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# The use of a temporal analogue to investigate the possible impact of projected global warming on the UK tourist industry

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**Tourism in the UK benefited from the continued 'hot spell' throughout the three summer months in 1995. A revival of the traditional British seaside holiday was experienced whilst holidays taken abroad fell significantly. This paper uses information from the regional tourist boards to evaluate the nature of the climate–tourism relationship for domestic tourists in 1995. Subsequently, the likely concerns and opportunities for tourism in a globally warmer world are identified. © 1998 Elsevier Science Ltd. All rights reserved**

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## Introduction

Global warming is set to severely affect a wide range of industries. The tourism industry will be no exception to this and there are likely to be shifts in tourist patterns as a direct result of global warming and associated impacts. The effects of this on regional and national economies may be highly significant.

The UK tourist industry sustains 1.5 million jobs, that is, over 6% of the UK's labour force and five times that of the car industry.[1] With a continuing general increase in both disposable income and those retired within the population, it is reasonable to assume that the importance of tourism is unlikely to decline in the near future. Indeed, the Department of National Heritage has predicted that tourism will be the World's largest industry by the time the next Millennium arrives.

With so many uncertainties surrounding the nature of the direct causes and impacts of global warming, it does seem at present, unfeasible to project or predict future tourism scenarios and hence anticipate the maximum adaptation to $CO_2$ induced climate change due to the delicate and dynamic balance that exists between tourism and the environment.[2] However, doing nothing in the absence of such predictions implies that the industry is unaware of the problem and is unable to mitigate the likely impacts.

This paper will examine the influence of climate and weather on tourism in the UK, and will identify the role of the abnormal weather in 1995. The importance of good weather for UK holidays will be discussed, and the use of 1995 as a temporal analogue for future conditions will be evaluated.

## Global warming and tourism

As the probable extent and impacts of Global warming are only beginning to be accepted and understood worldwide,[3] there is a need to be looking to identify and quantify the possible impacts on industries that are climate-dependent or climate-sensitive, such as tourism.

Whilst discussions concerning the future impacts of climate change on, for example, tourism are useful, they often omit a fundamental point. That is, it is weather that has an immediate impacts upon the intentions and motivations of humans, whereas climate is the long term average of weather conditions. So, although climate may offer an indication of the weather that can be expected at a destination area, it often disguises extremes and 'short term anomalous events'. It is also possible that weather extremes will dominate the future climate not weather trends.

The relationship between weather, climate and tourism in a globally changing environment is shown in *Figure 1*. It demonstrates that the relationship between tourism and climate is more than just an assumed one, and shows how the past, present and

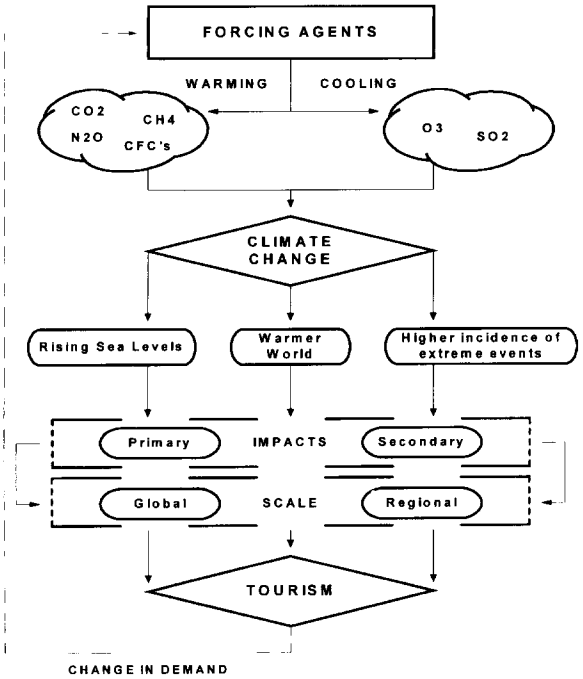


**Figure 1** The relationship between climate and tourism in a globally warmed environment

future actions of man may affect this relationship. This diagram also illustrates the variety of ways in which global warming may affect tourism, and also emphasises the precarious nature of tourism dependent economies in the future.

