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0521017440 - Does the Weather Really Matter?: The Social Implications of Climate Change

William James Burroughs

Excerpt

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1

Introduction

‘Why, sometimes I’ve believed as many as
six impossible things before breakfast.’

The White Queen, in *Through the Looking-Glass*, Chapter 5¹

Dotted around the world are many examples of abandoned cities, monuments and settlements which appear to provide stark evidence of the part fluctuations in the climate can play in human activities. From the jungles of Guatemala to the shores of western Greenland fjords there are the ruins of societies which seem to have been overwhelmed by the effects of prolonged adverse weather. The same story of changing patterns of temperature or rainfall overwhelming day-to-day life can be seen in the Scottish uplands or the deserts of Arizona. The remains of past thriving communities appear to provide mute testimony to the part sustained changes in the weather have played in history.

At a time of growing concern about the impact of human activities on the climate these stark reminders of the impact of natural changes in the climate are seen as potent warnings. But are they relevant? The important questions are ‘How big a part did climate change play in both success and failure?’ and ‘Is the evidence of the past relevant to analysing current events?’ Only by addressing these questions can we decide whether examples from the past can be applied to current efforts to predict the consequences of future climatic change.

This process is not easy. The subject of the historical impact of climatic change stirs strong emotions. There is a range between those who argue that fluctuations in the climate were wholly inconsequential in the course of history to those who believe they are an unrecognised mainspring which has controlled the outcome of many events. As with so many fiercely

debated issues, reality lies somewhere between these extremes. What is more difficult to establish is precisely where on the spectrum of impact particular events lie. So the objective of this book will be to present examples of where the impact of extreme weather or more sustained shifts of the climate have had measurable consequences and to explore how these have combined with other factors to influence social, political and economic development. Then we will consider just how important predicted changes in the climate are likely to be in comparison with other factors, such as resource constraints or population growth.

Concentrating on the big issues is essential if we are to discover which aspects of our changing weather and climate matter. There is plenty of econometric analysis which shows how changes in, say, temperature or rainfall lead to changes in demand for weather-sensitive goods and services, or alter the supply of other goods and services. Not surprisingly these changes in demand or supply can then be linked to shifts in prices with obvious consequences for producers and consumers. This provides fertile ground for economic analysis of how the market forces exploit the consequent shifts in prices. While this is an important subject on which much has been written,² it rarely achieves the level of being a really big issue. What we are looking for here is the instances of how the weather can conspire to have a more permanent effect on the course of events.

This may look like an artificial distinction, and to a certain extent it is. But, it is important to discover which changes matter and when they matter. So the first stage of this book is to identify historic examples which can be used to tease out what really counts. This will make it possible to establish how the evidence of the past can illuminate current predictions of what the economic consequences of climatic change will be. Armed with this insight it may then be possible to decide whether forecasting techniques are able to address the essential features of the economic impact of possible changes and whether the resulting predictions have any utility in terms of taking action.

1.1 Weather or climate?

So far, in the text and in the title of the book the terms ‘weather’ and ‘climate change’ appear to have been used interchangeably. This blurring of well-defined concepts is enough to raise the hackles of any self-respecting meteorologist. The reason is simple: we are concerned about a

continuum of events which inevitably makes drawing a sharp line difficult. So, we can accept the definition that weather is what is happening to the atmosphere at any given time, while climate is what we would normally expect to experience at any given time of the year on the basis of statistics built up over many years. But when it comes to discussing the impact of extreme events this clear distinction is less easy to maintain.

