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Do Seasonal Climatic Factors Lead To Tourist Visits To Al-Ula?

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Abstract: *Seasonal tourism is an important factor in the tourism industry, economically, environmentally, and socially for the Al-Ula region, and the climate is an important factor in the decision-making of tourists, as it affects the success of the work of tourism companies. This scientific paper sheds light on the role of seasonal climatic factors in attracting tourists to the Al-Ula region, as seasonal climatic factors play a prominent role in the process of attracting tourists from late autumn to early spring. Monsoon tourism also provides time for both the environment and the host communities to recover from the stresses of the peak season (s) during the summer. These seasonal and natural climatic factors in the region can be invested in supporting tourism.*

Keywords*: tourism, seasonality, Al Ula region, the climate factors, tourism, and recreation.*

I. Introduction

In the past years, tourism has become one of the most important economic trends for many countries, as tourism in all its forms is an economic resource for any country (Turrión, 2018). Many countries are keen to develop and support their tourism, depending on their resources, whether natural or human, to become the most dynamic and fastest-growing sector in their economy (Goh, 2002). Researchers have identified two main reasons for seasonal tourism: (1) Factors related to natural phenomena, such as climate, landforms, and environmental characteristics; (2) Institutional or social factors. Natural seasonality is largely attributed to climatic conditions (such as temperature and precipitation) and other aspects of the natural world (such as migration of animal and bird species, flowering times of wildflowers, etc.) (Butler 2001). Seasonal climatic factors play a vital role in determining tourism demand as well as the behavior of travelers at the site during the tourism trip. Scientific studies in the field of tourism and hospitality revealed that the idea of push and pull factors in the tourism incentive supports the role of seasonality in tourism demand and behavior. Natural factors such as climate are both factors that attract and expel tourists, but these factors are likely to increase the demand for tourism and increase the flow to tourist destinations. (Butler, 1997; orluka, 2018). Climate is important for tourism in any country; Because it attracts tourists who expect favorable weather conditions in their destination suitable for their special holidays. (Kulendran, 2012). Many researchers (Hadwen, 2011; Ridderstaat, 2014; Qiang, 2020; Matthews, 2020; Fitchett, 2018; Chen, 2017; Scott, 2012) reveal the role of seasonal climate factors in the development of tourism, as the climate is an important leader of the seasonality of tourism In climate-dependent destinations, the climate attracts visitors who expect favorable weather conditions in the destination they visit, however, the climate may also encourage people to stay in their country instead of traveling abroad, in addition to the importance of understanding the effects of climate change on tourism demand patterns. Seasonal diversity is pervasive in the tourism system due to the climatic and socio-structural cycles of tourist destinations (Fernández, 2016). Given the increase in tourism mobility in the Kingdom of Saudi Arabia in the past two years, the cultural and social diversity and its natural composition, and the desire to practice travel and tourism as a recreational and exploratory activity for the tourism aspects of the Kingdom, the tourism markets in the Kingdom have also become more diversified, and it has provided opportunities for tourism development based on investment and exploitation of natural resources. Foremost among them is the exploitation of the climatic seasons to raise the

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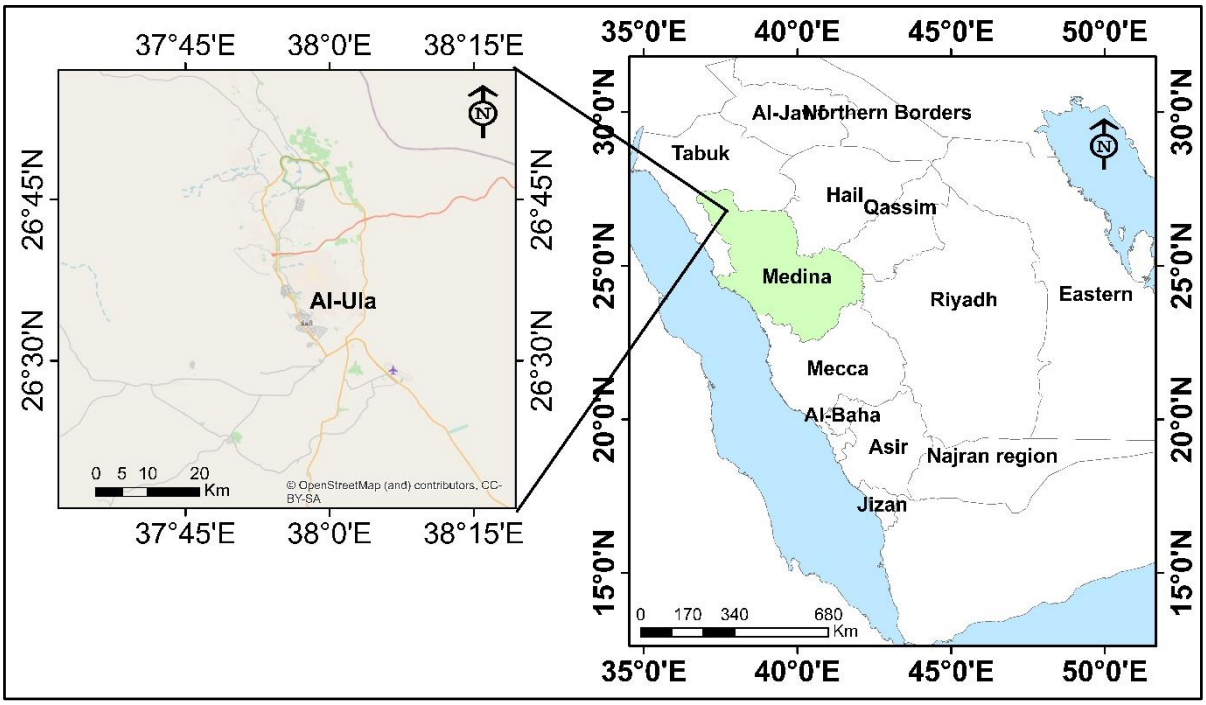
efficiency of this tourism and its development as an emerging economic resource. Climate conditions constitute a major role in marketing to tourist destinations in the Kingdom of Saudi Arabia, especially during vacation times, foremost of which is the Al-Ula region, which is full of the unique natural composition and archaeological aspects of Hajar and Madan Saleh. This study aims to provide an overview of the seasonality and estimate the best climatic seasons for tourism, and the extent of their impact on the increase in tourists in Al-Ula Governorate.

