

Being Weatherwise for Sailing

In this, the first of a new series, Fiona Campbell, meteorologist for the British Olympic and America's Cup teams, looks at how sailing enthusiasts can be more weatherwise.

Weather & sailing. Where do you start? The internet now gives everyone access to huge amounts of weather information, but for an enjoyable and safe weekend potter on the harbour you need a few weather basics. Over the coming weeks we will discuss how to read the large scale weather, how to understand the many forecasts available, where to get the forecasts and then how to transfer all this information onto your local sailing waters. You can comment on these features and add your suggestions in our [message board](#).

This week we begin by looking at some basics all sailors need to know : **the 'High's & Low's of UK Weather'**.

The UK's mid latitude position between 50 – 60°N leaves it between the warm south and the cold north. The atmosphere is driven by a need to reduce this temperature gradient by sending warm air north and cold air south using cyclones & anticyclones, or the high's & low's which make up our 'synoptic - scale' weather, and which we see on the [pressure charts](#).

When low pressure systems form in the western Atlantic, they pick up warm moist air which is then mixed with cooler air from the north as they move east across the top of the Azores high. The boundaries between these air masses are marked by fronts.

A typical anticlockwise rotating low centre will reach western Ireland and then curve north up the western Scottish coast. The warm front moves across the UK first, with warm moist air behind it bringing spells of rain and often reduced visibility with south to south westerly winds. The cold front chasing along behind is the boundary between this warm moist air, and the cooler more unstable brighter & more showery weather behind, with winds typically from the south west to north west.

The transition of these fronts is something the sailor has to take note of as the passage of these fronts over head will bring strong winds and occasionally heavy rain which can quickly turn a pleasant days sail into a dash for shore.

High pressure usually follows these low pressure systems. These anticyclones are clockwise rotating sinking air masses which we associate in the summer season with light winds and sunny skies, and often building afternoon onshore or sea breezes.

The pressure imbalance created between the high and low pressure areas is what drives the wind as it tries to reduce this pressure gradient. Wind which we see on the water is, in the northern hemisphere, more backed (further left looking upwind) than this 500m pressure gradient wind due to the effect of friction or drag on the wind by the surface. The rougher the surface the more drag on the wind, i.e. winds are more backed over the land (20 – 40°) than they are over the smoother sea (10 – 20°). This is something to look for on the water when winds are blowing off the shore, as they will veer (clockwise, or shift right looking upwind) downwind of the shore.

Heat from the sun has a noticeable effect of the surface winds. How many mornings have you looked out the window to see calm conditions but by lunchtime the winds have picked up nicely? During the night the earth cools and so in turn it cools the air directly above it, which reduces it's 'energy' or mixing and so reduces the wind speed. As the sun heats the earth, the air next to the surface begins to warm and so begins to rise and mix as cooler air sinks to the surface to replace it, which results in an increased wind speed.

Friction & heating are just two examples of the many factors which we must take into account when on the water. The forecasts we receive are often for a much wider area and there are small scale processes which affect the local winds. We will look at the forecast's themselves next week, their strengths and limitations before we move on to have a closer look as to how the sailor can adapt it to their local shores.

Related links:

[Fiona Campbell's Job](#)

[Sailing and Weather](#)

[Royal Yachting Association](#)

In the second feature of this series, Fiona Campbell, meteorologist for the British Olympic and America's Cup teams, looks at some of the forecasts freely available for sailors : "And now the shipping forecast...".

You can comment on these features and add your suggestions in our [message board](#).

There are many forecasts available for sailors before they set to sea. All these forecasts are written by the meteorologist using the most recent data available and is the best picture they can give at that time. It is always worth noting that most forecasts are often very general as they have to cover such a wide area, particularly the shipping forecast. Also land based forecasts will often give wind speeds less than those that you will see on the water, due to many things, including friction as we discussed in the previous article, and will discuss in more depth later.

Beaufort Scale

Wind speed in mariners' terms is measured using the Beaufort Scale, each force corresponding to a wind speed range and in turn a water state. See the scale and sea state in Bill Giles explanation at <http://www.bbc.co.uk/weather/features/alphabet5.shtml>.

