

## **Met Office National Severe Weather Warning Service Next Generation – What is changing?**

### **Briefing document for emergency responders**

#### **Background**

The Met Office issues weather warnings to inform the public and emergency services of severe or hazardous weather. These warnings are given a colour (yellow, amber or red) depending on a combination of both the impact the weather may have and the likelihood of those impacts occurring. The warnings are currently issued for five weather types – rain, snow, wind, fog and ice.

After listening to user feedback, we will be implementing a range of improvements to the way we produce, disseminate and communicate warnings throughout March and April 2018.

#### **What is changing?**

Fundamentally, the weather warnings will remain the same - they will continue to be issued when the combination of severe weather impacts and the likelihood of those impacts occurring meet the criteria for a warning to be issued. However, improvements have been made to the way people can access, understand and use our warnings information. These improvements include:

- introducing two additional warning types – thunderstorm and lightning
- extending the warnings from five days out to seven days
- improving the language we use to communicate severe weather and impacts
- improving the visual design across all Met Office digital channels including Hazard Manager, our website and app
- changing the data feed format from XML to GeoJSON which will be made available via an API

#### **When are these changes happening?**

Some of the changes have already begun, with design changes already appearing on our website and mobile web. All design changes will be made to Met Office channels by the end of March 2018. We anticipate introducing warnings for thunderstorm, lightning and extending out to days six and seven later in April. This is to allow partners who take warnings via our data feed to make any necessary changes to how they receive warnings data from the Met Office.

#### **Why is the Met Office introducing additional weather types?**

The introduction of thunderstorm and lightning warnings comes from comprehensive user research carried out with members of the public and the emergency responder community. When asked to describe the types of impacts they would expect in association with rain and with thunderstorms, users described very different pictures.

The user research has shown that rain suggests something which will last for hours, maybe even days, which will result in river flooding. Thunderstorms, however, are described as shorter lasting periods of heavy or intense rain, leading to faster onset impacts. Recognising that this is how our users differentiate between convective rainfall and dynamic rainfall, has enabled the Met Office to introduce thunderstorm warnings as an active communication tool.

The introduction of thunderstorm warnings adds to the capability of warnings to differentiate between the nature of impacts caused by large areas of rain and smaller areas of intense rainfall from thunderstorms.

Thunderstorm warnings will also allow the Met Office to warn for the impacts of other hazards, which are not currently catered for within rain warnings, such as hail.

The introduction of lightning allows warnings to be issued when there is no risk of flooding. Electrical storms can affect power supplies and cause damage to buildings and infrastructure, as well as pose a danger to life. Until now, the Met Office did not have the ability to issue warnings for lightning.

### **Why have separate Thunderstorm, Rain and Lightning warnings?**

Issuing separate thunderstorm, rain and lightning warnings increases our ability to communicate clearly the severe weather forecast and the impacts associated with that weather.

Rain warnings will continue to be issued for weather where the main impact is flooding, and where no other hazards are expected, such as lightning.

Thunderstorm warnings will be issued when the main impact is expected to be from surface water flooding and/or damage from hail. Strong winds and lightning will be additional hazards.

Lightning warnings will be issued when impacts from frequent lightning strikes are possible, but impacts from rain are not expected, such as during electrical storms. In addition, having lightning as a separate warning option from thunderstorms allows dual warnings to be issued such as “snow and lightning”.

### **Does this mean more warnings will be issued now there are rain and thunderstorm warnings?**

No. Introducing the option to issue thunderstorm warnings will help the messaging and overall communication of impacts from thunderstorms. In previous years, if a particular day had thundery showers forecast, the only option to warn for these was to issue a rain warning. Many of the rain warnings issued over the summer of 2017, for example, would be issued as thunderstorm warnings under the new system. In the future we will be able to decide which warning gives the best advice to the public and our partners and choose accordingly – thunderstorm, rain or lightning.

### **Does this mean the underpinning capability for forecasting thunderstorms has changed?**

No. The underpinning forecasting capability has not changed. Thunderstorm warnings are being introduced to improve the communication of severe weather and impacts, not as a result of a change in forecasting capability.

### **How will the introduction of thunderstorm warnings affect the decision making process between the Met Office and flood partners?**

It won't. The Met Office is committed to working closely with partners across all weather warnings. The introduction of thunderstorm warnings will not change the process of sharing information and highlighting the impacts that are forecast.

### **How will the introduction of thunderstorm warnings affect Severe Weather/Flood Plans?**

The introduction of thunderstorm warnings should not affect the essence of Severe Weather or Flood Plans. It may, however, be necessary to change some of the content where rain warnings are specifically referred. It may be appropriate to add rain and thunderstorm warnings.

### **How will the introduction of thunderstorm warnings affect the Flood Advisory Service (FAS) (England and Wales)?**

Thunderstorms bring the risk of flooding, which is already reflected within the flood guidance statements for England, Wales and Scotland. In many cases, but not all, flooding resulting from thunderstorms is surface water flooding, which is already covered within the flood guidance statements. There will be no change to how surface water flooding is reflected within the flood guidance statements.

The introduction of thunderstorm warnings is primarily to aid the communication of impacts; therefore, the Flood Advisory Service will continue to operate as it currently does: taking into consideration the flood risk to assess if a FAS is required.

### **How will the introduction of thunderstorm and lightning warnings affect emergency responder Severe Weather Teleconferences?**

Thunderstorms bring the risk of flooding and other hazards, such as hail. Thunderstorm warnings will be issued when the weather has the potential to result in impacts. Severe weather teleconferences will therefore continue to be held at the discretion of the local resilience partners if the potential for impacts is deemed sufficient to hold a multi-partner teleconference.

