

THE DETERMINATION OF SEA TOURISM SEASON ACCORDING TO THE CLIMATICAL CONDITIONS IN MARMARIS - ALANYA COASTAL BELT (SW OF TURKEY)

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Abstract. *The attractiveness of a tourist destination is partly dependent on its environmental and climatic resource. It is important that climatic conditions are within presumed threshold values with respect to tourism and recreation activities in the form that people rest in a healthy environment, relieve from their tiredness and benefit from health effects of sea water and atmosphere. The purpose of this study is to determine the most favourable season according to the climatical condition in respect of sea tourism in Marmaris-Alanya coastal belt of Turkey where tourism intensifies in summer season and in the frame of sea-sun-sand. The climatical elements bearing importance for the sun and sea bathing; sunshine duration, temperature, relative humidity, wind, precipitation and sea surface temperature have been taken into consideration for this purpose. Conditions in respect of sunbathing in the study area are quite favourable in sea tourism season. The period during which temperature is favourable with relative humidity and wind conditions is seen May 6-October 23. The most favourable period for sea tourism season is seen June 13-June 25. Extreme period in respect of sea tourism season is seen May 12-July 25 and September 3- October 19. Acting in the light of these data in the planning and implementation of tourism activities poses great significance.*

Key Words: *tourism season, climate, Alanya - Marmaris, sea tourism, Mediterranean*

Introduction

Weather and climate, together with some other natural resources, such as geographical location, orography and landscape, play important roles for tourism and recreation (de Freitas, 2003). Climatic elements, having the greatest influence on tourism, are temperature, sunshine radiation, precipitation, wind, humidity and fog (from Stern *et al.* 2000; Hamilton and Lau, 2004; Gomez Martin, 2005; Matzarakis, 2001, Cengiz *et al.* 2008)

“Tourism is one of the world’s largest, fastest growing and most climate-dependent economic sectors” (Wall, 2007). “Climate is influential for international tourism, which being situation-specific is responsive to its variability and change. One of the major attributes of the most tourist destinations is seasonality. Not only is there a regular round of activities associated with the seasons, there is also variation in activity in areas lacking

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a marked seasonal climate. This is because seasonal variations in visitation to areas of supply. Thus, for example, the desire for many Canadians to escape the Canadian winter to warmer climates creates a seasonal demand in temperate and tropical areas which do not have the same degree of annual variation in temperature” (Wall, 2007). “Maddison (2001) investigated the importance of climate as a determinant of the destination choice made by British tourists” (Corobov, 2007).

“Various places in the world have a “tourism potential” and weather and climate set limits. For example, tourism administrators do not promote places with a little potential or appeal, as this would not be profitable. On the other hand, the tourist who chooses to visit such places would suffer inconvenience discomfort. Rainy summers or less snowy winters can have significant impacts on tourism” (de Freitas, 2001).

“Climatic information can be useful in decision-making if presented in an appropriate form. Therefore it is important to identify which climate-related criteria people use to make their decisions about holiday destinations, taking into account that the human response to climate depends on individual perception and sensitivity (de Freitas, 2001).

Favourable climate and weather conditions are essential advantages for recreational and tourism activity. However, in temperate climatic belt they are characterised by seasonality. “Tourism is highly dependent on climate. Climate factors, such as temperature, wind and sunshine, account for a large share of the succes of major tourism regions, such as the Mediterranean” (Amelung and Viner, 2007).

“The research dealing with climate tourism relationships should consider three categories of information (de Freitas, 2003). These are aesthetic factors (cloudness, visibility, sunshine duration, day length), physical state of the atmosphere (precipitation, snow cower, wind, solar radiation, UV radiation, air pollution) and bio-thermal conditions (human heat balance considerations). According to this concept, the actual weather is one of the basic demand indicators of recreational and tourism potentials of any time, season and/or region” (Blazejczyk, 2007).

“According to de Freitas (2001), there are two further aspects of climate that are relevant to tourism: first, there is the physical aspect. Here, the climate facilitates or hinders certain tourist activities whether through rain, wind or snow. For example, wind and rain will make a day of sunbathing at the beach impossible. Second, there is the aesthetic aspect of climate. This may be

through the quality of light that affects the appearance of the tourists' surroundings or it may come from the appearance of the sky and of the sea and other water bodies. In the long run, climate has an effect on the other elements that fall under the aesthetic category of de Freitas" (Hamilton, 2007).

"Climate data must be presented in a form that relates to the individual's response to the weather or climate conditions. That is events rather than averages. Most research on tourism climate appears to be motivated by the potential usefulness of climatological information within the planning processes for tourism and recreation. The research addresses the theme of tourism climate as an adjunct to a variety of decision making processes ranging from those related to such things as the development and location appropriate recreational facilities, or determining the length of the recreation season during which a facility will operate, to those as specific as planning future activities involving personal decisions of when and where to go for a holiday (de Freitas, 2003).

"Since outdoor recreation is very weather sensitive (Perry, 1972), weather and climate can be one of the most important features attracting tourists, but also present limiting factors. The role of climate in determining the suitability of a region for tourism or outdoor recreation is often assumed to be self-evident and therefore to require no elaboration. Climate-related information is often very poor and barely helps tourists in planning and scheduling their holidays or the promotion of a tourist destination in publicity campaigns" (Zaninović and Matzarakis, 2007).

