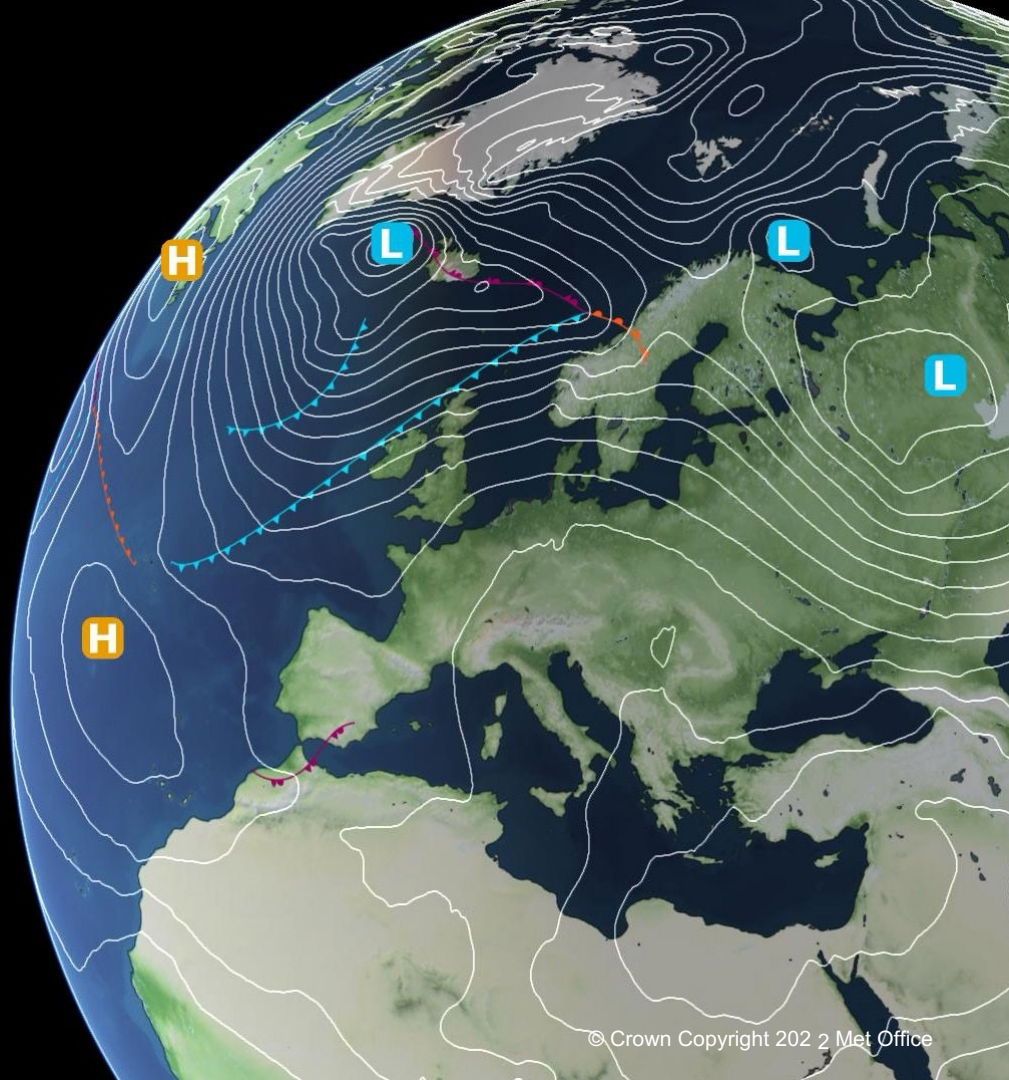
Extreme weather resilience – what does this year tell us?

Dr Emily Wallace

Fellow in Weather and Climate Extremes and Impacts



Met Office

The Met Office

OUR PURPOSE Helping you make better decisions **to stay safe and thrive**

OUR VISION Recognised as global leaders in weather and climate science and services in our changing world

- Trading fund within DESNZ.
- Tasked with supporting business and industry making the UK a safer and efficient place to live and work.
- Trusted in supporting aviation, defence, energy, water, media, and transport.
- Delivering expert weather, climate and digital services through being a thought leader with strong trust and engagement

Heathrow nationalgrid ena energynetworks association itv sky news CIBSE

Met Office | 2023/24 storm season timeline

AGNES
Named 25/09/23
by **Met Office**

Rain Wind

Wind impacts

Mainly wind impacts with some power outages and disruption to travel.

