

Workshop Leader Notes

Aim: To use the Met Office shipping forecast to understand weather observations and weather systems around the United Kingdom.

Objectives:

- Understand some meteorological terminology.
- Use weather forecast information to plot wind speed and direction on a weather map.
- Be able to illustrate a general synoptic weather pattern on a weather map.
- Interpret technical information to be able to briefly describe the weather situation using common language.

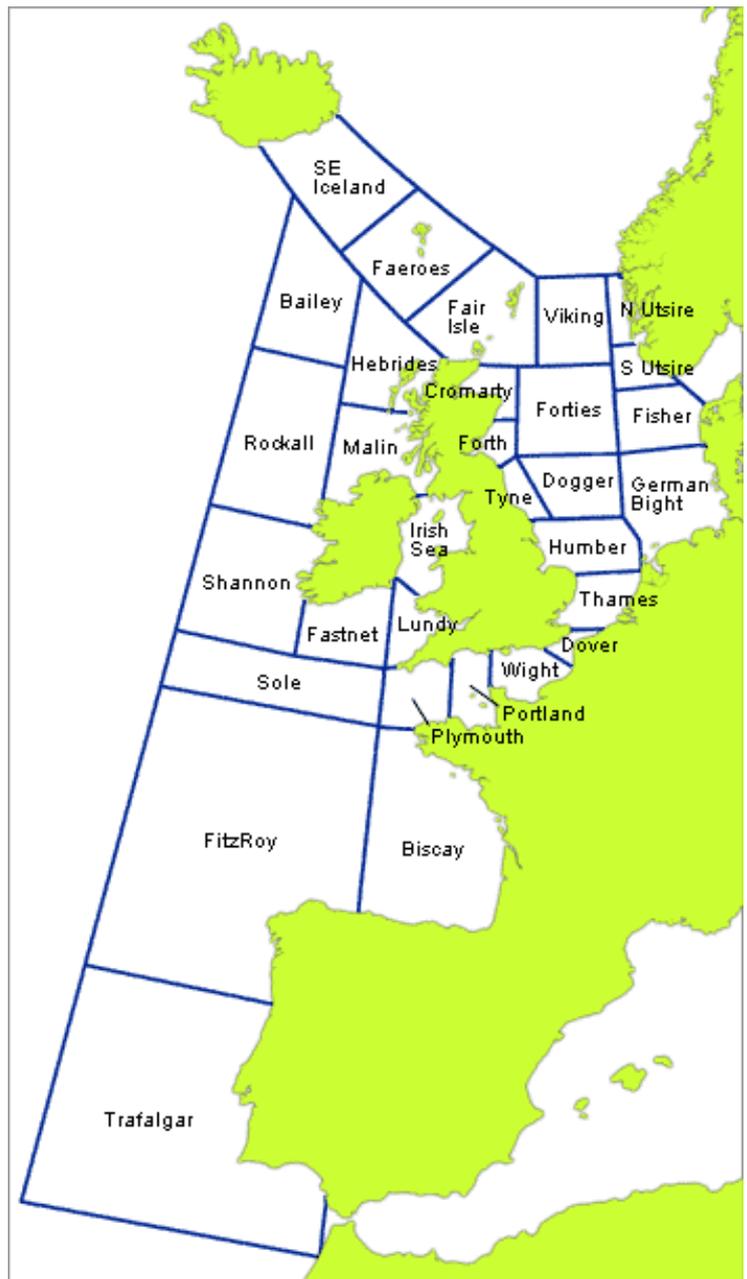
Introduction: This is a 60 minute workshop to help you relate a set of weather observations to a large scale weather system. You will be led through a series of short exercises that will build upon each other to create a big weather picture over the UK. You will then use that weather picture to describe the weather situation to others. This workshop is designed to be short, simple and is at an introductory level. It is assumed that the participant has no prior meteorological knowledge. Enjoy! **There are some easy bits and some challenging bits, designed for mixed ability workshops. Some parts may take some people longer than others. As time is tight the workshop leader should adjust the tasks to suite the class ability and age and clock.**

The shipping forecast is issued four times a day, 2300, 0500, 1100, 1700 GMT and covers the next 24 hours. The waters around the British Isles are divided into 31 sea areas shown on the map to the right.