II. STUDY AREA

Al-Ula is one of the governorates of the Medina region, which is located to the north of it, and it is a plain located between mountain heights bordered on the east and west. It extends between latitude 05˝ 33´ 25˚ and 71˝ 48´ 27˚ north and between longitudes 01˝ 63´36˚ and 45˝ 77´ 38˚ east. Figure No. (1).



.Figure 1: The location of the study area in relation to the Medina area

III. METHODOLOGY

The climatic data for Al-Ula Governorate, obtained from the NASA Space Science website, were used, and were calculated from the records collected through the registration stations over the last ten years and extending from 2010 to 2019. Data were obtained on monthly precipitation amounts (mm), average maximum, and monthly minimum temperatures (°C), relative humidity %, as well as wind speed m/s. These climatic variables, especially temperature and precipitation, were selected for evidence of their influence on the behaviors and decisions of outdoor leisure and entertainment visitors (Kozak,2002; Hamilton, 2005). The temperatures were also extracted from the satellite images of the Landsat 8 satellite for Madan Saleh and Alula for the year 2019. Using ArcGIS software.

IV. The concept of seasonal tourism

The concept of seasonal tourism is a well-known and clear concept but there is no single precise definition agreed upon. Seasonal tourism can be defined in many aspects and, in different regions, seasonality can have different meanings. It can be defined as a systematic movement during the year and described as a type of tourist that is repeated every year. Indicates (Hylleberg, 1992) that seasonality is a regular movement although it is not regular during the year due to changes in weather and timing decisions directly or indirectly through production and consumption decisions made by tourism agents. (Butler,1994) believes that seasonal tourism is a temporal imbalance in the phenomenon of tourism that can be expressed in the number of visitors and their spending movement on various forms of transportation jobs and admission to tourist attractions. Thus, it shows that the phenomena of

seasonal tourism affect all aspects of supply-demand activities including the activities that are provided in terms of human resource volume of available resources, available attractions, and favorable weather conditions. Seasonality can be said to be simply "a cyclic pattern that repeats itself every year or less" (Jang, 2004). An important implication in this definition is that the seasonality can be driven by a wide range of factors, which could result in different seasonal patterns. When the fluctuations in timing and magnitude follow a mathematical/statistical pattern, the seasonal variation may be deterministic. On the other hand, if the seasonal pattern tends to change over time, or when the timing is regular, but the magnitude is not, the seasonality should be treated as stochastic. Seasonal tourism is one of the most bewildering issues in tourism management, as seasonal effects have been described in many scientific studies as having negative effects, due to: the instability of work and unemployment, Income instability, which creates difficulties in investment returns (Ashworth, 1999 ; Ball, 1988 ; Butler, 2001; Jang, 2004; Manning & Powers, 1984). As well as the ineffective use of resources and facilities (Sutcliffe, 1980). On the other hand, seasonality has some potential benefits, as investors and owners of tourism properties can take advantage of pauses or lulls in demand to carry out maintenance, repair, and redevelopment of facilities (Grant,1997), and to take advantage of available labor at specific times (Mourdoukoutas,1988), and the promotion of environmental, social and cultural recovery during low season (Butler, 1994; Higham, 2002). However, there are a few destinations that are not adversely affected in one way or the other by these negative effects. In fact, planning and equitable distribution of tourism demand during the season in the tourism area, and through the distribution of marketing and visits, management of the tourism and investment aspects, and management of operations, work to improve the use of resources and reduce the negative effects associated with the tourist season.

