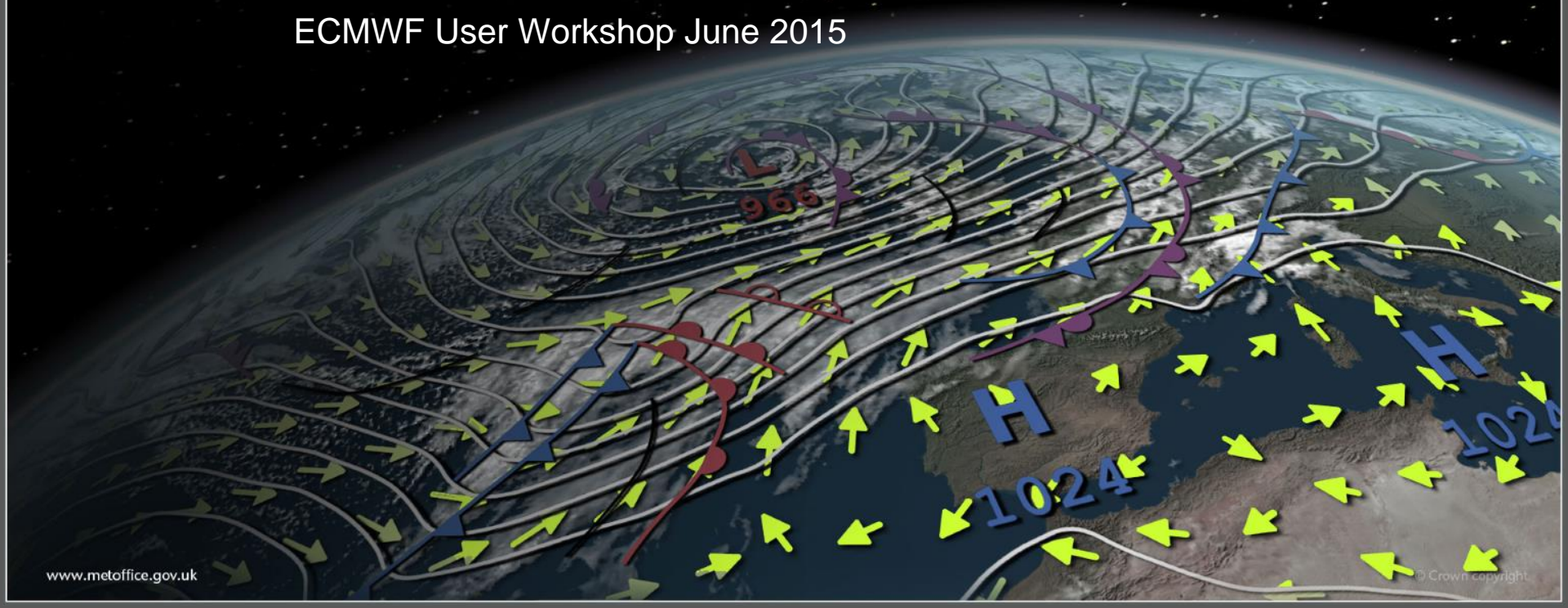




The UK National Severe Weather Warning Service - Guidance Unit Perspective

Dan Suri, Chief Operational Meteorologist

ECMWF User Workshop June 2015



Contents

- Who are the Guidance Unit?
- The National Severe Weather Warnings Service.
- Impacts matrix.
- Met Office warning strategy for the St Jude's Day Storm.

The aim is to use the example of the St Jude's Day Storm to illustrate how ECMWF products are used at the Met Office in forecasting a major severe weather event.

The Guidance Unit

Made up of three positions – the Chief Operational Meteorologist and two Deputies.

Chief leads the shift and has overall accountability for the global meteorological story.

Chief focuses on short-range, one Deputy focuses on medium-range, the other on global guidance.

Outside normal working hours are the senior point of contact.

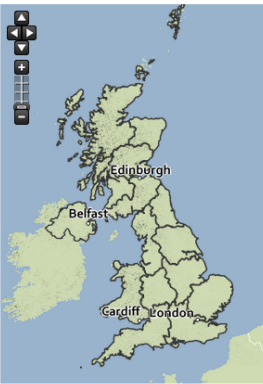
Core products are the NSWWS and internal cross-organization guidance.

National Severe Weather Warnings - United Kingdom

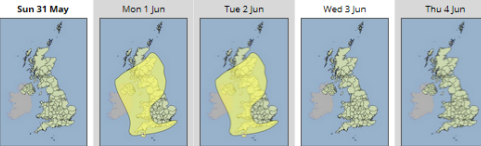
Overview
Detail

Warnings overview: United Kingdom
Issued on Sun 31 May

Sun 31 May



Sun 31 May
Mon 1 Jun
Tue 2 Jun
Wed 3 Jun
Thu 4 Jun



Use the small maps above to select the weather warnings over the next five days. Click on your chosen region below for more details of current warnings in force.

| | |
|------------------------------|-----------------------------|
| United Kingdom | North West England |
| Orkney & Shetland | North East England |
| Highlands & Eilean Siar | Yorkshire & Humber |
| Grampian | West Midlands |
| Strathclyde | East Midlands |
| Central, Tayside & Fife | East of England |
| SW Scotland, Lothian Borders | South West England |
| Northern Ireland | London & South East England |
| Wales | |

Warnings: Severe Severe Severe

Rain Wind Snow Ice Fog


The Met Office has responsibility for providing weather warnings for the UK. Coloured regions on the map show where severe weather warnings have been issued. When issued, the public are advised to take extra care. Further information and advice can be found on the [Severe weather impact](#) page.

