

# The exceptional UK rainfall and flooding of summer 2007

## Walker Institute briefing

### The wettest UK summer on record

Summer 2007 in the UK was the wettest since records began in 1914.

June was particularly wet. Parts of north east England had four times the normal amount of rainfall – much of it falling during the 24th/ 25th with devastating floods the result. We saw yet more flooding during July, this time mostly over the midlands and south of the UK, with the deluge of rain we received on Friday 20th July.

On Friday 20th July very moist, warm air was transported over us that a few days earlier had been over the sub-tropical Atlantic. This warm, moist air met colder air and so there was lots of energy and moisture available to produce very heavy rainfall. We saw rainfall rates of more than 50mm an hour – we would normally think of 10mm an hour as heavy.



The exceptional rainfall of Friday 20th July 2007 caused extensive flooding in the south of England.  
Source: BBC

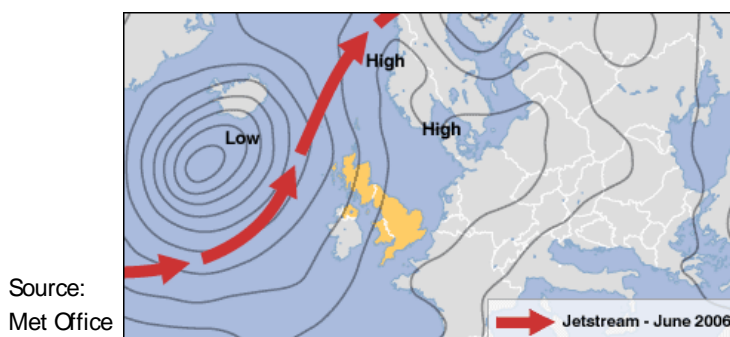
### Why was the summer of 2007 so wet?

Whether the UK experiences a dry or wet summer depends on the course of low pressure systems which track across the Atlantic.

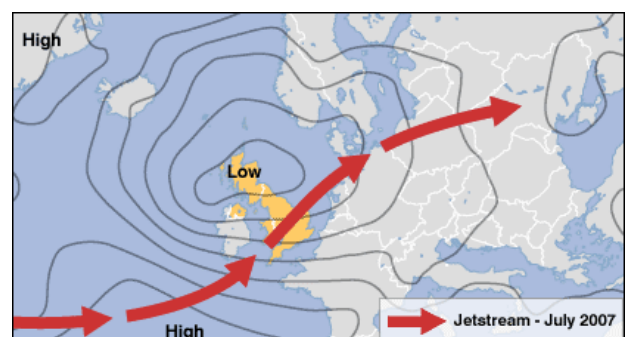
High up in the atmosphere is a ribbon of fast moving air – known as the jet stream. It is the jet stream that steers the weather systems which bring much of our rainfall.

From early June 2007 the jet stream was further south than normal and so rainfall systems were steered straight over the UK. What's more, once these systems reached the UK, they tended to "park", dumping rainfall over us for hour on hour.

The jet stream – a ribbon of fast moving air high up in the atmosphere – steers the weather systems that bring rainfall to the UK.



Source: Met Office



## Why was the jet stream unusually further south during summer 2007?

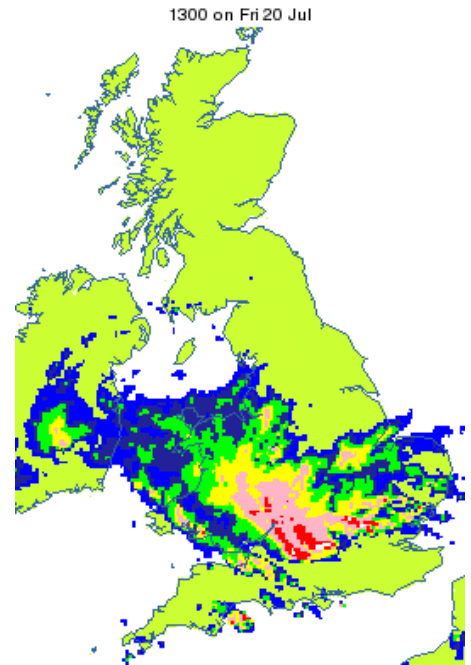
Many different things affect our weather and, at present, we don't know why the jet stream was further south than normal during summer 2007.

The weather over the UK and Europe can be affected by conditions in other parts of the world, even as far away as the tropics. During summer 2007 we saw the following weather conditions outside the UK:

- strong anticyclone over the eastern Mediterranean with very high temperatures and wild fires,
- above average rainfall in a very vigorous Indian/ Asian Summer Monsoon, and
- a weak La Niña in the equatorial East Pacific sea surface temperatures.

Previous atmospheric modelling studies at Reading suggest that the strong Indian/ Asian Monsoon may be a factor for the eastern Mediterranean heat, but it is equally possible that these Mediterranean conditions could be an extension of the pattern affecting the UK and western Europe during June 2007. Experiments with atmospheric models will help us to clarify these possible links.

The links with La Niña appear to be tenuous with no strong evidence that La Niña was responsible for a significant southward shift of the jet-stream or the persistent weather pattern that the UK experienced during summer 2007.



Intense rainfall falling over southern England on Friday 20th July 2007.  
Source: Met Office

## Was the flooding caused by climate change?

Predictions of future climate change suggest that during winter we could experience more frequent heavy rainfall and so an increased risk of flooding over central and northern Europe (including the UK).

Predictions also suggest drier summers, associated with a poleward shift of the storm-track, the opposite of what occurred in summer 2007.

Recent Met Office work has also suggested that despite the decrease in summer mean rainfall, the wettest days in the summer are likely to be-

come somewhat wetter. This increase is associated with enhanced rainfall from isolated convective storms in a warmer world with more moisture in the air.

Predicting rainfall changes, particularly when we start to zoom in to areas the size of the UK, remain a challenge for climate models. However, scientists at the Walker Institute are developing more detailed climate models which will lay the foundations for improved predictions of the changing risks from extreme events.

*"Governments and businesses require more confident forecasts of local and regional changes in climate and extremes. Improving predictions of regional climate change and hazardous weather are key aims of the Walker Institute."*

Prof Nigel Arnell, Director of the Walker Institute

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