

Analysis of 2008-2012 rainfall in Ofcom regions

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Introduction and background

During 2012, Ofcom has received an increasing number of reports linking line outages and faults to heavy (or above average) rainfall. Ofcom have identified a need to verify this theory and to investigate whether this is becoming a more frequently occurring trend.

The report has been designed to mirror the 26 regions used by BT/Ofcom and all results have been presented to these areas. Each region has been assigned a number; and an introductory map provides the design of how these regions were assigned their number.

The methodology used to conduct this analysis has been outlined within this report to aid understanding of how figures have been derived.

As part of the analysis report, we have provided a series of maps to demonstrate the actual rainfall totals experienced in each region, annually. The report also provides maps that display the number of days that experienced rainfall over 10mm during the year, again arranged by the 26 regions. This allows a quick visual check of the wettest regions and conversely the driest ones too.

A graph for each region (26 graphs) plots monthly average rainfall anomalies and also days of rainfall anomalies of 10mm or more compared to long term averages. Each graph spans a timeframe of 2008-2012. The graphs provide a more detailed check for each region for 2012's rainfall compared to a baseline. By checking a region's graph it can be determined if 2012's rainfall was indeed above average or not.

Finally, we have provided a report on major flooding occurrences in 2012.

The supporting statistical data is enclosed as Annex 1 of this report and can be used for your further analysis.

Analysis of 2008-2012 rainfall in Ofcom regions

SOURCE DATA

The Met Office National Climate Information Centre maintain monthly, seasonal, annual and long term average climate grids for a number of climate variables. The process used to make these grids takes all the available station values (after quality control) and interpolates them onto a regular grid. The interpolation method takes into account topography, proximity to the coast and proximity to urban areas. The values on the grid represent each grid-box centre-point (rather than the grid-box mean). Further details can be found at the Met Office's methods and analysis webpage.¹

Monthly and annual series

The monthly (January 2008, February 2008 etc) and annual (2008, 2009 etc.) grids used here have grid spacing of 5 km. The climate variables used were "rainfall total", and "count of days with rainfall greater than or equal to 10mm" (often abbreviated to DR10). For rainfall total, 60 monthly grids and five annual grids were used. For DR10, 60 monthly grids were used, while annual values were calculated further on in the analysis (see Maps section).

Long term averages

Long term average values (LTAs) were used in the production of the graphs to calculate anomaly values. These put the period 2008-2012 into some historical context.

In this case the averaging period used was 1971-2000, and monthly averages were used. Thus for rainfall total, 12 grids were used – January [being the average of January 1971, January 1972, ..., January 2000], February etc. Similarly for DR10, 12 grids were used – January, February, etc. These long term average grids have grid spacing of 1 km.

PRODUCTION OF REGIONAL AVERAGES

For any grid, whether monthly, annual or LTA, regional average values are found using the same method. The method is to take the mean of the values for all grid-boxes with centre-points in a particular region.

MAPS

5 maps were produced for each of rainfall total and DR10. For rainfall, these show regional averages from the 5 annual grids (2008, 2009 etc.). For DR10, each shows the sum of 12 monthly regional averages (2008 = January 2008 + February 2008 + ...)

GRAPHS

26 graphs were produced – one for each region. These show monthly time series of anomalies for rainfall and DR10. For rainfall, percentage anomalies are used. An example calculation for May 2009 is given here:

```
RainfallAnomaly_{May2009} = \frac{(Rainfall_{May2009} - RainfallLTA_{May}) \times 100}{RainfallLTA_{May}}
```

Values of this quantity have a lower limit of -100% (representing no rainfall across the region for the whole month – which did not in fact occur) but no upper limit. A value of -50% would mean half as much rainfall as normal, while a value of +200% would mean twice as much.

For DR10, absolute anomalies are used:

DR10Anomaly_{Mav2009} = DR10_{Mav2009} - DR10LTA_{Mav}

Both quantities are shown on the same graph, with the rainfall anomaly shown on the left hand axis, while the DR10 anomaly is shown on the right hand axis.



London regions



Total rainfall maps









Days of rain over 10mm maps



Rainfall anomaly comparison graphs









- DR10

- DR10













Rainfall -

- Rainfall -







Forecast region 11



Forecast region 12

50 0 -50

-100

Jan-08 Jul-08 Jan-09

Jul-09

Jan-10

- Rainfall -

Jul-10 Jan-11

- DR10

Jul-11

Jan-12

Jul-12

Date











Rainfall anomaly (%)







Flooding major instances report

8TH JUNE 2012 – FLOODING FROM PERSISTENT RAIN IN THE ABERYSTWYTH AREA

Persistent heavy rainfall across mid-Wales during Friday 8th to early Saturday 9th June 2012 resulted in significant flooding in the Aberystwyth area. More than 1000 people were evacuated and 150 rescued, dozens of homes in several villages were flooded. The village of Pennal was evacuated due to concerns with the stability of a nearby dam. A number of roads, including the A487, were closed.

For more details of the impacts, see the links below:

Flood risk villagers continue with clean-up

Victims hoping for a return to homes

First minister praises rescuers bravery

The flooding resulted from localised persistent, steady rainfall from early Friday 8th to early Saturday 9th June. The rainfall was sustained at around 5 to 8mm per hour continuously for around 24 hours. The 34-hour totals to 0900 BST on 9th June represent more than the average rainfall for the whole month.

The flooding may have been exacerbated by the ground conditions which would have already been wet following earlier rainfall in the month. For the first 10 days of June, many stations have already received well above the average rainfall for all of June – and in some cases more than 150%.

10TH-11TH JUNE 2012 – HEAVY RAIN IN SOUTHERN ENGLAND

Following recent flooding across mid-Wales it was the turn of southern England to experience flooding problems from persistent heavy rainfall from Sunday 10th to Monday 11th June 2012. West Sussex and Hampshire were worst affected with more than



70mm of rain falling in a 16 hour period. The June average for this area is typically around 60mm. There were flooding problems on a number of main roads and several reports of flooded homes. However, the rainfall was not confined to southern England - there were also flooding reports in parts of Sheffield and Leeds, for example. The 11th was also a very cold day for June with daily maximum temperatures only around 11 °C in the rain affected areas – for Boscombe Down, Solent, Odiham and South Farnborough this was the coldest June day since 1989.

For more details of the impacts, see the links below:

Flooding and heavy rain warnings for England

Hampshire motorists freed from submerged cars

The flooding was associated with an area of low pressure running along the south coast of England. Both Shoreham Airport and Wiggonholt (West Sussex) recorded more than 70mm in the 36 hours from 1200 BST 10th to 0000 BST 12th June – with most of this falling within the 16 hours from 1200 BST 10th to 0400 BST 11th.

Many stations recorded more than 150% of the monthly average, and three in West Sussex more than 200%.

22ND JUNE 2012 – FLOODING FROM PERSISTENT RAIN IN LANCASHIRE AND WEST YORKSHIRE

Heavy rainfall for much of Friday 22nd June caused significant flooding across NW England. Lancashire and West Yorkshire were worst affected as around 500 properties were flooded by both surface water flooding and where rivers burst their banks. Locations affected included Darwen, Oldham, Wigan, Todmorden, Croston, Bacup, Mytholmroyd and Hebden Bridge. Roads were closed and trains services on the west coast main line were suspended due to flooding.

For more details of the impacts, see the links below:

Flooding hits northern England

Homes evacuated as flooding affects Croston and Darwen

Clear-up begins after flooding

The flooding resulted from persistent, heavy rainfall across north-west England for much of Friday 22nd June. 24-hour totals from 0900 BST 22nd to 0900 BST 23rd were typically around 50 to 80 mm – approaching the average for the whole of June – while 48-hour totals from 0900 BST 21st to 0900 BST 23rd approached or in some places exceeded 100mm.

With the exception of the far north-west of Scotland, June was a cold and very wet month, with the jet stream



displaced further south than would be expected at this time of year. Approximately 75% of the station networks recorded over 150% of the June average rainfall, and almost 50% recorded over 200%. Around 30 stations recorded over 250%.

28TH JUNE 2012 – WIDESPREAD THUNDERSTORMS AND TORRENTIAL DOWNPOURS IN THE MIDLANDS, NORTHERN ENGLAND, NORTHERN IRELAND AND SCOTLAND.

Thursday 28 June was a day of dramatic weather across the UK, as a series of major storms brought flashflooding and disruption widely across parts of central and northern England and Northern Ireland. The thunderstorms were associated with hot, humid air from a 'Spanish plume' ahead of frontal systems pushing in from the west. In the south-east, it was a warm, muggy day with the temperature reaching 28.4 °C at St James's Park, Central London and 28.6 °C at Gravesend, Kent.