### **How can I access the new thunderstorm and lightning warnings?**

Met Office weather warnings, including thunderstorm and lightning, are available across all Met Office channels, including the Met Office website, mobile web and Apps. Emergency Responders can also see warnings in Hazard Manager and receive them directly by email.

### **Why are warnings being issued with a six or seven day lead-time?**

There are a few occasions where forecast certainty is sufficient to issue warnings with a lead-time of six or seven days, but our current warning service does not enable us to issue warnings at these timescales. More often than not, these are for large storms, such as the St Jude's Day storm or Ex-Ophelia. Our users have told us that, although certainty at days six and seven is often low, the extra lead-time for these unusual but high impact events is beneficial.

In addition, the Met Office issues weather forecasts out to day seven, so issuing warnings to day seven makes our services consistent.

### **What improvements are being made to the language used in warnings?**

Our user research has shown that many members of the public do not use the impact matrix, which we use to convey the level of risk in each warning. We are therefore changing the way we communicate risk within our warnings to communicate the level of impact and the likelihood of those impacts occurring. To do this, we will be

explicitly stating the types of impacts forecast and using probabilistic language to express the certainty of those impacts occurring. See Figure 1.

### **Does this mean the matrix is being removed?**

No. The matrix is still at the heart of every warning and it will appear on all our channels where warnings appear, with the exception of the Met Office App.

### **How will Hazard Manager be changing?**

The following changes will be made to Hazard Manager:

- Weather and Warnings have been combined into one product on the **'My products'** menu (removing the Warnings only product)
- Extended warnings from five to seven day lead time
- Extended forecast weather layers from five to seven days
- New feature to indicate when warnings have been issued on the thumbnail maps
- New feature to navigate around thumbnail maps
- Labels instead of icons on the warnings to identify weather type
- Better differentiation between the selected warning and other warning polygons on the map
- Warnings details have been reordered to provide the most important information first

### **How are the Met Office data feeds for weather warnings changing?**

We have already contacted our data customers about the expected changes to weather warning data feeds, however, if you receive warnings information from the Met Office via an XML feed through a URL or via FTP, then you will see the following changes:

- warnings data feeds will be available as API
- the XML format will change to GeoJSON
- the warning areas will be represented by polygon coordinates, removing the requirement for third parties to apply a Cardinal Spline algorithm

If you would like any further information on any of the changes being made to Met Office weather warnings, please contact your Met Office account manager or email [emergencysupport@metoffice.gov.uk](mailto:emergencysupport@metoffice.gov.uk)

**Figure 1:** Rain Warnings - An example of the probabilistic language and forecast impacts as they may appear within weather warnings

### Low likelihood of High impacts Rain

- Fast flowing or deep floodwater is possible, causing a danger to life
- Extensive flooding of homes and businesses is possible
- Damage to buildings and structures or building collapse might happen
- Road may potentially close, along with bus and train service delays and cancellations
- Dangerous driving conditions might occur, because of spray and flooded roads
- Loss of power and other essential services, such as gas, water or mobile phone services, is possible
- Communities could be completely cut off by floodwater, perhaps for several days

### Medium likelihood of High impacts Rain

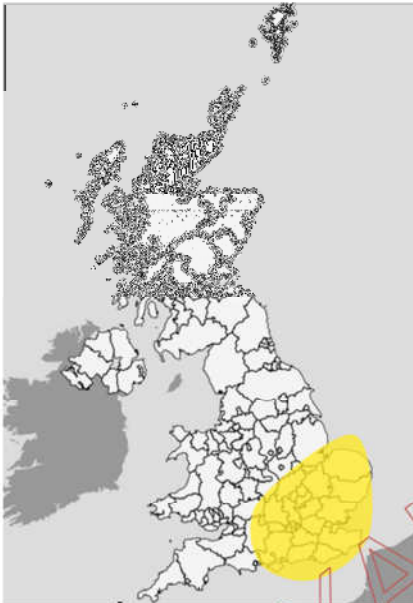
- Fast flowing or deep floodwater is likely, causing danger to life
- Extensive flooding to homes and businesses is likely, which could lead to collapsed or damaged buildings or structures
- Road closures and bus and train service delays and cancellations likely
- Dangerous driving conditions because of spray and flooded roads
- Power and other essential services, such as gas, water or mobile phone service, will probably be lost
- There is a good chance communities in flooded areas could be completely cut off, perhaps for several days

**Figure 2:** An example of how a thunderstorm warning will look when received by email (emergency responder service)

Met Office
National Severe Weather Warning Service

**Yellow warning  
Thunderstorm**

Between  
12:00 Mon 02 July 2018 and  
23:30 Mon 02 July 2018



**Although many areas will stay dry, heavy thunderstorms will develop later on Monday.**


**What to expect**

- Flooding of homes and businesses could happen quickly, with damage to some buildings from firewater or lightning strikes
- Fast flooding or close encounters in floods, causing a danger to life
- Where flooding or lightning strikes occur, delays and some cancellations to train and bus services are likely
- Spray and sudden flooding could lead to difficult driving conditions and some road closures
- Some communities might become cut off if roads flood
- Power cuts might occur and other services to some homes and businesses could be

**Further details**

Heavy showers and thunderstorms will develop on Monday afternoon across much of east and south-east England.

Many areas will miss the worst, and some may even stay dry. However, where showers do occur heavy rain, lightning, hail and brief periods of strong winds can be expected.



Low likelihood of Medium Impacts

Issued at 15:30 Sun 01 July, 2018  
 For enquiries regarding this warning please contact the Met Office Weather Desk  
 Phone: 0370 9000100 E-mail: enquiries@metoffice.gov.uk  
<https://www.metoffice.gov.uk/government/consultations/consultations>