The forecast contains details of gale warnings in force, a general synopsis and sea-area forecasts containing forecast wind direction and force, weather and visibility.

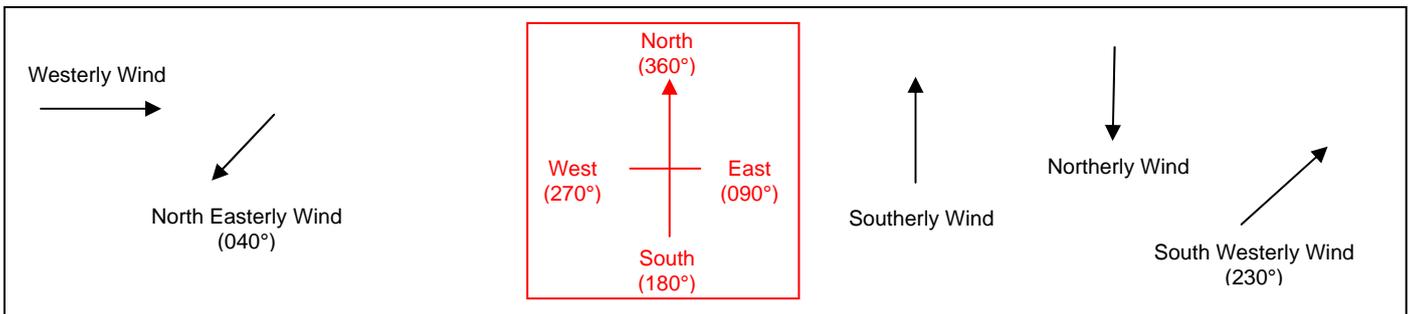
If you are interested, the latest shipping forecast can be found online at:

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



Part One:

1. You have been provided with the Met Office shipping forecast, issued Thursday 10th March 2011 at 1130 UTC (same as Greenwich Mean Time). Please read the forecast. You will find out that it is a windy weather story across many shipping forecast areas. **The workshop leader should introduce the concept of the shipping forecast, describes its purpose and customers. Go through a little of the structure and terminology and the reasons behind certain language use. The weather situation is real; no faked data has been used – hence some real life ambiguities and inconsistencies may be included (this is all part of the challenge – deciding what data/information is valuable and valid and which is not).**
2. You have also been provided with a large full size forecast map indicating all the shipping areas. Mark the forecast wind speed and direction in each sea area. Examples of wind symbols are given in the table below. Consider indicating any forecast wind changes on your map too. Wind direction is plotted to indicate “where the wind is coming from”, examples are given below... **Some help may be required by participants at this point. Get them to plot wind arrow of speed and direction on their sea areas map.**



3. Using the general synopsis at 0600 UTC, mark the located and value of an area of low pressure and an area of high pressure on your map. **The workshop leader will probably need to explain the concept of atmospheric pressure in broad simple terms at this point. Indicate typical values of high and low pressure to give a hint of what to look for.**
4. Where is the strongest wind speed and what is the wind direction? **The Beaufort force is given below.**
5. Where is the lightest wind speed and what is the wind direction (if any)?
6. Shade sea areas containing rain in **green** **These tasks are designed to be easier parts for younger or less experience participants.**
7. Shade sea areas containing showers in **blue**
8. Mark sea areas of reduced or poor visibilities in cross hatching



Hint: you have been provided with a help sheet (A) towards the end of this task sheet. This will assist you with shipping forecast terminology. You have also been provided with a Beaufort Wind Scale below too.

The Beaufort Scale

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 vane 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

Probably best to go through the first few sea areas verbally with the group and explain what it telling them/us. Point them to the help sheet at the end with specific terminology.

Shipping forecast

The shipping forecast issued by the Met Office, on behalf of the Maritime and Coastguard Agency, on Thursday 10 March 2011 at 1130 UTC

There are warnings of gales in Viking, North Utsire, South Utsire, Forties, Cromarty, Forth, Tyne, Dogger, Fisher, German Bight, Humber, Thames, Dover, Wight, Portland, Trafalgar, Irish Sea, Shannon, Rockall, Malin, Hebrides, Bailey, Fair Isle, Faeroes, South-east Iceland.