Several distinct lines of thunderstorms developed during the day, one line originated in the Cardiff area of south Wales in the early morning, orientated in a SSW / NNE direction. This moved in a ENE direction across Worcestershire, Shropshire, the West Midlands and Leicestershire to clear Lincolnshire by late afternoon. A second line of thunderstorms, again orientated SSW/ NNE reached the Lancashire coast/Morecambe Bay area around late morning and moved in a NE direction to reach the Newcastle area later in the day, to clear the NE coast by late evening. Both of these lines of storms were associated with very intense rainfall, exceeding 20mm per hour, and vigorous lightning activity.

There were also torrential downpours across parts of Northern Ireland and western Scotland. Southern parts of England and Wales escaped.

The storms resulted in widespread impacts across swathes of central and northern England and Northern Ireland. Impacts included the following:

- In Shropshire, one man died after being swept away in a stream.
- There was widespread flash-flooding affecting roads (including the A1 in Newcastle) as drainage systems were overwhelmed by the intense rainfall. Cars were abandoned as streets became awash with water.
- Hundreds of properties across England and Northern Ireland were flooded.
- The East Coast main line was closed between Newcastle and Berwick due to landslides.
 The West Coast main line was also affected by a landslip near Tebay in Cumbria. The West Highland line was blocked near Tulloch Bridge as a landslide derailed a freight train.

- Over 40 schools were closed in the Newcastle, Northumberland and County Durham
- In north-east England, over 20,000 homes were without power due to lightening and flash flooding. In Northern Ireland, over 1000 homes lost power.
- In Leicestershire, golf-ball sized hailstones caused damage and were large enough to damage cars and greenhouses.

For more details of the impacts, see the links below. Note – there are many more available links relating to flood impacts.

Travel disruption to continue

North-east hit by travel disruption

Man found dead as downpours cause chaos

Landslides and rain disrupt rail services in Scotland

Leicestershire hit by strong winds, rain and hailstones

Northern Ireland flooding (note this relates to flooding in Belfast area on Wednesday 27th)

The very hit-and-miss nature of this event is apparent, with a number of stations widely in the path of these downpours receiving 20 to 30mm in one hour – while other nearby stations remained largely dry.

Highest 12-hour 09-21 totals were 46.2mm at Levens Hall, Cumbria and 35.8mm at Winterbourne, Warwickshire. It was not the overall totals that caused the disruption, rather the intensity at which the rain fell.

For several stations - such as Coningsby in Lincolnshire, Albemarle in Northumberland and Levens Hall in Cumbria, around 25mm fell within a space of around 30 minutes. At Cranwell, Lincolnshire, around 30mm fell within 1 hour.

6TH-7TH JULY – HEAVY RAIN AND FLOODING IN DEVON, DORSET AND ELSEWHERE

There was persistent heavy rain across much of central, eastern and northern England and parts of Wales during Friday 6th July with 40 to 50mm falling in the 24-hours between 0000 BST 6th and 0000 BST 7th. While there were no very large-scale flood incidents, there was disruption to transport networks and reports of a number of flooded properties in many widespread locations across the Midlands, parts of Wales and also southern Scotland. The flooding was exacerbated by the wet ground conditions from the exceptionally wet weather through all of June and early July. From Friday evening and through to mid-day Saturday 7th the focus of the heavy rainfall shifted to south-west England. Between 1800 BST 6th to 1200 BST 7th, 40 to 50 mm fell across parts of south and east Devon, representing



around the July average rainfall in only 18 hours, resulting in further flash-flooding. Several Environment-Agency rain-gauges in East Devon recorded over 100mm of rainfall, or more than twice the July average, in a 33hour period.

There were reports of flooded properties in many parts of the UK – including Lincolnshire, Derbyshire, Leicestershire, Nottinghamshire, Staffordshire, parts of Wales and southern Scotland – particularly the Edinburgh, Lothian and Borders area. Roads (including a section of the A1) were affected by flooding very widely. In south-west England, the worst affected areas included South Hams (south Devon), and the Otter and Axe Valleys in East Devon, where dozens of properties were affected by flash-flooding – for example in Ottery St Mary and Otterton, Modbury and Yealmpton. There were also land-slips on the cliffs at Lyme Regis, Dorset.

For more details of the impacts, see the links below. Note – there are many more available links relating to flood impacts.

- Flooding and rain persist in UK
- Flooding hits parts of Scotland
- Severe flood warning in SW England
- Weymouth Olympic site flooded
- Mudslides at Lyme Regis

Hosepipe bans - restrictions lifted

For the 24-hour period 0000 BST 6th to 0000 BST 7th July 2012, rainfall totals were recorded of 35 to 40mm or higher across parts of North Wales, the Midlands and the south Pennines. The highest totals included 56.6 mm at Emley Moor, and 52.6 mm at Ryhill, both West Yorkshire, each of these exceeding the average rainfall for the whole of July.

The rainfall totals across the south-west for the 18-hour period 1800 BST 6th to 1200 BST 7th included 53.8mm at Dunkeswell, Devon, 45.2mm at Isle of Portland, Dorset and 43.6mm at Exeter Airport - each of these being more than the July average for the whole month. Three Environment Agency rain-gauges located in the Axe Valley, East Devon at Raymonds Hill, Goren and Wilmington, recorded over 100mm, more than twice the monthly average rainfall, in the 33 hour period from 1300 BST 6th to 2200 BST 7th July.

5TH AUGUST 2012 – WIDESPREAD TORRENTIAL DOWNPOURS 5TH AUGUST 2012

Torrential downpours associated with thunderstorms on Sunday 5th August resulted in local flooding problems in parts of the UK. There were reports of flash-flooding in southern Scotland, north-west and north-east England, Wales and south-west England. For more details of the impacts, see the links below:

Flood alerts remain in parts of the UK

Clear up in Scotland as flood alerts continue

The heavy showers were associated with an area of low pressure over the UK. Because of their slow-moving nature, some places received 20 to 30mm within an hour, whereas other locations remained dry. Hailstones were also reported in a number of locations.

A Met Office gauge at Bradford recorded 34.4mm within the hour to 1700 BST on Sunday 5th August. Other MO gauges recorded much lower hourly totals. However, the hit-and-miss nature of the showers, and the density of the MO gauge network means that in most instances the rain-gauge network did not capture the highest totals. Environment Agency rain-gauge at Ashcombe, Devon reported 40.5 mm in the hour, 74.5 mm in 3 hours, 93.5 mm in 6 hours.

The impacts reported were mainly been due to the intensity of the rainfall, rather than the overall totals. This would have overwhelmed drainage systems, resulting in surface water flooding. This type of flooding may often be exacerbated both by large areas of hard-standing (tarmac, concrete etc) in urban areas, and also local topography (e.g. flood-waters running down a road).

The overall impacts of the flooding were not as severe as those that from the thunderstorms of Thursday 28th. Hourly totals from this event were again typically 20 to 30mm, but overall 28th June was a day of more exceptional weather.

23RD-26TH SEPTEMBER – AUTUMN STORM 23RD TO 26TH SEPTEMBER 2012

From Sunday 23rd to Wednesday 26th September an unusually deep vigorous low pressure system affected the UK. This autumn storm brought widespread heavy rain accompanied by strong winds and resulted in numerous impacts – including localised flooding accompanied by winds which were strong enough to bring down trees in some areas (still in full leaf at this time of year).

The storm originated as a low pressure system to the west of Spain, drawing in warm, moist air from exhurricane Nadine, before tracking north-east toward the UK from 22nd to 23rd. The system then became slow moving and centred over the UK from 24th to 26th before slowly filling. The lowest pressure recorded was 974.2 mb – to find a compatible low pressure system such as this it is necessary to go back to September 1981.

The storm brought widespread impacts with flooding reported across many parts of the UK. On Monday

24th there was transport disruption in Devon and Cornwall, reports of flooding around Somerset/Bristol/ Gloucestershire and a number of homes were evacuated in the Merseyside area. On Tuesday 25th there were more widespread flooding problems across much of north-east England and eastern Scotland accompanied by very strong winds in these areas. Flooding problems were also reported across parts of north-west England, Wales and the Midlands (for example, Shropshire), mainly affecting transport (roads and railways).

One of the worst affected areas was north-east England, with hundreds of homes evacuated in Morpeth, Gateshead, County Durham and Sunderland and a row of houses at risk of collapse. The A1 was affected by flooding problems in Northumberland and North Yorkshire and numerous other roads were also flooded. The east coast main line was affected by flooding in the Darlington area. The North sea coast of north-east England and eastern Scotland was affected by large waves while there were reports of fallen trees in the Lothian and Borders areas, Aberdeen, Edinburgh and Dundee. Power cuts affected hundreds of homes in eastern Scotland and there was disruption to ferry services. Rainfall totals were also very high across Northern Ireland, although little flooding was reported here.

