Weather and Climate

Mountain areas often have a very different climate and experience different weather conditions, compared to surrounding areas. It is important to remember that climate describes the average weather conditions over longer periods and over large areas, where as weather describes the day-to-day conditions of the atmosphere.

There are many factors that affect climate and weather including: latitude, altitude, relief, aspect and distance from the sea.

Latitude

Places close to the equator are usually warmer because they receive more intense solar energy than places further away from the equator, which are cooler. We have a temperate climate.

Altitude

Locations at a higher altitude have colder temperatures. Temperature usually decreases by 1°C for every 100 metres in altitude. This happens because air becomes thinner and is less able to absorb and retain heat. The cooler the temperature the less evaporation there is, meaning that there is more moisture in the air.

Relief

Relief refers to the way the landscape changes in height. It shows the difference in elevation of various physical geographical features in a given area, such as mountains, valleys, lowlands.

Aspect

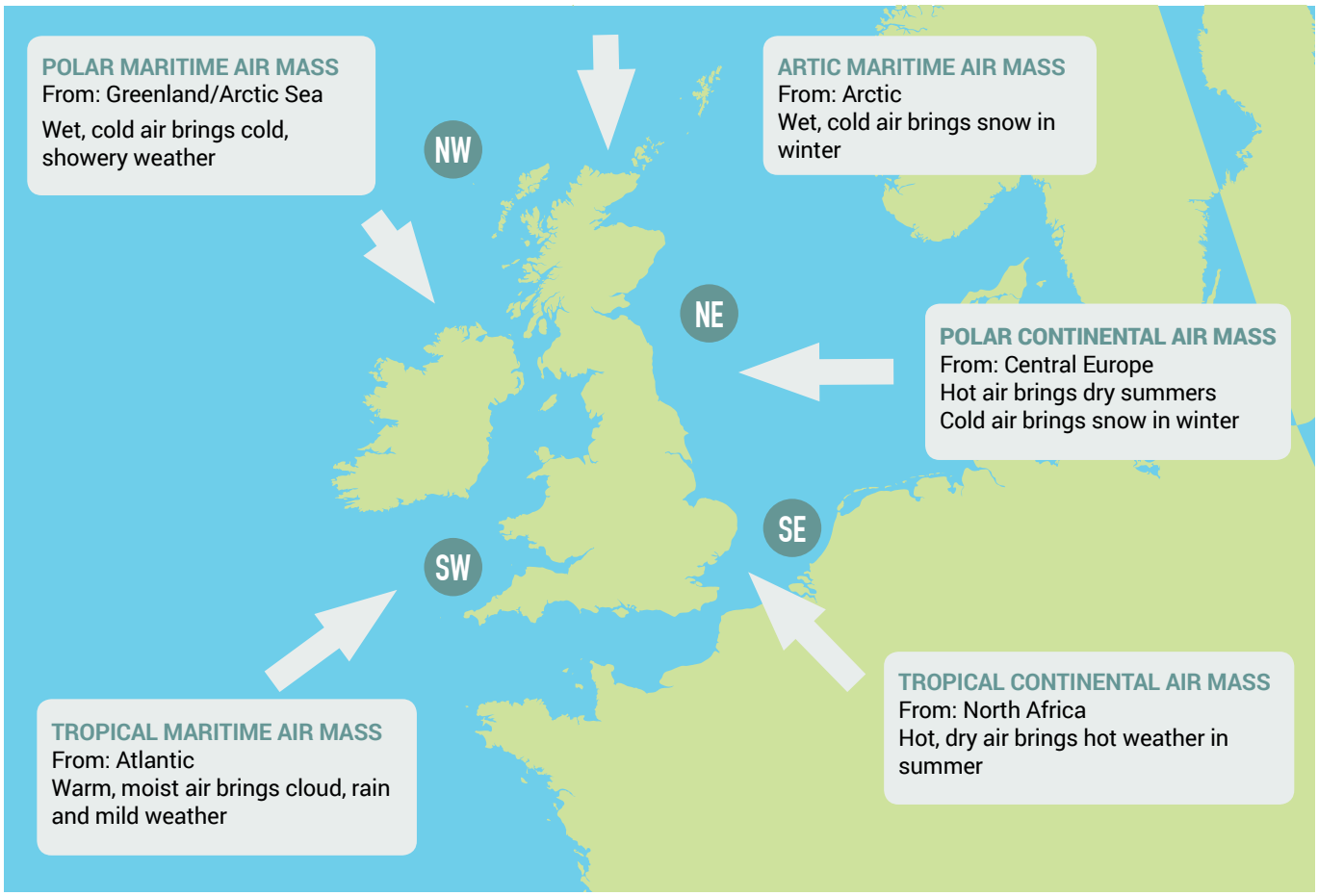
Aspect is the compass direction that a slope faces. In the Northern Hemisphere, places which are south-facing are warmer and places which are north-facing are colder.