Wind is also reported in miles per hour or kilometres per hour on many land based forecasts. So when looking at television & newspaper forecasts make sure you check the unit of measurement. Miles per hour is similar to knots (1 knot = 1.15 mph), but a forecast of 30 kph may sound strong but it would actually be a nice sail in 16 knots of breeze (1 knot = 1.85 kph). You can use the calculators on the BBC Weather site to convert these.

The BBC also use arrows, which are range from thin to thick as wind speed increases, and they also change in colour depicting warm or cool winds. Green or blue arrows depict cooler air which when coming down from the north flow over increasingly warm sea surface temperatures. The lower level air is heated which rises and is then replaced by cooler air aloft as it sinks which, on the water gives gusty conditions as the air is 'unstable' and 'turbulent'.

Rain later. Good.

In 1853 Captain Robert FitzRoy was put in charge of forming the Met Office to provide meteorological and sea current data to mariners. The Met Office continues to provide this information in the form of the [Shipping Forecast](#) and the [Inshore waters](#) forecasts that you can listen to on BBC Radio 4 or read on this website. At first these seem quite daunting, especially when heard being read at pace on Radio 4, however once understood and read at one's leisure they can give you a good overall picture of what is currently happening and what to expect.

The shipping forecast gives a general synopsis which explains where the high's and low's are and where they are expected to travel to over the next twenty four hours. It then proceeds to, almost, logically go around British waters and give the wind direction and strength followed by weather and visibility. There are a few things which you need to remember; backing is anticlockwise and veering is clockwise, or left and right looking upwind. When wind directions vary cyclonically it means that the low centre is coming close by and wind directions will vary by a large amount in a cyclonic or anticlockwise direction.

Following the shipping forecast in the radio bulletins is the coastal forecast. This brings the synoptic scale down to a more local level. The areas are much smaller but the format is the same; wind direction and strength, weather and visibility. This forecast will take into account more of the effects of the land, such as where winds funnel and increase through channels, such as Dover in a westerly, and where winds will increase as they are forced around headlands, St Davids Heads in a south to south westerly, or decrease if in the lee of high ground such as Thames Estuary in a light north westerly.

Tides

When sailing in coastal waters, particularly those such as the Solent or Bristol Channel, you should always remember that a tide pushing you into the wind will add up to 3 or 4 knots onto the present wind speed, and subtract it when it is wind with tide. Check [UK Tides](#).

In addition to the shipping forecast there are many other sources of information. Next week we will look at where to find them, which are the most useful and also how to read the synoptic charts in more detail.

Related links:

[Fiona Campbell's Job Sailing and Weather](#)
[Royal Yachting Association](#)

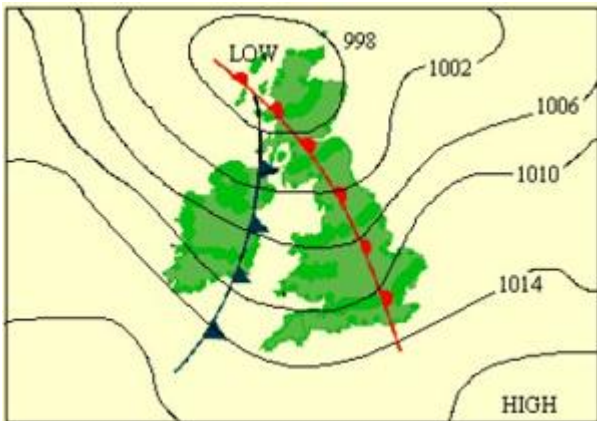
In the third feature of this series, Fiona Campbell, meteorologist for the British Olympic and America's Cup teams, looks at how you can use maps and charts to help you understand the weather and help you plan your sailing.

You can comment on these features and add your suggestions in our [message board](#).

There are almost endless internet sites providing weather forecasts, charts and observations from around the world. They range from giving a basic picture-based outlook for your area, to the actual current observations, to the model output itself. You are already reading one of the most organised and informative sites!

A good place to start is with the synoptic scale chart, or the pressure chart, which will give you an idea what the broad scale weather is and how it is likely to change over the next few days. Watch the weather on TV and follow the pressure charts through the week to see how fast things are changing; where are the fronts? How fast are they moving?

