

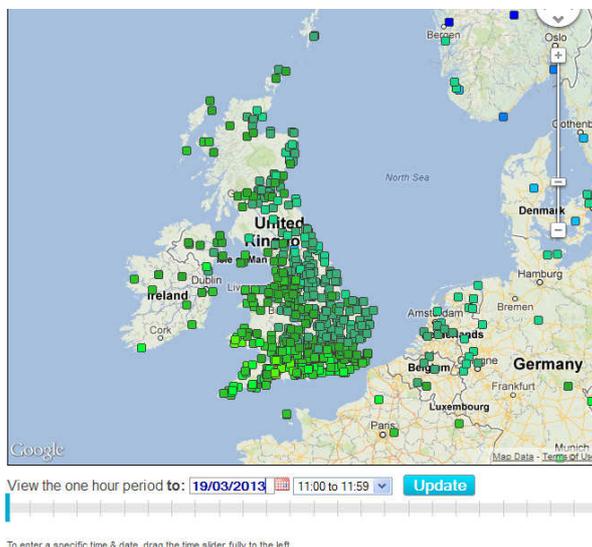
A Case Study of a Weather System using WOW data

Notes for Teachers

This exercise asks students to use real weather data to investigate the weather conditions associated with a depression passing over the UK. The WOW website is run by the Met Office. Some Met Office weather data is available through it, but there is much more data that has been submitted by the general public. Anyone can submit data – whether they have a weather station in their back garden or are just looking out of the window. The Met Office assigns each observer a star rating based on the quality of their instruments and how well they are located to accurately record the weather.

Preparation

Each student or pair of students will need a PC or laptop with internet access. They should go to the WOW website <http://wow.metoffice.gov.uk>. By sliding the time slider bar all the way to the left, you are able to enter a specific date to look at.



Use the pop up calendar to select 8th December 2011 and the drop down box to choose 0600 to 0659 in the morning.

Use the Layers menu on the right to select wind speed.

Where is the wind coming from?

Answer: The wind is from the South and South West

Is the wind weak or strong?

The wind arrows are variable, but its pretty windy in places. There is more wind information in England than in Scotland, this is because of where the people are who are contributing information to the website.

Change the time to 1200-1259. How does the wind look now?

The wind is still from the southwest, but its got stronger.

Change the time to 1800-1850. How does the wind look now?

Its still very windy, but the wind is now from the West.



View the one hour period to:

Now use the layers menu on the right to look at temperature.

At 0600-0659, what are the temperatures across the UK?

The temperature ranges from 11.9C in Cornwall, to 0.3 in Scotland. It is warmer in the South and West, and colder in the North and East.

Capture the image, stick it into a work book at draw a line roughly dividing colder and warmer temperatures. What is a line dividing cold and warm temperatures called?

Such a line is called a front. This is a warm front, because the warmer temperatures are behind the front.

Now look at the temperature between 1200-1259. What is the pattern of temperatures?

The range of temperatures are roughly the same, but now the whole of the South of England, Wales and the Midlands are warm, with colder temperatures in Northern Ireland and Scotland.

Capture the image, stick it into a work book at draw a line dividing colder and warmer temperatures.

It's a cold front this time, because the temperatures behind the front are colder.

For Stronger Students:

Find the Met Office Weather Station in Glen Ogle in the Highlands of Scotland, and click on it. Click on 'View Observation' and then on 'Graph View' and use the calendars to select from 8/12/11 to 9/12/11. How does the air temperature change?

The air temperature rises sharply from 6am, then falls from 11am. 6am is before sunrise at this location in December, so these two changes in temperature mark the passage of the warm and cold fronts.

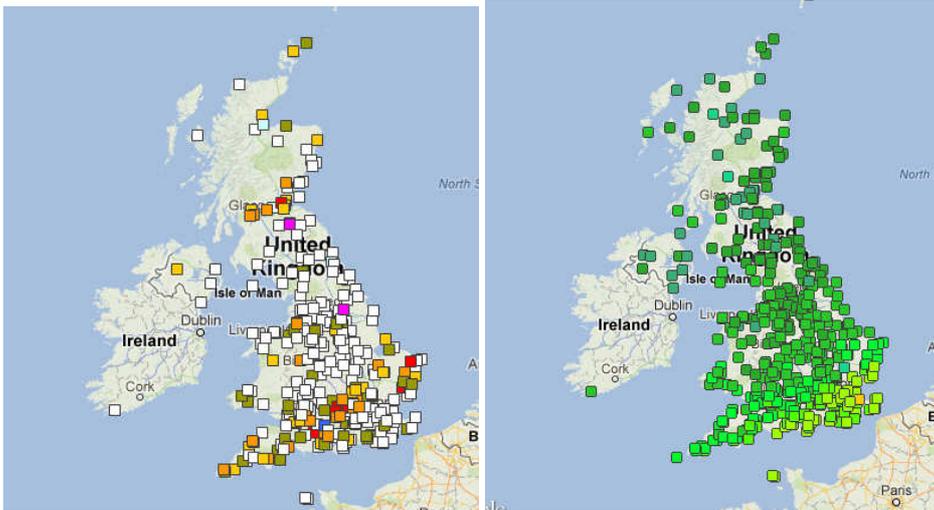
Now look at the temperature between 1800-1859. What is the pattern of temperatures?