Humans have been, knowingly or otherwise, applying various radiative forcing agents into the atmosphere. Some of these have a cooling effect on the Earth, but most demonstrate a warming influence. The implications of this are still not fully understood, but it is safe to assume that there is already a substantial global warming and sea level rise 'commitment', regardless of 'near-future' controls on emissions.[4,5] A globally warmer World will melt part of the continental cryosphere (ice cover) and, more significantly, cause thermal expansion of the oceans,[4] the impacts of the associated increase in sea levels are set to be far reaching, affecting waterfront locations, hydrological regimes and water resources. Sea levels are expected to rise 25 cm by the year 2025,[6] such a rise is likely to dramatically affect the low lying regions of the world, particularly those that are dependent upon tourism.

Warmer global temperatures may also cause an increased incidence of extreme climatic events, the most likely of which will be more frequent hurricane activity in the tropical zones. Other extreme events that are likely to become more common are floods and droughts. It would only take an average temperature increase of 1°C in the UK to make the very hot year of 1976 appear normal, hence removing the need for UK tourists to travel to the Mediterranean in search of sun.[7] Current tourist destinations, such as the Mediterranean, may become too hot for tourist activities during the summer months, they may conversely become more favourable locations for tourism in the so-called shoulder months.

Two further variables need to be considered when examining the impacts of changing climate on the UK tourist industry. Firstly, the UK is in a fairly isolated location in the North Atlantic, and as a result warming may be subdued in western regions.[8] Secondly, England represents $<1\%$ of the Earth's surface and some regions will always experience climatic anomalies of a different sign to the global anomaly.[9] Hence, all climate projections for the UK should be treated with caution and recognize that changes in weather patterns are unlikely to be uniform across the country. It has recently been estimated that by 2030, North and North West regions of the UK will become 7% wetter, whilst the South will experience the same temperatures that are currently enjoyed in Paris with an 8% decrease in summer rainfall.[10]

## The relationship between weather and tourism in the UK

Climate and weather play a large role in the way people live their lives, they influence what people eat and drink, their mode of travel and recreation habits. This has led to research in to what constitutes good weather and methods of classifying climate based on human comfort.[11,12] Such works have highlighted that the characteristics of weather and climate that need to be considered include: rainfall; sunshine; temperature; humidity; and wind.

The British are renowned for being obsessed with the weather, and this appears to be reflected in their holiday decisions. A recent survey showed that British tourists were twice as likely as their Italian counterparts to enjoy a sunny beach holiday.[13] The British also appear to have started to take 'spontaneous short break holidays', particularly in the shoulder months, in response to short range weather forecasts.[14] It is perhaps strange, therefore, that more research has not been conducted in to the weather–tourism relationship, especially when considering the likely implications of global warming.

Kleinwort Benson[15] produced evidence that air fares, tourist spending in the UK and UK spending overseas may be partially determined by climatic conditions. These data are shown in *Tables 1* and *2*. UK spending abroad and air travel both sell well following a cold winter. Perhaps more significant is that following a hot summer, tourist spending in the UK is enhanced whilst UK spending abroad suffers. Similar findings have recently been presented by

**Table 1** Sales of goods following a cold winter

| Stronger sales following a cold winter | | Weaker sales following a cold winter | |
|---|---|---|---|
| UK spending overseas | 6.5 | Road tax | −2.0 |
| Air fares | 4.7 | Education and training | −1.4 |
| Betting and gaming | 4.5 | Jewellery and fancy goods | −1.2 |
| Floor coverings | 2.7 | Telephone services | −0.4 |

The numbers refer to the percentage difference in volume between one simulation with temperatures 1°C below normal in the winter months and another simulation with temperatures 1°C above normal.[15]

Agnew,[16] who also found that 'unusually dull winter weather increases expenditure the following summer'. This negative lagged relationship between fine weather and expenditure may be a function of elasticity of disposable income. Therefore, following a winter when the weather was worse than usual, tourist expenditure in the summer may increase as a result of tourists being dissuaded from taking trips in the winter period.

