URBAN TOURISM IN SOUTHERN EUROPE
Assessing present and future climate conditions

Raquel Machete
António Lopes
Hélder Fraga

raquelmachete@campus.ul.pt
If rigour and uniformity are ascribed to the mechanisms that study atmospheric circulation, the same can not be said about the research of ideal weather types, subject to the component of perception (Brum Ferreira et al, 1983). Hence, the study of the present or future climate potential of any given region should include the tourist point of view, e.g. subjective nuances (Gómez-Martín, 2006)

1. CLIMATIC PREFERENCES RESEARCH APPROACHES

1.1. Expert based studies of tourism climate preferences
1.2. Revealed tourism climate preferences
1.3. Stated tourism climate preferences

(Scott et al, 2008)
Figures for 2012 show that the number of tourist arrivals in Europe was over half of the world total (534 million). Within Europe, the southern subregion leaded the way, with almost 40% of that share.

In the same year, a declaration was proposed, afterwards known as “Istanbul Declaration on City Tourism” and signed by 21 cities, three of which figure in the current analysis: Athens, Barcelona and Lisbon.
1.1. EXPERT BASED STUDIES OF TOURISM CLIMATE PREFERENCES

Bioclimatological methods that evaluate the climatic potential of different regions for tourism (metrics/indexes that aim to evaluate climate holistically, instead of focusing on one parameter)

a) Weather typing – establishing thresholds for outdoor recreation
   1978 Yapp and McDonald
   1978 Besancenot et al

b) Integrative indexes – rating of the effect of combined climate conditions
   (Mieczkowski, 1985; Morgan et al, 2000; de Freitas et al, 2008)

LIMITATIONS:

- Ratings and weightings of each variable were typically based on the opinion of the author
- Insufficient temporal and spatial scale
1.2. REVEALED TOURISM CLIMATE PREFERENCES

Determine statistical relationships between measures of tourism demand (number of tourist arrivals/departures...) and climate to deduce climate preferences of tourists. They provide an objective marker (tourist behaviour).

LIMITATIONS

- Low spatial and temporal resolution of data (quarterly or monthly data)
- Innacuracy of the representation of the destination climate (using the climate of the capital city as representative of the country; using a single variable – often temperature)
1.3. STATED TOURISM CLIMATE PREFERENCES

Methods that directly measure the climatic preferences of tourists – surveys

LIMITATIONS

*In situ* surveys
- Limited range of weather conditions that can be examined without significant personnel cost
- Response bias

*Ex situ* surveys
- Heterogeneity of geographical and cultural backgrounds or homogeneity of demographic characteristics (conclusions can not be generalized)

Statement ≠ Behaviour
2. METHODS AND DATA

METHOD
Weather types (Besancenot et al, 1978; Gómez-Martín, 2006)

DATA
Observation data: Meteorological observatories

Projections: Model (RCM) SMHI-RCA4 (Swedish Meteorological Institute), forced by the model (GCM) EC-EARTH (Royal Netherlands Meteorological Institute)
RCP 4.5
RCP8.5

The climate change signal – difference pattern between the rcp 4.5 and the rcp 8.5 for 2041-2060 and 1981-2000 was interpolated, and afterwards it was added to the baseline period (observation data).
WEATHER TYPES (1978)

J P Besancenot, J Mounier and F Lavenne

Tipology of daily frequent combinations of the main climatic elements

The weather preferences of the “average” tourist were used to establish nine types of weather, during the summer, for the temperate latitudes.
ADVANTAGES OF THIS METHOD

a) Describes real weather conditions, such as experienced by the tourist
b) Allows for the inclusion of risk factors (strong winds, heat stress...)
c) Can be adjusted to different tourism activities /types of destination

APPLICATION TO CATALONIA (Gómez-Martín, 2006)

<table>
<thead>
<tr>
<th>Type</th>
<th>Daily Sunshine (h)</th>
<th>Cloud Cover N_b (octas)</th>
<th>Daily precip. (h)</th>
<th>Max. daily temp. (°C)</th>
<th>Wind speed (m s⁻¹)</th>
<th>P (kcal m⁻² h⁻¹)</th>
<th>THI (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>≥11</td>
<td>≤2/8</td>
<td>0</td>
<td>22 to &lt;28</td>
<td>&lt;8</td>
<td>≥50</td>
<td>15 to &lt; 28.5</td>
</tr>
<tr>
<td>Type 2</td>
<td>5 to &lt;11</td>
<td>5/8 &gt; N_b, ≥2/8</td>
<td>0</td>
<td>22 to &lt;28</td>
<td>&lt;8</td>
<td>≥50</td>
<td>15 to &lt; 28.5</td>
</tr>
<tr>
<td>Type 3</td>
<td>&gt; 5</td>
<td>&lt;5/8</td>
<td>0</td>
<td>28 to &lt;33</td>
<td>&lt;8</td>
<td>≥50</td>
<td>20 to &lt; 28.5</td>
</tr>
<tr>
<td>Type 4</td>
<td>&gt; 5</td>
<td>&lt;5/8</td>
<td>0</td>
<td>16 to &lt;22</td>
<td>&lt;8</td>
<td>≥50</td>
<td>15 to &lt; 26.5</td>
</tr>
<tr>
<td>Type 5</td>
<td>&gt; 5</td>
<td>&lt;5/8</td>
<td>0 to &lt;1</td>
<td>16 to &lt;33</td>
<td>&lt;8</td>
<td>≥50</td>
<td>15 to &lt; 28.5</td>
</tr>
<tr>
<td>Type 6</td>
<td>&gt; 5</td>
<td>&lt;5/8</td>
<td>0</td>
<td>22 to &lt;33</td>
<td>8 to &lt;12</td>
<td>≥50</td>
<td></td>
</tr>
<tr>
<td>Type 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 8</td>
<td>≤5</td>
<td>≥5/8</td>
<td>&gt;3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These parameters can adopt any value