The range of temperatures are roughly the same, but now only the very South East corner of England is warm, with the rest of the country being cold.

Capture the image, stick it into a work book at draw a line dividing colder and warmer temperatures.

Now use the Layers Menu to select rainfall rate at 1800-1850. Where is it raining?

The rain is mainly in a band across the South of England. It should roughly coincide with the line drawn on the temperature map at this time.



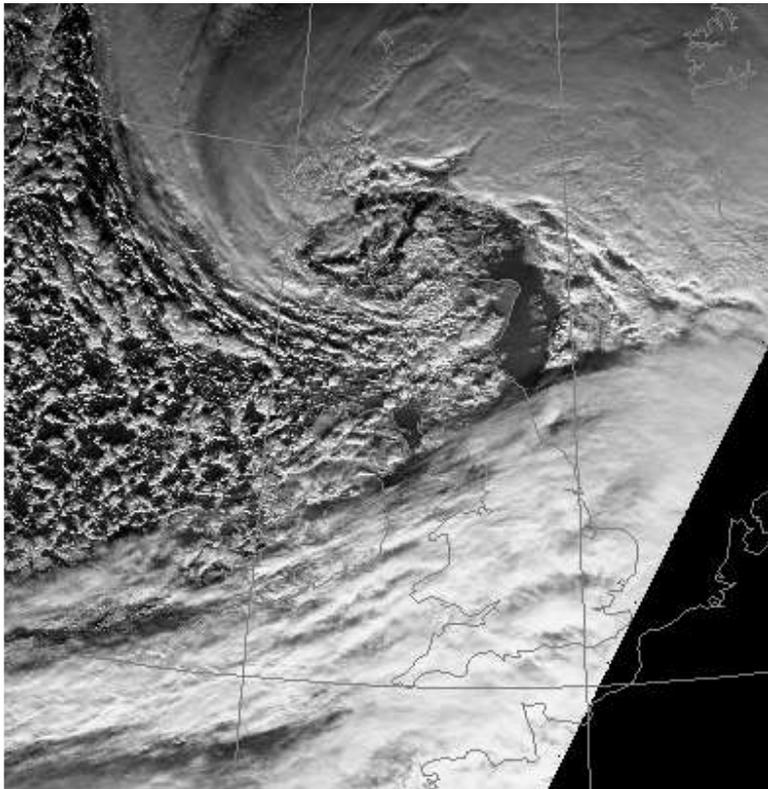
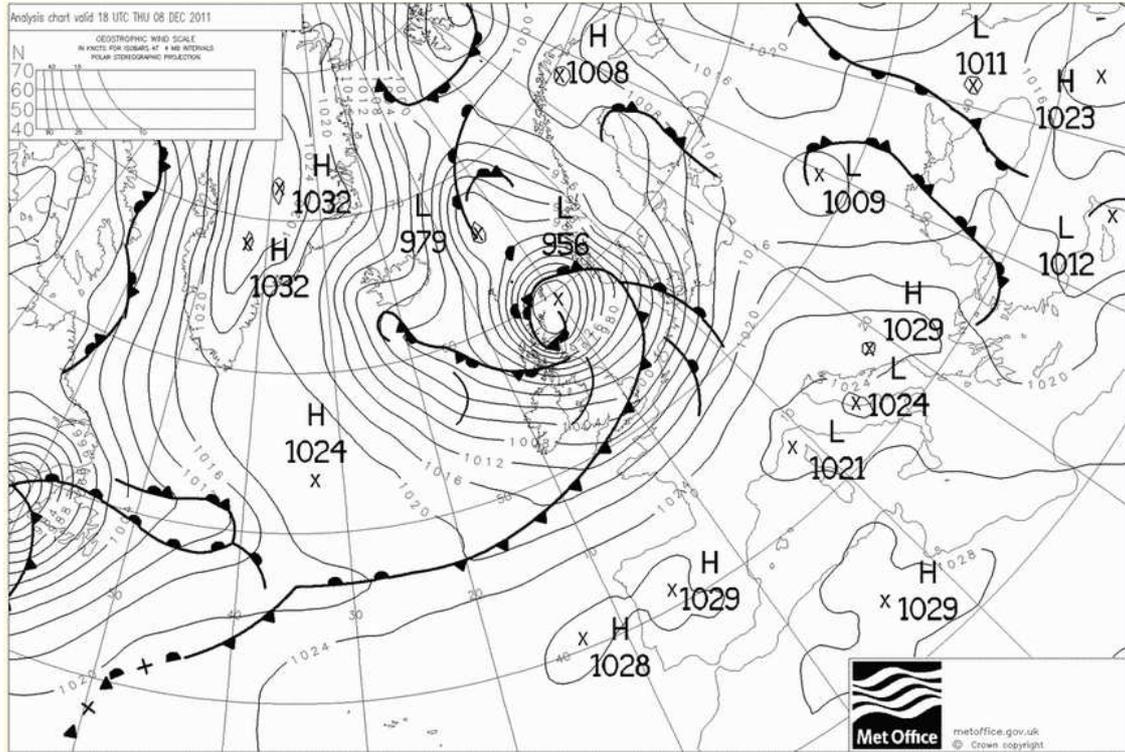
Go back in time, hour by hour, what happens to where the rain is?
The belt of rain moves slowly up the country.

