

# The influence of weather and climate on recreation and tourism

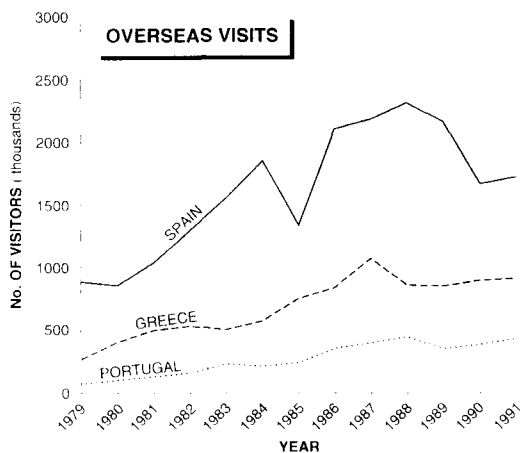
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Tourism and outdoor recreation is one of the most important and rapidly growing service industries throughout the world. In 1993 more than 17 million foreign tourists are expected to visit the UK and spend more than £7 billion. Overall, the UK tourist industry is a larger employer than the National Health Service and it is the premier industry in Scotland, where some 10–15 million visitors are attracted annually. A similar reliance on tourism exists in many less-developed countries. For example, more than 10 million tourists visit the Caribbean islands every year and the industry makes up nearly 80 per cent of the gross national product of the Bahamas and the Cayman Islands. Apart from its economic importance, tourism and outdoor recreation also satisfies social needs and aspirations.

During recent years, there has been a steady growth in tourist activity. Figure 1 indicates the increase in the number of UK residents making holiday visits by air during the third quarter of the year (July, August and September) to three of the most popular Mediterranean destinations. Over the 1979–91 period, the total number of visits to these countries has more than doubled. With a long-term trend to more leisure time, partly created by a rising proportion of retired people in the population, and more disposable income amongst the population as a whole, the importance of tourism is unlikely to decline in the future.

It seems almost self-evident that tourism is dependent on weather and climate. Whatever the specific type of holiday enjoyed, most outdoor tourism rests on the attraction of certain renewable biophysical resources, such as forests, lakes, or beaches, all of which are climate-dependent. In some parts of the world, it is the climate itself which is the main feature



*Fig. 1 Growth in the number of UK residents making summer holiday visits by air to Spain, Greece and Portugal (source: International Passenger Survey, Department of National Heritage)*

promoting tourism. But there have been comparatively few investigations into the relationships between weather and climate and tourism. One possible reason for this is that meteorologists and leisure specialists rarely communicate with each other. Also, atmospheric conditions are only one factor influencing tourist decisions, so the direct linkages between the weather and the behaviour of the leisure consumer are often difficult to demonstrate.

## Weather-sensitive tourism

Weather-sensitive tourism exists in those parts of the world, like Britain, where the seasonal climatic conditions are insufficiently reliable to attract mass travel and leisure participation on their own. It includes so-called 'cultural tourism' (visits to historic cities and heritage

sites), general travel leading to appreciation of landscape and scenery, family visits, and some outdoor sport and leisure pursuits. These visits tend to be planned, and are often undertaken in spite of – rather than because of – the weather conditions.

Although the weather does not directly stimulate the activity, the weather conditions experienced by holiday-makers can be a powerful influence on their decision-making. This means that flexibility and opportunism are important when leisure involves outdoor activities. For example, during weather conditions unfavourable for walking or camping, these activities may well be exchanged for visits to nearby towns. Although the tourist will be disappointed by this experience, such weather-sensitive behaviour may well benefit the local economy by generating extra income for local shops, restaurants and indoor entertainments. This demonstrates that 'poor weather' is always a relative term, although rainfall is a general handicap on outdoor activities as shown by its importance in the weather insurance market (Lear 1993). In 1988/89, during what was probably the warmest December–March period over western Europe for about 300 years, the lack of snow created a switch from skiing to indoor activities, such as swimming, as well as to alternative outdoor activities, such as hill walking, at many winter resorts.

