The Shipping Forecast – an icon of British weather and safety at sea

Jim Galvin
Operations Centre, Met Office, Exeter

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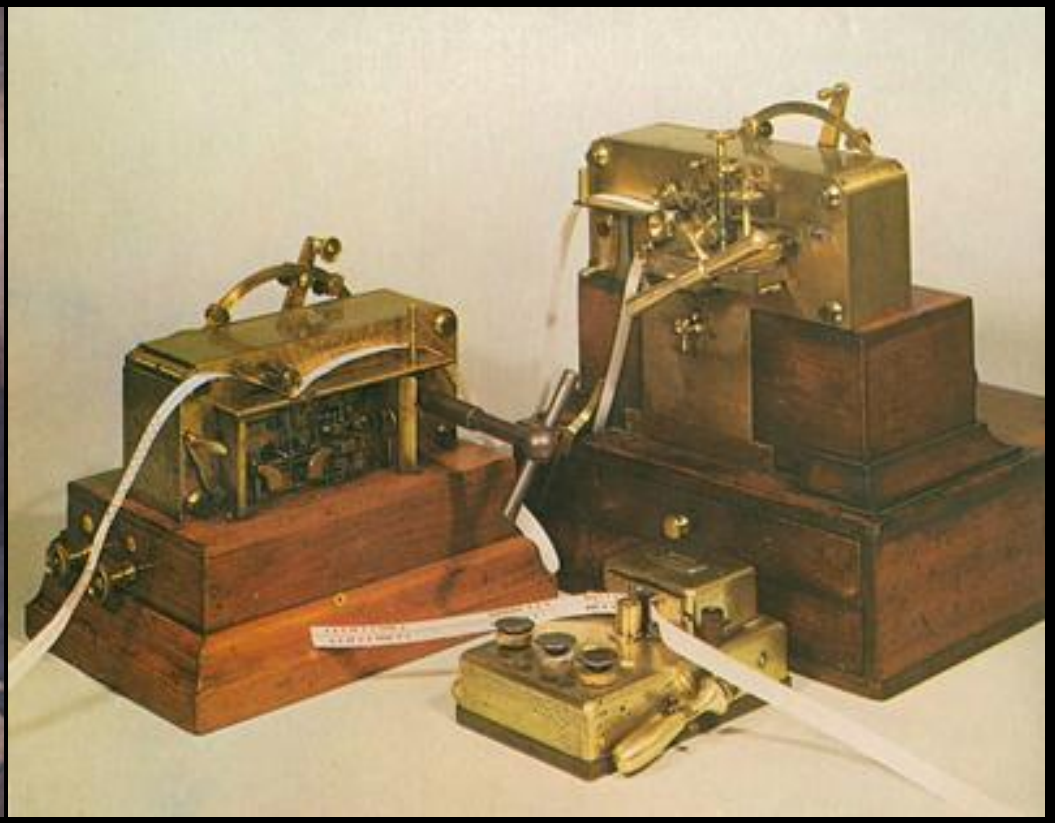
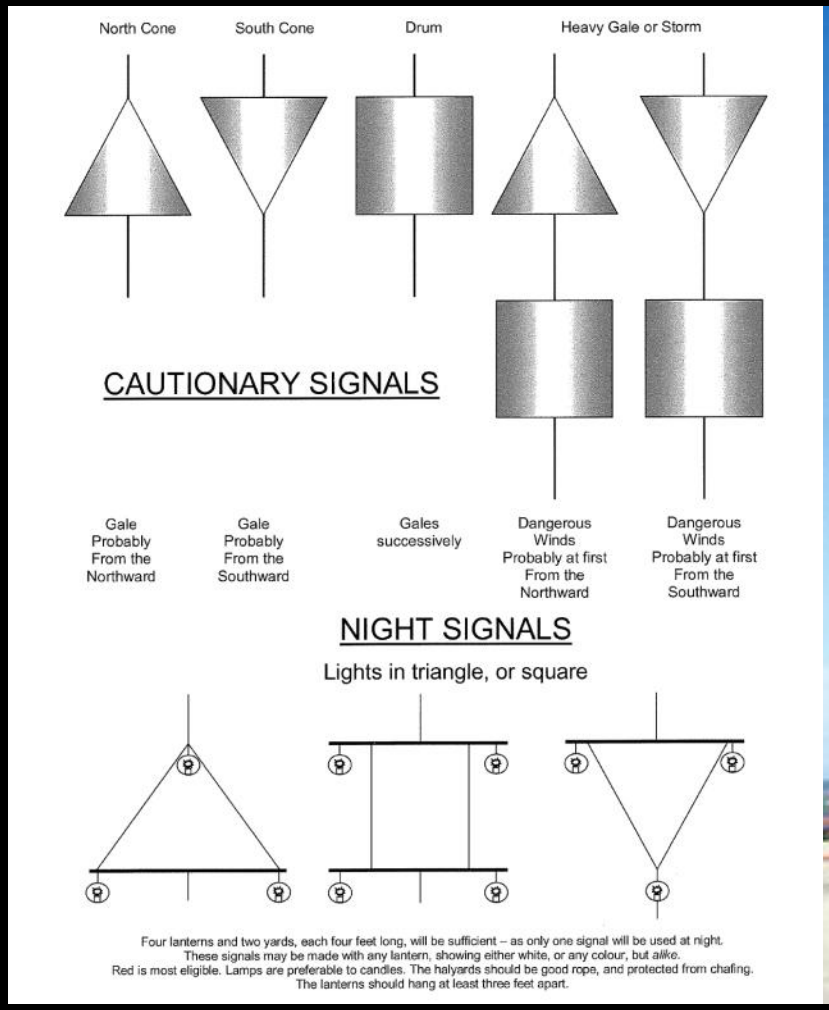
- *Verification of forecasts – a measure of value*
- *Some thoughts about the future*

