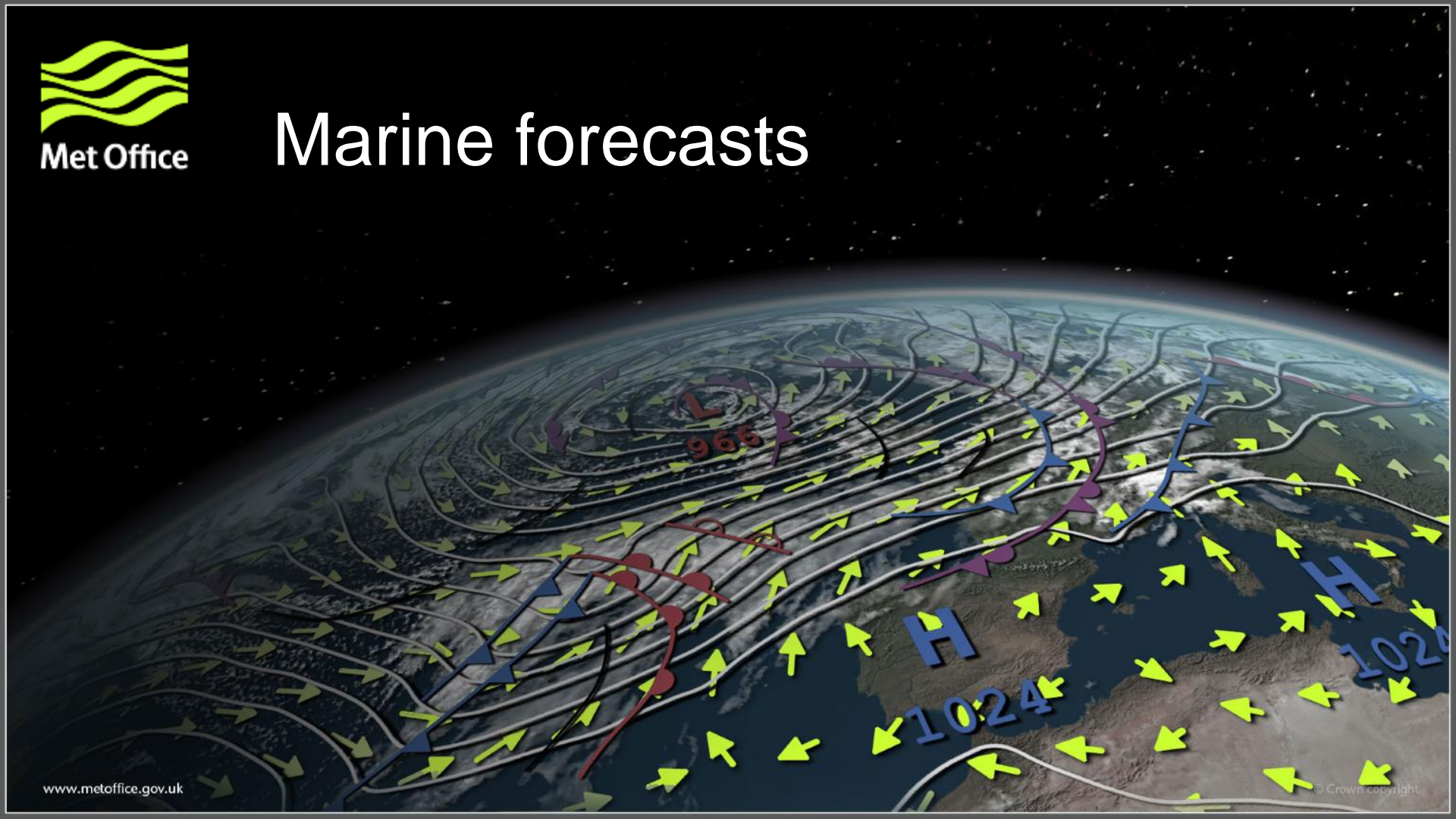


# Marine forecasts



# Marine forecasts

In the UK, the Maritime and Coastguard Agency (MCA) is responsible for the provision of Maritime Safety Information (MSI) to ships at sea, which includes the broadcast of warnings and forecasts.

This includes Navigation Warnings.

The Met Office initiates warnings and prepares routine forecasts for dissemination on behalf of the MCA.

# Marine forecasts

- Shipping forecast & gale warnings
- Inshore waters forecast & strong winds
- High Seas forecast and storm warnings
- Latest marine observations
- Extended Outlook

# Shipping forecast & gale warnings

- Thirty-one sea areas
- Issued four times a day, 2300, 0500, 1100, 1700 GMT
- Broadcast daily on BBC Radio 4 at the following times:
  - 0048 and 0520 (long wave and FM)
  - 1201 and 1754 (normally long wave only)



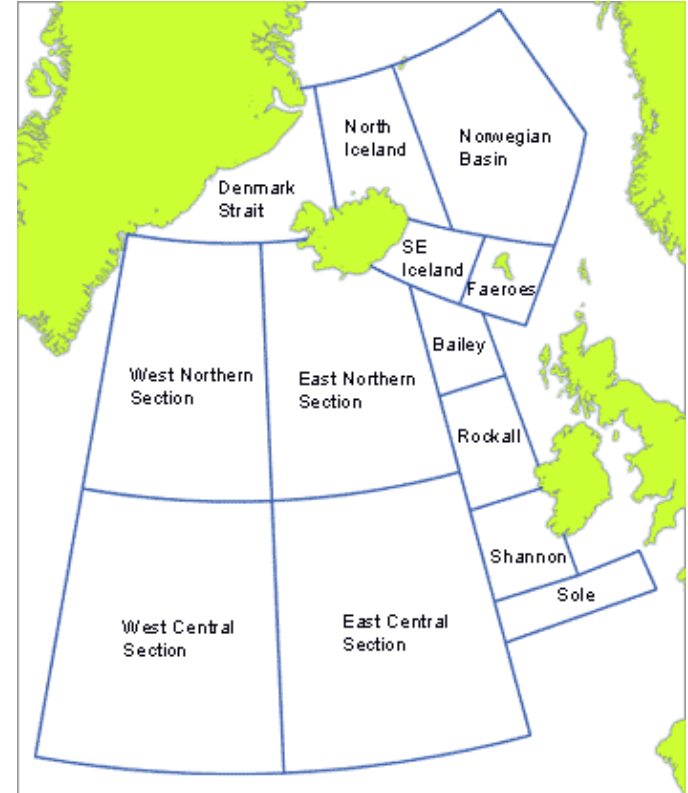
# Inshore Waters Forecast and strong winds

- 19 designated areas
- For coastal waters up to 12 miles offshore
- Forecast for 24 hours
- Issued four times a day
- Contains details of forecast wind direction and force, weather, visibility and sea state



# High seas forecast & storm warnings

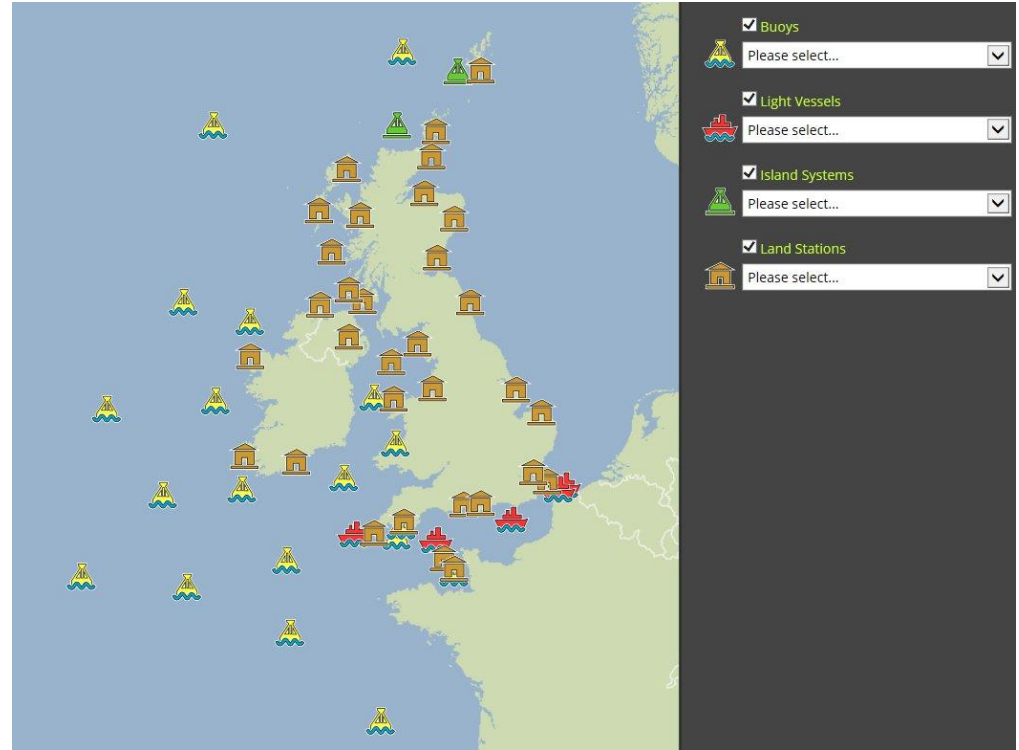
- Twelve sea areas, six of the areas are also in the shipping forecast
- Issued twice a day at 0930 and 2130 GMT and covers the next 24 hours with an outlook for the following 24 hours
- Includes general synopsis and sea-area forecasts containing forecast wind direction & force, weather and visibility





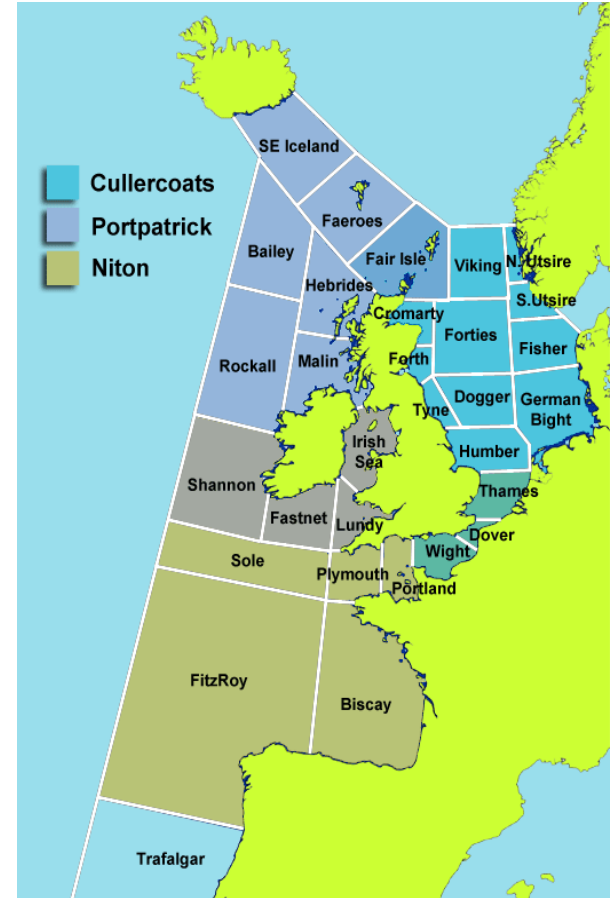
# Marine observations

- Observational data available for a number of locations shown on the map
- Latest observations are displayed with an archive for the past 24 hours
- Information updated hourly