Fortunately, up until this event September's weather had been relatively quiet and dry with well below average rainfall for the month from 1st to 22nd. This provided an opportunity for the ground to dry out following the exceptionally wet weather of summer 2012.

For more details of impacts, please refer to the following links:

Hundreds of homes evacuated as downpour continues

Storms continue to cause havoc

Severe weather in Tyne and Wear

Gales hit Scotland

More than a month's rain in Northern Ireland

From 0000 BST Saturday 22nd September to 0600 BST Wednesday 26th September weather data showed the low pressure system originating from ex-hurricane Nadine, and tracking north-east before becoming 'stuck' over the UK

Daily rainfall totals 0900-0900 BST Sunday 23rd September (i.e. 24 hours to 0900 BST 24th) were around 40 to 60mm – in places over 70mm – in a swathe from Devon, Somerset, Gloucestershire to central Wales – most of this falling overnight 23rd/24th.

Daily rainfall totals 0900-0900 BST Monday 24th September (i.e. 24 hours to 0900 BST 25th) were

around 50 to 70mm across parts of the North Pennines (including 97.8mm at Ravensworth (North Yorkshire)) orographic enhancement would have had a significant effect. Totals were also widely over 50mm across Northern Ireland with 87.2mm at Killylane.

Daily rainfall totals 0900-0900 BST Tuesday 25th September (i.e. 24 hours to 0900 BST 26th) showing yet another 20 to 30mm of rain falling in a swathe from the North York Moors through North-West England to much of Wales.

During a 72 hour period 0900 BST 23rd to 0900 BST 26th September a broad swathe from the North York Moors, North Pennines, North-West England to North Wales and also the east of Northern Ireland received over 80mm with some locations approaching 100mm – in many locations this was well over the average rainfall for the whole of September – and in places, over 150%.

Ravensworth, North Yorkshire, recorded 130.8mm, 166% of the September average rainfall within a 52 hour period from 22 BST 23rd to 0200 BST 26th September 2012.

On 23rd September, winds gusted at over 40 Knots (46 mph) along the south coast and the East Anglia coast. On 24th gusts exceeded 40 Knots widely with 61 Knots (70mph) at Warcop Range, Cumbria and 54 knots (62 mph) at Edinburgh Blackford Hill. On 25th, winds were still gusting widely at over 40 Knots in exposed coastal locations but with the east coast of Scotland bearing the brunt: Inverbervie recording a gust of 63 Knots (72mph) and Peterhead Harbour 60 Knots (69 mph) (both Aberdeenshire). Winds were gusting at over 40 Knots in inland parts of southern and eastern Scotland - sufficient to fell some trees. Coastal areas of Northern Ireland also experienced gusts of 40 to 50 Knots.

The heavy rain also suppressed temperatures, which were at times notably low for the time of year. On 23rd, daily maximum temperatures struggled to reach 10°C across much of the Pennines and central Wales, while on 24th, daily maximum temperatures again remained below 10 °C across southern Scotland, Northern Ireland, and parts of the Pennines and Wales (you would normally expect around 13 to 15 °C in these areas at this time of year).

The lowest pressure recorded during this event was 974.2 mb at Loftus (Cleveland) at 0600 BST on Tuesday 24th September – unusually low for the time of year. While pressures as low as this have been recorded on a number of other occasions in September, the majority of events have been across northern Scotland, or otherwise confined to a smaller portion of the UK (e.g. Cornwall, Scilly and Channel Islands). For a comparable event, where the pressure has more widely fallen below 975 mb – for example across much of northern England and Scotland – it is necessary to go back to 19 September 1981 – although arguably the 1981 event was more extreme in terms of low pressure.

20TH-26TH NOVEMBER 2012 – HEAVY RAIN AND WIDESPREAD FLOODING FROM A SEQUENCE OF LOW PRESSURE SYSTEMS

Prolonged heavy rain fell across much of south-west England overnight 20/21 November 2012 from a front/ wave associated with an area of low pressure. Around 40 to 50mm fell across a 12-hour period – notably wet but not exceptional. However, with the ground already saturated, there were widespread flooding problems, particularly to transport routes with flooding of roads and landslips. The Exeter to London Great Western railway line was also closed. Most dramatically, a bank of the Great Western canal collapsed near Tiverton, draining the canal into the surrounding land. The worst affected counties included Devon, Somerset and Gloucestershire. Some of the flooding problems were likely to have been exacerbated by autumn leaves and other debris blocking drains, and there were also more intense bursts within the overall event. The rain was accompanied by some strong winds, gusting at 40 to 50 Knots in exposed locations along the south coast.

For more details of impacts, please refer to the following links:

Heavy rain causes flooding in west of England

Devon villages cut off after flooding

Heavy rain causes floods in Midlands and south-west

A particularly active cold front brought further heavy rain sweeping across the UK during 22 November. Although overall totals were not exceptional, the rain fell on already saturated ground and included some short, very intense bursts. Much of south-west England recorded another 20mm of rainfall, while parts of North Wales and Cumbria recorded around 40mm. There were further widespread flooding problems and travel disruption occurred across south-west England, the Midlands, Wales, Cumbria and Scotland. The passage of the front was accompanied by very strong winds, gusting at 40 to 50 Knots (46 to 58 mph) widely across inland locations, and 50 to 60 Knots in exposed coastal locations. Max gusts included 75 Knots (86mph) at Capel Curig, Gwynedd, 61 Knots (70 mph) at St Marys, Isles of Scilly, and 59 Knots (68 mph) at Emley Moor, West Yorkshire.

Roads and rail services – including both main railway lines from the south-west to London – were closed due to flooding and landslips. In Exeter, a large retaining wall collapsed. In Plymouth, there was some structural damage reported due to high winds. There were reports of fallen trees and structural damage to buildings in the West Midlands. Roads were affected by flooding across north Wales and in Llanberis (Gwynedd) around 100 homes were affected by flash-flooding. There was further flooding reported in Ulverston, Cumbria and parts of Dumfies and Galashiels.

For more details of impacts, please refer to the following links:

Torrential rain and wind cause UK flood havoc

Somerset flooding: man dies as car trapped in floods

West Midlands: Weather damage clear up begins

Clean-up gets underway in Wales

Mop-up underway after flooding and heavy rain across Scotland

Rainfall totals at Capel Curig (Gwynedd), Mona (Anglesey), Walney Island and Shap (both Cumbria) stations recorded around 35 to 45mm in 12 hours between 0900 GMT and 2100 GMT on 22nd.

After a brief respite, with lighter winds and in many areas an early-morning frost, another low-pressure area moved up from the south-west on Saturday 24th. Rain persisted all day across much of southern England, and pushed up into the Midlands and north-east England through the day. More than 50mm fell widely, and with the ground already saturated there were major flooding problems. Devon and Cornwall were among the worst-hit areas, but there were problems elsewhere too. Both main railway lines out of Exeter were closed by floodwaters and numerous roads were closed including the M5. Hundreds of homes were flooded, with locations affected including Helston (Cornwall), Kennford (Devon), Malmesbury (Wiltshire), Kempsey (Worcestershire), and parts of Somerset and Gloucestershire.

Aerial views show flood-hit Exeter

Two killed as wind and rain batter Britain

As it happened - England and Wales flooding

The system brought very strong winds in its wake, gusting at around 40 to 50 Knots (46 to 58 mph) across south-east England. Showers followed on Sunday 25th, which merged into longer spells of rain in places as another, albeit less vigorous, depression moved in from the west. By 0900 GMT on Monday 26th, many places along a line from Devon to Humberside had had over a month's worth of rain in the space of a week.

Arriving in quick succession after the previous system, the next system brought lighter, more showery rain



across the worst-hit areas of south-west England but more persistent, heavy rainfall across much of northern England and north Wales from late on Sunday 25th. Around 30 to 50mm of rain were recorded in these areas – not exceptional totals in themselves but causing further significant flooding problems on top of all the previous rainfall.

Properties at a number of locations in North Wales were affected by flooding, including St Asaph (Denbighshire), with roads and rail services affected in Conwy and Denbighshire. Parts of Newcastle and a hospital in Northallerton were affected by flooding. Across northeast England, further roads were closed and rail services affected – including the East Coast main line near Darlington – while the level of the River Ouse in York was being carefully monitored.