National Severe Weather Warnings - United Kingdom

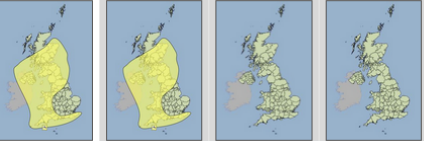
Overview
Detail

Warnings in place for the region: United Kingdom
Issued on Sun 31 May

Sun 31 May



Mon 1 Jun
Tue 2 Jun
Wed 3 Jun
Thu 4 Jun



[« Back to Warnings Overview map](#)

[Collapse all warnings](#)

1. Yellow warning of wind

| Dates | Warning | Chief Forecaster's assessment | Weather Impact Matrix | | | | | | | | |
|---|--|---|--|--|--|--|--|--|--|--|--|
| <p>Issued at: 1137 on Sun 31 May 2015</p> <p>Valid from: 1600 on Mon 1 Jun 2015</p> <p>Valid to: 1800 on Tue 2 Jun 2015</p> | <p>An unseasonably windy spell is likely across many parts of the UK later on Monday, overnight and well into Tuesday, as active frontal systems sweep across the UK. An initial swathe of southerly gales will move east across many parts later on Monday, giving gusts to 50 mph widely but 60-65 mph across exposed Irish Sea and perhaps some English Channel coasts. Winds will become west or southwesterly on Tuesday, with further gales in places, before gradually easing later. Heavy rain will accompany the strong winds at times and large waves may affect some coasts in the west and south.</p> <p>Given the unseasonable nature of the winds, the public should be aware of the potential for disruption to transport and outdoor activities. Damage to some trees seems likely, given that they are in full leaf.</p> <p>There remains uncertainty in the areas likely to be worst affected and this warning will be updated on Monday in the light of new information.</p> | <p>A powerful jet stream stretching across the Atlantic into the UK will steer a number of active weather systems across the UK during Monday and Tuesday. One such system will sweep eastwards later on Monday into Monday night, with the windy weather maintained well into Tuesday by a vigorous depression passing northern Scotland. Developments are complex so there is still considerable uncertainty in details of these developments, especially by Tuesday, when it may be less windy across parts of the south.</p> | <div style="text-align: center;"> <p>High</p> <table border="1" style="width: 40px; height: 40px; border-collapse: collapse;"> <tr> <td style="background-color: green;"></td> <td style="background-color: yellow;"></td> <td style="background-color: orange;"></td> <td style="background-color: red;"></td> </tr> <tr> <td style="background-color: green;"></td> <td style="background-color: yellow;"></td> <td style="background-color: orange;"></td> <td style="background-color: red;"></td> </tr> </table> <p>Likely</p> <p>Very Low Impact High</p> <p>What does this mean?</p> </div> | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Warnings are for reasonable worst case scenarios.

NSWWS - Background

The National Severe Weather Warnings Service.

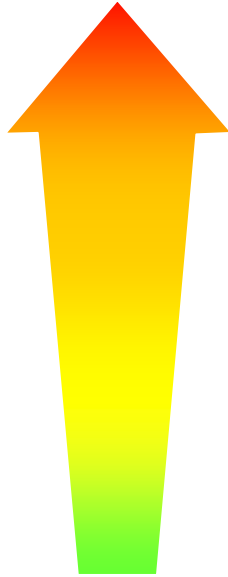
Introduced by the Met Office in the aftermath of the 15/16 October 1987 Storm.

Gives up to four days notice of severe weather.

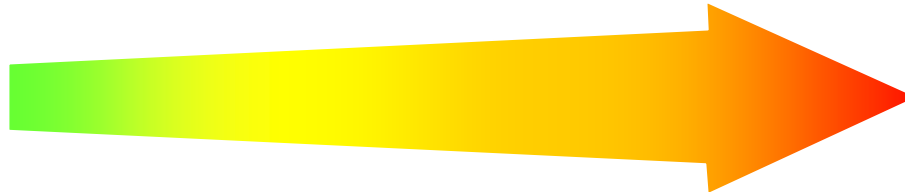
Has evolved into an impacts-based traffic light warning service which incorporates a probabilistic element.

A matrix is used to communicate probability and magnitude of impacts on two key market sectors – the general public and civil contingency organizations.