# Extended outlook

- Issued once a day at 2300GMT and covers the next 3 to 5 days
- Contains details of the likelihood of gales or storms, a general synopsis and a general forecast for each area







Met Office

# Model Data



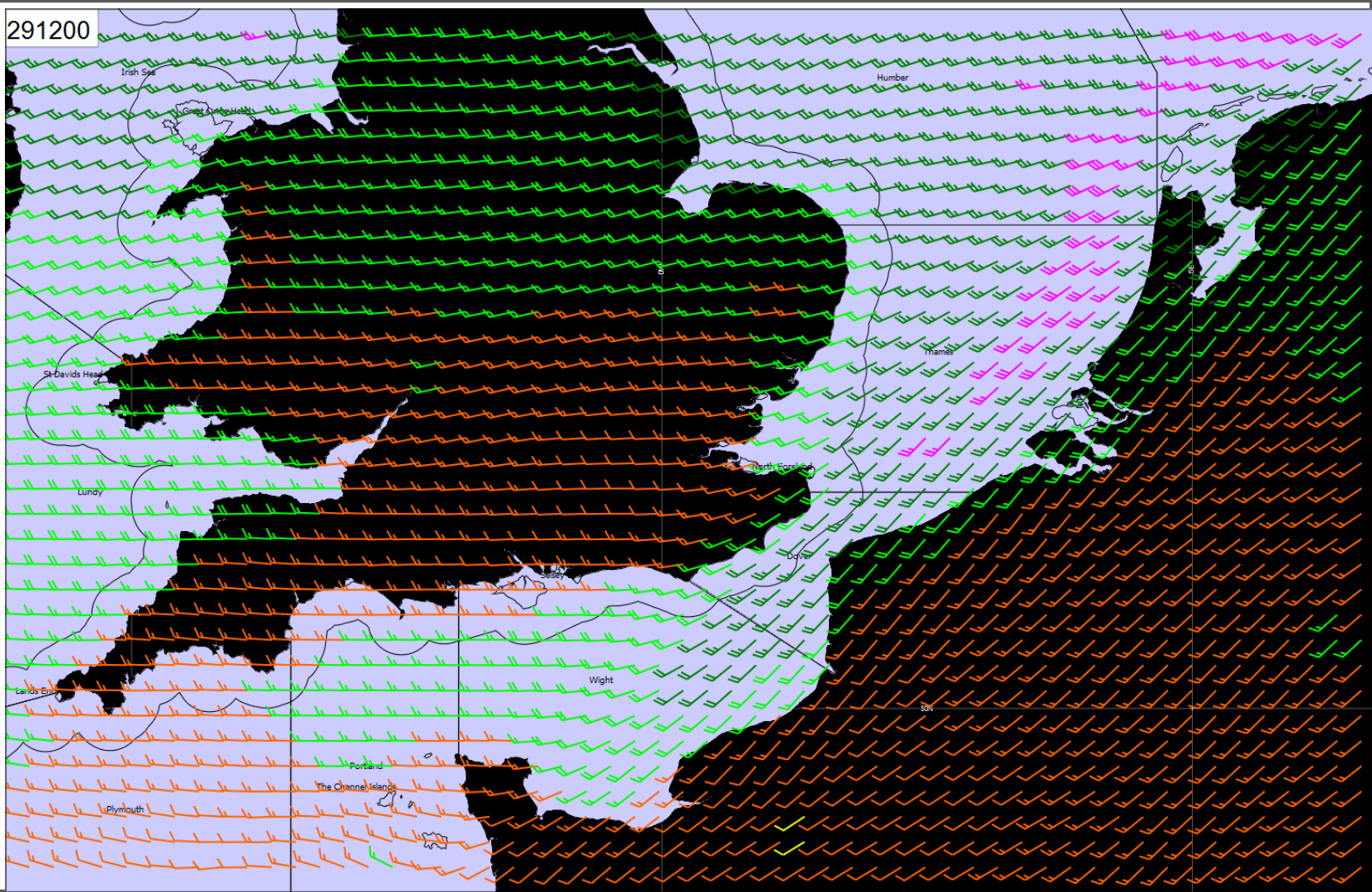




Met Office

Global

291200



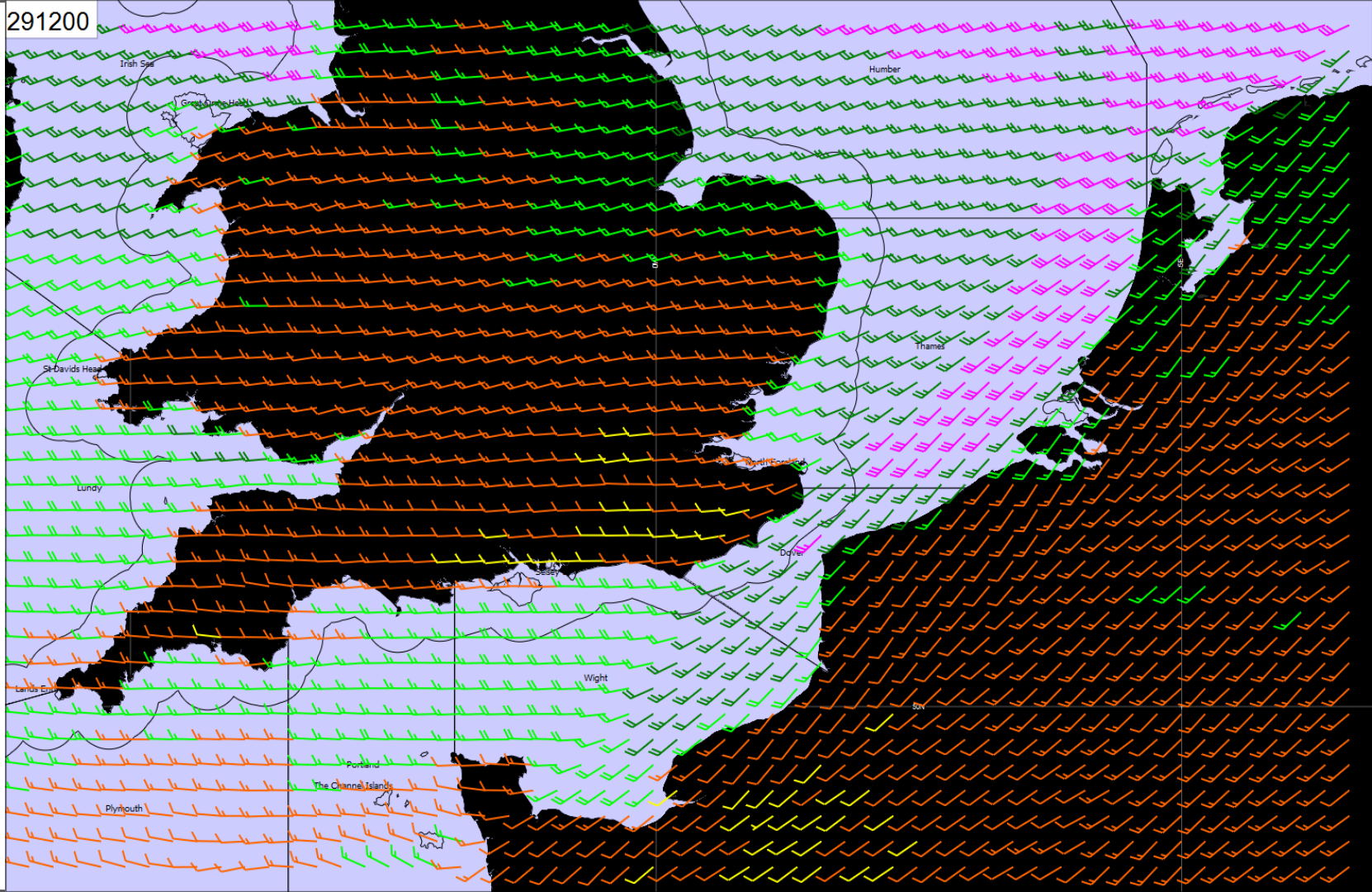




Met Office

Euro 4

291200







Met Office

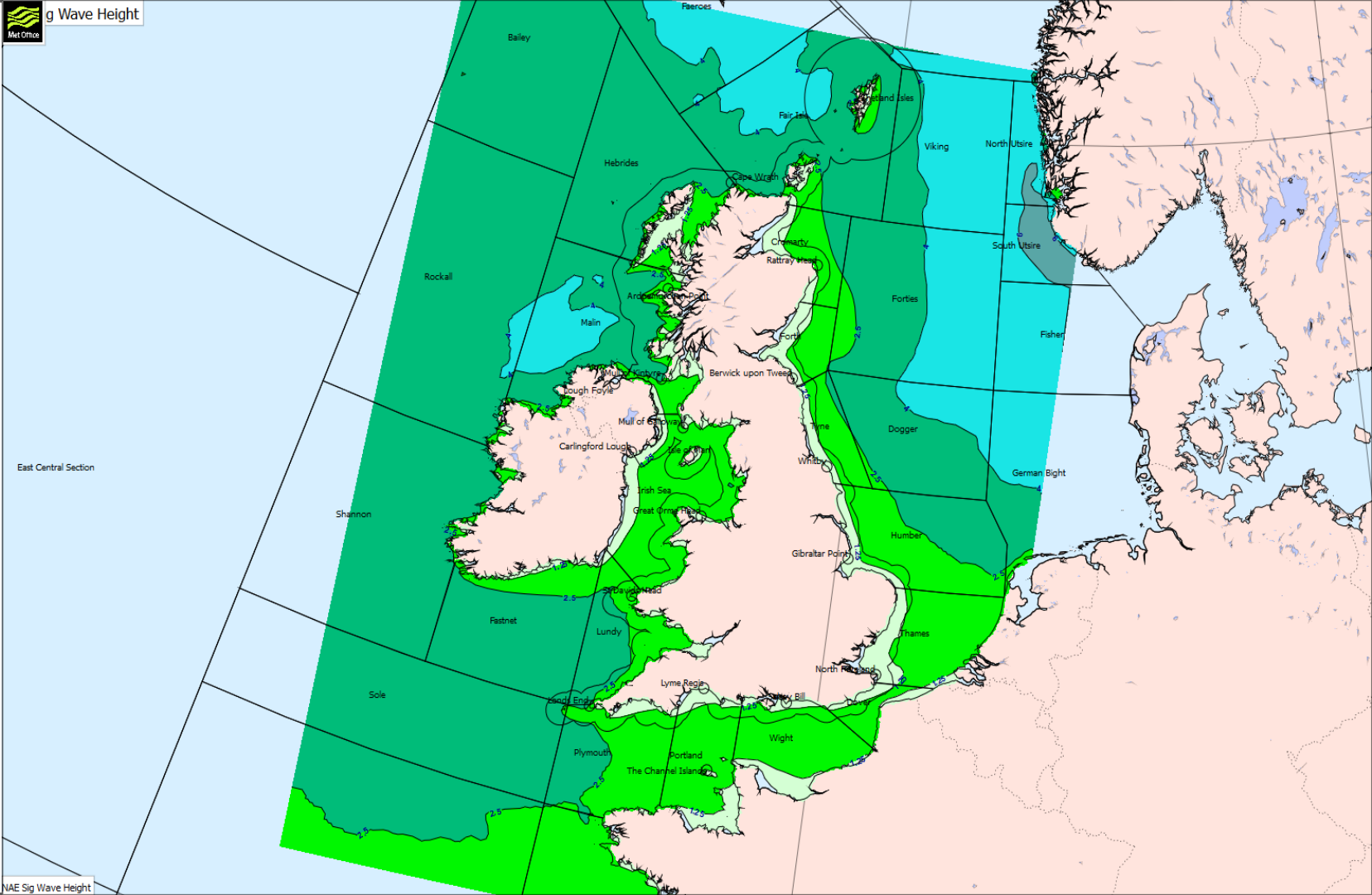
UK 4

g Wave Height



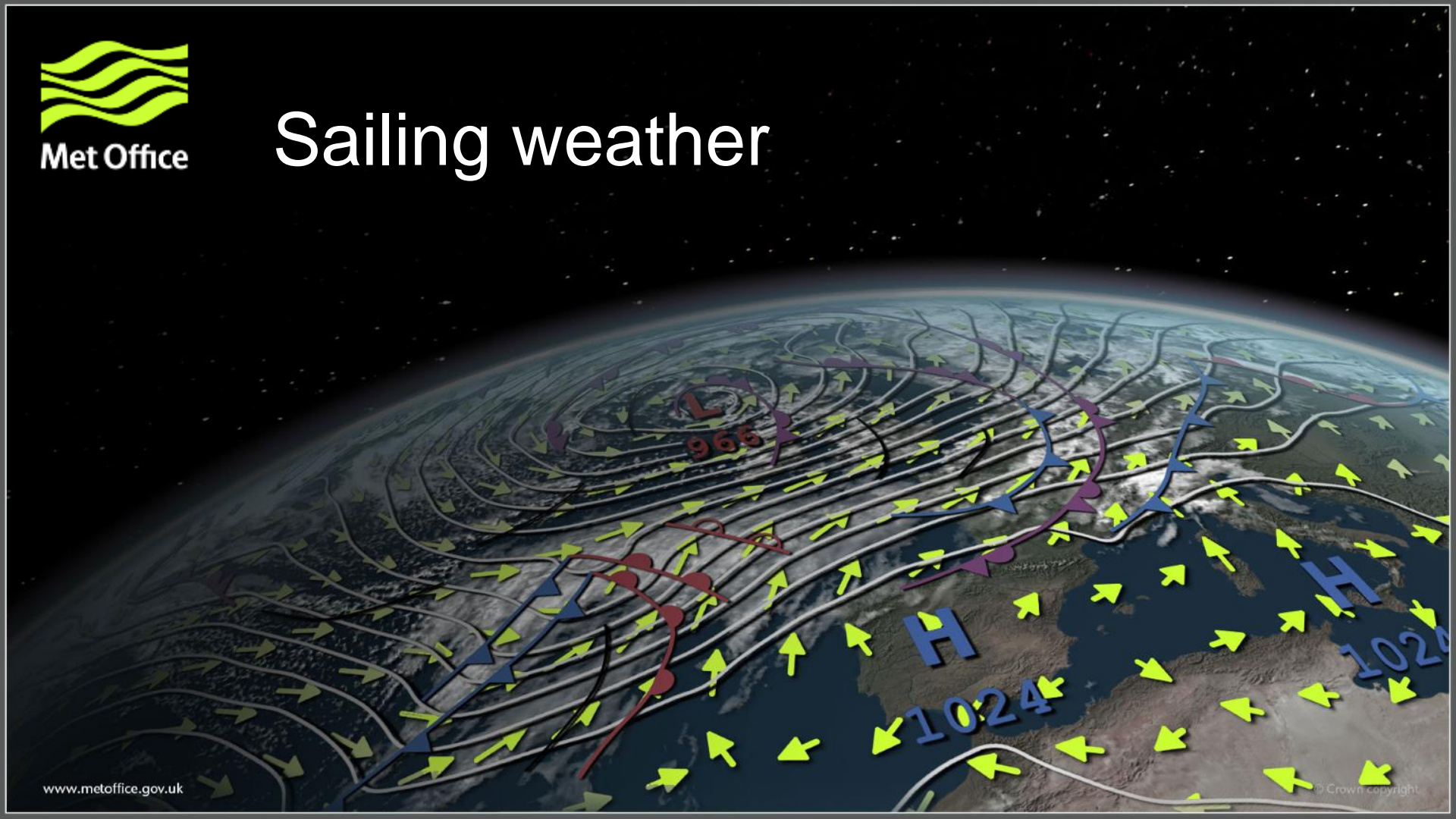
East Central Section

NAE Sig Wave Height





# Sailing weather





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# Clouds



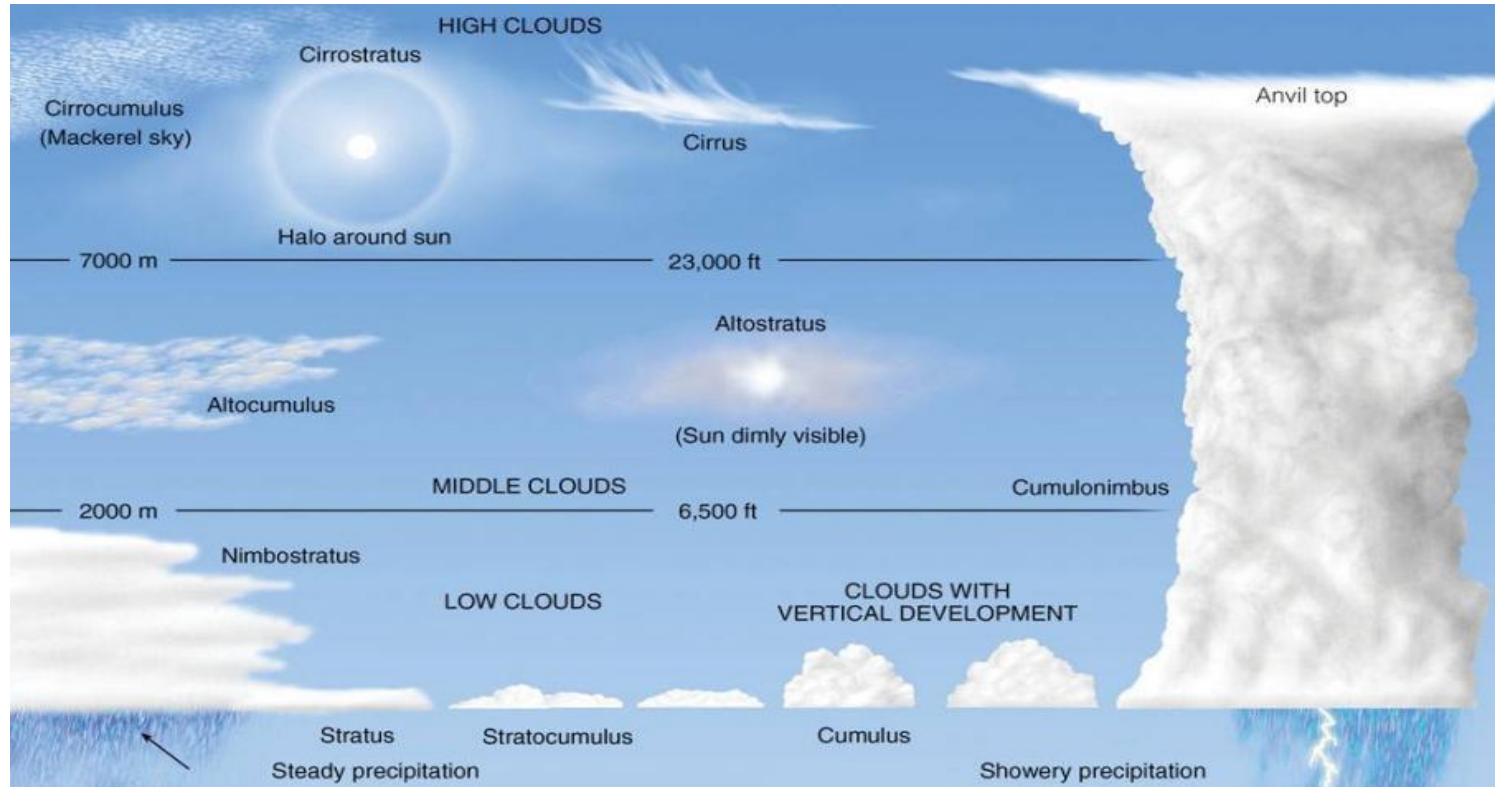
