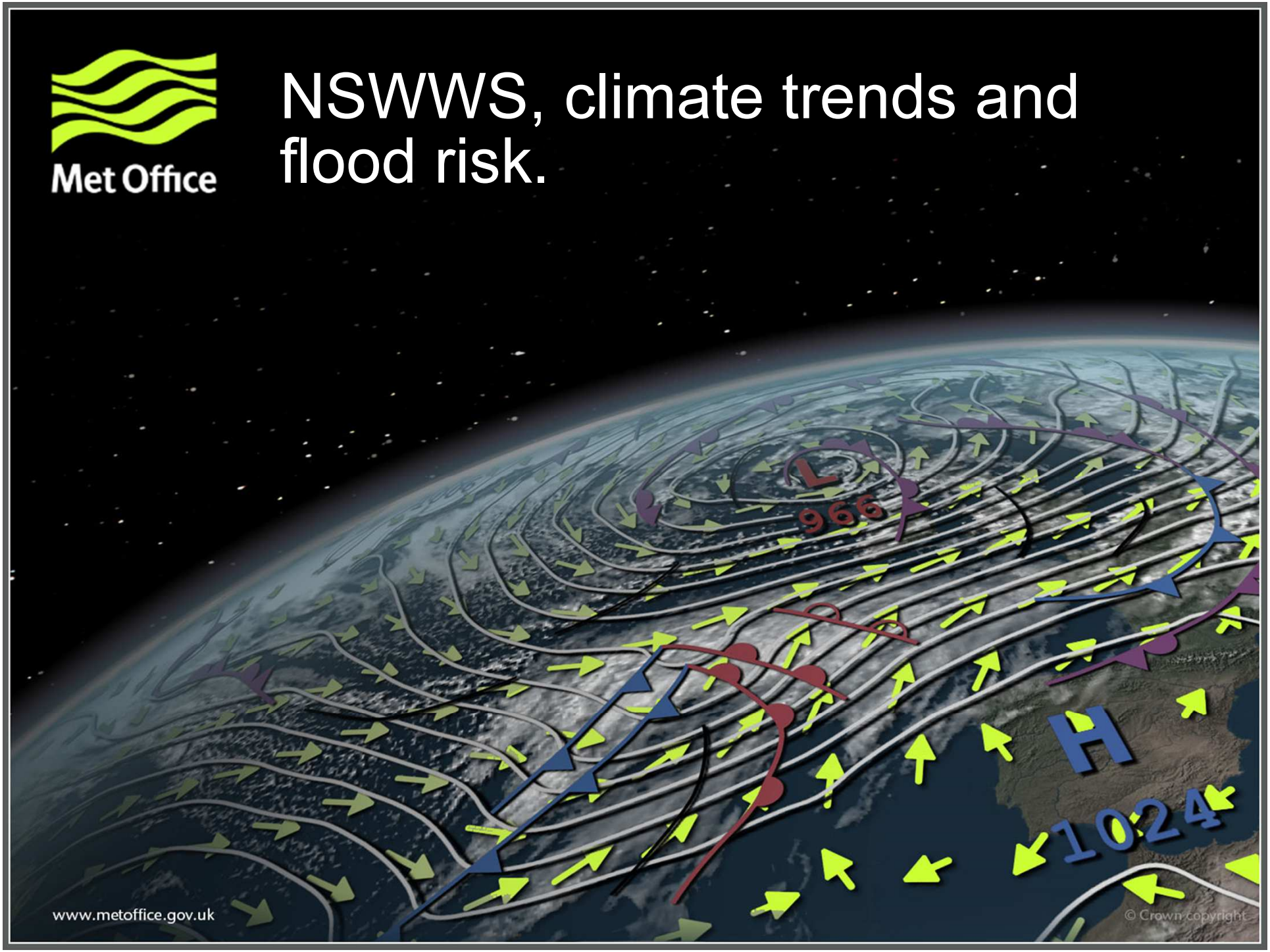
NSWWS, climate trends and flood risk.



National Severe Weather Warning Service (NSWWS)

www.metoffice.gov.uk

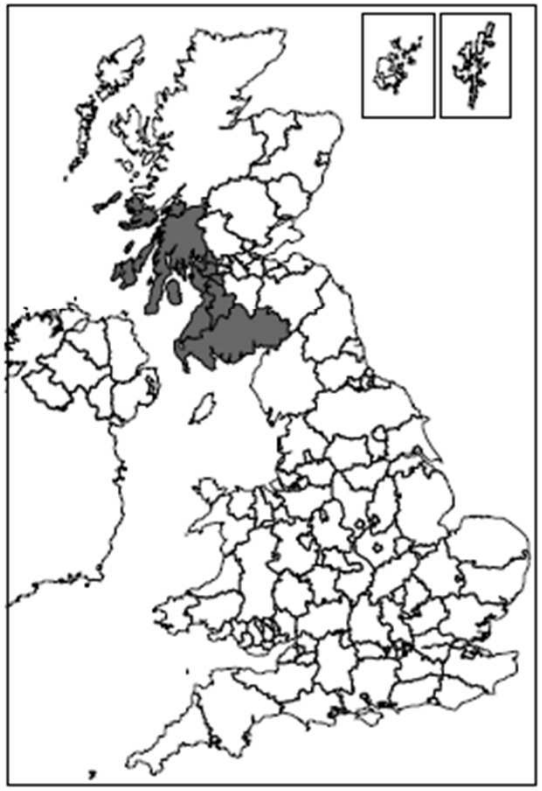
Threshold Based – 1988 to 2011

National Severe Weather Warning Service

FLASH WARNING

Set up as a threshold based warning system. Warnings were issued when the probability of thresholds being met was reached.

