

Thunderstorms north-east Scotland 11-12 August 2020

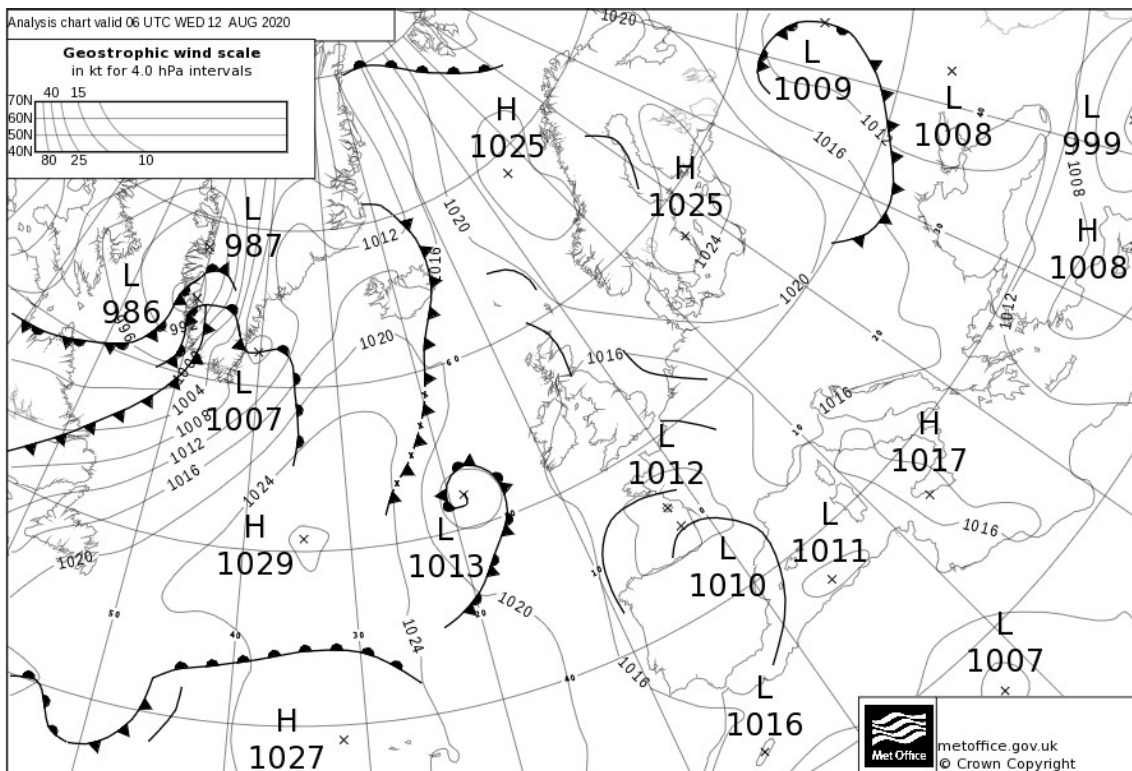
North-east Scotland experienced thunderstorms and torrential downpours during the evening of 11th August and into the morning of 12 August 2020. In places 30 to 50mm or more of rain fell within 3 hours or less.

Impacts

The torrential downpours caused widespread flash-flooding and disruption to the road and rail networks, with Falkirk, Fife, Perth, Edinburgh and the Aberdeenshire area all affected by flash-flooding. Several schools were closed across Aberdeenshire, and there were reports of lightning strikes. The very heavy rain from the thunderstorms seems likely to have been a factor in the landslide that caused train derailment at Stonehaven, which tragically led to three fatalities and a number of casualties.

Weather data

The analysis chart at 0600 UTC 12 August 2020 shows a line of convection associated with severe thunderstorms across north-east Scotland, with very humid, hot air across the south of the UK. Parts of southern England reached 34 to 35°C on both 11th and 12th August.