It would be wrong to conclude that weather-sensitive tourism is not seasonal. Annual holiday patterns and the necessity for advance bookings ensure a seasonal concentration of tourist activity in most areas. In Scotland, for example, the Caledonian–Macbrayne ferry company serving the west coast and the Hebrides carries over half of the annual number of passengers during 12 peak summer weeks. Similarly, 40 per cent of all bed-nights booked in Scottish youth hostels are registered in July. This emphasis on the summer period exists despite a marked trend to more spontaneous, short-break holidays in the UK and marketing efforts within the tourist industry designed to spread the load to the shoulder seasons (May, June and September). At these times the weather conditions are often relatively good with fairly low rainfall, good visibility, long hours of daylight and temperatures still high

enough for many activities. There is a similar case for promoting an extension of the Scottish ski season, because the best combination of snow cover and weather conditions can often occur in April and May when many UK skiers are tempted to the European Alps.

The weather sensitivity of tourism can be expressed in at least four ways:

(i) *Participation rates.* Within the various tourist seasons, there are key weather thresholds which are required before a majority of people are willing to participate in certain mainstream weather-sensitive activities such as swimming, beach use, outdoor sports and visiting parks. In Canada and Australia various baseline studies of recreation climatology have been produced (Crowe *et al.* 1973; Masterton and McNichol 1981; De Freitas 1990). The Canadian surveys attempt, firstly, to outline the components of the tourist season in terms of different outdoor activities, as shown in Fig. 2. For example, the *winter season* has been defined as the period between the first and last dates with a snow cover of at least 2.5 cm. Secondly, within the seasons, the weather conditions necessary for specific outdoor recreations are identified. Thus, a *ski day* is defined as a day with at least 6 hours between 0800h and 1800h with 2.5 cm of snow on the ground, air temperature between  $-20$  and  $+5^{\circ}\text{C}$ , winds of less than  $6.5\text{ ms}^{-1}$ , visibility better than 0.8 km and no liquid precipitation.

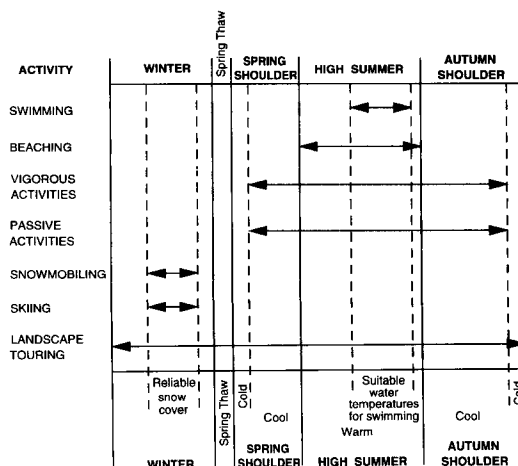


Fig. 2 The tourism and recreation seasons in Ontario, Canada (after Crowe *et al.* 1973)

Other work has sought to quantify the local relationships between individual weather variables and the daily participation rate in outdoor recreation. As shown in Fig. 3, Paul (1972) used daily maximum air temperature as a predictor of the relative participation rate for five forms of outdoor recreation in western Canada. With maxima below 16°C, only multi-activity parks, golf/tennis and special sites attracted significant numbers of people. The use of these facilities peaks around 25°C. Above 21°C beach use and swimming become increasingly preferred activities. This is a useful indication of the weather sensitivity of recreational choices but it is also of limited value because it is confined to only one weather variable and does not define an upper thermal limit for beach use and swimming. In Britain similar work has examined the statistical links between daily weather variables and recreational traffic flows in attempts to forecast the peak demand for car parking in parts of the Peak District National Park (Houghton-Evans and Miles 1972) and to assess the degree of visitor pressure at two leisure sites in south-east England (Duffell 1972). In addition, a body of literature also exists on the effect of weather on individual activities as varied as baseball (Shaw 1963), gliding (Wallington 1961), parachuting (D'Allenger 1970) and pigeon racing (Rice 1969).

(ii) *Personal safety and comfort.* The level of safety for many outdoor pursuits such as sailing, canoeing, hill walking and mountain climbing is crucially dependent on the weather. These are all forms of outdoor recreation which are gaining in popularity within Britain at the present time. Rapid changes in weather conditions, particularly those leading to increased wind-chill, flash flooding and reduced visibility, are most significant. The main hazards are often experienced in upland areas and this has been recognised in the UK by the introduction of specialised weather services, such as the Mountaincall weather forecast developed for walkers and climbers in eastern and western Scotland and Snowdonia. But, with the recent advent of adventure holidays overseas, where physically testing activities are pursued in increasingly remote areas, it is likely that weather-related safety will become a more prominent issue in the future.