27-28 SEPTEMBER 23

BABET
Named 16/10/23
by **Met Office**

Rain Rain Rain Wind

Rain impacts

Impacts from the exception rainfall with homes flooded in Scotland and England.

Around 30,000 homes lost power in Northern Scotland. Further impacts to transport and farming.

A warnings survey was conducted in eastern Scotland, 97% of those surveyed were aware of the warning and of those 89% took action as a result with the main actions:

48% stayed in

45% secured things around their property

36% took an umbrella or wore different clothing

18-21 OCTOBER 23

CIARÁN
Named 29/10/23
by **Met Office**

Wind Rain Wind

Wind and rain impacts

The worst of the impacts occurred across Northern France and the Channel Islands.

In the UK, the storm caused major transport disruption, school closures and almost 150,000 homes were left without power. Large waves battered the South Coast with several vehicles swept into the sea and a major incident declared in Hampshire and the Isle of Wight.

1-2 NOVEMBER 23

DEBI
Named 12/11/23
by **Met Éireann**

Wind Wind

Wind impacts

The worst weather impacts from storm Debi were across the Republic of Ireland where a red weather warning was issued, and 100,000 homes and businesses lost power.

In the UK, there was some localised transport disruption with some road closures and disruption to rail, air and ferry services. This storm brought further heavy rain and strong winds to parts of Northern Ireland which was still recovering from flooding following earlier wet weather.

13 NOVEMBER 23

ELIN
Named 09/12/23,
by **Met Éireann**

Rain Wind

Wind and rain impacts

The storms also caused localised impacts in the UK, with flooding a particular concern due to the saturated ground following the wet autumn in many areas. Numerous flood warnings were in place for major rivers such as the Severn and Ouse with the ongoing risk of groundwater flooding.

9 DECEMBER 23

FERGUS
Named 09/12/23
by **Met Éireann**

Wind

Wind and rain impacts

The worst weather impacts occurred across the Republic of Ireland with a possible tornado in Leitrim Village.

10 DECEMBER 23

GERRIT
Named 26/12/23,
by **Met Office**

Rain Wind Snow

Wind impacts

Storm Gerrit caused severe travel disruption to the rail network and on roads, with many people travelling after Christmas. Thousands of properties experienced loss of power, with residents in north-east Scotland and Shetland worst affected.

In Stalybridge, Greater Manchester, a major incident was declared after around a hundred homes were damaged by a mini tornado.

27-28 DECEMBER 23

HENK
Named 02/01/24
by **Met Office**

Wind Rain

Wind and rain impacts

Storm Henk caused power outages, severe disruption to road and rail transport and flooding problems. Approximately 38,000 properties were estimated were to have lost power due to fallen trees bringing down lines.

Almost 300 flood warnings were in place in England, with others in Wales and Scotland. Hundreds of properties located near the River Severn in the West Midlands were flooded, in some cases for the fourth time of the winter.

2 JANUARY 24

ISHA
Named 19/01/24,
by **Met Office**

Wind Wind Wind

Wind impacts

Storm Isha caused widespread impacts with power outages and disruption to road, rail, air and ferry transport.

21-22 JANUARY 24

JOCELYN
Named 22/01/24
by **Met Éireann**

Wind Wind Rain

Wind and rain impacts

Storm Jocelyn brought further disruption to northern and western areas of the UK hampering recovery operations following Storm Isha.