Thresholds were validated by surveys
<table>
<thead>
<tr>
<th>WEATHER TYPE</th>
<th>SUNSHINE (H)</th>
<th>CLOUD COVER (OCTAS)</th>
<th>RAIN (MM)</th>
<th>MAXIMUM TEMPERATURE (°C)</th>
<th>WIND (M/S)</th>
<th>PET (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1. very good, sunny weather</td>
<td>≥ 11</td>
<td>≤ 2/8</td>
<td>0</td>
<td>22 a &lt; 28</td>
<td>&lt; 8</td>
<td>18 &lt; 35</td>
</tr>
<tr>
<td>Type 2. Fine weather w/ partial cloud cover</td>
<td>5 &lt; 11</td>
<td>5/8 ≥ 2/8</td>
<td>0</td>
<td>22 a &lt; 28</td>
<td>&lt; 8</td>
<td>18 &lt; 35</td>
</tr>
<tr>
<td>Type 3. Fine, hot, sultry weather</td>
<td>‟5</td>
<td>≤5/8</td>
<td>0</td>
<td>22 a &lt; 33</td>
<td>&lt; 8</td>
<td>23 &lt; 35</td>
</tr>
<tr>
<td>Type 4. Fine, cool weather</td>
<td>› 5</td>
<td>&lt; 5/8</td>
<td>0</td>
<td>16 a &lt; 22</td>
<td>&lt; 8</td>
<td>18 a &lt; 23</td>
</tr>
<tr>
<td>Type 5. Fine weather with short amount of rain</td>
<td>‟5</td>
<td>≤ 5/8</td>
<td>0,1 &lt; 1</td>
<td>16 a &lt; 33</td>
<td>&lt; 8</td>
<td>18 a &lt; 35</td>
</tr>
<tr>
<td>Type 6. Fine weather w/ strong winds</td>
<td>‟5</td>
<td>&lt; 5/8</td>
<td>0</td>
<td>22 a &lt; 33</td>
<td>8 &lt;12</td>
<td>18 a &lt; 35</td>
</tr>
<tr>
<td>Type 7. Extremely hot weather</td>
<td>‟5</td>
<td>&lt; 5/8</td>
<td>0</td>
<td>≥ 33</td>
<td>&lt; 8</td>
<td>≥ 35</td>
</tr>
<tr>
<td>Tipo 8. Unfavourable weather for tourism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CITIES IN THE ANALYSIS – Lisbon, Barcelona, Rome, Athens and Zagreb
3. RESULTS

LISBON (1981-2000)

Portela- Loures (38°46′54″N 09°06′51″E)

Slight decrease in the average number of favourable days (1-6) from 69% to 65% (rcp 4.5) and 66% (rcp 8.5)

Highest decrease: type 1

Highest increase: type 7
Barcelona – Airport (41°17′34N 2° 4′12E)

Variations in the average number of favourable days (1-6) from 65% to 68% (rcp 4.5) and 63% (rcp 8.5)
Highest decrease: type 8
Highest increase: type 7
Rome displays the most severe decrease of favourable days for tourism. The average number of favourable days (1-6) declines from 59% to 46% (rcp 4.5) and 47% (rcp 8.5)

Highest decrease: type 1 (followed by 2)

Highest increase: type 7
With a departing point of 57% of favourable days (1-6), in 2041-2050 this figure is projected to decline to 51% (rcp 4.5) and 49% (rcp 8.5)
Highest decrease: type 2
Highest increase: type 7
The percentage of favourable days in Zagreb has slight variations between the two periods. The average number of favourable days (1-6) varies from 44% to 46% (RCP 4.5) and 43% (RCP 8.5).

Highest decrease:
Highest increase: type 8 (followed by 4)
CONCLUSIONS

• The five selected south European cities display very different patterns of weather types, during the summer. Hence, predicting a decline of the regions’ attractiveness under climate change as a whole, is to overlook these nuances.

• At the exception of Zagreb, the share of days with favourable weather (types 1-6) always exceeds the days with unfavourable types (7 and 8) for the baseline period. Under future scenarios, Rome, Athens and Zagreb present almost the same share of favourable and unfavourable days. For Rome and Athens, it is the increase in maximum air temperatures that explains such a decline – the final decade of July and all August are predominantly unfavourable.

• Although we assume type 7 (extremely hot weather) as unfavourable, recent surveys to tourists leads us to question established ideal temperature thresholds (Martínez-Ibarra and Gómez-Martín, 2012; Rutty & Scott, 2014)
Thank you for your attention!

Let’s meet in Lisbon, now that you’ve seen the share of favourable weather conditions.
BIBLIOGRAPHY