NSWWS – The Matrix



| | | | | | |
|------------|----------|----------|--------|--------|-------|
| LIKELIHOOD | HIGH | Red | Orange | Yellow | Green |
| | MED | Red | Orange | Yellow | Green |
| | LOW | Red | Orange | Yellow | Green |
| | VERY LOW | Red | Orange | Yellow | Green |
| | | VERY LOW | LOW | MEDIUM | HIGH |
| | | IMPACT | | | |





Met Office

NSWWS – The Matrix

| | |
|--|---|
| | <p>NO SEVERE WEATHER EXPECTED Keep up to date with latest forecast</p> |
| | <p>BE AWARE Remain alert and keep up to date with latest forecast</p> |
| | <p>BE PREPARED Remain vigilant, keep up to date with latest forecast and take precautions where possible</p> |
| | <p>TAKE ACTION Remain extra vigilant, keep up to date with latest forecast. Follow orders and any advice given by authorities and be prepared for extraordinary measures</p> |

NSWWS – Impacts Table

| Colour coding | Very Low | Low | Medium | High |
|---|---|--|---|--|
| Overall Generic Impacts on emergency responder organisations | Nil | Limited number of RTC's Incidents dealt with under "business as usual response" by emergency services | Loss of life possible Short term loss of some utilities Commuters stranded for short periods Short term strain on emergency responder organisations. | Loss of life likely Loss of utilities for lengthy periods (potentially days) Commuters stranded for long periods Prolonged strain on resources of emergency responders Mutual aid arrangements activated |
| Response Level | Appropriate agency response under BAU. | Some multi-agency response but mostly BAU. LRF/SCG Level. Operational and Tactical Level Response | Multi-agency response needed. Multiple LRF/SCG's and possibly Regional level. Operational, Tactical and Strategic level response. | Multi-agency Strategic response needed mutual aid necessary perhaps national co-ordination. COBR set up. |
| Implications for public | Journey times not significantly affected Some disruption to outdoor events | Longer journey times Cancellation or disruption to outdoor events | Disruption to travel with short term delays and commuters stranded for short periods. Possible disruption to power supplies Risk of school closures. | Severe disruption to travel with prolonged delays possible and commuters stranded. Disruption to power supplies very likely. High risk school closures in worst affected areas. |
| Public Advice | Nil | Drive carefully | Prepare before travelling. Consider delaying your journey. Disruption to travel/transport networks. | 'Avoid all non-essential travel' or 'postpone journeys if at all possible' |

NSWWS – The Warnings Process

Warnings process:

1. Forecast the weather.
2. Assess of the likelihood of severe weather.
3. Assess potential impact of any severe weather (eg geographical factors, climatological context, antecedent conditions etc).
4. Requires input from a number parties, eg Flood Forecasting Centre, Hazards Centre, Civil Contingencies Advisors.
5. Chief Op Met's assessment explaining why the warning has been assigned that colour and discussing uncertainties.

NSWWS - Assessment

Regular meetings between Met Office and users are held to assess where events should be on the matrix.

Customer-driven guidelines as to what meteorological events correlate to what level of impact (so still really a little bit threshold-based!).

These guidelines can then be flexed based on other factors, eg timing of event, population movements.

Verification is largely done by subjective assessment. Targets are set by the PWS Customer Group.

NSWWS - Impacts

Example of guidelines, in this case for wind.