"The appearance of the built environment is influenced by, among other things, climate. Landscape is also influenced by climate. The coast is the interface of the sea and the land, which Mieczkowski (1990) calls "a junction of seascape and landscape." Coastal tourism can be found mostly on sandy coasts; rocky or marsh coasts are less popular (Wong, 1994). Mieczkowski (1990) divides the coastal belt into four areas that are relevant to tourism: the marine belt, the beach, the shoreland and the hinterland. The beach is the most important of these, as it is where the main tourist activities take place. The coast has a special climate. Cooler air from the sea that flows landwards creates a breeze at the seashore. Without this breeze the thermal conditions at the beach would not be as pleasant (Mieczkowski, 1990)" (Hamilton, 2007).

"The Mediterranean tourist sector has traditionally been characterised by strong seasonality, with large differences in occupancy rates between winter and summer. For example, in Spain in the early 1990s, tourist expenditures were around 50% higher in the peak month of August than in an average month,

and around 30% lower in February” (from González & Moral, 1995, Amelung, 2007). “In Spain, in 2003, more than three times as many hotel nights were spent in August as in December (from INE, 2004, Amelung, 2007).

Material and Method

Study Area

The study area comprises the coastal belt between Marmaris - Alanya in the Mediterranean geographical region of Turkey (Fig. 1). This area is tourism belt where tourism activities characterized according to sun-sea-sand elements, by means of its climate, natural beaches and cultural attractiveness. The sun, sea, nature and history combine to form very popular holiday centers in the study area. Antalya, Marmaris, Alanya, Fethiye, etc. holiday centers taking place in this field are important not only for Turkey but also for Mediterranean basin and the world.

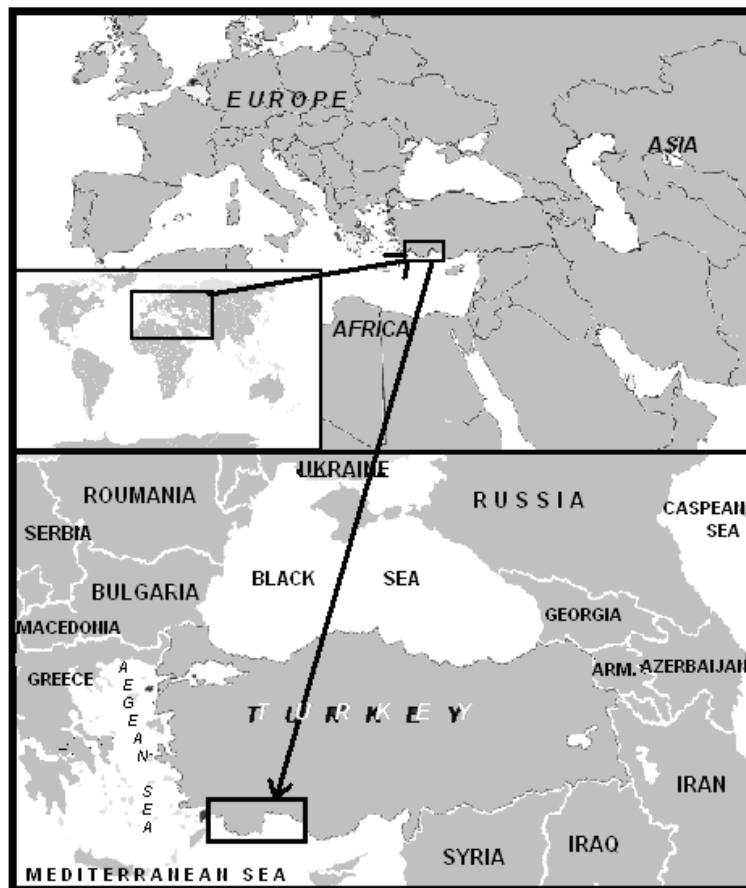


Fig. 1. Location map of Marmaris-Alanya coastal belt (SW of Turkey)

Besides attractions resulting from geological and geo-morphological characteristics of the shore, Marmaris-Alanya coastal belt has the attractiveness of scenery in many places having the sea blue of coastal belt with the plantation green together. The study area is a treasure chest of caves, inlets, bays, abys at which yachtsmen can choose a different and private anchorage each right. The sailing paradise of Turkey is also home to the “Mavi Yolculuk”, or “Blue Voyage”, an idyllicruise which travels to the private beach of Cleopatra, the eternal fires of Mount Olimpos and the remains of thousands of ancient civilization (Fig. 2 and 3).

There are many beaches along this coastal belt. Furthermore, with its historical sites bearing traces of a long history of settlement and many of which are well protected, alternative tourism activities like congress, rafting, paragliding, golf apart from sea and summer tourism, airway transport like Dalaman and Antalya airports making accessibility to the region from within the country or abroad very easy and secure, yacht tourism becoming even more attractive with jagged coastal structure between Marmaris-Kemer (Fig. 2 and 3) and local cuisine, it has the potential to reach a much better point for tourism in future.

