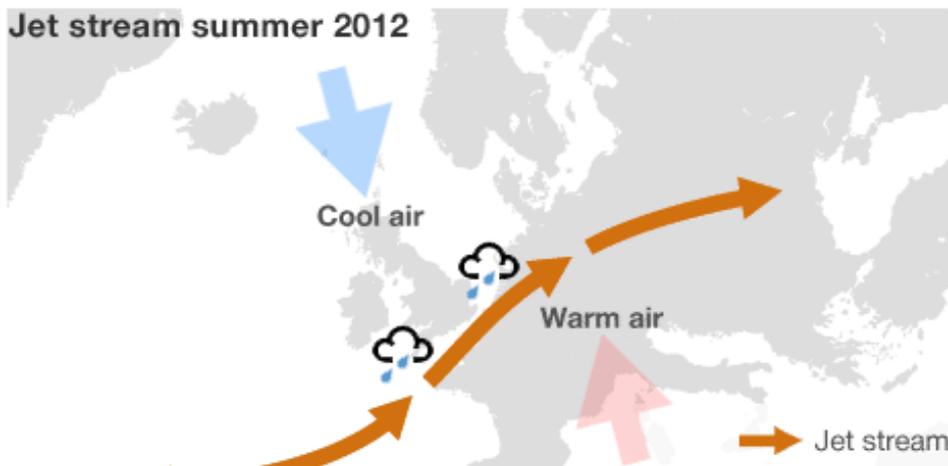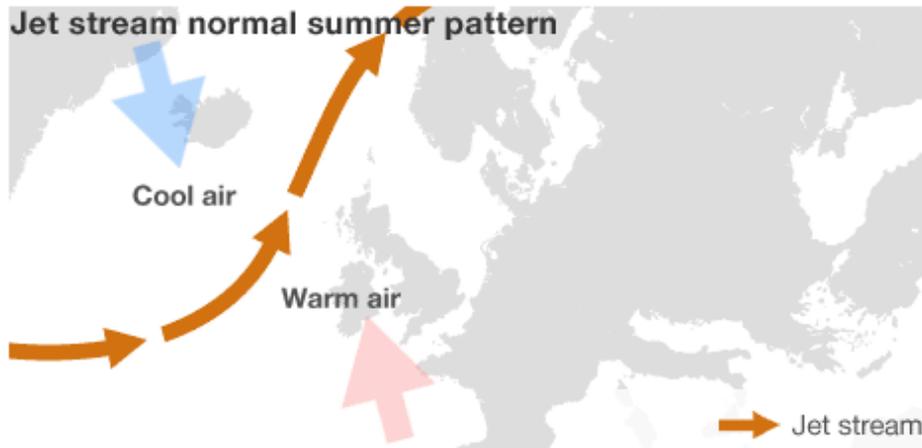The Jet Stream

The polar front jet stream is a belt of westerlies in the upper troposphere, with wind speeds up to 200mph. It is at a high of around 10km – the height at which aeroplanes fly. Trans-Atlantic pilots make use of the jet stream to minimise flight times.

The jet stream is found where the poleward surface temperature gradient is strongest – i.e. above the polar front. This location is also favoured for the formation and intensification of depressions.

Depressions on average follow the same path as the jet stream. This creates a clustering of the tracks followed by depressions known as the 'storm track' at the surface. The developing depression interacts with the jet creating continental-scale waves along it.

In the summer of 2012, the weather in the UK was particularly bad – whereas usually in the summer, the storm track (and therefore the jet stream) are to the North of the UK, bringing bad weather to Norway, in 2012 the storms tracked much further south, bringing rain to England and Wales and extremely good weather to the far north of Scotland. Why was this? The atmosphere is complex and things can never be attributed to one or two particular causes, but there were a couple of notable events elsewhere in the climate systems. Firstly, there had been a strong La Niña event in the East Pacific, secondly the Arctic was far warmer than usual, with far less sea-ice persisting through the summer. Both these factors will have contributed to a greater or lesser extent to the position of the polar front, the jet stream and the storm track.

RMetS

Jet stream normal summer pattern

Cool air

Warm air

Jet stream

Jet stream summer 2012

Cool air

Warm air

Jet stream

The image below from the BBC shows the position of the jet stream in the winter of 2013/ 2014. It indicates that the path of the damaging storms in that season was that they approached the UK from further south over the Atlantic, therefore bringing relatively warm air and plenty of energy with them – contributing to the destructiveness of the storms.

You can find current images of the jet stream at
http://www.netweather.tv/index.cgi?action=jetstream;sess=