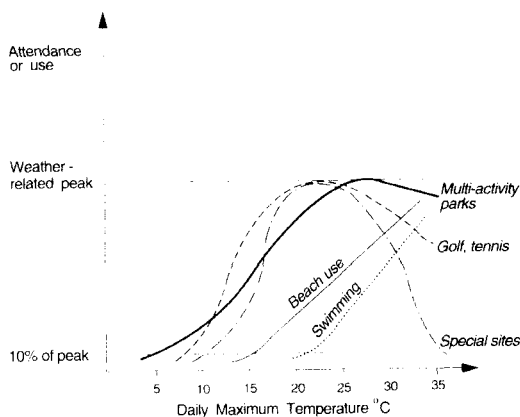


Fig. 3 Weather sensitivity of five selected outdoor pursuits in Canada (after Paul 1972)

In some parts of the world bodily discomfort may seriously limit the tourist potential. For example, Terjung (1968) showed that the major tourist attractions in Alaska, such as the forest and national parks, all lie outside the most comfortable parts of the state. Some Mediterranean destinations, like Greece, suffer from heat stress at the peak of the summer tourist season (Giles *et al.* 1987; Giles and Balafoutis 1990). On the other hand, Stephenson (1963) concluded from his work on 'effective temperature' in Singapore that even near the equator outdoor sports can be safely indulged in throughout the year.

(iii) *Visitor satisfaction.* The relationship between the weather that a visitor expects (or hopes) to find at a holiday destination and the weather that is actually experienced can affect the level of tourist satisfaction and – by implication – the likelihood of a return visit. In Scotland routine surveys conducted by the Scottish Tourist Board show that over 10 per cent of British tourists, and nearly 20 per cent of overseas visitors, complain about the weather. Adverse weather is the main single cause of tourist dissatisfaction – exceeding classic grumbles like the price of food and petrol and the state of the public toilets. There is a problem of marketing here. Whilst it is undoubtedly true that few visitors to Scotland are drawn there by the weather alone, their expectations may be raised to an unrealistic level by a domi-

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nance of 'blue sky' photographs in the brochures issued by the various tourist boards.

At the same time, Hay (1989) has stressed the importance of investment in indoor facilities designed, to some extent, to counter the Scottish weather. This strategy has reached its ultimate development in the UK with the Center Parcs initiative which is advertised as the British holiday the weather cannot spoil. Perhaps the way for the industry to deal with the uncertain British weather is through more subtle marketing which admits that rainfall exists but which also emphasises some of the more positive qualities of mid-latitude weather such as its variety, the rôle of clouds in enhancing skylscapes, the lack of extremes of temperature and humidity, etc.

(iv) *Profitability of the tourist industry.* Some sectors of the tourist industry operate on relatively small financial margins and the weather can be an important factor in determining the level of profitability in individual seasons. For example, poor snow-cover conditions at many European winter sports centres during the late 1980s and early 1990s created major problems. The tour operators suffered because clients either failed to book or delayed booking until a few weeks before departure in an attempt to secure snow. Even with a reduced number of skiers at the resorts, access to the slopes was restricted. At Gstaad, Switzerland, there was so little snow in early 1990 that hotels rationed guests to two days per week skiing on a crowded high-level glacier. By early February 1990 the Thomson group claimed to have spent in excess of £100 000 (more than in the whole of the previous season) transferring ski clients between different European resorts and compensating them for lack of snow.

Due to a lack of customers, the ski equipment manufacturers, wholesalers and retailers also suffered. Shops were left with unsold stock and manufacturers could not clear their stockrooms. In Switzerland over half the retailers failed to keep up to date with payments to suppliers and several manufacturing companies were wound up. Hire shops did less business and suffered extra loss as skis were damaged on exposed rocky slopes. Hotels, restaurants, lift companies and ski schools all laid off staff, although some were redeployed into

construction work which, characteristically, showed an increase in activity in the mild winters.

These weather effects carried right through to the service and financial sectors. For example, for the 1991/92 season British skiers faced a general 20 per cent increase in accident insurance premiums after the insurance industry had experienced record claims in the previous year. Normally about 35 out of every 1000 British skiers make an accident-related insurance claim which, in turn, results in approximately 21 000 claims for the insurance industry. But, in 1990/91, there were over 45 000 claims, almost half for medical expenses after accidents involving exposed rocks and congestion on the slopes as skiers were concentrated on to small areas with only a patchy snow cover.

