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**"More Heat and Drought -
Can Mediterranean Tourism Survive and Prosper?"**

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MORE HEAT AND DROUGHT __CAN MEDITERRANEAN TOURISM SURVIVE AND PROSPER?

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Introduction

The climate of the Mediterranean is perceived, quite erroneously, by many tourists as idyllic, benign and delightful .It is the renowned radiance and clarity of light ,rather than the heat-waves, droughts, storms and floods that can plague the region at times, that have made the area seductive to north Europeans for many centuries. The Mediterranean is currently the world's most popular and successful tourist destination with over 120 million visitors every year. Climate constitutes an important part of the environmental context in which recreation and tourism take place and because tourism is a voluntary and discretionary activity, participation will depend on perceived favourable conditions. For many activities there are critical threshold levels beyond which participation and enjoyment levels fall and safety or health may be endangered.

Whilst in the eighteenth and nineteenth centuries it was the winter that was “the season” with the aristocracy of northern Europe fleeing the cold and dark winters, today it is mass “sun-lust” package tourism that leads to a seasonal peak in high summer A UK survey suggested that for over 80% of overseas holiday-makers better weather than can normally be found in the UK in summer was the primary reason for choosing an overseas holiday. Concern about skin cancer and worries about UV-B radiation has so far tended merely to modify behaviour (e.g. the use of more effective sunscreen treatments), rather than cause a change in destination preference. It is still the case that for many the acquisition of a sun tan and the purchase of a holiday is as important as buying consumer durables for the home. The beach has become a fun place of ease, entertainment and relaxation.

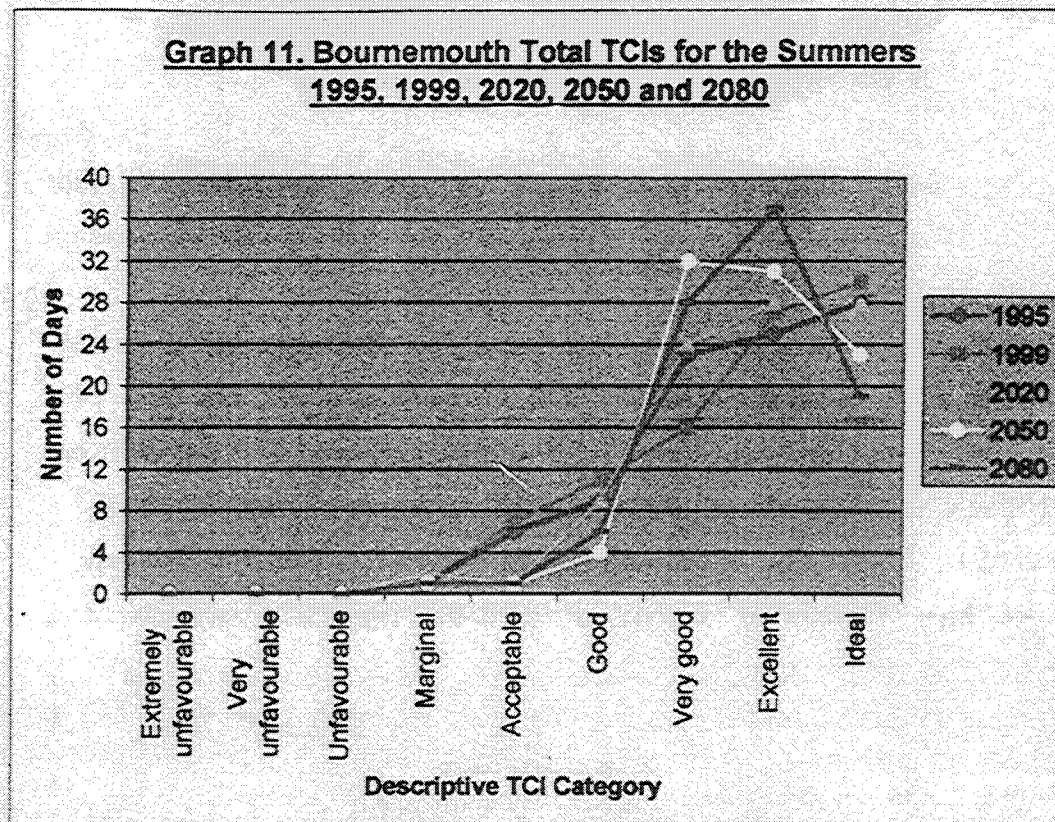
KEY SENSITIVITIES TO WEATHER AND CLIMATE