Distance from the Sea

Oceans heat up and cool down much more slowly than land. This means that coastal locations tend to be cooler in summer and warmer in winter than places inland at the same latitude and altitude.

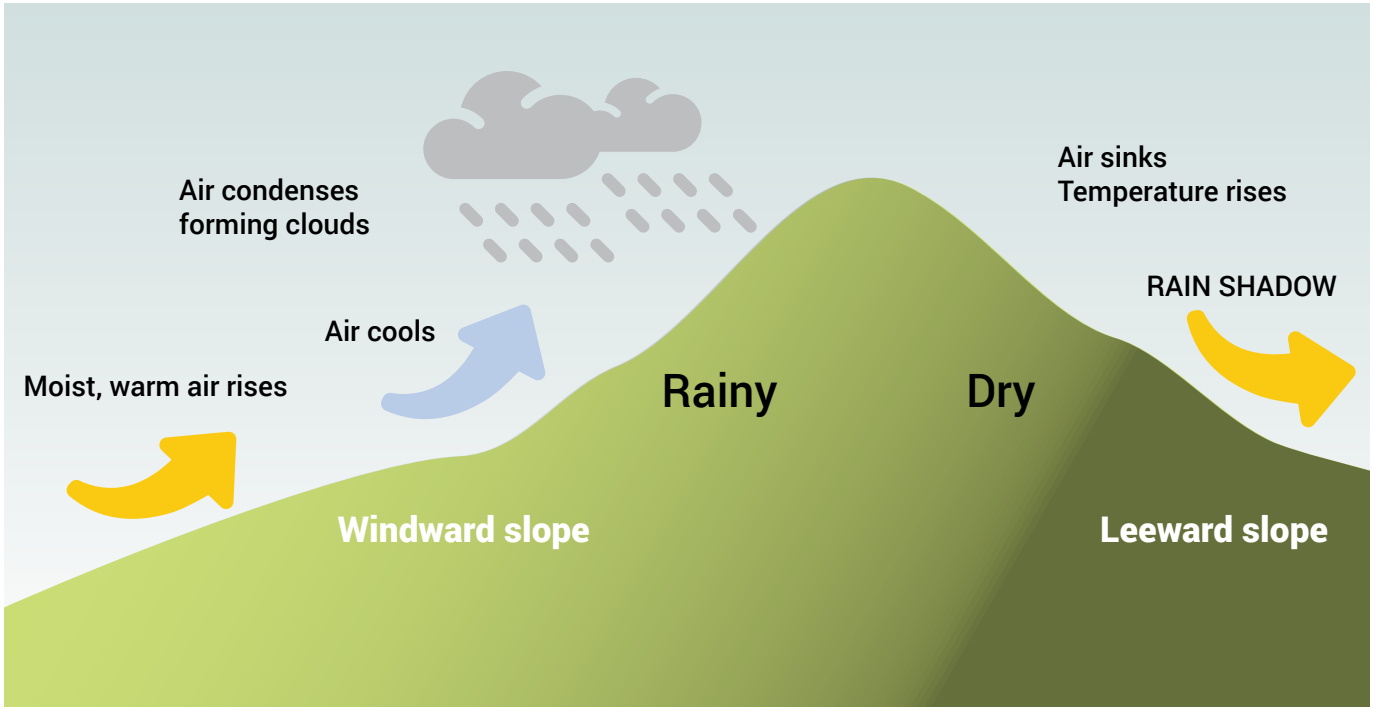
Air Mass

Air mass is a large volume of air which travels from one area to another. The weather an air mass brings is determined by the region it has come from and the type of surface it has moved over. There are 5 main Air Masses which affect The British Isles.



Mountains and Rainfall

Relief rain is formed when air is forced to cool when it rises over relief features in the landscape, such as mountains. As it rises, it cools, condenses and forms rain. There is often a rain shadow effect whereby the leeward (downwind) slope receives a relatively small amount of rain. The higher the mountain, the more pronounced the rain shadow effect is and the less likely rain will fall on the leeward side.



Close up of freeze thaw

Freeze thaw

There is also freeze thaw weathering. This occurs in mountain environments when water in cracks in the rock freezes and expands forcing open the gap. When the ice melts more water can get into the crack and freeze again. As the water turns into ice it expands and exerts pressure on the surrounding rock, causing pieces to break off over time. These small pieces of rock are called scree and often build up forming scree slopes on mountainsides.

Questions

Mountain environments are generally colder and wetter than other areas. Explain why this is the case.

If you were running a ski centre in Scotland describe which air masses you would want in winter for cold and snowy weather.

If you were going out on a hill walk in summer describe which air masses you would want for pleasant walking conditions.

Explain what impacts you think temperature and rainfall may have on the growing season for plants in mountain environments.

Give reasons why rainfall and freeze thaw weathering could impact stone built paths in the mountains.

