Climate Tourism Assessment

Visitors Mangement in Protected Wetlands: Making Them the allies of conservation

Valsaín (Segovia, Spain), 24-28 July 2017

SUSTAINABLE TOURISM AND HERITAGE
Enhancing and Planning Tools
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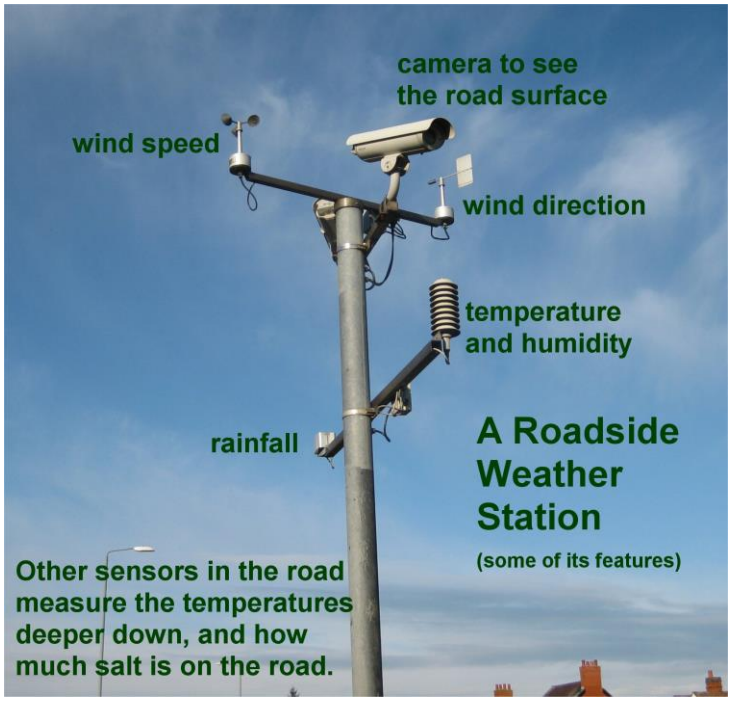
Definitions

Climate is one of the components with the greatest importance weight in the tourism assessment of a destination.

It creates the environmental conditions that allow, favour, hamper or prevent the practice of recreational activities, especially those carried out outdoors.

From the tourism perspective, climate evaluation is based on three criteria: safety (*vs*. climate risks), enjoyable weather conditions for tourists, and bioclimatic comfort.

3.2. Weather stations		
Station 1	Name: Geographical coordinates:	Years of recording: Height above sea level:
Station 2	Name: Geographical coordinates:	Years of recording: Height above sea level:
Station 3	Name: Geographical coordinates:	Years of recording: Height above sea level:
Location map of the study area, including meteorological stations		



4. ELEMENTS OF THE CLIMATE

4.1. Temperature (°C)

Average monthly Temperatures (T) and No. days with Temperatures between 20°C and 26°C													
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
T °C													–
No. days													

Comments (seasonality, extreme temperatures, inter-annual variability, etc.)

The average monthly temperatures are basic data to be able to evaluate seasonal differences, apparent temperature and enjoyable weather conditions for tourists.

The number of days with temperatures between 20°C and 26°C is useful to know the general bioclimatic comfort of the destination. This range was chosen because it is the one in which the human body feels in equilibrium with its internal temperature of 37°C.

4.2. Sunshine (hours)

Daily[1], monthly[2] and annual solar Insolation													
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Annual total
Hours per day													
Hours per month													

Comments (limiting factors such as the local effects of the reliefs, cloud frequency, etc.)

[1] Apply values from table CLI1 in the Introductory text.
[2] Multiply daily sunshine by the number of days per month.

Sunshine or solar Insolation is estimated in hours of daylight and is calculated for each month depending on the position of the Earth with respect to the Sun. Thus, taking into account the latitude of the analysed site is possible to determine the number of hours of light that are produced each month of the year.

It is also necessary to consider the limiting factors, such as the presence of areas of shade, reliefs, clouds, etc., and verify their existence.

4.3. Precipitation (mm)

Average of monthly Precipitation (P) and No. days of rain per month													
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
mm P													
No. days													

Comments (total annual P, seasonality, maximum 24-hour precipitation, precipitation forms -rain, hail, sleet, and snow-, variability, number of days without rainfall, etc.)

