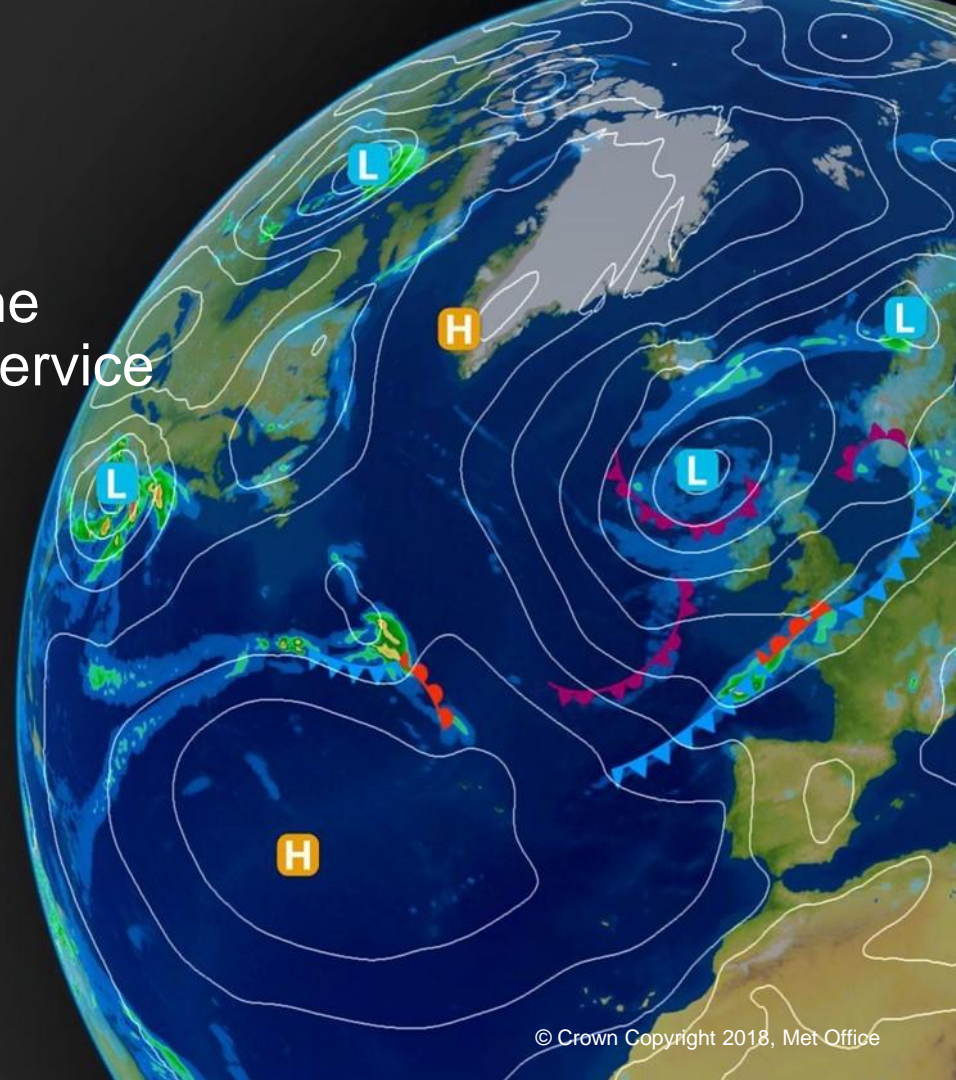


The October Storm:

Hurricane force winds give birth to the
National Severe Weather Warning Service

Prof. Brian Golding OBE
Co-chair WMO/WWRP HIWeather
Met Office Fellow in Weather Impacts





16th October 1987: Worst UK storm since 1703

- 18 deaths
- 15 million trees lost
- Thousands of houses without power
- Insurance cost £2bn
- Damage to communications infrastructure:
 - TV & radio reduced to skeleton services
 - Met Office almost isolated



What was forecast?