The General synopsis at 0600

Low Fair Isle 981 expected Baltic sea 977 by 0600 tomorrow. New lows expected Viking 986 and Fair Isle 990 by same time

The area forecasts for the next 24 hours

Viking, North Utsire, South Utsire

Cyclonic, mainly westerly or northwesterly 6 to gale 8, occasionally severe gale 9 in South Utsire, decreasing 4 at times. Rough or very rough. Rain, snow or squally wintry showers. Moderate or good, occasionally very poor

Forties, Cromarty

West or northwest backing southwest, 7 to severe gale 9, occasionally storm 10. Rough or very rough. Rain or squally wintry showers. Good, occasionally poor

Forth, Tyne, Dogger, Fisher, German Bight, Humber

West or southwest 7 to severe gale 9, occasionally storm 10 at first, except in Tyne and Humber. Very rough or high, but rough in Forth and Tyne. Squally showers. Good, occasionally poor

Thames, Dover, Wight, Portland, Plymouth

Southwest 5 to 7, occasionally gale 8 except in Plymouth, decreasing 4 or 5 later. Moderate or rough. Showers. Moderate or good

South Biscay

Easterly or northeasterly 3 or 4, occasionally 5. Moderate or rough. Mainly fair. Moderate or good

Trafalgar (Issued 0015 UTC Thu 10 Mar)

Easterly or northeasterly 5 to 7, decreasing 4 at times, occasionally gale 8 in southeast. Moderate or rough. Thundery showers. Good, occasionally poor

North FitzRoy

Southwesterly 3 or 4, increasing 5 or 6. Rough or very rough. Showers later. Good

Sole, Lundy, Fastnet, Irish Sea

West backing south 5 to 7, occasionally gale 8, except in Sole. Moderate or rough, but very rough in Sole and Fastnet. Showers. Moderate or good

Shannon

West or southwest, becoming cyclonic later 5 to 7, occasionally gale 8. Very rough or high. Showers then rain. Moderate or good, occasionally poor

Rockall, Malin

West gale 8 to storm 10, decreasing 5 or 6 later. High or very high. Squally wintry showers. Good, occasionally poor

Hebrides, Bailey

Cyclonic mainly westerly or northwesterly 7 to severe gale 9, occasionally storm 10, decreasing 5 or 6 at times. High or very high. Squally wintry showers. Good, occasionally poor

Fair Isle, Faeroes

Cyclonic, mainly north or northwest 6 to gale 8, perhaps severe gale 9 later, decreasing 4 or 5 at times. Very rough or high. Rain, snow or squally wintry showers. Good, occasionally very poor

South-east Iceland

Northerly or northeasterly 5 to 7, occasionally gale 8. Very rough or high. Snow showers. Good, occasionally very poor. Occasional light icing in north



Part Two:

- 9. We are now going to add some real weather observations from 1500 UTC on the same day as our forecast information. The map on the next page (labelled, 'Observations Map') shows the locations of coastal, island, light vessel and buoy weather stations around the United Kingdom. Spend a moment locating some weather stations.....
- 10. Following the Observations Map you will find a few pages of 'Latest Observations' for those weather stations. Spend a moment reviewing the weather information. Wind information is given as in degrees from true north and wind speeds are in knots. **A lot of weather observational information has been given. Only some of it is needed and participants with little data handling experience may feel a little overwhelmed with all the information. Fell free to show a few examples and perhaps direct them to the areas of importance to get them started. The conversion tables below are for information as some participants may not have come across wind speeds in knots before.**

To convert knots (kts) to miles per hour (mph) use the following formula: 1 knot = 1.15 miles per hour
To convert miles per hour (mph) to knots (kts) use the following formula: 1 miles per hour = 0.868976242 knots

5 Knots = 6 MPH	40 Knots = 46 MPH
10 Knots = 12 MPH	45 Knots = 52 MPH
15 Knots = 17MPH	50 Knots = 58 MPH
20 Knots = 23MPH	55 Knots = 63 MPH
25 Knots = 29 MPH	60 Knots = 69 MPH
30 Knots = 35 MPH	65 Knots = 75 MPH
35 Knots = 40 MPH	70 Knots = 81 MPH