For example : 80% confidence of gusts reaching 70 mph or more.



Impact Based – 2011 onwards

	Very Low	Low	Medium	High
Impact and advice applying to ALL SEVERE WEATHER	On the whole, day to day activities not affected but some localised, small scale impacts occur A few transport routes affected.	Some short lived disruption to day to day routines in affected areas Incidents dealt with under‘ business as usual' response by emergency services Some transport routes and travel services affected. Some journeys require longer travel times. .	Injuries with danger to life Disruption to day to day routines and activities. Short-term strain on emergency responder organisations. Transport routes and travel services affected. Longer journey times expected. Some vehicles and passengers stranded. Disruption to some utilities and services. Damage to buildings and property.	Danger to life Prolonged disruption to day to day routines and activities Prolonged strain on emergency responders organisations. Transport routes and travel services affected for a prolonged period. Long travel delays. Vehicles and passengers stranded for long periods. Disruption to utilities and services for a prolonged period. Extensive damage to buildings and property.

What is warned for?

Rain

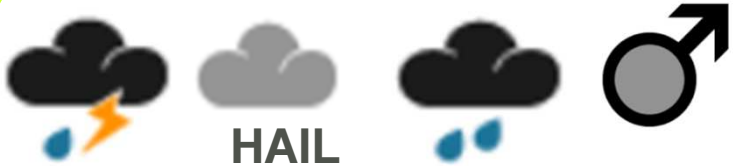
Wind

Snow

Ice

Fog

Lightning



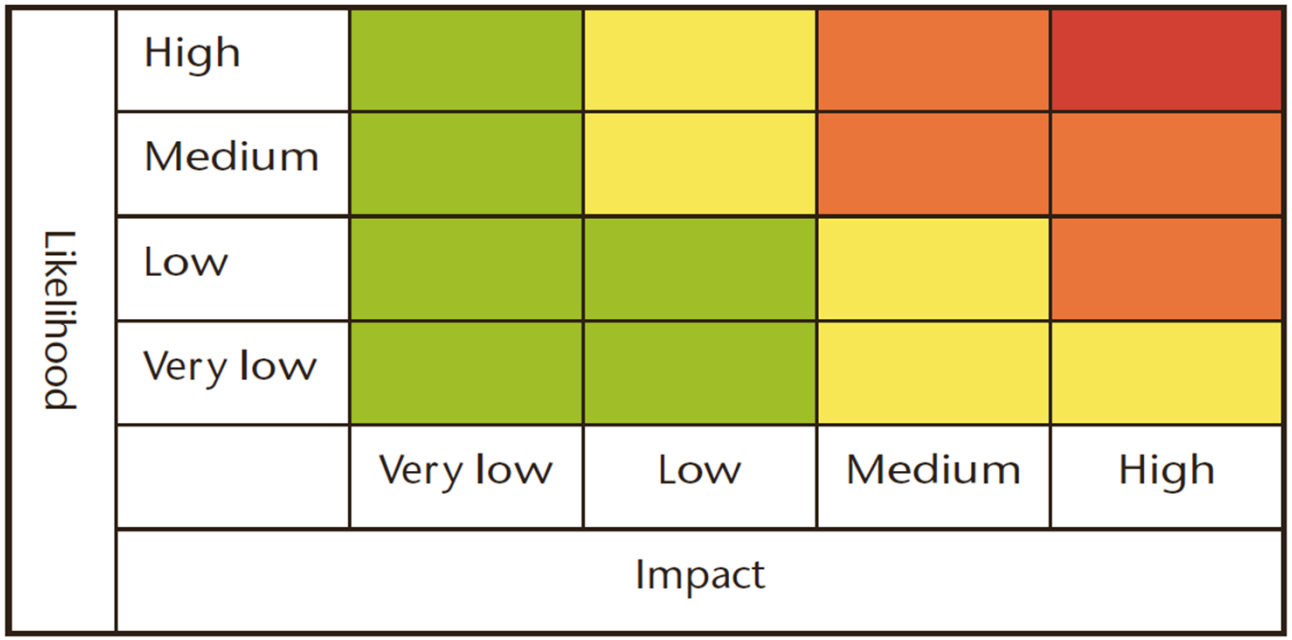
Thunderstorm

Warnings can be issued out to 7 days ahead

Impact Matrix

Likelihood and Impact are plotted onto a Weather Impact Matrix

Likelihood of impacts occurring

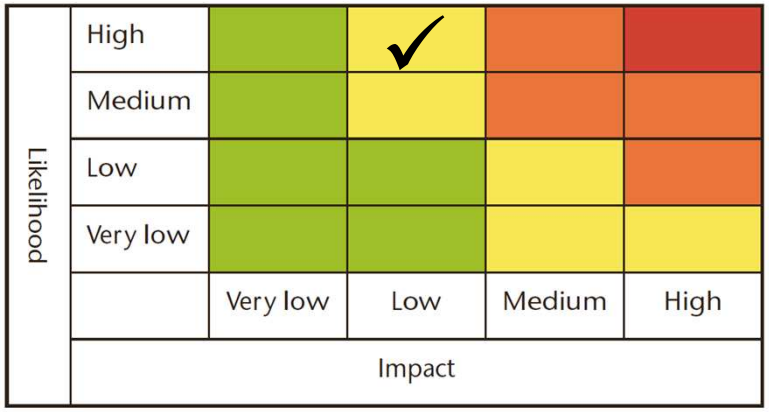


Level of impacts Expected

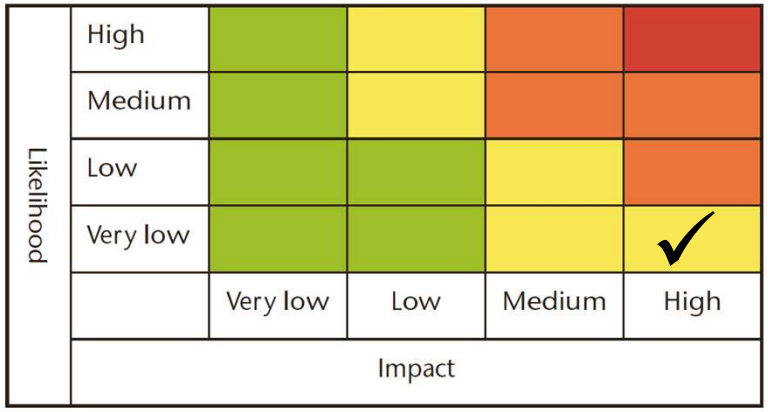
Plotting the Likelihood against the Impact allocates the warning a colour. The location of the tick in the box is the important element NOT the colour!

Locate the tick!

It is very important that you look to see where the tick is on the matrix. Yellows are not all the same!



Low impacts – no major issues?



High impacts – risk to life?

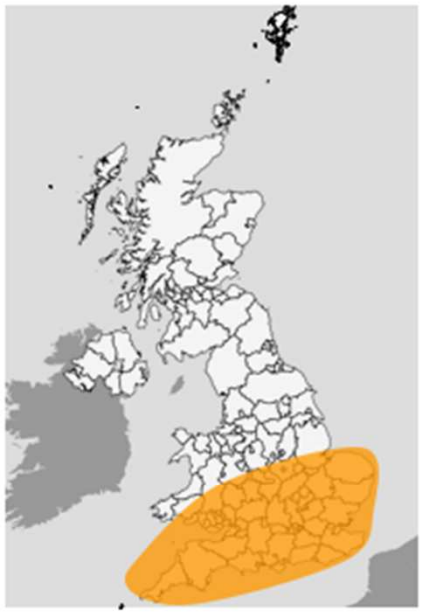
Met Office

Example Warning

Met Office — National Severe Weather Warning Service

Amber warning
Rain

Between
02:00 Tue 24 Apr 2018 and
12:00 Tue 24 Apr 2018



Further heavy rain expected through Tuesday.

