Methodologies to assess the effects of climate in Tourism: Weather types and individual perception

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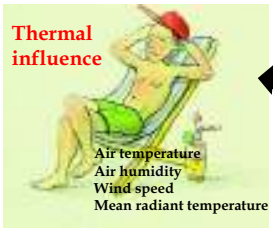
3rd INTERNATIONAL WORKSHOP ON CLIMATE, TOURISM AND RECREATION
Alexandroupolis/Greece
19th to 22nd September 2007,

1

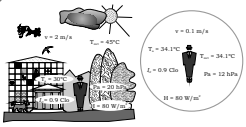
The climate is an important part of how the image of a tourism destination is formed

De Freitas (2003)
Matzarakis (2006)



Physiological Equivalent Temperature

A way to evaluate the thermal influence in the human body



a. Actual environment b. Standard environment
Actual environment with PET = 34.1ºC and equivalent standard environment (Andrade, 2003)

And risk factors:
- Extreme events
- UV radiation
- Health

2

Weather type methodology (based on daily data)

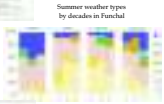
People are sensitive to particular combinations of meteorological parameters, rather than to individual ones

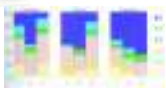
2a Examples of former studies

First classifications of weather types for tourism purposes (Besancenot, 1989)

Frequency of weather types in two mediterranean locations

An application to Funchal (Madeira islands) (Alcoforado *et al.*, 1999)





2b

Weather types can integrate thermophysiological indices

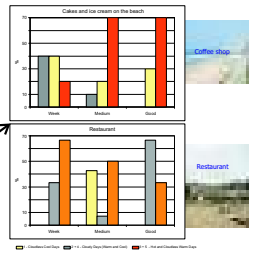
A recent example

Weather types (WT) for recreation at sea side

Location: Praia Grande/Portugal (Alcoforado *et al.* 2004)

Cloudiness (octas)	PET (ºC) ≤ 30	30 to 40	≥ 40
< 4	1 (23)	3 (30)	5 (15)
4 to 6	2 (21)	4 (11)	
> 6			

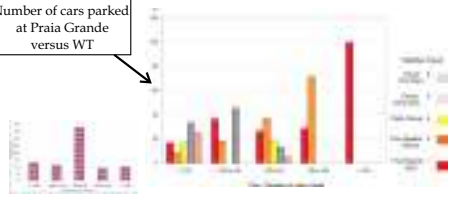
Class identification ← 1 (23) → Frequency (%)



Weather types classification was validated by behaviour observation

Consumption behaviour versus WT

Number of cars parked at Praia Grande versus WT



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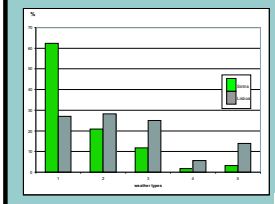
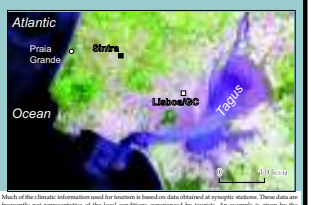
The importance of using local meteorological data



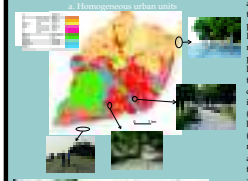


Much of the climatic information used for tourism is based on data obtained at synoptic stations. These data are frequently not representative of the local conditions experienced by tourists. An example is given by the comparison of the frequency of weather types at Sintra/Granja (near Praia Grande) and Lisbon (Lisboa/Gago Coutinho), 20 km apart. As it can be seen, the coolest weather type (type 1- legend in 2b) is much more common in Sintra than in Lisbon. The use of data from Lisboa/Gago Coutinho as climatic information of the western seashore can easily be deceiver to tourists.