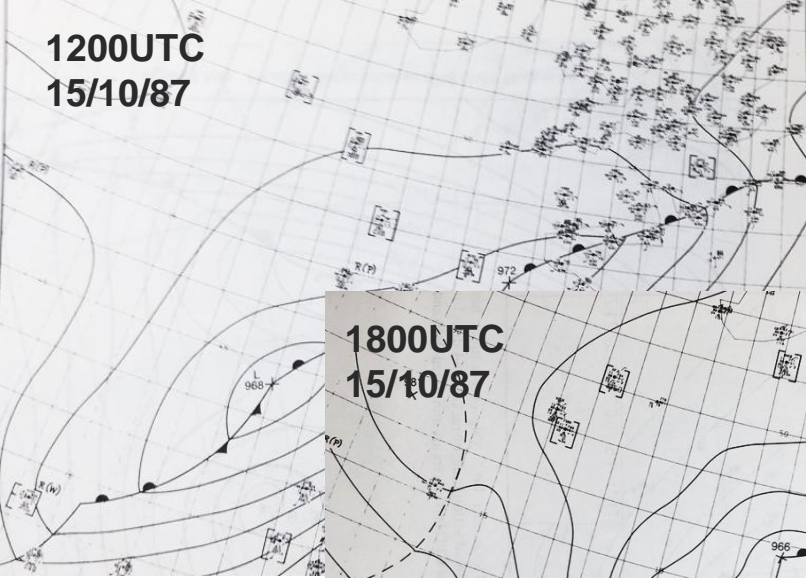
- 5-day severe weather forecast issued 11th
- Bespoke customer warnings issued on time on 15th.
- TV forecasts on 15th included strong wind but emphasised rain
- Flash warning of severe gales issued shortly after midnight

Flash warnings

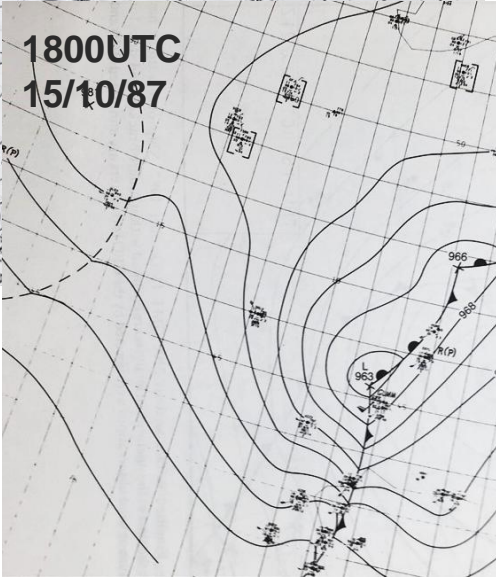
- Issued up to 3 hours ahead of onset
- Based on actual reports
- Covered 18 major urban areas and 6 hazards
- Broadcast on national TV and Radio