Rain brings fresh flooding risk to England

Wales floods: hundreds told to evacuate homes

UK: flooding continues to threaten homes

Over the 8-day period from Monday 19th to Monday 26th November 2012 inclusive most of England and Wales recorded over 75mm, a large swathe from southwest England through the Midlands and Wales to northern England over 100mm, and a few locations over 150mm. These accumulations were due to successive low pressure systems and associated fronts affecting England and Wales on 20/21st, 22nd, 24-25th and 26th November 2012. Parts of southern Scotland – particularly the Glasgow area - had also recorded around 50mm on 18th which caused some flooding problems, but fortunately Scotland escaped the subsequent wet weather. The flooding which resulted was exacerbated by already very wet ground conditions following the exceptionally wet weather from April to July 2012 - while August and October were also wetter than average in many parts. In terms of overall impacts, around 1000 properties were flooded during the week (compared with c. 50,000 properties during the summer 2007 floods). The Environment Agency described these as the worst floods in the south-west since the autumn of 2000.

The hourly rainfall accumulations for Exeter Airport from 19th to 26th November 2012, shows a sequence of rainfall events. For the two main events, 64mm fell in 33 hours to 1000 GMT on 21st, and another 48mm fell in 18 hours to 0100 GMT on 25th

For England and Wales, and south-west England and south Wales, the 7-day period from 20-26 November (and 19-25 November respectively) was provisionally the second wettest week in the last 50 years, behind only a spell from late October to early November 2000.

19TH-20TH DECEMBER 2012 – WIDESPREAD HEAVY RAIN FROM ATLANTIC FRONTS

After a settled and cold spell, by 14th December 2012 it began to turn much more unsettled again. There was a particularly wet spell of weather on 19-20 December 2012 as Atlantic fronts brought prolonged heavy rain to much of the UK. These fronts were associated with a large area of low pressure to the west of the UK, bringing mild but very wet conditions. In the 48 hours from 0900 GMT 19th to 0900 GMT 21st December 2012, around 50mm of rain fell across parts of Cornwall, Hampshire, south Wales, northern England and eastern Scotland. Although totals were not exceptional, the rain fell on saturated ground, resulting in further widespread flooding problems - many affecting the road network due to surface run-off from surrounding land. Fortunately neither of the rainfall totals were as high or the flood impacts as severe as those experienced during an earlier wet spell in late November.

A series of active depressions brought further problems over the next few days, with any drier interludes (such as 21st December in the south-west) too short-lived to allow much benefit in terms of drying out.

Despite a relatively dry start to the month, rainfall totals for December were already well above average across many parts of the UK and it had been a particularly wet month in parts of eastern Scotland and north-east England. Annual rainfall totals from 1st January to 20th December 2012 showed that many locations recorded well over 130% of the annual average, with Durham recording over 150% – making this easily the wettest year in Durham in records from 1880. Only 56mm of the 983mm annual total fell between January and March 2012 – with 927mm falling in the 9 months from April to December 2012.

For more details of impacts, please refer to the following links:

Wallington evacuated as heavy rain hits England

Worcestershire flood defences up as heavy rain forecast

<u>Clean up after 'perfect storm' batters</u> east coast of Scotland

At 1800 GMT on Thursday 20 December 2012 there was low pressure and associated fronts that brought heavy rain to many parts of the UK. This fell as snow over the high ground of north-east Scotland – combined here with a wind gusting at up to 50 Kts in exposed coastal locations, causing some coastal problems. Elsewhere, conditions were generally mild. Annex 1

- Rainfall amount
- -Days of rainfall ≥ 10 mm

Rainfall amount

Forecast area	2008	2009	2010	2011	2012	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08
Forecast Area 1	2011	1951	1371	2267	1742	306.788	228.893	208.574	107.282	22.9204	119.485	100.661	134.475	112.562	291.115	214.194
Forecast Area 2	1224	1314	1114	1287	1200	220.022	84.1737	102.613	95.7167	29.8489	79.7927	91.3942	138.051	75.0964	132.574	81.0705
Forecast Area 3	1677	1600	1181	1778	1658	273.298	118.81	151.342	83.8032	27.733	109.845	130.427	192.445	127.063	244.244	95.1781
Forecast Area 4	1050	889	798	761	1161	155.945	39.5656	79.6516	86.3673	22.4483	85.1421	122.101	124.557	125.129	83.0197	63.4157
Forecast Area 5	973	791	682	649	1087	160.08	39.9625	84.9959	69.1853	30.2467	68.452	101.012	108.571	97.3369	83.7535	70.268
Forecast Area 6	1205	969	819	974	1316	181.287	52.3492	98.8409	80.0173	44.7074	74.1761	121.355	116.534	129.19	151.904	72.1906
Forecast Area 7	1000	760	718	750	1050	134.85	39.1343	70.7406	77.6868	43.9772	78.5188	89.198	88.7521	123.339	141.943	55.3644
Forecast Area 8	1639	1516	1085	1580	1718	255.746	90.1882	129.018	74.3473	28.4579	122.625	148.486	172.721	151.347	261.105	97.185
Forecast Area 9	1421	1195	930	1032	1435	204.25	69.4011	128.154	88.5411	52.6154	80.7365	124.065	138.576	137.498	200.958	111.131
Forecast Area 10	892	727	580	468	947	104.197	32.4037	72.5571	63.8615	65.688	36.9113	93.4159	95.6616	121.312	73.6152	81.4376
Forecast Area 11	806	706	592	505	945	106.135	30.5384	67.9	60.5212	47.5783	42.0729	74.9457	85.1695	100.489	74.6278	69.0031
Forecast Area 12	1636	1563	1152	1263	1705	234.359	73.4502	144.942	79.2052	80.0319	81.2056	171.062	220.035	153.557	189.66	127.473
Forecast Area 13	938	777	617	564	1069	114.569	31.4967	88.8881	56.2374	85.5026	46.1939	109.239	102.2	109.747	58.2684	84.6288
Forecast Area 14	801	635	581	451	889	87.0944	23.91	76.9195	49.0432	82.9	54.6696	80.3509	91.3624	84.2552	51.4486	80.2683
Forecast Area 15	910	809	654	662	1047	117.959	29.2527	97.6416	62.0299	83.5624	54.3968	95.1871	88.1557	76.7153	65.5196	84.9261
Forecast Area 16	967	942	722	725	1203	119.79	35.8163	103.306	62.7071	97.8943	51.424	99.2425	87.0649	79.7422	86.6378	90.439
Forecast Area 17	1285	1256	934	973	1502	145.156	53.0139	126.835	67.8759	107.024	48.7314	165.426	146.013	109.633	136.795	92.7717
Forecast Area 18	775	785	711	570	868	100.696	24.0318	85.7182	57.8811	87.5545	25.1103	52.8983	61.1236	67.6642	67.2285	118.06
Forecast Area 19	905	939	815	700	1083	115.287	29.4601	92.4098	71.0209	89.3617	35.8408	67.4202	83.0107	82.5262	74.8688	113.846
Forecast Area 20	701	713	589	532	823	79.8171	17.1283	85.4422	59.8843	68.5979	32.5823	63.9125	61.7122	52.9855	48.3486	84.2961
Forecast Area 21	601	645	542	494	799	65.4955	9.76216	68.201	52.8533	78.2271	29.198	53.6406	57.6071	44.8061	41.5208	69.354
Forecast Area 22	674	690	569	538	849	83.3089	15.6328	75.7468	51.7116	75.2584	36.7407	67.1128	70.666	46.142	50.5205	63.903
Forecast Area 23	661	699	609	532	930	76.2076	12.793	74.4648	56.0035	82.9122	31.4574	60.9325	70.9072	51.2711	49.2125	67.7457
Forecast Area 24	692	587	595	433	777	71.7165	21.052	81.7582	45.4023	57.8623	48.3562	53.8833	81.9225	54.1038	64.0507	81.9226
Forecast Area 25	607	617	544	488	749	65.799	12.8312	71.5421	44.7717	85.5241	27.6825	53.1176	65.3117	41.2739	45.7487	78.6803
Forecast Area 26	683	636	559	473	790	74.2397	15.8152	84.1889	47.9539	81.7385	37.1683	59.8637	79.143	50.2946	50.0944	79.1068

Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10
163.951	199.149	119.53	208.905	97.9905	143.622	76.2834	147.766	224.098	164.499	202.156	276.33	100.253	95.9142	84.138	112.558
96.9484	106.383	66.6465	83.332	49.727	96.1064	73.7319	146.417	120.892	102.273	152.31	200.522	97.3307	100.324	88.8722	72.11
125.958	165.092	44.6606	111.201	80.0372	109.508	59.8876	172.338	235.458	92.4401	125.158	290.573	112.155	81.1329	73.6218	114.924
69.2078	67.9327	48.4772	34.7281	35.8788	53.8707	63.4626	147.541	65.2741	35.803	65.9345	177.436	94.8791	74.882	73.7935	76.8077
61.6479	59.6334	41.4654	34.8137	28.4593	71.6911	55.7157	127.555	61.3233	28.784	62.0552	149.587	76.2148	59.1717	66.2457	55.2418
85.7488	73.2486	31.1097	53.4083	41.401	90.8118	70.4512	171.328	60.7298	50.4754	63.9039	175.041	89.6278	67.0006	70.6109	62.4209
62.9616	58.8457	16.9058	30.8181	40.6628	67.5602	46.6279	119.626	51.5498	34.4878	59.8556	152.803	80.1304	63.4609	52.5465	48.3943
114.795	158.545	30.261	81.491	53.7667	114.689	62.5033	197.96	163.489	66.6405	119.414	343.368	126.491	69.4582	56.9315	93.4846
80.9513	122.68	28.0208	54.8793	63.0237	81.0518	69.8987	168.088	79.4235	45.2702	99.3663	267.505	121.446	83.8171	52.373	68.8487
50.9437	62.1686	32.2079	28.314	46.2337	53.8154	106.055	123.019	44.7347	18.9801	51.1815	104.037	58.5712	56.1732	45.0369	39.7249
50.2955	60.2147	33.6738	30.3127	35.6857	56.2065	65.1146	131.698	53.7039	22.6512	50.321	102.826	63.681	52.3992	51.0636	45.1922
89.7358	190.532	39.3469	64.5963	83.4581	87.8846	83.1845	270.229	98.4869	46.7166	141.984	301.438	165.308	107.689	63.8914	117
51.9244	71.3578	49.8429	29.8692	46.011	43.0389	72.0523	123.07	47.3896	18.6309	57.0119	152.704	71.7454	68.0743	53.9018	48.1268
40.4772	49.709	52.9459	23.8722	34.6893	40.7009	58.8422	95.1091	54.2728	16.4369	41.0994	101.055	68.6874	56.5204	63.4738	41.1611
54.1933	80.4766	65.5394	37.689	40.4808	38.7761	36.7161	101.684	45.7897	24.838	62.0603	176.364	101.162	73.2318	83.7594	54.0954
53.3628	103.112	77.6124	50.9472	46.6228	29.5176	41.31	100.248	54.9788	30.8742	87.4021	194.825	128.54	76.2185	85.5505	68.9001
88.4731	145.465	79.0495	62.8612	77.1151	63.56	50.2998	210.052	65.0533	40.9061	106.018	236.896	121.133	99.057	92.2041	83.0104
30.4491	92.8345	66.1618	36.7757	34.192	32.7423	31.3461	71.4288	20.0561	26.5983	67.8145	197.253	116.648	60.6159	116.192	58.5142
49.9857	113.038	71.0077	41.8568	48.82	45.1135	26.0917	85.8029	33.3722	29.9971	79.393	229.945	135.416	100.508	119.105	69.1437
43.5573	77.0679	64.9848	36.8276	29.9189	37.7937	37.6371	72.8987	32.4746	32.0644	36.4873	159.12	90.5937	55.7221	99.5552	40.8419
28.8807	65.6008	58.6225	29.9436	25.5632	27.8766	45.4928	65.0465	36.2539	38.1658	30.8667	138.413	75.6273	47.2251	93.7987	29.9639
40.2433	68.3036	68.3716	29.5922	32.6595	36.5916	45.3516	71.1428	34.9098	27.0523	41.0084	152.227	85.5009	51.6842	88.9358	35.9732
31.7264	68.0916	61.0486	30.5045	28.8692	28.1073	53.7721	72.7291	47.9842	46.1828	32.9452	151.067	84.7053	55.241	105.903	32.4829
29.2111	44.1528	55.1896	35.2123	12.3783	38.5025	48.1286	87.9823	36.8912	14.3484	44.8073	90.3943	78.1872	53.6785	79.033	34.6783
21.1735	59.7351	65.2535	29.04	23.3484	27.3659	52.7458	60.3484	26.7833	23.2032	39.7154	134.203	77.5067	41.709	83.6385	33.908
25.2384	54.3159	66.0557	33.2792	24.2334	27.1683	52.8004	70.8236	42.2008	18.3169	40.0423	123.55	80.627	43.4666	81.2168	34.7153

Note that annual rainfall accumulations are not equal to the summed monthly accumulations due to calculation methods.

Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11
108.171	55.4237	42.2507	180.153	123.566	170.16	177.188	155.129	76.722	174.518	171.623	115.766	117.801	251.026	100.993	89.4675
59.1522	53.9714	40.3322	145.65	88.2563	132.943	107.483	167.259	49.799	79.9312	128.036	94.5267	32.6758	113.523	96.9697	113.225
76.1502	38.7481	35.3462	159.568	82.1799	145.352	139.795	183.734	51.6757	126.171	190.439	95.0922	61.4818	163.538	101.192	104.784
20.7567	24.3801	42.4425	75.0044	65.4644	89.5744	72.845	139.937	44.2438	62.9822	95.1998	26.671	12.2831	57.2562	66.2489	78.1376
24.6899	18.4756	44.2229	58.7137	71.8679	86.582	62.7557	103.01	31.9904	52.3655	94.5198	11.2542	9.70068	50.5765	57.2355	54.2375
26.1473	19.9153	36.0456	96.6814	91.4282	111.857	95.2149	107.33	32.1038	74.8281	140.276	17.3589	15.5023	82.3862	69.1762	85.441
19.8785	26.9263	25.7302	125.444	70.5685	115.496	71.6651	69.4415	30.3399	49.5315	84.9978	15.8449	17.1283	52.334	51.7651	69.8561
35.6464	31.3934	38.1543	181.035	86.4797	175.828	114.269	163.677	41.4722	138.738	182.416	61.6012	53.059	141.11	81.4293	100.027
35.4072	50.7414	46.5432	131.028	85.9506	123.815	99.3772	107.05	46.0438	113.973	108.849	24.0116	24.9974	88.0229	88.6385	77.6546
26.051	31.7758	45.9859	32.5213	98.8162	60.8309	65.8474	47.2317	27.5134	40.6548	52.1887	12.9642	4.76575	57.7146	49.0591	40.2181
26.6045	20.9002	42.4529	51.3857	88.7455	63.1837	67.624	62.5536	24.3211	42.3467	61.5341	9.78941	6.02286	51.0562	50.9841	44.3369
45.9089	52.9712	36.7539	146.526	128.097	149.645	119.773	145.929	48.4789	154.771	119.349	30.8749	26.1501	80.4449	117.406	94.8384
24.8471	43.1491	35.4201	38.0568	122.61	46.5473	56.1877	55.8469	26.1879	65.5727	55.2447	13.1766	5.27317	46.3439	59.6254	49.2413
21.3903	37.1837	33.8223	26.8113	135.975	45.3913	51.6055	43.2864	26.4409	50.3221	50.1376	6.8441	5.54282	40.4422	47.0221	42.6576
26.6653	30.6679	25.761	30.4907	105.262	54.4774	68.7693	67.4683	30.1256	97.8405	58.4988	14.7566	5.4494	37.8298	82.5783	54.4519
31.9203	25.4311	29.784	33.6957	92.1892	64.8072	74.4114	95.7512	45.5206	105.022	69.855	19.1339	5.66864	39.1448	84.9354	44.4805
33.93	41.7353	31.6224	88.3882	103.614	98.0177	88.711	131.751	43.9383	126.285	90.0241	28.4163	15.2272	39.4895	94.2518	63.2249
18.0337	37.5693	44.4112	26.4217	90.3535	48.9021	76.5452	79.6107	56.6775	98.5542	51.5334	17.0092	2.96692	11.3949	79.5136	42.7382
21.6967	20.3102	38.7579	19.4391	118.403	47.6403	107.516	100.081	51.8736	113.351	70.4006	18.6834	3.78569	22.6705	90.8632	58.9677
20.0801	31.1346	20.5479	13.6635	89.6915	46.7519	85.7011	48.6503	36.1791	88.3232	42.0747	12.1261	3.58258	18.3278	89.6674	54.7806
21.879	35.9966	25.3661	14.0096	94.4652	42.1755	73.8691	38.297	25.1155	80.5503	36.9895	9.6617	2.51835	26.68	83.8969	54.9941
18.2744	40.0567	16.6907	17.5059	108.9	44.207	78.1431	40.4599	27.1416	79.9251	45.9965	11.8989	5.83384	26.5989	90.768	45.7248
22.1609	52.9096	28.4512	14.6501	110.278	46.4143	78.491	39.6918	26.6122	84.1907	45.1843	10.8187	2.74396	24.3505	89.7341	51.9556
16.2481	21.0506	34.7739	33.8038	124.119	64.9072	57.3215	53.7907	23.9316	55.4293	42.966	6.45091	4.18865	18.5122	63.8723	52.4463
15.1652	36.183	24.2988	21.4273	99.0965	44.8829	64.9794	46.335	30.849	80.5207	38.6537	10.0063	3.39296	15.325	86.5282	51.093
14.3235	30.5686	26.0305	24.2247	121.984	49.4907	61.0637	43.9397	28.973	74.1193	42.5786	7.15946	4.74025	16.7063	71.7785	50.3032