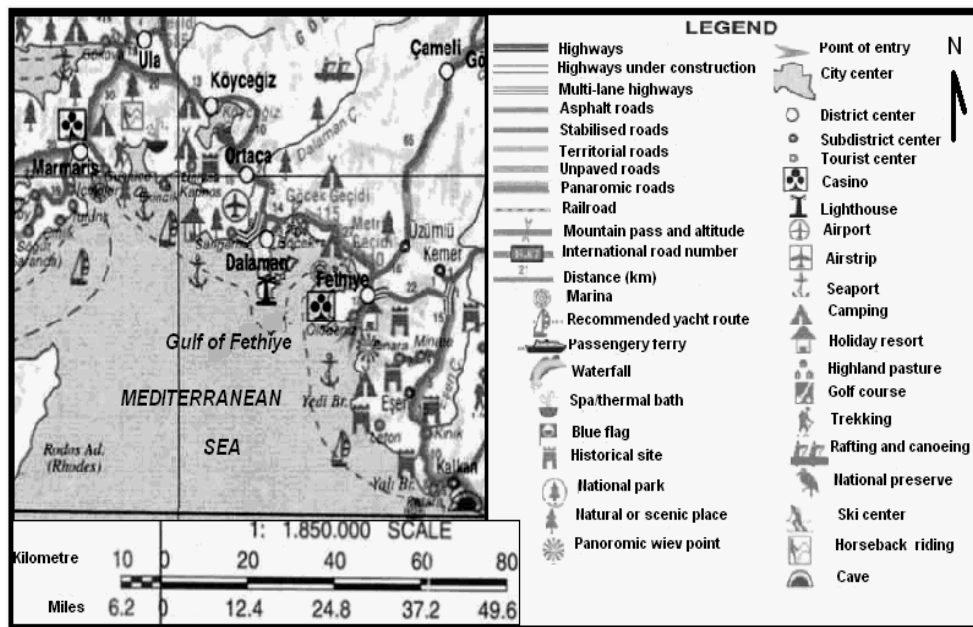


Fig. 2. Tourist map of Marmaris-Kaş coastal belt (SW of Turkey)
Sources: <http://resim.turkcebilgi.com/resim>

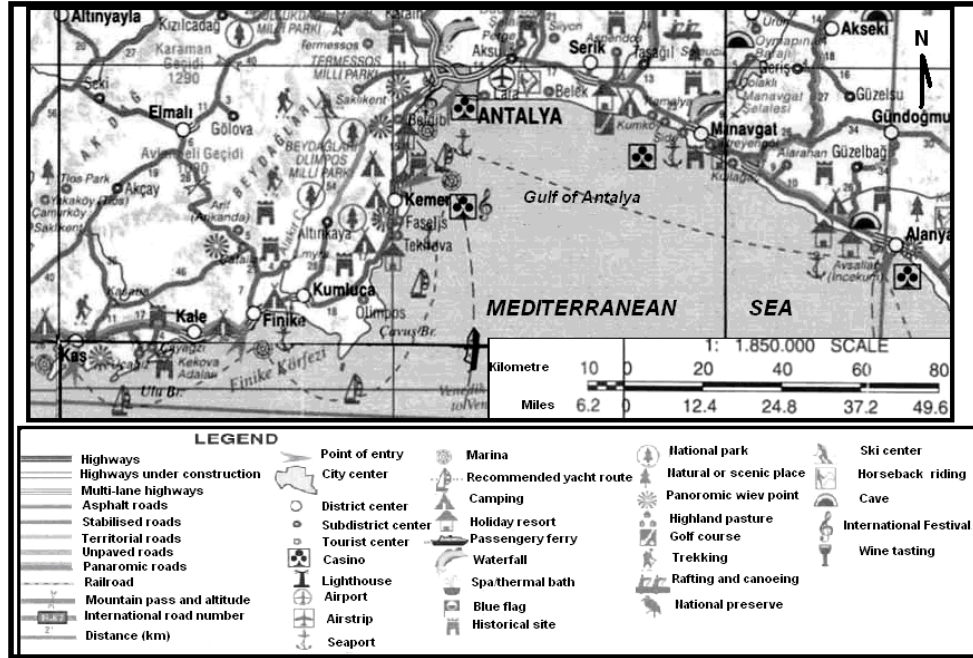


Fig. 3. Tourist map of Kaş-Alanya coastal belt (SW of Turkey)

Sources: <http://resim.turkcebilgi.com/resim>

Conceptual framework

In this study carried out for the determination of the favourable season by the sea tourism in Marmaris-Alanya coastal belt where tourism is shaped by the elements of sea-sun-sand, the climatical conditions were also observed which bears importance in participating such activities in a comfortable and healthy environment as well as determining the favourable season for the sun and the sea bathing.

It is important for the weather to be open or slightly cloudy and without rain, reaching of the sun rays to earth with appropriate angles and the temperature to be in appropriate values together with the relative humidity and wind in respect of sun bathing.

“According to Maddison (2001) the maximum daytime temperature should ideally be close to 30°C, while Lise and Tol (2002) estimate the optimal 24-hour mean daily temperature to be around 21°C.” (from Abegg *et al.*, 1998, Amelung, 2007). “Globally, OECD tourists prefer a temperature of 21°C (average of the hottest month of the year) in their holiday destination choice” (Corobov, 2007).

In order to provide bioclimatic comfort which bears great importance for the tourism in the open area the combination of 21...27,5°C temperature, 30-65% relative humidity and speed of the wind less than 5 m/sec has been described as appropriate (From Olgyay, 1973, Topay and Yilmaz, 2004).

