## Met Office

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 $B T /$ 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 10 mm 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 10 mm 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 10 mm " (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 $2008+\ldots$.

## 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 $_{\text {May2009 }}=\frac{\left.\text { Rainfall }_{\text {May2009 }}-\text { RainfallLTA }_{\text {May }}\right) \times 100}{\text { RainfallLTA }_{\text {May }}}$
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 may2009 $=$ DR10 $_{\text {May2009 }}-$ DR10LTA $_{\text {May }}$
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.

Main UK regions


London regions


## 2008 rainfall

All values in mm


2011 rainfall
All values in mm .


## 2009 rainfall

All values in mm , ${ }^{\frac{?}{}}$


## Days of rain over 10mm maps



## Rainfall anomaly comparison graphs



Forecast region 2
LTA period $=1971-2000$


Forecast region 4


Forecast region 6
LTA period = 1971-2000


Forecast region 7
LTA period $=1971-2000$


Forecast region 9
LTA period = 1971-2000


Forecast region 8
LTA period $=1971-2000$


Forecast region 10
LTA period = 1971-2000


Forecast region 11
LTA period $=1971-2000$


Forecast region 13
LTA period = 1971-2000


Forecast region 15
LTA period = 1971-2000


Forecast region 17
LTA period $=1971-2000$


Forecast region 12
LTA period = 1971-2000


Forecast region 14
LTA period = 1971-2000


Forecast region 16
LTA period $=1971-2000$


Forecast region 18
LTA period $=1971-2000$


Forecast region 19
LTA period = 1971-2000


Forecast region 21
LTA period = 1971-2000


Forecast region 23
LTA period $=1971-2000$


Forecast region 25
LTA period $=1971-2000$


Forecast region 20
LTA period $=1971-2000$


Forecast region 22
LTA period $=1971-2000$


Forecast region 24
LTA period = 1971-2000


Forecast region 26
LTA period $=1971-2000$


## 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 8 mm 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


70 mm of rain falling in a 16 hour period. The June average for this area is typically around 60 mm . 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 11 th was also a very cold day for June with daily maximum temperatures only around $11^{\circ} \mathrm{C}$ 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 70 mm 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 21 st to 0900 BST 23rd approached or in some places exceeded 100 mm .

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 $28.4^{\circ} \mathrm{C}$ at St James's Park, Central London and $28.6{ }^{\circ} \mathrm{C}$ 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 30 mm in one hour - while other nearby stations remained largely dry.
Highest 12-hour 09-21 totals were 46.2 mm at Levens Hall, Cumbria and 35.8 mm 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 25 mm fell within a space of around 30 minutes. At Cranwell, Lincolnshire, around 30 mm 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 50 mm 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 EnvironmentAgency 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 40 mm 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 53.8 mm at Dunkeswell, Devon, 45.2 mm at Isle of Portland, Dorset and 43.6 mm 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 100 mm , 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 30 mm within an hour, whereas other locations remained dry. Hailstones were also reported in a number of locations.
A Met Office gauge at Bradford recorded 34.4 mm 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 30 mm , 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 23 rd . 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 1 st to 22 nd. 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 60 mm - in places over 70 mm - 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 70 mm across parts of the North Pennines (including 97.8 mm at Ravensworth (North Yorkshire)) orographic enhancement would have had a significant effect. Totals were also widely over 50 mm across Northern Ireland with 87.2 mm at Killylane.
Daily rainfall totals 0900-0900 BST Tuesday 25th September (i.e. 24 hours to 0900 BST 26th) showing yet another 20 to 30 mm 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 80 mm with some locations approaching 100 mm - in many locations this was well over the average rainfall for the whole of September - and in places, over 150\%.
Ravensworth, North Yorkshire, recorded 130.8 mm , 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 ( 72 mph ) 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 $10^{\circ} \mathrm{C}$ across much of the Pennines and central Wales, while on 24th, daily maximum temperatures again remained below $10^{\circ} \mathrm{C}$ across southern Scotland, Northern Ireland, and parts of the Pennines and Wales (you would normally expect around 13 to $15^{\circ} \mathrm{C}$ 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 50 mm 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 20 mm of rainfall, while parts of North Wales and Cumbria recorded around 40 mm . 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 ( 86 mph ) 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 45 mm 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 50 mm 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 50 mm 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 75 mm , a large swathe from southwest England through the Midlands and Wales to northern England over 100 mm , and a few locations over 150 mm . 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 50 mm 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, 64 mm fell in 33 hours to 1000 GMT on 21 st , and another 48 mm 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 50 mm 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 21 st 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 983 mm annual total fell between January and March 2012 - with 927 mm 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
Clean up after 'perfect storm' batters 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 >=10mm


## 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 | 1.401 | 90.8118 | 70.4512 | 1.328 | 60.7298 | 50.4754 | 63.9039 | 175.041 | 89.6278 | 7.0006 | 0.6109 | 2.4209 |
| 62.9616 | 58.8457 | 16.9058 | 30.8181 | 40.6628 | 7.560 | 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 | 3.4846 |
| 80.9513 | 122.68 | 28.0208 | 54.8793 | 63.0237 | . 0518 | . 8987 | 168.088 | . 4235 | 45.2702 | 99.3663 | 267.505 | 121.446 | 83.8171 | 52.373 | 8.8487 |
| 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 |


| 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 |


| 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 |


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

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 | $8.43 \mathrm{E}-05$ | 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 | . 77945 | 3.10987 | 3.70026 | 2.52108 | 0.802821 | 0.456085 | 4.25377 | 1.51298 | 3.21815 | 3.6536 | 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 | . 60752 | 0.615267 | 1.08415 | 5.34579 | 1.43896 | 5.94534 | 3.1102 | 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 | . 1252 |
| 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 | 6.7231 | 2.2299 | 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 | 2.8055 | 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 | 2.6056 | 1.90013 | 1.65106 | 3.73694 | 4.25577 | 3.34587 |
| 2.38323 | 0.763971 | 0.72778 | 0.869934 | 1.70324 | 0.884006 | 0.451306 | 0.806795 | 5.03426 | 0.762444 | 5.67386 | 3.2923 | 2.03291 | 1.409 | 4.17964 | 4.38935 | 3.95031 |
| 3.02707 | 1.04036 | 1.47786 | 1.45217 | 1.98289 | 0.985652 | 0.624124 | 1.1579 | 6.599 | 0.945353 | 5.79072 | 4.8644 | 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 | 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 | 4.9922 |
| 2.71361 | 0.835937 | 0.734702 | 1.2077 | 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 | 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 |