## Weather, climate and tourist motivations

For residents of the UK, climate is recognized as a primary motivating factor for holidays taken abroad.[17] Climate has also been suggested to be one of the key factors influencing tourist development.[18] Kevan[19] believes that the modern geographical location of today's resorts is related to past and present movements of people travelling to warmer regions for a cure to an illness. Weather and climate are thus clearly important factors in past and present tourist patterns.

Impressions of the weather that may be expected at certain destinations are based on climate information. Typically, the Mediterranean provides dependable summer weather and the Canary Islands are a popular winter destination for the same reason. Weather may also affect the short-term attitudes of the tourist. For this to occur, the tourist will need to be in a position to take advantage of the situation. Some tourists may be unable or unwilling to alter holiday plans in response to an unexpected change in weather, and it is highly unlikely that tourists in the UK alter their booked holidays in a response to the weather.

**Table 2** Sales of goods following a hot summer

| Stronger sales following a hot summer | | Weaker sales following a hot summer | |
|---|---|---|---|
| Jewellery and fancy goods | 2.5 | UK spending overseas | −4.4 |
| Tourist spending in the UK | 1.4 | Air fares | −2.5 |
| Education and training | 1.3 | Womenswear | −0.9 |
| Road tax | 1.2 | Food (household spending) | −0.7 |

Percentage difference in volume between one simulation with temperatures 1°C above normal in the summer months and another simulation with temperatures 1°C below normal.[15]

Climate is one of many factors that can influence tourist decisions and whilst good weather may not be the primary reason for selecting destinations, it can be the secondary factor that enhances the holiday. Results from a survey which examined the reasons for destination choice by Canadian holiday-makers showed that good weather was an important factor for travel, although for the British Isles good weather was the least popular response when compared to all other destinations in the world.[20]

When examining the tourism literature it is interesting to see that climate and weather, as motivational factors, are often overlooked or referred to in conjunction with other factors, each of which could be important for tourism decisions.[21] Some of the main variables involved in the tourist decision-making process are shown in *Figure 2*. The motivations for travel will depend upon the characteristics of the individual holiday-maker, the reasons for travel, and the considerations that he or she will have to take account of. The term 'resources' has been applied to a wide variety of variables including climate. It does, however, also include the cultural resources of the destination area, such as, historical sites, people and traditional events, also other resources such as, lakes, mountain and forests, which are themselves climate-dependent. There is clearly a need for recognition of each of these variables as influential factors for tourist decisions.

## 1995—a temporal analogue?

The unusual weather of 1995 in the UK, coinciding with a dramatic increase in domestic tourism is used in this study as a temporal analogue for future conditions given the present state of understanding (i.e. predictions concerning future impacts of climate change). A temporal analogue is a useful method of identifying the possible impacts of global warming as it is based on real events, in this case the unique nature of the weather in 1995 and the possibility that such events will become increasingly common in the future. However, as with all discussions of this nature, the inherent weakness in evalu-

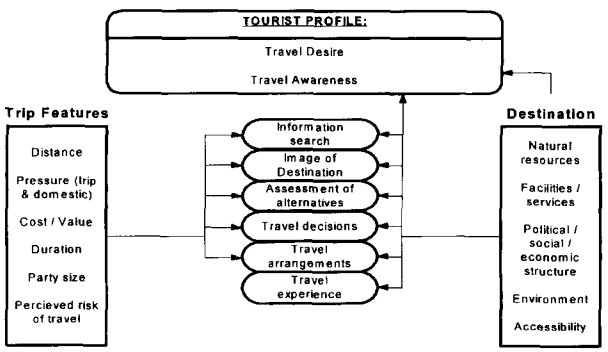


**Figure 2** The tourist decision making process (from Ref. 21)

ating impacts in the future is that the relative importance of 'other' factors cannot be predicted for future conditions, most notably technological advances and behavioural responses to conditions currently considered 'extreme' that in the future may be normal.