When the Great Storm of October 1987 wrought havoc over southern England or Hurricane Gilbert tore across the Caribbean in 1988, these were major weather events. But when England was hit by another intense depression in January 1990 or Gilbert was followed by the huge losses resulting from hurricanes Hugo in 1989 and Andrew in 1992, people started to talk in terms of climatic change. The trouble with this translation from weather events to climatic change is, however, that we need to be careful with the statistics. It is all too easy to cite the close succession of a few extremes in some carefully selected period as being significant. If, however, we look at the longer term and take a more rigorous line with the definitions of events, and the timescale over which they are considered, we can produce very different conclusions. For instance, much has been written about the surge in damaging hurricanes in the Caribbean and tropical North Atlantic and its link with global warming. But many commentators paid too little attention to the statistics. Far from showing a dramatic increase, not only has the incidence of tropical storms and hurricanes shown a marked decrease since the 1960s but also the peak winds which cause so much of the damage have declined (Fig. 1.1).³ Although there is an unresolved issue as to how much of this decline was due to changes in how observations were made, there is no question of an increase in recent decades. Similarly, the incidence of gales over the British Isles has not shown any obvious trends in the last century or so (Fig. 1.2).⁴

The challenge of handling statistics is compounded when the weather events being considered cover whole seasons. Droughts are usually of greatest interest in respect of the growing seasons in mid-latitudes, and in terms of the behaviour of the rainy season in more arid parts of the world. These figures, although the average of several months, can fluctuate wildly from year to year. What constitutes a few exceptional seasons as opposed to a sustained shift in climate may take many years to establish. In recent decades, the drought in the Sahel has to be regarded as the clearest example of climatic change (Fig. 1.3).⁵ But many other widely quoted cases of major shifts have to be looked at more carefully. For the

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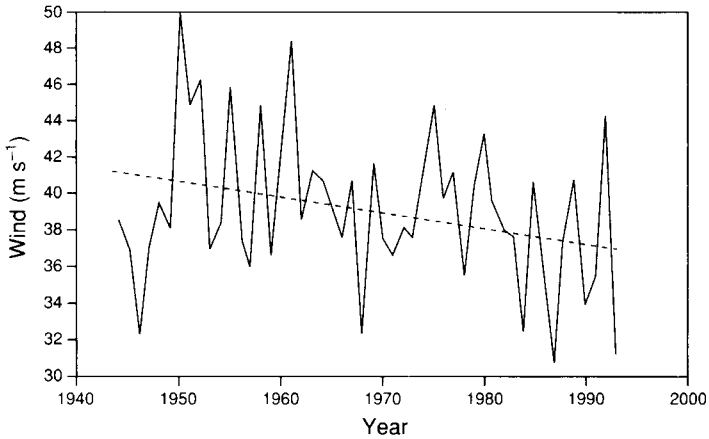
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Figure 1.1. The mean annual maximum sustained wind speed attained in hurricanes in the North Atlantic between 1944 and 1993, showing a marked decline since the 1950s. (From IPCC, 1995, Figure 3.19.)

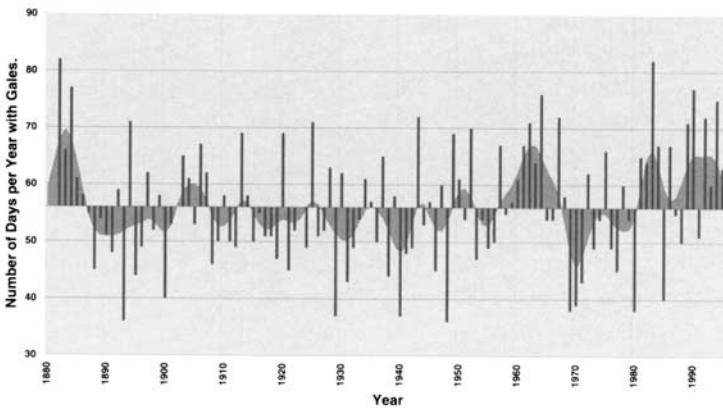


Figure 1.2. The number of days with winter gales in the vicinity of the British Isles over the last 100 years, showing no significant increase in recent decades, together with smoothed data showing longer term fluctuations. (Data supplied by the Climatic Research Unit, University of East Anglia, UK.)

most part they will turn out to be isolated events which may, or may not be, part of a much longer term climatic trend.