# Clouds

- What are they made of and what can they tell us about the weather?
- 10 basic types – split into 3 categories
- Categories are high, medium and low



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# Clouds





# Low Clouds - Cumulonimbus

- Very high and large heaped cloud – water at bottom and ice at top
- Characteristic anvil shape to the top
- Most dangerous cloud for anyone who works or is active outdoors
- Source of heavy showers, thunderstorms, tornadoes/ waterspouts, hail, squall lines and very gusty winds





Met Office

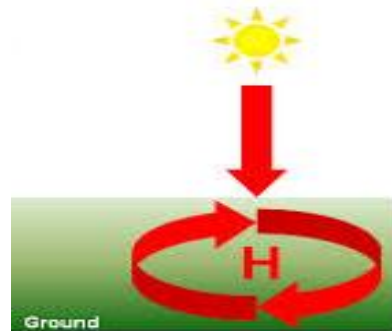
# Clouds and low pressure systems





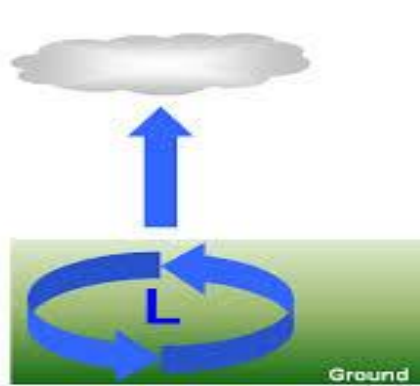
# Difference between high and low pressure areas

