



## Projections of climate potential for a touristic resort in Mallorca

Arnau Amengual Pou, Victor Homar Santaner, Romualdo Romero March, Sergio Alonso Oroza, and Climent Ramis Noguera

Universitat de les Illes Balears, Departament de Física, Palma de Mallorca, Spain (victor.homar@uib.es)

Platja de Palma, in the Island of Mallorca, is one of the most popular touristic areas in the Mediterranean with more than 8 million tourist-nights spent per year. Socioeconomic activities undertaken in Platja de Palma are very closely linked with its climate. Therefore, optimization of residential and tourism opportunities in the medium term should necessarily take into account the close interdependence between the evolution of the main atmospheric parameters and the sea, sun and sand tourism (S3), the main tourist model exploited in the area and heavily dependent on the climate.

We used the Climate Index for Tourism (CIT, Freitas et al. 2008) to estimate the satisfaction of the S3 tourist in terms of the environmental conditions of the day. The CIT integrates thermal aspects, aesthetic and physical parameters, and derive a measure of perceived satisfaction for the average tourists in terms of three thresholds: unacceptable conditions, acceptable, and ideal. In the first place, we analyzed the evolution of the CIT using data from the proximity weather station in Palma airport for the period 1973-2008. Then, the impact of climate change on the tourism potential of the resort was assessed by calculating the CIT for future climate scenarios. We used regional climate simulation results from the European project ENSEMBLES and for the period 2001-2050. In order to compute the CIT index, daily series of temperature, precipitation, relative humidity, cloudiness and wind near surface are necessary. Model output series are calibrated using observations from Palma airport. In addition, future CIT series are also calibrated using values directly derived from observations.

The analysis of the observed period reveals an increase in the number of days per year of acceptable conditions for S3 tourism since 1973 but a decrease in the frequency of ideal conditions, mainly during summer and autumn. Also, ideal conditions in Platja de Palma have increased in frequency during spring for the last 35 years. The changes projected by the regional climate models for the period 2021-2050 indicate an even more drastic decrease in the average annual days with ideal conditions -likely due to a significant shift towards an uncomfortable range of air temperatures- and a considerable increase in terms of acceptable and unacceptable S3 days. The results confirm the need to elaborate and implement strategic plans to adapt and mitigate the impacts of the projected changes in the S3 touristic potential of this popular resort.