It is interesting to know the distribution of rainfall or precipitation throughout the year, as it is a limiting factor for the practice of outdoor activities.

Elements of the Climate

4.4. Relative humidity (%)

Average of monthly Relative Humidity and No. days with Relative Humidity between 20% and 60%													
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
%													-
No. days													

Comments (seasonality, number of days within humidity comfort ranges, etc.)

Relative humidity is an element that can limit the performance of outdoor activities if its values are above 60% or below 20% because it would affect human well-being and health.
Moreover, it also increases the effects of temperature on the human body, as will be seen below.

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4.5. Wind													
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
Days with wind ≤ Force 3 (Beaufort scale)[3]													
No. days													
Days with wind Force 3-4 (Beaufort scale)[4]													
No. days													
Days with wind ≥ Force 5 (Beaufort scale)[5]													
No. days													
Days with wind ≥ Force 6 (Beaufort scale)[6]													
No. days													
Days with wind > Force 7-12 (Beaufort scale)[7]													
No. days													

Comments (main wind circulation patterns, wind direction, seasonality, etc.)	

[3] Beaufort 1-3: 12-19 km/h, gentle breeze.
[4] Beaufort 3-4: 20-29 km/h, moderate breeze.
[5] Beaufort 5: 30-39 km/h, fresh breeze.
[6] Beaufort 6: 40-50 km/h, strong breeze.
[7] Beaufort 7-12: > 50 km/ h, strong winds, gales.

Wind can be an important limiting factor if it is strong and also modifies the effect of temperature on the human body.

4.6. Apparent temperature[1]													
Estimated Apparent Temperatures[2] (Heat Index) and No. days with Apparent Temperatures between 20°C and 26°C													
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
T °C / % Humidity													–
Evaluation[10]													
No. days													
Estimated Apparent Temperatures[2] (Windchill Index) and No. days with Apparent Temperatures between 20°C and 26°C													
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
T °C / Winds													–
Evaluation[11]													
No. days													

Comments	

[1] The Apparent temperature is the temperature equivalent perceived by humans, caused by the combined effects of air temperature, relative humidity and wind speed.
[2] Apply values from the data in table CLI2 'Apparent Temperature due to heat (Heat Index)' and table CLI3 'Apparent Temperature due to cold (Windchill Index)' in the Introductory text.
[10] **Evaluation of the Apparent Temperature due to heat (heat strokes/heat exhaustion): 1** - Extreme danger (> 54°C); **2** - Danger (41°C – 53°C); **3** - Extreme caution (33°C – 40°C); **4** - Caution (27°C – 32°C); **5** - Seemingly without risk
[11] **Evaluation of the Apparent temperature due to wind (hypothermia/frostbite): 1** - Very high risk (< -55°C); **2** - High risk (-40°C– -54°C); **3** - Moderate risk (-28°C– -39°C); **4** - Low risk (-10°C– -27°C); **5** - Seemingly without risk

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The apparent temperature is the temperature perceived by a person due to a combination of air temperature, relative humidity and wind speed.

This perception is based on the relationship that exists between the heat produced by the internal metabolism of the body (37°C) and that which the body gives off into the atmosphere as a result of activity.

This concept has to do with human health and comfort, and it is essential to consider it in proposals for outdoor tourism activities.

RELATIVE HUMIDITY (%)	AIR TEMPERATURE (°C)																	
	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
45	27	28	29	30	32	33	35	37	39	41	43	46	49	51	54	57	61	64
50	27	28	30	31	33	34	36	38	41	43	46	49	52	55	58	62		
55	28	29	30	32	34	36	38	40	43	46	48	52	55	59	62			
60	28	29	31	33	35	37	40	42	45	48	51	55	59	63				
65	28	30	32	34	36	39	41	44	48	51	55	59	63					
70	29	31	33	35	38	40	43	47	50	54	58	63						
75	29	31	34	36	39	42	46	49	53	58	62							
80	30	32	35	38	41	44	48	52	57	61								
85	30	33	36	39	43	47	51	55	60	65								
90	31	34	37	41	45	49	54	58	64									
95	31	35	38	42	47	51	57	62										
100	32	36	40	44	49	54	60											

Caution	27 a 32	Possible fatigue for long exposure or physical activity.
Extreme caution	33 a 40	Sunstroke, heat stroke, cramps. Possible for long exposure or physical activity.
Danger	41 a 53	Sunstroke, heat stroke, cramps. Highly possible for long exposure or physical activity.
Extremely danger	54 or more	Imminent heat stroke, sunstroke.