FitzRoy, the telegraph and the Meteorological Department

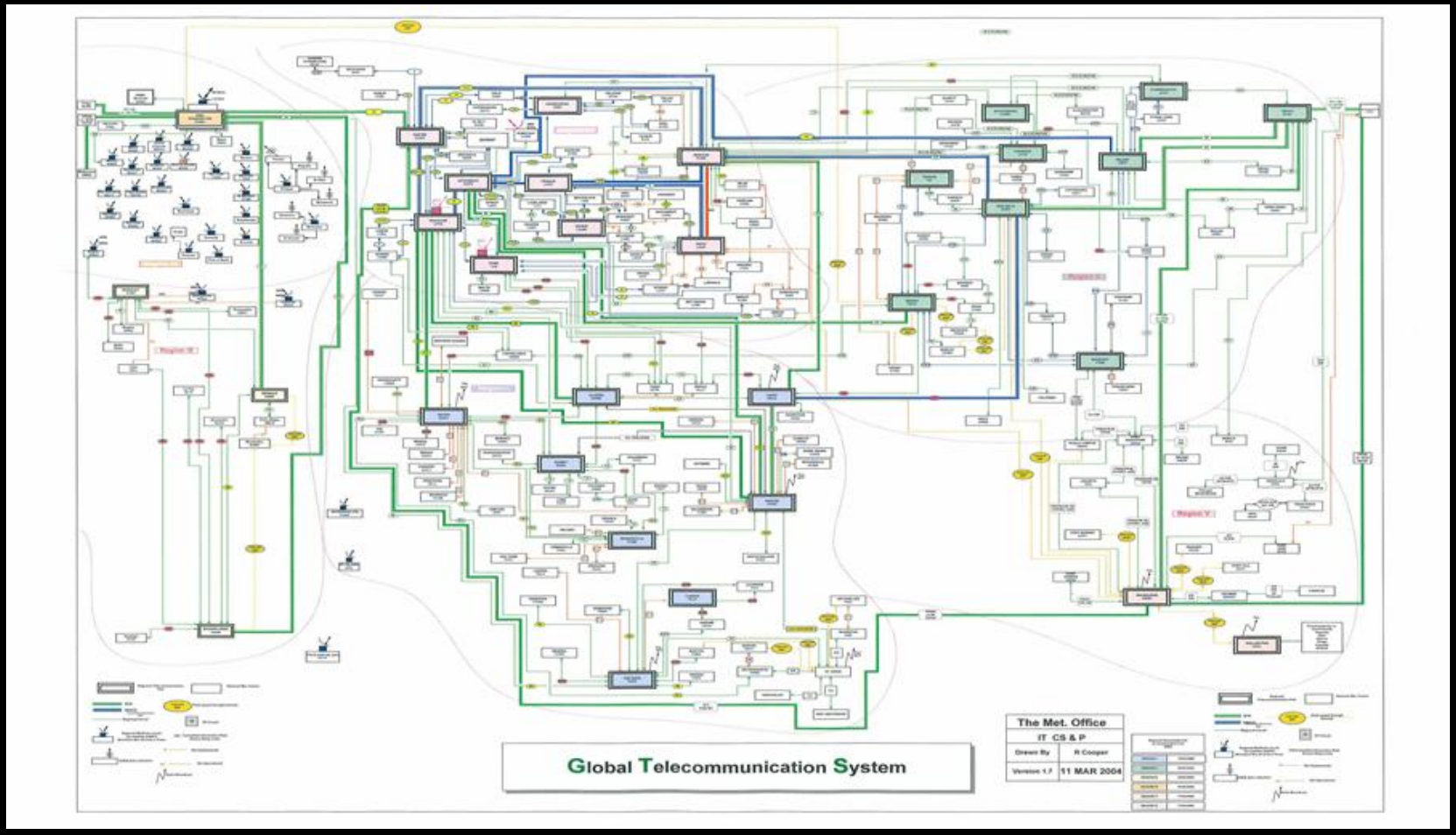
Established in Board of Trade in 1854



FitzRoy's big idea – not a great success! But…



…in the longer term



Development of what we produce – Shipping Forecast

1924

2002

Our customers and the rôle of the forecaster

- The maritime community!
- More formally, the Maritime and Coastguard Agency (MCA), who own the forecasts
- By agreement, the BBC
- Organisations involved in rescues (RNLI, the military)
- The forecaster adds value and produces a forecast of suitable length

Producing our forecasts

- Directly funded through taxation
- Part of the Public Weather Service, ensuring safety from poor weather
- Raw data are assessed and modified by the forecaster – particularly important for the Shipping Forecast
- Part of the Global Maritime Distress and Safety System

Forecasts we produce

Shipping

Inshore Waters

High Seas

Definition of terms

- *Winds*

8-point compass, variability ± 45°

Speed ± 1 Beaufort Force

Beaufort Wind Scale	Mean Wind Speed		Limits of wind speed		Descriptive term	S.W.H.*	Probable maximum wave height in metres *
	Knots	m/s	Knots	m/s			
0	0	0	**<1**	0-0.2	Calm	-	-
1	2	0.8	**1-3**	0.3-1.5	Light air	0.1	0.1
2	5	2.4	**4-6**	1.6-3.3	Light breeze	0.2	0.3
3	9	4.3	**7-10**	3.4-5.4	Gentle breeze	0.6	1.0
4	13	6.7	**11-16**	5.5-7.9	Moderate breeze	1.0	1.5
5	19	9.3	**17-21**	8.0-10.7	Fresh breeze	2.0	2.5
6	24	12.3	**22-27**	10.8-13.8	Strong breeze	3.0	4.0
7	30	15.5	**28-33**	13.9-17.1	Near Gale	4.0	5.5
8	37	18.9	**34-40**	17.2-20.7	Gale	5.5	7.5
9	44	22.6	**41-47**	20.8-24.4	Severe Gale	7.0	10.0
10	52	26.4	**48-55**	25.5-28.4	Storm	9.0	12.5
11	60	30.5	**56-63**	28.5-32.6	Violent Storm	11.5	16.0
12	-	-	**64+**	32.7+	Hurricane	14+	-

* 1 These values refer to well developed wind waves of the open sea.
2 The lag effect between the wind increasing and the sea increasing should be considered.

Gale Gust Criteria	
Gale 8	Gust 43-51
Severe Gale 9	Gust 52-60
Storm 10	Gust 61-68
Violent Storm 11	Gust 69+
Hurricane 12	-

Definition of terms

- *Waves*

  "Total sea" – a combination of wind waves (locally produced) and swell waves (produced by distant strong winds)

  Height forecast is that of the mean of the largest 7% of combined wind and swell waves

  Height ± 1 sea state

Sea State		WMO
Smooth	<0.5 m	0,1,2
Slight	0.5-1.25 m	3
Moderate	1.25-2.5 m	4
Rough	2.5-4.0 m	5
Very Rough	4.0-6.0 m	6
High	6.0-9.0 m	7
Very High	9.0-14.0 m	8
Phenomenal	>14.0 m	9

Definition of terms

- *Veering* – a change of wind in the clockwise sense (up to 180°)
- *Backing* – a change of wind in the anticlockwise sense (up to 180°)
- *At first* – within the first 12 hours
- *Later* – within the latter 12 hours
- *Occasional/occasionally* – lasts less than half the time (location or time specific)
- *At times* – non-persistent (lasts more than half the forecast period)
- *For a time* – a transient state

Definition of terms

- *Weather (and superstructure icing)*

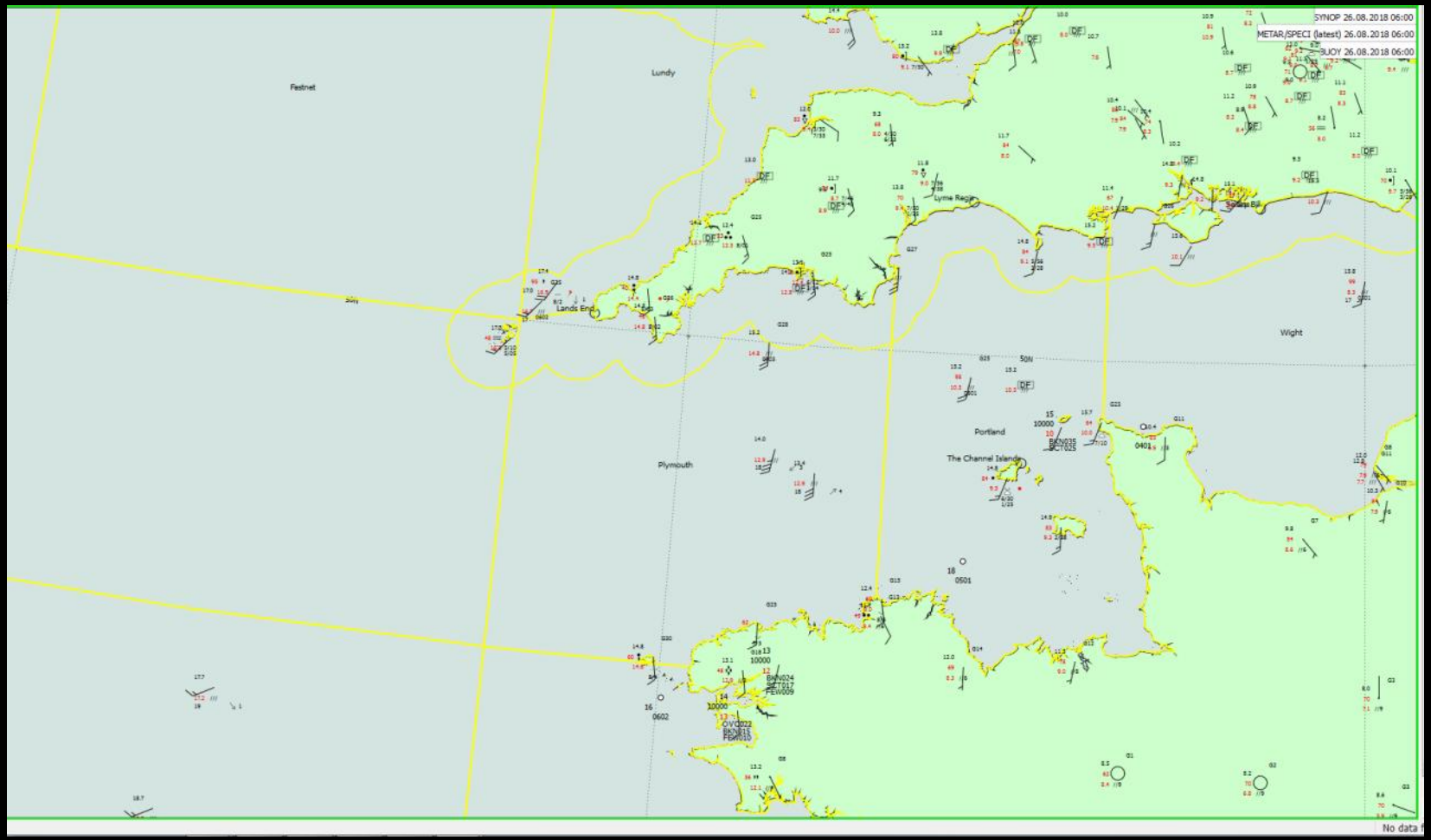
  Only significant factors included: rain, showers (which may be associated with gusts and assumed visibility), snow, thunderstorm (usually associated with gusts), squall, fog. Persistence and timing included, but only forecast if they have an effect.