1995 represented a record-breaking year both for value and volume of tourism in the UK, coinciding with unusually hot weather throughout the year as a whole but especially the three summer months. As a result, many overseas holiday resorts were not filled, even after last-minute price reductions as holiday-makers chose to remain in the UK. The prolonged good weather, the weakness of sterling, and over-capacity in the foreign package holiday market were all significant contributory factors to the slump in the overseas package holiday market.[22–24] The resultant excess supply of overseas package holidays proved to be disastrous for the profitability of tour operators with an estimated two million holidays unsold. In response to 1995, tour operators reduced the number of holidays available in 1996 by *ca* 10% and increased prices to the most popular destinations, notably Spain, by up to 13%.[22]

Summer (June–August) was the third hottest in the record going back to 1659, the second driest (in a record since 1727) and the fifth sunniest. This century the only comparable summers in England were 1976, 1989 and 1990. In Scotland and Wales 1995 was the best summer of the century. Over 6 weeks before the English August Bank Holiday (28 August) much of central and southern England registered only 2 days with showery rain and dry sequences of 30 days or more were common. Because much of the summer rainfall resulted from localized showers there were long sequences of days ideal for outdoor recreational activities. Using a mean temperature threshold of 20°C, when relatively passive outdoor leisure activities like picnicking and beach going become popular, Hulme[25] has shown that there were 38 such days in 1995 and 42 in 1976. Over the period 1961–90 the mean annual frequency of such days was 10. In both 1976 and 1995, inland cities, like London and Birmingham, noted over 55 days with maximum temperatures $> 25$°C. It can be shown that almost two-thirds of days in the three summer months of 1995 attained temperatures conducive to popular outdoor recreational activities.

The year as a whole turned out to be the warmest since records started and this implied plenty of good holiday weather in the shoulder-seasons, especially in spring, helping to extend the holiday season. With an increased proportion of the domestic population opting to stay in the UK for their summer holiday in 1995, a better understanding of tourist motivations and the nature of the UK tourist product would help evaluation of the future impacts of climate change on tourism. Different marketing strategies of the regional tourist boards, general improvements in the standard of service and accommodation, and a growth in the activity holiday market have greatly enhanced the performance of the UK as a tourist destination. The role of the exceptionally hot weather in 1995 is yet to be fully understood. Despite this, it is clear that the warm weather in 1995 was a major contributory factor towards the high number of domestic tourists opting to 'stay at home'.

1995 provided a rejuvenating boost to the British seaside resorts, many of which have been in decline for many years, with falling visitor numbers and under investment. The establishment by the English Tourist Board of a 'seaside hotline' telephone information service is but one sign of a new confidence in the seaside product.

## The regional tourist boards of the UK

Questionnaires were sent to all 14 regional tourist boards (RTBs) in the UK at the end of 1995. This questionnaire aimed to identify the significance of 1995 and the probable factors responsible for the success of the UK as a tourist destination that year. The questions also focused on the relative role of the weather in 1995 in altering tourist decisions and asked speculative questions as to the implications of global warming on the UK tourist industry.

All but two of the regional tourist boards responded to the survey, three replied but only supplied data on the value and volume of tourism in 1995. Therefore, ten completed surveys were returned. Of these ten responses, nine experienced value and volume of tourism in 1995 well above the average. Half of these respondents said that weather played an important role in the holiday decision-making process but only within certain markets. And whilst half of the respondents stated that perceived climate was not a primary motivating factor for choice of destination, weather was considered an important variable for UK residents on seaside and family holidays and also when considering overseas holidays. Conversely, the role of weather in attracting visitors to the UK was believed to be negligible, factors such as, culture, heritage and the environment were frequently cited variables.

One of the survey questions asked whether or not it was believed the UK would become a more attractive tourist destination in the future, assuming that global warming increased temperatures worldwide. Half of the tourist boards that responded said that the UK would not become more attractive, four said that they did not know, and one said that the UK would benefit only in a certain market. The majority of respondents clearly believed that factors other than climate were important for attracting visitors to the UK. This question also highlighted the need for

better communication and understanding between climate and tourism organizations, as four RTBs did not know what the impacts of warmer temperatures would be on their tourism industry. Similar findings have also been presented by Wall and Badke.[26] Clearly, the significance of climatic variables other than temperature need to be carefully considered.