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Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
166.95	244.057	254.583	221.976	358.132	253.507	161.252	83.4805	108.987	93.8802	90.8023	106.365	125.806	191.473	164.969	188.872	224.891
165.309	114.366	106.616	112.319	135.48	95.1582	39.0155	22.1232	147.102	66.9767	120.935	119.77	118.026	70.4437	121.61	79.2759	186.203
156.837	168.141	211.755	179.274	229.913	147.291	80.3517	48.5856	93.0671	80.2783	185.444	161.955	163.689	145.858	157.082	162.391	215.337
108.957	51.2111	73.7561	41.9334	87.4761	54.0915	27.8743	17.654	143.176	70.386	150.691	101.367	100.719	118.557	93.6691	127.464	145.978
68.2089	44.6441	67.4145	36.5157	103.947	73.8739	31.7864	30.0313	154.574	51.9969	147.878	106.49	89.8216	91.0976	83.1251	113.604	138.743
78.8325	60.2391	118.407	46.8226	184.581	117.026	53.6395	26.8393	143.683	64.0622	177.907	137.84	105.316	140.164	96.9387	104.31	189.09
85.0702	63.5318	75.4126	40.3323	142.036	70.5277	35.6485	22.4868	117	61.0607	140.027	111.901	86.0394	149.323	91.2379	90.5691	136.21
147.985	174.443	160.954	103.788	228.44	138.911	84.4007	34.4708	102.195	88.1813	220.763	155.515	162.834	207.057	163.368	178.959	224.721
69.4608	95.2198	92.3798	75.8012	178.283	107.552	52.7457	26.2325	158.932	64.669	195.106	127.727	123.707	136.99	121.209	144.657	221.414
36.7175	28.1708	40.5636	35.9492	65.9657	48.8446	23.2708	20.9098	119.464	45.9985	157.499	104.174	77.3161	83.6803	66.8632	108.602	120.743
49.928	28.5483	44.8944	35.2319	80.67	55.4492	23.3685	24.3924	136.901	44.2029	142.541	118.892	77.2217	76.3006	68.2372	97.6056	127.443
75.664	128.977	136.852	109.126	193.352	120.76	58.7894	30.7597	171.324	81.4339	216.765	131.469	171.211	101.121	155.966	194.225	286.026
56.0272	44.9106	42.2622	43.0777	84.9762	50.3732	22.7012	22.4046	128.471	49.9042	157.637	102.537	102.805	77.2895	94.5486	144.953	140.126
55.6538	30.9868	28.2484	31.6762	64.1091	41.5067	22.5476	21.746	129.195	52.1333	137.014	101.376	66.6713	50.5575	93.6759	105.295	110.814
87.1901	46.2621	39.8871	50.2801	88.9614	51.8886	21.0731	24.9417	142.076	42.6833	148.73	104.048	78.6481	57.7361	119.022	121.358	137.635
108.142	52.2664	50.0384	55.1713	94.5567	48.9307	19.9516	28.6021	159.507	41.4109	155.732	135.603	77.5163	73.4094	144.446	148.041	169.39
81.1994	84.5527	110.723	77.5011	163.031	97.7817	38.6882	27.7598	180.395	46.4731	176.933	130.631	147.598	86.2194	161.358	185.099	250.228
59.5761	29.6624	32.8502	39.9585	101.671	47.0332	16.7363	31.7891	113.658	42.7339	107.83	92.3981	35.8159	75.1053	124.169	72.2857	135.906
71.4786	47.3853	40.1052	49.9874	111.346	52.3056	21.9266	26.3179	140.141	52.011	157.766	113.42	49.9593	83.3676	141.064	104.378	172.782
58.0241	28.5175	23.7851	40.1474	68.1821	41.2737	16.1303	18.2398	123.129	31.7882	128.058	100.089	41.288	51.4091	104.171	69.5568	115.686
74.1468	31.385	19.2147	30.2115	55.6651	42.4344	18.4049	16.4291	120.074	29.986	118.285	97.142	34.7517	43.8985	95.1223	67.5239	119.725
78.3483	33.6264	19.4011	32.9085	65.439	39.9907	21.2365	19.3463	120.743	29.5781	124.099	87.5325	37.1762	45.9999	94.5028	83.651	117.371
76.5914	38.1465	20.1432	30.826	62.4744	44.903	22.0809	21.1641	135.562	31.965	130.892	98.9597	33.4953	50.9753	98.3549	89.3621	150.73
53.9869	26.0008	27.697	28.6635	55.7602	39.4691	16.9782	37.8949	115.4	46.0291	98.2636	104.951	53.018	40.8991	83.0338	78.9603	97.3493
63.4958	25.4395	23.0685	32.6598	59.0687	43.7369	18.712	19.6005	112.477	39.0305	111.803	115.543	35.2843	47.3917	89.4133	68.7414	103.79
65.9507	27.7065	22.3419	31.1166	64.8346	45.3518	19.0598	26.0314	118.548	55.668	110.694	102.205	38.7218	40.0272	94.9016	78.7792	101.494

Days of rainfall >=10mm

Forecast area	2008	2009	2010	2011	2012	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08
Forecast Area 1	62	61	41	71	55	9.65517	7.08335	6.50227	2.33758	0.743325	3.35691	2.47557	4.17616	3.35258	9.71208	7.2464
Forecast Area 2	35	36	31	36	32	7.04238	2.23007	2.1943	2.29657	0.774475	2.13966	2.57714	4.41218	1.97008	4.07519	1.92415
Forecast Area 3	52	51	37	57	51	9.74953	3.5831	4.62766	1.67697	0.713047	3.07291	3.97531	6.17144	3.70686	8.10489	2.91406
Forecast Area 4	28	22	20	18	35	5.10396	0.783989	1.37944	2.42799	0.365431	2.28355	3.89466	3.4743	2.76175	2.3115	1.29354
Forecast Area 5	28	22	16	15	35	5.71257	0.931208	1.80002	1.53356	0.672078	1.94782	3.07116	3.27429	2.56184	2.55215	1.67072
Forecast Area 6	35	25	20	26	42	6.41897	1.49086	2.1815	1.68346	1.75463	1.84314	4.01301	3.90514	4.01348	4.18561	1.24248
Forecast Area 7	27	18	16	16	34	4.36639	0.787813	1.04294	1.59205	1.2796	1.70713	2.4481	3.01731	3.91524	4.65212	0.843456
Forecast Area 8	51	46	33	50	56	9.43839	2.87135	3.74076	1.58218	0.574858	3.64678	5.14653	5.77313	5.19263	7.17969	2.83697
Forecast Area 9	41	37	25	28	46	6.18226	2.31048	3.66681	2.10802	1.21225	2.13221	3.68271	4.14337	4.21727	5.6818	3.45239
Forecast Area 10	25	18	12	8	29	2.94657	0.500573	1.64614	1.07171	2.74961	0.528293	1.91094	2.65773	4.57823	2.31763	2.43122
Forecast Area 11	20	17	12	9	30	3.17874	0.333447	1.09276	0.853642	1.79894	1.08417	1.55777	2.44496	2.81593	2.16204	1.88987
Forecast Area 12	55	53	36	41	61	7.77691	3.16557	4.38849	1.72312	2.44723	2.87835	6.40745	8.18705	4.84452	6.5677	4.18523
Forecast Area 13	29	21	14	12	34	3.20481	0.788889	2.00433	0.998016	3.76768	1.20589	3.64378	2.6354	4.57402	1.62045	2.99591
Forecast Area 14	23	14	12	8	30	2.41969	0.154872	1.22071	0.972908	3.6442	1.873	2.73632	2.26706	3.0374	1.30093	2.24957
Forecast Area 15	27	24	14	16	33	4.20696	0.561888	2.39473	1.35114	3.06607	1.61001	3.44423	1.83931	2.64909	1.731	2.55652
Forecast Area 16	30	31	21	20	41	4.19651	1.34376	2.95011	1.41	3.42661	1.36125	3.35356	1.67802	2.96816	2.82576	2.48589
Forecast Area 17	42	43	28	28	49	4.75219	1.91465	3.64688	1.54729	4.05341	1.17065	6.11972	4.64447	3.88755	4.32544	2.819
Forecast Area 18	24	23	19	15	27	3.02658	0.288723	2.16695	1.15787	3.20054	0.841045	2.2224	1.01333	2.58874	2.20827	4.17901
Forecast Area 19	28	30	22	20	37	3.92114	0.410402	2.71261	1.28036	2.55149	1.1664	2.80464	1.57212	3.04387	2.44037	4.191
Forecast Area 20	20	22	13	11	22	1.88848	0.224408	2.51022	1.23769	3.02708	1.02413	2.57104	1.054	1.70776	1.16981	2.50472
Forecast Area 21	16	19	11	12	22	0.994325	0.00017494	1.89451	1.22677	3.52527	0.463757	1.47609	0.859204	1.59467	0.426836	2.40613
Forecast Area 22	17	20	12	12	23	1.46649	0.0187611	1.84752	1.28	3.15517	1.39117	2.48857	0.946839	1.07234	0.581634	2.12241
Forecast Area 23	17	19	12	13	24	1.3877	0.00511861	1.97999	1.1886	3.53046	0.491296	1.70273	1.03461	1.67818	1.01282	2.46555
Forecast Area 24	17	12	12	9	22	1.85634	0.0571159	1.63837	0.808509	2.265	1.44133	1.64799	2.08193	0.956161	1.77396	2.30185
Forecast Area 25	15	16	12	10	21	0.985251	0.0150233	1.355	0.914203	3.56183	0.309019	1.90514	1.4406	0.717722	0.619165	2.29059
Forecast Area 26	17	15	12	10	23	1.66531	0.0243338	1.92075	1.00344	3.2467	0.987756	1.96106	1.72318	1.0446	0.990303	2.1964