  Fog, heavy snow and icing are most significant (because of the effect of very poor visibility and the risk of ice).

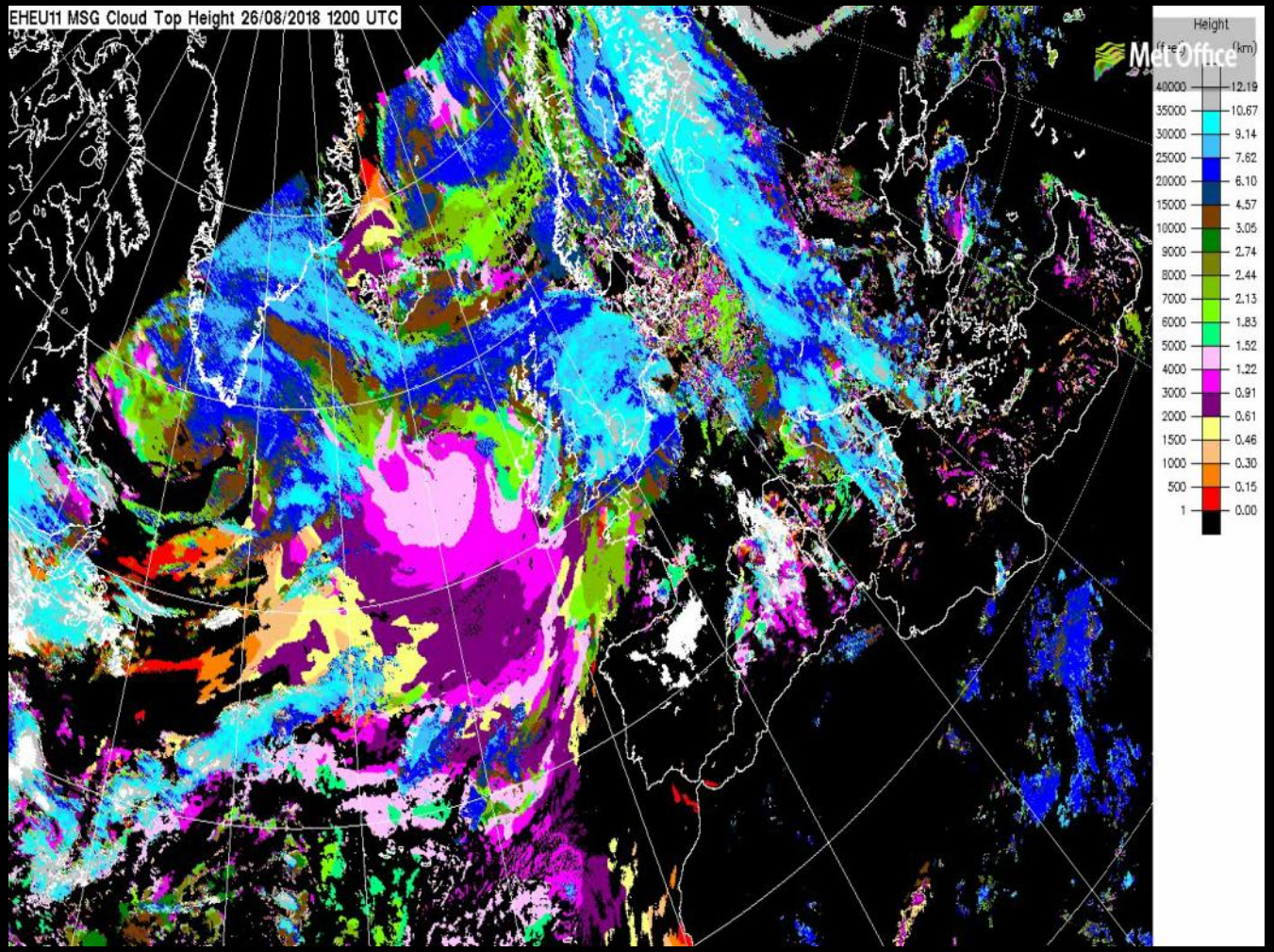
- *Visibility*

  Good: > 5 n.mi. (≥ 10 km);
  Moderate: 2-5 n.mi. (3.7-9 km);
  Poor: 0.6-2 n.mi. (1.0-3.7 km);
  Very poor: < 0.6 n.mi. (< 1000 m).

Observations – the starting point for everything!



Observations – the starting point for everything!



Forecast production

- *General*

  Gales or storms include gust-speed criteria (a uniquely British system)!