According to the climatheraphy experts, the monthly mean temperature value 18...32°C, the relative humidity value 30-70%, the number of sunny days 20 and over or the fully closed day number 10 or less the mean wind speed to be 6m/s in respect of the human health are considered positive by climate (Ülker, 1994). According to Olgyay (1973) the most favourable temperature for summer season is a slight wind (0.1-0.3 m/s) and 19°C, for the winter it is 16.5°C. According to Bedford the temperatures in comfort area 13,5...23°C and the relative humidity between 30-70% accepted as favourable (Ülker, 1988).

Whereas in studies carried out for Turkey, effective temperature values that humans can feel comfortable are stated to vary from 16,7°C to 24,7°C (Sungur, 1980). In case the relative humidity and the wind factors are favourable in middle latitudes where Turkey also exists, the temperature range 17...24,9°C is considered favourable to determine the comfort area (From Hobbs, 1980; Koçman, 1993). According to Altunkasa (1997) in case all the other conditions are normal, the temperature 21...27°C and the relative humidity 30-65% value together form the comfort environment (Topay and Yilmaz, 2004).

The temperature degree where inhalation becomes difficult in a certain degree of humidity and where a discomfort is felt as if under bathroom temperature is called as suffocating temperature limit (Erinç, 1984). Accordingly, for example when relative humidity becomes 100% while suffocating temperature limit is 16,5°C, it raises to 22-23°C when it falls to 70%, it raises to 36,9°C when it falls to 30% (from Scharlau, Erinç, 1984). The value people feel themselves most comfortable with regards relative humidity is determined as 45% (www.science.howstuffworks.com, 2008).

“Scientists tend to think nowadays that the wind is a positive factor for man’s comfort. The wind velocity affects the human body in two ways - it determines the convective heat exchange of the human body, and it affects the evaporative capacity of the air. Consequently these two factors define the cooling capacity of perspiration. This cooling, caused by the evaporation of perspiration and intensified by the wind, increases comfort of man” (Bitan, 1976).

Precipitation characteristics are important for tourism activities particularly for the period corresponding to tourism season. Rainless weather conditions are

important for activities like sun bathing, benefiting from sea, visiting tourism-wise attractive areas.

In protective and treating and/or cure aimed works named as talasotherapy (sea cures) and maintained on the basis of sea, sea surface temperatures pose great importance. Besides, sea bathing and cures enjoyed in times it is warm have great benefits for health (Ülker, 1988). For a healthy sea bathing that may bring in benefits for people, first of all sea air and water need to be clean and in favourable temperature.

The weather temperatures at least 20°C, as a normal value 25...28°C, at most 32...34°C, as for the sea water temperatures 22...25°C, as an extremal value 18...28°C are accepted as the suitable values (Ülker, 1988).

In this study the sea tourism season has been evaluated in the frame of the elements of season, temperature, relative humidity, wind, sunshine, precipitation and sea surface temperature. The evaluations here are made within the framework of above mentioned factors.

Data sources

The sunshine duration, sunshine rate, the reaching angles of the sun rays to the earth, temperature, wind, precipitation, relative humidity and the sea surface temperatures in the holiday centers in 1975-2006 selected from the study field while determining the sea tourism season have been handled, the general conditions of these elements have been put forward and their combined effects have been allowed. The values put forward in the examinations summarized with the general conditions above have been taken into consideration.

Results

Sunshine conditions

Tourism activities on the study area largely display a structuring within the framework of sea-sun-sand. Therefore determining the sunshine conditions in respect of the sea and sun bathing bears great importance. On the other hand, one of the reasons of preference of foreign tourists visiting this area from countries and regions (particularly Western and Northern European countries) where direct sun radiation is limited will be the possibilities of sun bathing.

Along Marmaris-Alanya coastal belt, sunshine reaches the surface with angles from 29°35' to 77°15' within the year. These angles vary between 52° to 77° when sea tourism activities become intense. The real sunshine duration period in this time is between 7-12 hours and sunshine ratio is between 55-85% (Tab. 1). On the other hand, net amount of radiation reaching surface where

Tab. 1. Sunshine conditions of selected holiday centers along Marmaris-Alanya coastal belt (SW of Turkey)