### **Climate-dependent tourism**

In climate-dependent tourism, travel to the holiday destination is directly generated by the perceived attractiveness and seasonal reliability of basic climatic conditions, such as air temperatures, the duration of sunshine, sea surface temperatures, or snow cover. This type of tourism also depends to some extent on the weather conditions of the area of origin since tourists are usually making a conscious decision to travel in order to gain a short-term climatic advantage over that existing back home.

Many of the most successful tourist areas have marketed their climatic resources on a year-round basis. Within Europe the Mediterranean countries have long traded on tourism which depends on guaranteed summer sun. More recently, with the growth in the so-called 'silver market' (people age 55+ and actively retired with a substantial disposable income), long-stay winter holidays in a climate substantially better than that in northern Europe have also become popular. A similar pattern exists in North America, with regular winter visitors from the northern states to Florida and Mexico, and there is also a regular winter exodus from the southern states in Australia to the 'Gold Coast' resorts of Queensland. If climate-dependent tourism is partially influenced by the 'push' factor of weather conditions

in the area of visitor origin, it should be possible to identify this effect. For example, Smith (1990) showed a good statistical relationship between summer visits from the UK to Portugal and a relatively crude measure of rainfall over Britain in the *previous* summer. The general suggestion, that the wetter the British summer, the more tourists may be encouraged to take a Mediterranean holiday in the following year, seems plausible and deserves further investigation with more sophisticated weather indices.

### Climate change

As with all other economic sectors, there are likely to be both winners and losers in the tourist industry as a result of climate change. For Ontario, Canada, it has been claimed that, although the ski season will be reduced, the opportunities for summer recreation will be enhanced by a longer season provided that the predicted decline in river and freshwater lake levels does not adversely affect wetland and shoreline-based activities, like camping or fishing (Wall 1986). In Scotland, warmer summer conditions will also be welcome but may be offset by more rainfall or changes in humidity which increase the concentrations of biting insects.

One of the main impacts of global warming world-wide is likely to be on the ski industry, especially where skiing occupies comparatively small areas of low mountains. In winter sports resorts as far apart as eastern Canada (McBoyle and Wall 1987) and the Snowy Mountains of Australia (Galloway 1988) there is concern that within a period of 20–30 years the most vulnerable slopes may no longer have a viable length of season. Small villages in the pre-Alp areas with perhaps one ski lift and a couple of hotels may face economic decline, although some new employment opportunities may be created by developments at the higher-level Alpine resorts which some tour operators are already promoting, as shown in Fig. 4. Just as Perry (1972) drew attention to the rôle of the changing frequencies of weather types which encouraged the initial post-1945 expansion of ski facilities in the Cairngorm area of the Scottish Highlands, so it is clear that recent winters

dominated by more westerly airflows have given a relative snow-cover benefit to the more westerly ski resorts, such as Glencoe and the newly developed centre at Aonach Mor, at the expense of the more traditional eastern slopes. There are other possible effects: warmer winters are

### With Ski Thomson the likelihood of snow is always higher.



No one can guarantee snow. Not even Ski Thomson.

So this season we've chosen resorts, above all, for their consistently good conditions.

Lower resorts that have recently had a problem with snowfall have been dropped. And higher resorts have been introduced in Switzerland, France, Austria and America.

Standards in existing resorts with good snow records are as high as ever. So we've increased the number of places available.

But hurry, these are bound to be snapped up.

So pick up a brochure. And if you book before the 18th August, not only are there special children's offers, there are 2 free places for every 10 booked. There's also money off C&A ski wear.

Even more reason to put Ski Thomson top of your list.

**Ski Thomson**

Fig. 4 Newspaper advertisement by a package tour operator promoting the advantages of higher-level ski resorts in Europe and North America following several poor snow seasons in Europe. (Reproduced with permission from Thomson Tour Operations Ltd. This advertisement is from last season and consequently the product information is no longer valid.)

likely to bring more risk of snow avalanches, which are already a growing threat in several winter sports areas. This may result in more frequent and costly closure of some ski slopes and greater controls on off-piste activities, such as climbing and backpacking.