  Wording has particular and restricted meaning

- *Shipping forecast*

  350 (±20) words; 380 at 2300 to allow Trafalgar to be included

  Areas with gales (or greater) listed at top

Forecast production

- *Inshore waters forecast*

  no word restriction, but each coastal section separate

  inclusion of strong winds automatically generates a warning

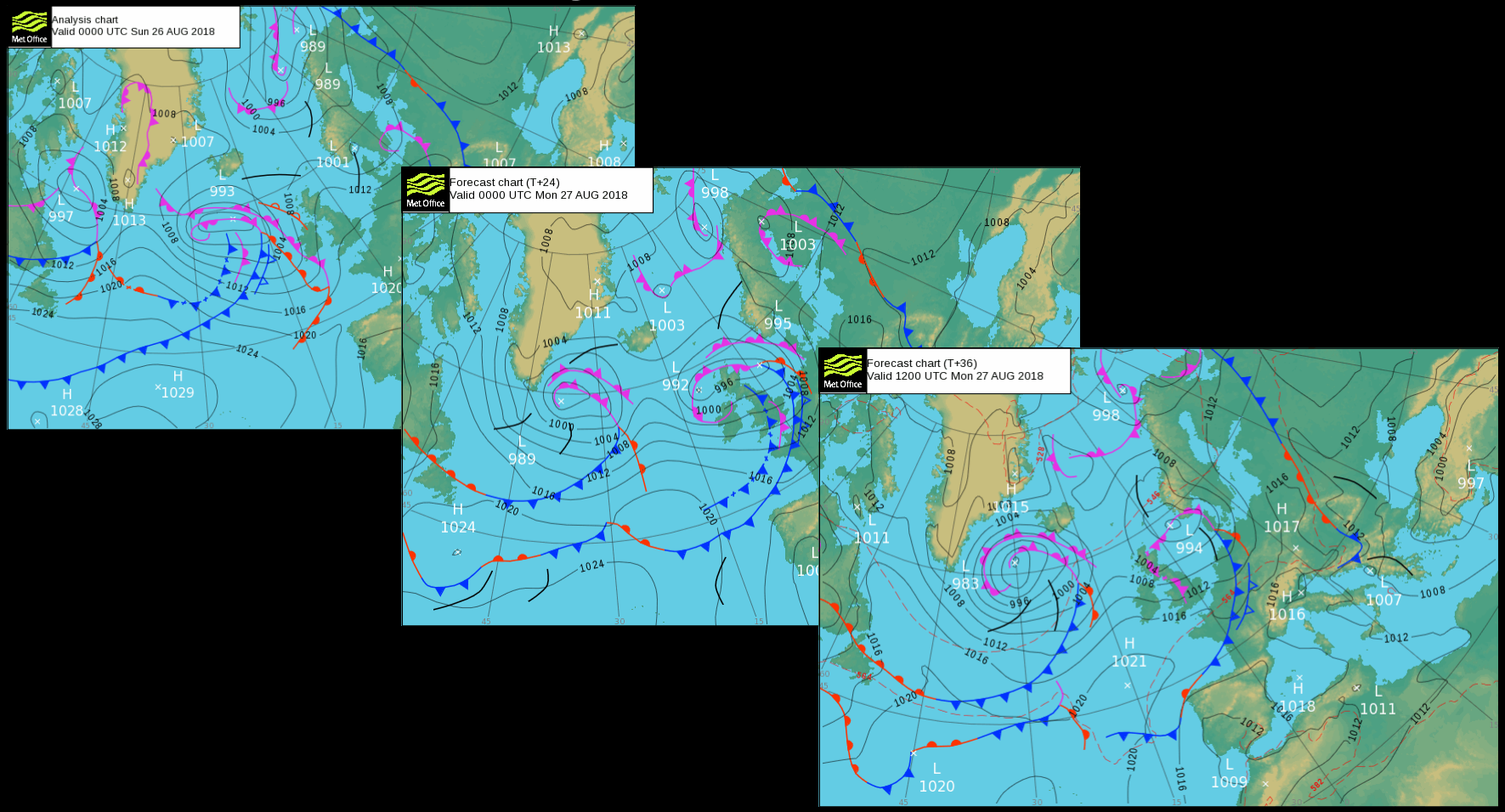
- *High seas forecast*

  details of storms (Force 10 or more) to be included

  …but few observations and uncertainty from model run to model run

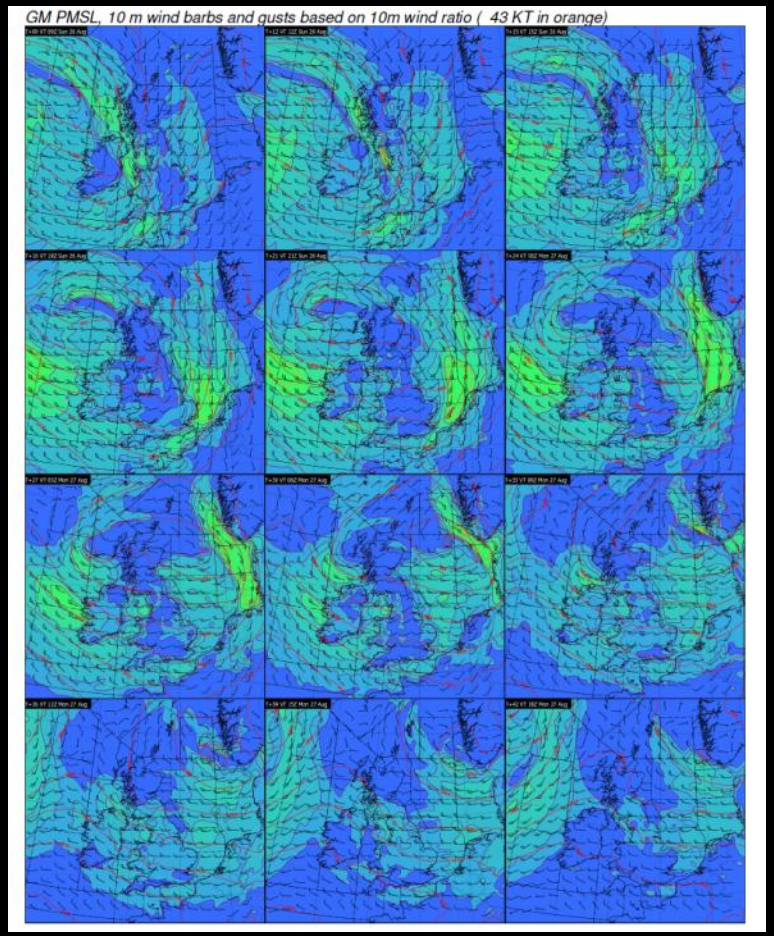
Weather foreacsting

- 26-27 August 2018



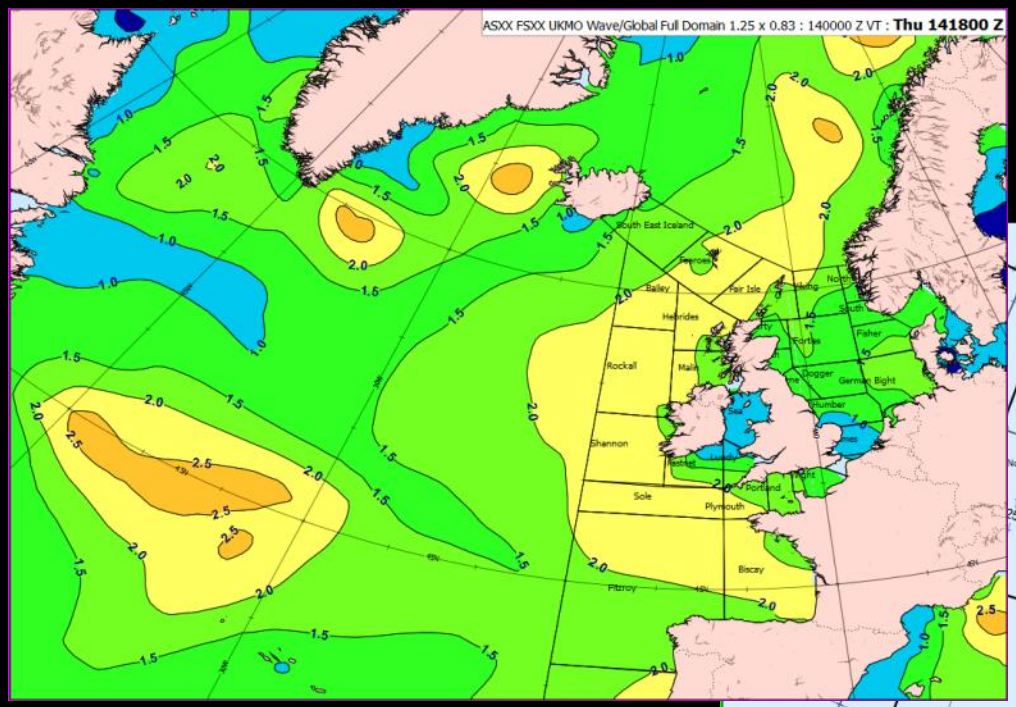
Weather forecasting

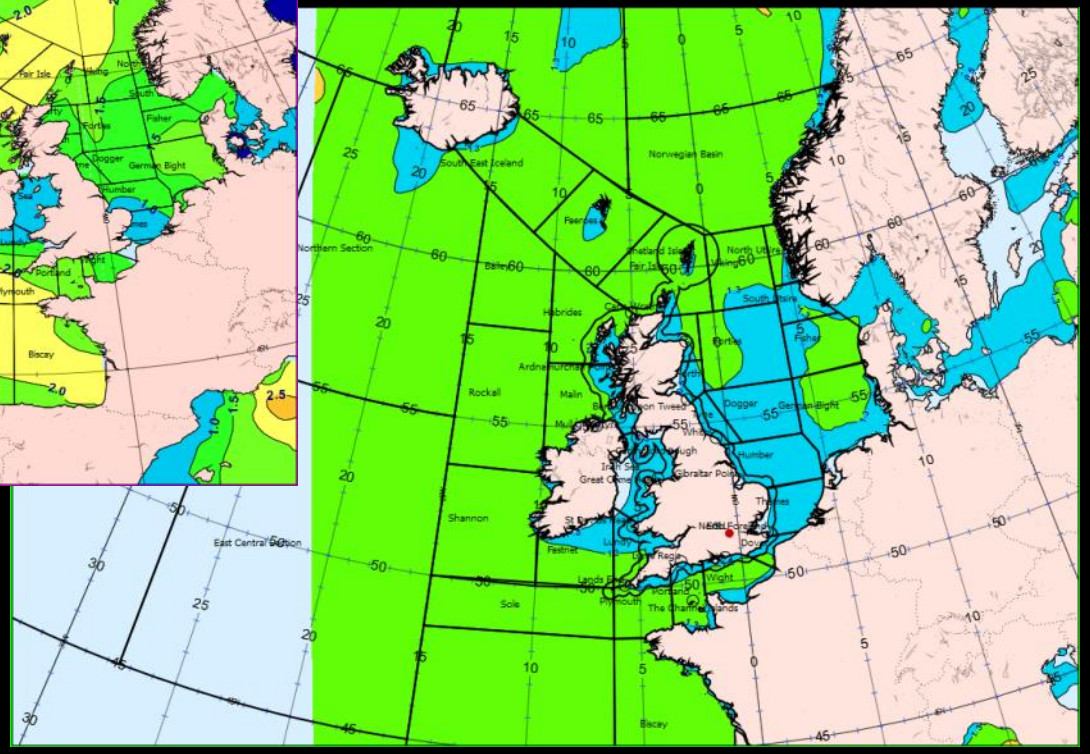
- Interpreting raw model output – winds (Chief Forecaster's modified fields)