Holiday centers	Meteorological Elements	Months												Yearly average
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Ave.	Theor.sun.dur. (Hour:min.)	10,00	11,00	12,10	13,15	14,15	14,45	14,30	13,40	12,32	11,30	10,20	9,45	12,28*
	Real sun. dur. (Hour/min.)	4,12	5,00	6,18	7,24	9,12	11,00	11,12	10,42	9,12	7,06	4,48	3,36	7,47
	Sun. ratio (%)	41,2	45,5	51,1	55,1	64,5	76,1	77,8	77,8	74,0	62,5	43,9	35,6	60,8
Marmaris Lat.(36°51' N)	Declination of Sun. rays	36° 23'	44° 37'	52° 05'	60° 10'	67° 37'	75° 39'	67° 45'	59° 53'	52° 01'	43° 49'	35° 30'	29° 46'	-
	Real sun. dur. (Hour/min.)	5,06	5,42	6,54	7,54	9,36	11,24	11,42	11,12	10,00	8,00	6,00	4,48	8,19
	Sun. ratio (%)	50,6	49,3	54,0	57,3	66,1	77,8	79,9	83,0	81,2	70,8	58,8	47,4	66,7
Dalaman Lat.(36°45' N)	Declination of Sun. rays	36° 29'	44° 43'	52° 11'	60° 16'	67° 43'	75° 45'	67° 51'	59° 59'	52° 07'	43° 55'	35° 36'	29° 52'	-
	Real sun. dur. (Hour/min.)	4,42	5,06	6,48	7,48	9,42	11,24	11,30	11,06	9,48	7,32	5,30	4,06	7,51
	Sun. ratio (%)	44,2	46,0	53,5	56,9	66,6	77,8	79,0	82,5	76,9	64,8	51,9	42,9	61,2
Fethiye Lat.(36°37' N)	Declination of Sun. rays	36° 37'	44° 51'	52° 19'	60° 24'	67° 51'	75° 53'	67° 59'	60° 07'	52° 15'	44° 03'	35° 44'	30° 00'	-
	Real sun. dur. (Hour/min.)	5,18	6,06	6,54	8,00	9,54	11,36	12,00	11,36	10,00	8,06	6,18	4,54	8,30
	Sun. ratio (%)	51,8	55,1	54,0	60,8	67,4	78,6	83,9	84,8	81,2	71,3	60,6	48,0	67,6
Antalya Lat.(36°42' N)	Declination of Sun. rays	36° 32'	44° 46'	52° 14'	60° 19'	67° 46'	75° 48'	67° 54'	60° 02'	52° 10'	43° 58'	35° 39'	29° 55'	-
	Real sun. dur. (Hour/min.)	3,48	5,00	6,24	7,30	9,42	10,48	11,06	10,30	9,18	7,18	5,30	3,54	7,56
	Sun. ratio (%)	34,8	45,5	51,6	55,5	66,6	72,5	77,3	76,9	74,5	63,5	51,9	37,5	61,6
Alanya Lat.(36°33' N)	Declination of Sun. rays	32° 41'	44° 55'	52° 23'	60° 28'	67° 55'	75° 57'	68° 03'	60° 11'	52° 19'	44° 07'	35° 18'	30° 04'	-

*Since the difference of latitude between holiday centers is not much, theoretical sunshine duration display approximately the same values.

sunshine reaches the surface in angles close to vertical and sun exposure periods are long, is rather too much with over 2700 hours (2734-3037 hours) of insolation a year, or an average of more than 7 hours per day. From November to March it has a mean of 3,5-6 hours of sunshine a day, and in the sunniest season, in the summer, the sunshine on the average about 11 hours a day. Clear days when the mean daily cloudiness is under two tenths, are twice as frequent as cloudy days, when over eight tenths of the sky are overcast. During July and August about 20 days in the month are clear.

Temperature

The temperature values stay high through the year and even during winter period. The mean annual temperature changes between 17,9-19,3°C on Marmaris-Alanya coastal belt (Tab. 2). In this region where the typical Mediterranean climatical conditions are seen, the daily temperature mean in April-November ranges between 19 to 29°C and even in the winter months the daily mean temperatures do not fall below 7,5°C. During July and August the highest daily temperature often exceeds 30°C (hot days); while the night temperature does not drop below 20°C (warm nights).

Continental tropical (cT) air mass originating from the Africa leads to rise of temperature gets warm very strongly in sea tourism season too. During the months of July and August when tourism gets intense, temperature is above presumed threshold values 28°...29°C. Furthermore, mild, warm and very warm thermal periods are encountered within the year due to effect of maritime, no actual winter season occurs in its true sense and warm and very warm thermal conditions dominate during April-November period covering tourism season as well.

Extreme daily mean temperature for sea bathing is established as 20°...32°C. Accordingly, it was observed that there is one period within a year for most favourable periods with respect to sea bathing along Marmaris-Alanya coastal belt (Tab. 3). This period is seen between May 13 - October 17 and experienced in Dalaman as the shortest period, in Kaş as the longest period (Tab. 1).

Relative Humidity

Pursuant to studies carried out on this issue, relative humidity values of the air is determined to be between 30-70% for humans to remain in a healthy and comfortable environment (Olgyay, 1973; pursuant to Bedford, Ülker, 1988; Ülker, 1994).

Tab. 2. The monthly mean temperature distribution of selected holiday centers along Marmaris-Alanya coastal belt (SW of Turkey)

Holiday centers (Observing period)	Monthly mean temperature (°C)												Yearly mean
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Marmaris (1975-2006)	10,7	10,8	12,7	15,9	20,6	25,5	28,3	28,0	24,7	20,1	15,2	12,0	18,7
Köyceğiz (1975-2006)	9,2	10,2	12,2	16,1	20,8	25,7	28,4	27,7	24,5	19,2	14,0	10,6	18,2
Dalaman (1975-2006)	10,1	10,4	12,2	15,4	20,0	24,8	27,4	27,1	23,6	19,1	14,4	11,4	17,9
Fethiye (1975-2006)	10,1	10,6	12,6	15,9	20,3	24,8	27,5	27,3	23,7	19,0	14,2	11,2	18,1
Finike (1975-2006)	10,9	11,1	13,2	16,2	20,2	24,6	27,2	26,8	23,5	19,4	15,4	12,3	18,4
Antalya (1975-2006)	9,6	9,9	12,2	15,8	20,3	25,3	28,3	27,8	24,3	19,5	14,2	10,8	18,1
Manavgat (1975-2006)	10,3	10,7	12,9	16,0	19,9	24,4	27,2	27,0	24,0	19,8	15,1	11,8	18,3
Alanya (1975-2006)	11,8	11,8	13,7	16,8	20,9	25,0	27,7	27,9	25,4	21,2	16,4	13,2	19,3