Air descending down through the atmosphere usually results in dry, settled conditions over the Earth's surface

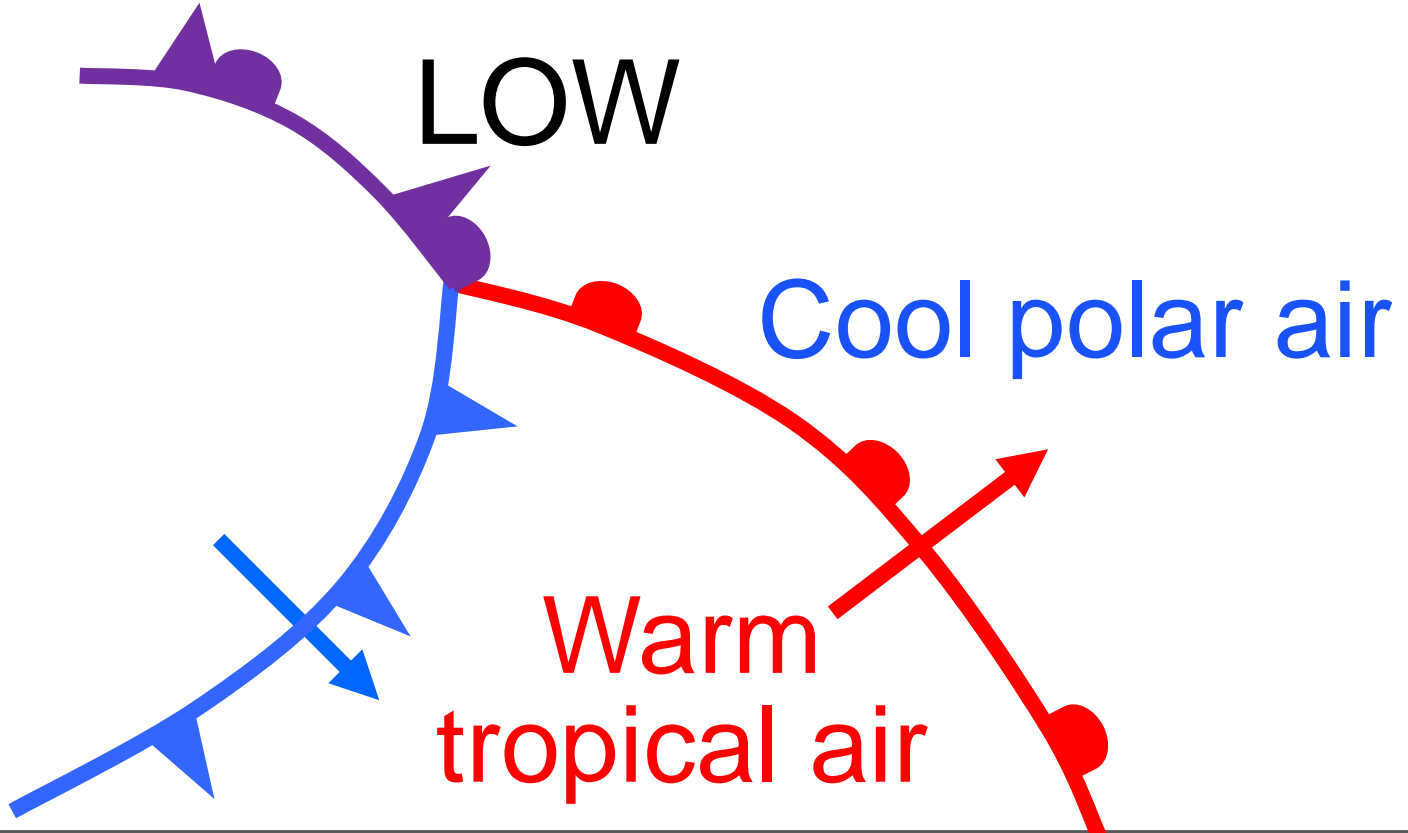


# Difference between high and low pressure areas

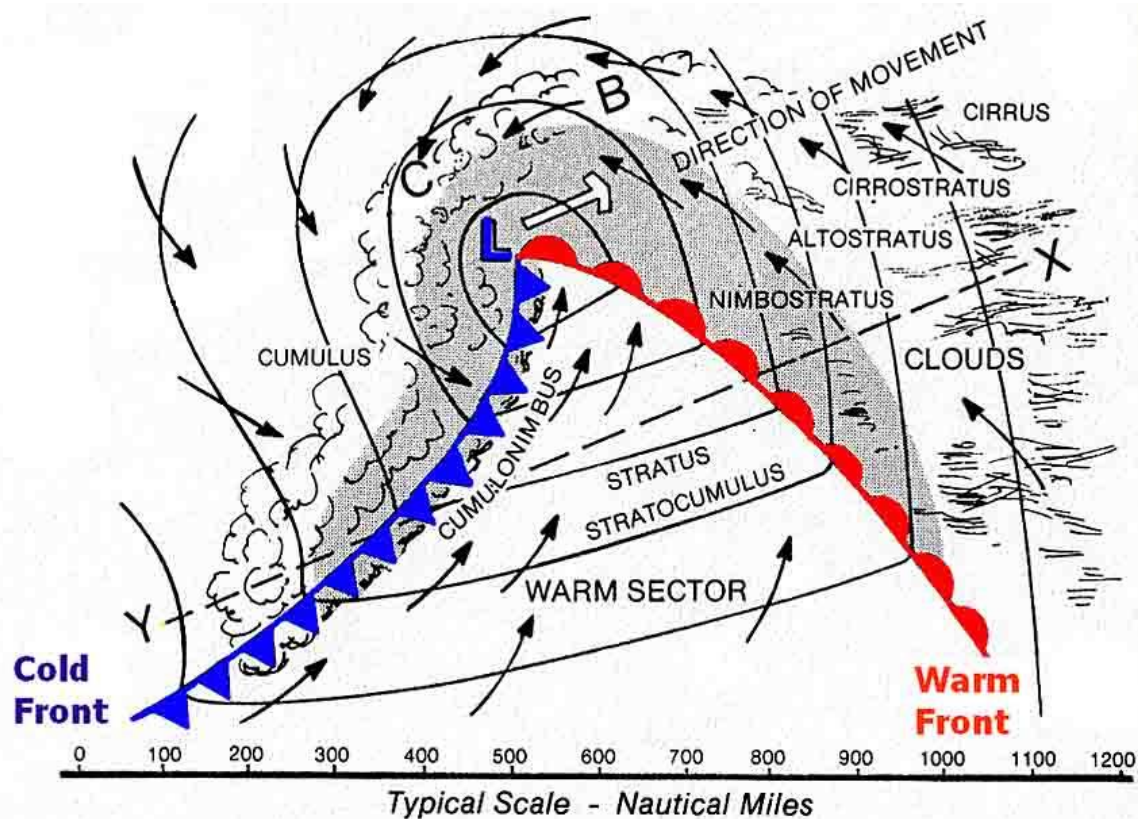
Air rising upwards through the atmosphere leads to disturbed weather, bringing rain



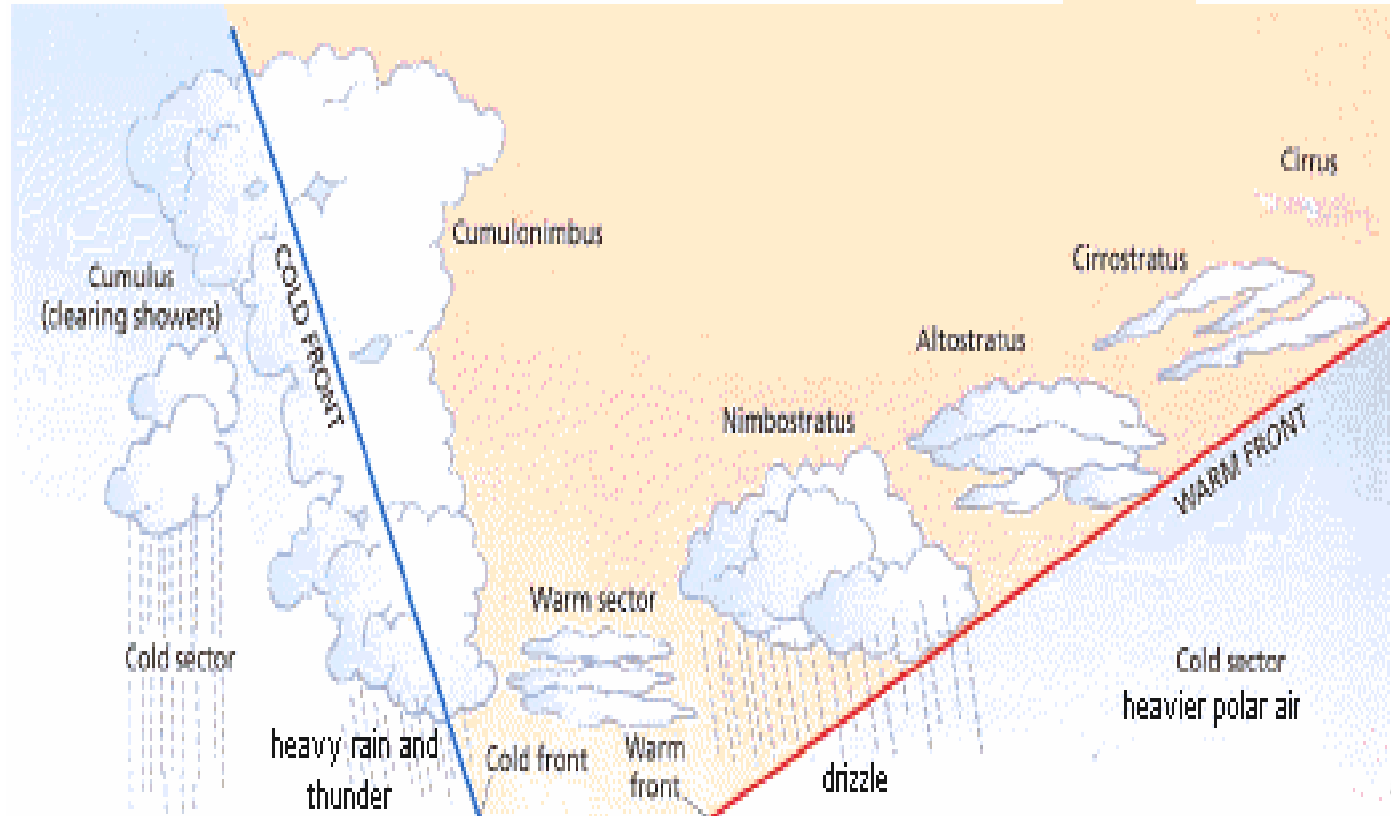
Which way is the low pressure and its fronts moving?



