

COURSE SUPPLEMENT

COME RAIN OR SHINE

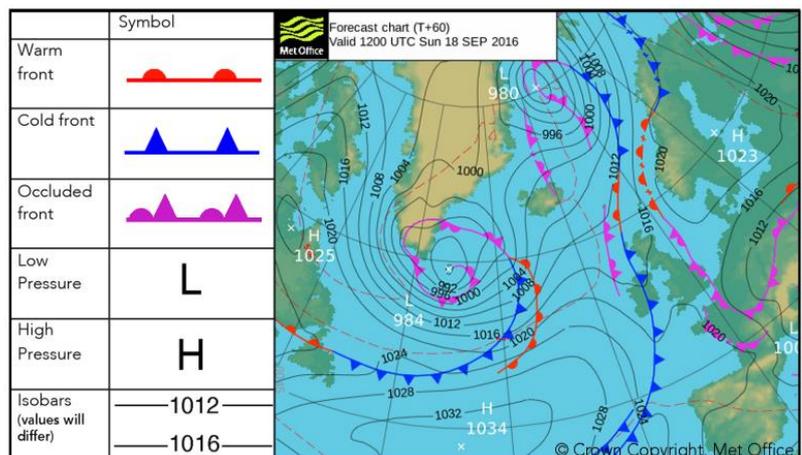
Understanding the weather

BASIC POINTERS

We've provided some basic pointers to help you get to grips with some of the terminology and concepts you'll be encountering each week. We've also gathered all the diagrams for each week of the course, into a weekly supplement. You may find these useful to print out, to keep to hand whilst you work through the course.

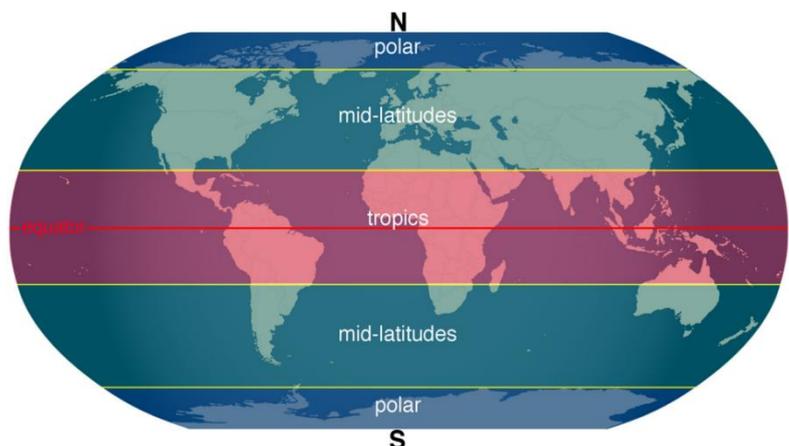
WEATHER (OR SYNOPTIC) CHART

A brief guide to the basics of reading a weather (also known as a synoptic) chart.



TEMPERATURE ZONES

A basic guide to where you can expect Earth's temperature zones to fall.



EARTH'S ATMOSPHERE

Exosphere

The exosphere is the uppermost region of Earth's atmosphere as it gradually fades into the vacuum of space. Air in the exosphere is extremely thin.

Thermosphere

Much of the UV and X-ray radiation from the Sun is absorbed in the thermosphere, causing temperatures in the upper thermosphere to range from about 500°C to 2,000°C or higher. The aurora (the Southern and Northern Lights) primarily occur in the thermosphere. Charged particles (electrons, protons, and other ions) from space collide with atoms and molecules in the thermosphere at high latitudes, exciting them into higher energy states. Those atoms and molecules shed this excess energy by emitting photons of light, which we see as colourful auroral displays.