Tab. 3. Favourable temperature period for sea bathing of selected holiday centers along Marmaris-Alanya coastal belt (SW of Turkey)

Holiday centers (Observing period)	Temperature (20–32 °C) Starting and termination date	Number of days
Marmaris (1975-2006)	15 May-17 October	156
Köyceğiz (1975-2006)	12 May-15 October	157
Dalaman (1975-2006)	18 May-13 October	149
Fethiye (1975-2006)	15 May-14 October	153
Kaş (1995-2006)	5 May-26 October	176
Kale-Demre (1981-2006)	12 May-11 October	153
Finike (1975-2006)	12 May-17 October	159
Antalya (1975-2006)	15 May-15 October	155
Manavgat (1975-2006)	14 May-19 October	159
Alanya (1975-2006)	12 May-25 October	167
Mean	13 May-17 October	158

Tab. 4. Relative humidity conditions of selected holiday centers along Marmaris-Alanya coastal belt (SW of Turkey)

Holiday centers (Observing period)	Yearly mean relative humidity (%)	Occurring period of relative humidity between 30%-70%	Number of days
Marmaris (1975-2006)	65	21 April - 31 October	194
Köyceğiz (1975-2006)	61,0	8 January - 13 November	269
Dalaman (1975-2006)	70	31 May - 3 October	126
Fethiye (1975-2006)	64	3 January - 13 November	316
Kaş (1975-2006)	54	1 January- 31 December	366
Kale-Demre(1981-2006)	69,6	21 April - 23 September	156
Finike (1975-2006)	67	1 June - 6 Aralık	189
Antalya (1975-2006)	63	4 Ocak - 23 December	354
Manavgat (1975-2006)	60	1 January - 31 December	366
Alanya (1975-2006)	65	1 January – 8 May, 2 June – 31 December	340

Along Marmaris-Alanya coastal belt, relative humidity values manifest an increase within September-May period, a decrease within May-September period. The mean annual relative humidity changes between 54 and 69,6%. Monthly mean values within the period between April-October when tourism activities gain intensity are between 40-70%.

The period when relative humidity values are favourable for human comfort and tourism activities varies between 126 and 366 days, average number of days is 340. In this respect, there is one period within the year in Marmaris-Antalya coastal belt except Alanya (Tab. 4).

Wind

According to the wind data of selected holiday centers along Marmaris-Alanya coastal belt, yearly mean wind speeds vary between 1,2 m/sec (Köyceğiz) and 2,8 m/sec (Antalya) and it rests within threshold values presumed for sea tourism activities during April-October period (it varies from 0,9 to 4,0 m/sec. (Tab. 5). Dominant wind directions change during all season (Tab. 5). In the annual wind rose mild winds prevail.

Tab. 5. Mean wind speeds of selected tourism centers along Marmaris-Alanya coastal belt (SW of Turkey)

Holiday centers (Observing period)	April-October period mean wind speed values (m/sec.)	Yearly dominant wind direction and mean wind speed (m/sec)
Marmaris (1975-2006)	1,9–2,2	WNW-2,2
Köyceğiz (1975-2006)	1,0–1,6	SSE-1,2
Dalaman (1975-2006)	1,9–2,7	S-2,4
Fethiye (1975-2006)	1,3–1,5	ENE-1,4
Kaş (1975-2006)	0,9–4,0	WSW-2,4
Kale-Demre (1981-2006)	1,4–2,4	SSW-1,6
Finike (1975-2006)	1,3–2,4	NNW-1,9
Antalya (1975-2006)	2,1–3,5	NW-2,8
Manavgat (1975-2006)	1,7–2,7	N-2,3
Alanya (1975-2006)	1,1– 1,6	E-1,4

Precipitation

The study area is under the Mediterranean climatic conditions. During the winter period, polar frontal activities producing mostly rainfall dominate on the study area. Summer period is rainless due to the complete influence of tropical air mass.

The mean annual precipitation in Marmaris-Alanya coastal belt ranges between 920-1200 mm. Most precipitation occurs in winter, which is a characteristic of the maritime precipitation regime. About 90% of the total precipitation occurs between October and April (Tab. 6) and in that period there are about 7 to 9 rainy days per month. The warm season has less precipitation and fewer rainy days, while in the summer there are only 2 to 4 rainy days per month.

When the annual course of precipitation on Marmaris-Alanya coastal belt is examined, rate of precipitation within the period including months of May-September covering tourism season too over yearly precipitation are seen to vary between 4,79% (Finike) and 8,61% (Manavgat). Precipitation particularly in June, July and August when sun and sea bathing activities are intensified do not exceed 2% of yearly rain except Manavgat (3,06%) and quite warm and rainless/quite rainy weather conditions become dominant in summer season.