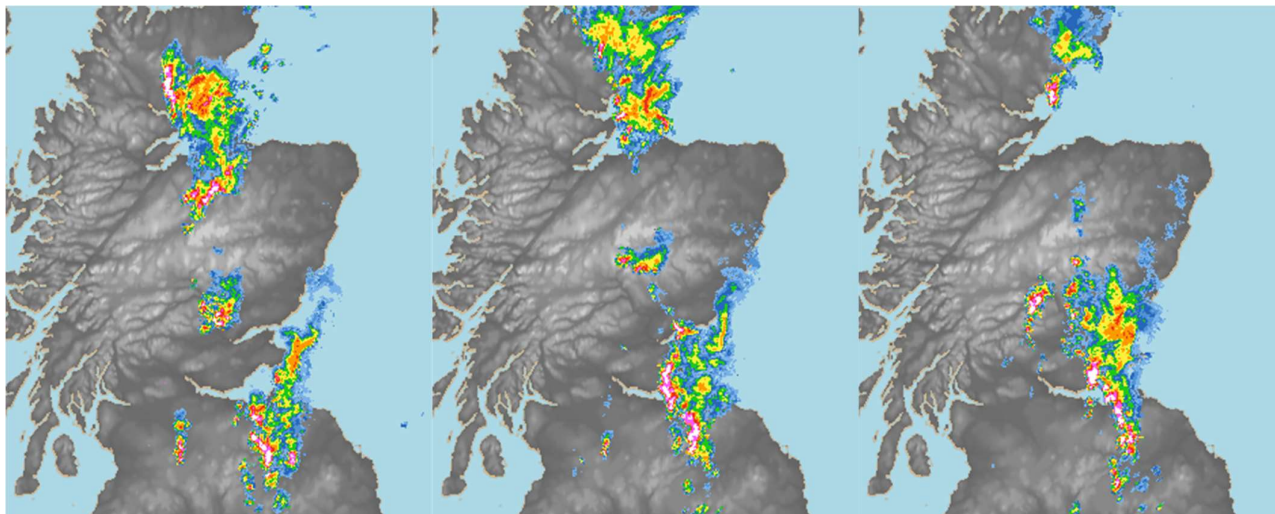


The sequence of rain-radar images at hourly intervals from 18 UTC 11 August to 09 UTC 12 August show torrential downpours in the Edinburgh area during the evening of the 11th moving northward across Fife before clearing Aberdeenshire during the morning of the 12th.