Mesosphere

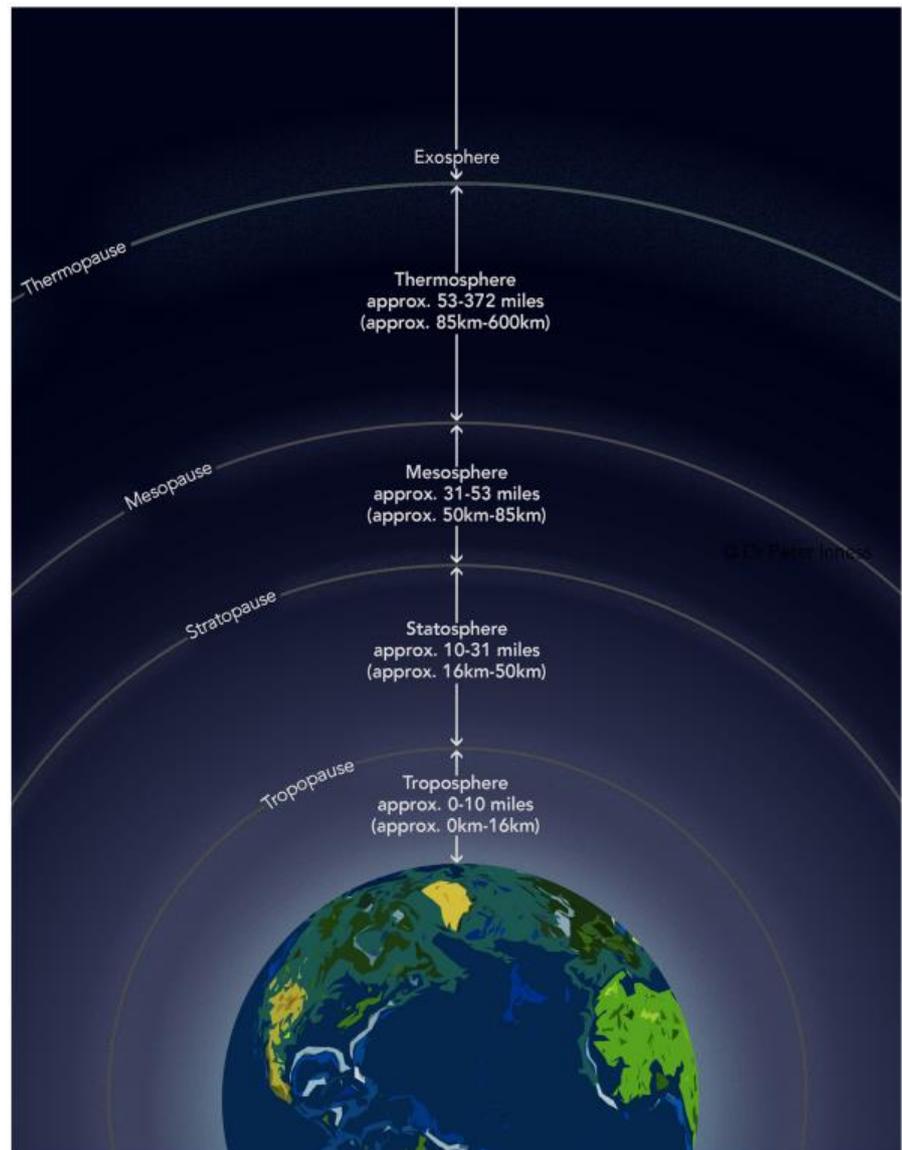
Unlike the layer below, temperature drops with increasing altitude. The coldest temperatures in the Earth's atmosphere (about -90°C), are found near the top of this layer. Most meteors burn up in this layer.

Stratosphere

Here you'll find the ozone layer, where its absorption of ultraviolet radiation from the Sun causes temperatures to increase as you go higher.

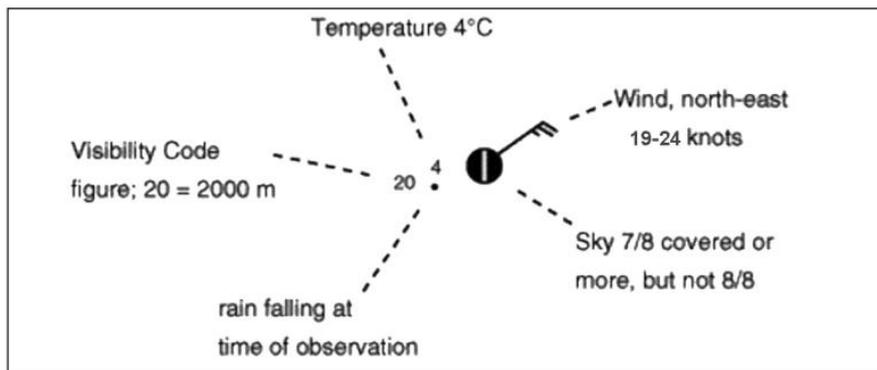
Troposphere

Is the most dense out of all the layers and is where almost all weather activities take place.