Synoptic evolution on 15th

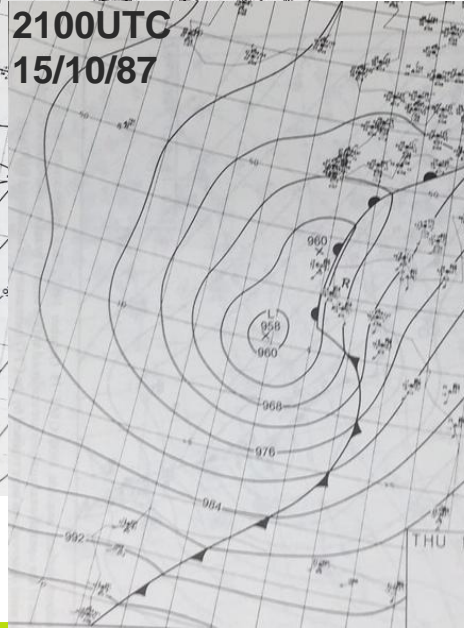
1200UTC
15/10/87



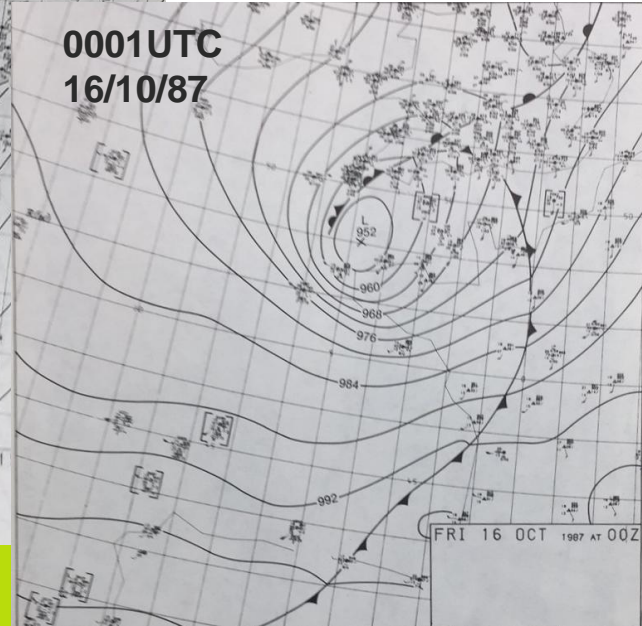
1800UTC
15/10/87



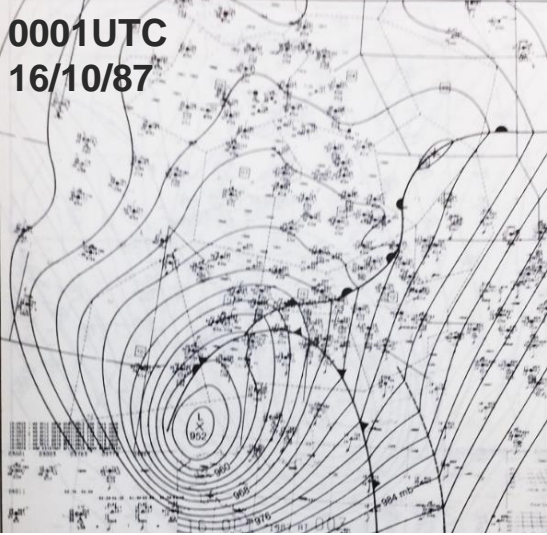
2100UTC
15/10/87



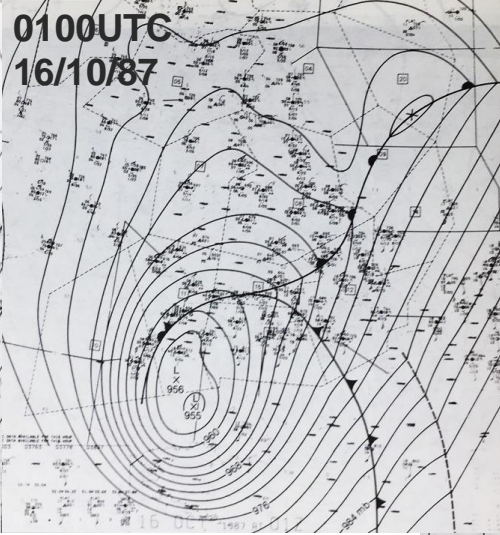
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16/10/87



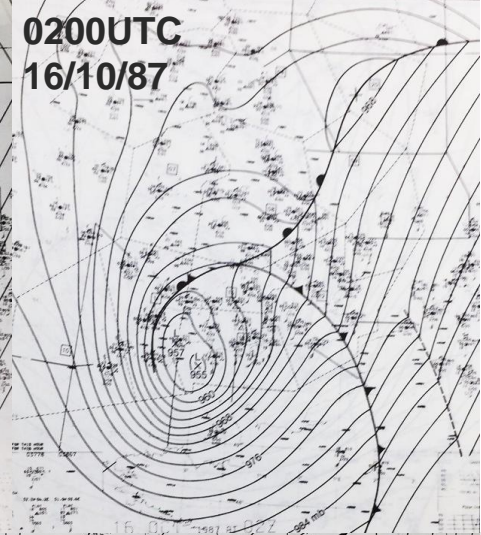
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16/10/87