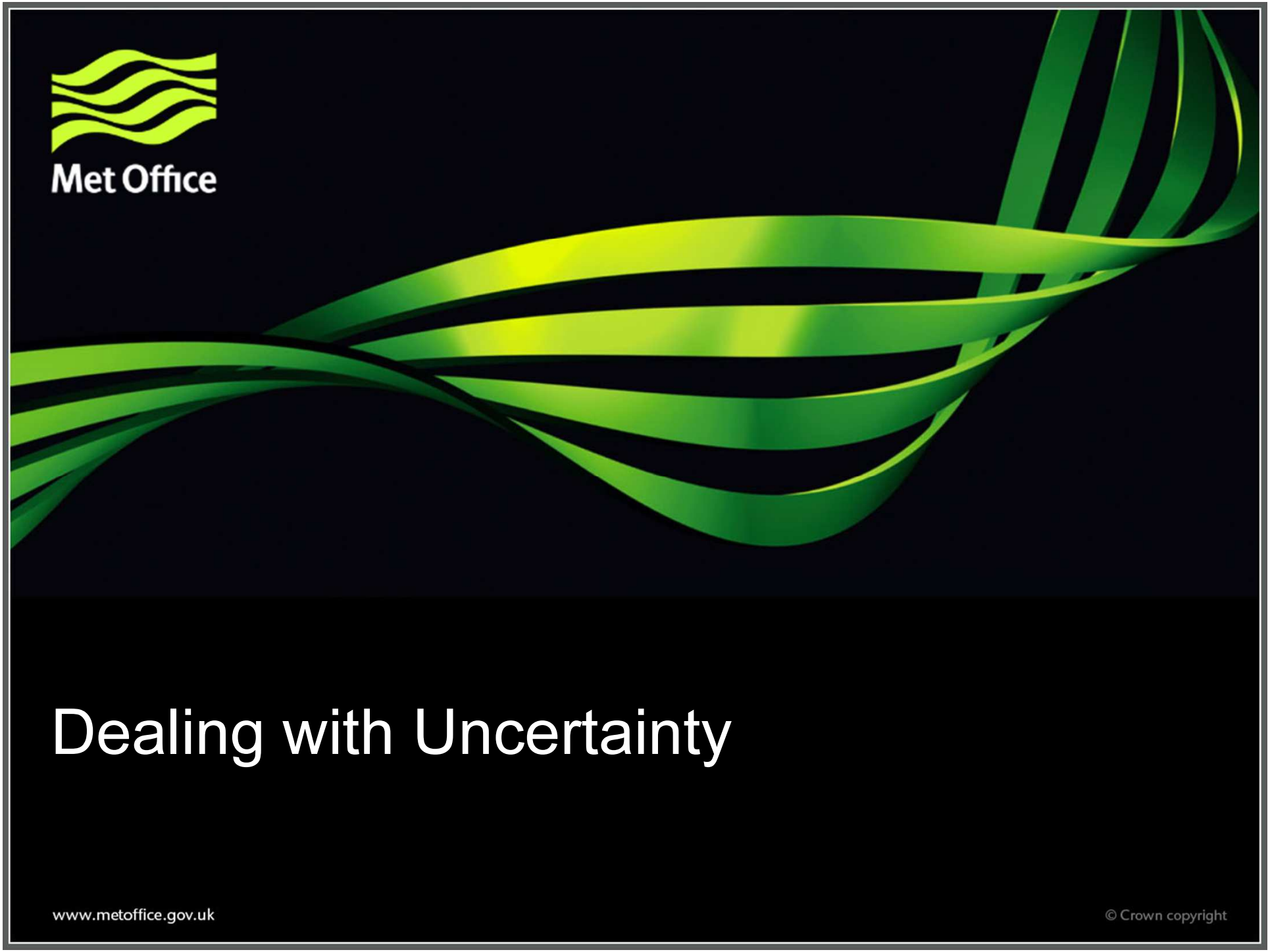
What to expect

- Homes and businesses are likely to be flooded, causing damage to some buildings
- Fast flowing or deep floodwater is likely, causing danger to life
- Delays and some cancellations to train and bus services are likely
- Spray and flooding probably leading to difficult driving conditions and some road closures
- A good chance some communities cut off by flooded roads
- Power cuts and loss of other services to some homes and businesses likely

Further details

An area of low pressure will move across central parts of the UK bringing areas of heavy rain across southern parts of England and Wales giving 40-50 mm quite widely, but locally as much as 60-70 mm, falling onto already saturated ground.

Issued at 12:49 Sun, 22 Apr 2018
For enquiries regarding this warning please contact the Met Office Weather Desk Phone: 03709000100
E-mail: enquiries@metoffice.gov.uk
Visit: www.metoffice.gov.uk/premium/hazardmanager



Dealing with Uncertainty

Level of Certainty

The Met Office Chief Forecaster monitors other information in addition to that from the UK, including USA, Germany, Japan, and France.

Model output similar leads to certainty 

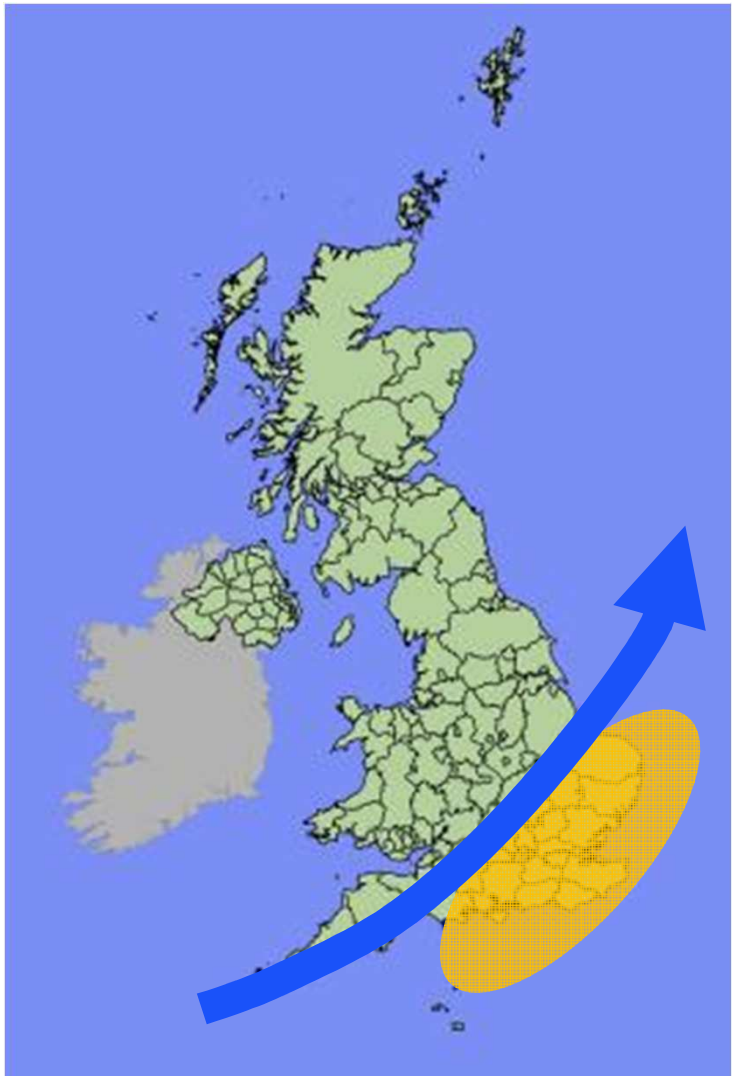
Model output different leads to uncertainty 

If necessary the Chief Forecaster can adjust the UK model to bring it into line with other information.

Dealing with uncertainty - example

Here the model is suggesting that the track of the low pressure will be across central Southern England with the strongest winds across SE England.