# And the clouds around the low pressure and with its fronts?



# And the clouds around the low pressure and with its fronts?



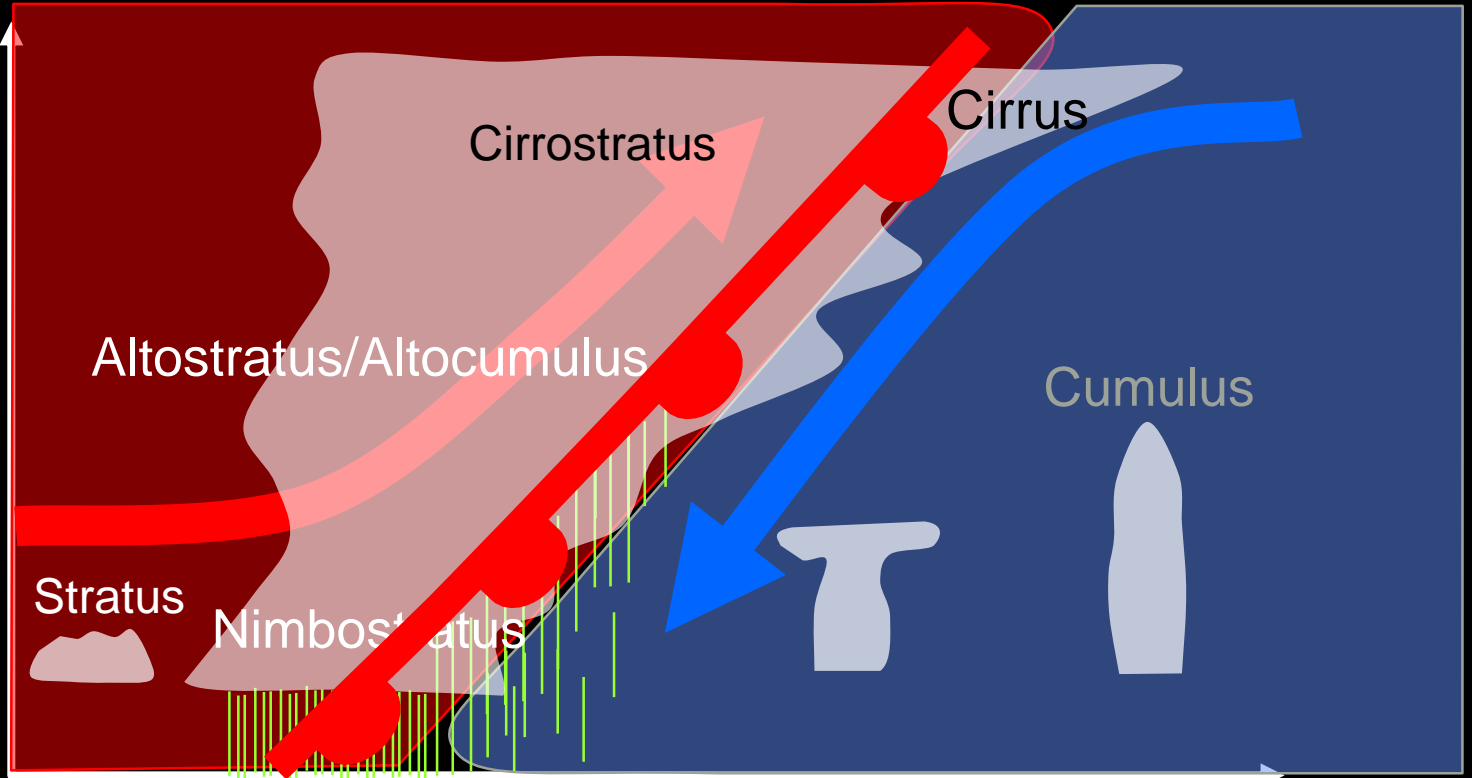


Met Office

height

Tropical air

Polar air



Equator

N. Pole

1200-1500 km  
750-900 miles





Met Office

“Ring around the moon ... rain soon”

“Mackerel  
skies and  
mares’  
tails make  
tall ships  
carry low  
sails”