0100UTC
16/10/87

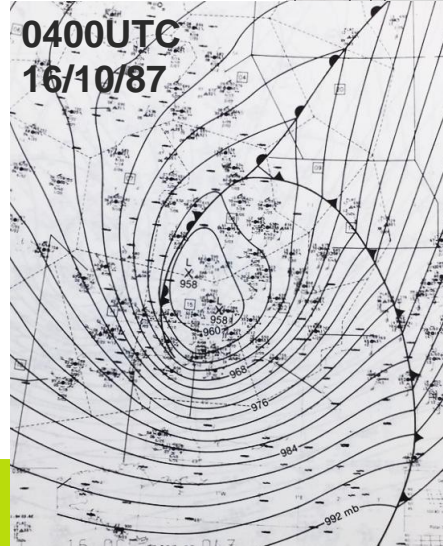


0200UTC
16/10/87

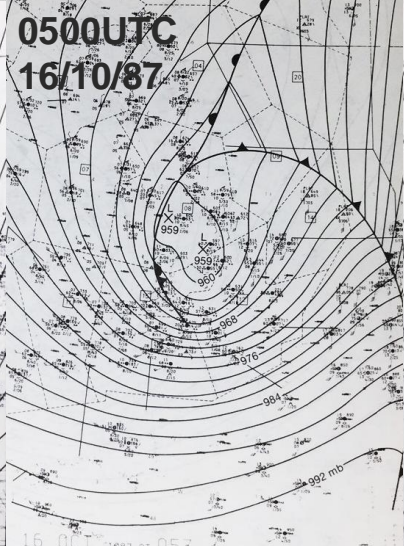


Synoptic evolution on 16th October

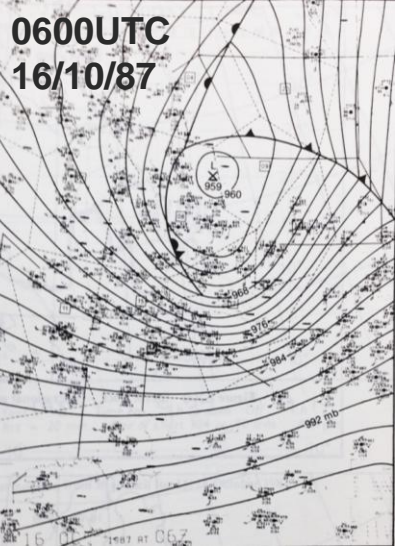
0400UTC
16/10/87



0500UTC
16/10/87