Major holiday decisions within many of the “tourist exporting” countries of Northern Europe are subject to a push and pull effect. The higher temperatures and settled weather of the Mediterranean summer exerts a big attraction, but better summers at home will reduce overseas holiday bookings. Giles and Perry (1998) have shown that the exceptional summer of 1995 in the UK led to a drop in outbound tourism and a big reduction in demand in the peak summer season for Mediterranean package holidays. In hot years there is a suggestion that Dutch tourists too prefer domestic to foreign beach holidays (WISE 1999). Large numbers of people indulge in short-term opportunistic decision-making and switch their normal holiday preferences to take account of the unusually favourable conditions at home. Such limited evidence does suggest that climate warming might alter the competitive balance of holiday destinations with adverse effects on high season tourism in the Mediterranean. A limited survey of UK travel agents revealed that their customers most of all wanted guaranteed fine warm weather. Press reports about adverse health conditions, terrorism threats and devastating forest fires were more likely to concern customers than reports of very high temperatures.

THE FUTURE CLIMATE

IPCC3 (2001) has shown that higher maximum temperatures and more hot days are very likely to increase in frequency during the 21st century. The Mediterranean is likely to become less attractive for health reasons in the summer. Apart from the dangers increasingly associated with skin cancer, many Mediterranean beach resorts may simply be too hot for comfort in the peak season, with a much higher frequency of severe heat waves (Perry, 1987). Carter (1991) has used an approximate index of climatic favourability to investigate changes of seasonal climate in Europe under possible future climate change. Results suggested that a climate warming of 4 degrees C would lead to a shift in the optimum summertime climate from the traditional southern coastal resorts northwards to currently less fashionable regions. This result holds true regardless of whether the warming is associated with moderate decreases or increases of precipitation. Mieczkowski (1985) proposed a tourism climate index (TCI) as a means of evaluating world climates for tourism. Whilst he used 5 climate variables in the TCI formulae thermal comfort was considered the most important and given a 50% weighting in the formulae. Using the ACACIA A2 High scenarios (2000) the index was calculated for the recent good summer of 1995 and an average summer 1999, together with the expected index value in 2020, 2050 and 2080 for the UK resort of Bournemouth. From Fig 1 it can be clearly seen that in the 21st century most summers are likely to have a preponderance of very good, excellent or ideal days for the holiday-maker in the UK. However the attractiveness of the Mediterranean coastal zone in spring and autumn would be enhanced relative to the present. It is in the months of October-November that the lingering warmth and sunshine of the Mediterranean provides the biggest contrast with the weather in northern Europe. At this season maximum temperatures at present are 8-10°C higher than in London whilst in April this difference is only 5-7°C. Rotmans, Hulme and Downing (1994) suggest that the area suitable for sun-related tourism will decline in much of Italy and Greece as summer temperatures make beach tourism too uncomfortable. It is single-product destinations that are most vulnerable. A few destinations (e.g. Cyprus and

Fig 1 Total Thermal Comfort Indices at Bournemouth UK in recent summers and in 2020, 2050 and 2080



Corsica) offer the potential to commute from hot beaches to cooler mountains but the Mediterranean area is likely to face other climate-related problems, such as marine water pollution and the scarcity of fresh water supplies. The availability of water supply could become a major constraint and the quantity and quality of water available may not be sufficient to satisfy future tourist demands. Large scale expenditure on desalinization plants will be needed, especially in some island resorts if water supplies are to be guaranteed