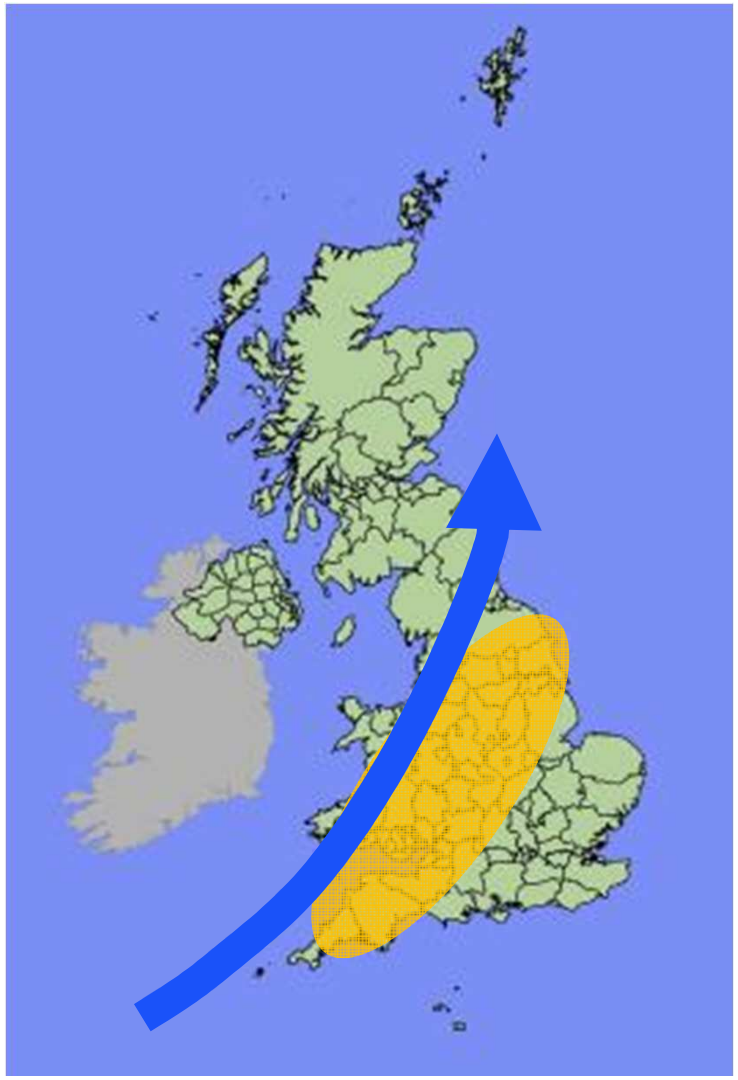
Likelihood					
	High				
	Medium			✓	
	Low				
	Very low				
		Very low	Low	Medium	High
		Impact			



Dealing with uncertainty - example

However, this model is suggesting a track further northwest across Wales and northern England with the strongest winds across western and into northern England.

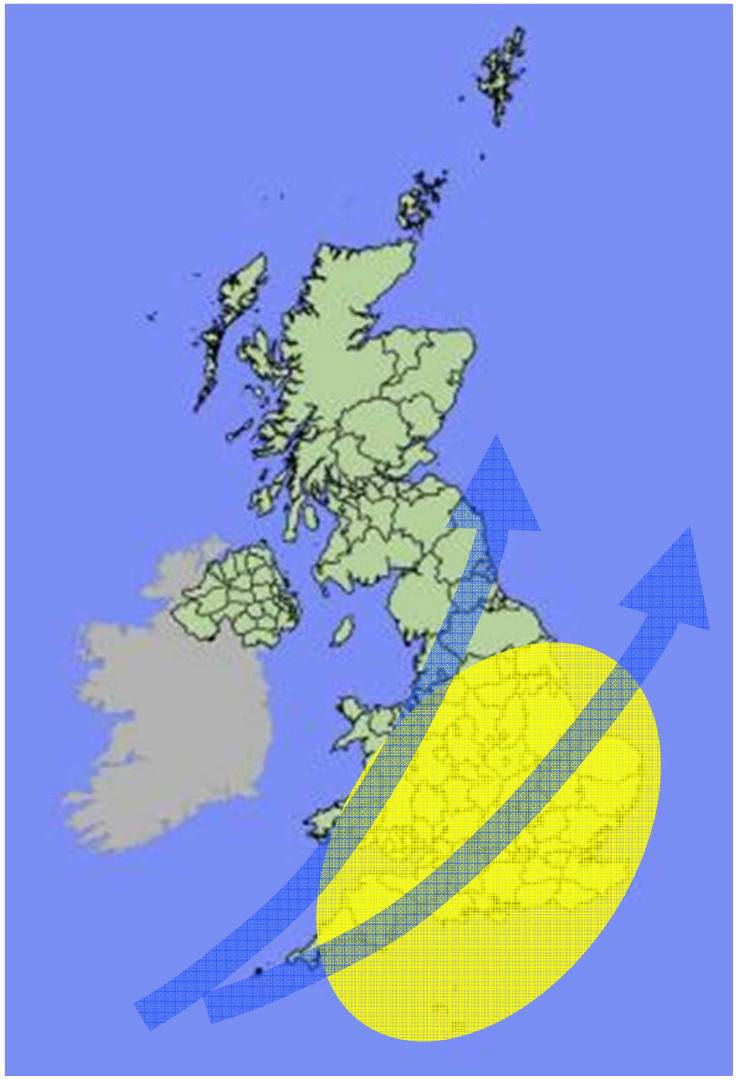
Likelihood				
High				
Medium			✓	
Low				
Very low				
	Very low	Low	Medium	High
	Impact			



Dealing with uncertainty - example

Due to the uncertainty around the track a larger area may be covered by the warning with a lower likelihood.

