To what climate are we adapting?

Contributed by Mike Hulme
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Moves to adapt our society for a changing climate may have focused rather too much on long-term scenarios and not enough on how to cope with weather and short-term variability, argues Mike Hulme. He says the past two British summers show the dangers of this overemphasis on laudable long-sightedness. Are we giving too much weight to the anthropogenic 'signal' of global warming whilst ignoring the natural 'noise' of climate?

This year's British summer has again failed to meet many of our expectations.

As reported by the Daily Telegraph at the end of August: "Summer is all but over. We are entitled to ask: what summer? For the second year running we have been denied anything worthy of the name."

Rainfall was more than 50 percent above average; sunshine levels were well below average, with August being particularly gloomy.

The average temperature was a fraction above the 1961-90 mean, although this was disguised by cooler days offsetting warmer nights.

Is this the British summer climate to which we are being told we need to adapt?

The Mayor of London's office has just published its first ever climate change adaptation strategy in which the risks of increasing summer heatwaves and droughts compete with those of more frequent winter flooding. Both scenarios demand the attention of Boris Johnson and his urban planners.

In a couple of months time, the government - through the UK Climate Impacts Programme - will launch (with much publicity and scientific acclaim) a new set of climate scenarios called UKCIP08 for the nation until the year 2100.

They will be the first national scenarios that offer probabilities about how future climate may change.

'Eye off the storm'

As we think more carefully about how we live with our climate and how we can improve our preparedness for future weather, are we over-emphasising long-term prospects over shorter-term realities?

Are we paying too much attention to uncertain long-term climate predictions - dominated by greenhouse gas-driven global warming - whilst taking our eye off the more immediate weather futures which will determine the significance of climate for society over the next years and decades? Climate adaptation is at a crossroads between the long- and short-term

Using the jargon of climate science, are we giving too much weight to the anthropogenic "signal" of global warming whilst ignoring the natural "noise" of climate?

Individuals, communities and societies have always wanted to know what the future weather will be; whether for managing the cultivation of land or the building of homes through to preparing for social rituals or communal celebrations.

Since the middle of the 19th Century, scientific weather forecasting has been evolving. Current forecasts are able to predict weather three days ahead. These forecasts are as skilful, and contain more detail, as next-day forecasts 40 years ago.

We are better prepared and better adapted to avoid weather risks, such as storms at sea, and to grasp opportunities (eg transport management) than any previous generation.

Paralleling these developments, we have in the last 10 to 15 years also been urged to start bringing long-term climate predictions - scenarios for 2050 and 2100 linked to global warming and derived from climate models - into our adaptation planning.

This is particularly needed for infrastructure projects which have a long life-span.

Balancing act

But are these long-term climate scenarios alone what we most urgently need to improve society's adaptation to weather and climate - to avoid risks and to grasp opportunities? The projection of drier, warmer summers can seem wide of the mark

Weather forecasts offer easily demonstrable and quantified skill. But climate scenarios for the year 2050 cannot be tested against observations; we have to rely on our faith in the underlying climate models.

This faith is tested when we endure summers like those of 2007 and 2008. All long-term climate scenarios suggest British summers will become drier; if we now start adapting for drier summers what happens to farmers, businesses and tourists when we have two successive very wet summers?

All long-term scenarios also suggest heatwaves, such as the one in August 2003, will become more frequent, even the norm, by 2050. How does adapting to this prospect improve our ability to survive cool, gloomy weeks like those we had in 2008?

We will never know empirically on any useful timescale whether or not we have accurate climate predictions for 2050. Yet even if they do prove accurate, if our shorter-term forewarning of daily weather to decadal climate is poor, we may end up just as maladapted and just as exposed to weather risks as if we had ignored global warming entirely.

Two extremes

Scientists have recently begun to tackle seasonal to decadal climate forecasting, time-scales in which natural variability ("noise") is more important than global warming ("signal"). Yet for now, these forecasts remain primitive and of limited skill.

So we remain caught between the two extremes of what science can foretell of future weather: daily forecasts with known skill and value, and centennial scenarios of unknown skill based on (good) faith. How do we prepare the 2012 London Olympics to be well adapted to British summer climate?

We do need to consider the latter in guiding long-term infrastructure design, but an over-reliance on such scenarios to dominate our adaptation thinking and planning carries three dangers.

Long-term climate scenarios may prove to be inaccurate (we have poor means of knowing for sure).

Second, even if they do prove accurate on the time-scale of 50 to 100 years, they may be all but useless for foretelling the climate of the next one to 10 years.

This is linked to the third danger, which is about the social psychology of weather expectations.

Constant public talk of presaged late-century climate will alter public expectations of near-term climate, which - as we have seen these last two years - will continue to yield weather of very different character to that offered by our 2050s scenarios.

To use a specific example: how do we prepare the 2012 London Olympics to be well adapted to British summer climate?

Do we take a 2050 climate change scenario - heatwaves, droughts and all - and assume this will best describe the summer of 2012?

Do we use one of the new experimental decadal forecasts that suggests we may see little warming and maybe wetter summers over the next decade?

Or do we make sure that the Olympics are prepared to cope with whatever the summer of 2012 turns out like - whether the blazing heat of 1995 or the gloom of 2008?

There is an irony here. At the same time as the new national UKCIP08 scenarios offer us more detailed information than ever before about the climate of 2050 - for example, probabilities of hourly rainfall at 1km resolution - so climate science is increasingly emphasising that our weather from months to a decade or two ahead will be dominated by natural variability which we poorly understand and struggle to predict.

The coming decade will yield the familiar mixture of British weather: heat, cold, wind, rain and drought.

Yes, let us use such foresight as science can offer us about the longer term; but effective adaptation to weather and climate variability and management of public expectations of future weather demand more than merely this.

Premature locking of our infrastructure and our social psychology into the dimly presaged but overly precise climate of the late 21st Century maybe as risky as pretending we are still living with the climate of the 20th Century.

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