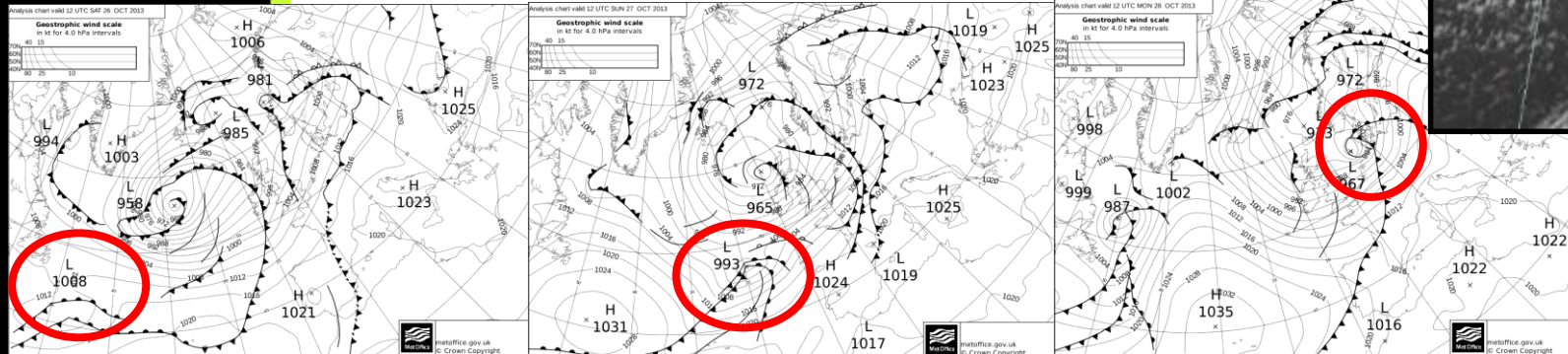
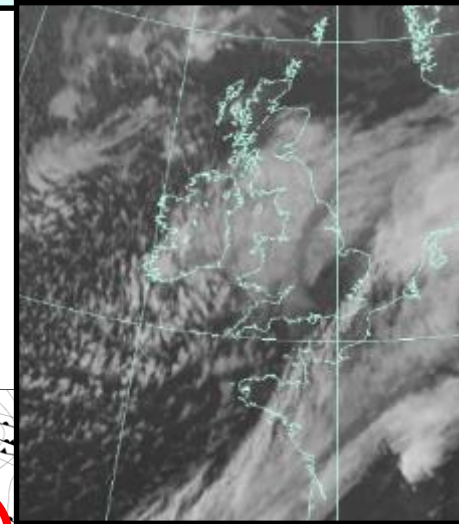
| | Very low | Low | Medium | High |
|---|---|---|--|---|
| Specific impact levels associated with WIND | <p>Debris dislodged and some branches removed.</p> <p>Perhaps some very limited travel disruption.</p> <p>Difficulties on some prone routes e.g. crosswinds on exposed or high level roads.</p> | <p>Some branches or trees brought down.</p> <p>Localised travel disruption.</p> <p>Localised problems for high-sided vehicles on prone routes.</p> <p>Risk of isolated power interruptions.</p> | <p>More widespread tree damage and other debris, slates etc. dislodged from roofs.</p> <p>Casualties possible as a result of flying debris.</p> <p>Potential closure of known susceptible routes (e.g. some bridges) with travel disruption.</p> <p>Risk of localised interruptions to power.</p> <p>Risk of damage to overhead rail power lines and disruption to ferry services.</p> | <p>Widespread structural damage, e.g. roofs blown off, mobile homes overturned, power lines brought down.</p> <p>Mobile phone masts damaged.</p> <p>Casualties likely with danger to life from flying debris.</p> <p>Widespread and potentially prolonged interruptions to power.</p> <p>Roads blocked by fallen trees in many areas.</p> <p>Risk of coastal inundation during high tides.</p> <p>Building cranes/ scaffolding at risk of toppling.</p> |

St Jude's Day Storm

Impacts included 4 fatalities, London Transport shut and 130 Heathrow flights cancelled.

Brought two zones of high winds to England:

- Storm force S-SE'ly winds gusting 55-70 kt, mainly along S Coast.
- High winds gusts up to 65 kt on rearward flank of depression during morning rush hour.



St Jude's Day Storm

Stormy spell first flagged up in long range guidance 16-18 Oct.

Risk initially thought greatest in the N and W.


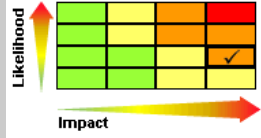

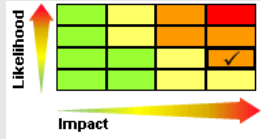

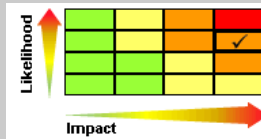


Signal for S'ern UK being worst affected emerged 22/23 Oct.

Presented a challenging communication strategy because:

- Uncertainty in synoptic- and mesoscale developments influencing extent and magnitude of impacts.
- Timing of the storm - Monday morning rush hour – warnings needed to be issued with sufficient lead time to allow appropriate contingency planning.