Tab. 6. The monthly mean precipitation distribution of selected holiday centers along Marmaris-Alanya coastal belt (SW of Turkey)

Holiday centers (Obser. period) 1975-2006	Amount of monthly mean precipitation (mm)												Ratio of precipitation in May-September period (%)	Ratio of precipitation in June-August period (%)
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
Marmaris	260,2	168,8	124,5	43,0	32,6	12,2	1,1	2,1	11,9	91,2	174,4	276,2	4,99	1,28
Köyceğiz	230,9	154,7	98,3	56,7	31,0	16,1	2,6	3,3	13,8	81,0	156,5	251,4	6,09	2,00
Dalaman	221,7	148,0	93,3	43,1	22,7	5,6	0,7	0,5	22,8	76,5	150,0	248,9	5,05	0,65
Fethiye	205,7	140,5	91,3	37,1	24,7	4,1	3,3	1,3	12,6	64,9	122,7	213,0	4,99	0,14
Finike	246,0	143,4	80,7	38,8	22,7	8,5	3,6	1,3	9,2	63,0	83,3	244,7	4,79	0,15
Antalya	255,8	164,5	89,3	43,7	29,8	6,6	3,9	4,3	13,8	62,2	111,5	269,7	5,53	1,40
Manavgat	293,7	181,7	108,6	44,7	31,1	11,6	3,6	13,4	20,7	84,2	139,9	308,8	8,61	3,06
Alanya	237,3	170,0	90,1	47,6	35,2	8,2	5,8	3,3	29,3	80,8	138,0	230,4	7,60	1,60
Mean	243,9	159,0	97,0	44,3	28,7	9,1	3,1	3,7	16,8	75,5	134,5	255,4	5,95	1,28

Sea surface temperature

Sea surface temperature never decreases below 16°C during each season on the study area. When the most favourable sea surface temperature as 22°C- 25°C with respect to sea bathing is taken into consideration, the favourable period is seen in Marmaris (99 days) the longest, in Finike (52 days) the shortest period. Besides, they are common in two periods in the study area (Tab. 7). Within the year, the first period is seen between 1 June- 1 July, the second period is seen between October 6 - November 7. There is an interruption arising from high temperatures between July 2 and October 5 in average.

Tab. 7. The sea surface temperature periods for sea bathing of selected holiday centers along Marmaris-Alanya coastal belt (SW of Turkey)

Holiday centers (Observing period)	Sea surface temperature (22–25°C). Starting and termination date	Number of days	Sea surface temperature (18–28°C). Starting and termination date	Number of days
Marmaris (1975-2006)	19 June-5 August 11 September-31 October	48 51	27 April-12 December	230
Fethiye (1975-2006)	16 May -15 June 5 October-4 November	31 31	2 April-25 July 29 August-16 December	115 110
Kaş (1995-2006)	7 June-4 July 11 October-10 November	28 30	23 April-8 August 2 September-29 December	108 119
Finike (1975-2006)	2 June-24 June 11 October-9 November	23 29	16 April-27 July 31 August-20 December	103 114
Antalya (1975-2006)	27 May-23 June 13 October-9 November	28 28	24 April-22 July 9 September-23 December	91 106
Alanya (1975-2006)	27 May-23 June 13 October-8 November	28 27	23 April-23 July 6 September-24 December	93 111
Mean	1 June-1 July 6 October-7 November	31 33	19 April-27 July 3 September-21 December	100 110

In case favourable sea surface temperatures are taken into consideration as 18°-28°C, favourable period with respect to sea bathing increases and varies from 197 days (Antalya) to 230 days (Marmaris). This period is in one period in Marmaris, in two periods in other centers (Tab. 7). Within the year, the first period is seen between July 19 - July 27, the second period is seen between September 3 - November 21 (Tab. 7). In the study area, there is an interruption arising from high temperatures between July 28 and September 4 in average.

Discussion

The most favourable periods in respect of the sea tourism in Marmaris-Alanya coastal belt have been determined according to the combined effects of the climatical elements evaluated with the above general conditions.

As it is obvious, Mediterranean climate is characterized by the mild and rainy winter, and hot and dry summers. The typical Mediterranean climatic conditions are seen in the study area.

In this area, favourable conditions for sunbathing are seen between the months April-November. But, there are quite favourable conditions between May 6 - October 23, because in this period temperature, wind and the precipitation conditions are also quite favourable. During May-October period, favourable sunshine durations are more than 7 hours. In this period atmospheric activity is reduced so much in order not to give way to cloudness and rainfalls.

It has been acted according to the conditions put forward by Ülker (1988) and Koçman (1993) and those stated to be more suitable for the areas covering also Turkey in determining the durations in respect of being in a comfortable environment by climatical conditions for those who attend the tourism actions. The results obtained have been mentioned below.

When the period, favourable temperature values are 18°-32°C, favourable relative humidity values are 30-70% and wind speed is below 6 m/sec. are evaluated all together; most ideal period in the study area with respect to human health and sea tourism varies between 126 days (Dalaman) and 193 days (Kaş), average period is 171 days. Furthermore, when looked in general, the time slice is seen to be a period between May 6 - October 23 (Tab. 8). This period starts on April 28 (Kaş and Alanya) the earliest, on June 1 (Finike) the latest, the period ends on October 3 (Dalaman) the earliest, on November 6 (Kaş) the latest.

When the period, favourable temperature values are 17.0°-24,9°C, favourable relative humidity values are 30-70% and wind speed is below 6 m/sec. are evaluated all together; most ideal period in the study area with respect to human health and sea tourism varies between 19 (Dalaman) and 112 days (Kaş), average period is 70 days. Another remarkable point concerning temperature periods is that there are two different periods within a year for study area (Tab. 8). The first period within the year on Marmaris-Alanya coastal belt covering important tourism centers is experienced between May 8–June 11 in average. The second period on the study area is seen between September 13 – October 17 in average.