The combination of high temperatures with high percentages of relative humidity causes the apparent temperature to be higher than the real temperature of the drier air, and can lead to an increase in the internal body heat. With high temperatures and low relative humidity, the apparent temperature is lower than the temperature of the air due to a greater cooling of the skin because of a greater evaporation of sweat.

This phenomenon can be evaluated with the Heat Index table.

Elements of the Climate

WIND AT 10m (km/h)	AIR TEMPERATURE (°C) 0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
5	-2	-7	-13	-19	-24	-30	-36	-41	-47	-53	-58
10	-3	-9	-15	-21	-27	-33	-39	-45	-51	-57	-63
15	-4	-11	-17	-23	-29	-35	-41	-47	-54	-60	-66
20	-5	-11	-18	-24	-30	-37	-43	-49	-56	-62	-68
25	-6	-12	-19	-25	-32	-38	-44	-51	-57	-64	-70
30	-6	-13	-19	-26	-32	-39	-46	-52	-59	-65	-72
35	-7	-13	-20	-27	-33	-40	-47	-53	-60	-66	-73
40	-7	-14	-21	-27	-34	-41	-47	-54	-61	-67	-74
45	-8	-14	-21	-28	-35	-41	-48	-55	-62	-68	-75
50	-8	-15	-22	-29	-35	-42	-49	-56	-63	-69	-76
55	-8	-15	-22	-29	-36	-43	-50	-56	-63	-70	-77
60	-9	-16	-23	-29	-36	-43	-50	-57	-64	-71	-78
65	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79
70	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79
75	-9	-17	-24	-31	-38	-45	-52	-59	-66	-73	-80
80	-10	-17	-24	-31	-38	-45	-52	-59	-67	-74	-81

Approximate thresholds:

Low risk:	-10 a -27	Risk of hypothermia if long time is spent outdoor
Moderate risk:	-28 a -39	Risk of freezing for prolonged exposure
High risk:	-40 a -54	Risk of freezing in 10 min long exposure
Extremely high risk:	55 or less	Risk of freezing in less than 2 min long exposure

With the skin exposed to the air outdoors, being initially warm, if the skin is initially cold, the thresholds are shorter.

In the case of low temperatures, the main factor that conditions how they are perceived is wind.

Thus, strong winds produce an apparent temperature that is colder than the temperature of the surrounding atmosphere. This is because when the air around us is at a temperature that is lower than that of our body metabolic heat is lost by convection.

This phenomenon is evaluated by means of the Windchill Index.

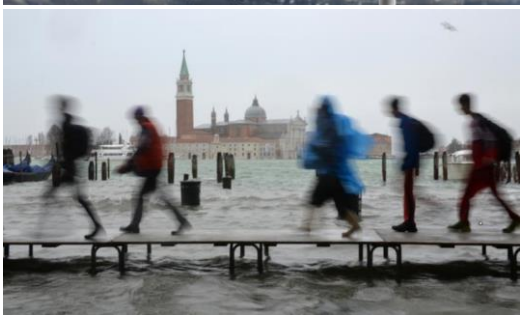
Climate Risks

5. CLIMATE RISKS		
Climate risks		**a** - Torrential rainstorm events; **b** - Thunderstorms; **c** - Heat waves; **d** - Cold waves; **e** - Hailstones; **f** - Droughts; **g** - Hurricanes; **h** - Snowstorms; **i** - Sandstorms; **j** - Tornadoes; **k** - Avalanches; **l** - Waterspouts; **m** - Others (specify in comments field)
Comments (frequency or recurrence interval of the climate risk, degree of intensity, area usually affected and damage caused, time of year in which they arise, duration of the event, etc.)		