Likelihood					
	High				
	Medium				
	Low			✓	
	Very low				
		Very low	Low	Medium	High
	Impact				



Assessing Risk

Assessing the Risk

Location

Assessing the Risk

Current conditions

Assessing the Risk

Time of year

Assessing the Risk

Time of day / day of week

Flood Guidance Statement

www.metoffice.gov.uk

Flood Risk

Flood Guidance Statement

10:30hrs Saturday 12 May 2018

FLOODFORECASTINGCENTRE

a working partnership between Environment Agency | Met Office

Saturday	Sunday	Monday	Tuesday	Wednesday
12 May 2018 10:30-23:59	13 May 2018	14 May 2018	15 May 2018	16 May 2018
Trend since last FGS				
Steady →	Steady →	Increased ↑	Increased ↑	Increased ↑

Severe coastal flooding impacts are probable on Monday and Tuesday in parts of the south of England. Severe river and surface water flooding impacts are possible on Monday and Tuesday. See end of FGS for 6-10 day forecast.

Flood Risk

Specific Areas of Concern map 3: Monday 14th and Tuesday 15th May 2018

RISK AREA **C**
Impact **SEVERE**
Likelihood **MEDIUM**

Source **Coastal/Tidal**
Likely duration **2 Days**

Impacts mainly around the Monday evening and Tuesday morning high tides

RISK AREA **D**
Impact **SEVERE**
Likelihood **LOW**

Source **River Surface**
Likely duration **2 Days**

Impacts most likely in urban areas and on rapidly responding rivers

RISK AREA **E**
Impact **SIGNIFICANT**
Likelihood **MEDIUM**

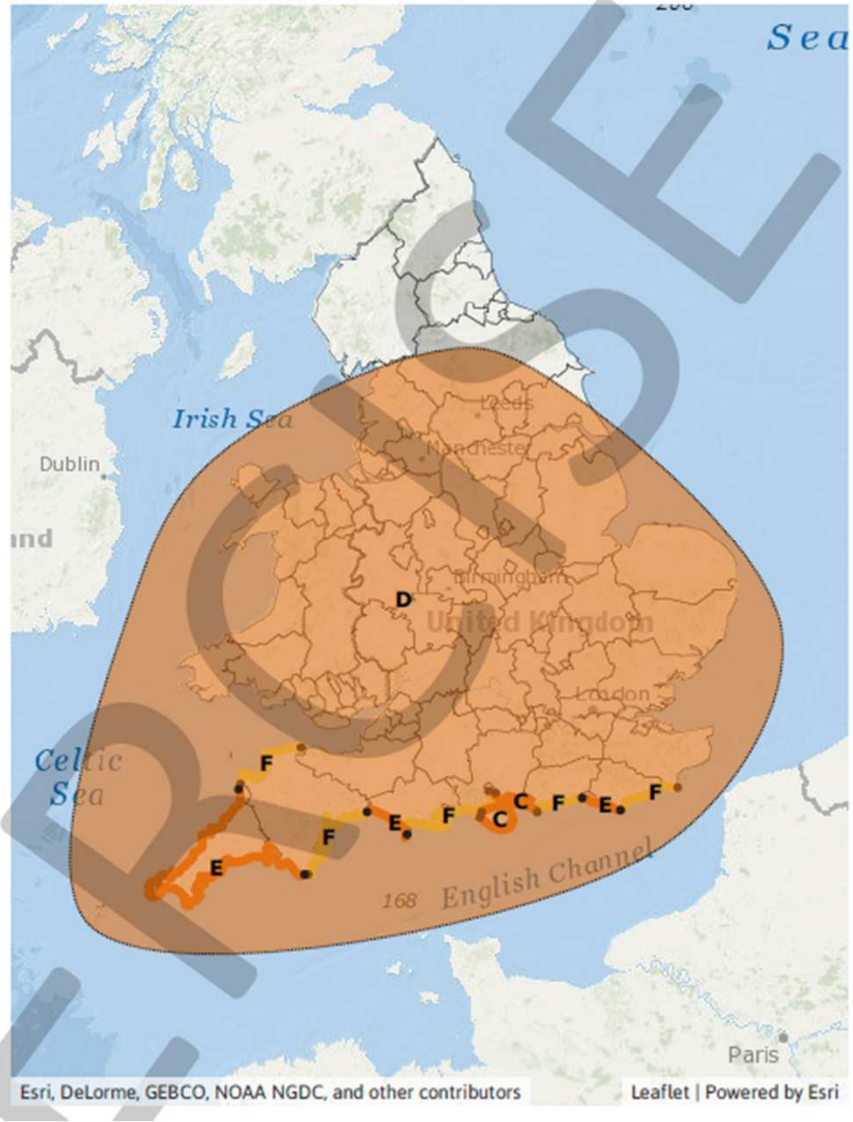
Source **Coastal/Tidal**
Likely duration **2 Days**