Summary Conversion Table

- 11. Approximately place a small selection of observational information on your forecast map. Perhaps place just one 1500 UTC observation in each sea area (where possible). **Unfortunately the sea areas map is not the same scale as the observations map. The workshop leader may wish to spend some time highlight some of the observations locations on the sea area map, to help people get use to the situation as presented. Note, not all sea areas have observations and some sea areas have plenty of observational data. This could be a useful discussion on point on why people think this may be the case?**
- 12. Where do the observations differ and where are they similar to the forecast information? This process is known as forecast verification. This process quality controls a weather forecast. **This discussion could be a long or as short as one wishes to make it. The concept of forecast verification is potentially a big one!**

Latest observations — 1500 UTC on 10 Mar 2011: East & North coasts

Location	Weather	Temperature			Humidity	Wind		Vis	Pressure	Wave	
		Air	Dew Pt	Sea		Dir	Speed			Period	Height
		°C	°C	°C		deg	knots			n miles	hPa
K7	N/A	1.8	-4.7	7.4	62	350	5	N/A	991.0	9	3.0
F3	N/A	8.3	6.8	7.4	90	230	40	2	1010.0	7	2.2
Lerwick		1.4	-3.1	N/A	72	350	14	19	990.1	N/A	N/A
Foula	N/A	3.4	-3.7	N/A	60	330	9	N/A	991.2	N/A	N/A
Sule Skerry	N/A	3.9	-3.5	N/A	58	150	5	N/A	991.7	N/A	N/A
Kirkwall		3.5	-3.6	N/A	60	300	5	10	992.1	N/A	N/A
Wick Airport		3.3	0.4	N/A	81	260	6	12	992.5	N/A	N/A
Lossiemouth		2.2	0.6	N/A	89	240	11	3	994.2	N/A	N/A
Dyce		3.7	0.5	N/A	80	260	10	19	994.1	N/A	N/A
Leuchars		6.2	1.1	N/A	70	270	21	24	996.2	N/A	N/A
Boulmer		5.1	1.8	N/A	79	270	25	7	999.1	N/A	N/A
Donna Nook		11.1	3.4	N/A	59	280	21	16	1003.8	N/A	N/A
Weybourne		13.3	3.9	N/A	53	250	28	21	1004.4	N/A	N/A
Shoeburyness	N/A	11.7	6.3	N/A	69	240	13	8	1009.5	N/A	N/A
Manston		11.8	6.2	N/A	69	230	21	11	1010.4	N/A	N/A
Sandettie	N/A	8.5	7.1	7.0	91	230	38	5	1011.3	6	2.0

Latest observations — 1500 UTC on 10 Mar 2011: South coast

Location	Weather	Temperature			Humidity	Wind		Vis	Pressure	Wave	
		Air	Dew Pt	Sea		Dir	Speed			Period	Height
		°C	°C	°C		deg	knots			n miles	hPa
Greenwich	N/A	9.2	7.3	8.3	88	240	34	5	1014.9	7	2.0
Solent	N/A	8.9	7.4	N/A	90	260	28	N/A	1012.6	N/A	N/A
Hurn		10.8	7.9	N/A	82	250	20	8	1013.5	N/A	N/A
Channel	N/A	10.1	8.1	9.2	87	240	29	5	1017.4	7	1.6
Guernsey		9.8	7.3	N/A	84	240	20	9	1018.6	N/A	N/A
Jersey Buoy	N/A	N/A	N/A	8.1	N/A	290	20	N/A	1019.8	13	1.7
Jersey Airport		9.6	7.0	N/A	84	250	17	14	1019.2	N/A	N/A
Plymouth		10.0	8.5	N/A	90	270	17	3	1016.1	N/A	N/A
Culdrose		10.4	7.4	N/A	82	270	16	4	1017.0	N/A	N/A
Seven Stones	N/A	10.3	8.6	9.5	89	260	22	5	1017.4	9	2.5