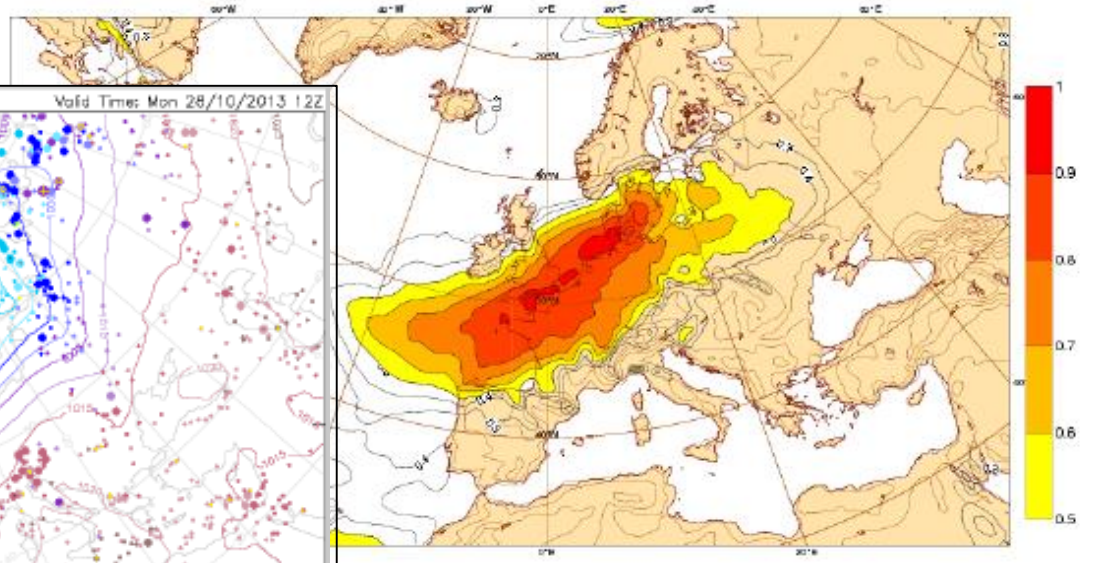
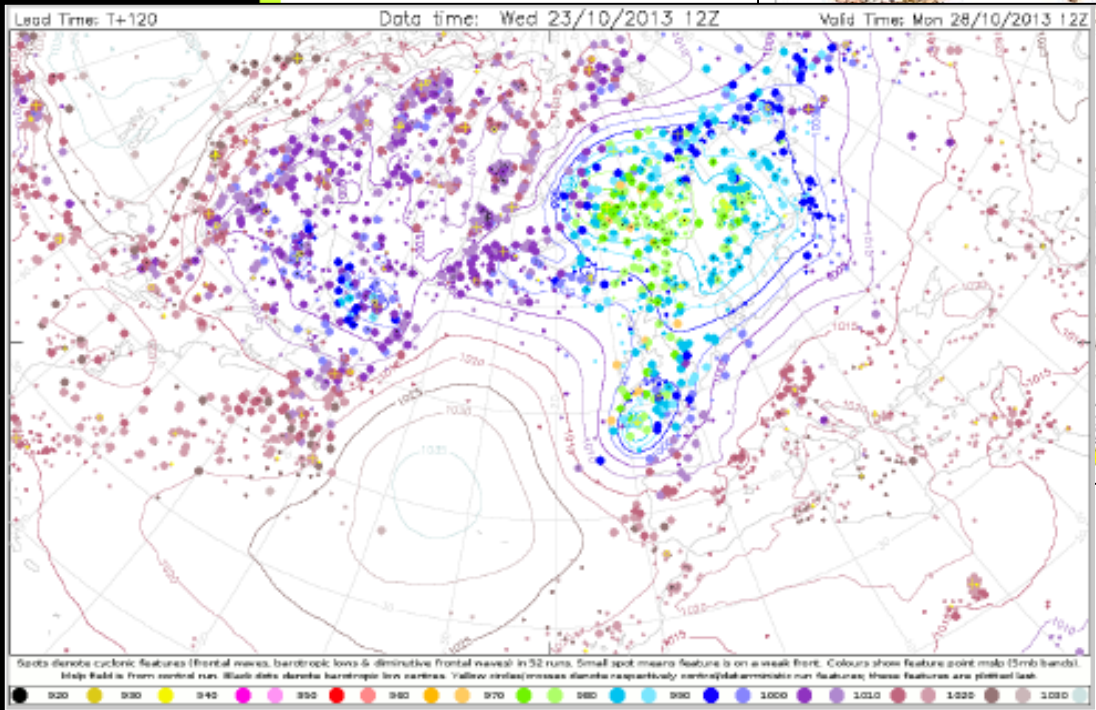
St Jude's Day Storm

Evolution of the Amber Wind Warning (dwarning/dtime)

| Date | Warning Area | Impact Matrix |
|-----------------|---|--|
| Thu 24 Oct 2013 |  |  |
| Fri 25 Oct 2013 |  |  |
| Sat 26 Oct 2013 |  |  |
| Sun 27 Oct 2013 |  |  |