Now use the layers menu to select 'pressure' and investigate how that changes through the day.
Throughout the day, the lowest pressures are in the North of Scotland, with pressure getting gradually higher as you go further south. The pressure falls through the day and you can see the lowest pressure move East – first out to the Shetland Isles, then over to Norway by the late evening.

Summarise what you think is going on with the weather on the 8th December 2011.
Through the course of the day, a depression or mid-latitude low pressure weather system passed over the UK. In the early hours of the morning, a warm front, dividing cold and warm temperatures and with some associated rainfall (mainly towards the centre of the Low) moved across the country. By midday, the cold front was moving down the country, bringing colder temperatures and heavy rain. By 6pm, only the very south east was still in the warmer air. Because the pressure fell very rapidly across the country (if you could see pressure contours, they would be close together) the wind speeds were very fast.

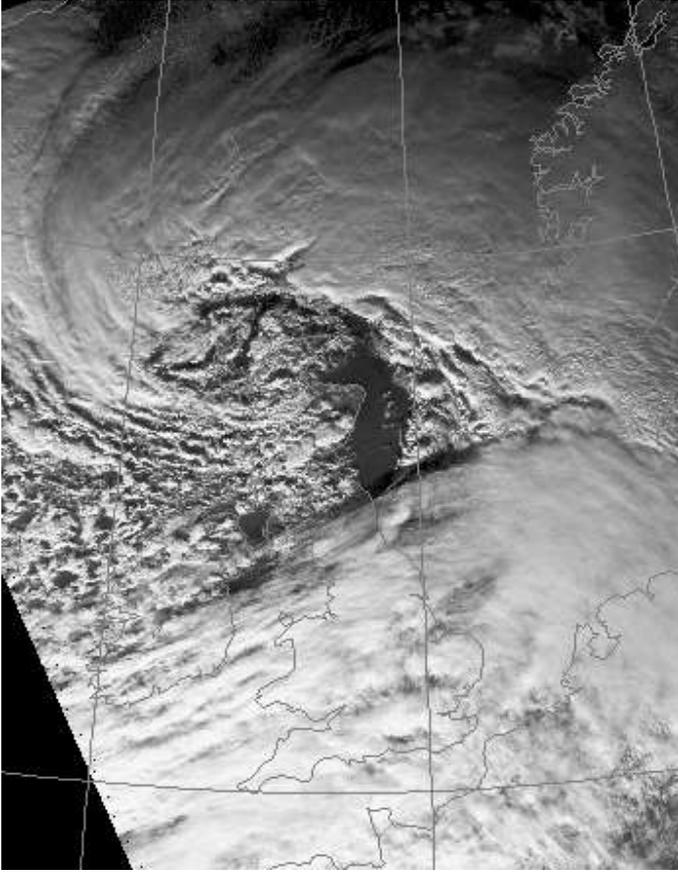
Possible Extension Activities:

- Draw station plots for some of the weather stations on the weather charts showing pressure, temperature, weather etc. You can find information about this at <http://www.metlink.org/> by selecting secondary – key stage 4 – weather maps – student charts from the left hand menu.
- The WOW website has 3 types of data – Met Office, WOW sites and quick observations. Each observation is given a star quality rating. Do you need to take the quality of the data into account? Does the quantity of data on the map matter?
- Look up news reports of this weather event (for example on the BBC news website, search for '8 December Scotland Storm')



MODIS channel 2 (visible) satellite image 1215 UTC 8/12/11

The warm sector is filled with cloud, and the cold front is clearly marked by the edge of the cloud.



MODIS channel 2 (visible) satellite image 1227 UTC 8/12/11