Latest observations — 1500 UTC on 10 Mar 2011: West coast

Location	Weather	Temperature			Humidity	Wind		Vis	Pressure	Wave	
		Air	Dew Pt	Sea		Dir	Speed			Period	Height
		°C	°C	°C	%	deg	knots	n miles	hPa	seconds	metres
Stornoway		3.8	2.1	N/A	89	160	8	13	991.5	N/A	N/A
Skve: Lusa		3.6	2.0	N/A	89	300	20	11	995.7	N/A	N/A
Tiree		6.7	-0.6	N/A	60	290	32	9	997.9	N/A	N/A
Machrihanish	N/A	6.2	2.6	N/A	78	280	30	7	1001.6	N/A	N/A
Ronaldsway		7.9	0.0	N/A	57	280	20	14	1005.8	N/A	N/A
Crosby		7.4	5.1	N/A	85	280	20	5	1007.0	N/A	N/A
Valley		9.5	4.5	N/A	71	260	18	8	1008.4	N/A	N/A
Aberporth	N/A	9.3	5.6	7.9	78	260	18	N/A	1010.6	5	2.2
Turbot Bank	N/A	9.1	6.3	8.2	83	250	20	N/A	1013.2	6	2.8
Malin Head		4.6	0.9	N/A	77	270	31	8	1003.4	N/A	N/A
Aldergrove		4.9	0.8	N/A	75	260	17	19	1005.3	N/A	N/A
M5	N/A	9.1	5.6	8.3	79	270	13	N/A	1013.6	6	2.3
Roches Point	N/A	10.6	2.3	N/A	56	290	21	14	1013.1	N/A	N/A
M3	N/A	9.7	6.6	10.6	81	280	21	N/A	1016.4	9	5.8
Valentia		9.0	4.0	N/A	71	280	16	16	1015.6	N/A	N/A
Belmullet		8.1	1.5	N/A	63	270	17	19	1009.3	N/A	N/A
M4	N/A	6.7	1.0	9.6	67	270	29	N/A	1003.4	N/A	N/A
K4	N/A	N/A	N/A	10.4	N/A	280	26	N/A	1005.2	8	6.3
K5	N/A	3.5	-1.8	9.5	68	280	18	N/A	993.6	8	5.1

Latest observations — 1500 UTC on 10 Mar 2011: Offshore

Location	Weather	Temperature			Humidity	Wind		Vis	Pressure	Wave	
		Air	Dew Pt	Sea		Dir	Speed			Period	Height
		°C	°C	°C	%	deg	knots	n miles	hPa	seconds	metres
Gascoigne	N/A	11.3	5.0	11.9	65	30	3	N/A	1024.4	11	3.4
K2	N/A	9.9	5.1	11.1	72	N/A	N/A	N/A	1018.4	9	5.2
K1	N/A	11.5	9.2	11.8	86	280	19	N/A	1021.8	N/A	N/A
M6	N/A	7.6	2.5	10.4	70	270	N/A	N/A	1015.0	9	5.2
PAP	N/A	11.2	7.7	11.8	79	300	16	N/A	1022.6	9	4.2

Part Three:

13. We are now going to summarise all our findings. In no more than 60 words summarise the weather situation around the coast line of Britain in your own words. Is it wet / dry / windy / calm / sunny / dull / hot / cold for example? **Lots of hints have been given so far (i.e. windy in places!), some things can be inferred (if its raining it must be cloudy!) etc. Perhaps introduce the idea that the wind direction can help with airmass identification, hence a host of different weather variables could be assumed (depends on time available).**
14. If you were asked by somebody where they should go for a day out on the coast with the nicest weather factor, where would you send them and why? (assuming time, distance and money was no object). **Hopefully most participants will look at the list of observations and pick the driest, warmest, best visibility and least windy location(s).**
15. If you were on a cross channel ferry from Dover to Calais at 1500 UTC on Thursday 10th March 2011, what *marine weather hazards* would the ferry captain encounter? **This involves breaking down and interpreting the shipping forecast information for sea area Dover. Hazards are rough seas, moderate visibility in showers and strong winds.**
16. Compare the weather situation (forecast and observation) in Sea Area Biscay with Sea Area Hebrides. Summarise using the table below to help you? **This task involves combining and mixing information from the two different sources, the shipping forecast and the observational data, to create a single decision making picture. This is a key skill for a meteorologist / scientist / weather forecaster.**

Weather Type	Biscay	Hebrides
Wind Speed and Direction	Easterly or northeasterly 3 or 4, occasionally 5	Cyclonic mainly westerly or northwesterly 7 to severe gale 9, occasionally storm 10, decreasing 5 or 6 at times.
Precipitation (if any)	Mainly fair.	Squally wintry showers.
Visibility	Moderate or good	Good, occasionally poor
Pressure	1024 mb (Gascogne)	991mb (Stornoway)
Temperature	Plus 11 Celsius (Gascogne)	Plus 4 Celsius (Stornoway)