As indicated by Smith (1991), rising sea-levels will have profound effects along all marine shorelines. For British beaches backed by a sea-wall it is likely that increased erosion will lead to a lowering of the beach. In the absence of a large natural supply of sand, or costly engineering measures, the beach facility could

be reduced with subsequent undermining of the sea-wall at precisely the time when rising temperatures are encouraging more seaside holidays. Other coastal habitats used for recreation such as sand dunes, shingle banks and even soft-earth cliffs will also be affected as will built facilities along the shore such as promenades, marinas, etc. If any persistent change to warmer, drier summer conditions occurs, the risk of wildfire outbreaks will increase. In Britain this could mean restrictions on public access to many of the National Park areas similar to the controls which were imposed for the Peak District National Park in the drought summer of 1976.

There may well be problems on tropical holidays too. Tourists are already becoming aware of the dangers to health of excessive exposure to UV-B radiation. In addition, several destinations in the Caribbean and the Far East are prone to tropical storms and hurricanes. As global warming develops, marine temperatures are likely to increase and the areas of ocean with sea surface temperatures high enough to initiate a hurricane are likely to expand. The inference is that the existing hurricane zones will experience more frequent and more intense events and that such storms will spread to other coastal areas. This might well affect newly developing tourist spots, such as Malaysia or northern Australia, which perhaps have few facilities apart from climate to offer the holiday-maker, as well as established tourist areas like Florida.

## Conclusion

There is little doubt that weather and climate should feature more in the minds of planners and policy-makers with responsibility for tourism and outdoor recreation. Many of the published studies of the weather sensitivity of tourism are now over 20 years old and there is a clear need for new insights. Some stimulus may come from the publicity given to global warming but, without a better understanding of current weather influences, the tourist industry is unlikely to cope with the challenge of future climate change which may have far-reaching effects and may even alter the competitive balance of holiday destinations worldwide.

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## Weather and mountain activities

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Interest in mountain leisure activities has grown dramatically over the last 50 years, even during the recent/current recession. Time available for leisure activities has increased, people are much more mobile, and the countryside has generally been made more accessible to the public.

Some mountain activities such as hill walking can be done ‘on a shoe-string’. All that is needed in addition to a reasonably fit body are a pair of stout boots and protective clothing, a map and compass, and the ability to use them in difficult situations. The late mountaineer turned ocean sailor Bill Tilman, when asked by a Sandhurst cadet how one went on an expedition, told him “You just put on your boots and go”. In the post-war period, the well dressed hill walker wore ex-Army boots, and an ex-Army gas cape which certainly didn’t let any moisture in but neither did it let perspiration out!

Nowadays, one can spend hundreds or even thousands of pounds on up-to-date clothing and equipment which is guaranteed not to let any precipitation in, lets the perspiration out, and is also lightweight. The supporting industries of clothing and equipment manufacture and sales, and mountain-training establishments, have weathered the recession well, established shops have expanded, and new shops have

opened in the popular areas, *e.g.* Snowdonia. Training courses are still well booked up.

I helped D. E. Pedgley with the first Mountain Weather field course, under the auspices of the Royal Meteorological Society and the Field Studies Council, in 1970, and took over his work in 1976. By then T. R. Spalding and R. M. Blackall had entered the fray, so I started the more practically oriented Mountain Weather courses at the Sports Council’s National Mountaineering Centre at Plas-y-Brenin in Snowdonia. The one-week courses there evolved into two weekend courses a year in the early 1980s, with the Mountain Leadership and Mountain Instructor courses being catered for. As I get longer in the tooth, Terry Spalding has taken over the Plas-y-Brenin courses, and Rodney Blackall is running Holiday Fellowship courses in Snowdonia (see Pedgley 1979).

As a follow-on from the development of new materials and new technology, new mountain sports have expanded, *e.g.* ice climbing, rock climbing, mountain biking, orienteering, and the aviation hobbies of gliding, hang gliding, parascending and microlight flying, all of which are weather dependent with safety and enjoyment being enhanced or marred by our varied weather.

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\* Mr George, who is retired from the Met. Office, was Assistant Instructor, 1970–75, and Chief Instructor, 1976–92, on Mountain Weather courses in Snowdonia.

### Factors affecting mountain activities

Figure 1 summarises the impact of the weather,