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5 clouds that spell danger

'I wandered lonely as a cloud...' Wordsworth may have been awed by the majestic beauty of what were probably fluffy cumulus clouds, but those most English of visions can lead to unpleasant sailing conditions if they continue to grow

Before sailing and when already at sea, clouds can provide the sailor with the first warning signs of potential danger ahead. Of course, not all clouds spell doom, but it is important to be able to recognise the main cloud types and the impact they may have on our sailing.

HOW CLOUDS FORM

Before getting into the detail of individual cloud types it's important to appreciate how clouds develop. There are two main cloud forms: convective and dynamic. Both rely on air being lifted, forcing clouds to develop.

Convective clouds are Wordsworth's 'wanderers'. Think of that fluffy cumulus cloud. It has developed because a bubble of air, which is warmer that the surrounding air, has begun to rise. That bubble will continue to rise so long as it is warmer than the air around it. The invisible water vapour within the bubble will eventually condense into visible water droplets that we see as a cloud. Eventually, the bubble reaches the same temperature as the surrounding air, stops rising, and forms the top of the cloud. In dynamic clouds a parcel of air has again been forced to rise, or has encountered cooler air and therefore condenses.

DANGER CLOUD 1
Cirrus formations warn that a front may be approaching

This process can be seen taking place along fronts.

As a general rule of thumb, sailors should think of convective clouds as being more gusty than dynamic clouds; however, as always in meteorology, there are exceptions to the rule!

DANGER CLOUD 1: CIRRUS (FRONT AHEAD)

It's a little unfair of me to describe cirrus clouds as being 'dangerous'. After all, these are the wispy clouds we see on a fine summer's day high in the atmosphere (usually around 20,000ft or so).

Formed dynamically, cirrus clouds themselves are not necessarily a danger, but they can be the first signifier that a warm front is on its way.

If the cirrus clouds thicken and increase, they may eventually hide the sun. This should confirm to the sailor that the clouds are almost certainly associated with a front. Keep your eye on the barometer, is it falling? If it is, then this continues to build our

Gusts of wind surround large shower clouds as updraughts and downdraughts compete for airspace

evidence and it will not be long before the winds pick up and probably back.

The next cloud of a frontal system would be cirrostratus (a type of thicker cirrus) and then the lower (although still at around 12,000ft) altostratus cloud.

By now winds will have lifted, perhaps by two or three forces, and the first rain of the front will begin to fall. As a result visibility will begin to deteriorate.

DANGER CLOUD 2: ALTOSTRATUS LENTICULARIS (GUSTY WINDS)

I have described in recent articles on wind around hills how clouds capping high island groups can signify that there will be strong gusts of wind on the leeward side of the higher ground.

These are signifiers of warm air aloft (so watch for warm fronts on the weather map), which can act as a cap on rising air, forcing it to flow at a faster rate over the tops of the hills, similar to a Venturi effect.

Once the air has pass to the lee side of the hill it can 'tumble' down the sides of the high ground creating rotor-gusts and increasing the mean speed by at least two or three forces.

Look for cigar-shaped, shallow yet dense clouds often just above a hill. Notice the sea surface for an increase in small waves and white-horses as these often highlight the area where the gusts are occurring.

DANGER CLOUD 2
Altostratus lenticularis cloud highlights the risk of strong winds on the leeward side of an island

DANGER CLOUD 3: STRATUS (POOR VISIBILITY)

Low, grey stratus cloud needs little explanation, except that you should think of this cloud as fog having been lifted from the surface, usually by the wind. They are dynamically formed clouds.

Stratus alerts us to the fact that the air is saturated. There is lots of moisture around, and should the wind begin to ease, fog is likely to form.

The Shipping Forecast may mention 'drizzle', perhaps even fog patches, and so you will be alerted to the possibility of fog occurring. Stratus often forms in warm sectors (that's the bit behind the warm front and just ahead of the cold front), or when there's high pressure.

