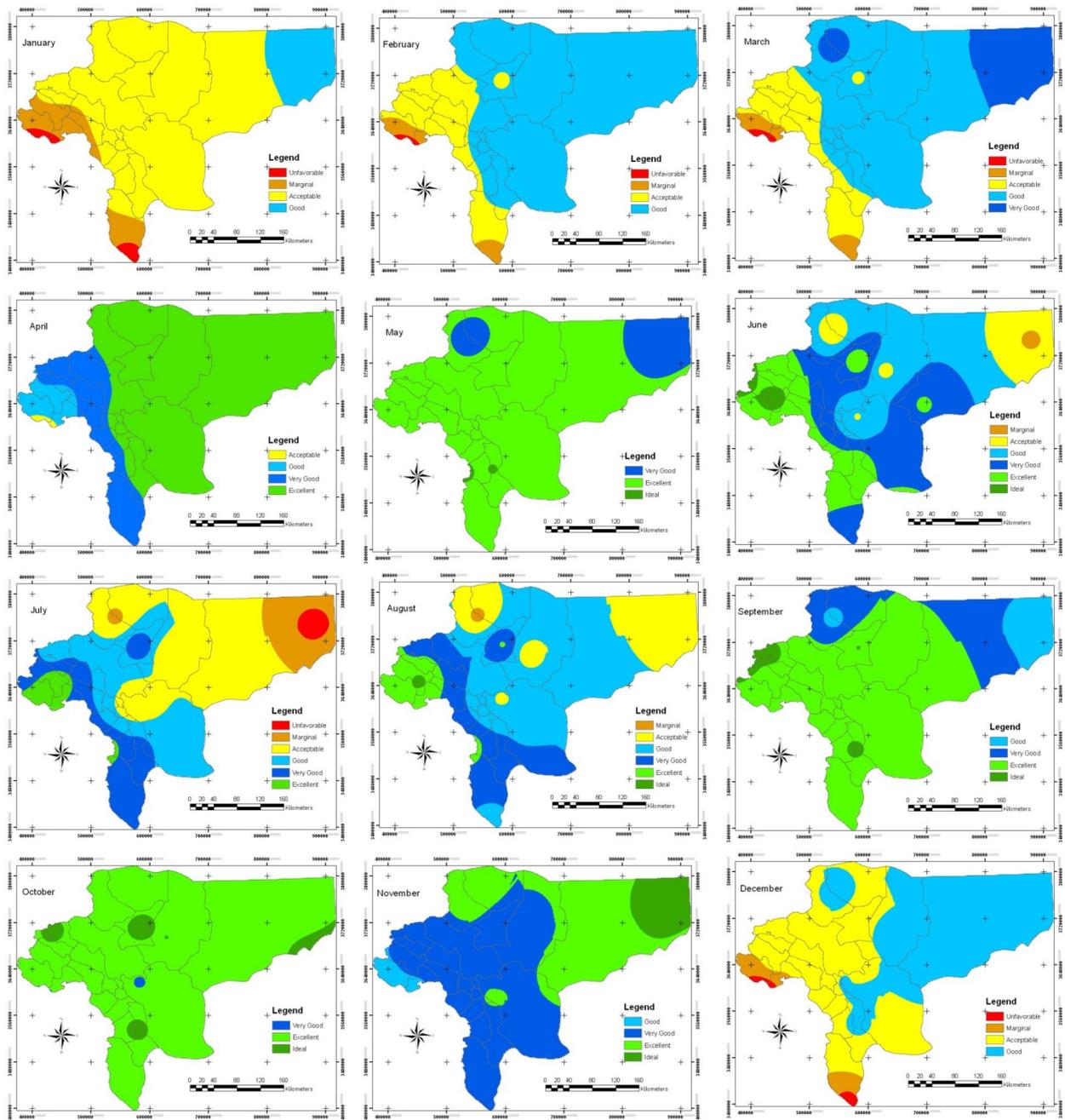


Fig. 2: TCI Map Dispersion in Isfahan Province

In March, as rain and snow continue in province, especially in the western and southern parts, still these areas are in marginal condition, but as the weather gets warmer in eastern and northeast of province, the climate condition in these two areas is changed to very good one. At this time, the eastern and northern deserts of Isfahan have the best climate for attracting tourists.

In April, as the air temperature is suddenly increased and rain and snow are over, the climate condition of province is changed greatly, and majority of areas, especially in north, east, and center have excellent climate condition, and therefore, this month is very suitable for tourists' presence. However, the western areas in this month are not still suitable for tourist presence regarding climate conditions.

May is one of the best months for the presence of tourists in Isfahan because most of the areas are in excellent condition. In this month, the central parts and specially Isfahan and its surrounding areas have the best conditions for tourist presence.

June, July and August have the most special dispersion of climate condition in Isfahan to the extent that ideal condition in west to acceptable conditions in east and north are observable. Isfahan and its surrounding areas have good conditions in these months.

September is also one of the best months for the presence of tourists in Isfahan and except the eastern and northern areas that have very good condition; other areas of province are in excellent to ideal condition.

In November, as the air temperature is suddenly decreasing, the climate condition of province is also changed quickly and varies from good in west to ideal in northern east. In this month, most of the areas in Isfahan are in very good condition.

However, in December, as cold weather is spread all over the province and rain and snow begin in west and south, the climate condition is turned to winter and varieties can be observed from unfavourable condition in south and west to good condition in east of province. Isfahan and its surrounding areas have well to acceptable condition. (Figure 2)

4. Conclusion

Using the capabilities of GIS in interpolation, conversion of Vector data to Raster data, and combination of maps, it is possible to extend the condition of climate comfort in one point to a wide area, and instead of focusing the discussion on one or two stations, speaking about a wide area such as a city or province.

Generally and based on the above picture and maps, October, May, September, November, and April are the best months for the presence of tourists in Isfahan and climate conditions are excellent to ideal.

June, August and March are located in the next position and during these months, the province is in a good condition.

July, due to hotness of weather and January and February due to rainfall and cold weather are in acceptable position and are considered as having the worst condition for tourists' presence.

Considering the special dispersion, the central parts of province have the best condition for the presence of tourists. The eastern areas during the cold months and western and southern areas during the hot months have suitable conditions for the presence of tourists.

Compare between TCI Model with others models such as Terjong, Beyker and PET don't show any different.

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