23-24 JANUARY 24

KATHLEEN
Named 04/04/24,
by **Met Eireann**

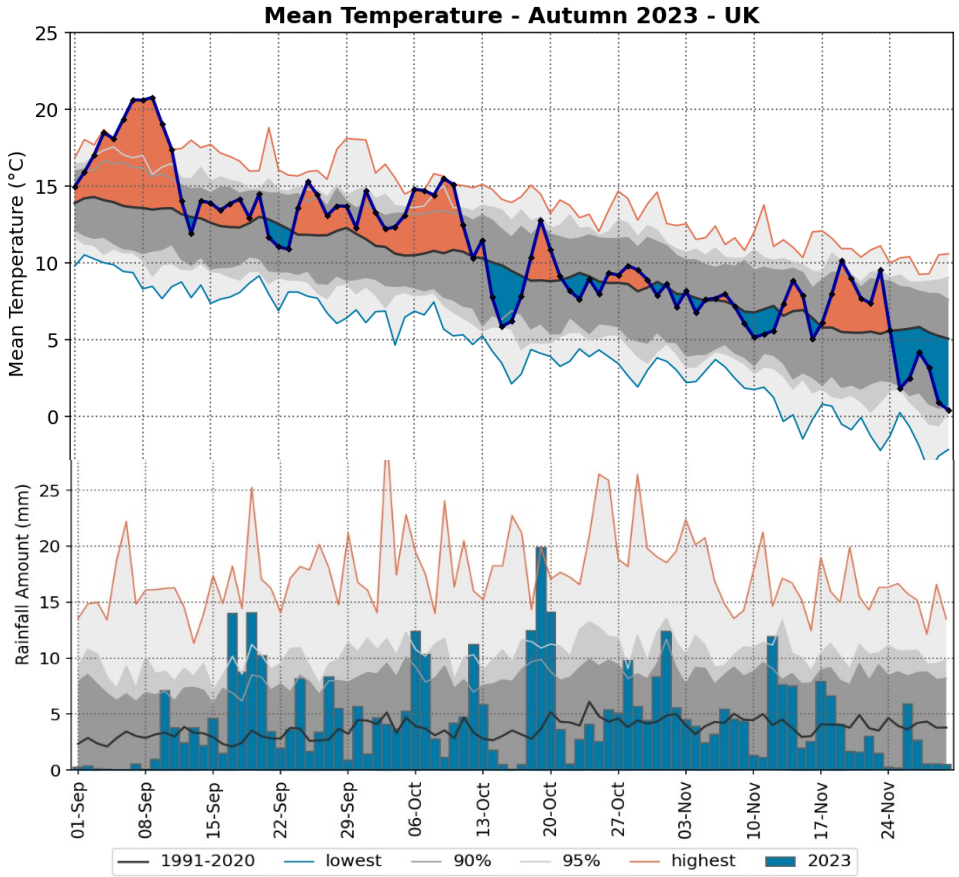
Wind

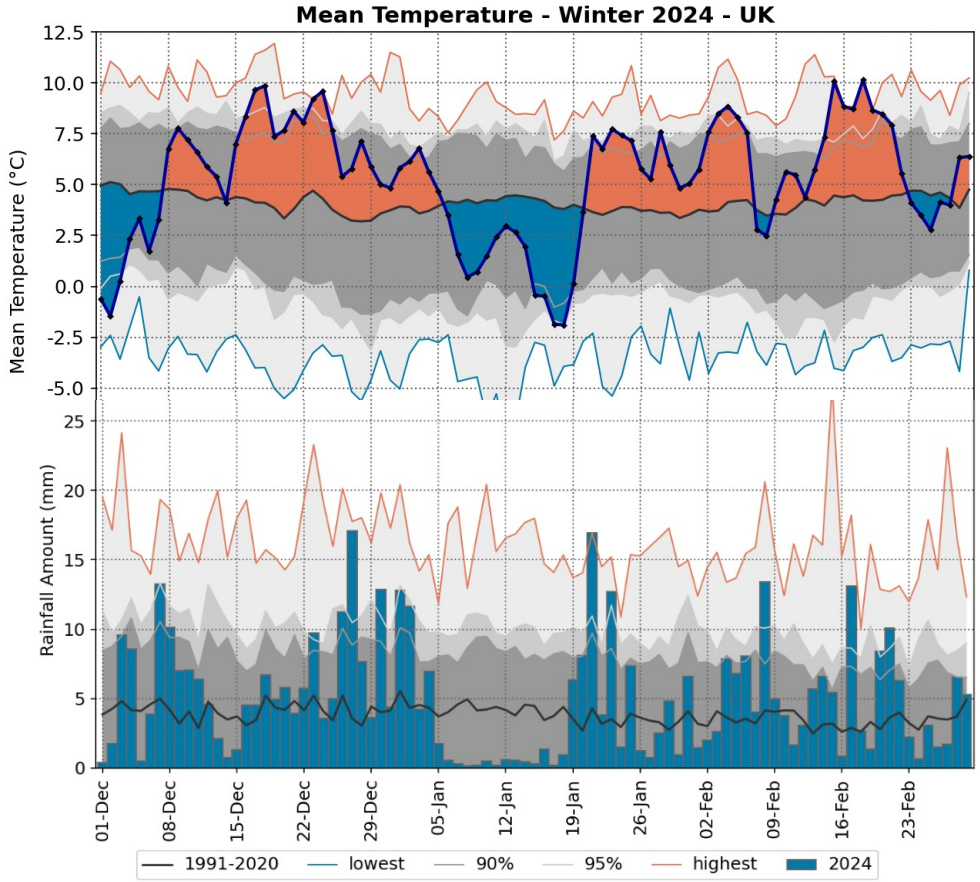
Wind impacts

Storm Kathleen brought impacts to western areas of the UK with power outages and disruption to transport with a number of flights and ferry crossings cancelled.

6-7 APRIL 24

Source: HadUK-Grid 01/12/2023 11:07





Met Office | 2023/24 storm season timeline

Record heat

Extreme rainfall

Cold snap

Unusual heat

Cold snap

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What problems did this cause?

- Maintenance schedules couldn’t be completed because there were so many wet and windy days
- Icing and damage of components with wet conditions transitioning quickly into cold