Met Office

height

Polar air

Tropical air

Cumulonimbus

Cirrus

Cumulus

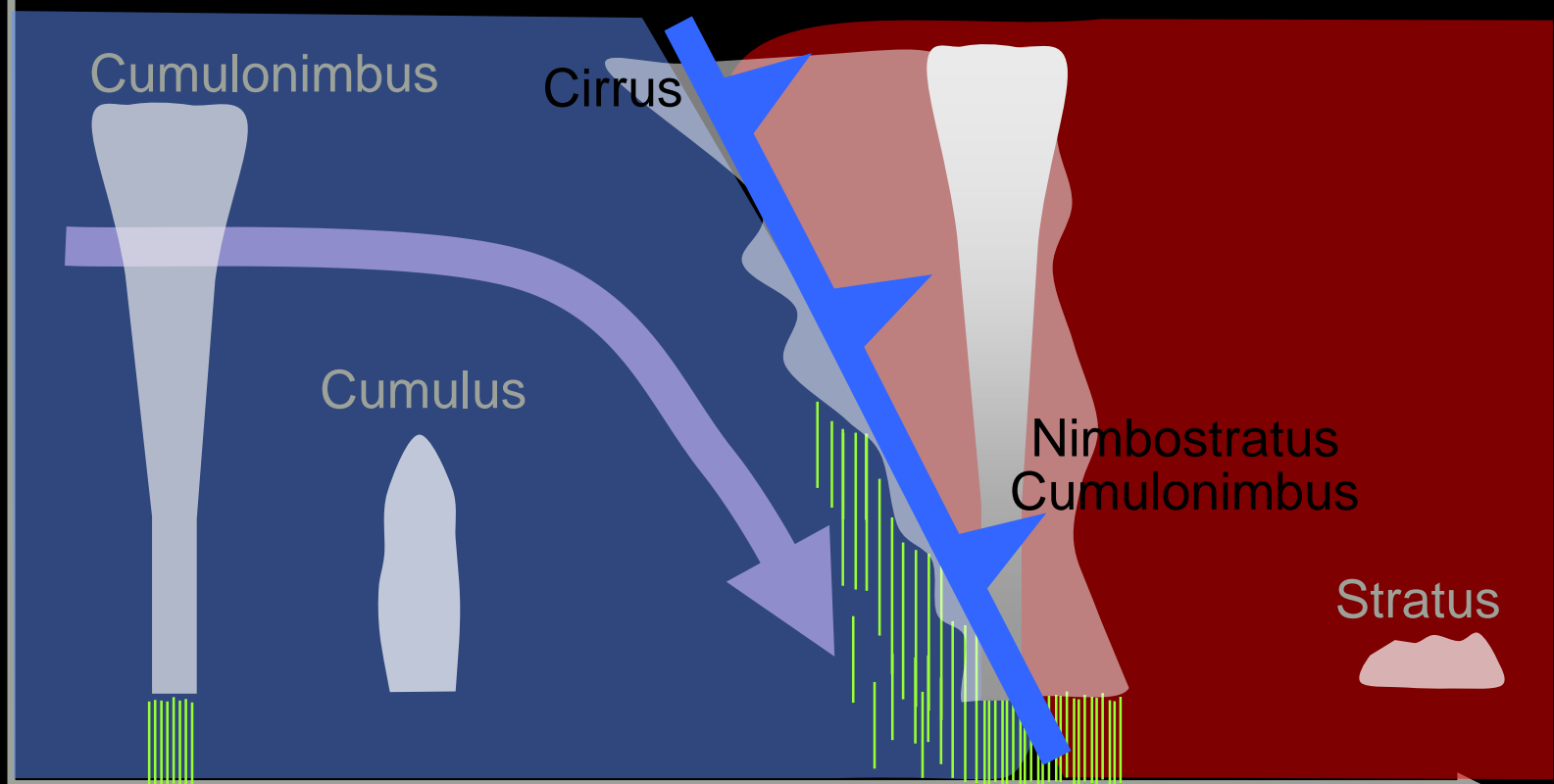
Nimbostratus  
Cumulonimbus

Stratus

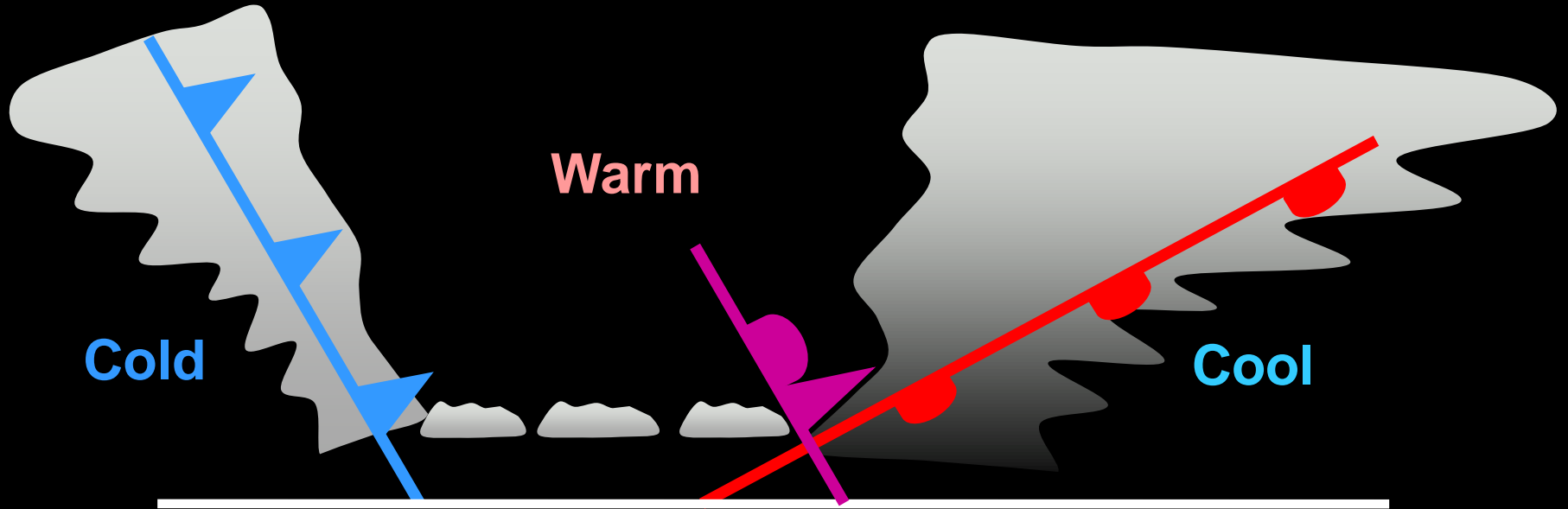
N. Pole

300-500 km  
200-350 miles

Equator



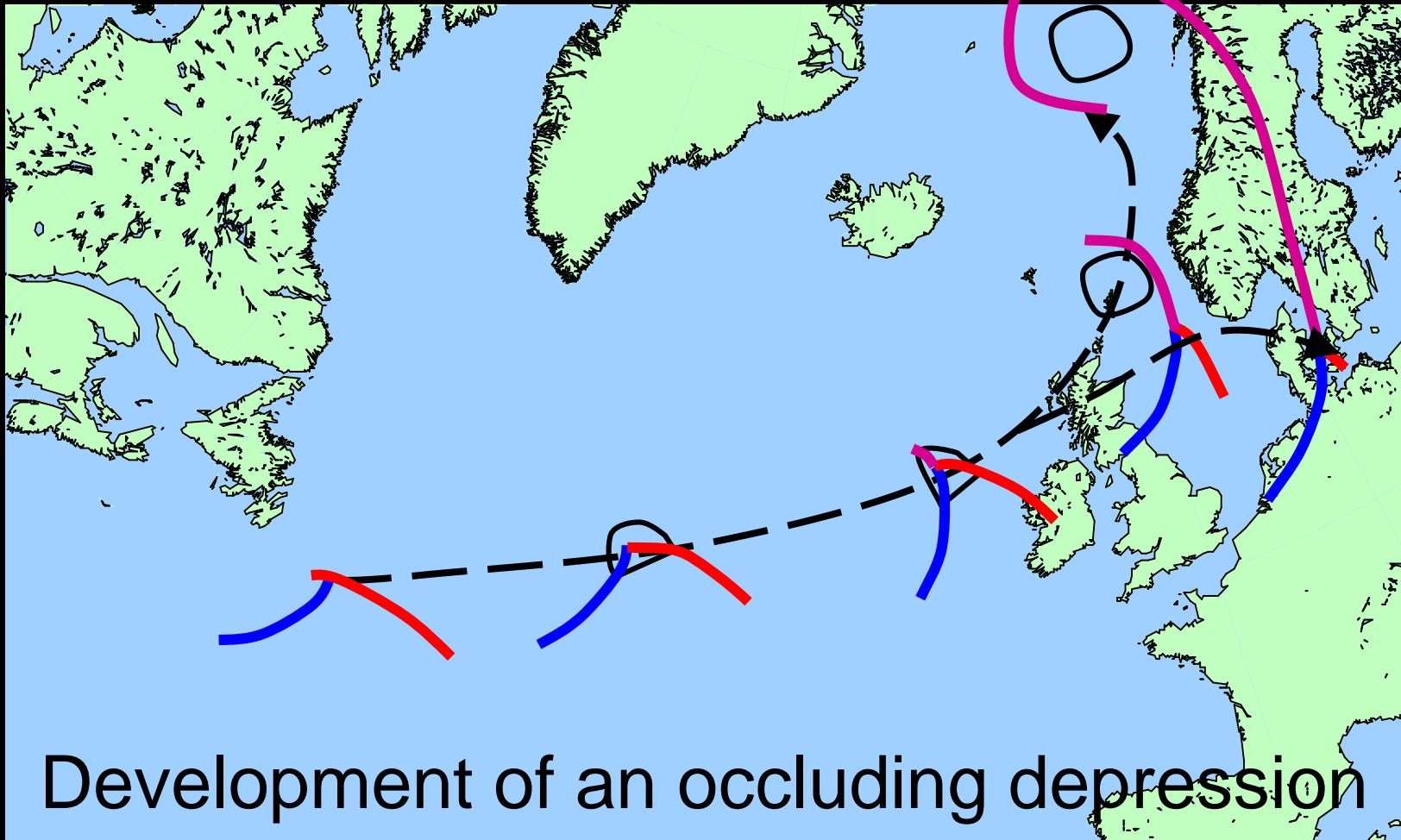
# One last thing... Occluded fronts



Occlusion  $\approx$  hidden



Met Office



Development of an occluding depression



# Barometric pressure and winds



Met Office

# Beaufort Scale and its meaning

**Force 4:** seen as limit of safety for many sailing boats and motor boats

**Force 6:** known as the ‘yachtsman’s gale’

**Force 8:** usually when the wind starts to become a hazard for commercial shipping



**BEAUFORT FORCE 4**  
WIND SPEED: 11-16 KNOTS

SEA: WAVE HEIGHT 1-1.5M (3.5-5FT), SMALL WAVES BECOMING LONGER, FAIRLY FREQUENT WHITE HORSES





# Changes in barometric pressure

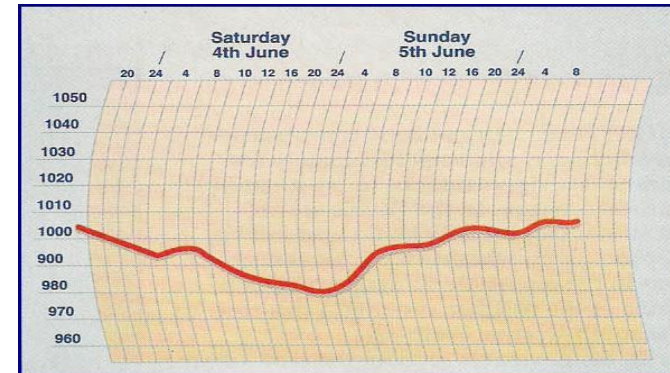
## Fall or rise

**8mb in 3 hours** - almost certainly a **Force 8** will follow

**5mb in 3 hours** - almost certainly a **Force 6** will follow, if Force 3 or less when you see this you have about 4 to 8 hours notice

Not the time to be caught on a 'lee' shore – e.g. a southerly on the south coast!

**1 or few mb erratic** - indicative of squall lines, sudden change strong gusts or lulls with dark thunderclouds





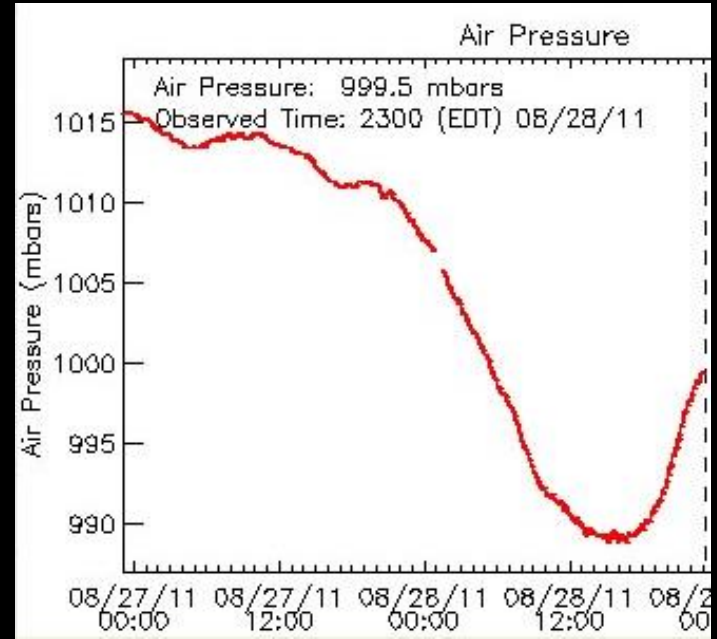
Met Office

# Weather Bomb!

The scientific term for a weather bomb is an 'explosive deepening'

The phenomenon happens in a rapidly deepening area of low pressure and is characterised by a decrease in atmospheric pressure of at least 24 millibars in 24 hours

The lower the pressure, the stronger the winds become. A Scottish storm which had a drop of 44mb - gusts of 165mph were recorded over the Highlands



The North Atlantic is particularly prone to weather bombs thanks to the Gulf Stream, which pits a reliable source of warm air against cold air



Met Office

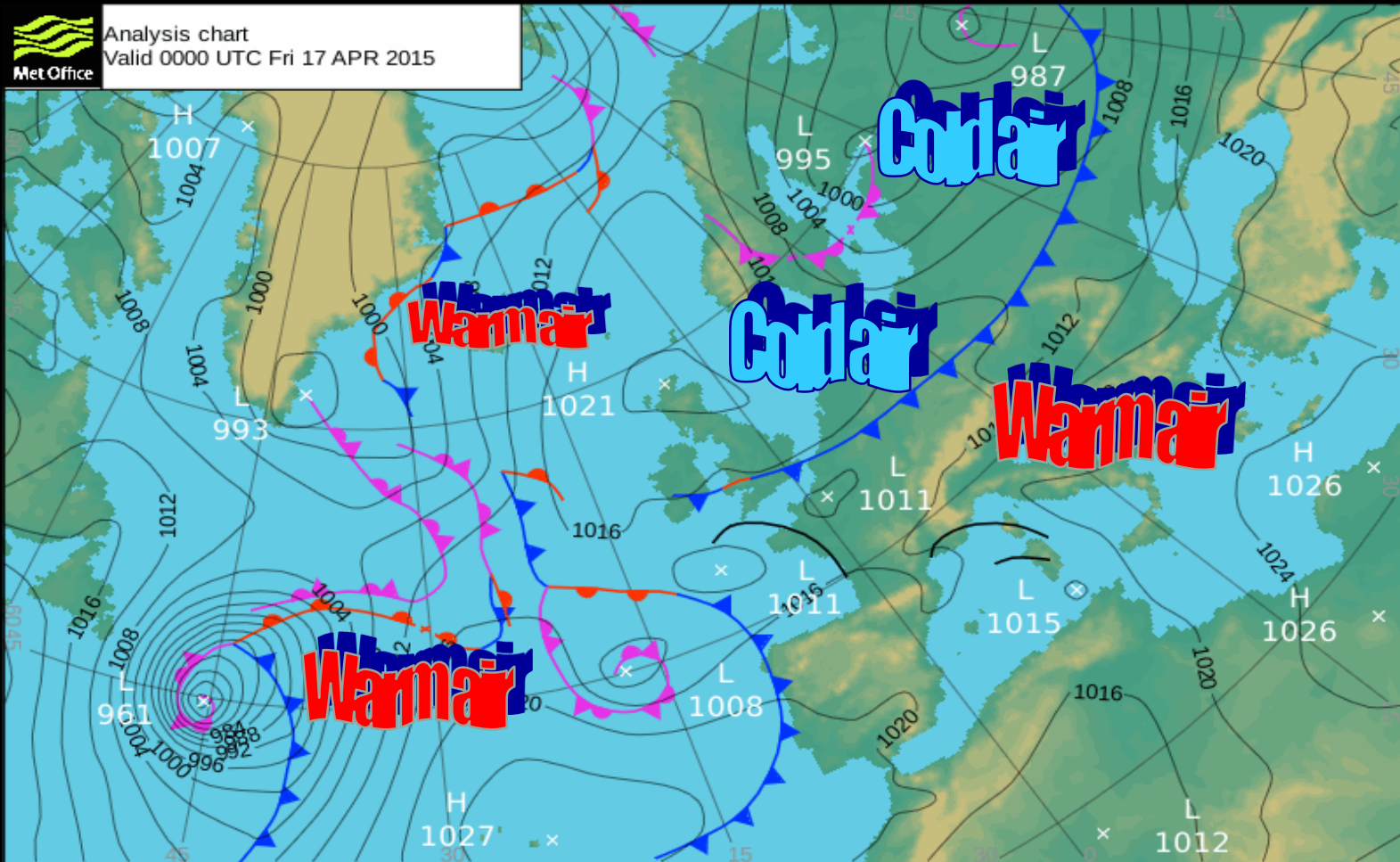
# Analysis and forecast chart interpretation