18 UTC

19 UTC

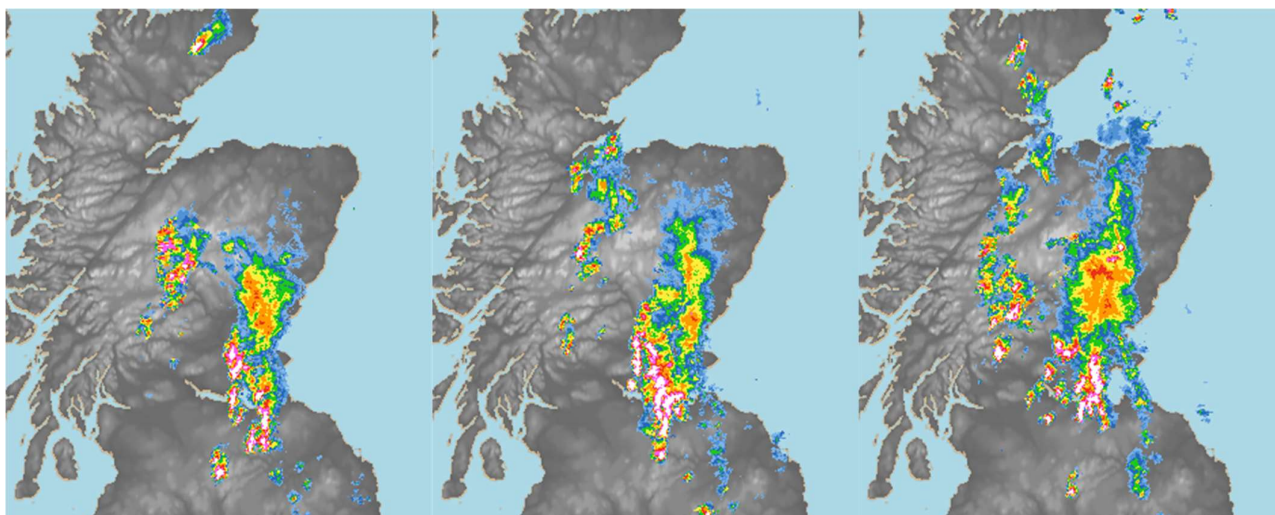
20 UTC



21 UTC

22 UTC

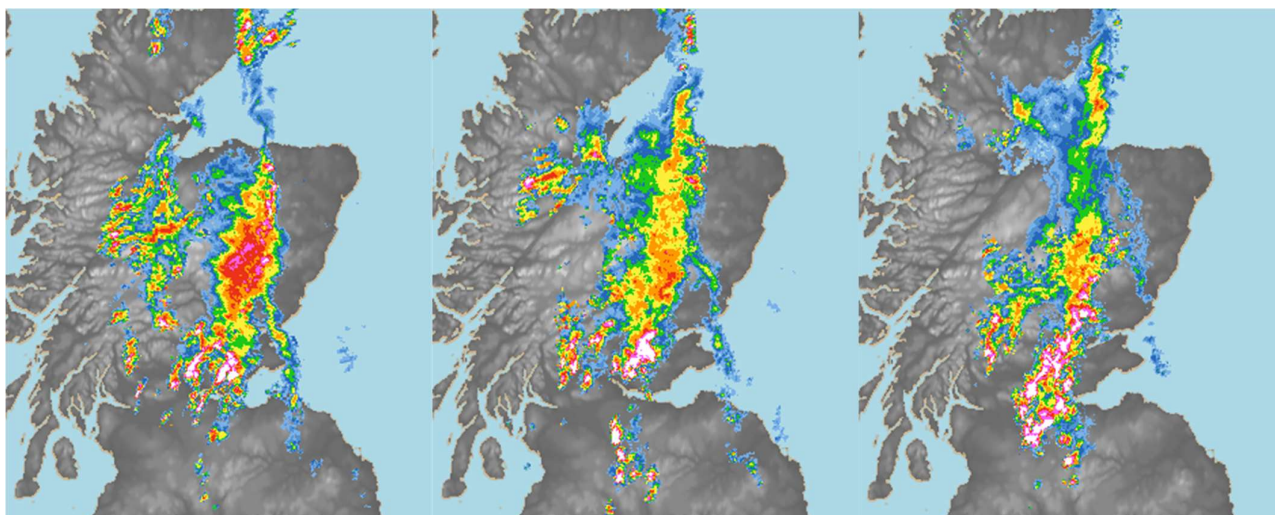
23 UTC



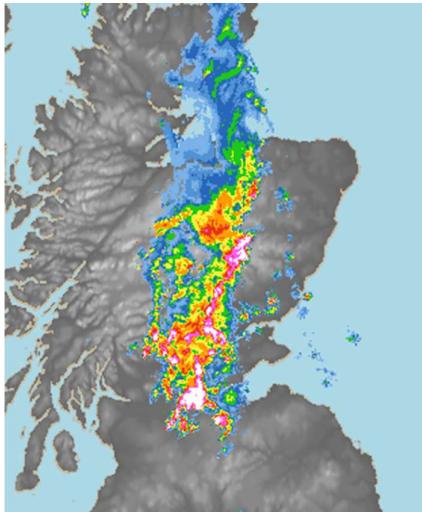
00 UTC

01 UTC

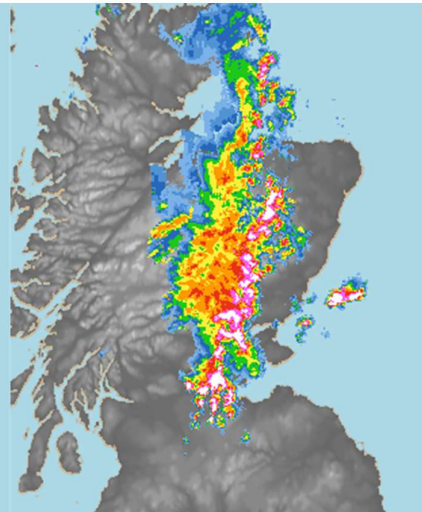
02 UTC



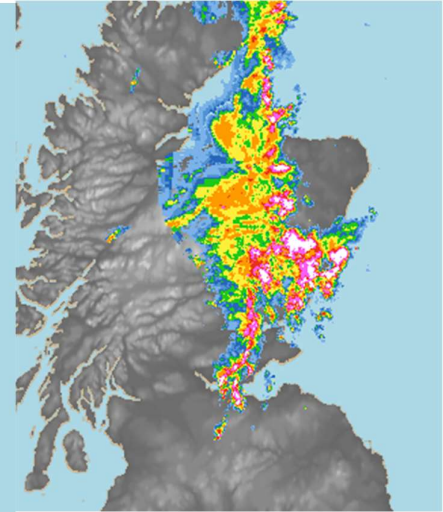