Weather forecasting

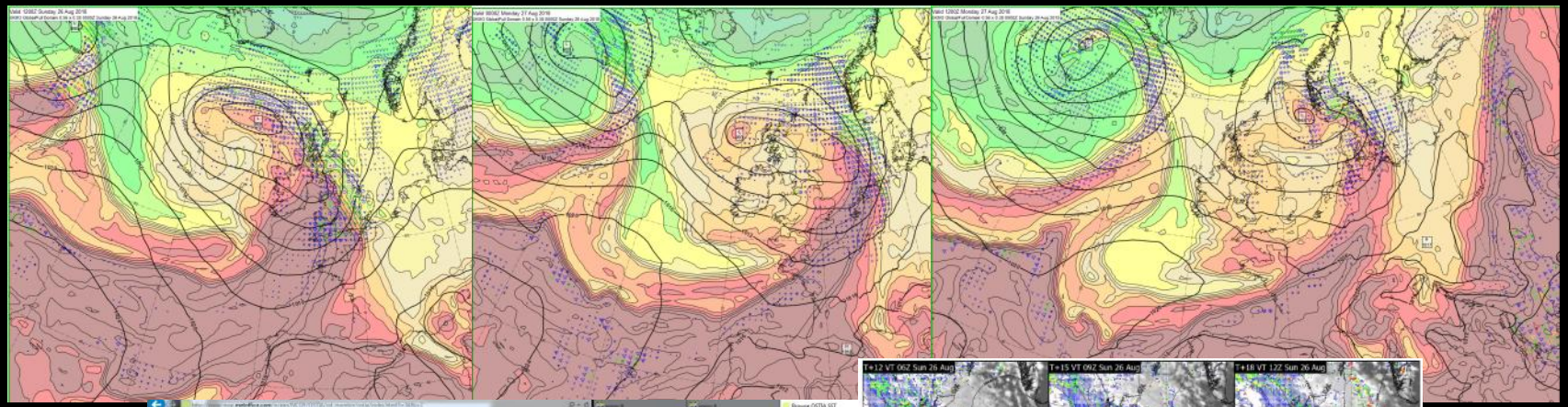
- Interpreting raw model output – waves

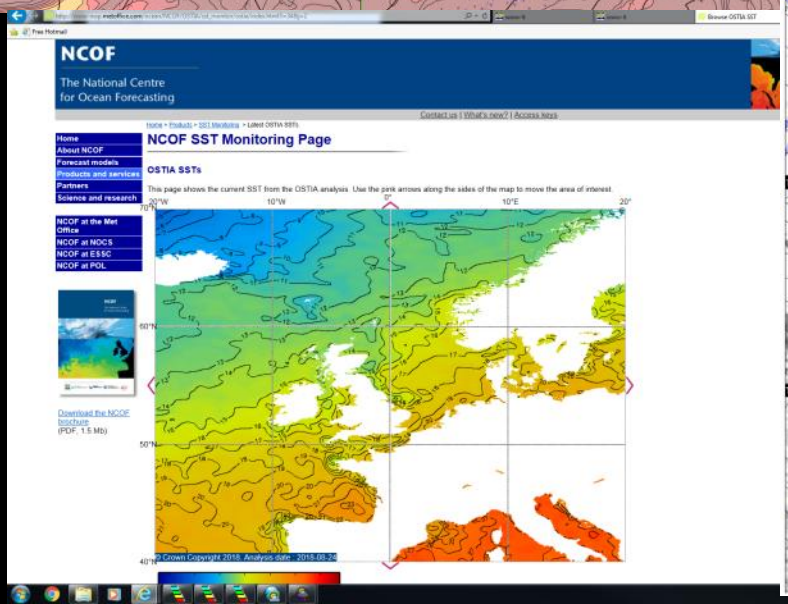


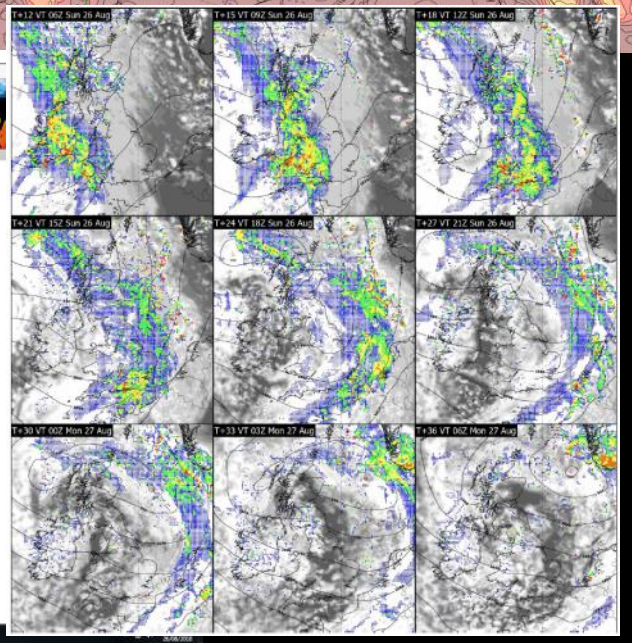


Weather forecasting

- Interpreting raw model output – weather

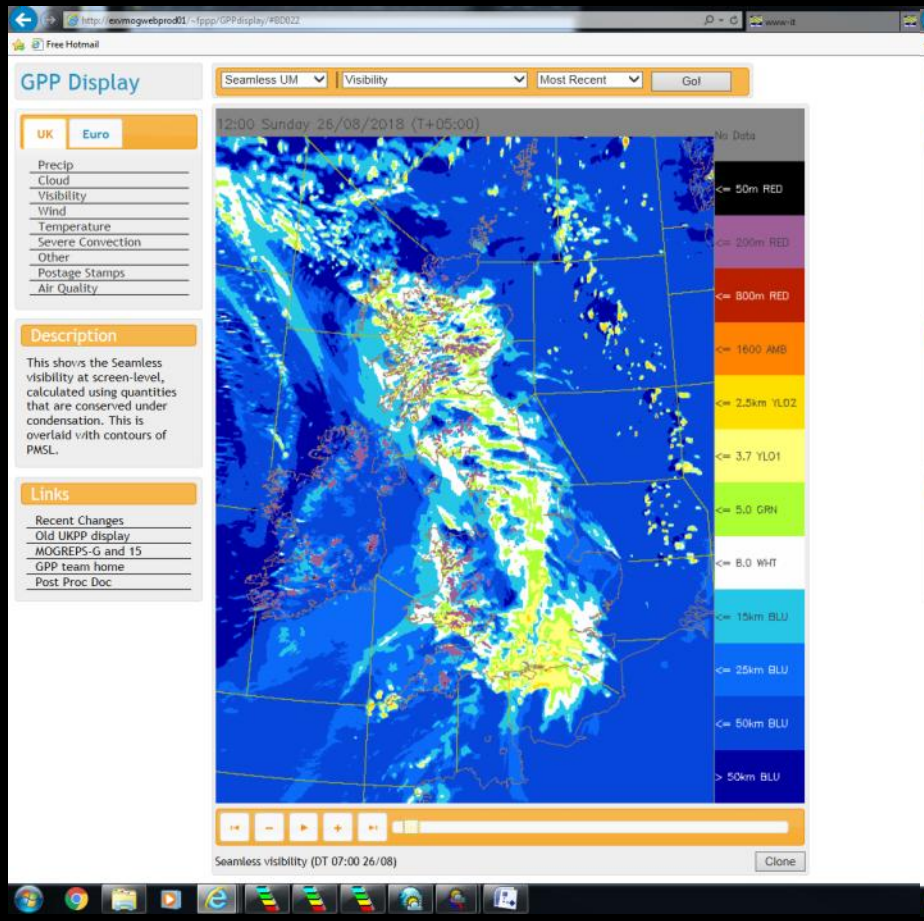


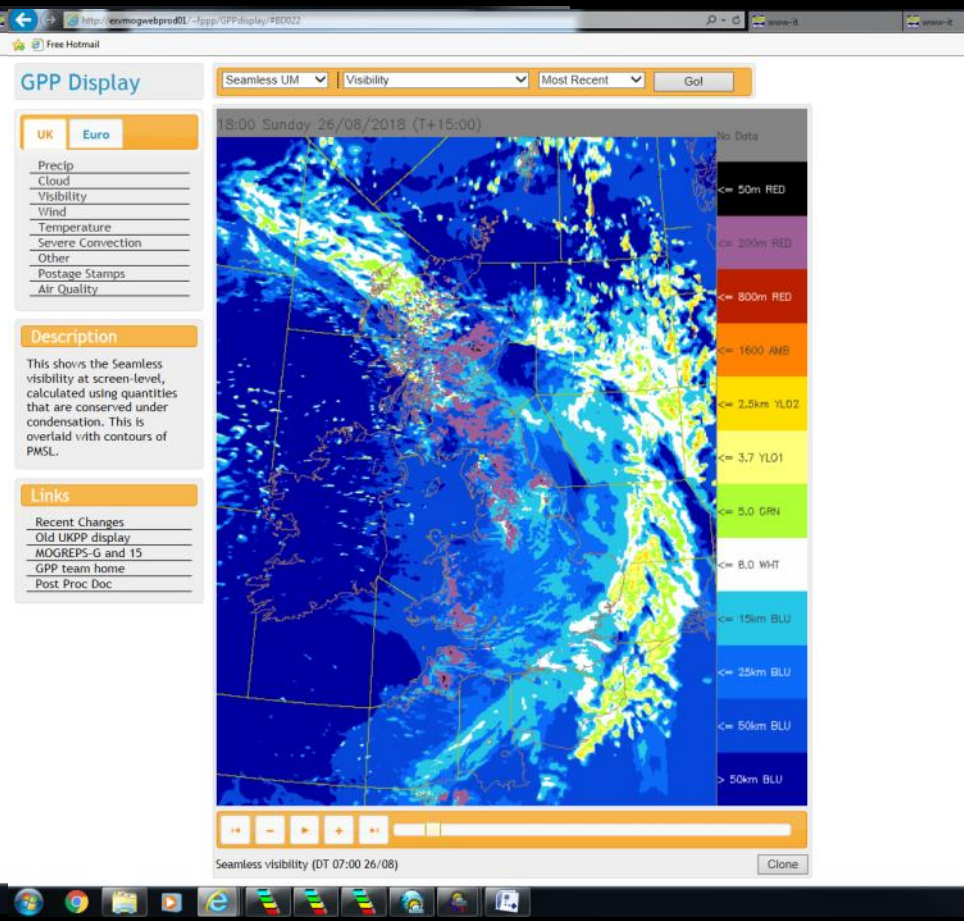




Weather forecasting

- Interpreting raw model output – visibility