V. Seasonal tourism

Each element of the climate effects in one way or another the possibility of practicing different forms of leisure and tourism. Every element of the weather often has a positive effect on comfort, sometimes making it difficult for others (for example, cloudy skies enable sunbathing, but high temperatures hinder many active recreations). Also, a tourist or visitor to an open area may be affected by a whole range of weather elements, which is why it is so important to look at specific weather elements and determine how they affect leisure and tourism.

VI. Discussion

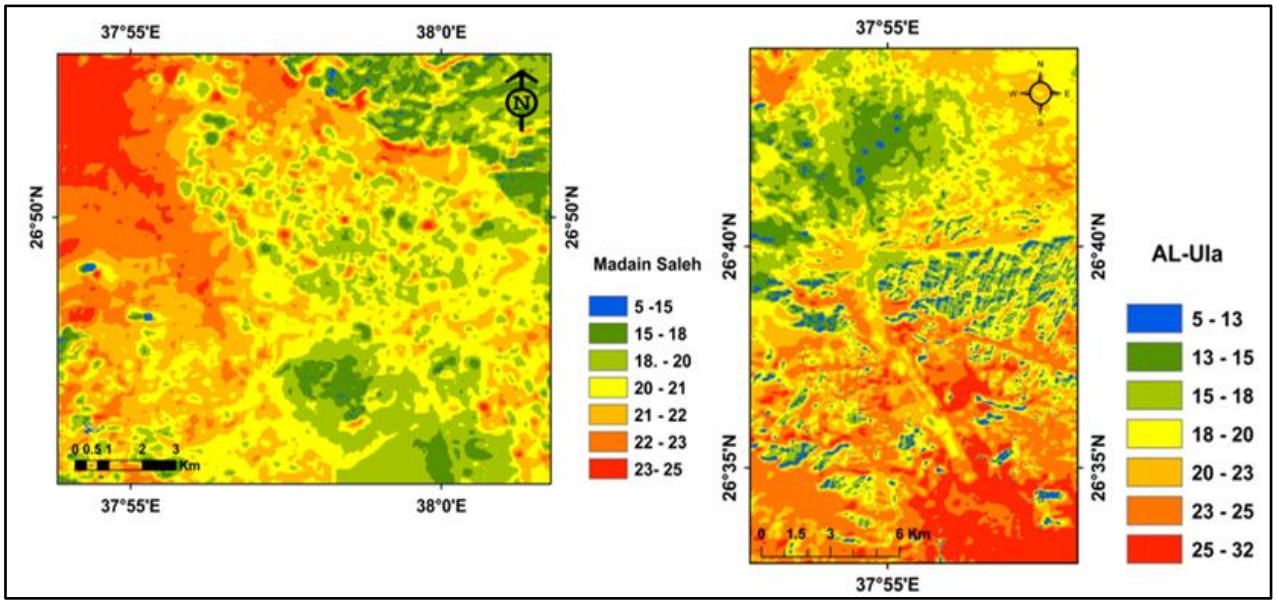
This study focuses on analyzing the importance of some aspects of seasonal tourism in Al-Ula governorate, which are temperature, winds, rain, relative humidity, and solar radiation.

6-1 : Air temperature: Al-Ula Governorate is characterized by hot summers and cold winters, as temperatures start to rise from late April until early October, while they decrease during the winter months from mid-December to February, and this period may be accompanied by rain. While the spring and autumn seasons in Al-Ula constitute a few months, it is dominated by climate moderation, as it is characterized by days that tend to be slightly hot, and nights tend to be cold. This is due to the nature of the desert study area, which is generally dominated by a desert climate. Table (1). The highest air temperature (average and above average for the maximum daily temperatures) occurs from the beginning of the third decade of May to mid-September, and the average daily temperature (about 7.8 °C) was observed in January, and in February (about 9.5 °C). ˚), which are high temperatures compared to the neighboring regions such as Tabuk, Hail, and AlJawf region. These degrees are somewhat suitable for winter sports, especially for camping enthusiasts, visiting sandy areas, or rural agricultural areas, and visiting heritage attractions such as Madan Saleh and Al Hajar. On the other hand, moderate thermal conditions in winter are less stressful for human metabolism. (Błażejczyk, 2011). The period during which the temperature conditions are more varied plays an important role for winter sports for the tourist, for example, the dependence of metabolic rates on the air temperature, A decrease in air temperature of 5 °C increases the basal metabolic rate (BMR) by 17%, while a decrease in temperature of 15-20 ° C increases your body mass rate by up to 80%. The BMR value changes rapidly Depending on the form of physical activity when lying down, the average person produces about 50 watts per second of heat, however, walking without a load in a flat area at a speed of 4 km / h, causes the body to produce approximately 115 w / S^2 of heat. Walking at a load of 10 kg produces 195 W / S^2 and walking at 8 km / h without a load produces up to 290 W / S^2 of heat. (Błażejczyk,2011; Świątek, 2014; Błażejczyk 2004). Therefore, cool, and moderate temperatures favor