03 UTC



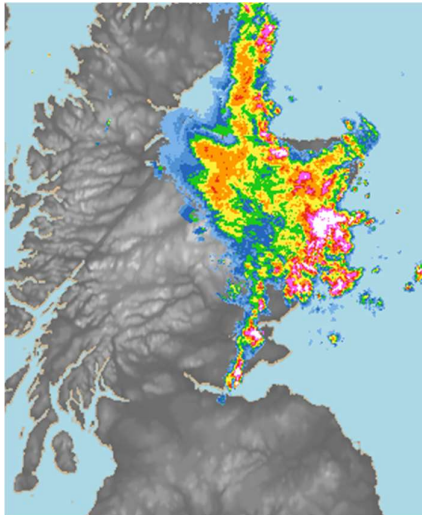
04 UTC



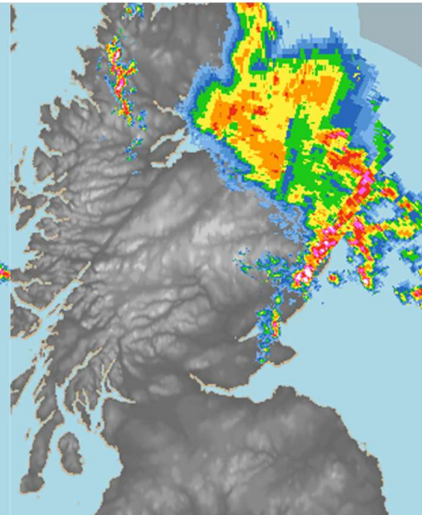
05 UTC



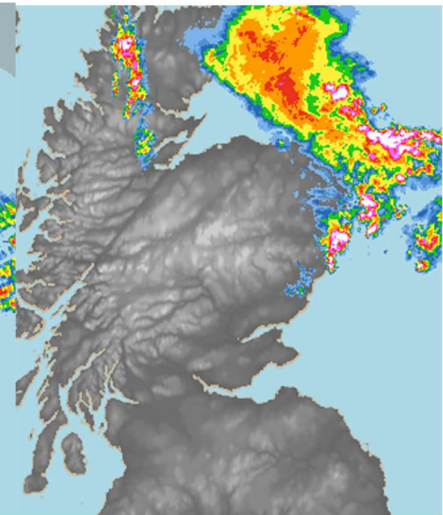
06 UTC



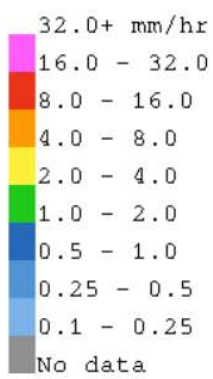
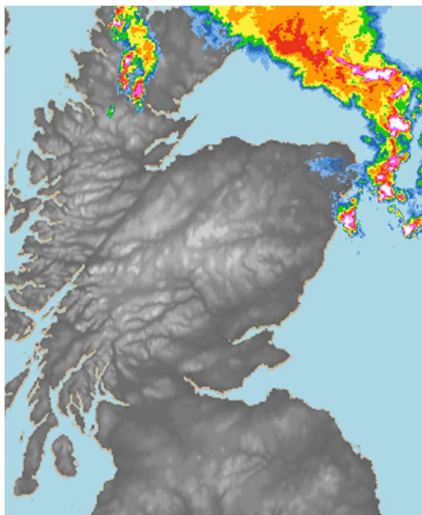
07 UTC