- Erosion around pipelines because of high river levels
- Movement around pipelines because of ground saturation?
- LNG tankers couldn’t dock because of windy weather
- The windy season reduced the need for gas for power

Met Office

What problems did this cause?

- Maintenance schedules couldn't be completed because there were **so many wet and windy days,** blocking access
- Icing and damage of components with **wet transitioning quickly into cold**
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- Movement around pipelines because of **ground saturation**?
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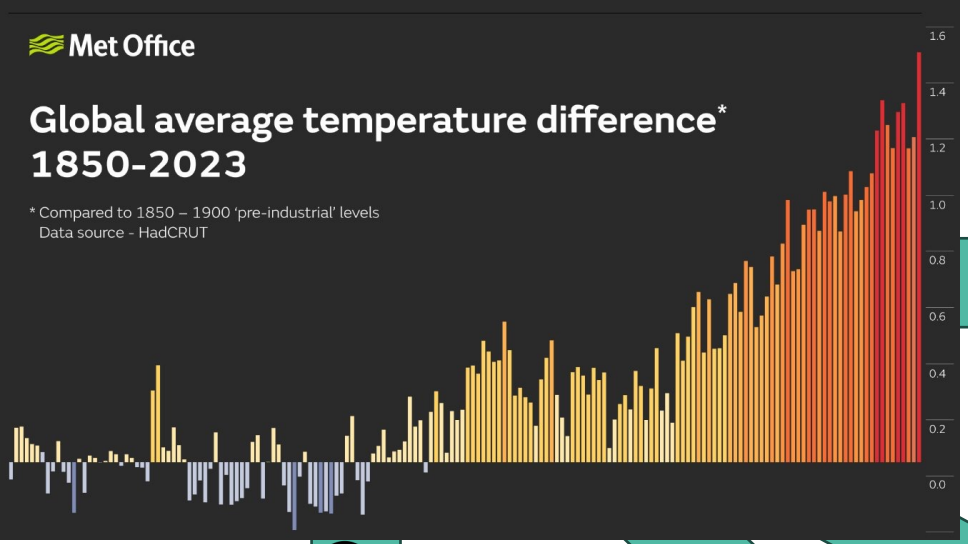
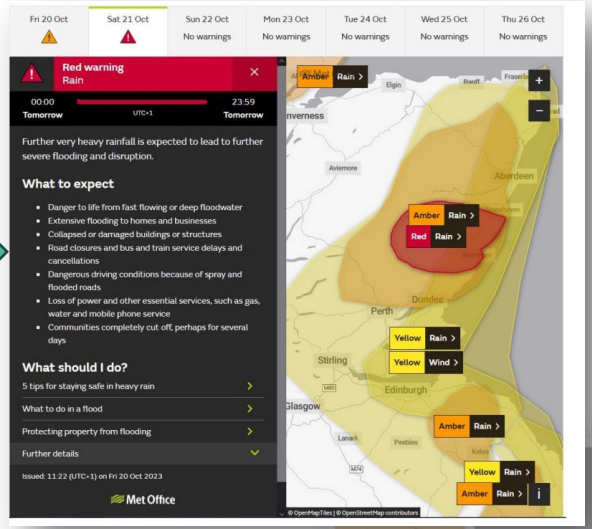
- The windy season reduced the need for gas for power