St Jude's Day Storm

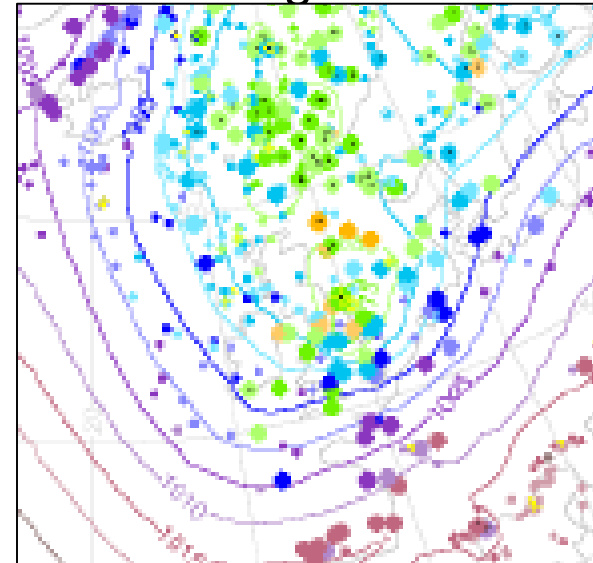
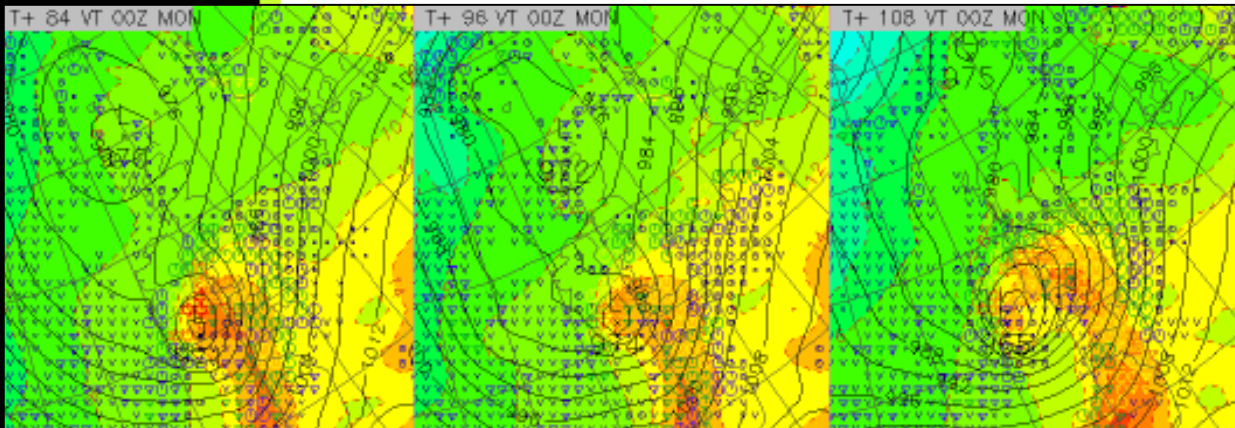
Friday 25 October 2013 00UTC @ECMWF Extreme forecast index 1-072-096 VT: Monday 28 October 2013 00UTC - Tuesday 29 October 2013 00UTC
Surface: 10 metre wind gust index



St Jude's Day Storm

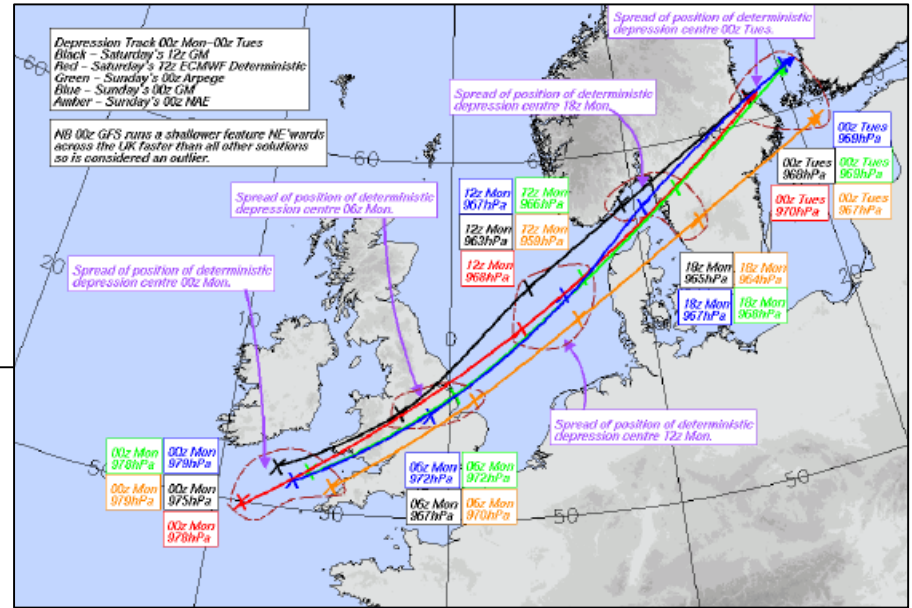
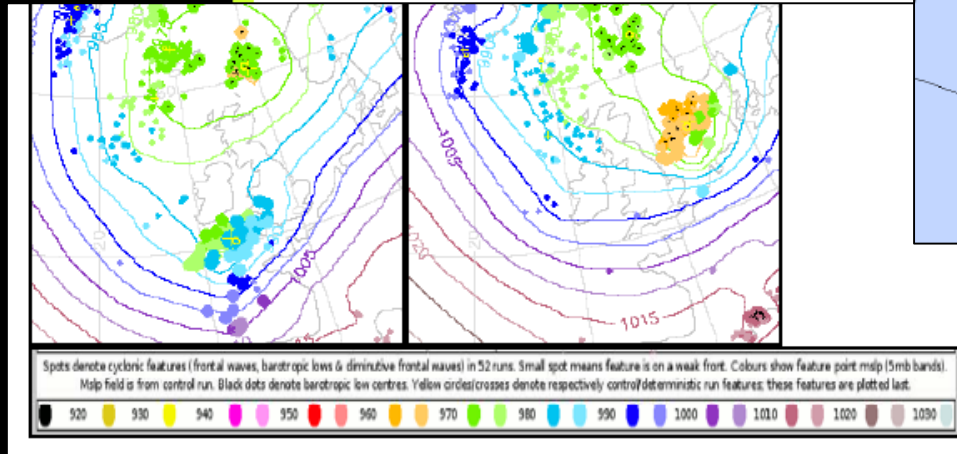
The potential severity of the event led to an Amber warning being issued on 24th.