Tab. 8. Favourable periods for human health of selected holiday centers along Marmaris-Alanya coastal belt (SW of Turkey)

Holiday centers (Observing period)	Favourable period Temperature (18,0°C-32°C)+relative humidity 30%-70%)+wind speed (below 6 m/sec) Starting and termination date	Number of days	Favourable period Temperature (17,0°C-24,9°C)+relative humidity 30%-70%)+wind speed (below 6 m/sec) Starting and termination date			
			I. Period	Number of days	II. Period	Number of days
Marmaris (1975-2006)	29 April- 26 October	181	25 April- 9 June	46	12 September-20 October	39
Köyceğiz (1975-2006)	29 April- 24 October	179	25 April- 9 June	46	12 September-26 October	45
Dalaman (1975-2006)	31 May- 3 October	126	31 May-12 June	13	7 September-12 September	6
Fethiye (1975-2006)	3 May- 24 October	175	26 April-12 June	48	7 September-27 October	51
Kaş (1975-2006)	28 April- 6 November	193	11 April-12 June	55	23 September-18 November	57
Kale-Demre (1981-2006)	29 April- 23 September	148	26 April-13 June	49	8 September-23 September	16
Finike (1975-2006)	1 June - 28 October	150	1 June-10 June	10	9 September-1 October	23
Antalya (1975-2006)	29 April- 26 October	181	12 May-10 June	30	9 September-29 October	51
Manavgat (1975-2006)	29 April- 1 November	187	26 April-11 June	47	17 September-6 November	51
Alanya (1975-2006)	28 April- 5 November	192	3 June-11 June	9	23 September-7 November	46
Mean	6 May- 23 October	171	8 May-11 June	35	13 September-17 October	35

Tab. 9. The most favourable and favourable periods for sea bathing of selected holiday centers along Marmaris-Alanya coastal belt (SW of Turkey)

Holiday centers (Observing period)	The most favourable period Starting and termination date	Number of days	Favourable periods Starting and termination date	Number of days
Marmaris (1975-2006)	19 June–5 July	17	15 May–17 October	156
Fethiye (1975-2006)	13 June–15 June	3	15 May–25 July 29 August–14 October	72 47
Kaş (1975-2006)	13 June–4 July	22	5 May–8 August 2 September–26 October	96 55
Finike (1975-2006)	11 June–24 June	14	12 May–27 July 31 August–17 October	77 48
Antalya (1975-2006)	11 June–23 June	13	15 May–22 July 9 September–15 October	69 37
Alanya (1975-2006)	12 June–23 June	12	12 May–23 July 6 September–25 October	73 50
Mean	13 June–25 June	13	12 May–25 July 3 September–19 October	75 47

When the most favourable temperature for sea bathing is taken as 25...28°C and the most favourable sea surface temperature as 22...25°C, the most favourable sea bathing season in the study area is seen to be corresponding to a period between June 13– June 25 (13 days) in average (Table 8). This period starting on June 11 (Finike, Anatlya) the earliest, on June 19 (Marmaris) the latest, terminates on June 15 (Fethiye) the earliest, on July 5 (Kaş) the latest.

If favourable temperature for sea bathing is taken as 20-32°C and favourable sea surface temperature as 18-28°C, favourable sea bathing season in the study area is seen to be corresponding to a period between May 12– July 25 and September 3 – October 19 in average (Tab. 9). In this respect, there are two different periods within the year except Marmaris (Tab. 9). The first period within the year starts on May 5 (Kaş) the earliest, on May 15 (Alanya, Fethiye) the latest, it ends on July 22 (Antalya) the earliest, on August 8 (Kaş) the latest. The Second period within the year starts on August 29 (Fethiye) the earliest, on September 9 (Antalya) the latest, it ends on October 14 (Fethiye) the earliest, on October 26 (Kaş) the latest (Tab. 9).

Conclusions

Marmaris-Alanya coastal belt manifests very suitable climate conditions with respect to sea tourism. In the period when tourism activities become intense, relative humidity, wind, precipitation values are favourable for sea tourism activities. These climate properties contribute the benefiting activities from the sea and touristic tours.

Moving forward with the daily averages of the climatical elements in the examination field of this study the favourable season in respect of sea tourism has been tried to be determined. Apart from that determining the most favourable periods in the day can be also resorted by examining the conditions of making use of daily detailed sunbathing, thermal comfort and the sea of all the holiday centers in the study area.

Tourism activities can be spread over spring and autumn seasons chiefly with sea tourism. It is because summer season generally includes some problems with respect to climate. Besides benefiting from sea and sunshine, tourism can be varied through alternative tourism activities to realise said purpose. It would be appropriate to act according to these data in related planning.

Meteorological information signboards including information on meteorological indicators posing importance for health and benefiting from sea, in places

people can see easily in tourism centers. Particularly in periods and times that temperature and relative humidity values reach values to affect human comfort negatively, regional people and participants of tourism activities should be warned by means of mass communication. As a result, the climatic properties of the study area create almost favourable conditions for the touristic activities, and human healthiness and sea bathing. In fact, the sea and climatic conditions could be effective for the medical and sea tourism. For this reason on the Marmaris-Alanya coastal belt climatic rehabilitation stations can be founded as a social service.

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