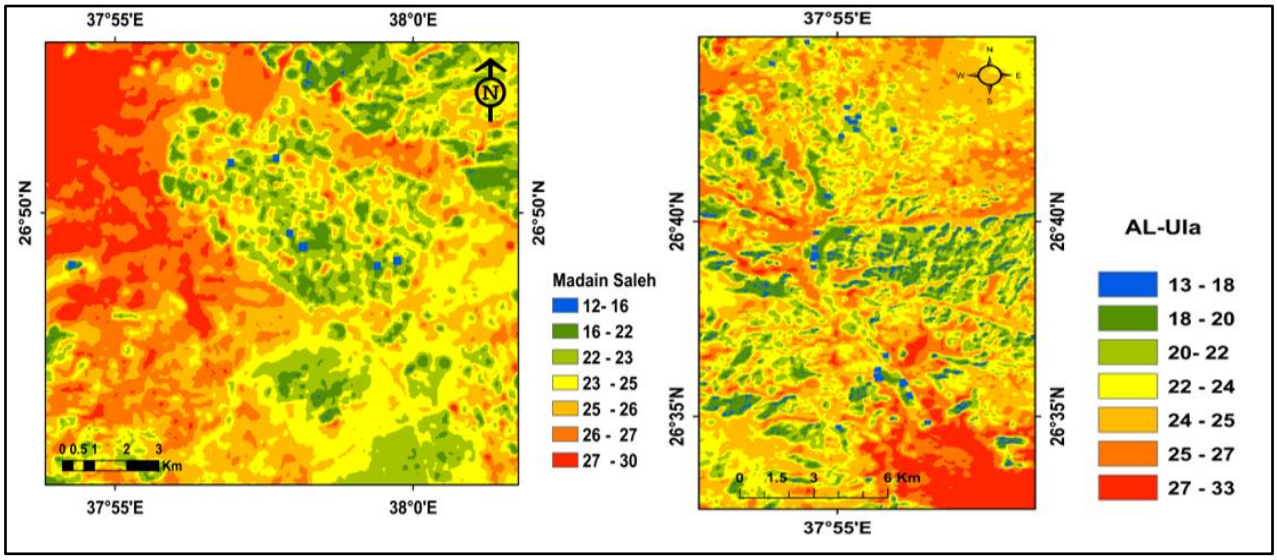
in terms of tourism and active leisure, rather than passive entertainment. The following figures show the temperature analysis from the satellite visuals for the study area for the 15th of the year 2020 AD, for January, February, March, and November. Figure (2), shows the temperature for January in Al-Ula, which ranged between 19°C and 32.5°C, and in Madan Saleh, it ranged between 20.3°C and 30.6°C. Figure (3), shows the temperature for February in the city of Al-Ula, which ranged between 22 and 36 degrees, and in Madan Saleh, it ranged between 18 and 32.5 degrees. The temperatures for this day during January and February are very suitable for a beautiful tourist day in Al-Ula and Madan Saleh. Figure (4) shows the temperature for March in the city of Al-Ula, which ranged between 30 °C and 41 °C, and in Madan Saleh, it ranged between 23 ° C and 37.6 ° C. Figure (5) shows the temperature for November in the city of Al-Ula, which ranged between 22.5 and 34.5, and in Madan Saleh it ranged between 25°C and 35.5°C.

Table (1): Average max and min temperature (C˚), humidity (%), wind speed (m /s), rain (mm)