DROUGHT

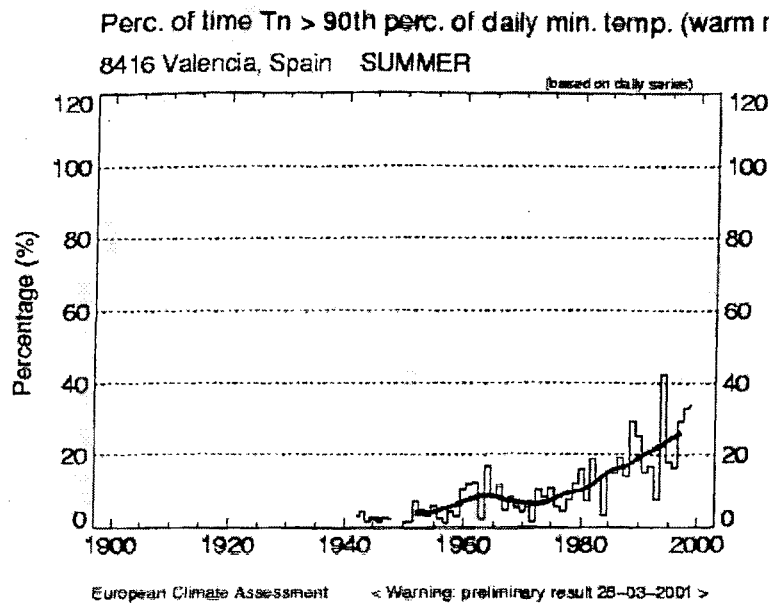
The Spanish drought of the early 1990's showed how island resorts like Majorca could become dependent on water being transported from the mainland with attendant political tensions (Wheeler 1995). In the last three decades there has been a decrease in spring rainfall in southern Spain and Portugal with the rainy season ending earlier and the dry season onset also occurring earlier. Small islands, for example in the Aegean, could be particularly affected if tourism is allowed to continue to grow. Nicholls and Hoozemans

(1996) have shown that in the Mediterranean there are 162 islands exceeding 10 square km in size. Most have a low resource base but significant tourist development, Decline in rainfall and water supply availability, together with beach erosion could undermine their tourist industries and hence their local economies.. It has been suggested (Karas 1997) that Crete could experience serious water shortages in 5 years out of 6 by 2010. There is likely to be an increase in friction, with a conflict of interest between local people and tourist authorities on the use of scarce water. It has been calculated that a luxury hotel consumes around 600 litres of fresh water per guest per night Water-hungry land uses like golf courses and water parks will be seen as water-stealers by local people. Projected decreases in runoff will exacerbate the problem of salinisation of water resources. Increased degradation of the environment and spreading desertification is likely to make some areas less scenically attractive to tourists

HEATWAVES

Two major factors have interacted to impede the development of a definition of what a heatwave is, namely, the absence of a simple meteorological measure representing the complex interaction between the human body and the thermal environment, and the lack of suitable homogeneous time series of the meteorological variables likely to be involved Robinson (2001). Should we use exceedance of fixed absolute values, or deviation from the normal local climate as the basis for a definition? There are clearly several dimensions to very hot weather that need to be considered and examples of. three hot weather variables are shown in Fig2-5 These are taken from the European Climate assessment web-site. Extended heat waves, defined as 10 days or more, appear to be becoming more frequent in the Mediterranean. In the 15 years to 1994 Italy endured 8 such heatwaves. In addition short-duration heat waves of 3-5 days with temperatures 7 degrees C or more above normal have occurred on 33 occasions in the central Mediterranean between 1950-95. Individual heat wave days have increased from 52 days in the decade 1950-1959 to 230 in the decade 1980-1989. (Conte,Sorani and Piervitali 1999) Heat waves cause rises in the death rate, especially in urban areas, for example in one episode from 13 July –2nd August 1983 in Rome 450 deaths above the normal average occurred. In 1987 more than 1100 residents died in Greece between 20-31st July (Katsouyanni et al 1988) with a combination of temperatures above 40C and poor air quality In 1998 in Cyprus 45 deaths attributable to heat were noted when the maximum temperature exceeded 40C on 8 successive days. In Athens the National Weather Service of Greece forecasts heat wave emergencies and warnings are disseminated to the public. Extreme heatwaves and the deaths involved frequently get reported in the media of foreign countries and give a negative image to potential holiday-makers.Emotive phrases like “killer heatwave” have been used. Even reports by reputable organizations can use hyperbole to get their message across. The World Wild Fund For Nature reported that some tourist destinations could be turned into “holiday horror stories”.. It has to be remembered that holiday-makers from northern Europe will be unused to temperatures as high as 40C and may be more at risk than local people, who are used to long hot summers .Gawith,Downing and Karacotas (1999) have shown that at Thessaloniki in northern Greece the temperature-humidity index (THI) which assesses the impact of high temperatures and humidity will rise above a value of 84 (when nearly everyone feels