The connection between the measurable impact of extreme events and its relevance to calculating the consequences of longer term shifts in the

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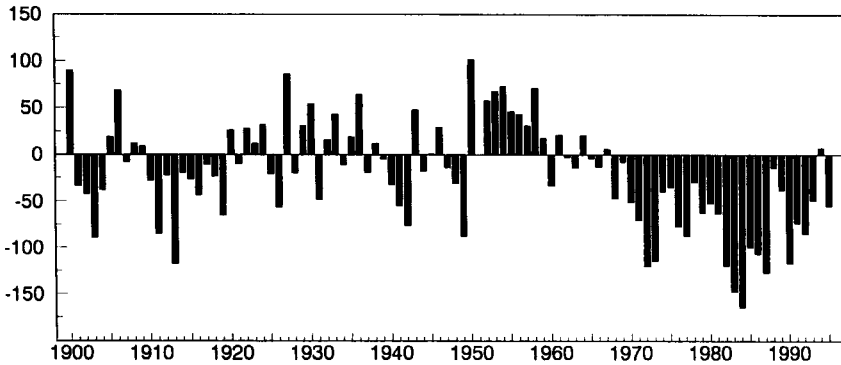
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Figure 1.3. Standardised precipitation anomaly in the Sahel Region, showing the sharp reduction in rainfall from the late 1950s onwards. (Reproduced by permission of the UK Meteorological Office.)

climate is an underlying theme of this book. It will continually crop up not only as a statistical issue but in terms of whether the vulnerability of economic and social structures to fluctuations in weather and climate alter with time and what this means for forecasting the impact of future changes. In the meantime, the standard distinction between weather and climate will be maintained wherever practicable. At times, however, there will be a certain fuzziness which reflects the complex interactions between weather, climate and economic activity.

1.2 Fine tuning

The complexity of the interaction between the climate in any part of the world and economic activity can be seen in how societies function. A fall of snow which brings London or Washington to a grinding halt is seen to be of little consequence to Chicago or Stockholm, and positively trivial in Winnipeg or Novosibirsk. Similarly, summer heatwaves which prostrate many temperate countries, are regarded as normal in hotter parts of the world.

The extent to which all aspects of our lives are carefully adapted to the climate becomes even more obvious when we look at different sectors of the economy. Be it agriculture, energy supplies, housing, the retail sector, or the transport system, in their design and operation they all reflect the local climate both in what is normal and in the extremes that can be

expected. So, for example, every aspect of agriculture is geared to the local climate and its normal fluctuations. It is only when something truly out of the ordinary strikes that the system breaks down. Even then the response is not passive. Society seeks ways to adapt and so reduce the impact of any repetition of such extreme events.

This variable response to increasingly anomalous weather touches on another essential feature of the economic impact of climatic change. This is the non-linear response of many systems. With modest fluctuations about the norm, systems adapt well and take the ups and downs in their stride. But beyond a certain level they become much more sensitive and can buckle under the strain. What produces the breakdown varies from situation to situation, so it is important to look at a wide variety of past weather-induced social and economic dislocations to get a better idea of how different factors contribute to collapse. This means looking behind these examples to establish what matters most and then exploring whether the messages of the past can be applied to current concerns about climatic change.

1.3 Remembering the past

Because history is rich in fascinating examples of how weather and climate change have played a central part in moulding events, we need to be careful when choosing examples. A selective interpretation of the evidence can lead to contradictory conclusions. What is needed is a sense of proportion in deciding, in the aftermath of some extreme weather event or sustained climatic abnormality, to what extent any outcome could be attributed to the meteorological conditions. So we have to consider what other factors come into play at the time to produce a given outcome, and decide whether in the longer term this outcome was likely to happen in any case.