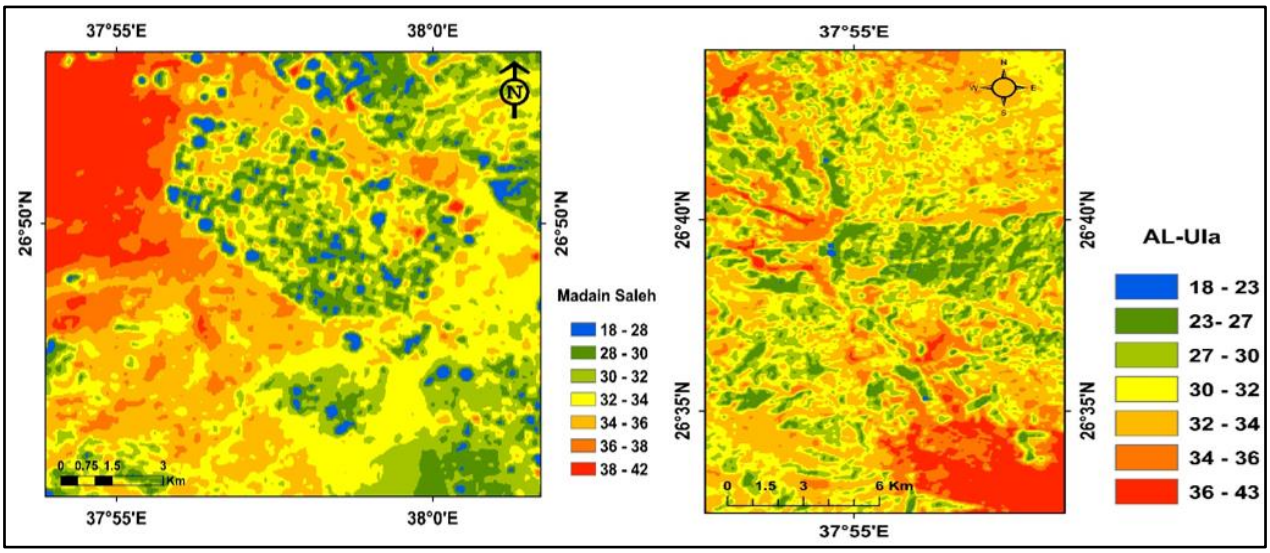
Months	T-MAX C˚	T-MIN C˚	HUM %	WIND SPEED m/s	Precip mm	Solar radiation kW-(hr/m^2/day
JAN	23.2	7.83	38	4.9	50.79	6.75
FEP	25.92	9.46	31	5.4	16.15	7.15
MAR	29.83	12.61	23	5.7	24.4	7.21
APR	33.53	16.49	20	6.1	5.37	7.28
MAY	38.61	21.1	15	6.3	2.09	7.4
JUN	41.86	23.88	13	6	0	8.45
JUL	42.87	25.53	16	5.7	0	8.11
AUG	43.41	26.42	16	5.6	0	7.44
SEP	41.35	24.61	16	5.3	0	7.31
OCT	36	20.75	23	4.8	5.17	6.55
NOV	28.67	14.45	33	4.8	53.47	6.4
DEC	24.34	9.73	38	4.9	30.12	6.37



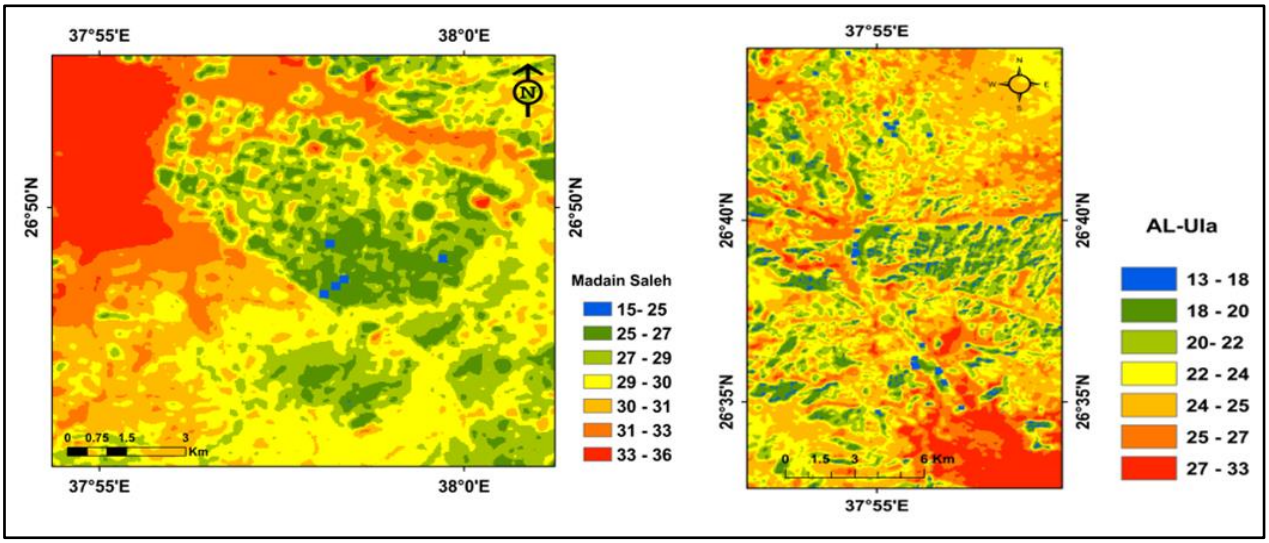
Figure(2): The temperature in the study area for the month of January 2020. Visible Landsat 8.