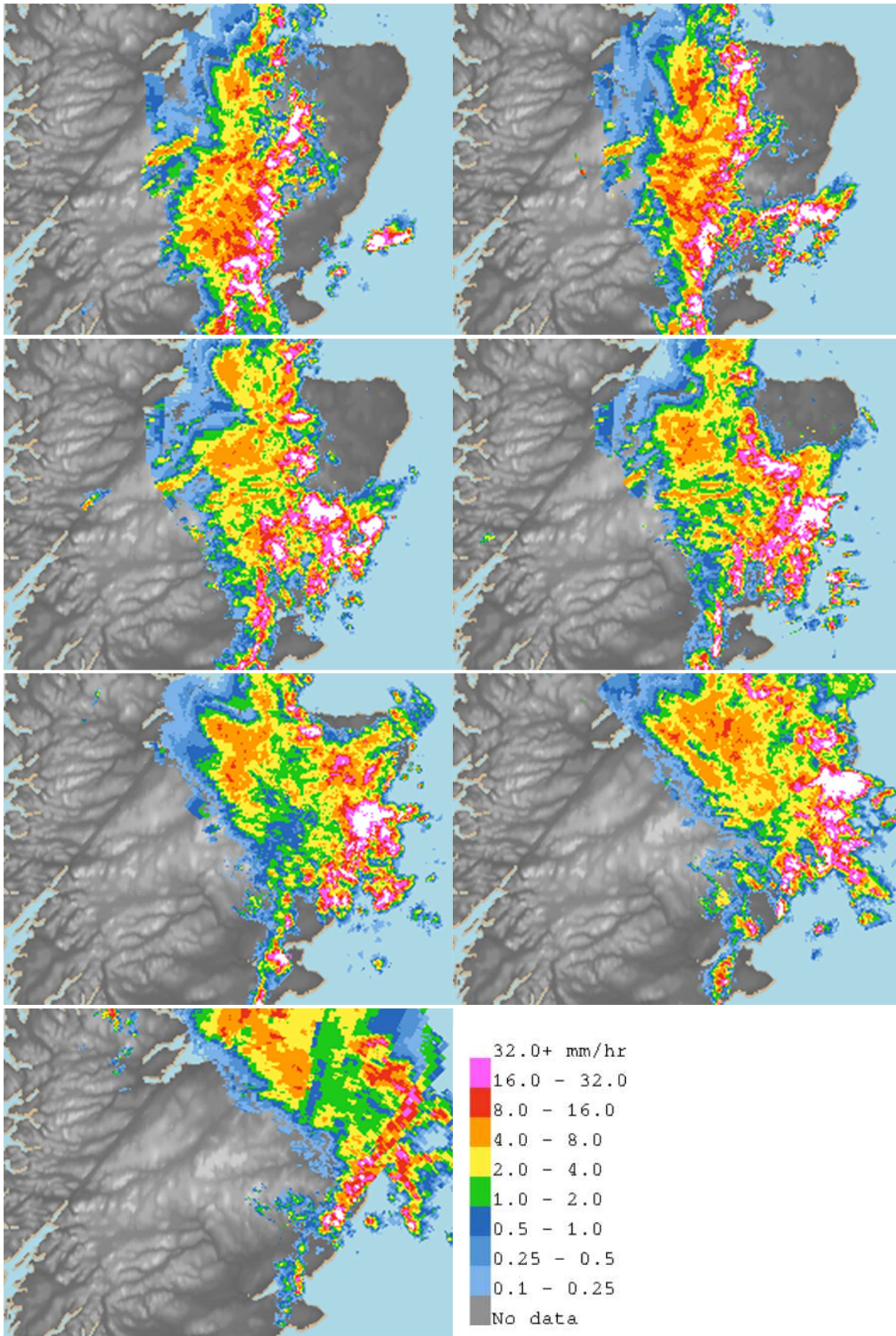
08 UTC



09 UTC

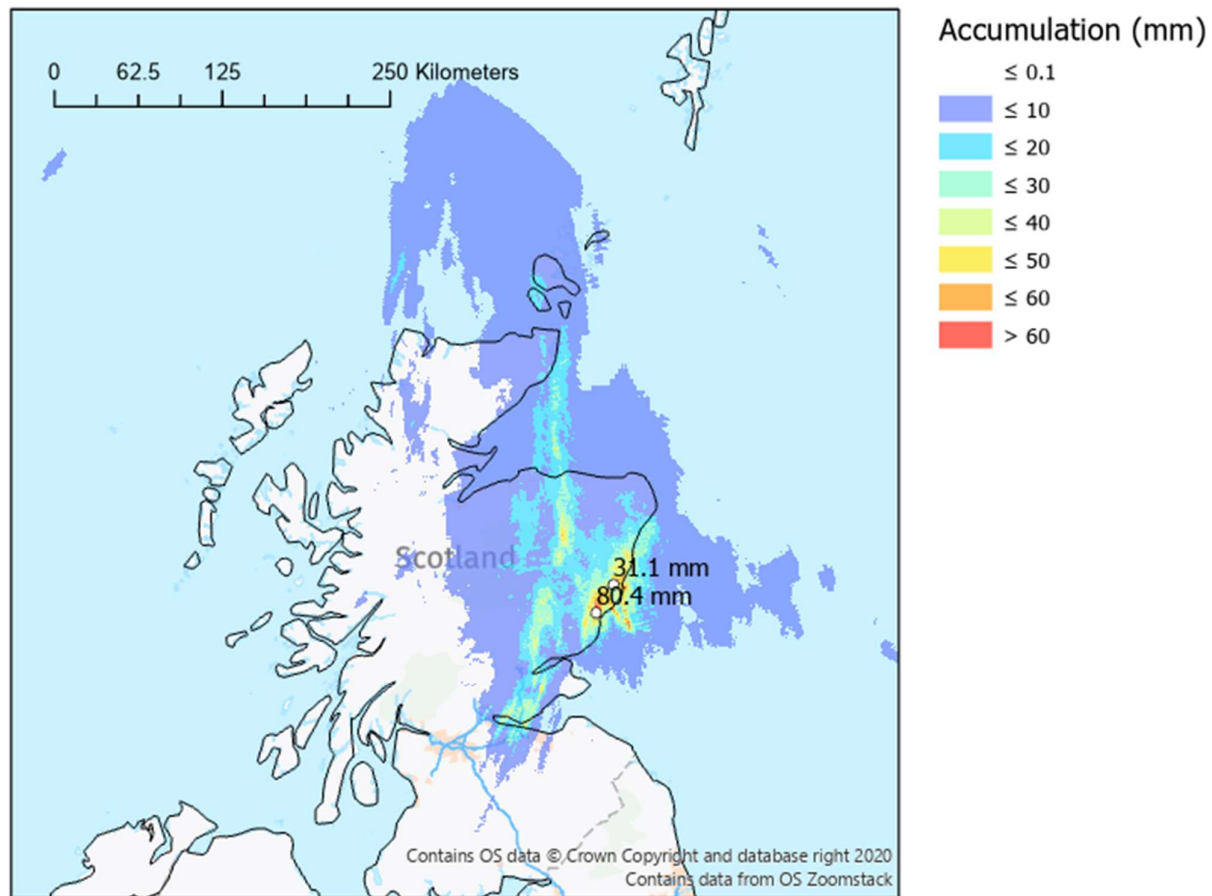


The sequence of rain-radar images at 30-minute intervals from 0400 UTC to 0700 UTC show the heaviest rainfall across Aberdeenshire during this period.



In an event such as this there may be a very large spatial variation in rainfall amounts across a relatively small area, and any network of rain-gauges will inevitably struggle to capture the detailed spatial rainfall pattern. The figure below shows estimated rainfall totals across Scotland from 0400

to 0700 UTC on 12 August 2020 (source: Met Office observations R&D). This period covers the most intense rainfall across the Aberdeenshire area. The rain-radar indicates 30mm or more falling widely across Aberdeenshire in around 3 hours with some locations recording 50mm+; in some location this approaching the August 1981-2010 long term average rainfall for the whole month.