Met Office
Global average temperature difference*
1850-2023
* Compared to 1850 – 1900 'pre-industrial' levels
Data source - HadCRUT
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0


Fri 20 Oct
Sat 21 Oct
Sun 22 Oct
No warnings
Mon 23 Oct
No warnings
Tue 24 Oct
No warnings
Wed 25 Oct
No warnings
Thu 26 Oct
No warnings
Red warning
Rain
00:00
Tomorrow
UTC+1
23:59
Tomorrow
Further very heavy rainfall is expected to lead to further severe flooding and disruption.
What to expect
Danger to life from fast flowing or deep floodwater
Extensive flooding to homes and businesses
Collapsed or damaged buildings or structures
Road closures and bus and train service delays and cancellations
Dangerous driving conditions because of spray and flooded roads
Loss of power and other essential services, such as gas, water and mobile phone service
Communities completely cut off, perhaps for several days
What should I do?
5 tips for staying safe in heavy rain
What to do in a flood
Protecting property from flooding
Further details
Issued: 11:22 (UTC+1) on Fri 20 Oct 2023
Met Office
Amber Rain
Red Rain
Yellow Rain
Yellow Wind
Amber Rain
Yellow Rain
Amber Rain
Aberdeen
Perth
Dundee
Stirling
Edinburgh
Glasgow
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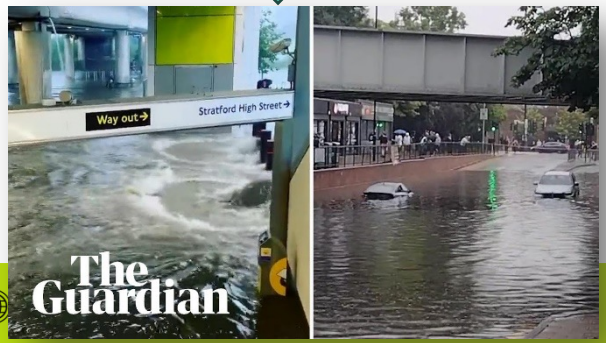
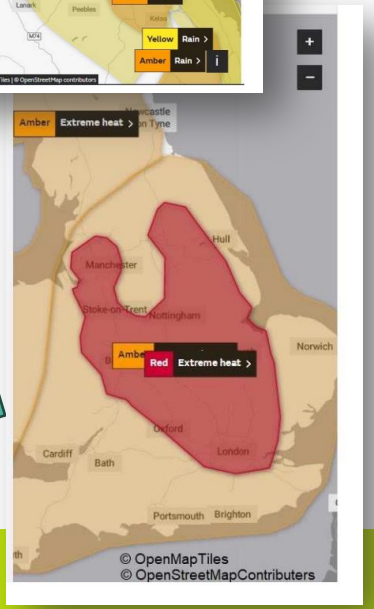

Way out
Stratford High Street
The Guardian


Amber Extreme heat
Amber Red Extreme heat
Hull
Manchester
Stoke-on-Trent
Nottingham
Norwich
Oxford
London
Cardiff
Bath
Portsmouth
Brighton
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Met Office

The case for collaboration:

1. **Understand the risks** – what scenarios could be a problem, now? In the future?
   This is likely to be not simplistic “wet”, “dry” “windy” what else matters? Who is needed for this problem?

2. **How could you deal with unprecedented scenarios?**
   How much warning could you get? How could you respond?

3. **Data is great – shared data and advice can be even better.**

Emily.Wallace@metoffice.gov.uk
Sally.Ellis@metoffice.gov.uk

Emily Wallace LinkedIn

Met Office

Climate Data Portal: A geospatial view of climate data
https://climate-themetoffice.hub.arcgis.com/

A briefing note on the AMOC (of which the Gulf stream is a part):
: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/climate/deliverables/amoc.pdf

I gave a nerd's answer on predictability. Here is the marketing answer with some statistics:
https://www.metoffice.gov.uk/about-us/who-we-are/accuracy
It's also worth saying, that it's also true that history is becoming a less good predictor of the future as our climate changes – this is critical to recognise as it relates to standards and regulations, emergency planning and a whole lot of other aspects of managing infrastructure. Climate projections, forecasts and the sort of collaborative exercises I spoke about critical for dealing with this.