Figure(3): The temperature in the study area for the month of February 2020. Visible Landsat8



Figure(4): The temperature in the study area for the month of March 2020. Visible Landsat8



Figure(5): The temperature in the study area for the month of Nov 2020. Visible Landsat8

Universal Thermal Climate Index (UTCI)

The Global Thermal Climate Index describes human heat stress caused by a combination of weather elements. Extreme cold stress occurs, when a person must intensify activity, protect the face and extremities from cooling and use warmer clothing, the UTCI range of extreme cold stress covers between -27 °C and -13 °C; Moderate cold stress ranges between -13 °C and 0 °C; The simple cold pressure ranges between 0 °C and 9 °C and there is no heat pressure (thermal comfort) between 9 °C and 26 °C. (Błażejczyk, 2011; Shirota, 2019). The length of the heat stress absence period (the period during which the human physiological thermoregulation is sufficient to maintain thermal comfort) varies from place to place. Wind speed has a very large influence on the heat balance. In the winter season and even early spring, the Al-Ula region is affected by cold winds, and sometimes it is of very cold pressure, so it causes thermal stress in the region, which harms tourism**.**

6-2: Wind speed

Wind intensifies thermoregulation by increasing heat exchange between the human body and its surroundings. And therefore, the strong, cold winds lead to hypothermia. (Shirota, 2019). Due to the increased air resistance, strong winds impede cycling and hiking, causing increased physical stress, and strong winds impede outdoor activities such as camping, parties, or tourist events. Also, high-speed winds can be associated with feelings of tension and mental distress can be magnified. The speed of the wind plays a big role in raising the dust and dust plankton in the Al-Ula region, in which dunes and open barren areas abound. Analysis of the available data demonstrates that wind speed fluctuation is related to the measured air temperature change, As the highest wind speed occurs in the spring, especially in April and May, and the lowest in the winter. Table (1). Due to the nature of the Al-Ula region, which is characterized by the arid desert range, the winds vary according to the different climatic conditions each year, as they are not constant characteristics every year, and they may differ from year to year, as it is a desert region. Wind is an important factor in tourists visiting the area, either positively or negatively, depending on its speed. The summer season is not suitable for tourism in the Al-Ula region due to the high temperature and wind speed, which tend to be hot winds that cause many negative problems for tourists. Figure (6).

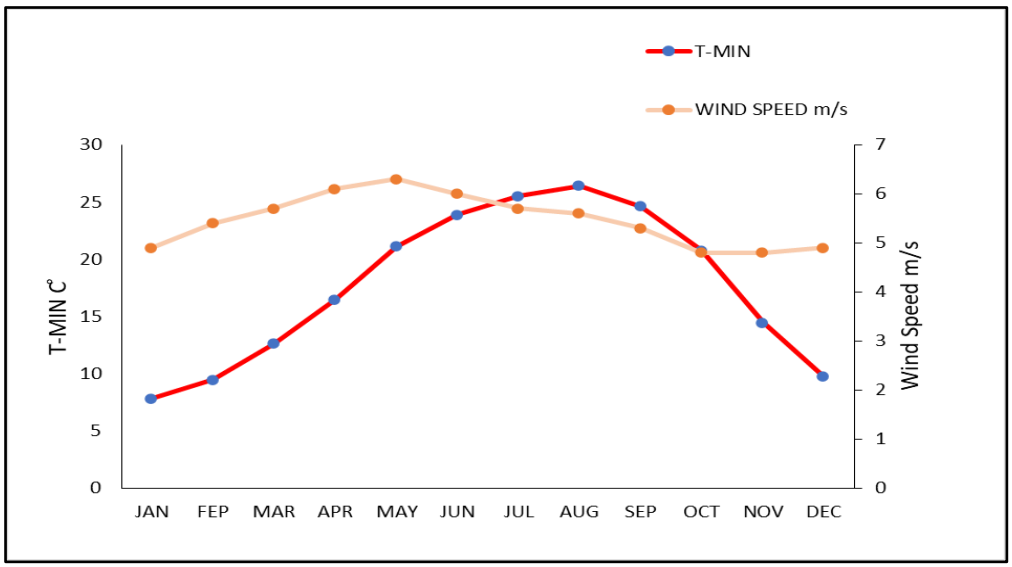


Figure 6: Average wind speed (m / s) and average min temperature (C̊) in study area

6-3: Relative humidity

Relative humidity affects air temperature and well-being while relaxing or exercising in the open area. Through the statistical analysis, changes in relative humidity are inversely proportional to changes in temperature in the Al-Ula region. Table 2. The highest values of relative humidity were recorded in December and January, followed by November and February. Table No. (1). These months are considered the highest in terms of relative humidity and gentle in terms of temperatures, which makes them have a positive impact on the tourism activities of the region.

Table (2): The statistical relationship between the humidity % and the average temperature C̊.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig. F Change
1	.920[a]	846	830	2.95711	54.725	.000

6-4: Precipitation

Rainfall seriously disrupts walking, cycling, and other types of outdoor recreation and sightseeing. Heavy rains make tourism virtually impossible, while light rains degrade the quality of experience for this type of entertainment (Moreno, 2008). It is noted that the highest rates of precipitation in general in the Al-Ula region are recorded from the end of the fall season until the beginning of the spring season, as of November, December, January, February, and March are the most recorded months of rainfall in Al-Ula. Figure (7) and Table. (1). The rains in the Al-Ula region are irregular, as they vary from one season to another, and their amount varies from one season to another, as there can be years of drought, and other years with good precipitation. This is due to its desert nature.