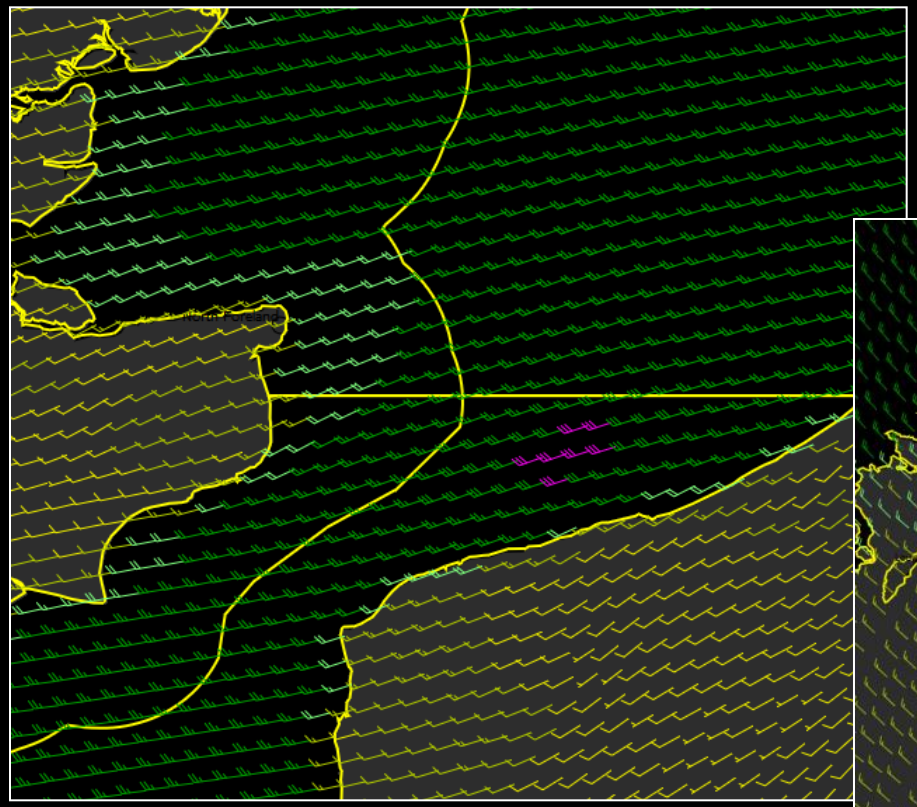




The need for a forecaster – value added (or “Can a computer do it?”)

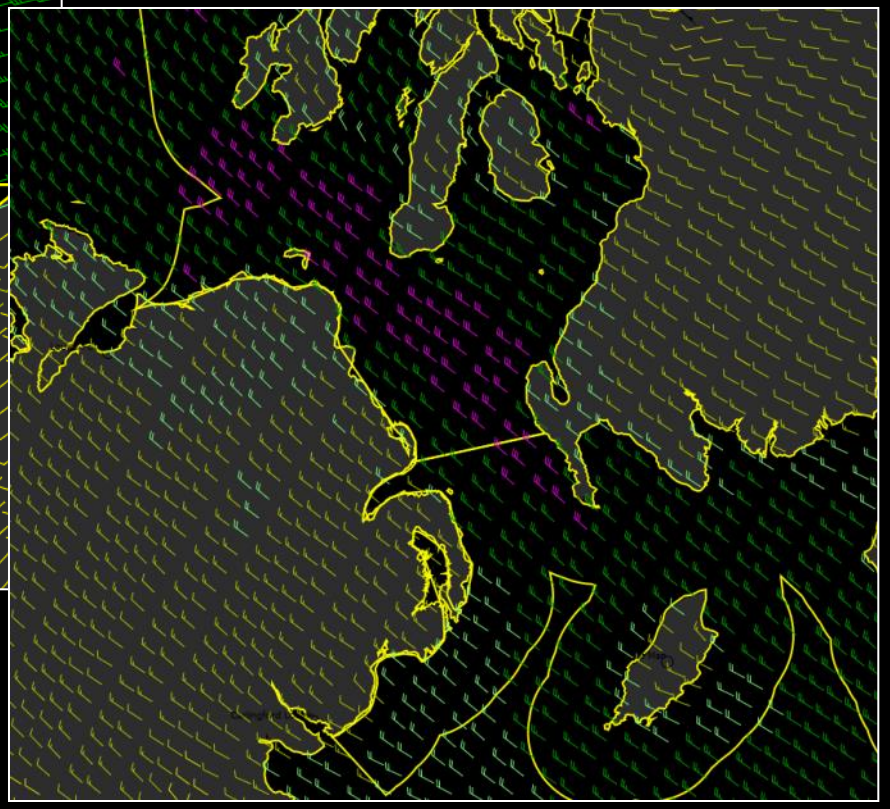
- Models are an increasingly good tool, but…
- Forecasters have tools to add value to numerical model output (so an improvement on the raw data increasingly available)
- A good knowledge of particular areas of interest