If we take the example of the failure of the Norse colony in Greenland, this discipline is still likely to lead us to conclude that climatic change played a major part. But, in the case of the decline in the Mayan civilisation in the ninth century we cannot assume that other factors, including pestilence, population growth and war, did not play a more important part in the social collapse – although declining rainfall may have finally tipped the balance. Other frequently cited examples – such as the disappearance of the thriving Harappan culture in the Indus valley around 1500 BC, the dark ages that descended on the eastern Mediterranean at

the end of the thirteenth century BC, the Byzantine Empire in the seventh century AD, and departure of the Anasazi from their well-developed communities in Arizona at the end of the thirteenth century – beg similar questions.

These problems are compounded by the fact that in many cases all we have to work on is the evidence of decline. So we cannot draw on economic data, but have only fragmentary historical records to tell the story of what happened. Given the wide ranges of possible causes for the consequences, it is essential to have a framework for assessing the contribution meteorological events may have made. In this respect, the historical approach of defining whether such fluctuations in the weather constituted nothing more than a fateful event or whether they amounted to a crisis or, worse still, a catastrophe, is a useful way to categorise the impact. This qualitative graduation can provide a useful way to discriminate between various examples of the historical and economic impact of climatic change.

A fateful event is where, even though the weather played an important part in the outcome of major developments, it was purely random or coincidental. A good example is the ‘divine wind’ (*kamikaze*) that destroyed Kublai Khan’s Mongol invasion fleet in the Sea of Japan in 1281. There is no doubt that the weather was the dominant factor in the destruction of the fleet. But this was a product of chance, not a sustained shift in the weather in thirteenth-century Japan. If Kublai Khan’s astrologers had chosen a different date for sailing, the outcome might have been very different, but this is mere speculation.

By comparison, the contribution of weather fluctuations or climatic change to historical crises is much more difficult to unravel. A *crisis* develops over a sufficiently long period to lead to either a breakdown in social structures and order or a radical change in direction. For this to result from meteorological events would probably require several years, if not decades, of changes in temperature or rainfall to produce, say, a series of poor harvests or crop failures. Even then it is likely that although these meteorological developments might erode the foundations of a society, they would, at most, be only part of the story.

It is not just the complex way in which a crisis builds up which matters, but also how its impact is recorded for posterity. The progress of civilisations are usually marked by the creation of artefacts, monuments and records of successes. During periods of decline these activities are either drastically curtailed or cease. This dramatic response may exaggerate the scale of disruption. So, if, say, a prolonged drought produced sustained

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food shortages, it would become increasingly difficult to maintain the extravagant and elaborate trappings of an advanced culture. It would also make it more vulnerable to disease, external attack or internal revolt. Where the society suffered internal collapse, it is probable that the surviving population reverted to a subsistence economy, which meant the lot of peasant farmers changed much less. But the surviving records paint a picture of disproportionate change. If this is the case, then it is possible that relatively small but sustained changes in the climate could undermine a social structure rendered brittle by extravagance in times of plenty. Such changes would, however, be difficult to detect and would inevitably combine with other internal and external factors to blur the picture. So any attempts to identify evidence of climate-induced change in the ups and downs of past civilisations must reflect this non-linear response.

By comparison, *catastrophes*, where climatic factors dominate social change, are relatively easy to handle. The only problem is they are exceedingly few and far between. Indeed the collapse of the Norse colony may be the only example of where the deterioration of the climate is the principal cause of collapse. Even here there are plenty of people who are prepared to argue that other factors were equally important. For the rest, it is probably best to work on the basis of either fateful events or extreme weather which lasted long enough to contribute a crisis.

While this classification is designed principally to enable us to consider the riddles of the shadowy ups and downs of distant history, it can be applied to more recent events. So, when we turn to better documented examples of European history, this unravelling of the meteorology from the demographic, economic and social developments becomes even more complicated, given the subtle changes that were taking place. Nevertheless, the part played by the deterioration of the climate in the apocalyptic events of the fourteenth century, or the Tudor inflation, provide an excellent starting point for exploring these issues. They also set the scene for equally contentious questions surrounding, say, the agricultural recession in the late nineteenth century in Britain, the 'dust-bowl' years of the 1930s in the USA or what 'General Winter' played in the defeats of Napoleon and Hitler in Russia. In Steinbeck's description of the drought in Oklahoma in *The Grapes of Wrath* or Sergeant Burgogne's escapades during the retreat from Moscow in 1812, the weather dominates, but was it the sole cause and was it that exceptional?