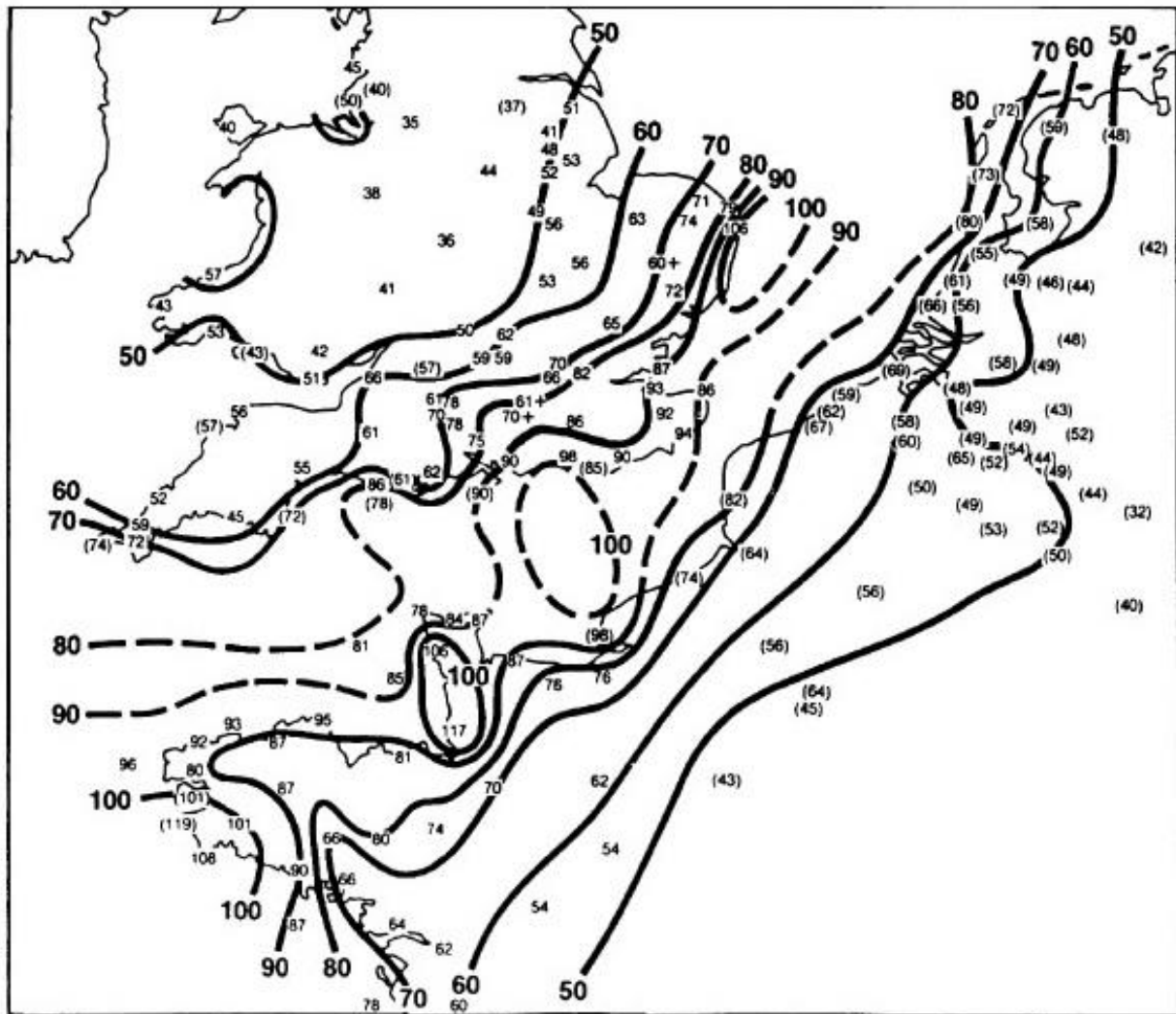


0600UTC
16/10/87

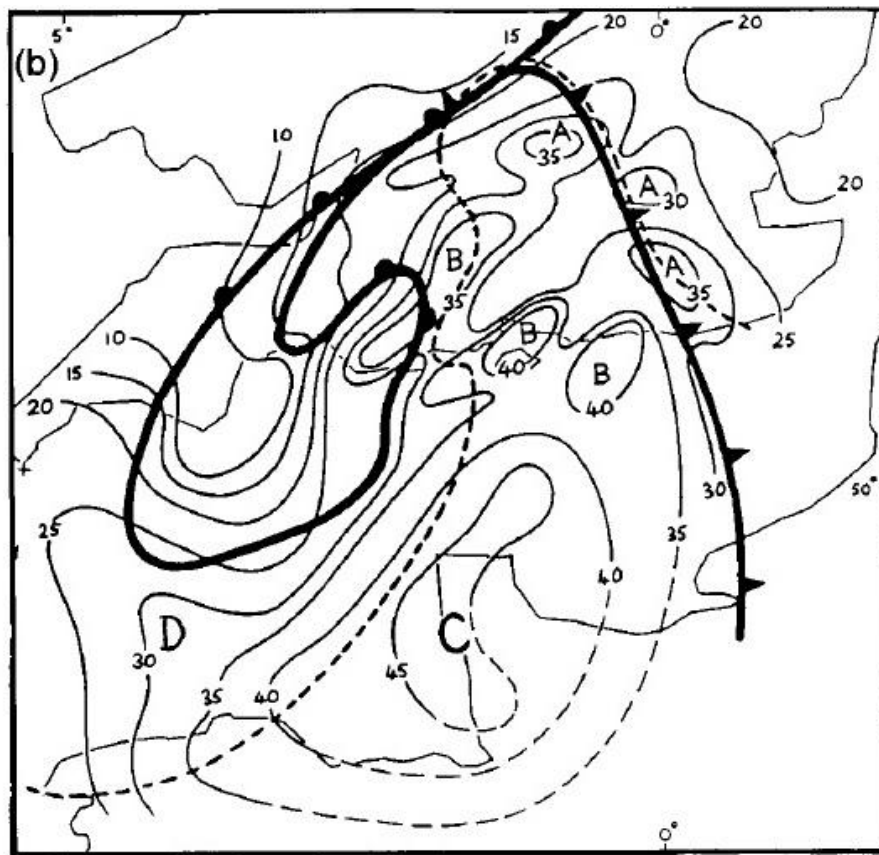


Why was the wind so strong?

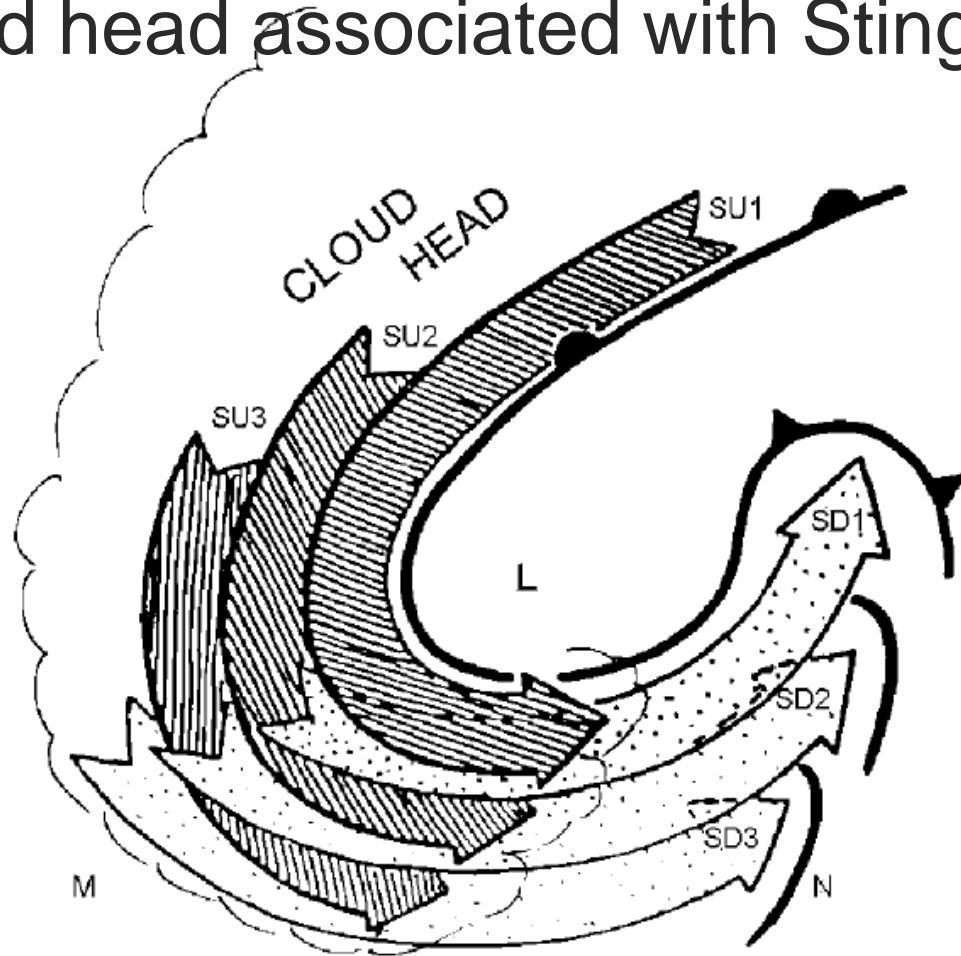
Detailed
analysis of
maximum
observed
winds
15-16 October