How strong will the winds be?

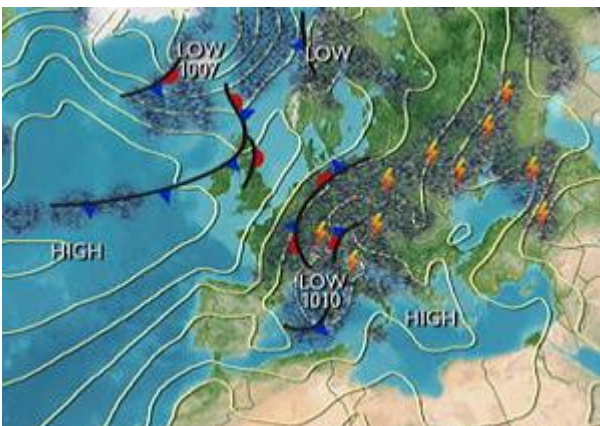


A mean sea level pressure chart shows the direct relationship between isobar spacing (pressure gradient) and orientation, and the strength and direction of surface winds. The general rule is that winds are strongest where the isobars are closest together. Thus the strongest winds are usually experienced near cold fronts and low pressure systems. Winds are normally light near high pressure systems where the isobars are widely spaced.

The synoptic chart shows lines of equal pressure to which the surface wind blows about 15 – 30° backed from parallel. To infer a wind speed from these lines, take your dividers or mark off on a piece of paper the distance between the two closest isobars to your sailing area. Then read off the wind speed at your latitude from the scale in the corner of the chart. This is the actual (if taken from an analysis chart) or the predicted wind speed at about 500m, the wind on the water is around 20 or 30% less. <http://www.met-office.gov.uk/weather/charts/animation.html> - The Met office animates the charts but these do not have the geostrophic scale on.

<http://weather.noaa.gov/fax/otherfax.shtml> - then click on SIGWX for the required time period

http://www.westwind.ch/w_ukmb.php - If you click on ALL it will take a while to download but you will be able to animate all the forecast charts.



Warm fronts and cold fronts are marked by red semicircles and blue triangles respectively on the synoptic weather charts. As the cold front catches up with the warm front it pushes it's way underneath the rising warm air and the air masses begin to mix, this is marked by an occluded front on the weather map, a semi circle next to a triangle.

One thing to look for when studying the synoptic chart is not only how close the isobars are which gives an idea of wind strength, but also by how much does the direction of the isobars change around the front. A strong 'V' around

the front will indicate an active front, however if the isobars bend little around the front it is likely to be less active with lighter winds, less rain and not large veer behind the front.

One very good site to trawl round is www.westwind.ch, it's a collection of all the weather sites you could wish for, from written forecasts to the actual model output. The AVN model will give you a more detailed forecast of the wind over the course of the day. Wind speeds are displayed using wind barbs. The angle shows the direction and the speed is shown in 5 or 10 knot barbs, short or long respectively. The synoptic charts can also be found under UKMO and Brack.

As well as searching on the internet and watching the weather on TV, newspapers show the weather charts and radio, especially BBC Radio 4, give regular weather reports. Local radio stations often give the sea forecast and sea conditions particularly over the weekend or holiday periods. Once out on the water the coastguard relays the Met Office coastal forecasts, with an announcement on Channel 16 that will advise you which channel to tune into. All times and other sources of national and local forecasts and tides can be found in your almanac.

For actual observations www.xcweather.co.uk you can look up wind to see what's coming your way. www.wendywindblows.com is a subscription site but you can access observations online or by phone.

There are far too many sites to list them all, but here are a few I suggest you visit;

<http://www.ecmwf.int>

<http://www.westwind.ch>

<http://www.greatweather.co.uk/>

Sailing sites with many links to weather include;

<http://www.madforsailing.com>

<http://www.yachtsandyachting.com>

<http://www.uksail.com>

<http://ukdinghyracing.com>

Plus the many others already linked to via this BBC site.

Next week we will take all these forecasts and knowledge and begin to condense it down to what we will see on our local waters, and introduce some local effects, which you can forecast yourself.

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