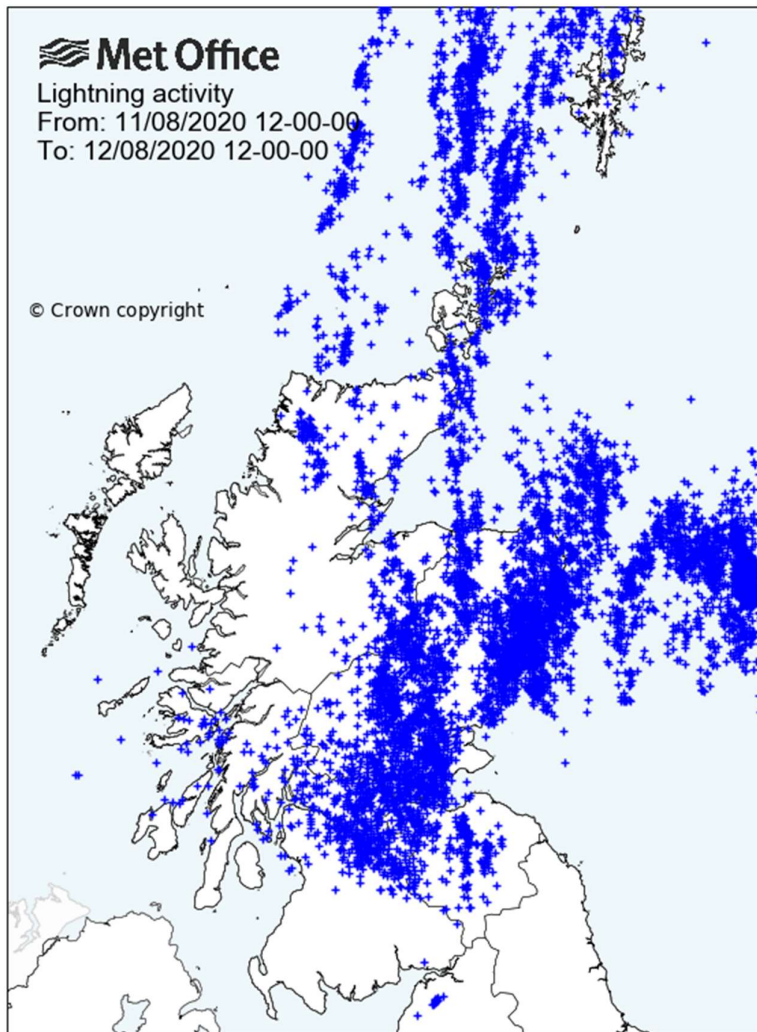
The table below lists the highest hourly rainfall totals recorded at Met Office stations in the area. A rain-gauge at Cheyne (Aberdeenshire) operated by the Scottish Environment Protection Agency (SEPA) and located close to Stonehaven is reported to have recorded 78.4mm in a three-hour period including 36.6mm in one hour, and other rain-gauges in the area indicate 30 to 50mm or more falling in the vicinity.

Station	Hourly total (mm)	Hour ending
Inverbervie (Aberdeenshire)	41.6	0600 UTC 12 August
Aberdeen, Craibstone	32.4	0700 UTC 12 August
Edinburgh Royal Botanic Garden	25.8	2300 UTC 11 August

The table below lists the highest daily rainfall totals recorded by the network of rain-gauges registered by the Met Office from 0900 UTC 11th to 0900 UTC 12th August 2020. These rainfall totals would typically represent approximately the whole-month August long-term average rain falling within the space of a few hours, or less. Several other rain-gauges in the network recorded over 50mm.

Station	Daily total (mm)	August 1981-2010 long-term average (mm)
Grangemouth Refinery (Stirling)	95.0	67.1
Perth, Norwich Union (Perth)	86.2	-
Stonehaven, Cheyne (Aberdeenshire)	79.0	-
Newton of Falkland (Fife)	77.2	-
Gilston (Mid-Lothian)	62.8	64.2
Kinross (Kinross-shire)	61.6	81.4

The map below shows lightning activity recorded across Scotland between 1200 UTC 11 August and 1200 UTC 12 August 2020.



Thunderstorms in the UK are very frequently associated with a break-down following hot, humid weather, with torrential downpours often accompanied by large hail and lightning strikes. Such events often result highly localised large rainfall totals of short duration. One example was on 28 June 2012, a day of severe thunderstorms across the UK with widespread flash-flooding, hail and lightning strikes across Wales and northern England. This event closed the West Coast main line due to a landslip near Tebay in Cumbria, and the West Highland line was blocked near Tulloch Bridge as a landslide derailed a freight train.

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