Detailed wind analysis at 0130UTC showing banded structure



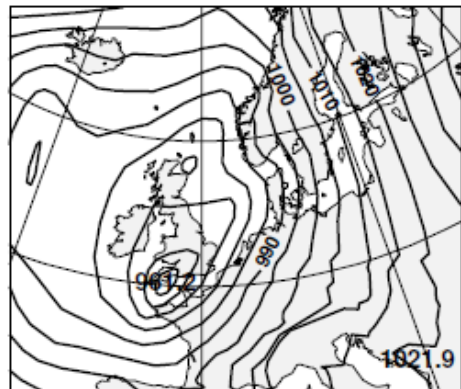
Schematic of Banded circulation around cloud head associated with Sting Jet



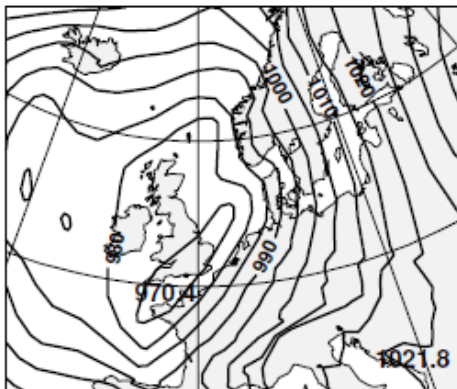
How predictable was it?