Only by looking at what the real consequences of the weather were in an adequate range of events can we start to build up a better picture of

how meteorological fluctuations combine with other aspects of our society to have profound implications. Once we have formed a balanced view of these more distant happenings, we can then look at recent events in a slightly different light. How various factors combine to dislocate economic structures then becomes a matter of not only the severity of the weather anomaly, but the underlying vulnerability of social structures to both sudden changes or sustained abnormal conditions.

The timescale of events is an essential part of the analysis. We all understand how snowstorms, hurricanes or flash floods can wreak havoc in a matter of hours. Their impact is immediate and often devastating to property and in loss of life. Similarly, the build-up of a prolonged cold spell or a hot dry summer can be appreciated, although the real damage may be less obvious to see. So, while the impact of the drought in Britain in the summer of 1976 had obvious agricultural and water supply implications, the biggest economic impact took place underground. The drying out of clay soils and the damage to the foundations of houses cost the insurance industry over £100 million (\$160 million)⁶ at the time. Even more insidious and so more difficult to quantify was the resulting increased premiums for insuring domestic properties and parallel stiffening of building regulations to protect new buildings from future drought-induced settlement.

The quoted costs of extreme events depends not only on the extent and form of the damage, but also on who pays. In the case of flood damage in the USA, often properties are not covered by private insurance schemes. Many people rely on Federal cover, but others have no cover and have to fall back on disaster relief if the axe falls. This means widely different figures are quoted depending on who is doing the counting. In the case of the massive Mississippi floods of June 1993, the global figure estimated the damage at \$15 billion. But the exposure of the insurance companies was much smaller, being just under \$1 billion. Given that agricultural losses were around \$5 billion, the remainder was picked up by either the Federal Government or absorbed by individuals. Wherever possible, global figures will be used in this book, and if a breakdown exists of how these costs have been compiled, this will be given.

Assessing the impact of longer term changes requires even more detective work. While the trend may show up in more frequent droughts, floods, hurricanes or storms, the economic consequences are blurred by not only the drawn-out nature of the changes, but also the process of adaptation. This automatic adjustment as part of the continual process of

social development and economic renewal also disguises the impact of climatic change. It also provides a reminder not to overstate the consequences of these changes. Since all societies have evolved to adapt to change as an essential part of their development, most aspects of past climatic change will inevitably have been absorbed in this evolutionary process. So we must be careful not to assume a causal connection between climatic developments and other social and economic changes where none may exist. This ability of markets to adjust to substantial changes in supply and demand is central to the arguments of those economists who say that the impact of global warming associated with the build-up of greenhouse gases in the atmosphere, along with other aspects of exponential growth in the consumption of natural resources, has been exaggerated.⁷ They maintain that the dynamic response of markets will accommodate the predicted changes. So the question of how fast systems can respond to new challenges is central to the prediction of the future impact of any given climatic change. This depends on how quickly people react to warnings of future environmental threats and how much they are willing to pay to avert them.

1.4 What is the 'real' impact?

These opening observations about the problems of attributing economic consequences to climatic change lead to an even more contentious issue. This is the matter of measuring the real economic impact. It emerges in two particular ways.

First, there is the question of the changing price of goods and services and the consequences of inflation. While correcting figures for the changing cost of living can remove the crude effects of inflation, it is only part of the story. Changing public perceptions of risk and resultant behaviour can have a much greater impact. The huge rise in weather-related insurance claims in recent years may be more to do with the risks people take with their property and the compensation they expect to receive than to changes in the incidence of damaging weather events. Unscrambling this complex interplay has to be part of reaching sensible conclusions about what could be the real consequences of climatic change.

Even more contentious is a second factor – making comparisons between the damage in the developed world and that in the developing world. This issue has come into sharp focus following the Climate Con-