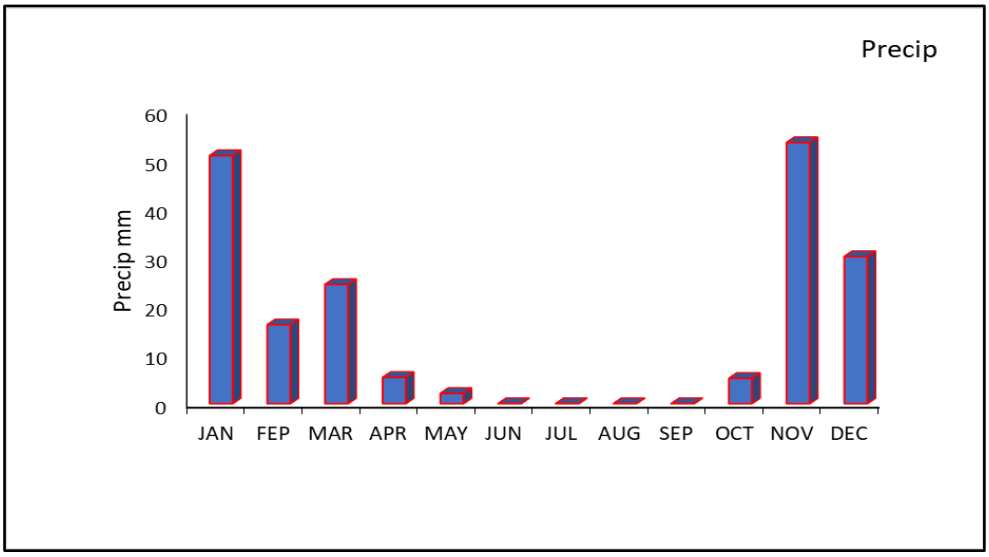


Figure (7): Average monthly precipitation in the study area

6-5: the Solar Radiation

The duration of solar radiation does not directly affect the performance of outdoor leisure and tourism activities. But it affects the satisfaction that tourists feel from the activities involved. High true sunlight duration values are influenced by both cloudiness, atmospheric temperatures, and day length. The favorable solar conditions occur from October to January. Table (1) and Figure (8). The solar radiation values increase in the remaining months, and this causes many health problems for visitors to the area. Sunlight causes skin cancer, and many problems and damages occur to the lens of the eye, as soon as heat stroke causes fainting and headache (Shirota, 2019).