GUIDE TO WEATHER SYMBOLS

On the right is a typical simplified weather symbol from a chart of weather observations. Let's look at some other symbols which you may come across when looking at weather reports.



WIND SPEED: THE BEAUFORT SCALE

The scale is used to describe the intensity of wind speed.

In addition to showing the speed of the wind, the direction the tail is pointing in gives the wind direction: for example in all the weather symbols in the chart, the wind direction is north-easterly, ie from the north east.

Wind	Symbol	Speed (mph)	Force #	Effect
calm		>1	0	smoke rises vertically
light air		1-3	1	smoke drifts slightly
light breeze		4-7	2	leaves rustle; wind van moves
gentle breeze		8-12	3	leaves- constant motion light flag extended
moderate breeze		13-18	4	raises dust and papers; small branches stir
fresh breeze		19-24	5	small trees sway
strong breeze		25-31	6	large branches move; use of umbrella difficult
moderate gale		32-38	7	whole trees in motion
fresh gale		39-46	8	twigs broken off trees; difficult to drive a car
strong gale		47-54	9	slight structure; damage occurs
whole gale		55-63	10	trees uprooted; severe structural damage
storm		64-73	11	widespread damage
hurricane		Above 75	12	devastation

The Beaufort Scale has unofficially been extended to Force 17 to describe tropical storms exceeding 126 miles per hour.

CLOUD COVER

Cloud cover is measured in Oktas, or how many eighths of the sky is cloudy.

	Symbol		Symbol
Clear sky		5/8 covered	
1/8 covered or less, but not zero		6/8 covered	
2/8 covered		7/8 covered	
3/8 covered		sky completely covered	
4/8 covered		sky obscured, eg by fog	

PRECIPITATION

A guide to precipitation symbols.

	Symbol		Symbol
Rain		Fog	
Drizzle		Thunderstorm	
Shower		Hail	
Snow			

CLOUD GUIDE

CLOUD BASE	Bubbly appearance	Other sort of structure	Flat with few features
HIGH Above 6,000 metres	<p>Cirrocumulus</p>  <p>Not a common type. Sometimes dappled or rippled. Sun visible.</p>	<p>Cirrus</p>  <p>Sometimes delicate, hair-like strands. Sometimes thicker blobs.</p>	<p>Cirrostratus</p>  <p>A veil of white thin cloud. Sun clearly visible with shadows. Often with halo.</p>
MEDIUM 2,000 to 6,000 metres	<p>Autocumulus</p>  <p>Broken into small flat clouds, often regularly arranged. No rain or snow.</p>	<p>Use the photographs to help you identify the type of cloud in the sky. Consider the following:</p> <ol style="list-style-type: none"> 1. Is the base of the cloud high, medium or low? 2. Is the cloud flat with few features, is it bubbly, or does it have some other sort of structure? 3. Is the rain falling or does it seem likely to fall? 	<p>Altostratus</p>  <p>Thicker than cirrostratus; sun visible as disc. No shadows or halo.</p>
LOW Below 2,000 metres	<p>Cumulus</p>  <p>Small cumulus have a cotton wool shape. Often grow to bunch together. No rain.</p>	<p>Stratocumulus</p>  <p>Common. Sometimes covering whole sky, sometimes more like flattened cumulus.</p>	<p>Stratus</p>  <p>Grey, flat and boring, no sun visible. Drizzle may fall. Called hill fog on high ground.</p>
LOW Rain falling	<p>Cumulonimbus</p>  <p>Cumulus grown tall and dark. Showers likely. Top can be very high, sometimes feathery or flat.</p>	 <p>Written by Geoff Jenkins. All photographs (except Cumulonimbus) are © Geoff Jenkins 2011. Cumulonimbus photograph is © Steve Robson 2011.</p>	<p>Nimbostratus</p>  <p>Thick dark stratus, giving rain which is often heavy and prolonged. Difficult to photograph.</p>