Met Office ECMWF T511 HiRes Forecast Evolution

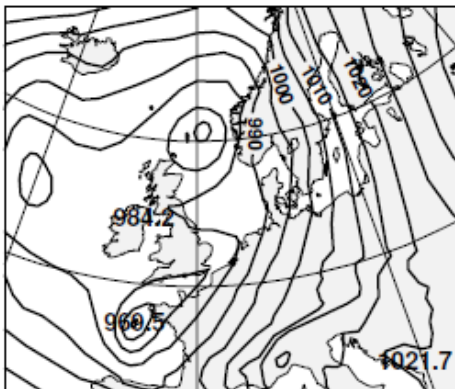
(a) T511 Analysis 19871016 0UTC



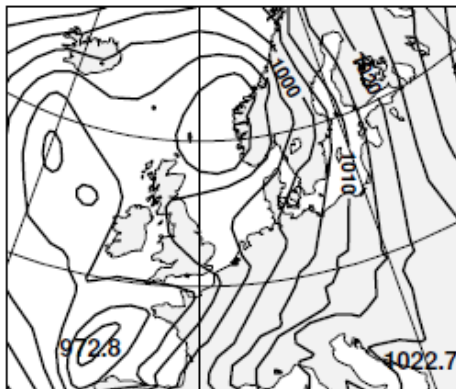
(b) T511 Forecast 19871015 12UTC t+12



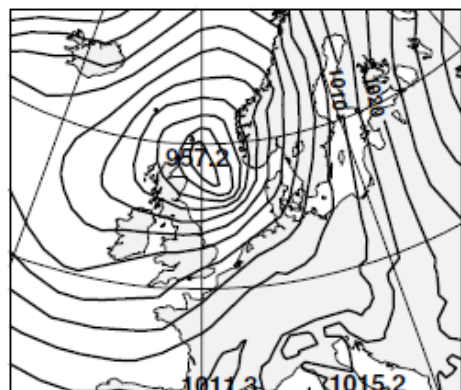
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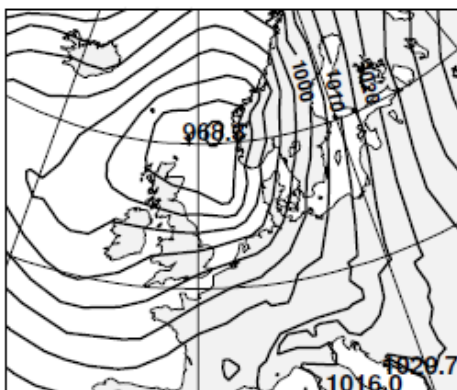
(d) T511 Forecast 19871013 12UTC t+60



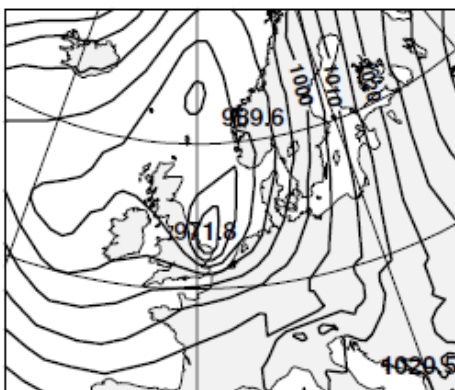
(e) T511 Analysis 19871016 12UTC



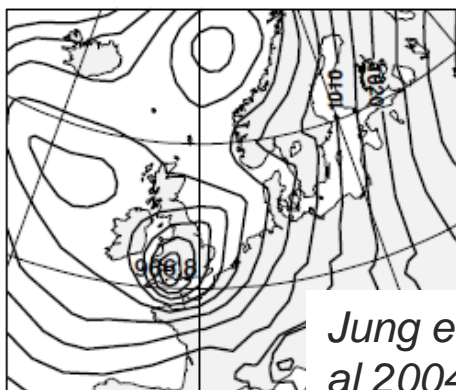
(f) T511 Forecast 19871015 12UTC t+24



(g) T511 Forecast 19871014 12UTC t+48

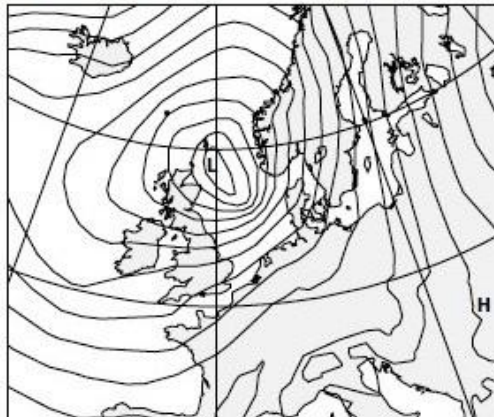


(h) T511 Forecast 19871013 12UTC t+72

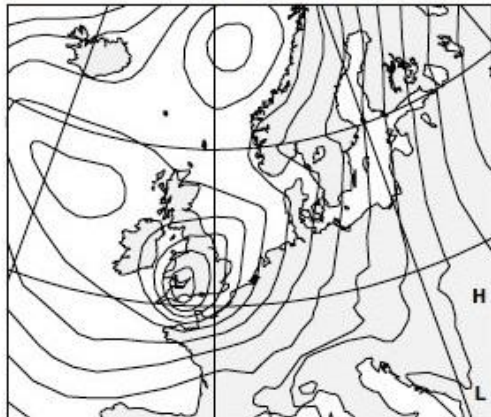


Met Office ECMWF T255 ensemble spread at T+72

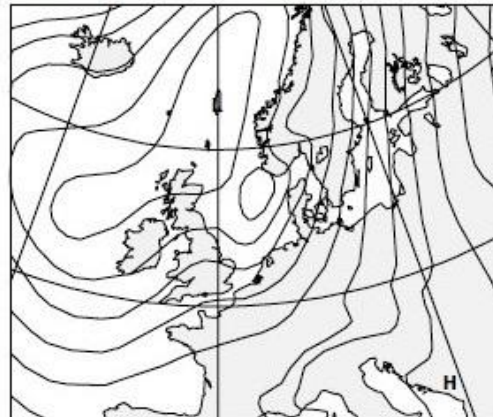
(a) Verifying Analysis 12UTC on 19871016