The need for a forecaster – areas of interest

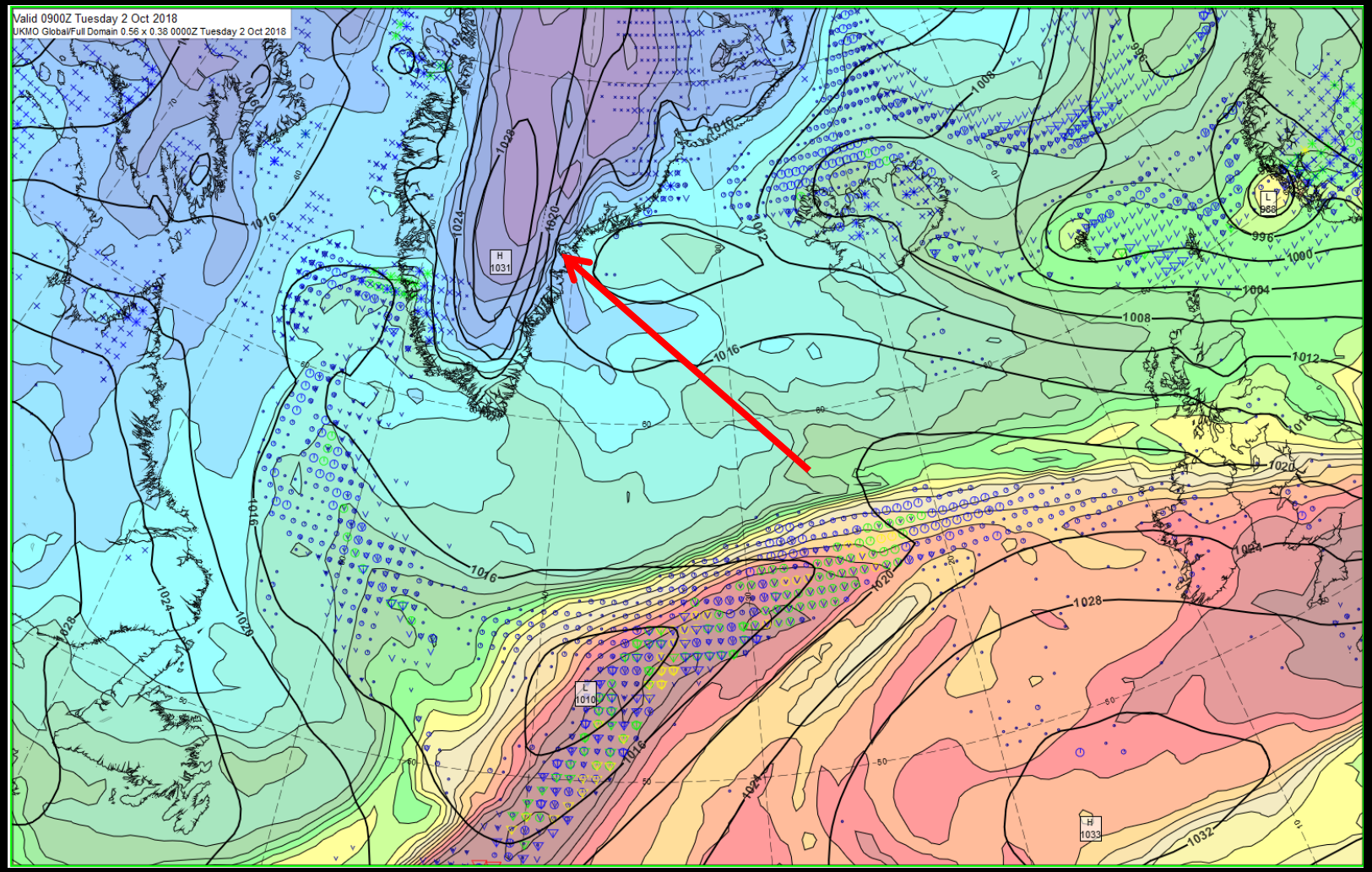


The Dover Strait

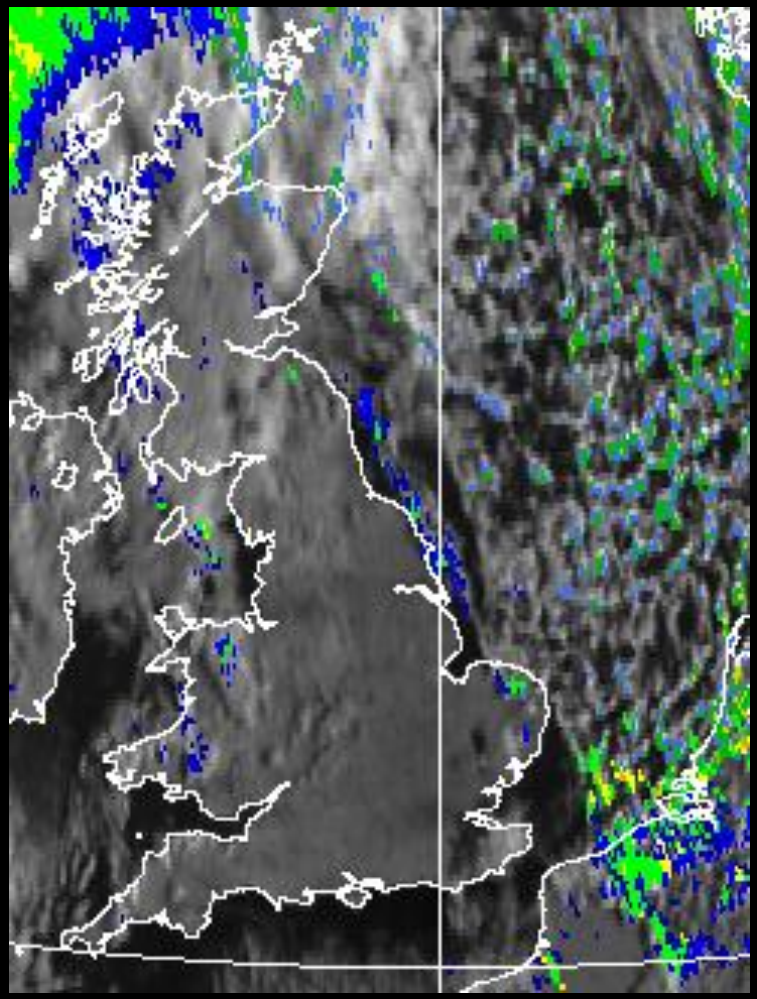
The North Channel



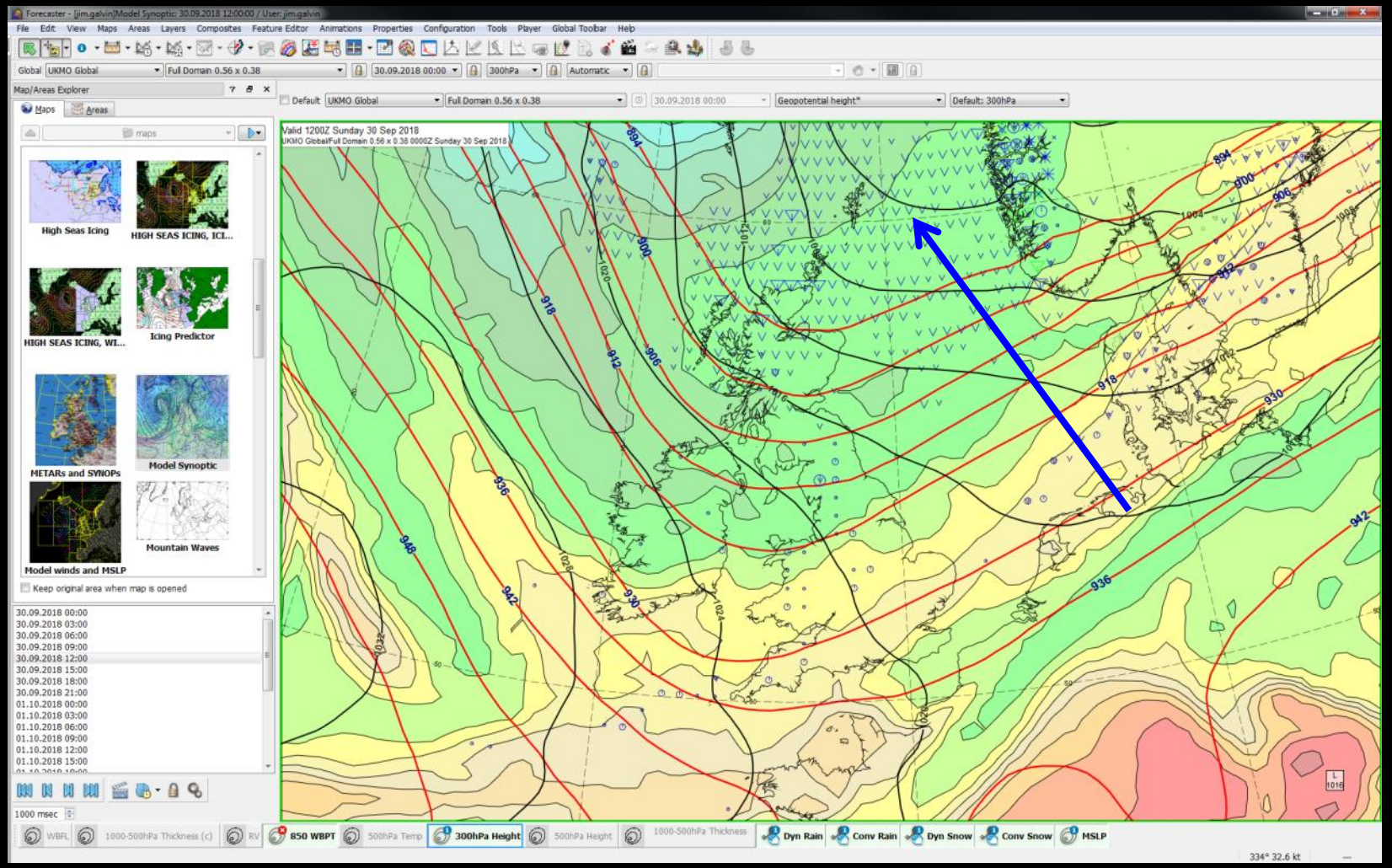
The need for a forecaster – the piteraq



The need for a forecaster – convergence showers



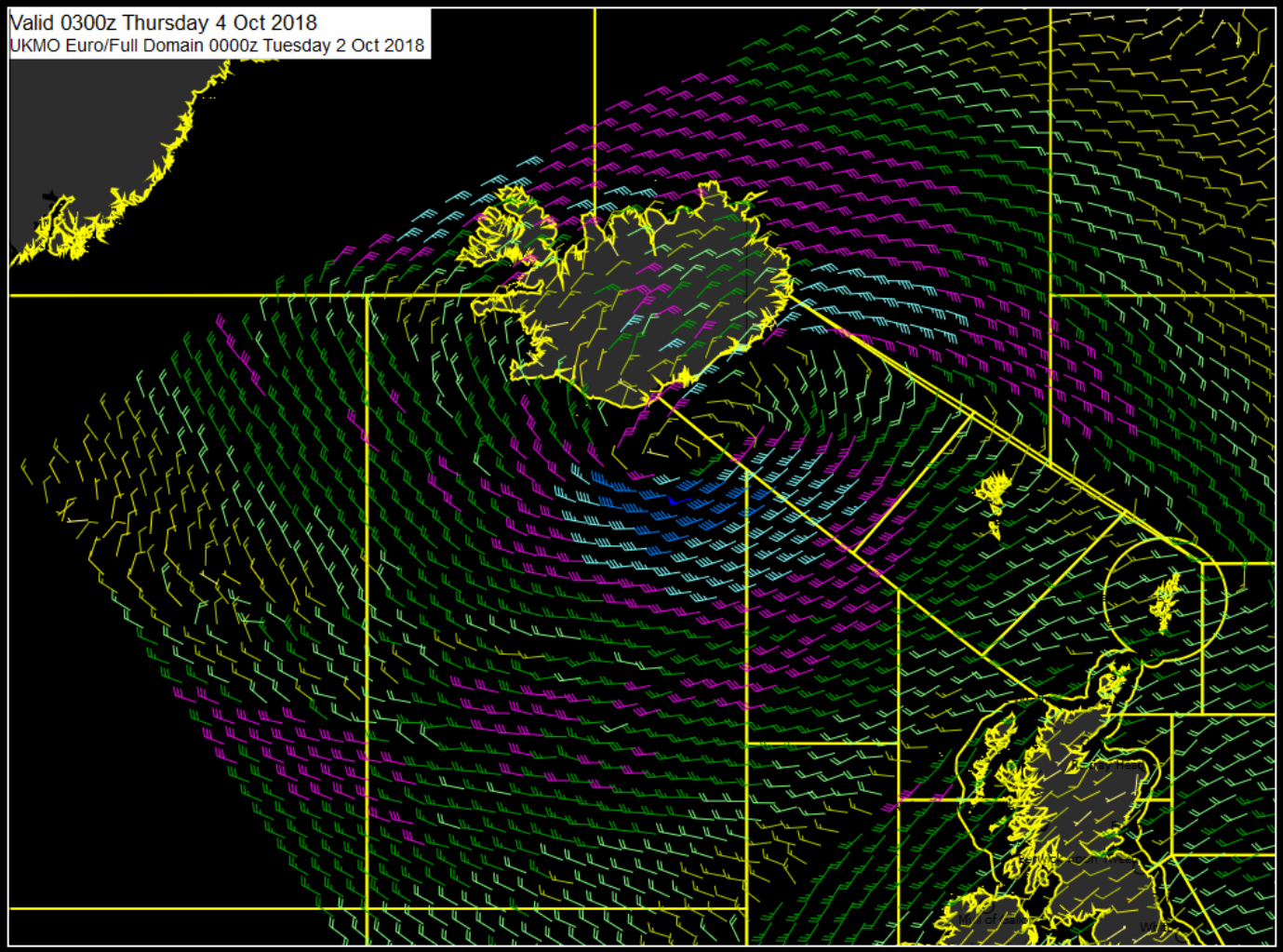
The need for a forecaster – thunderstorms



The need for a forecaster – sea-fog forecasting

- Sea temperatures are key
- Model products often a poor guide
- Wind speeds have a rôle
- Formation dependent on moisture in depth and the temperature profile

The need for a forecaster – predicting storms



The need for a forecaster – the 350-word limit

- 30 areas in Shipping Forecast
- Word limit means areas must be grouped
- Grouping must be strictly in the order in which areas are to be broadcast
- Areas may be split (into two) – helpful for large areas, but not encouraged for small ones
- Tends to favour the inclusion of the stronger winds expected in a group of areas at the expense of lighter ones
- Weather may be treated more generally (although areas can be ‘exceptions’)

Verification

- To prove worth, we must ensure our forecasts are appropriate and accurate
  - Only winds verified* (using a scheme by Mike Sharpe)
  - We must forecast within 1 Beaufort Force
- Timeliness is essential
  - Forecasts to be delivered according to schedule on at least 95% of occasions

So, can you trust the Shipping Forecast to be:

- correct to within ±1 category?…….almost definitely
- exactly correct?.....most of the time
- **BUT** it will emphasise the most severe
- it might neglect the more mundane

The need for a forecaster – other duties

- Provision of hindcasts for particular incidents or events
- Nowcasting weather for rescues, sporting events and bomb disposal
- Provision of a fishing-fleet forecast (winter only)

A look into the future

- Increased automation – can artificial intelligence write our forecasts?
- A change in the way of working
- Will there still be broadcasts of the Shipping Forecast in, say, 10 years' time?

Acknowledgements

- Colleagues in PWS (Marine) were helpful during the production of this presentation

Questions and answers