Mar-10	Feb-10	Jan-10	Dec-09	Nov-09	Oct-09	Sep-09	Aug-09	Jul-09	Jun-09	May-09	Apr-09	Mar-09	Feb-09	Jan-09	Dec-08
2.97517	2.40873	2.47008	2.86115	9.01137	5.93733	4.94396	7.2033	4.26991	2.19043	4.40714	3.04042	7.02667	3.2906	6.43594	5.37808
1.93901	2.53213	2.52446	2.39843	5.58208	4.34697	2.79098	3.60381	4.4988	2.0133	2.63153	1.17584	2.3058	1.58774	3.24364	3.14566
3.95466	1.82757	2.19426	3.48926	9.77456	3.82893	2.91795	7.84524	5.88229	1.7946	2.79395	2.03772	3.79502	0.802992	5.60029	3.85046
2.24127	1.34697	1.47729	1.73373	5.93218	1.63389	1.04734	1.45344	4.10372	1.45337	0.924023	0.936684	0.666363	1.27447	1.10456	2.02992
1.32845	1.38624	1.20897	1.38134	4.83451	1.79495	1.08489	1.47484	4.17945	1.63547	1.8887	0.619252	0.598828	1.22264	0.820346	1.78015
1.39334	1.74056	1.02809	1.28944	4.98337	2.22482	1.43588	0.664161	5.42881	1.92713	2.26356	0.910063	1.2355	0.351373	1.80156	2.36588
1.04418	0.423413	0.461528	0.987293	4.44341	2.24536	0.966046	0.300233	3.38445	1.24317	1.77298	0.894618	0.0742058	0.00559788	1.25499	1.19896
3.28146	1.14764	1.75974	3.47778	11.1887	3.88177	2.04095	4.81869	6.99647	1.97517	3.00298	1.355	2.20397	0.365356	4.49261	3.47922
1.9132	0.687733	1.73726	3.78643	9.36369	3.40511	1.56239	1.89268	5.21375	2.22784	2.2389	1.44133	1.55711	0.33204	4.27812	2.38654
0.0638915	0.156327	0.906244	1.327	2.20924	1.97052	0.767035	0.236313	3.08603	3.61959	1.39258	0.448311	0.873734	0.713234	1.29	1.25809
0.397545	0.36931	0.928241	1.18195	2.02216	1.701	0.962172	1.24171	3.3934	2.35913	1.34844	0.443969	0.509455	0.605365	0.988495	1.09467
4.21061	1.08407	3.1349	5.96586	11.2347	4.89679	1.50392	3.12232	9.20067	2.17549	2.71015	2.44962	1.59827	0.627816	7.59477	2.27617
0.958852	0.58765	1.4663	1.63453	4.72301	1.21012	0.750068	1.10441	3.80211	2.549	0.925597	0.940072	0.927512	1.36696	1.56506	1.73935
0.392274	0.92816	0.949565	1.45614	2.10683	0.781201	0.477273	1.38658	1.80175	1.9124	1.05038	0.518086	0.610267	1.35445	0.235864	1.28007
0.949622	2.0805	1.34688	3.39889	6.40783	1.66571	0.9462	1.27997	2.62301	1.15887	0.667084	0.498532	1.11603	1.73803	2.73653	1.92958
1.86412	1.91533	2.67938	4.77986	6.88588	3.46031	1.13424	1.31385	2.93751	1.34892	0.114731	0.657714	1.6169	2.61942	4.26118	1.9878
2.49839	2.08579	3.54452	3.41163	9.62541	3.66831	1.47094	1.26238	7.42629	1.35806	1.64147	2.71389	2.11524	2.56763	5.7603	2.72807
1.68083	3.86309	1.15871	3.35892	8.11872	1.91756	0.947024	0.313805	1.47494	0.877817	0.619171	0.486114	0.843151	1.14726	3.2447	0.75182
1.72923	4.04668	3.25063	4.36986	9.08635	1.95342	1.05278	0.828962	2.21669	0.83229	1.00199	0.921931	1.08863	1.66365	4.52776	1.8856
0.228338	3.39256	0.899068	2.9403	6.45015	0.997673	1.24096	0.984115	2.15469	1.18976	1.12846	0.182161	0.940157	1.41852	2.75055	1.37855
0.000377023	2.95714	0.609315	2.45203	5.03817	0.572082	1.47573	0.955934	1.16537	1.51194	0.960534	0.249494	0.924211	1.22042	2.05298	0.768132
0.0187065	2.39583	0.204653	3.03328	5.65892	0.417452	1.13406	1.27221	1.53567	1.67302	0.742553	0.305071	0.941034	1.21018	2.17773	1.11348
0.00879711	2.97159	0.86663	2.66959	5.51221	0.325173	1.6367	1.01042	1.27918	1.7569	0.985593	0.192102	0.985341	1.04774	2.0414	0.983308
0.288225	1.37673	0.658115	1.3605	1.87817	1.23349	0.505936	0.624267	1.77099	1.81752	1.14787	0.0904007	0.420139	1.27252	0.163247	0.497825
0.397689	2.44723	0.23277	2.25113	4.88737	0.729514	0.610187	0.584634	1.30293	1.63382	0.459142	0.203714	0.640264	1.15198	1.4069	0.398598
0.200453	1.78815	0.165879	1.96921	4.23228	0.500218	0.544424	0.863496	1.56187	1.72685	0.535431	0.281022	0.606164	1.31444	0.795059	0.702231

For days of rainfall >=10mm, annual values are calculated by summing the monthly values. This means that, in contrast with rainfall accumulations, the annual values ARE equal to the summed monthly values.

Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11
2.95075	1.24587	0.975474	5.33322	3.75308	5.92306	5.93991	4.8337	2.1131	5.44826	5.51082	3.20149	3.27134	7.78608	2.90183	2.8141
1.17544	1.22204	1.22144	4.40342	2.20364	4.10685	3.32099	5.3776	1.12411	1.69284	3.78663	3.21395	0.828532	2.96242	2.31239	3.64931
2.2749	0.585726	0.81593	5.61951	2.10462	4.86095	4.39998	6.46548	1.413	3.74046	6.6575	3.14011	1.81236	5.19606	2.46563	3.58414
0.160304	0.204416	1.02584	2.3372	1.70959	2.39932	2.01633	3.97754	0.733309	1.45057	2.10313	0.654092	0.323292	1.38808	1.45083	2.26174
0.189443	0.170201	1.18041	1.20776	1.78409	2.67493	2.03936	2.9507	0.19411	1.05849	2.51207	0.126136	0.183363	1.05223	1.35576	1.44098
0.162143	0.320462	0.651525	2.72513	2.23045	3.55817	3.09289	3.23699	0.191697	2.02357	4.46728	0.100817	0.21781	1.51178	1.86753	2.16348
0.0696426	0.0324255	0.269878	4.082	1.56089	4.21286	1.69738	1.7309	0.794318	0.591957	1.8127	0.0109632	0.202893	0.165641	1.12952	1.91336
0.819374	0.336569	1.05269	6.20369	2.36355	6.11163	3.6042	5.29917	1.00188	4.17167	5.75065	1.7518	1.68657	4.30786	2.01988	3.66208
0.682341	0.887463	1.67878	3.91166	2.23792	3.90746	3.25812	2.78278	1.12932	3.34785	2.97209	0.440466	0.607898	2.24598	2.56054	2.11681
0.370043	0.707012	1.62225	0.0845611	3.25572	1.21281	2.14222	0.751633	0.297558	0.307631	1.80235	0.0252333	0.0218548	1.62665	1.33217	0.392131
0.293572	0.187605	1.15433	0.790706	2.48262	1.43657	2.24381	1.45996	0.120989	0.327096	1.44037	0.038565	0.0611239	1.1225	1.08379	0.705349
1.23256	1.06673	1.24723	4.62814	3.35826	5.08819	4.294	5.17424	1.11175	5.90407	3.69098	0.723606	0.516743	2.30943	4.06334	3.37423
0.266877	1.00473	1.15975	0.659074	3.75499	1.07273	1.78417	1.28691	0.213989	1.55225	1.63213	0.0439818	0.0684197	1.30203	1.3972	0.921855
0.166722	1.01958	0.786367	0.273701	3.90959	1.10563	0.968108	0.620699	0.383596	0.704018	0.523541	0.0283954	0.0423791	1.27733	1.10411	0.725934
0.48711	0.639079	0.569179	0.377468	2.73199	1.38331	2.0957	1.38437	0.252271	4.2977	1.01957	0.089469	0.104802	1.25992	1.93456	1.19217
1.02248	0.284145	0.903746	0.468993	2.15312	2.26516	2.79844	3.33418	0.974809	4.55125	1.7126	0.113108	0.0469376	1.48314	2.36626	0.551301
0.441669	0.87512	0.993644	2.79883	3.04388	3.51486	2.77648	4.09336	1.01062	5.17885	2.07744	0.263507	0.19298	0.567722	2.64483	1.70667
0.210969	0.984965	1.1237	0.678262	2.72461	1.27863	2.49575	1.74081	1.38231	4.07642	1.03875	0.0424068	0.0501206	0.0800575	2.38366	0.787778
0.53502	0.175366	1.05288	0.116599	2.80337	1.60333	3.68147	2.32513	1.038	4.96175	1.86635	0.0996381	0.0479751	0.833046	2.84183	1.29655
0.190722	0.674239	0.11929	0.0846747	2.72514	1.57707	2.69104	0.412109	0.258204	3.95895	0.392685	0.0332727	0.0556769	0.221736	1.76807	1.1812
0	0.967325	0.369212	0.00402396	2.51916	1.75717	1.76833	0.000566745	0.000232339	3.03282	0.702474	8.43E-05	0	0.794756	1.45396	2.07549
0.104442	0.838561	0.111571	0.281147	3.33076	1.55102	2.47674	0.21203	0.212548	3.26572	0.726395	0.0208572	0.155603	0.607892	2.11355	1.02189
0.0039688	1.18325	0.275023	0.0326647	3.02594	1.90021	2.1068	0.0193489	0.00892878	3.01148	0.893324	0.000963402	0.00992845	0.835158	2.10937	1.36397
0.0398712	0.122289	0.7528	0.674621	4.32521	2.44479	0.871017	0.865924	0.0289238	1.20264	0.695816	0.0646385	0.018892	0.197831	1.54554	1.56728
0.0139622	1.0155	0.284573	0.505801	3.42824	1.34709	1.75357	0.379571	0.20179	2.5485	0.141991	0.0152328	0.0169813	0.211793	2.45798	0.969045
0.0194713	0.785324	0.317838	0.459607	3.94955	1.74357	1.14615	1.1545	0.343897	2.29846	0.218237	0.0235847	0.0342058	0.225794	1.72128	1.10108

Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
4.70957	7.56727	8.6177	6.77544	12.1726	8.99352	4.59329	2.3134	2.45779	2.30501	2.53077	2.99919	3.70374	5.90273	4.8892	6.26172	7.70956
4.62888	2.96929	2.77945	3.10987	3.70026	2.52108	0.802821	0.456085	4.25377	1.51298	3.21815	3.65365	3.60572	1.77558	3.03968	2.19714	5.33442
4.66366	5.6492	6.48886	5.88268	7.36138	4.35943	2.33487	1.39765	2.12676	2.59536	6.7155	5.38201	5.22342	4.32085	4.8559	4.70236	6.51158
3.29455	1.06149	1.89059	0.627133	1.72065	0.915281	0.537409	0.419558	4.79393	2.17041	5.37815	2.99542	3.21003	3.25736	2.70831	3.74702	4.62233
1.74295	0.849642	1.8119	0.489075	2.85171	1.60752	0.615267	1.08415	5.34579	1.43896	5.94534	3.11021	2.70637	2.7996	1.88589	3.38532	4.81081
1.50602	1.54638	3.94171	0.507477	6.51092	3.78306	1.02531	0.210048	4.17028	1.97237	6.70648	4.34945	3.29253	4.02572	1.93281	3.52117	6.91089
2.17211	1.36173	1.57975	0.297157	4.27138	1.31304	0.560267	0.245131	3.25097	2.45704	5.47239	3.6258	1.74937	4.18274	2.54604	3.29744	5.11252
4.27608	5.67689	5.26228	3.34167	7.62011	4.12429	2.36993	0.671701	3.24865	2.64021	6.90833	4.83781	5.56918	6.41666	5.9774	5.97593	7.62366
1.42831	2.81029	2.2497	1.86701	5.66584	3.1114	1.43504	0.524433	5.55825	1.83763	6.6125	3.56102	3.66296	3.86323	3.55331	4.32672	7.45478
0.964199	0.0730123	0.13268	0.0923771	0.869392	0.465393	0.355351	0.129396	3.86732	0.980478	5.92026	3.26967	1.84955	2.756	1.11802	4.29177	4.47896
1.39804	0.0709531	0.433712	0.440511	1.64715	0.893883	0.358503	0.446654	4.36057	1.02811	5.71511	3.6475	2.22815	2.43139	1.40282	3.48343	3.81648
1.93945	4.264	4.90836	3.5816	6.22073	3.76283	2.13005	0.733209	6.72311	2.22999	8.12949	4.97722	6.04891	2.8879	6.13745	6.6032	10.1401
1.59117	0.92477	0.598874	0.451637	1.57028	0.680394	0.30505	0.153241	4.35217	1.70928	6.12891	2.80559	3.27762	1.81544	3.42665	4.36422	4.68671
1.44204	0.364744	0.0635128	0.683761	0.753997	0.111732	0.606025	0.613301	3.82647	1.3839	6.18562	2.60569	1.90013	1.65106	3.73694	4.25577	3.34587
2.38323	0.763971	0.727784	0.869934	1.70324	0.884006	0.451306	0.806795	5.03426	0.762444	5.67386	3.29233	2.03291	1.409	4.17964	4.38935	3.95031
3.02707	1.04036	1.47786	1.45217	1.98289	0.985652	0.624124	1.15797	6.5999	0.945353	5.79072	4.86443	2.23895	1.93825	5.56338	5.49922	4.53764
2.57039	2.36347	3.71246	1.96743	4.87149	2.98746	1.14561	0.720113	6.79644	0.942948	6.71951	3.42059	5.04572	1.69539	5.80254	5.27917	8.10252
2.15411	0.329242	0.466425	0.978746	2.88878	1.51381	0.518471	1.01837	3.41835	0.99348	3.61259	2.51011	0.477101	2.72526	4.00709	1.97827	4.49922
2.71361	0.835937	0.734702	1.20779	2.95788	2.05929	0.932018	0.704477	5.2182	1.32127	5.08901	4.37052	0.750385	2.92889	4.97138	3.86076	5.06748
0.997824	0.309373	0.064506	1.01116	1.4236	1.26887	0.219153	0.228234	3.38997	0.383412	4.60613	2.35722	0.593836	1.31426	2.55126	2.16425	3.05393
1.8508	0.212972	0	0.909056	0.74861	0.961717	0.649556	0	3.30808	0.0494107	5.04113	1.83233	0.518735	1.31613	1.99048	2.23349	3.79992
1.84122	0.391503	0.0318597	0.996078	1.08985	0.432144	0.862825	0.307067	3.83647	0.0622124	4.6884	1.65337	0.493048	1.0564	2.99748	3.17718	3.27397
1.99377	0.561169	0	0.968441	0.968072	0.527132	0.619809	0.0338451	3.40927	0.041388	5.32659	1.97873	0.279206	1.37059	2.42882	3.07299	5.34236
1.56715	0.362778	0.634376	0.964218	0.365042	0.254805	0.431943	1.52499	3.51675	0.675859	3.14282	2.92475	1.28696	1.29287	2.03173	2.23993	2.42742
1.40916	0.209995	0.0861543	0.918529	0.840084	0.931718	0.761575	0.180154	3.01139	0.528565	3.97179	2.94572	0.560776	1.19009	2.49669	2.12275	2.5559
1.63103	0.44473	0.200608	0.973253	0.773629	0.749513	0.669359	0.964008	3.42708	1.10922	4.25834	2.84153	0.634328	1.06425	2.87807	2.7662	2.11743

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