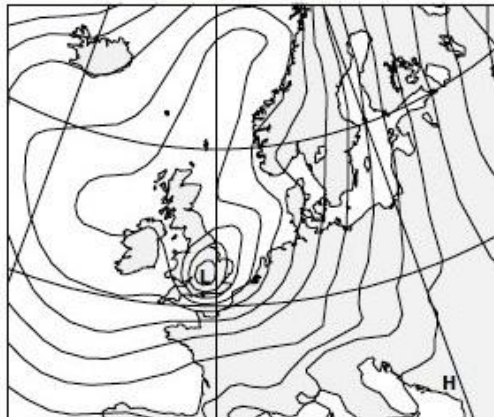
(b) T511 Forecast 12UTC 19871013 t+72



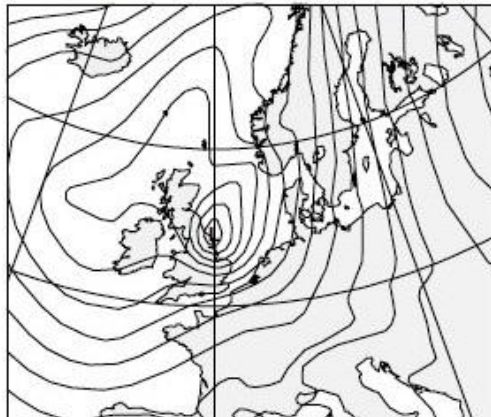
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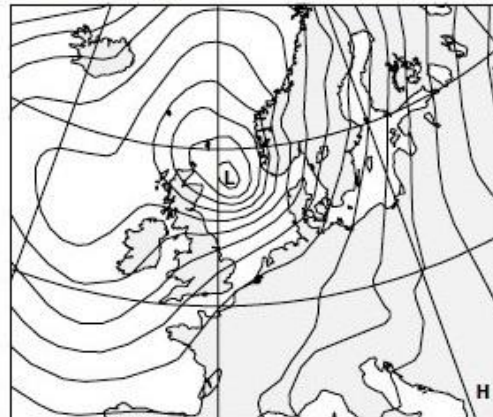
(d) EPS Member 4 12UTC 19871013 t+72



(e) EPS Member 12 12UTC 19871013 t+72



(f) EPS Member 27 12UTC 19871013 t+72



**So what could have been
done better?**

What went wrong?

- The warning service did not provide the right information to the right people at the right time
- The forecasts could have been better with observations to the southwest of the UK and with finer model resolution
- The uncertainty in the forecast could have been better presented to the public

National Severe Weather Warning Service

- covering the whole country,
- direct to emergency managers + TV / radio;
- issued much earlier, based on level of confidence:
 - Early: 60% confidence of disruption
 - Flash: 80% confidence of severe weather in next 24hrs

UK Civil Contingencies Act 2004

- Response to 3 different disasters: Floods, Animal Disease, Riots.
- Covers anything that seriously threatens human welfare.
- Includes infrastructure operators
- Mandates risk registers & contingency plans
- Gold-Silver-Bronze command structure
- Weather Warnings upgrade:
 - Lower confidence early alert (20-60% confidence)
 - Two levels of hazard intensity
 - Colour-coding according to likelihood and intensity

Localised, small scale impacts

Brief disruption;

inc... some transport impacts

Potential impacts

Be aware of possible delays & disruption. Severe weather possible power interruption, danger to life

Be prepared to protect yourself, your family & community. Likelihood of bad weather which could cause delays, power interruption, risk to life

Take action now to be safe. Extreme weather expected to cause widespread damage, travel, power disruption, risk to life





Dec 2011

Most likely track

Thursday 15 December –
Friday 16 December



Addressing the communication problem: focussing on impact

Low risk alternative track

Thursday 15 December –
Friday 16 December



Where to next?



- High density observations from unconventional sources
- Improved km-scale ensembles and data assimilation
- Coupled prediction of the weather-related hazards
- Better impact estimation using models, vulnerability maps etc
- Communicating consistent warnings through many channels
- Meeting different needs of different users.
- Including impact and response options in the warning.
- Extending from infrastructure & property to health.
- Evaluation of hazard and impact prediction and response

Summary

- 1987 review → changed governance of warnings
 - Lead times, spatial scope, audiences extended
 - 2004 review → changed governance of all risk
 - Lead times extended, multiple intensity thresholds, advisors
 - 2011 user review → impact based warnings
 - Risk matrix, increasing use of social media to support warnings
 - What next?:
- & do we have to wait for the next post-disaster review?

Questions?