Met Office



Analysis chart  
Valid 0000 UTC Fri 17 APR 2015

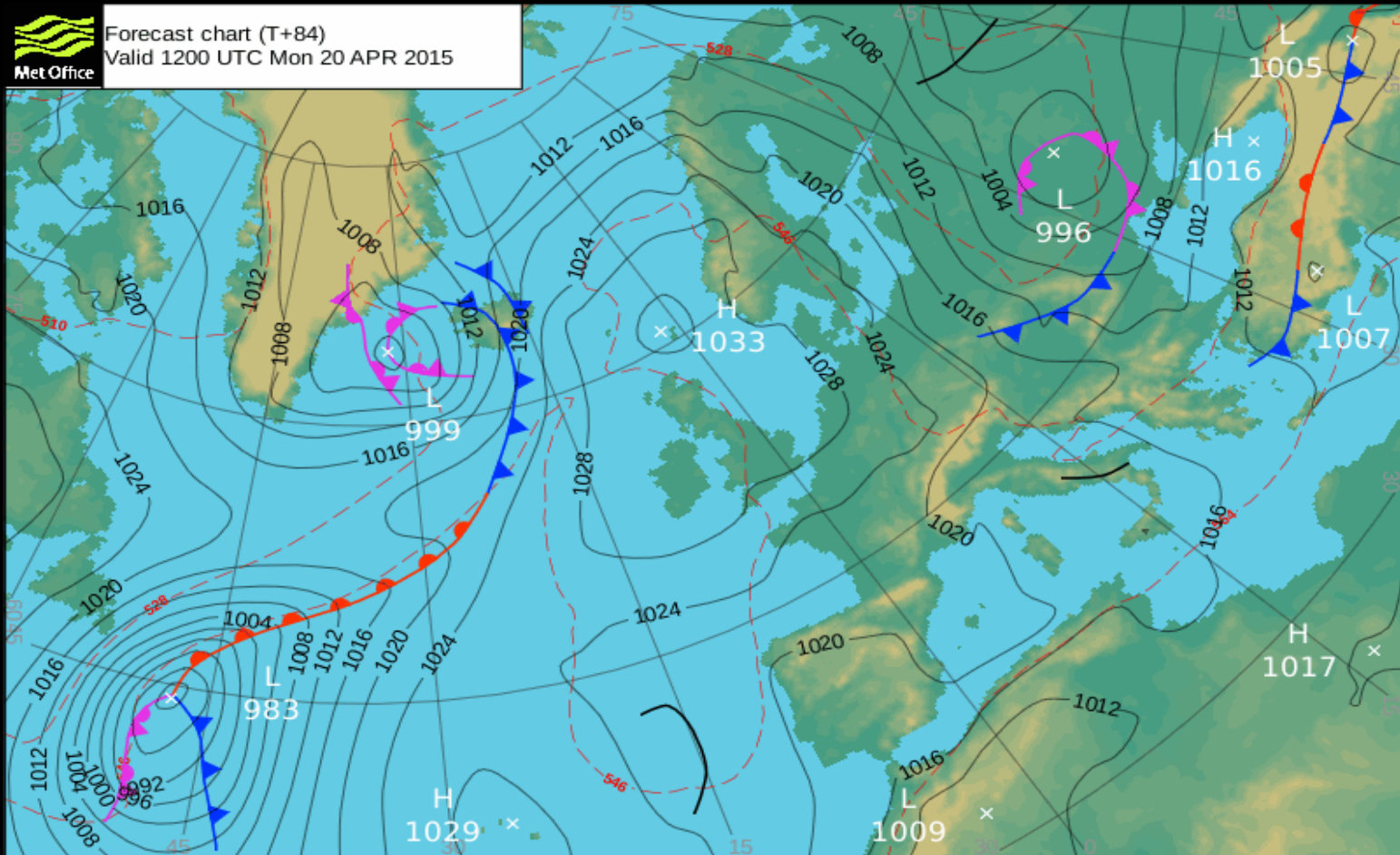




Met Office



Forecast chart (T+84)  
Valid 1200 UTC Mon 20 APR 2015





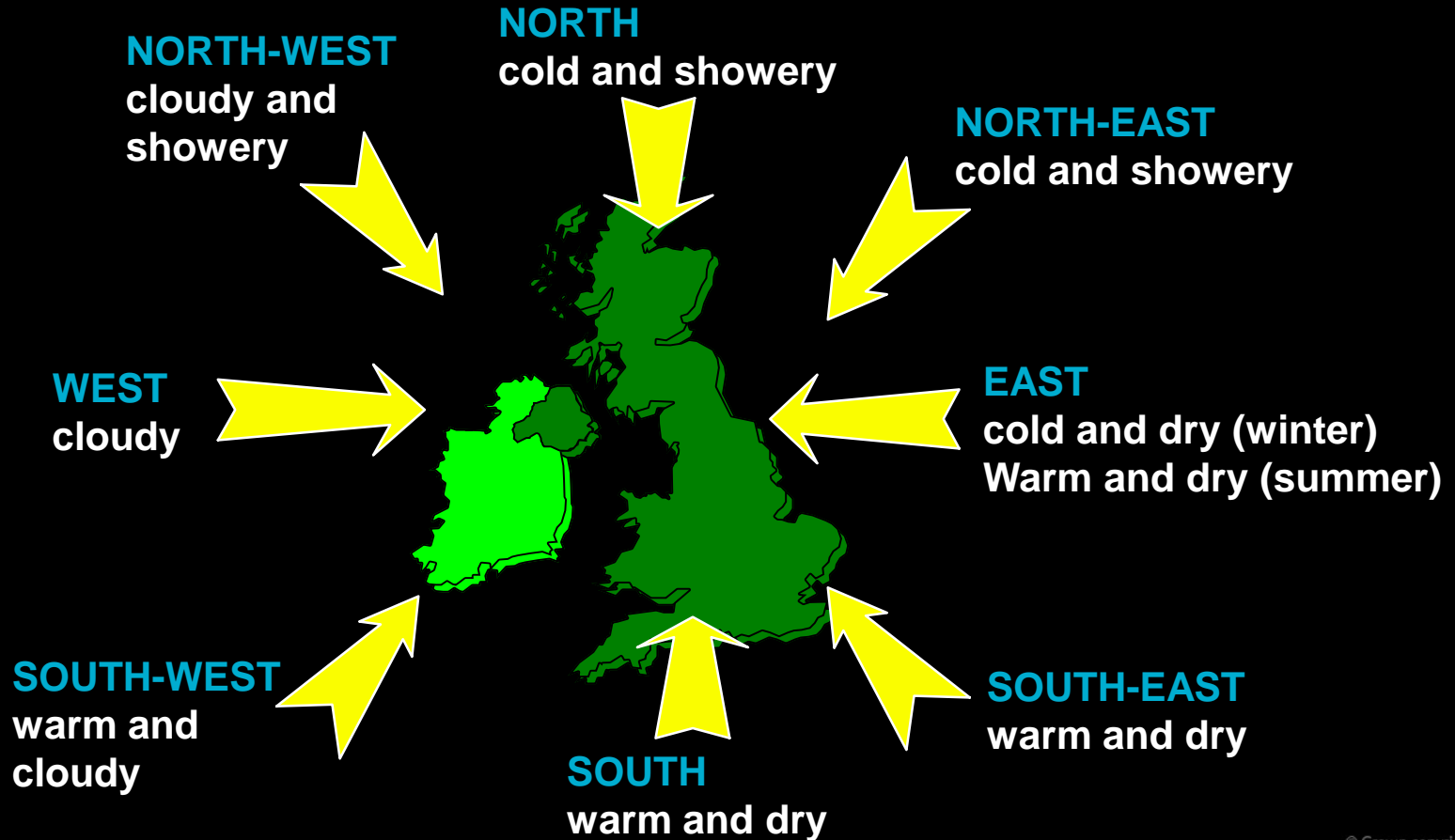


# Winds and weather



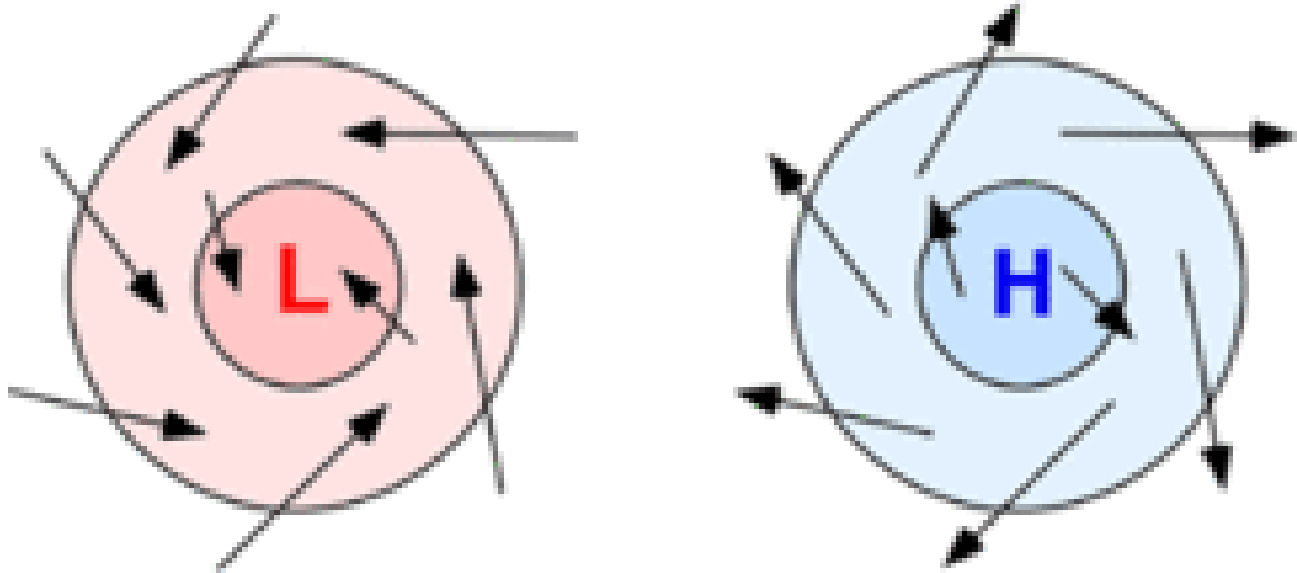
Met Office

# Weather and wind direction



# Which way do the winds blow?

## NORTHERN HEMISPHERE





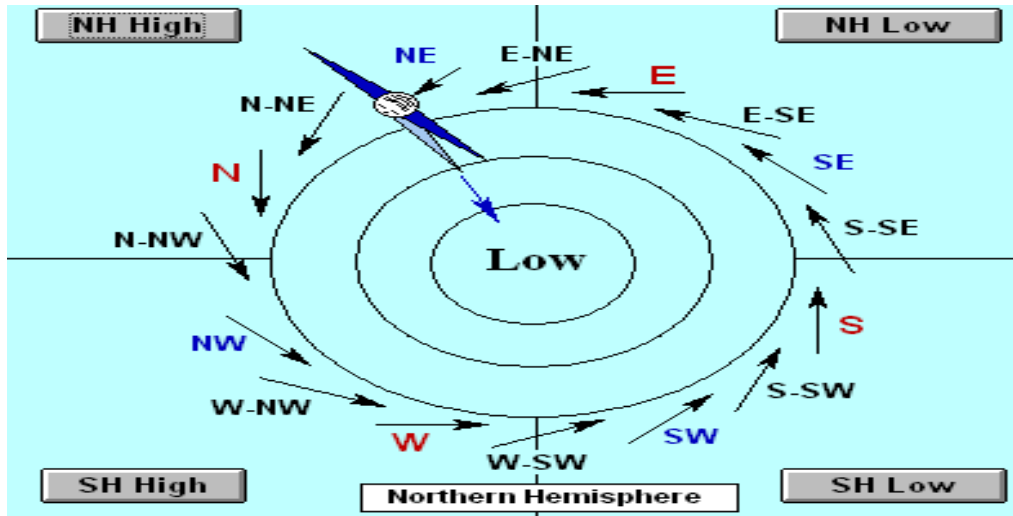


Met Office

# Winds around low and high pressure

Buys-Ballot law – when you are standing with your back to the wind the area of low pressure is on your left (in the Northern Hemisphere)

Around a low pressure area winds go in an anti-clockwise direction (in the Northern Hemisphere)



All opposite for high pressure!

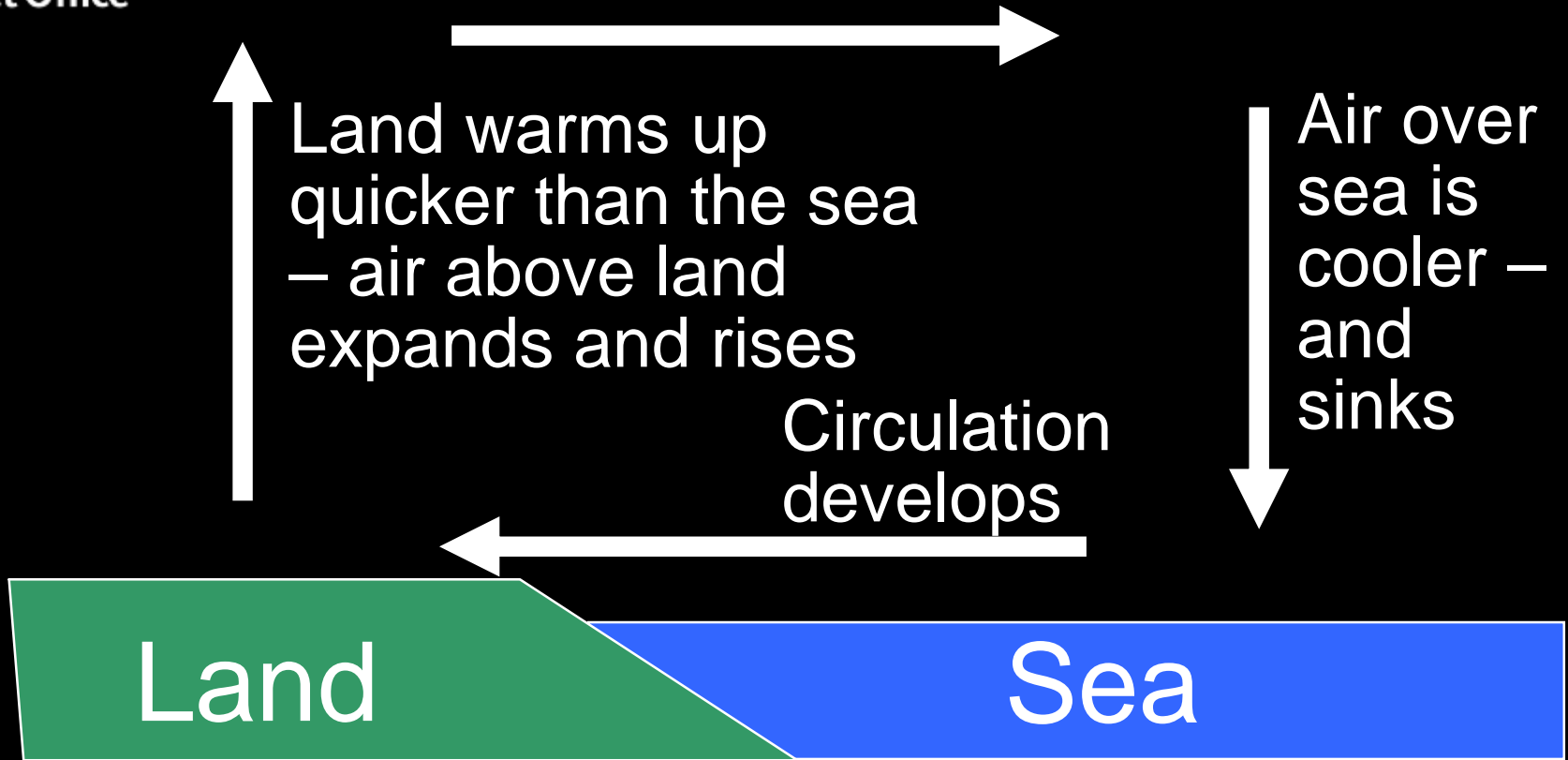


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# Coasts



# Sea breezes - A simple view



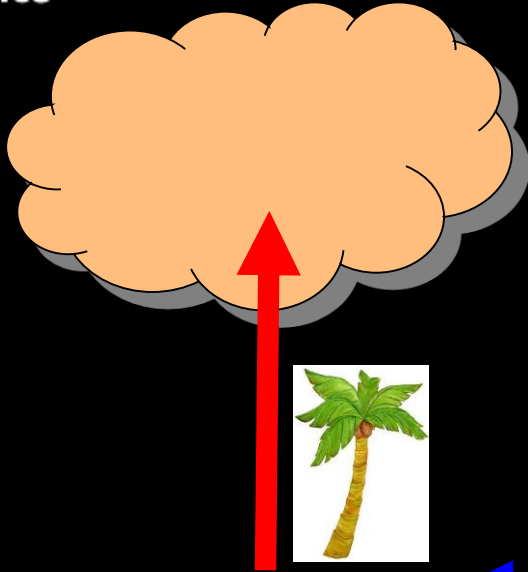


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# Sea breeze effects



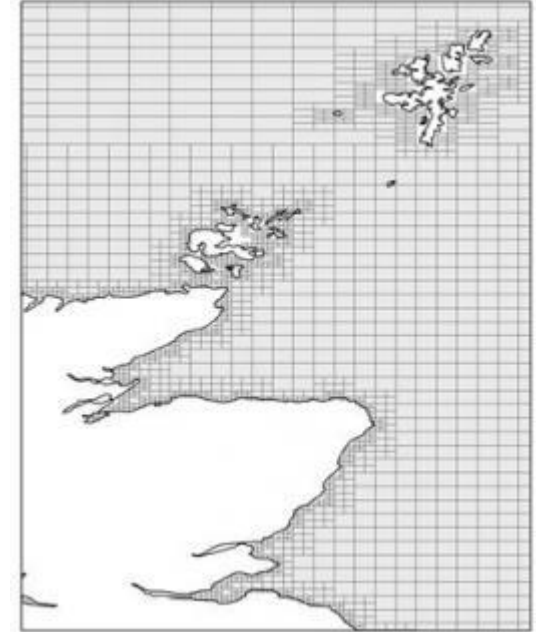
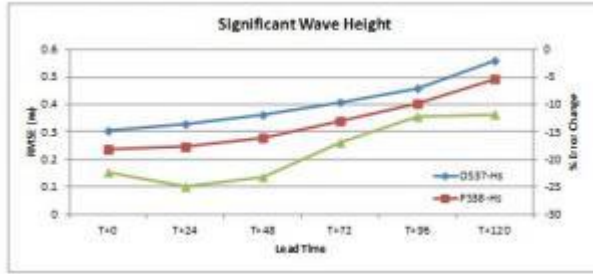
Coasts are usually sunnier than inland!



The Sea Breeze

Southampton  
Beaulieu

# Wave model upgrades





**Improvements to our upgraded Global wave model**

Alongside an update to the model physics, we now use a spherical multiple cell (SMC) grid with refined cell scales reducing from 25 km in open ocean to up to 3 km at coastlines.

This provides improved representation of water depth and topography, which affects the wave field.

**Greater model accuracy**

...around coastlines and islands.

**Overall reduction in errors of 20%**

...for significant wave height.

**Improved quality forecasts**

...in oceans and shelf seas worldwide.

**Better forecast accuracy**

- helps protect lives  
- brings economic benefits

...3 day forecasts now as accurate as 1 day forecasts.

# Weather forecast options

Phone the forecaster ( Best but costs!)

Use the web ( Beware of the machine fed output?)

<http://www.stronge.org.uk/marine/#gfs-and-ww3-forecasts>

<http://rasp.inn.leedsmet.ac.uk/>

Met Office general aviation pages

<http://www.metoffice.gov.uk/public/weather/marine>

Remember the product description and consider the update time





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Any questions?