4

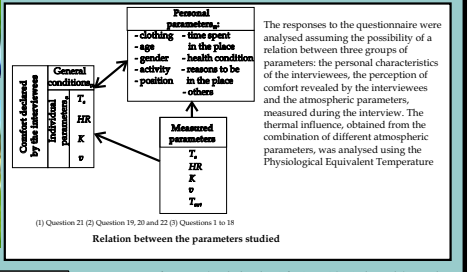
Perception of weather conditions

Oliveira and Andrade (2007)



Another important question about the assessment of the relations between climate and tourism is the knowledge of how tourists perceive the atmospheric conditions. Independently of the adequacy of the meteorological measurements to tourism purposes, it is the perception of the tourists that leads to the construction of the climatic image of the destination. The perception of atmospheric conditions is a very complex question, that involve not only thermophysiological factors (that can be objectively assessed, through the bioclimatic indices), but also psychological (subjective) factors. The subjective factors, such as motivation, individual preferences and cultural aspects, also influence the way by which the tourists perceive the weather at the destination and sense it as more or less comfortable. All these aspects are very difficult to assess (Oliveira and Andrade, 2007; Höppe, 2002), but the perception of the climatic variables can be assessed through interviews or behaviour observation (de Freitas, 2003).

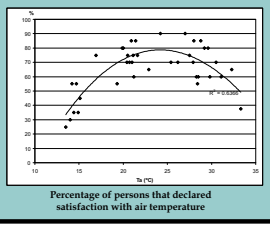
Types of clothing ensembles



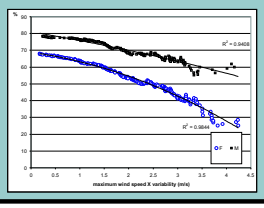
The responses to the questionnaire were analysed assuming the possibility of a relation between three groups of parameters: the personal characteristics of the interviewees, the perception of comfort revealed by the interviewees and the atmospheric parameters, measured during the interview. The thermal influence, obtained from the combination of different atmospheric parameters, was analysed using the Physiological Equivalent Temperature

(1) Question 21 (2) Question 19, 20 and 22 (3) Questions 1 to 18

Relation between the parameters studied



Percentage of persons that declared satisfaction with air temperature



Percentage of persons that declared satisfaction with wind speed, by gender

Conclusions

- Weather types (WT) express global atmospheric conditions perceived by tourists
- WT are a way to integrate thermal, physical and aesthetical components
- WT have been validated by behaviour or consumption data
- WT can integrate risk factors
- WT must be adapted to specific purposes and to local conditions
- Impacts of climate change in tourism will depend on the change in the frequency of WT
- Based on climate scenarios it is possible to project future WT
- Personal factors (including psychological features) must be considered when assessing how people perceive the atmospheric conditions
- Individuals in outdoor conditions may feel confortable with temperatures much higher than the values accepted by the traditional models of thermal comfort, designed for indoors

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The research group in local and urban climatology of the Geo-ecology area of the Centro de Estudos Geográficos (Centre of Geographical Studies) is constituted by Maria João Alcoforado, António Lopes, Henrique Andrade, Carla Mora and Sandra Oliveira. The group develops studies in climatology, in both theoretical and applied perspectives, mostly in urban areas, but also in tourism climatology, climate change in historical period and local climates in mountain areas.

Some publications from the members of the group:

Alcoforado, M.J.; Andrade, H. (2006), Nocturnal urban heat island in Lisbon (Portugal): main features and modelling attempts. Theoretical and Applied Climatology, 84, 1-3, p.151 159.

Alcoforado, M. J.; Nunes, M. F.; Garcia, J. C.; Taborda, J. P. (2000) Temperature and Precipitation Reconstruction in southern Portugal during the Late Maunder Minimum (1675-1715). The Holocene, 10 (3): 333-340.

Alcoforado, M. J.; Andrade, H.; Paulo, M. J. (2004) Weather and recreation at the Atlantic shore near Lisbon, Portugal. A study on applied climatology. In A. Matzarakis, DeFreitas, C.R. e Scott, D. (ed), Advances in Tourism Climatology, Berichte des Meteorologishen Institutes der Universitaet Freiburg, 12: 38-48.

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Lopes, A. 2003: Changes in Lisbon's urban climate as a consequence of urban growth. Wind, surface, UHI and energy budget. PhD Thesis, University of Lisbon (in Portuguese with abstract in English).

Mora, C. (2006) Regional and local climates in Serra da Estrela (Portugal). PhD thesis, University of Lisbon

The group is currently involved in the URBKLIM project (POCI/GEO/61148/2004) with the participation of several entities besides the Centre of Geographical Studies, namely the National Engineering Laboratory (LNEC) and the Faculty of Architecture of the Technical University of Lisbon. The main aim of this project is to contribute to the improvement of the urban climate and the sustainability of the city of Lisbon, by developing research about the perception of the bioclimatic comfort and the climatic risks in the urban environment.