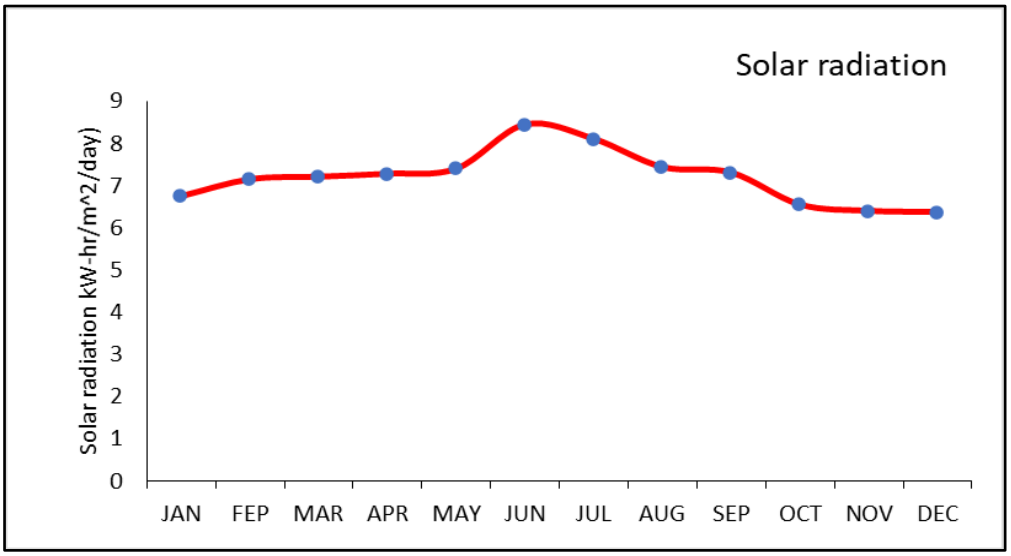


Figure (9): Solar radiation in the study area

VII. Conclusions

Outdoor recreation in the summer is almost non-existent due to the high temperatures from late May to early October, and the winds are dry and fast, and this does not reduce the tourist activity in the area, as it is often active short visits from one to three days, especially for tourists. Locals from within the Kingdom of Saudi Arabia, since this period is the year off for schools in the country, which invites many residents to visit the tourist monuments in Madan Saleh or Al-Hajjar, and the Al-Ula region is a link between the northern regions of the Kingdom and the city of enlightened for those who intend to visit the sanctuary The Prophet. Al-Ula is a rural area predominantly agricultural, and this is a good thing to stimulate and support rural tourism and to create an additional economic resource, which contributes to promoting tourism in the Al-Ula region**.** It is preferable to relax in the open air, enjoy entertainment, and visit the archaeological sites in Madan Saleh or Al-Hajjar from the end of October until mid-April, as this period is characterized by climatic characteristics suitable for tourism and hiking in Al-Ula. The moderate to cold temperatures give a lot of fun and entertainment atmosphere and help to camp and spend winter times in the open air, and the wind speed is favorable and its speed decreases during this period, which helps in cycling, walking, dune bashing, and horseback riding. The months of late fall through early spring are less than the rest of the months in the amount and values of true sunlight duration. The possibility of rain at the end of the autumn in what is known locally as "the" season is favorable and the beginning of the weather is pleasant and bodes well for a good tourist season. The rains in the Al-Ula region, unlike in many regions of the world, are important in softening the atmosphere and creating a tourist atmosphere, especially for those visiting the open wild areas, as well as working on the germination of wild weeds that increase the beauty of wild areas such as the Shamrock, lavender, plum, purple, and others. Fig. (10) and (11).

.Figure (10): Photos from Al-Ula Spring 2018
https://www.youtube.com/watch?v=3Jr1EFtl6ZA

.Figure (11): land trips in Al-Ula for the year 2019
https://twitter.com/b_kh_h/status/1203366655155412993

The favorable and positive climatic conditions, which contribute to the process of tourist attraction to the Al-Ula region, have helped to raise the number of visitors to the region in the last year, due to the interest that the region received from the competent authorities in Al-Ula or tourism. It has worked on developing antiquities areas in

Madan Saleh and Al-Hajjar and establishing sports activities such as desert polo (Figure 12), cycling, and the Dakar Rally in one of its stages. Tourism festivals, whether cultural, artistic, or lyrical, were held in open-air theaters, and perhaps the most important of them was Winter at Tantura. Figure (13).

Figure (12): Sports activities in Al-Ula. https://experiencealula.com/

Figure (13): Winter tourism in Al-Ula https://experiencealula.com/

VIII. Results

1- From the second decade of October until the first decade of March, the climatic conditions are suitable for tourism, hiking, and the establishment of tourist festivals, and it is also the most appropriate months of the year to visit the antiquities in Madan Saleh and Al-Hajjar and enjoy a walk in the open air.

2- Relative humidity and rain are two factors that catalyze a pleasant atmosphere and help to moisturize the atmosphere, especially because the Al-Ula region is a desert area, and it also helps to go out in the open air either for cycling, walking, horseback riding, or other activities.

3- In the study area, climate changes are affected by fluctuating local conditions, in particular, wind speed and effective temperature, Without neglecting the topography of the area, which affects the movement of the prevailing winds, their deviations, and their speed due to the variation in the topography of the region, and this controls the frictional force that limits the wind speed.

4- The presence of very hot or very cold conditions (Heat stress), However, it is difficult to compare the seasonal thermal comfort in the Al-Ula region compared to similar areas, due to the different climatic conditions, and this is due to the nature of the Al-Ula desert region.

IX. Recommendations

1-Tourism and recreation in natural areas with unstable climatic factors, and given that natural factors can, in principle, establish and maintain seasonality of tourism in natural areas, planners need to understand the relative importance of these different types of factors to ensure the provision of facilities, accommodation, and activities For your future visitors.

2-Because the Kingdom undertakes to establish nature reserves, rehabilitate the wilderness areas of the Al-Ula region, and pay attention to the area's historical heritage and the fact that Al-Ula is a first-class rural agricultural area; This supports summer tourism through rural tourism and the establishment of wild resorts such as the desert resorts in the United Arab Emirates or the Canyon resort in the Arizona desert and other resorts that contribute to the tourist attraction. And it is possible to write phrases motivating tourists for each recreational or rural activity, and are commensurate with the characteristics of each sector, as is the case in the Nicaraguan experience when I used the phrase "Cup Coffee the Behind Faces", a phrase that greatly contributed to encouraging tourism, And create an element of suspense for the tourist, and motivate him to visit farms and learn about coffee production and participate in harvesting.

3-Giving the Al-Ula region, with its rich historical or natural heritage, its right in terms of scientific studies, paying attention to tourism aspects, highlighting tourist maps for the region that allow tourists to move easily and easily, and highlighting the area attractively and surprisingly.

4- It is very important to make a statistic about the number of tourists in each month or season with their nationalities so that the decision-makers can take all precautions and make tourism plans that suit them and develop the tourist facility, and it also helps tourism companies to push the tourism wheel forward.

5- It is very important to make a statistic about the number of tourists in each month or season with their nationalities so that the decision-makers can take all precautions and make tourism plans that suit them and develop the tourism establishment, and it also helps tourism companies to push the tourism wheel forward.

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