All of the tourist boards consider sports tourism to be a growing market. As the average UK household now takes three holidays a year, activity breaks are a common theme for second and third holidays. With climate being an important factor in the decision as to whether or not to participate in outdoor leisure and recreation,[27] it seems as if there is great potential for recreational and sporting activities in a warmer UK. Recently, an enhanced potential for tourism and recreation as a result of projected increased temperature and reduced precipitation in summer, especially in the southern UK, has been identified as a likely impact of changing climate.[28]

Each of the regional tourist boards have long-term marketing strategies, it was therefore interesting to find that many were unaware of the consequences of global warming on tourism. Without proper management and appreciation of the impacts of climate change, unexpected problems may arise in the future when the nature of tourist products change due to a climatic shift. With nothing 'concrete' to base strategies on, managers are going to be faced with a need to adapt quickly and efficiently to changes in the environment and in the demands of society.

## Discussion

Global warming is likely to bring warmer temperatures and less summer precipitation to the UK. This will mean a more favourable climate for tourism and an extension to the holiday season, this will no doubt help the UK tourist destinations. However, it will probably be the effect that global warming has on overseas destinations that will determine the success of the UK tourism industry in the future. If for example, the Mediterranean becomes too hot for tourist activities in the summer season then these tourists will consider other destinations, of which, the UK may be a popular choice.

It is clear that there is a genuine need for better communication between climatologists and the industries most likely to be affected by global warming, especially in those regions or industries that are dependent upon certain climatic conditions for their success. Perhaps of most concern at the present time is the future of the skiing industry in the Scottish highlands.[17] Similar worries have been expressed over skiing resorts in the Alps and in Canada.[29] Estimating future scenarios will help the Scottish skiing resorts diversify in an attempt to maintain a tourist product.

The results from the survey helped to confirm what is largely assumed within the industry; family groups and the short-break markets have recently become the target for destination areas, and it is these groups that are also believed, by the RTBs, to be most affected by climate or climate-related factors. It is these groups that may become primary targets for tourism planners in the UK in the future. The reasons for this are varied, but the general population in the UK appear to be making more spontaneous holiday decisions.[14] This may have evolved from people waiting to take advantage of late booking foreign package holidays, and instead being tempted by domestic destinations due to the weather. Another factor that may have been important for tourism in the UK in 1995 was that of 1994. A tourist's experiences from one year to the next can strongly influence future holiday decisions.[30]

Undoubtedly, due to the different tourist products on offer around the UK and the variety of impacts that global warming is likely to bring to the UK, some regions will experience an increase in demand from tourists and others are likely to suffer as a result. Consideration must also be given to the secondary impacts that will arise due to rising sea levels and a warmer world. Currently of great concern is pollution, particularly in urban areas. Work conducted in Greece in 1987 and 1988 showed that not only were temperatures uncomfortable for tourists, but also very high levels of pollution were recorded in the hot spells.[31] In this country, ozone, created by the action of sunlight on car fumes has become one of the concerns for the future, particularly for asthmatics and allergy sufferers.

## Conclusion

In order to analyse the present state of climate–tourism relationships it may be possible to use the significant climatic anomalies to forecast likely future scenarios in a globally changed environment. In particular, the evidence suggests that climate warming alters the competitive balance of holiday destinations and their appeal, stimulating an increase in tourism in the UK. The extent to which people will behave in the same way if summers, like that of 1995, occur in one-third of years is of course unknown.

Tourism in the UK has an International dimension which is sensitive to any change in climate that alters the competitive balance of holiday destinations worldwide. Their present rarity ensures that collectively the nation adapts to a new temporary lifestyle when summers in the UK exceed the

normal modest expectations. There is therefore an increasing need for research to 'translate' the suggested future climate scenarios in terms of their likely impacts on groups like tour operators and tourist boards, as well as more generally for policy makers and the tourism private sector.

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