uncomfortable) for more than twice as long as at present by 2050. In addition there will be significant increases in the shoulder warm periods suggesting a lengthening of the summer season. Forest fires, such as were very widespread in August 1994 in Tuscany, Corsica, Sardinia and France can lead to evacuation from tourist facilities such as camp sites. Pinol, Terradas and Lloret (1998) found that in coastal eastern Spain there has been increased fire activity and the number of days of very high fire risk is likely to increase further since there is a correlation between summer heat and fire occurrence. In Italy a strong association has been found between the number of forest fires and both higher summer temperatures and lower summer precipitation. Measures such as the closure of



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Tn90 (194)

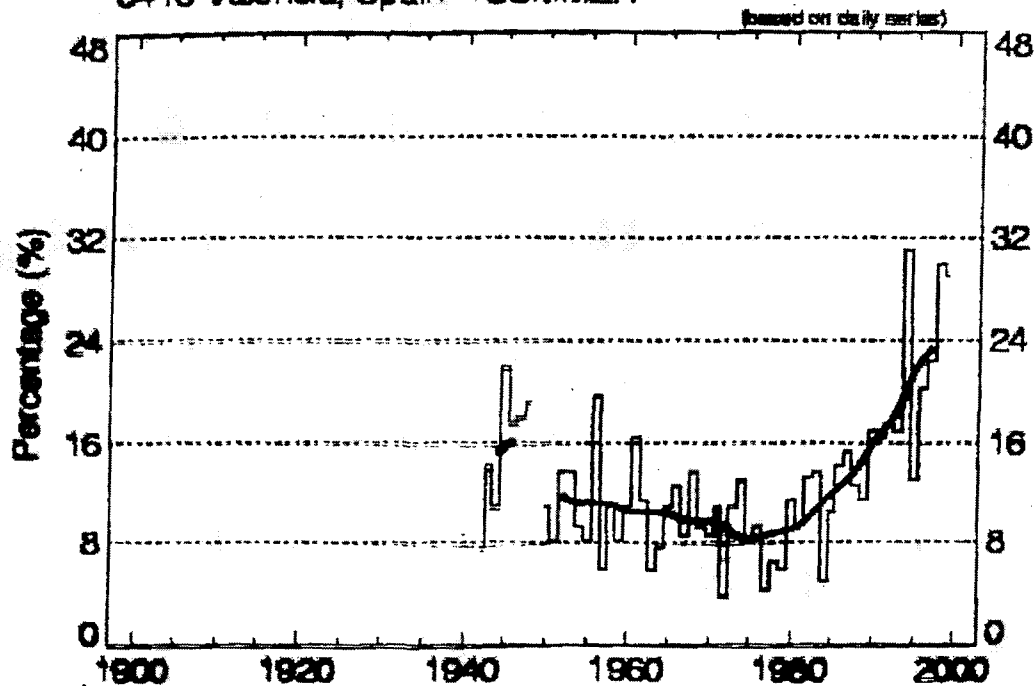
- Percent of time $T_n > 90\text{th percentile of daily minimum temperature (warm nights)}$

Let $T_{n,j}$ be the daily minimum temperature at day j of period j and let $T_{n,90}$ be the calendar day 90th percentile calculated for a 5 day window centred on each calendar day in the 1961-1990 period. Then the percentage of time is determined where:

$$T_{n,j} > T_{n,90}$$

Perc. of time Tx > 90th perc. of daily max. temp. (warm days)

8416 Valencia, Spain SUMMER



European Climate Assessment < Warning: preliminary result 28-03-2001 >

European Climate Assessment < Warning: preliminary result 28-03-2001 >

DISEASE

Higher temperatures could lead to some Mediterranean holiday areas becoming a suitable habitat for malaria-bearing mosquitos. Spain, for example, is currently seen as a friendly easily accessible no risk destination not requiring immunisation, or courses of treatment against exotic diseases. It is anticipated that by the 2020;s suitable habitats for malaria will have spread northward from North Africa into Spain. Increases in the incidence of food poisoning and food related diseases related to enhanced microbiological activity e.g. salmonella are likely to increase as temperatures rise. There will be a higher risk of epidemics of cholera and typhoid as well as infectious diseases. Adverse publicity would follow such public health scares and frighten tourists away, as happened at Salou, Spain a few years ago. Extra costs will be involved in maintaining and strengthening public health defences and in health and hygiene education programmes.