Impacts most likely around the Monday evening and Tuesday morning high tide

RISK AREA **F**
Impact **SIGNIFICANT**
Likelihood **LOW**

Source **Coastal/Tidal**
Likely duration **2 Days**

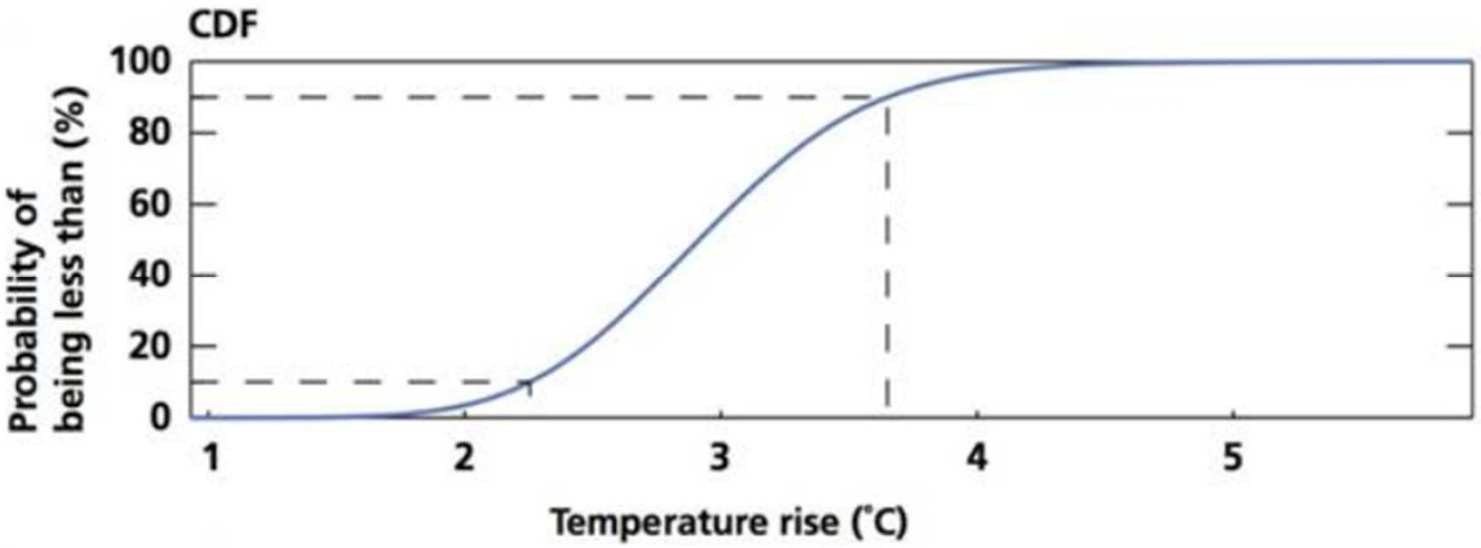
Impacts mainly around the Monday evening and Tuesday morning high tide



Climate Change

www.metoffice.gov.uk

Probability



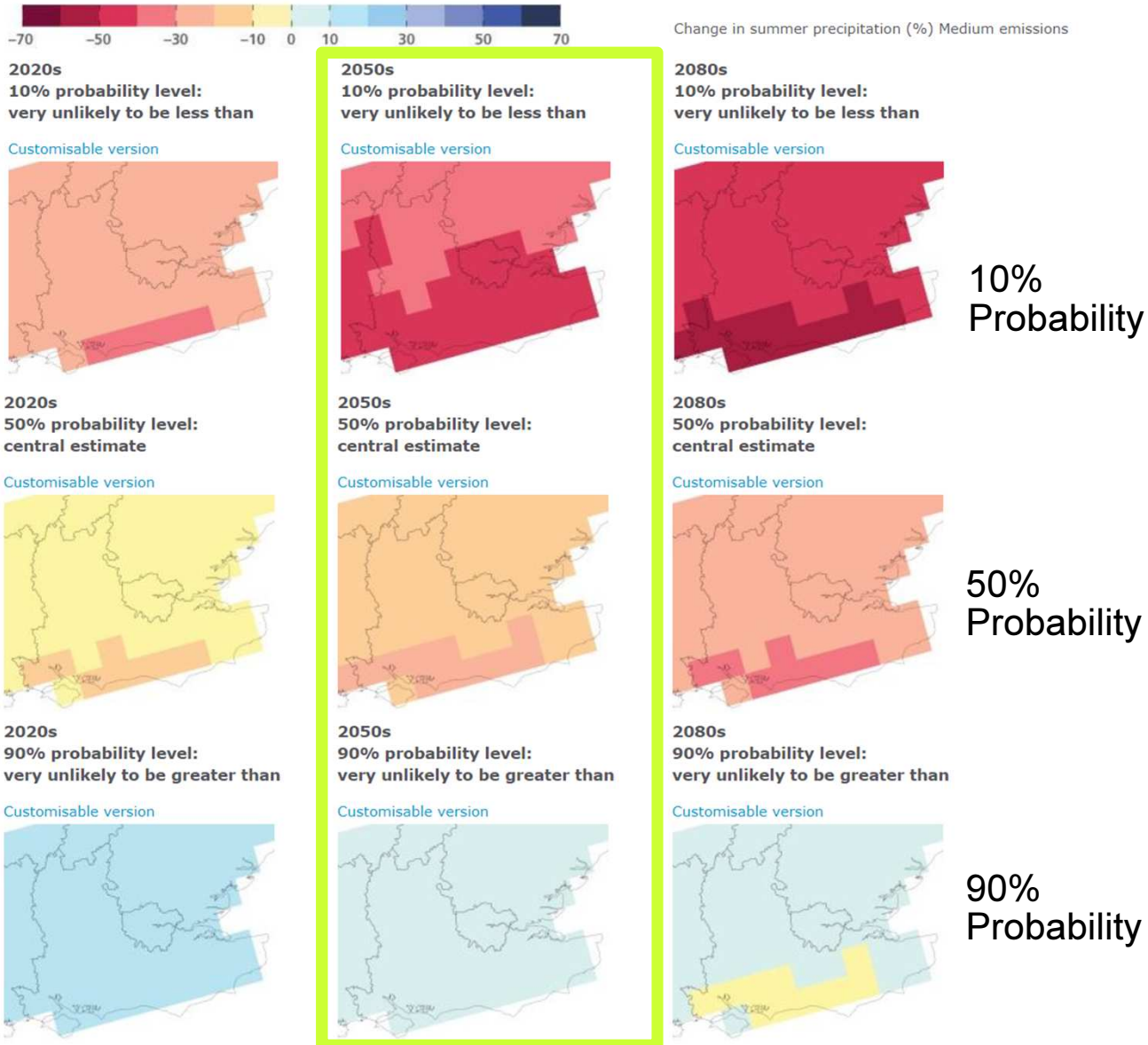
At the 10% probability level, only 10% of the climate model runs fall **at or below** that level, at the 90% probability level, only 10% of the climate model runs fall **at or above** that level.