DANGER CLOUD 3
Low stratus cloud highlights a moist atmosphere and the risk of fog

Nick Fox/Alamy Stock Photos

DANGER CLOUD 4: CUMULUS (GUSTY WINDS, HEAVY SHOWERS)

Now we get to clouds, which bring the risk of significant gusts.

Cumulus clouds are formed by convection. The smaller varieties of these clouds look like balls of cotton wool floating across the sky. They develop by the mechanism we discussed earlier where there is a sharp fall of temperature with height. This allows bubbles of air to rise, condense, form clouds and if conditions are right, rain drops can develop too.

These clouds have sections of them where air will rise (usually the warm centre of the cloud), and others where air will descend (the cooler surroundings of the cloud). It's this up and down motion of the air which causes the gusts.

Therefore in a cumulus cloud of slight or moderate vertical extent (those are clouds of perhaps 10,000ft depth, so enough to produce a light shower), it is around the clouds that you need to be on the look out for gusts. The deeper the cloud, the stronger the gusts are likely to be.

As a rule of thumb, expect gusts of two forces above the mean in such a situation. Watch out for cloud forming along the coasts as well. If you are at sea and skies are clear overhead, yet inland cloud is visible, you should expect there to be some gusting winds close to the coasts. This is usually due to the wind flowing from the sea inland (perhaps as part of a sea breeze), then being forced to rise over a cliff. It's within this area, close to the shore, that the strongest gusts of wind are likely to be found.

DANGER CLOUD 4
Cumulus clouds indicate the risk of showers and sudden wind changes

DANGER CLOUD 5: CUMULONIMBUS (SUDDEN GUSTS, HAIL, THUNDERSTORMS)

The grand-daddy of all convective clouds! This is the familiar thundercloud, often identifiable by it's anvil-shaped top. The cumulonimbus warns the sailor the atmosphere is in an angry mood, with a

DANGER CLOUD 5
If you spot cumulonimbus clouds then gusts, hail or thunderstorms could be on their way

sharp temperature contrast between the warmer surface and colder air at higher levels. Meteorologists call this an unstable atmosphere and not only does it give rise to cumulus and cumulonimbus clouds as well as their associated wind gusts, but also heavy showers, a risk of hail and thunderstorms.

The speed of development of the cumulonimbus cloud can tell us a lot about the strength of gusts. If the cloud has formed rapidly from a small cumulus, then expect gusts of winds to be sudden and violent. A more gradual development of the cloud, over an hour or so, usually means that although strong, the gusts won't be quite as violent as they could be.

In these clouds the strongest gusts are not only found around the clouds, but underneath them too. This is because of dense, cold air 'falling' out of the cloud and causing sudden gusts at the surface.

Watch for hail within cumulonimbus clouds, a sign of strong gusts. You can sometimes see if hail is possible, as the base of the cloud takes on a greenish hue.

The Shipping Forecast and Inshore Waters Forecast will also warn you that such clouds are likely and will refer to 'showers', 'heavy showers' or 'thundery showers'. Be aware of thunderstorms and that most amazing of phenomena at sea – the waterspout.

You have probably gathered by now that you really don't want to be sailing in the vicinity of a cumulonimbus cloud if you can possibly avoid it. They are clouds which are best given an extremely wide berth!

LEARNING ABOUT CLOUDS

All of those Latin names and descriptions can make learning about clouds daunting.

I'd recommend that get yourself a good cloud book (I happen to have written one called *The Pocket Weather Forecaster*, available to order online at www.weatherschool.co.uk/shop) and then learn the cloud types I've mentioned above.

Take plenty of photographs of the clouds and the weather associated with them, then use your book to identify the type of clouds they are. You will be amazed how quickly you'll get to recognise a cirrus from an altostratus and a cumulus from a cumulonimbus.

The sky is an ever changing canvas on which the atmosphere paints its story, by using the tips above you'll soon be an expert at decoding each picture.

It might just look 'a bit grey', but dense cumulus clouds indicate the risk of heavy showers and sudden gusts.

FOREWARNING
Altocumulus clouds sometimes indicate that cumulonimbus will develop

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