TOURISTS REACTIONS TO THE CHANGING CLIMATE AND ADAPTIVE RESPONSES

Considerably more research has been done on the likely changes that Mediterranean climates may experience than on the possible impact of those changes on tourists in the future. It is not always easy to tease out the impact of climate from the many other factors influencing holiday choice (Perry 2000).

. Tourism is a continuously adapting industry, responding to changing demographic and economic conditions as well as to new demands and technologies. Climate change will present new challenges but also lead to opportunities for tourist investment to capitalise on the new environmental conditions. Work has only just begun on “translating” the suggested future climate scenarios into their impacts on tourism but already some interesting adaptations are emerging:-

- 1 Higher air and sea temperatures are likely to encourage a longer tourist season. If the summer becomes widely perceived as too hot the season could become “doughnut shaped”, with peaks in spring and autumn months and a hole in high summer. Such a pattern might resemble the current profile of visitor demand for a resort like Dubai. Recently Maddison (2001) has indicated that a lengthening and flattening of the tourist season is likely in Greece although with overall tourist numbers almost unchanged. With this in mind, resorts need to discourage a “closing down” attitude at the end of summer. Higher temperatures will allow a prolongation of the season and if possible added cultural and sporting attractions such as arts festivals, regattas, food or drink events and local fiestas can help this process. Breaking the traditional seasonal patterns has as much to do with changing consumer attitudes as with developing new attractions and more targeted advertising could help in this respect. A longer tourist season would allow quicker returns on investment with more intensive utilization of facilities over a longer period. What in the UK is called the short-haul beach package has almost certainly peaked, but beach holidays will still be popular. They will be price-sensitive and probably booked later and we are likely to see greater segregation between resorts who continue to cater for this market and those who choose to chase other markets and become more diversified. Some parts particularly of the Spanish coasts, have an inheritance of many 30 year old hotels, devoid of modern amenities and catering for a declining number of holiday-makers, many of whom will be low-spending, low-yielding Eastern European tourists. The demand will be for more individual “bespoke packages” offering a little more excitement than the “identikit” traditional IT. (Middleton 1991)
- 2 The larger numbers of older people in the population will still wish to escape the dark, dreary winters of northern Europe. More are likely to consider moving permanently to, or buying second homes in, Mediterranean areas. King, Warnes and Williams (1998) have shown that in several retirement destinations, including the Costa del Sol and Malta the most important reason given for moving to the chosen destination was climate. Thus the climate of the receiving region for these

migrants has been considered to be the most important pull factor.. There are considerable planning implications if the growth of new apartments, villas and bungalows is not to cause environmental blight in some of these coastal areas. Along with this development will come increased demand for leisure pursuits e.g golf courses, marinas .

- 3 Tourists will increasingly expect holiday accommodation to be air conditioned. Such accommodation will attract a premium price, whilst poorer quality self-catering apartments and rooms without air conditioning will be much less attractive in the summer. At present only a fifth of rooms in hotels in Mediterranean countries are in the 4 and 5 star categories .Increased demands will be made on electricity supplies from the demand for additional cooling systems

CONCLUSIONS

We can use an economic principle that leisure time is a scarce resource and tourists resent interference or curtailment of their holiday enjoyment by adverse meteorological events like heat-waves. They will thus seek to minimise the likelihood that their holiday will be affected by circumstances perceived as adverse. by destination swopping. More research is needed to quantify the climatic wellbeing of tourists by developing and extending tourism climatic indices and beach comfort indices. Past growth and attractiveness are not necessarily a guide to the future and the Mediterranean tourist industry cannot assume an untroubled and guaranteed future. The primary resources of sun, sea and beaches are likely to be re-evaluated in the light of expected climate change.

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