Summer Precipitation (UKCP09)

Medium Emissions

↓ 20-30%

↑ 0-10%



10% Probability

50% Probability

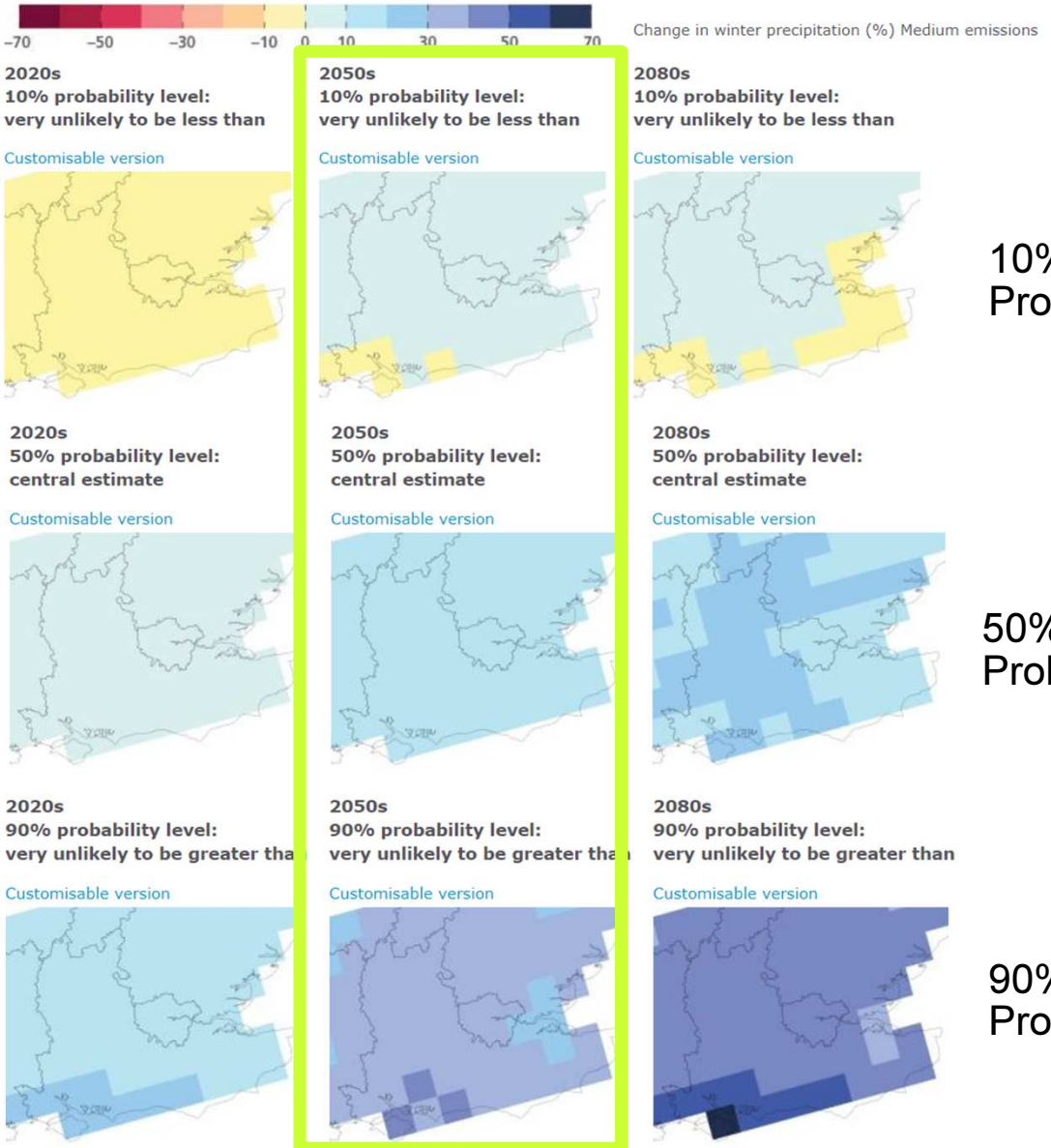
90% Probability

Winter Precipitation (UKCP09)

Medium Emissions

↑ 0-10%

↑ 30-40%



Summer Convection

We found that summers are likely to become drier overall by 2100, in a warming climate. But our results suggest that when it does rain, it will be heavier in short outbreaks. In particular, intense rainfall with the potential to cause serious flash flooding could become a more common occurrence.

Dr Elizabeth Kendon, Senior Climate Scientist at Met Office Hadley Centre

Winter Rainfall

In 2017, the Met Office published new innovative research which found that for England and Wales there is a 1 in 3 chance of a new monthly rainfall record in at least one region each winter.

Met Office records show that since 1910 there have been 17 record breaking rainfall months or seasons – with 9 of them since 2000.

Summary

Climate change impacts on rainfall are complex and uncertain.

The risk of surface water flooding could increase as we see more intense summer rainfall.

The risk of river and groundwater flooding could increase as we see increased winter rainfall.

However, due to uncertainty, a risk management approach is needed.

N.B. UKCP18 available in November!

Met Office

Questions and Answers