Weather Forecasts

The weather has an effect on the landuse and land management of an area. It also has a big impact on what activities people do in the outdoors. Weather forecasts help people to plan what they do and when, but forecasting the weather is a very difficult science.

Look at weather forecasts for Cairngorm Mountain, near Aviemore on different sources such as:

- **Accuweather**
- **MET office**
- **Mountain weather information service**

Now compare these forecasts to the live webcams on the website.

- **Cairngorm Mountain webcam**

You can also look at the forecast for your area and compare it to the weather outside now.

Questions

Describe the differences in the weather forecasts from different sources.

Explain how weather forecasts are produced.

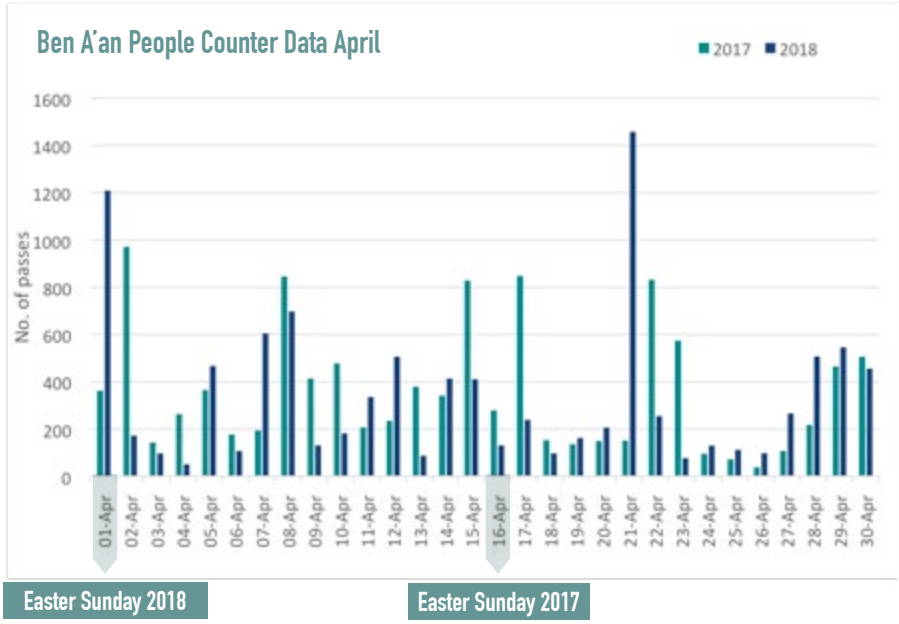
Explain how accurate the different forecasts are.

Give reasons for the variation in accuracy of a forecast

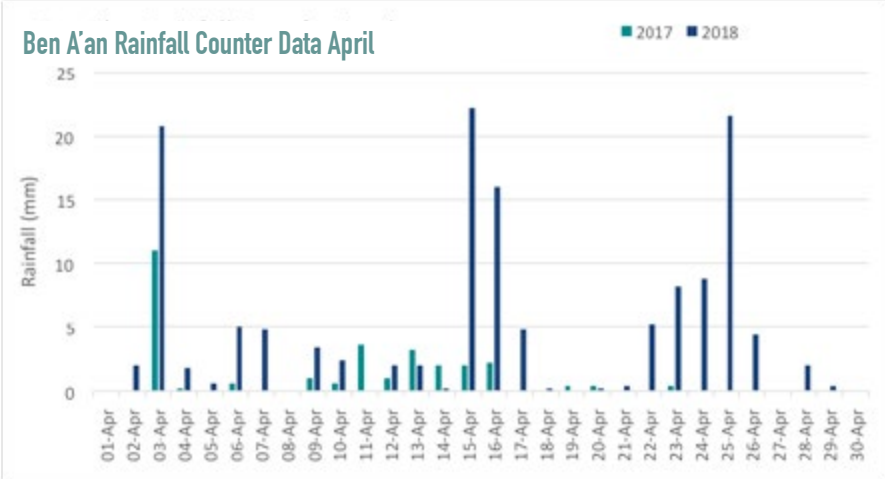
Effect Of Weather On Visitors

On some hill paths, people counters have been installed to record the number of people who are using a path. The one on Ben A'an is a post fixed in the ground with a laser sensor which can detect every time someone walks past, when they visit and in which direction they are traveling. This information is very useful when planning the management of the site.

This graph shows the number of people who walked past the people counter in April 2017 and 2018.



The graph opposite shows the rainfall data collected at Loch Katrine, which is next to Ben A'an. It was collected by SEPA (Scottish Environment Protection Agency) which monitors the amount of rainfall in order to manage potential flooding events.



Questions

Describe the patterns or trends in the data.

Explain what, if any, correlation there is between the rainfall and people counter data.

Give reasons, other than rainfall, that might affect the people counter data.

Explain what limitations there are with the data from people counters.

Further examples of people counter and weather data can be found on the resources page of our website.