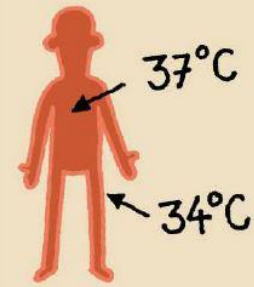
Assessing Climate for Tourism

6. ASSESSING CLIMATE FOR TOURISM		
Establish a rating of the climate based on its tourism potential according to the following criteria by using a rising scale from 1 to 5 in each section:		
Climate risks		These will be evaluated according to the frequency or recurrence interval, the degree of intensity and the area usually affected. **Range of risk: 1** - Very high climatic risk (> 3 months); **2** - High climatic risk (3 months); **3** - Moderate climate risk (2 months); **4** - Low climatic risk (1 month); **5** - No apparent risks
Good weather conditions		They are defined as the pleasant and enjoyable weather conditions that are essential to practise outdoor activities. **Ranges of Sunshine (hours of sun/year): 1** - ≤ 1,000; **2** - 1,000-1,500; **3** - 1,500-2,000; **4** - 2,000-2,500; **5** - ≥ 2,500
		Ranges of Precipitation (average number of days of rain/year): 1 - ≥ 150; **2** - 150-120; **3** - 120-80; **4** - 80-50; **5** - ≤ 50
Bioclimatic comfort		This refers to an ideal state of well-being, health and physical and mental comfort in a person due to favourable environmental conditions in which the organism finds itself in harmony with the surrounding atmosphere. It is established on the basis of apparent temperature (Heat Index and Windchill Index). **Ranges of General Bioclimatic Comfort: 1** - < 60 days; **2** - 60-150 days; **3** - 150-240 days; **4** - 240-300 days; **5** - > 300 days
Comments		

Bad weather conditions

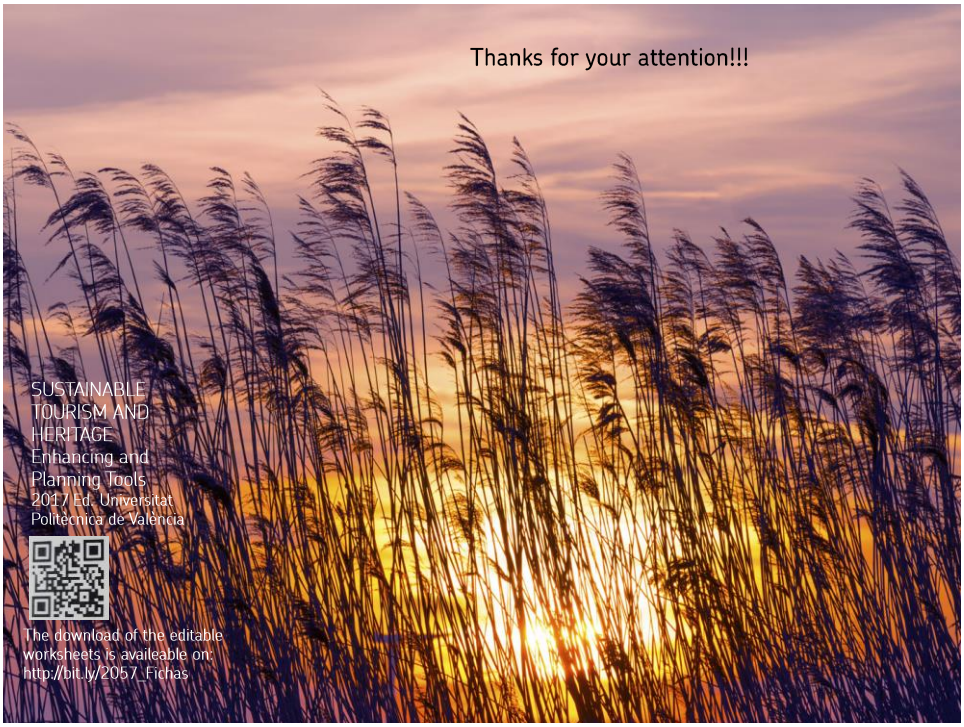


Our internal core and organs must be maintained at 37°C on average, while our skin needs to be slightly cooler, at 34°C. Thanks to internal and skin sensors, we're able to detect and react to the temperature both inside and outside our body.



Assessing Seasonal and Monthly Climate for Tourism

7. ASSESSING SEASONAL AND MONTHLY CLIMATE FOR TOURISM	
Specify the monthly conditions in which the climate can be enjoyable and comfortable taking into account jointly the Temperatures, Relative Humidity, Precipitations and Winds, as well as the existence of any climate risk. Identify measures to alleviate situations of discomfort.	
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	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