The weather chart below summarise the UK weather story for 1200 UTC on Thursday 10th March 2011 (i.e. three hours before the weather observation provided above). The chart description attached states:

Description of Thursday 10th March 2011, 1200 UTC surface analysis:

Low pressure sits to the north and northwest of the United Kingdom with occluded fronts over northern Scotland. A cold front lies from the Wash to the Bristol Channel, moving south-eastwards. An showery north westerly airflow covers most of the British Isles.

Some participants may never have seen a detailed weather analysis chart before, so take plenty of time (if needed) to explain it to the audience. If time is tight this last page of the task sheet could easily be omitted or given as a 'do at home' exercise!

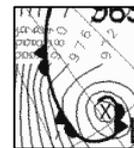
- The thin black line show lines of equal mean sea level pressure, known as isobars.
- The tighter the isobars are the winder it is and the lines point in the direction the wind is blowing....
- In the northern hemisphere, air moves counter-clockwise around low pressure weather systems (marked with a 'L') and clockwise around area of high pressure (marked with a 'H').
- The numbers indicate mean sea level pressure values in millibars
- Weather fronts are bands of cloud and rain (possibly snow/sleet in winter).



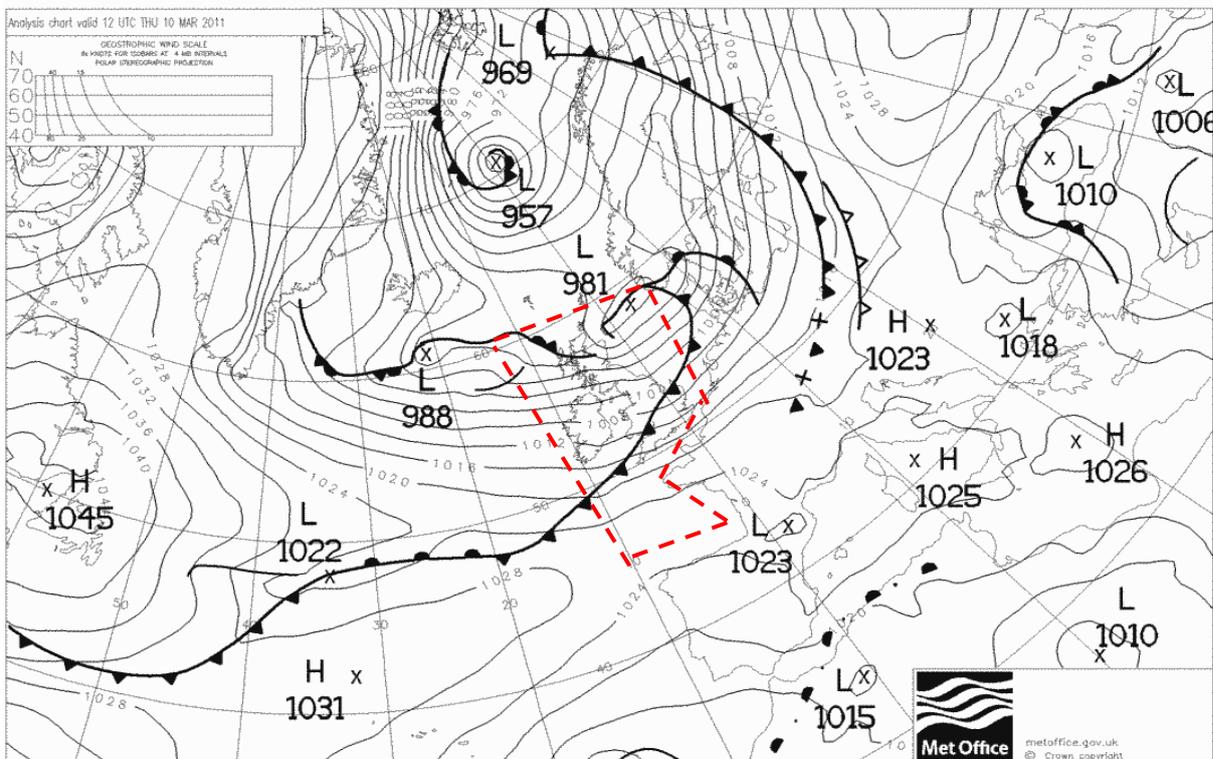
= Cold Fronts



= Warm Fronts



= Occluded Fronts



17. Using the chart above, where do you think it is wettest and windiest within the red dashed box and why? They will now obviously have knowledge of the weather situation based on earlier sections of this workshop, this can't be avoided, but to get the most of it try to persuade participants to only use the chart information to answer these questions.