Confidence increased when model solutions converged.



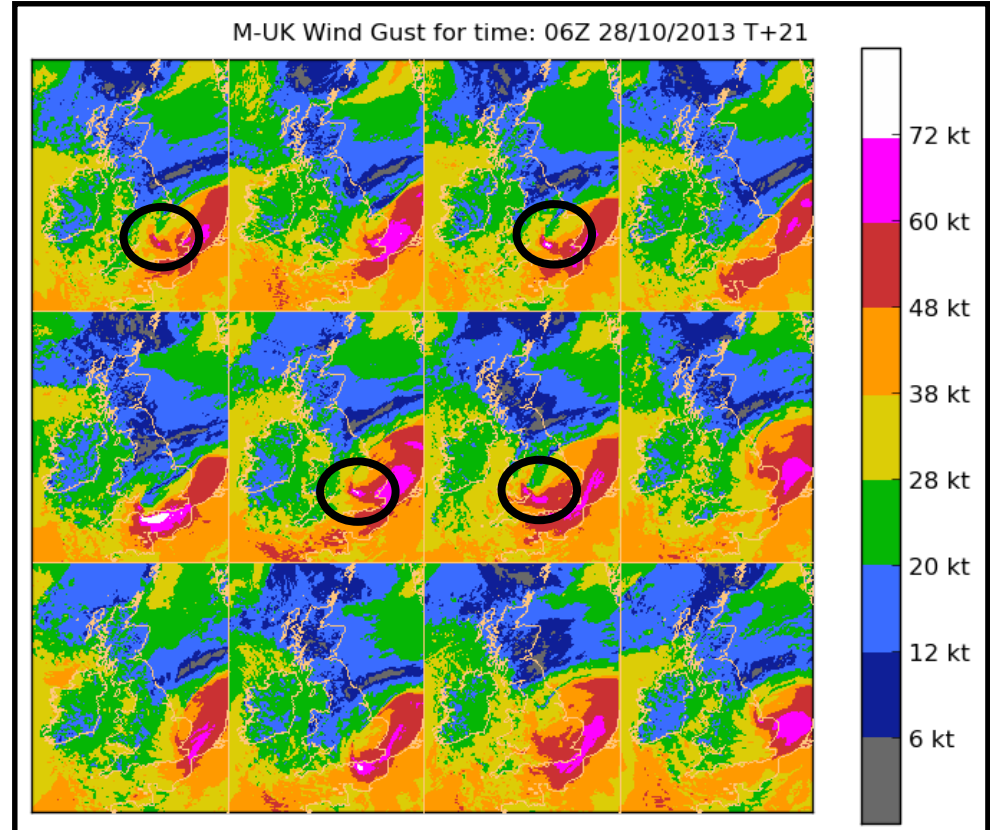
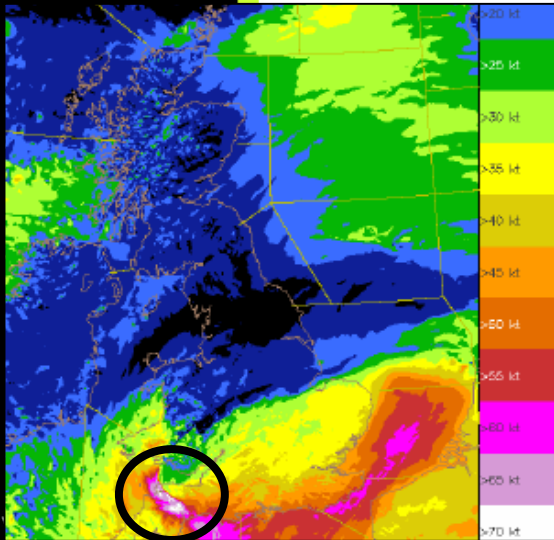
St Jude's Day Storm

During the weekend forecast track became much more solid...

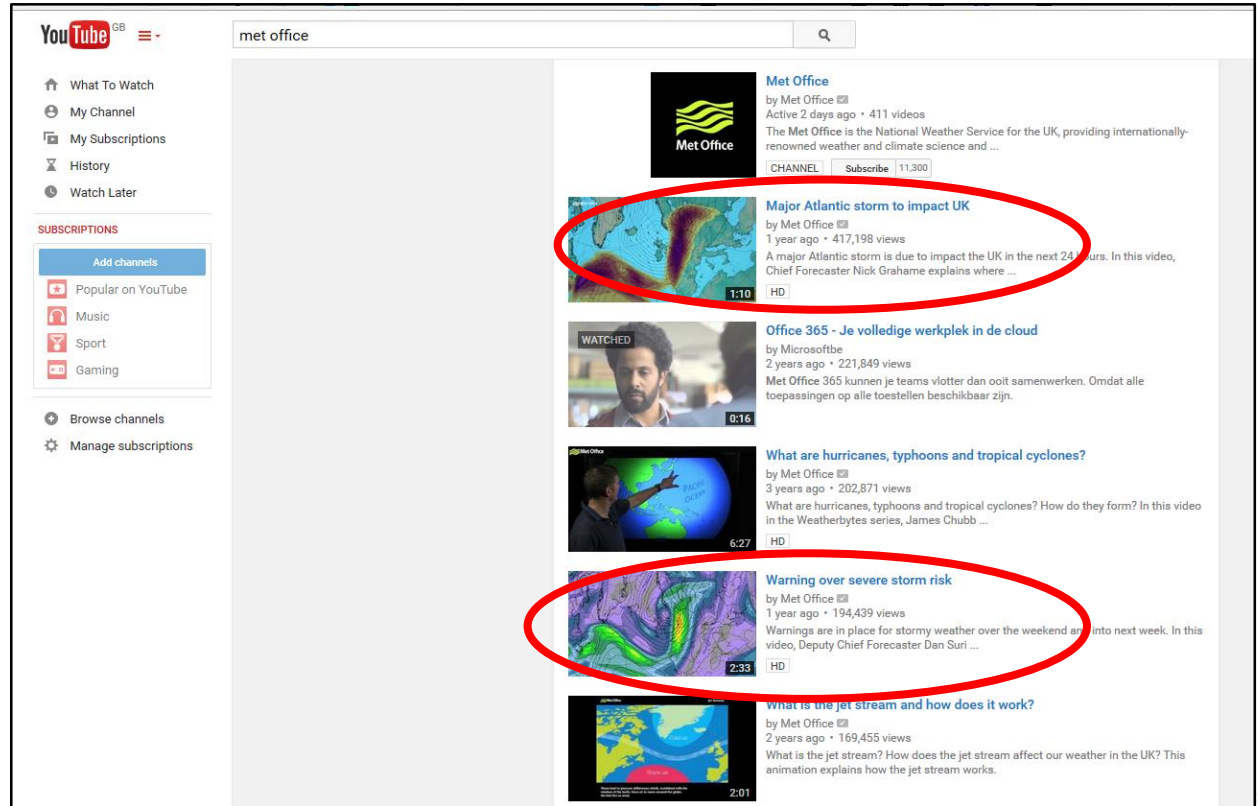


St Jude's Day Storm

...so challenge turned to finer-scale detail, eg possible sting jet.



St Jude's Day Storm



The screenshot shows the YouTube channel page for the Met Office. The search bar at the top contains the text 'met office'. The left sidebar includes navigation options like 'What To Watch', 'My Channel', 'My Subscriptions', 'History', and 'Watch Later'. Below this is a 'SUBSCRIPTIONS' section with an 'Add channels' button and a list of categories: 'Popular on YouTube', 'Music', 'Sport', and 'Gaming'. At the bottom of the sidebar are 'Browse channels' and 'Manage subscriptions' options.

The main content area displays search results for 'met office'. The first result is the channel page itself, showing the Met Office logo and a 'Subscribe' button with 11,300 subscribers. Below this are several video thumbnails, each with a red circle highlighting it:

- Major Atlantic storm to impact UK** by Met Office, 1 year ago, 417,198 views. Description: "A major Atlantic storm is due to impact the UK in the next 24 hours. In this video, Chief Forecaster Nick Grahame explains where ...". Duration: 1:10.
- Office 365 - Je volledige werkplek in de cloud** by Microsoftbe, 2 years ago, 221,849 views. Description: "Met Office 365 kunnen je teams vlotter dan ooit samenwerken. Omdat alle toepassingen op alle toestellen beschikbaar zijn." Duration: 0:16.
- What are hurricanes, typhoons and tropical cyclones?** by Met Office, 3 years ago, 202,871 views. Description: "What are hurricanes, typhoons and tropical cyclones? How do they form? In this video in the Weatherbytes series, James Chubb ...". Duration: 6:27.
- Warning over severe storm risk** by Met Office, 1 year ago, 194,439 views. Description: "Warnings are in place for stormy weather over the weekend and into next week. In this video, Deputy Chief Forecaster Dan Suri ...". Duration: 2:33.
- What is the jet stream and how does it work?** by Met Office, 2 years ago, 169,455 views. Description: "What is the jet stream? How does the jet stream affect our weather in the UK? This animation explains how the jet stream works." Duration: 2:01.

Take Home Message

NSWWS is an impacts-based service drawing on multiple information streams in decision-making...

...so information on potential impacts is vital.

Some of the most useful products currently include Dalmatian Plots, EFI and probability maps.

In broader terms ECMWF output is important, especially in view of increasing risk assessment into Week 2 and beyond...

...in this period tools identifying regimes and changes in regime are proving useful.



Met Office

Any questions?

dan.suri@metoffice.gov.uk