18. Using the chart above, summarise the weather story in Stornoway at 1200 UT on 10th March?
This is a difficult question when given cold, especially if weather charts are brand new to the participant(s). Instead, the workshop leader could reset the question to 'is it easier' to summarise the weather story for Stornoway using the weather map above, discuss? This could lead to an open forum type discussion on the pros and cons of the written/radio based shipping forecast versus a weather map/chart/image.
19. Do your answers to the two questions above (17 and 18) verify with the shipping forecast and weather observations? If yes, why? If no why? There should be reasonable agreement (hopefully!), In areas where the agreement is poor, it is probably in areas with limited data and information. This could be discussed as a wider point of forecasting when blind (i.e. no or limited weather observations). A discussion of how modern weather forecasting overcomes these challenges could finish the workshop.

Marine Forecast Glossary

Marine forecasts contain a number of terms which are used to convey specific meanings.

Gale warnings

Gale

Winds of at least Beaufort force 8 (34–40 knots) or gusts reaching 43–51 knots

Severe gale

Winds of force 9 (41–47 knots) or gusts reaching 52–60 knots

Storm

Winds of force 10 (48–55 knots) or gusts reaching 61–68 knots

Violent storm

Winds of force 11 (56–63 knots) or gusts of 69 knots or more

Hurricane force

Winds of force 12 (64 knots or more)

Note: The term used is 'hurricane force'; the term 'hurricane' on its own means a true tropical cyclone, not experienced in British waters.

Imminent

Expected within six hours of time of issue

Soon

Expected within six to 12 hours of time of issue

Later

Expected more than 12 hours from time of issue

Visibility

Very poor

Visibility less than 1,000 metres

Poor

Visibility between 1,000 metres and 2 nautical miles

Moderate

Visibility between 2 and 5 nautical miles

Good

Visibility more than 5 nautical miles

Movement of pressure systems

Slowly

Moving at less than 15 knots

Steadily

Moving at 15 to 25 knots

Rather quickly

Moving at 25 to 35 knots

Rapidly

Moving at 35 to 45 knots

Very rapidly

Moving at more than 45 knots

Pressure tendency in station reports

Rising (or falling) more slowly

Pressure rising (or falling) at a progressively slower rate through the preceding three hours

Rising (or falling) slowly

Pressure change of 0.1 to 1.5 hPa in the preceding three hours

Rising (or falling)

Pressure change of 1.6 to 3.5 hPa in the preceding three hours

Rising (or falling) quickly

Pressure change of 3.6 to 6.0 hPa in the preceding three hours

Rising (or falling) v. rapidly

Pressure change of more than 6.0 hPa in the preceding three hours

Now rising (or falling)

Pressure has been falling (rising) or steady in the preceding three hours, but at the time of observation was definitely rising (falling)

Note: For those more familiar with the millibar, 1 hPa = 1 mb

Wind

Wind direction

Indicates the direction from which the wind is blowing

Becoming cyclonic

Indicates that there will be considerable change in wind direction across the path of a depression within the forecast area

Veering

The changing of the wind direction clockwise, e.g. SW to W

Backing

The changing of the wind in the opposite direction to veering (anticlockwise), e.g. SE to NE

Sea state

Smooth

Wave height less than 0.5 m

Slight

Wave height of 0.5 to 1.25 m

Moderate

Wave height of 1.25 to 2.5 m

Rough

Wave height of 2.5 to 4.0 m

Very rough

Wave height of 4.0 to 6.0 m

High

Wave height of 6.0 to 9.0 m

Very high

Wave height of 9.0 to 14.0 m

Phenomenal

Wave height more than 14.0 m